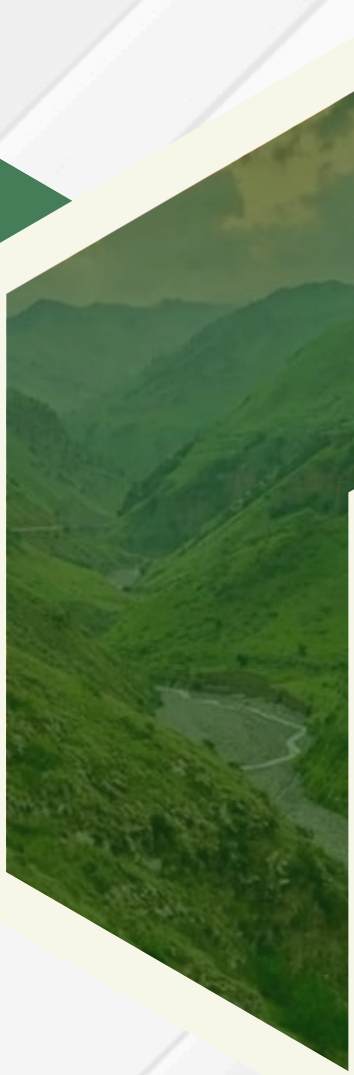
DELIVERABLE - 04
DRAFT LANDUSE PLAN
REVISION-2



2025-45

PROVINCIAL LANDUSE PLAN OF KHYBER PAKHTUNKHWA

DISTRICT KURRAM

Contents

1 PROLOUGE....1-1

1.1 Introduction....1-1

1.1.1 Background....1-1

1.1.2 Objective....1-2

1.1.3 Land Use Planning Process....1-2

1.1.4 Project Methodology....1-4

1.1.5 Project Area....1-5

1.2 Vision Development....1-7

1.2.1 SWOT Analysis....1-13

1.2.2 Key Finding....1-13

1.2.3 Vision Statement of District Kurram....1-14

1.2.3.1 Vision Statement Resulting from Consultations with The General Public in Neighborhood and Village Councils....1-14

1.2.3.2 Vision Statement Developed Through Consultations with Civil Society Organizations 14

1.2.3.3 Vision Statement Developed by Group-A During the Consultative Workshop....1-14

1.2.3.4 Vision Statement by Group-B During the Consultative Workshop....1-14

1.2.3.5 Vision Statement of Group-C During the Consultative Workshop....1-15

1.2.3.6 Vision Statement of Group-D During the Consultative Workshop....1-15

1.2.3.7 Vision 2045 for Kurram District:....1-15

1.3 Physical Characteristic of the District....1-15

1.3.1 Hydrology and Water Resources....1-18

1.3.1.1 Surface Water....1-18

1.3.1.1.1 Kurram River....1-20

1.3.1.1.2 Khurmana River....1-22

1.3.2 Climate of Project Area....1-22

1.3.2.1 Precipitation....1-22

1.3.2.2 Temperature....1-26

1.3.2.3 Relative Humidity....1-27

1.3.2.4 Wind Speed....1-28

1.3.3 Elevation....1-30

1.3.4 Seismic Condition....1-33

1.4 Soil and Land use Properties of Project District....1-35

1.4.1 Land Cover of Project District....1-37

1.5 Socio Economic Profile 1-39
1.5.1 Historical Growth Trend in District Kurram 1-39
1.5.2 Population Growth of District Kurram 1-39
1.5.3 Tehsil Level Analysis 1-40
1.5.4 Population Distribution 1-40
1.5.4.1 Age and Sex-Wise Population Distribution 1-41
1.5.5 Population Density 1-42
1.5.6 In Migration 1-43
1.5.7 Out Migration 1-45
1.5.8 Population Projection of 20 Year 1-47
1.5.9 Household Size 1-51
1.5.10 Literacy Analysis of Kurram District 1-51
1.5.11 Education Attainment 1-53
1.5.11.1 Education Attainment (LFS 2021-22) 1-53
1.5.11.2 Education Attainment (2023 Census) 1-55
1.5.11.3 Education Attainment (HIS Survey) 1-57
1.5.11.4 Comparative Analysis of Educational Attainment (HIS, Census 2023 & LFS 2021-22) 58
1.5.12 Employment 1-59
1.5.12.1 Employment as Per Labor Force Survey 2021-22 1-59
1.5.12.2 Employment as Per Census 2023 1-61
1.5.12.3 Employment as Per HIS Survey 1-62
1.5.12.4 Comparative Analysis of Employment (HIS, Census 2023 and LFS) 1-63
1.6 Urbanization and Hierarchy of Human Settlement 1-64
1.6.1 Urbanization 1-64
1.6.2 Urbanization in District Kurram 1-64
1.6.3 Urbanization Trend in Historical Perspective 1-64
1.6.4 Urban Growth Trend 1-65
1.6.4.1 Parachinar Urban Area 1-66
1.6.4.2 Sadda Proposed Urban Area 1-72
1.6.4.3 Dogar Proposed Urban Area 1-78
1.6.5 Human Settlement 1-84
1.6.5.1 Settlement Wise Demography Analysis 1-84
1.6.5.1.1 District Level Overview 1-84
1.6.5.1.2 Tehsil Level 1- 84

1.6.5.1.3 Section Level 1-85
1.6.5.1.4 Settlement Level 1-85
1.6.5.2 Population Growth Trend and Implication 1-86
1.6.6 Hierarchy of Human Settlement 1-98
1.6.6.1 Population-Based Classification: 1-98
1.6.6.2 Housing Stock-Based Classification: 1-98
1.6.6.3 Combined Population and Housing Stock Classification: 1-98
1.6.6.4 Central Place Theory (CPT): 1-98
1.6.6.5 Fuzzy Analytic Hierarchy Process (FAHP): 1-98
1.6.6.6 Composite Characteristic Approach: 1-98
1.6.6.7 Density-Based Classification: 1-98
1.6.7 Defining Characteristics and Scores 1-99
1.6.8 Hierarchy of Human Settlement District Kurram 1-99
1.6.9 Declaration of Human Settlement 1-115
1.6.9.1 Defining Urban Centers 1-116
1.6.9.2 Importance of Urban Centers in Land Use Planning 1-116
1.6.9.3 Key Components of a 20-Year Land Use Plan 1-116
1.6.9.4 The Role of Technology in Shaping Urban Centers 1-116
1.6.10 Settlements to be Urbanized up to 2045 1-117
1.6.10.1 Currently Declared Urban Centers 1-117
1.6.10.1.1 Parachinar Urban Center 1-117
1.6.10.1.2 Sadda Urban Area 1-119
1.6.10.2 Proposed Urban Centers 11-21
1.6.10.2.1 Dogar Proposed Urban Area 1-121
1.6.10.2.2 Ali Zai Proposed Urban Area 1-123
2 Existing Land Use Distribution 2-1
2.1 LANDUSE DISTRIBUTION IN THE DISTRICT 2-1
2.2 TEHSIL WISE LAND USE DISTRIBUTION 2-1
2.2.1 Tehsil Upper Kurram Land Use Distribution 2-1
2.2.2 Tehsil Central Kurram Land Use Distribution 2-4
2.2.3 Tehsil Lower Kurram Land Use Distribution 2-6
2.3 LANDUSE DISTRIBUTON IN URBAN CENTER 2-9
2.3.1 Existing Land use Distribution of Parachinar Urban Center 2-9
2.3.2 Existing Land use Distribution of Sadda Urban Center 2-12
2.3.3 Existing Land use Distribution of Dogar Urban Center 2-15

2.3.4 Existing Land use Distribution of Ali Zai Urban Center 2-18
3 Sectoral Studies 3-1
3.1 Housing 3-1
3.1.1 Current Housing Stock by Type 3-1
3.1.1.1 Housing Stock Projection of District Kurram (2025) 3-2
3.1.1.2 Distribution of Housing Types in 2025 3-2
3.1.2 Housing Stock Verification and Shortfall in 2025 3-2
3.1.2.1 Average Household Size 3-3
3.1.2.2 Ownership Pattern 3-3
3.1.2.3 Housing Current Backlog 3-4
3.1.2.4 Plan Period Requirement 3-4
3.1.2.5 Housing Affordability and Adequacy Relative to Income Level 3-5
3.1.3 Constraints and Recommendations for Housing in Kurram District 3-7
3.1.3.1 Constraints 3-7
3.1.3.2 Recommendations 3-7
3.2 Communication 3-10
3.2.1 Major Road Network of Kurram 3-10
3.2.2 Road Inventory 3-13
3.2.3 Public transport in Kurram District 3-15
3.2.4 Railways 3-15
3.2.5 Airport 3-15
3.2.6 TRAFFIC AND TRANSPORTATION SURVEYS 3-15
3.2.6.1 Traffic volume on major transport corridors 3-15
3.2.6.2 Future Traffic Growth Estimates 3-21
3.2.6.3 Traffic Forecast 3-22
3.2.6.4 Existing and Future Capacity Analysis 3-23
3.2.7 ORIGIN-DESTINATION SURVEY AT CORDON POINTS 3-24
3.2.8 Annual Development Programme Projects in Kurram 3-28
3.2.9 National Highway Authority Projects in Kurram 3-29
3.2.10 Telecommunication, Postal Services & Telegraphs 3-29
3.2.10.1 Telecommunication Services 3-29
3.2.10.2 Postal Services 3-30
3.2.10.3 Money Orders and Financial Services: 3-30
3.2.10.4 Telegraph Services: 3-30
3.2.11 Major transport elements requiring upgradation in Kurram: 3-30

3.2.12 Proposed Bus Terminals 3-32
3.2.13 Communication Network Proposals 3-35
3.2.13.1 Summary 3-35
3.2.13.2 Major Transport Elements Requiring Upgradation in Kurram: 3-35
3.2.13.2.1 Road's Proposals: 3-35
3.3 Social Infrastructure 3-41
3.3.1 Education 3-41
3.3.1.1 Schools 3-41
3.3.1.2 Literacy Ratio 3-42
3.3.1.2.1 Literacy Ratio from Population Census-2023 for Kurram 3-42
3.3.1.2.2 Literacy Ratio from Household Information Survey 3-43
3.3.1.3 Existing Educational Institutes 3-44
3.3.1.4 Summary of Findings 3-45
3.3.1.4.1 Government Primary Schools 3-45
3.3.1.4.2 Degree Colleges in District Kurram 3-45
3.3.1.4.3 Private Schools in District Kurram 3-48
3.3.1.5 Gross and Net Enrollment Rates 3-51
3.3.1.5.1 Gross Enrollment Ratios (GER) at the Primary Level 3-51
3.3.1.5.1.1 Observations: 3-52
3.3.1.5.1.2 Gross Enrolment Ratios (GER) at the Secondary Level 3-52
3.3.1.5.1.3 Observations: 3-52
3.3.1.6 Gender Parity Index (GPI) 3-52
3.3.1.6.1 Observations: 3-52
3.3.1.6.2 NET Enrolment Ratios (NET) 3-52
3.3.1.7 Dropout Rate, Promotion Rate, and Repetition Rate 3-53
3.3.1.7.1 Student Flow Analysis in Kurram at Primary Level (Boys): 3-53
3.3.1.7.2 Key Observations: 3-54
3.3.1.7.3 Key Observations: 3-54
3.3.1.7.4 Key Observations: 3-55
3.3.1.7.5 Key Observations: 3-56
3.3.1.7.6 Student Flow Analysis in Kurram at Secondary Level (Girls) 3-56
3.3.1.7.7 Key Observations: 3-56
3.3.1.8 Teacher-Student Ratio 3-57
3.3.1.9 Education Facilities Satisfaction Tehsil-Wise Analysis (HIS Kurram) 3-57
3.3.1.10 Planning Standards for Establishing New Educational Institutions 3-60

3.3.1.11 Need for New Education facilities in District Kurram 3-63
3.3.1.11.1 Methodology and Analytical Approach 3-63
3.3.1.11.2 Tehsil-Wise Analysis & Requirements 3-65
3.3.1.11.3 Proposed Urban Areas Analysis & Requirements 3-66
3.3.1.11.4 Area Required for Educational institutes 3-67
3.3.1.11.4.1 Tehsil Wise Area Requirements 3-67
3.3.1.11.4.2 Urban Areas Requirements 3-68
3.3.1.11.5 District-Level Synthesis 3-69
3.3.1.11.6 Planning Implications and Recommendations 3-69
3.3.1.11.7 Conclusion 3-70
3.3.1.12 Constraints 3-70
3.3.1.13 Recommendation 3-70
3.3.2 Health 3-73
3.3.2.1 Existing Health Facilities 3-73
3.3.2.2 Government Health Facilities 3-73
3.3.2.2.1 Community Satisfaction Survey 3-75
3.3.2.2.2 Reason for Dissatisfaction 3-75
3.3.2.3 Planning Standards for Establishing New Health Facilities 3-78
3.3.2.4 Need for New Health Facilities in District Kurram 3-79
3.3.2.4.1 Tehsil Wise Health Facilities Gap and Demand as per the NRM (National Reference manual) 3-79
3.3.2.4.2 Urban Area Wise Health Facilities Gap and Demand as per the NRM (National Reference manual) 3-80
3.3.2.5 Area Requirements for Health Facilities 3-81
3.3.2.5.1 Tehsil Wise Area Requirements 3-81
3.3.2.5.2 Urban Areas Requirements 3-83
3.3.2.6 Constraints and Challenges in Healthcare for District Kurram 3-85
3.3.2.7 Recommendations for Improvement 3-86
3.3.3 Recreation 3-88
3.3.3.1 Sports Facilities 3-88
3.3.3.2 Entertainment and Tourism 3-91
3.3.3.3 Recommendations 3-91
3.3.3.4 Historical and Cultural Heritage 3-92
3.3.3.5 Parks and Zoos in kurram 3-94
3.3.3.5.1 Parks 3-94

3.3.3.5.2 Zoos 3-95
3.3.3.6 Existing Recreational Facility Satisfaction Tehsil-Wise 3-96
3.3.3.6.1 Satisfaction Levels 3-96
3.3.3.6.2 Reasons for Dissatisfaction 3-97
3.3.3.7 Planning Standards for Establishing New Park and Playgrounds 3-98
3.3.3.8 Area Requirements and Proposal for Reactional Facilities 3-99
3.3.4 Security Facilities 3-103
3.3.4.1 Standards for Establishing New Security Facilities 3-103
3.3.5 Religious Facilities 3-106
3.3.6 Graveyards 3-108
3.3.6.1 Existing Graveyards 3-108
3.4 Agriculture 3-111
3.4.1 Agriculture Land Utilization 3-111
3.4.2 Production Profile 3-114
3.4.3 Type of Irrigation and Water Management Issues 3-114
3.4.4 Agriculture Employment 3-115
3.4.5 Constraints 3-116
3.4.6 Recommendations 3-117
3.4.7 Future Proposals for Agriculture Sector 3-118
3.4.7.1 Modernization of Farming Practices 3-118
3.4.7.2 Water Resource Management and Irrigation Development 3-119
3.4.7.3 Post-Harvest Management and Value Addition 3-119
3.4.7.4 Market Access and Agribusiness Development 3-120
3.4.7.5 Climate-Smart and Sustainable Agriculture 3-120
3.5 Livestock 3-122
3.5.1 Available Livestock 3-122
3.5.1.1 Assessment of Poultry and Fisheries 3-122
3.5.1.1.1 Fisheries 3-123
3.5.1.1.2 Poultry 3-124
3.5.2 Livestock Facilities 3-124
3.5.2.1 Veterinary Facilities 3-124
3.5.3 Economic Potential of Livestock 3-124
3.5.4 Plans existing/ ongoing and New Schemes 3-125
3.5.5 Constraints 3-125
3.5.6 Recommendations 3-126

3.5.7 Proposed Future Interventions Livestock 3-127
3.5.7.1 Animal Health and Veterinary Services 3-127
3.5.7.2 Breed Improvement and Genetic Upgradation 3-127
3.5.7.3 Breed Improvement and Genetic Upgradation 3-128
3.5.7.4 Fodder and Feed Development 3-128
3.5.7.5 Dairy Development 3-128
3.5.7.6 3-128
3.5.7.7 Livestock Market Development and Value Chains 3-128
3.5.8 Proposal: Sustainable Rangelands Development 3-129
3.5.8.1 Major Components: 3-130
3.5.8.1.1 Component 1: Participatory Rangeland Restoration 3-130
3.5.8.1.2 Component 2: Fodder Security and Improved Water Access 3-130
3.5.8.1.3 Component 3: Sustainable Grazing Management and Land Tenure 3-130
3.5.8.1.4 Component 4: Livestock Health, Nutrition and Value Chain Support 3-130
3.5.8.1.5 Component 5: Institutional Strengthening, Capacity Building & Knowledge Management 3-130
3.5.8.1.6 Component 6: Climate Adaptation & Disaster Risk Reduction 3-131
3.6 FUELS, MINERALS, AND ENERGY OF KURRAM DISTRICT 3-132
3.6.1 Fuels and Minerals 3-132
3.6.1.1 Existing and Potential Fuel and Mineral Resources 3-132
3.6.1.1.1 Existing Resources: 3-132
3.6.1.1.2 Potential Resources: 3-132
3.6.1.2 Economic Impact Assessment 3-133
3.6.1.2.1 Positive Impacts: 3-133
3.6.1.2.2 Negative Impacts: 3-134
3.6.1.2.3 Recommendations: 3-134
3.6.2 Constraints and Recommendations 3-134
3.6.2.1 Constraints: 3-134
3.6.2.2 Recommendations: 3-135
3.6.3 Energy and Power Development 3-135
3.6.3.1 Identification of Energy Sources 3-135
3.6.3.1.1 Renewable: 3-135
3.6.3.1.2 Non-Renewable: 3-136
3.6.4 Constraints and Recommendations 3-137
3.6.4.1 Constraints: 3-137

3.6.4.2 Recommendations: 3-137
3.6.4.3 Kurram District: Challenges and Opportunities in Fuel, Mineral, and Energy Resource Development 3-137
3.6.5 Future Proposed Intervention....3-138
3.6.5.1 Institutional and Regulatory Strengthening 3-138
3.6.5.2 Technology Upgradation and Value Addition 3-138
3.6.5.3 Energy Sector Development....3-139
3.7 Industry 3-140
3.7.1 Categorization of Industrial Establishments 3-140
3.7.1.1 Categorization by Size 3-140
3.7.1.1.1 Light Industries....3-140
3.7.1.1.2 Medium Industries 3-140
3.7.1.1.3 Heavy Industries....3-140
3.7.1.2 Categorization by Type 3-142
3.7.2 Industrial Growth Pattern 3-142
3.7.3 Ownership Pattern 3-143
3.7.4 Industrial Employment....3-143
3.7.5 Raw Material Availability....3-144
3.7.5.1 Raw Material for Crush Plants 3-144
3.7.5.2 Raw Material for Flour Mill....3-144
3.7.6 Industrial Workforce....3-144
3.7.7 Employment Distribution by Sector....3-145
3.7.8 Workforce Distribution by Area 3-145
3.7.9 Formal and Informal Workforce 3-145
3.7.10 Future Proposed Interventions....3-145
3.7.10.1 Development of Industrial Infrastructure....3-146
3.7.10.2 Agro-Based and Mineral-Based Industries....3-146
3.7.10.3 Livestock and Dairy-Based Industries....3-147
3.7.10.4 Handicrafts and Cottage Industry Support 3-147
3.7.10.5 Skills Development and Industrial Workforce Training....3-147
3.7.10.6 Border Trade and Export Facilitation 3-148
3.7.11 Propose Future Demand....3-148
3.7.11.1 District Industrial Requirements 3-148
3.7.11.2 Urban Area Industrial Requirements 3-149
3.7.12 Constraints 3-152

3.7.13 Recommendations....3-152
3.8 ``Trade and Commerce....3-155
3.8.1 Distribution of Commerce and Trade Centers....3-155
3.8.2 International Commerce and Trade Center in Khyber Pakhtunkhwa....3-155
3.8.3 National Commerce and Trade Centers in Khyber Pakhtunkhwa....3-155
3.8.4 Regional Commerce and Trade Centers....3-156
3.8.5 Sub-Regional Commerce and Trade Center....3-156
3.8.5.1 Major Trade Sectors....3-156
3.8.6 Commercial Activities in District Kurram....3-158
3.8.6.1 Various Types of Markets....3-159
3.8.6.1.1 Central Marketplaces....3-159
3.8.6.1.2 Local Community Markets....3-159
3.8.6.2 Specialized Markets....3-160
3.8.6.3 Sunday Bazaar and Other Occasional Markets....3-160
3.8.6.4 Highway-Oriented Ribbons....3-160
3.8.7 Assessment of Existing Commercial Activities....3-160
3.8.7.1 Growth Pattern of Trade and Commerce....3-160
3.8.7.2 Border Trade Centers....3-163
3.8.7.3 Expansion of Commercial Areas....3-163
3.8.8 Proposed Future Demand....3-163
3.8.8.1 District Commercial Requirements....3-163
3.8.8.2 Urban Areas Commercial Demand....3-164
3.8.9 Future Proposed Interventions....3-165
3.8.10 Constraints....3-168
3.8.11 Recommendation....3-169
3.9 CHAPTER 15 Solid Waste Management....3-171
3.9.1 Solid Waste Management in Kurram District....3-171
3.9.1.1 Current and Projected Solid Waste Generation in Urban Settlement....3-171
3.9.1.2 Proposed Solid Waste Management Strategy for Rural Settlement....3-171
3.9.1.3 Current and Projected Solid Waste Generation in Urban Settlement....3-172
3.9.1.4 Proposed Solid Waste Management Strategy for Urban Centers....3-174
3.9.1.5 Proposed Waste Collection and Transportation System in Sadda....3-174
3.9.1.6 Proposed Waste Collection and Transportation System in Dogar....3-174
3.9.1.7 Proposed Waste Collection and Transportation System in Ali Zai....3-174
3.9.1.8 Proposed Waste Collection and Transportation System in Parachinar....3-175

3.9.2 Constraints 3-180
3.9.3 Recommendations 3-180
3.10 DRINKING WATER SUPPLY 3-182
3.10.1 Analysis and Background Studies 3-182
3.10.2 Drinking Water 3-182
3.10.2.1 Sources of Drinking Water Supply 3-182
3.10.3 Existing Coverage of Water Supply 3-184
3.10.3.1 Summary of Existing Water Supply System 3-184
3.10.3.2 Existing Water Supply System in Upper Kurram 3-185
3.10.3.3 Existing Water Supply System in Lower Kurram 3-192
3.10.3.4 Existing Water Supply System in Central Kurram 3-195
3.10.4 Quality and Quantity of Water 3-203
3.10.4.1 Water Demand/Quantity 3-203
3.10.4.2 Water Quality 3-204
3.10.4.3 Current and Future Water Demands 3-204
3.10.4.3.1 Water Demands 3-205
3.10.5 Proposed Water Supply system in Urban Centers 3-206
3.10.5.1 Proposed Water Supply System in Parachinar 3-207
3.10.5.2 Proposed Water Supply System in Sadda 3-207
3.10.5.3 Proposed Water Supply System in Dogar 3-207
3.10.5.4 Proposed Water Supply System in Ali Zai 3-207
3.10.6 Proposed Water Supply system in Rural Settlements 3-220
3.11 Sewerage and Storm water Drainage 3-221
3.11.1 Existing Situation of Sanitation and Drainage System 3-221
3.11.1.1 Sewage Flow 3-222
3.11.2 Proposed Sewerage and Wastewater Treatment Strategy 3-222
3.11.2.1 Proposed Sewerage Network in Urban Center 3-223
3.11.2.2 Ongoing Projects 3-228
3.12 Environment 3-229
3.12.1 Introduction 3-229
3.12.2 Environmental Objectives during Planning Stages 3-229
3.12.3 Environmental Baseline Analysis Outcome 3-229
3.12.4 Key Environmental Issues and Mitigation Strategies 3-229
3.12.4.1 Environmental Management and Sustainability 3-229
3.12.4.1.1 Water and Sanitation 3-230

3.12.4.2 Solid Waste Management 3-230
3.12.4.3 Forestry, Ecology, and Biodiversity 3-231
3.12.4.4 Air and Noise Pollution Control 3-231
3.12.4.5 Climate Resilience and Disaster Risk 3-231
3.12.4.6 Renewable Energy and Sustainable Infrastructure 3-232
3.13 Natural Hazard 3-233
3.13.1 General 3-233
3.13.2 Disaster Resilience 3-235
3.13.2.1 Safer Land-use Planning 3-235
3.13.2.2 Exposure 3-235
3.13.2.2.1 Disaster Preparedness and Response 3-235
3.13.2.3 Location and Accessibility 3-236
3.13.2.4 Geomorphological Characterization 3-236
3.13.2.4.1 General 3-236
3.13.2.5 Drainage 3-236
3.13.2.6 Geomorphological Characterization of District Kurram 3-237
3.13.2.7 Regional Geologic Scenario of District Kurram 3-238
3.13.2.7.1 Geological Formations 3-238
3.13.3 Disaster Profile of District Kurram 3-240
3.13.3.1 Earthquake Hazard 3-242
3.13.3.1.1 Preamble 3-242
3.13.3.1.2 Regional Geologic Faults 3-243
3.13.3.1.3 Earthquake Vulnerability 3-245
3.13.3.1.4 Earthquake Preparedness and Response 3-246
3.13.3.1.5 Historical Preview of Instrumental Seismic Data of District Kurram 3-247
3.13.3.1.6 Earthquake 2015 3-250
3.13.3.1.7 Earthquake Preparedness and Mitigation 3-251
3.13.3.2 Flood Hazard 3-252
3.13.3.2.1 Preamble 3-252
3.13.3.2.2 Surface Drainage System District Kurram 3-252
3.13.3.2.3 Flood Hazard Vulnerability 3-253
3.13.3.2.4 Riverine Flood Hazard Susceptibility Zones of District Kurram 3-253
3.13.3.2.5 Flood Hazard Management 3-254
3.13.3.3 Landslides 3-257
3.13.3.3.1 Preamble 3-257

3.13.3.3.2 Landslide Hazard Vulnerability 3-257
3.13.3.3.3 Landslide Susceptibility Zoning 3-258
3.13.3.3.4 Landslide Safety Guidelines 3-259
3.13.3.3.5 Conclusions 3-260
3.13.3.4 Hill Torrents 3-262
3.13.3.5 Loss of Cultivated and Arable Land 3-262
3.13.3.5.1 Mitigation and Prevention 3-262
3.13.3.6 Bank Collapse 3-263
3.14 District Economy 3-264
3.14.1 Overview 3-264
3.14.2 Poverty and Livelihood 3-264
3.14.3 Agriculture Sector 3-265
3.14.3.1 GDP 3-265
3.14.3.2 Land Utilization 3-265
3.14.3.2.1 Crop Production Profile 3-266
3.14.3.2.2 Challenges and Potential 3-267
3.14.3.2.3 Livestock Population and Opportunities for Growth 3-267
3.14.3.2.4 Livestock Infrastructure 3-268
3.14.3.2.5 Challenges and Potential 3-269
3.14.4 Industries 3-269
3.14.4.1 Type of Industries 3-269
3.14.4.2 Trade and Commerce 3-270
3.14.4.3 Mining 3-270
3.14.4.4 Tourism 3-270
3.14.4.5 Major Tourist Attraction in Kurram 3-270
3.14.4.6 Challenges and Potential 3-271
3.14.5 Key Economic Drivers 3-271
3.14.5.1 Primary Economic Drivers 3-271
3.14.5.1.1 Trade and Commerce and Industry 3-271
3.14.5.1.2 Agriculture 3-272
3.14.5.1.3 Livestock 3-272
3.14.5.1.4 Mining 3-272
3.14.5.2 Secondary Economic Drivers 3-272
3.14.5.2.1 Tourism 3-272
3.14.5.2.2 Construction 3-272

3.14.5.2.3 Manufacturing....3-272
3.14.6 Current and Projected Employment Generation....3-272
3.14.8 Employment....3-273
3.14.8.1 Future Employment Generation....3-275
3.14.8.2 Commerce, Trade and industry....3-275
3.14.8.3 Agriculture Sector....3-275
3.14.8.4 Services Sector....3-275
3.14.9 Constraints....3-275
3.14.10 Recommendation....3-276
3.14.11 Future Proposed Intervention....3-277
3.15 LAND MANAGEMENT SYSTEM....3-280
3.15.1 Land Management....3-280
3.15.2 Land Management in Khyber Pakhtunkhwa....3-280
3.15.2.1 Administrative Setup....3-280
3.15.2.2 Legislative Framework....3-280
3.15.2.3 Land Administration Processes....3-281
3.15.2.3.1 Types of Land Records....3-281
3.15.3 Challenges in the Land Management System....3-281
3.15.3.1 Institutional Issues....3-281
3.15.3.2 Technical Issues....3-281
3.15.4 Kurram Land Management....3-281
3.15.4.1 Land Ownership....3-282
3.15.4.2 Land Transfer....3-282
3.15.4.3 Land Entitlement....3-282
3.15.4.4 Government Land Entitlement....3-282
3.15.4.5 Compensation Mechanisms....3-282
3.15.5 Range Land Future Proposed Intervention....3-282
3.15.5.1 Rangeland Rehabilitation and Reseeding....3-282
3.15.5.2 Community-Based Rangeland Management Committees (CRMCs)....3-283
3.15.5.3 Silvo-Pastoral System Development....3-283
3.15.5.4 Community Fodder Banks and Drought Resilience Zones....3-283
3.15.5.5 Capacity Building and Awareness Programs....3-284
3.15.5.6 GIS-Based Rangeland Mapping and Monitoring....3-284
3.16 Potential Tourism Strategies....3-285
3.16.1 Vision Statement....3-285

3.16.2 Strategic Objectives 3-285
3.16.3 Potential Tourist Sites in Kurram 3-285
3.16.4 Tourism Clusters and Key Sites 3-288
3.16.5 Key Challenges 3-288
3.16.6 Policy Framework and Zoning Guidelines 3-288
3.16.6.1 Policy 1: Sustainable & Eco-Friendly Tourism 3-288
3.16.6.2 Policy 2: Infrastructure & Accessibility 3-288
3.16.6.3 Policy 3: Cultural Heritage & Community-Based Tourism 3-288
3.16.6.4 Policy 4: Investment and PPP Promotion 3-289
3.16.6.5 Policy 5: Environmental & Safety Safeguards 3-289
3.16.6.6 Policy 6: Tourism Marketing and Branding 3-289
3.16.7 6. Proposed Action Plan (2025–2045) 3-290
3.16.8 Expected Outcomes by 2045 3-290
3.16.9 Development Guidelines 3-291
4 Proposed Land Use Planning and Zoning 4-1
4.1 Proposed Zoning in Urban Area 4-1
4.1.1 Residential Zone 4-2
4.1.2 Commercial Zone 4-4
4.1.3 Industrial Zone 4-6
4.1.4 Institutional Zone 4-7
4.1.4.1 Educational Zone 4-7
4.1.4.2 Health Zone 4-8
4.1.4.3 Institutional Zone/Public Buildings 4-9
4.1.5 Recreational Zone 4-10
4.1.6 Forestation Zone 4-10
4.1.7 Agricultural Zone 4-11
4.2 Recommended Zoning for Urban Area 4-12
4.2.1 Parachinar Urban Center 4-13
4.2.2 Sadda Urban Center 4-18
4.2.3 Dogar Proposed Urban 4-22
4.2.3.1 Residential 4-22
4.2.3.2 4.2.2 Commercial 4-22
4.2.3.3 4.2.X.3 Institutional and Public Buildings 4-22
4.2.3.4 4.2.X.4 Industrial 4-22
4.2.3.5 Recreational and Open Space 4-22

4.2.3.6 Arterial Circulation and Transport Terminals 4-23
4.2.3.7 Other Uses 4-23
4.2.4 Ali Zai Proposed Urban 4-26
4.2.4.1 Residential 4-26
4.2.4.2 Commercial 4-26
4.2.4.3 Institutional and Public Facility 4-26
4.2.4.4 Industrial 4-26
4.2.4.5 Recreational and Open Space 4-26
4.2.4.6 Arterial Circulation and Transport Terminals 4-27
4.2.4.7 Other Uses 4-27
4.3 Comparative Review of Parachinar City Master Plan (2024–2042) and District Land Use Plan 4-30
4.3.1 Parachinar urban center 4-30
4.3.2 Master Plan Review 4-32
4.3.2.1 Residential 4-32
4.3.2.2 Commercial 4-32
4.3.2.3 Industry 4-33
4.3.2.4 Green Space/Recreational 4-33
4.3.2.5 Education: 4-33
4.3.2.6 Health 4-34
4.3.3 Executive Summary 4-36
4.4 District Land Use Zoning Plan 4-38
4.4.1 Agriculture Zone 4-42
4.4.2 Forest Zone 4-43
4.4.3 Range Zone 4-44
4.5 Tehsil Wise land Use Zoning 4-45
4.5.1 Tehsil Upper Kurram 4-45
4.5.2 Tehsil Central Kurram 4-49
4.5.3 Tehsil Lower Kurram 4-53
4.6 Rural Development Framework 4-57
4.6.1 Introduction and Planning Rationale 4-57
4.6.2 Rural Settlement Hierarchy and Functional Classification 4-57
4.6.2.1 Rural Growth Centers (RGCs) 4-57
4.6.2.2 Rural Service Villages (RSVs) 4-57
4.6.2.3 Villages and Hamlets 4-58

4.6.3 Rural Land-Use Zoning Framework 4-59
4.6.3.1 Agriculture Zone (AZ) 4-59
4.6.3.2 Forest Zone (FZ) 4-59
4.6.3.3 Range Zone (RZ) 4-60
4.6.4 Rural Housing Policy 4-60
4.6.5 Rural Development Design and Infrastructure Standards 4-60
4.6.5.1 Road and Street Network 4-60
4.6.5.2 Setbacks, Plot Coverage, and Built Form 4-60
4.6.5.3 Essential Rural Services 4-61
4.6.5.4 Community Facilities and Open Spaces 4-61
4.6.5.5 Development Control Regulations (DCR) – Rural Areas 4-61
4.6.6 Commercial Regularization and Roadside Services Control in Rural Areas 4-61
4.6.6.1 Policy Rationale 4-61
4.6.6.2 Settlement-Based Commercial Permissions 4-62
4.6.6.3 Regularization of Existing Commercial Uses 4-62
4.6.6.4 Petrol Pump (Fuel Station) Approval Standards 4-63
4.6.6.5 Roadside Tuck-shop and Small Commercial Control 4-64
4.6.6.6 Corridor-Based Commercial Management 4-64
4.6.6.7 Environmental and Infrastructure Compliance 4-64
4.6.7 Phased Wise Service Provision and Implementation Strategy 4-65
4.6.8 Layout Framework for Rural Development (Indicative Planning Structure) 4-65
4.6.8.1 District-Level Structure 4-65
4.6.8.2 Settlement-Level Layout (Growth Centers and Service Villages) 4-66
4.6.8.2.1 Population Thresholds and Service Triggers 4-66
4.6.8.2.2 Residential Density and Housing Typology 4-67
4.6.8.2.3 Infrastructure Coordination and Phasing 4-67
4.6.8.2.4 Environmental and Agricultural Safeguards 4-67
4.6.8.2.5 Implementation and Control Measures 4-67
4.6.8.3 Village and Hamlet Layout 4-67
4.6.9 Conceptual Rural Development Layout 4-68
4.6.10 Rural Livelihood Diversification and Local Economic Development 4-68
4.6.11 Gender, Social Inclusion, and Vulnerable Groups 4-68
4.6.12 Disaster Risk Reduction and Climate Resilience 4-68
4.6.13 Rural Mobility, Accessibility, and Connectivity 4-69
4.6.14 Governance, Community Participation, and Ex Tribal Context 4-69

4.6.15 Flexibility and Context-Sensitive Application 4-69
4.6.16 Monitoring, Review, and Performance Indicators 4-69
4.6.17 Integration with District and Sectoral Planning 4-70
4.7 Conclusion and Policy Recommendations 4-70
4.7.1 Summary of Key Findings 4-70
4.7.2 Policy Recommendations 4-71
4.7.3 Conclusion 4-71
4.8 Land Use Regulations and Guidelines 4-72
4.8.1 Residential Zone 4-74
4.8.2 Commercial Zone (CBD) 4-75
4.8.3 Industrial Zone 4-76
4.8.4 Agriculture Zone 4-77
4.8.5 Mining Zone 4-78
4.8.6 Forest Zone 4-79
4.8.7 Institutional Zone 4-80
4.8.8 Mixed Land Use Zone 4-81
4.8.9 Recreation Zone 4-82
4.9 Implementation and Regulatory Framework 4-83
4.9.1 Institutional Responsibility 4-83
4.9.2 Approval and Monitoring 4-83
4.9.3 Environmental and Safety Compliance 4-83
4.9.4 Zoning Amendments 4-83
4.9.5 Enforcement and Penalties 4-84
4.9.6 Policy Statement 4-84
5 LEGAL & INSTITUTIONAL FRAMEWORK 5-1
5.1 Legal Framework for Implementation of District Land Use Plans 5-1
5.1.1 Constitution and Functions of the Council 5-1
5.1.2 Provincial Land-Use and Building Control Authority 5-1
5.1.3 District Local Enforcement Unit 5-2
5.1.4 District Land-Use Planning and Management Committee 5-2
5.1.5 Planning Control Permissions 5-3
5.1.6 Land Use Permission 5-3
5.1.7 Development Permissions 5-3
5.1.8 Certificates and Renewal of Building Stock 5-4
5.1.9 Improvement of Urban Design 5-4

5.1.10 Enforcement and Penalties 5-4
5.1.11 Inspection 5-5
5.1.12 Inclusion of Technical Experts in District Planning framework 5-5
5.2 Institutional Gaps and Implementation Strategy 5-5
5.2.1 Institutional Gap Analysis and Actionable Mechanisms 5-5
5.2.2 Strengthened District Institutional Framework and Human Resource Structure (Proposed for District Kurram) 5-7
5.2.2.1 Establishment of District Technical Planning Sub-Committee 5-7
5.2.2.2 Strengthening of Local Planning and Enforcement Unit 5-8
5.2.2.3 Digital Monitoring and Data Systems 5-8
5.2.2.4 Institutional Coordination Mechanism 5-8
5.2.2.5 Organizational Hierarchy 5-9

List of Tables

Table 1-1: List of Participated Stakeholders 1-8
Table 1-2 SWOT Analysis 1-13
Table 1-3: Mean Monthly Rainfall in Parachinar 1-23
Table 1-4: Mean Monthly Temperatures in Parachinar 1-26
Table 1-5: Mean Monthly Relative Humidity in Parachinar 1-27
Table 1-6: Mean Wind Speed at Synoptic Hours in Parachinar 1-29
Table 1-7: Mean Wind Direction at Synoptic Hours in Parachinar 1-30
Table 1-8: Population Distribution by Administrative Unit (1951–2023) 1-39
Table 1-9: Population Growth Rates in District Kurram (1972–2023) 1-39
Table 1-10: Intercensal Population Statistics at Tehsil Level in District Kurram 1-40
Table 1-11: Tehsil Wise Population Density and Sex Ratio 1-41
Table 1-12 Kurram District Age and Sex Wise Population Distribution 1-42
Table 1-13: District Kurram District Wise in Migration from Labour Force Survey 2021-2022 1-44
Table 1-14: District Kurram Occupation Wise In-Migration from Labour Force Survey 2021-2022 1-45
Table 1-15 District Kurram District Wise Out-Migration from Labour Force Survey 2021-2022 1-46
Table 1-16 District Kurram Occupation Wise Out-Migration from Labour Force Survey 2021-2022 . 46
Table 1-17 Kurram District Population Projection for Plan Period (2025-2045), Using Geometric Growth Model 1-48
Table 1-18 Kurram District Population Projection for Plan Period (2025-2045), Using Exponential Growth Model 1-49
Table 1-19 Kurram District Population Projection for Plan Period (2025-2045), Using Linear Growth Model 1-50
Table 1-20 Kurram District Population Projection for Plan Period (2025-2045), Taking Average of the 3 Models 1-51
Table 1-21 Literacy Analysis of Kurram District by Age and Sex 1-52
Table 1-22 Educational Attainment as per Labour Force Survey 1-54
Table 1-23 Educational Attainment as per Census 2023 1-56
Table 1-24 Education of Respondents (HIS-Kurram) 1-58
Table 1-25 Occupation of District Kurram as per LFS 2021-2022 1-60
Table 1-26 Occupation of District Kurram from Census 2023 1-61
Table 1-27 Occupation of Respondent Tehsil-Wise from HIS 1-63
Table 1-28: Parachinar Urban Area Land Cover from 2003 to 2023 1-66
Table 1-29: Sadda Urban Area Land Cover from 2003 to 2023 1-72
Table 1-30: Dogar Proposed Urban Area Land Cover from 2003 to 2023 1-78
Table 1-31: Settlement Wise Population Projections 1-87
Table 1-32 Scoring for Population Size 1-99
Table 1-33 Hierarchy of Settlements 1-100
Table 2-1: Land use Distribution in District Kurram 2-1
Table 2-2 Tehsil Upper Kurram Land Use Stats 2-2
Table 2-3 Tehsil Central Kurram Land Use Stats 2-4
Table 2-4 Tehsil Lower Kurram Land Use Stats 2-7
Table 2-5: Landuse Distribution in Urban Center Parachinar 2-10
Table 2-6: Land use Distribution in Urban Center Sadda 2-13
Table 2-7: Land Use Distribution in Dogar Proposed Urban Boundary 2-16
Table 2-8: Land use Distribution in Urban Center Ali Zai 2-18

Table 3-1 District Kurram Previous Housing Stock 3-2
Table 3-2 Projected Housing Stock by Type (2025) 3-2
Table 3-3 House Ownership Tehsil-Wise Analysis 3-3
Table 3-4 Current Housing Backlog 3-4
Table 3-5 Housing Projection 3-5
Table 3-6: Physical Criteria for Affordable Housing (District Kurram) 3-6
Table 3-7: Availability of Basic Facilities (District Kurram) 3-6
Table 3-8: Road Inventory of Kurram 3-14
Table 3-9: Vehicles Per Day (VPD) at Selected Data Count Locations in Kurram 3-16
Table 3-10: Summary of Future Traffic Growth Estimate of Kurram 3-21
Table 3-11: Summary of Traffic forecast of Kurram 3-23
Table 3-12: Road Network Analysis of Kurram 3-23
Table 3-13: Future Road Network Analysis of Kurram 3-24
Table 3-14: Trips Count from each origin 3-25
Table 3-15: Trips Count from each destination 3-27
Table 3-16: Annual Development Program Projects in Kurram 3-29
Table 3-17: Literacy Ratio from Population Census-2023 for Kurram 3-43
Table 3-18 Kurram Literacy Ratio by Age and Sex Group from Population Census 2023 3-43
Table 3-19: Education of Respondents (HIS-Kurram) 3-44
Table 3-20 Government Schools in District Kurram 3-45
Table 3-21: Private Schools in District Kurram 3-49
Table 3-22 Gross Enrollment Ratios (GER) at the Primary Level 3-51
Table 3-23 Gross Enrolment Ratios (GER) at the Secondary Level 3-52
Table 3-24 GPI quantifies gender equality in education. 3-52
Table 3-25: Net Enrollment Ratios (NER) in Kurram (2023-24) 3-53
Table 3-26 Student Flow Analysis in Kurram at Primary Level (Boys) 3-53
Table 3-27 Student Flow Analysis in Kurram at Primary Level (Girls) 3-54
Table 3-28 Student Flow Analysis in Kurram at Secondary Level (Boys and Girls from class 6 - 9) 3-55
Table 3-29 Student Flow Analysis in Kurram at Secondary Level for Boys (Class 6 - 9) 3-56
Table 3-30 Student Flow Analysis in Kurram at Secondary Level for Girls (Class 6 - 9) 3-56
Table 3-31 Teacher-Student Ratio in Primary Schools 3-57
Table 3-32 Teacher-Student Ratio in Middle, High and Higher Secondary Schools 3-57
Table 3-33 Education Facilities Satisfaction HIS Kurram 3-57
Table 3-34 Reasons of Dissatisfaction- Tehsil-Wise 3-58
Table 3-35 Education Facility Affordability- Tehsil-Wise 3-59
Table 3-36 Suggestion to Improve Current Education System- Tehsil-Wise 3-59
Table 3-37 Location Guidelines for New Educational Institutes 3-60
Table 3-38 Planning Standards for Establishing New Education Institutes 3-62
Table 3-39 District Kurram Primary School Backlog & Requirement 3-65
Table 3-40 District Kurram Middle/Secondary School Backlog & Requirement 3-65
Table 3-41 District Kurram Urban Areas Primary School Backlog 3-66
Table 3-42 District Kurram Urban Areas Middle and Secondary Schools Backlog 3-66
Table 3-43 Tehsil Wise Educational Facilities Area Requirements 3-67
Table 3-44 Urban Centers Educational Facilities Area Requirements 3-69
Table 3-45 Existing Government Health Institutions and Bed Strength in Kurram 3-74
Table 3-46 District Wise Population per Government Hospital/Dispensary Bed in Kurram 3-74
Table 3-47 Healthcare Professionals in Kurram District 3-75

Table 3-48 Town/Tehsil wise Health Satisfactory Survey 3-75
Table 3-49 Reasons for Dissatisfaction of Health Facilities - Tehsil-Wise 3-76
Table 3-50 Planning Standards for Establishing New Health Facilities 3-78
Table 3-51 Tehsil Upper Kurram Health Facilities Backload and Requirements 2045 3-80
Table 3-52 Tehsil Lower Kurram Health Facilities Backload and Requirements 2045 3-80
Table 3-53 Tehsil Central Kurram Health Facilities Backload and Requirements 2045 3-80
Table 3-54 Parachinar Urban Canter Health Facilities Backload and Requirements 2045 3-81
Table 3-55 Sadda Urban Canter Health Facilities Backload and Requirements 2045 3-81
Table 3-56 Dogar Urban Canter Health Facilities Backload and Requirements 2045 3-81
Table 3-57 Ali Zai Urban Canter Health Facilities Backload and Requirements 2045 3-81
Table 3-58 Tehsil Wise Health Facilities Area Requirements 3-83
Table 3-59 Urban Centers Health Facilities Area Requirements 3-85
Table 3-60: Tehsil wise Recreation Satisfaction Level 3-97
Table 3-61:Tehsil wise Recreation Dissatisfaction Level 3-97
Table 3-62 Passive Recreation Facilities Allocation Criteria 3-98
Table 3-63 Parachinar Reactional Area Requirements and Proposals 3-99
Table 3-64 Sadda Reactional Area Requirements and Proposals 3-100
Table 3-65 Dogar Reactional Area Requirements and Proposals 3-100
Table 3-66 Ali Zai Reactional Area Requirements and Proposals 3-101
Table 3-67 Existing Religious Facilities 3-106
Table 3-68 Availability of Graveyard Facility 3-108
Table 3-69: Numbers of Graveyard Facility 3-109
Table 3-70: District Kurram Agriculture Land Utilization From 2020-21 till 2022-23 (In Hectares) 3-112
Table 3-71: District Kurram Agricultural Production Profile From 2020-21 till 2021-23 3-114
Table 3-72: District Kurram Irrigated Area by Different Types of Irrigation From 2020-21 till 2022-23 3-115
Table 3-73: District Kurram Livestock Population Comparison with Khyber Pakhtunkhwa 3-122
Table 3-74: District Kurram Fisheries Production Comparison with District Kohat and Khyber Pakhtunkhwa 3-123
Table 3-75 Existing Micro Hydle Power Units Kurram 3-135
Table 3-76:Installation of Solar Mini-Grids in Kurram 3-136
Table 3-77 Proposed Technology Upgradation 3-138
Table 3-78 Proposed Energy Sector Development 3-139
Table 3-79: District Kurram Industries Categorization by Size 3-140
Table 3-80: District Kurram Industries Categorization by Type 3-142
Table 3-81: District Kurram Industrial Growth Pattern 3-143
Table 3-82: District Kurram Industries Ownership Pattern 3-143
Table 3-83: District Kurram Industries Ownership Pattern 3-144
Table 3-84 District Kurram Required & Proposed Industrial Areas 3-149
Table 3-85 District Kuram Urban Areas Required & Proposed Industrial Areas 3-150
Table 3-86: Cross Border Vehicular Movement from Khurlachi 3-157
Table 3-87: Trade Volume at land Border Crossing KP (Rs.Million) 3-157
Table 3-88: Mining in District Kurram (Tonnes) 3-158
Table 3-89 District Kurram Commercial Requirements 3-163
Table 3-90 District Kurram Proposed Urban Commercial Requirements 3-164
Table 3-91 Future Proposed Commercial Interventions 3-166

Table 3-92: Current and Future Solid Waste Generation in Rural Settlements 3-171
Table 3-93: Resource Evaluation for Waste Collection and Transportation in Rural Settlements (2025-2045).....3-172
Table 3-94: Current and Future Solid Waste Generation in Parachinar 3-172
Table 3-95: Current and Future Solid Waste Generation in Sadda 3-173
Table 3-96: Current and Future Solid Waste Generation in Dogar.....3-173
Table 3-97: Current and Future Solid Waste Generation in Dogar.....3-173
Table 3-98 Resource Evaluation for Waste Collection and Transportation in Sadda (2025-2045) 3-174
Table 3-99 Resource Evaluation for Waste Collection and Transportation in Dogar (2025-2045).....3-174
Table 3-100 Resource Evaluation for Waste Collection and Transportation in Ali Zai (2025-2045)....3-175
Table 3-101 Resource Evaluation for Waste Collection and Transportation in Parachinar (2025-2045) 3-175
Table 3-102: Summary - Existing Water Supply System Kurram.....3-184
Table 3-103: Existing Water Supply System in Upper Kurram.....3-185
Table 3-104: Existing Water Supply System in Lower Kurram.....3-192
Table 3-105: Water Sources and Their Distribution 3-201
Table 3-106: Per Capita Consumption of Water as per the PHED Criteria 3-203
Table 3-107: Water Demand from 2025 to 2045 in Rural Settlement 3-206
Table 3-108: Water Demand from 2025 to 2045 in Urban Centers.....3-206
Table 3-109:No of Tubewells Required in Urban Centers (2025-2045).....3-207
Table 3-110: No of OHRs Required in Urban Centers (2025-2045) 3-207
Table 3-111:No of Tubewells Required in Rural Settlements (2025-2045).....3-220
Table 3-112: No of OHRs Required in Rural Settlements (2025-2045).....3-220
Table 3-113: Sewage flow in Rural Settlements (2025-2045).....3-222
Table 3-114: Sewage flow in Urban Centers (2025-2045).....3-222
Table 3-115: Development schemes in District Kurram.....3-228
Table 3-116 Slope Ranges according to Morpho-dynamic Thresholds.....3-237
Table 3-117 Showing Seismic Hazard Zones of KP alongwith Peak Horizontal Ground Acceleration BCP, SP 2007.....3-247
Table 3-118 Composite Earthquake Catalogue Showing Instrumental Seismic Events Magnitudes (Mw) Ranging from (6.0 to 6.9) of District Kurram, KP 3-249
Table 3-119 Composite Earthquake Catalogue Showing Instrumental Seismic Events Magnitudes (Mw) Ranging from (7.0 to 8.5) of District Kurram, KP 3-250
Table 3-116: Poverty and Livelihood 3-264
Table 3-121: indicators of MPI poverty and intensity of MPI 3-265
Table 3-122: GDP Estimates of Khyber Pakhtunkhwa (2015-22 - Rs. Million).....3-265
Table 3-119: Land Utilization in District Kurram 3-266
Table 3-120: Crops, Area, Production and Yield in District Kurram 3-266
Table 3-121 : Vegetable and Fruits Cultivation in District Kurram.....3-267
Table 3-122: Livestock Population in District Kurram.....3-268
Table 3-123 Number of Hospital, Veterinary, Dispensaries, and centers.....3-268
Table 3-124 Number of Industries in Kurram District.....3-269
Table 3-129: Type of Industries in District Kurram.....3-269
Table 3-130: Godowns in Kurram.....3-270

Table 3-127: Mining in District Kurram (Tonnes) 3-270
Table 3-128 : Labour Force Data Kurram District 3-274
Table 3-133 Major Interventions for the District Economy 3-278
Table 4-1 Urban Area Housing Area Requirements 4-3
Table 4-2 District Kurram Commercial Requirements 4-5
Table 4-3 District Kurram Proposed Urban Commercial Requirements 4-5
Table 4-4 District Kurram Required & Proposed Industrial Areas 4-6
Table 4-5 District Kuram Urban Areas Required & Proposed Industrial Areas 4-7
Table 4-6 Urban Areas Projected Populations 4-13
Table 4-7 Parachinar Urban Center Existing and Proposed Land use Stats 4-16
Table 4-8 Sadda Proposed Urban Center Existing and Proposed Land use Stats 4-20
Table 4-9 Dogar Urban Center Existing and Proposed Land use Stats 4-24
Table 4-10 Ali Zai Urban Center Existing and Proposed Land use Stats 4-28
Table 4-11 Comparative Review of PAMP 4-35
Table 4-12 District Proposed Zones Stats 4-40
Table 4-13 Tehsil Upper Kurram Proposed Zones Stats 4-47
Table 4-14 Tehsil Upper Kurram Proposed Zones Map 4-48
Table 4-15 Tehsil Central Kurram Proposed Zones Stats 4-51
Table 4-16 Tehsil Central Kurram Proposed Zones Map 4-52
Table 4-17 Tehsil Lower Kurram Proposed Zones Stats 4-55
Table 4-18 Tehsil Lower Kurram Proposed Zones Map 4-56

List of Figures

Figure 1-1: Objectives of the Study....1-2
Figure 1-2: Project Process Mind Map....1-3
Figure 1-3: Stepwise Project Process....1-4
Figure 1-4: Project Methodology....1-5
Figure 1-5: Focus Group Discussions (FGD) in Upper Kurram, including Parachinar, Tootki, and Zeran Hasaan Zai. 1-9
Figure 1-6: Group Photo of Focus Group Discussion (FGD) in Upper Kurram 1-9
Figure 1-7: Group Photo of Focus Group Discussion (FGD) in Central Kurram 1-9
Figure 1-8: Group Photo of Focus Group Discussion (FGD) in Lower Kurram 1-10
Figure 1-9: Group Discussion (FGDs) with Civil Societies Organization 1-10
Figure 1-10: Focus Group Discussion (FGD) with Press Club, Kurram....1-11
Figure 1-11: Focus Group Discussion (FGD) with Trade Union....1-11
Figure 1-12: Focus Group Discussion (FGD) with District Bar Association, Kurram....1-12
Figure 1-13: Focus Group Discussion (FGD) with Political Union, Kurram....1-12
Figure 1-14: Monthly Distribution of Rainfall in Parachinar....1-23
Figure 1-15: Total Number of Rainy Days 1-24
Figure 1-16: Mean Monthly Temperatures in Parachinar 1-27
Figure 1-17: Mean Monthly Relative Humidity in Parachinar 1-28
Figure 1-18: Mean Monthly Wind Speed in Parachinar 1-29
Figure 1-19: Prevailing Wind Directions 1-30
Figure 1-20: District Kurram Literacy Ration by Age and Sex 1-53
Figure 1-21 Educational Attainment of District Kurram as per LFS 2021 2022 1-55
Figure 1-22 Educational Attainment of District Kurram as per Census 2023....1-57
Figure 1-23 Occupation of District Kurram from LFS 2021-2022 1-60
Figure 1-24 Occupation of District Kurram from Census 2023....1-62
Figure 14: Typical Cross-section of Hilly Terrain 3-38
Figure 15: Typical Cross-section of Rolling Terrain....3-39
Figure 3-3 Parachinar sport complex 3-89
Figure 3-4:Proposed Landfill and WWTP Site in Dogar 3-177
Figure 3-5:Proposed Landfill and WWTP Site in Ali Zai 3-178
Figure 3-6:Proposed Landfill Site and WWTP in Parachinar 3-179
Figure 3-7: Served and Unserved Population in Kurram District....3-202
Figure 3-8: Generalized Geotectonic Map of Northern Pakistan showing Major geologic faults and features.(After Ahmad et al., Pakistan Journal of Hydrocarbon Research, 2005.) 3-244
Figure 4-1: Suggested Settlement Hierarchy 4-59

List of Maps

Map 1-1: Location Map of the Project Area 1-6
Map 1-2: Location Map of the Project Area 1-17
Map 1-3: Available Water Resources (Streams) in District Kurram 1-19
Map 1-4: Kurram River Catchment Area Map 1-21
Map 1-5: Kurram District Overlayed on Annual Normal Isohyetal Map 1-25
Map 1-6: Elevation Map of the Project Area 1-32
Map 1-7: Seismic Zoning Map of District Kurram 1-34
Map 1-8: Soil Properties Map of Kurram District 1-36
Map 1-9: Land Cover Map of Kurram District 1-38
Map 1-10: Land Cover Map of Parachinar Urban Center 2003 1-67
Map 1-11: Land Cover Map of Parachinar Urban Center 2008 1-68
Map 1-12: Land Cover Map of Parachinar Urban Center 2013 1-69
Map 1-13: Land Cover Map of Parachinar Urban Center 2018 1-70
Map 1-14: Land Cover Map of Parachinar Urban Center 2023 1-71
Map 1-15: Land Cover Map of Sadda Proposed Urban Center 2003 1-73
Map 1-16: Land Cover Map of Sadda Proposed Urban Center 2008 1-74
Map 1-17: Land Cover Map of Sadda Proposed Urban Center 2013 1-75
Map 1-18: Land Cover Map of Sadda Proposed Urban Center 2018 1-76
Map 1-19: Land Cover Map of Sadda Proposed Urban Center 2023 1-77
Map 1-20: Land Cover Map of Dogar Proposed Urban Center 2003 1-79
Map 1-21: Land Cover Map of Dogar Proposed Urban Center 2008 1-80
Map 1-22: Land Cover Map of Dogar Proposed Urban Center 2013 1-81
Map 1-23: Land Cover Map of Dogar Proposed Urban Center 2018 1-82
Map 1-24: Land Cover Map of Dogar Proposed Urban Center 2023 1-83
Map 1-25: Parachinar Urban Area Map 1-118
Map 1-26 Sadda Urban Area Map 1-120
Map 1-27 Dogar Proposed Urban Center Map 1-122
Map 2-1: District Kurram Existing land use Map 2-1
Map 2-2 Tehsil upper Kurram Existing Land Use Map 2-3
Map 2-3 Tehsil Central Kurram Land Use Map 2-5
Map 2-4 Tehsil Lower Kurram Existing Land Use Map 2-8
Map 2-5: Land use Index Map (Urban Center: Parachinar) 2-11
Map 2-6: Landuse Index Map (Urban Center: Sadda) 2-14
Map 2-7: Location Index Map Urban Center Dogar 2-17
Map 2-8: Landuse Map (Urban Center: Ali Zai) 2-19
Map 3-1 Proposed Residential Zones 3-9
Map 3-2 The Hierarchy of Roads in Kurram 3-11
Map 3-3: Traffic Volume of Major Corridors 3-17
Map 3-4 Proposed Bus Terminals Map 3-34
Map 3-5 District Kurram Proposed RDistrict Kurram Proposed Roads Map 3-40
Map 3-6 Existing Education Facilities in District Kurram 3-47
Map 3-7 District Kurram Proposed Educational Zones 3-72
Map 3-8 Existing Health Facilities, District Kurram 3-77
Map 3-9 District Kurram proposed Health Zon 3-87
Map 3-10 Existing Sports Facilities Map 3-90

Map 3-11 District Kurram Proposed Recreational Zone Map 3-102
Map 3-12 Social Security Points in District Kurram 3-105
Map 3-13 Religious Facilities Map 3-107
Map 3-14 Existing Graveyards in District Kurram....3-110
Map 3-15: District Kurram Agriculture Land Use....3-113
Map 3-16: District Kurram Proposed Agriculture Zone 3-121
Map 3-17: Industries in Kurram District....3-141
Map 3-18 District Kurram Proposed Light manufacturing Zones....3-151
Map 3-19: Spatial Distribution of Trade and Commerce Activity in Kurram District 3-162
Map 3-20 Proposed Commercial Zones Map of District Kurram....3-167
Map 3-21 :Proposed Landfill and WWTP Site in Sadda 3-176
Map 3-22 Available Water Resources in District Kurram....3-183
Map 3-23 Existing Water Supply sources in District Kurram 3-199
Map 3-24 *Location of* Existing Tube wells in District Kurram 3-200
Map 3-25: Proposed Water Supply Network in Parachinar....3-208
Map 3-26: Location of Proposed OHR in Parachinar....3-209
Map 3-27: Location of Proposed tubewells in Parachinar 3-210
Map 3-28: Proposed Water Supply Network in Sadda 3-211
Map 3-29:Proposed OHR Location in Sadda 3-212
Map 3-30: Proposed Tubewell Location in Sadda 3-213
Map 3-31:Proposed Water Supply Network in Dogar....3-214
Map 3-32:Proposed OHR Location in Dogar 3-215
Map 3-33:Proposed Tubewell Location in Dogar....3-216
Map 3-34: Proposed Water Supply Network in Ali Zai....3-217
Map 3-35:Proposed OHR Location in Ali Zai 3-218
Map 3-36:Proposed Tubewell Location in Ali Zai....3-219
Map 3-37:Proposed Sewerage Network in Ali Zai....3-224
Map 3-38:Proposed Sewerage Network in Dogar....3-225
Map 3-39:Proposed Sewerage Network in Parachinar 3-226
Map 3-40:Proposed Sewerage in Sadda....3-227
Map 3-41 Physiographic Map of District Kurram 3-234
Map 3-42 District Kurram Flood Hazards Zones Map....3-256
Map 3-43 District Kurram land Slide Zones Map 3-261
Map 3-44: Protentional Tourism Sites in District Kurram 3-287
Map 3-45 Potential Reactional sites Map....3-292
Map 4-1 Parachinar Urban Center Proposed Zonings....4-17
Map 4-2 Sadda Urban Center Proposed Zonings 4-21
Map 4-3 Dogar Urban Center Proposed Zonings....4-25
Map 4-4 Dogar Urban Center Proposed Zonings....4-29
Map 4-5 Parachinar Approved Master Plan Map....4-37
Map 4-6 District Kurram Proposed Zones Map 4-41

1 PROLOUGE

1.1 Introduction

1.1.1 Background

Khyber Pakhtunkhwa's population is growing at an annual rate of 2.89%[1], and at this pace, it is projected to double by 2042. This rapid growth will place significant pressure on the province's natural resources and public infrastructure, leading to challenges such as inefficient land use, the conversion of agricultural land for commercial and residential purposes, water scarcity, deforestation, and environmental degradation. To address these issues, comprehensive district-level land use planning is essential to ensure the sustainable and efficient management of resources for present and future generations. Land use planning plays a pivotal role in shaping settlements' social and economic landscape by assessing future population size, structure, and distribution. It also serves as a strategic tool for guiding agricultural and industrial development. Recognizing its importance, the Government of Khyber Pakhtunkhwa has initiated the preparation of District Land Use Plans (DLUPs) for all districts of the province. To implement this initiative, the Provincial Land Use Plan Project (PLUP) and the Urban Policy and Planning Unit (UPPU) have awarded a consultancy contract through a competitive bidding process to the National Engineering Services of Pakistan (Pvt) Limitted for the preparation of land use plans of 2 districts. The Land Use Plan for District Kurram is a comprehensive and evidence-based planning document. This plan is a strategic framework to guide future growth by developing a comprehensive approach to land use and spatial planning in response to rapid population growth, urban expansion, and unregulated land conversion. Utilizing both primary and secondary data sources, the planning process involved household surveys, transportation and land use surveys, and stakeholder consultations. The plan proposes land use zoning, new urban areas to optimize land use, and minimize conflicts between residential, commercial, agricultural, and industrial land use. It emphasizes protecting ecologically sensitive areas through evidence-based planning. The plan incorporates legal mechanisms, institutional roles, and regulatory guidelines to support its execution at the district level. Furthermore, The Land Use Plan will help to induce a sustainable development, optimize exploitation of land and physical resources, enhancing provincial income, increase overall activity and balanced distribution of infrastructure and services. The Land Use Plan will be a tool to provide guidance to Provincial Government, Urban Policy Unit and TMAs for undertaking integrated and coherent development programs. Based on many studies, District Land Use Plan deals with efficient placement of broad, District-level Land Use and zoning for the sustainable growth of a District as a whole. It differs from the urban structure plans in many ways. A District can have more than one urban area and hundreds of villages and the District Plan have to consider these all. Besides, the nature of Land Uses at District level is not commonly found in an urban area, such as large-scale agriculture, rangeland, forestry, livestock, fishery etc. As against District Plan, the focus in urban plans is identification of issues and solutions for Central Business District, neighborhood planning, urban municipal services etc.

[1] 6th Population Census & Housing Census 2017, Pakistan Bureau of Statistics, Govt of Pakistan.

1.1.2 Objective

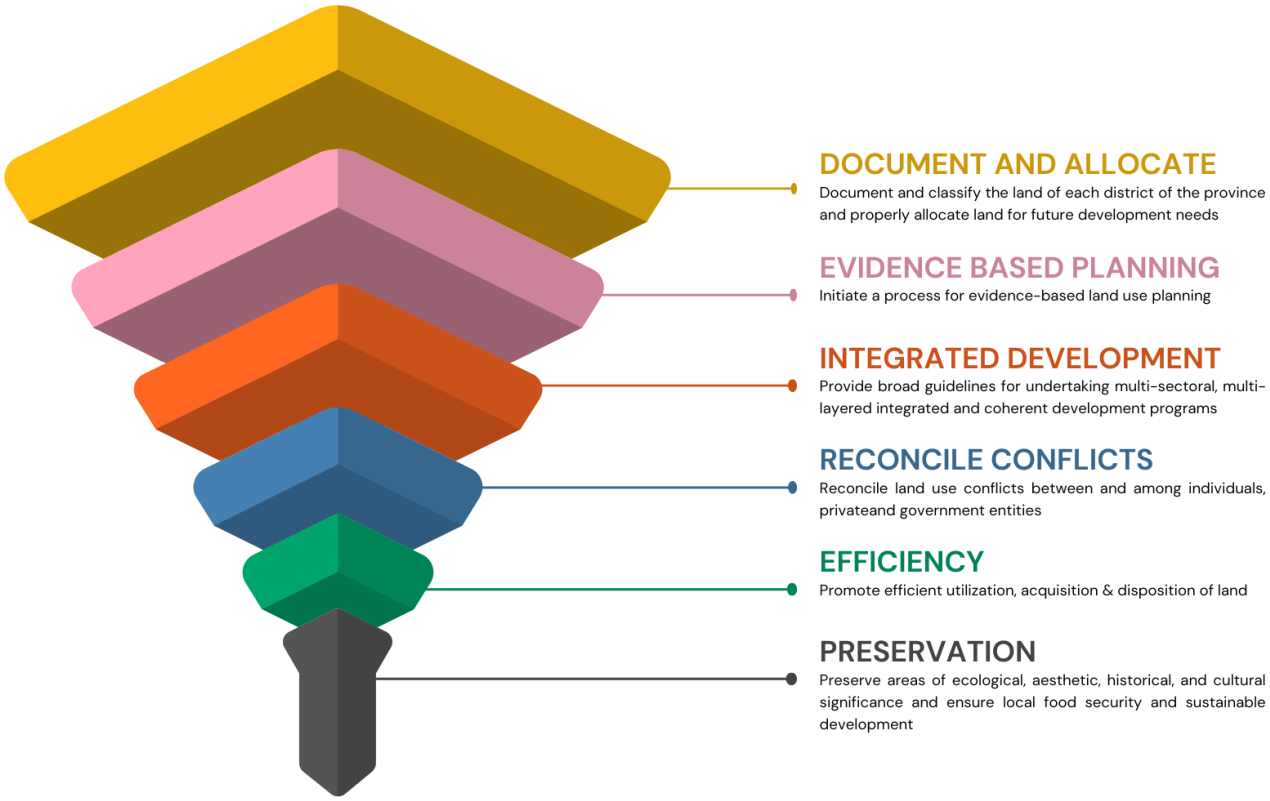


Figure 1-1: Objectives of the Study

1.1.3 Land Use Planning Process

Land use planning is believed to be holistic and relies on a detailed study of the project area and a thorough and critical analysis of data, as well as being responsive to the growing needs of the diversifying population. The consultant maintains that effective land use planning promotes sustainable development by simultaneously transforming the physical landscape and strengthening economic foundations. The balance between economic growth and environmental protection may not be achieved solely through the land use plans prepared by Technical expertise of consultants, only rather requires participation of Government entities and all relevant stakeholders in the process. The preparation process of the District Land Use Plan is classified into 09 steps presented.

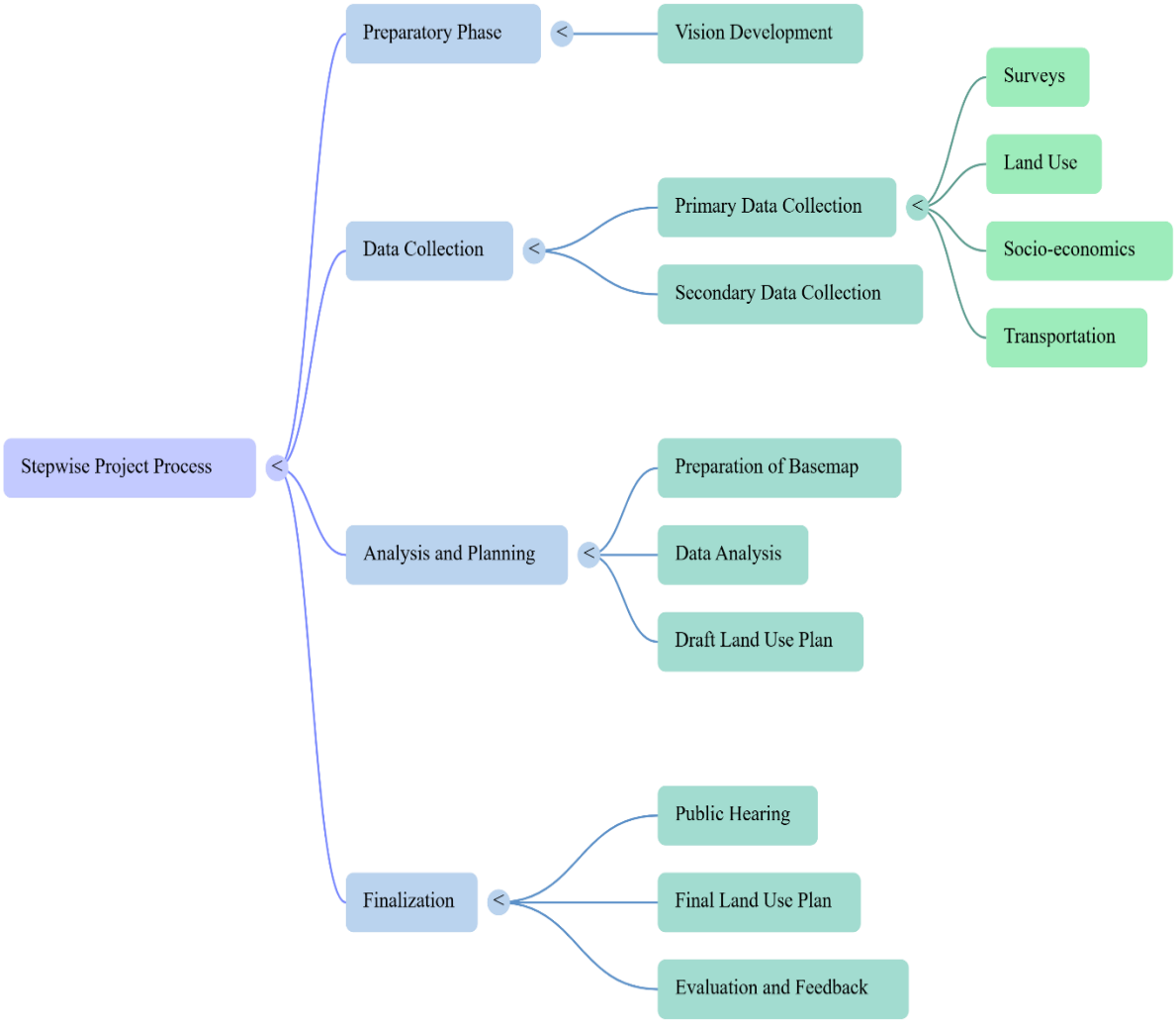


Figure 1-2: Project Process Mind Map

Figure 1-3: Stepwise Project Process

1.1.4 Project Methodology

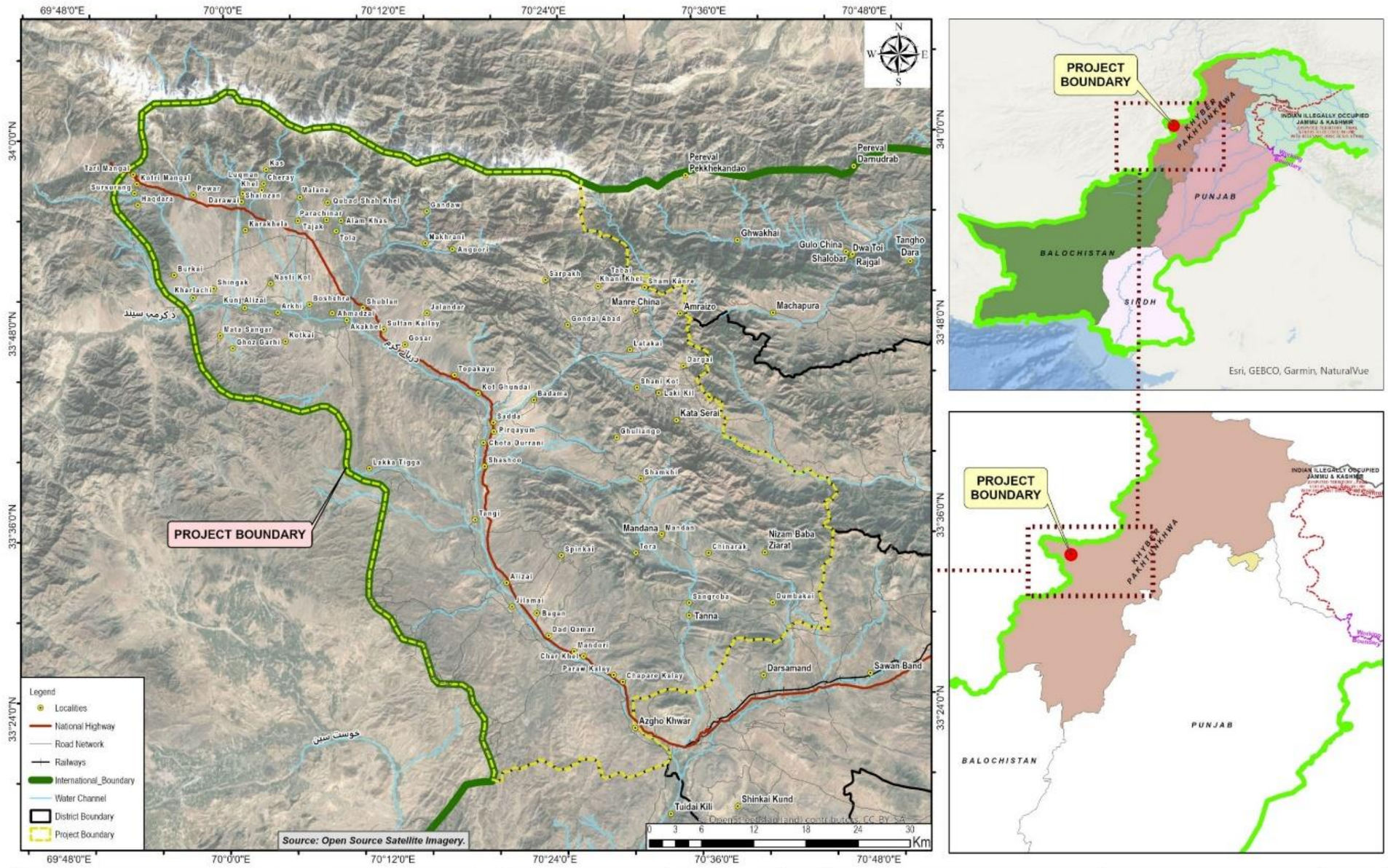
The planning process for the District Land Use Plan follows a structured and phased approach. It begins with the Preparatory Phase, where the consultant reviews the Terms of Reference (TORs), finalizes the methodology, and Key stakeholders were identified, and reviews their involvement at different stages of the project. This was followed by Vision Development, in which a collective vision for the district was formulated through focus group discussions and (FG), stakeholder workshops. The next step, Data Collection, involved gathering both primary and secondary data across multiple sectors, including housing, transport, environment, and Land use surveys. Using this data, the team proceeded with the Preparation of Base Maps and GIS-based spatial classification to visualize existing land use patterns. These components fed into a comprehensive Data Analysis phase, where socioeconomic trends, land utilization patterns, and urbanization dynamics were evaluated. Based on these insights, the Draft Land Use Plan was prepared, outlining zoning proposals, infrastructure distribution, and regulatory frameworks. The consultant will conduct a public hearing immediately after the draft land use plan is prepared to solicit feedback from stakeholders and the general public. The input gathered during the hearing will be carefully reviewed and incorporated where necessary to refine the final land use plan. The final land use plan will be approved by

the Land Use and Building Control Council and will be handed over to the district administration for implementation and execution.

Figure 1-4: Project Methodology

1.1.5 Project Area

District Kurram is located in the Northwest part of Khyber Pakhtunkhwa with its geometric centroid at 33.701°N, 70.355°E. The district is bordered by the Afghanistan in the North. Towards its East, it is bordered by District Khyber and Kurram and in the South, by District North Waziristan. Afghanistan lies to the West of District Kurram. The total area of the district is 3,380 sq. km. The district is divided into 03 Tehsils with a total population of 785,434. Among them, Upper Kurram has a population of 286,927, Centre Kurram 386,306 and Lower Kurram 160,857. The locational map of the District Kurram concerning Khyber Pakhtunkhwa and the NorthWest region is represented in Map 1-1.



Map 1-1: Location Map of the Project Area

1.2 Vision Development

Vision formulation is a crucial process that involves defining the collective desires of a community through active stakeholder engagement. During this undertaking, community members come together to align their shared values and objectives, ultimately crafting a unified vision for their community's future. This vision serves as a blueprint, outlining the physical, social, and environmental aspects that the community aspires to achieve over the next two decades.

Stakeholder Consultation is a process of systematically gathering and analyzing qualitative information to determine whose interests should be taken into account when developing and/or implementing a plan, policy or program.

Stakeholders in a process are actors (persons or organizations) with a vested interest in the plan/ policy being implemented and promoted. These stakeholders are usually grouped into different categories Government Departments/ Agencies, Local Political (legislators, governors), civil society organizations like Bar council, traders' associations, press club, political party local level leaders etc.

Timely and broad-based stakeholder involvement is an essential element for an effective Project planning and implementations. Public involvement during Land Use Planning of the Districts has a tendency to improve project design, environmental soundness and social acceptability.

Table 1-1: List of Participated Stakeholders

Sr. No.	Departments
1.	Deputy Commissioner Kurram
2.	Provincial Land Use Plan Urban Policy & Planning Unit (UPU) P & D Department KP
3.	Communication & Works Department
4.	Planning and Development Department
5.	Local Government
6.	Tehsil Municipal Administration (TMA)
7.	Agriculture Department
8.	Public Health Engineering (PHE)
9.	Irrigation Department
10.	Education Department
11.	Health Department
12.	Rescue 1122
13.	On Farm Water Management
14.	Forest Department
15.	Police Department
16.	Sports, Culture, Tourism, Archeology, Museum & Youth Affairs Department

Figure 1-5: Focus Group Discussions (FGD) in Upper Kurram, including Parachinar, Tootki, and Zeran Hasaan Zai.

Figure 1-6: Group Photo of Focus Group Discussion (FGD) in Upper Kurram

Figure 1-7: Group Photo of Focus Group Discussion (FGD) in Central Kurram

Figure 1-8: Group Photo of Focus Group Discussion (FGD) in Lower Kurram

Figure 1-9: Group Discussion (FGDs) with Civil Societies Organization

Figure 1-10: Focus Group Discussion (FGD) with Press Club, Kurram

Figure 1-11: Focus Group Discussion (FGD) with Trade Union

Figure 1-12: Focus Group Discussion (FGD) with District Bar Association, Kurram

Figure 1-13: Focus Group Discussion (FGD) with Political Union, Kurram

1.2.1 SWOT Analysis

Table 1-2 SWOT Analysis

Strength: ➢ Abundant natural resources, including fertile land, water reservoirs and mines and minerals. ➢ Potential in agriculture, with diverse crops and agricultural products. ➢ Strategic location with borders facilitating trade and economic opportunities. ➢ Presence of tourism spots and natural beauty. ➢ Strong community engagement and willingness for cooperation.	**Weaknesses:** ➢ Lack of peace and security, leading to ongoing conflicts and tensions. ➢ Inadequate provision of essential services such as electricity, clean drinking water, and healthcare. ➢ Infrastructure challenges including unpaved roads, inadequate drainage, and sewerage systems. ➢ Shortages in education and healthcare professionals. ➢ Governance issues such as coordination between government offices and elected representatives.
Opportunities: ➢ Government intervention and initiatives for peace and development. ➢ Development of infrastructure including roads, healthcare facilities, and education institutions. ➢ Utilization of natural resources for economic growth, including agriculture and tourism, as well as mines and minerals. ➢ Strategic partnerships for trade and economic activities, particularly with neighboring regions. ➢ Potential for industrialization and job creation through small-scale industries and vocational training.	**Threats:** ➢ Ongoing conflicts and security risks affecting stability and development. ➢ Environmental challenges such as forest fires and water shortages. ➢ Socio-economic disparities leading to unrest and discontent among communities. ➢ Governance issues including corruption and lack of effective implementation of policies. ➢ External factors such as regional instability and geopolitical tensions impacting trade and development initiatives.

1.2.2 Key Finding

The vision development exercise for District Kurram highlighted a mix of opportunities and challenges. The district possesses immense tourism potential due to its scenic valleys, cultural heritage, and natural resources, while also offering prospects for small-scale industries and diverse employment avenues. However, access to essential facilities such as healthcare, education, transportation, electricity, banking, and telecommunication services remains limited, hampering quality of life and economic development. Recreational and sports facilities are also inadequate, restricting opportunities for youth engagement and community well-being.

Unplanned development, weak infrastructure, and the lingering impacts of militancy have slowed Kurram progress compared to other settled districts. Inadequate road connectivity, limited higher education opportunities, and a weak healthcare system further constrain growth. Moreover, the absence of comprehensive development regulations risks unorganized expansion and environmental degradation, potentially threatening the district's natural beauty and tourism potential.

The people of Kurram aspire to elevate the district into a peaceful, modern, and thriving region by 2045. They seek to enhance healthcare, education, and social services, while fostering economic activities through tourism and small-scale industries. Sustainable development is a priority, ensuring the preservation of natural resources while fostering economic and social growth.

To achieve this vision, tourism promotion and small business expansion must be supported through government-backed incentives and infrastructure investment. The district has strong prospects for growth in hospitality, cultural tourism, and local industries, which can be realized by improving connectivity, providing essential services, and creating a favorable environment for investment. Additionally, upgrading road infrastructure and transport systems was identified as a key step in linking Kurram with regional markets and stimulating economic prosperity. By addressing these critical areas, Kurram could transition into a well-planned, modern, and economically vibrant district.

1.2.3 Vision Statement of District Kurram

The vision statement aims to articulate the envisioned future of District Kurram in 2045, assuming the implementation of the Land Use plan and associated policies. The following visions have been formulated based on the outcomes of focus group discussions and the consultative workshop.

1.2.3.1 Vision Statement Resulting from Consultations with The General Public in Neighborhood and Village Councils

"A secure, prosperous, and peaceful community, prioritizing essential services, economic growth, and harmony. Focus on law and order, functional borders, and peace for an ideal district. Promote economic activities, enhance infrastructure, and provide basic amenities. Preserve natural beauty, boost tourism, and ensure peace. Strive for prosperity, access to education and healthcare, and environmental preservation. Encourage investment for local development and ensure basic facilities."

1.2.3.2 Vision Statement Developed Through Consultations with Civil Society Organizations

"A peaceful and well-serviced region, committed to upholding the rule of law, fostering education, and ensuring the provision of essential services for the well-being of its residents."

1.2.3.3 Vision Statement Developed by Group-A During the Consultative Workshop

"To transform District Kurram into a vibrant, inclusive, and sustainable community by 2045, fostering economic prosperity, social cohesion, and environmental stewardship through collaborative efforts and innovative solutions."

1.2.3.4 Vision Statement by Group-B During the Consultative Workshop

"To establish a thriving agro-based industrial District, leveraging favorable weather conditions and promoting trade and tourism. Our vision is to cultivate a peaceful environment where all line departments diligently fulfill their responsibilities, ensuring the provision of essential facilities to all residents."

1.2.3.5 Vision Statement of Group-C During the Consultative Workshop

"An improved commerce and trade zone with basic health facilities good quality education, tourism opportunities, mines and minerals exploration, clean drinking water and peaceful environment."

1.2.3.6 Vision Statement of Group-D During the Consultative Workshop

"To foster a harmonious society where peace prevails, and every individual thrives in access to essential facilities including robust health and education services. We aspire to position Kurram as a premier tourism destination, showcasing its natural beauty and cultural heritage. Our vision is to see prosperity flourish through the efficient performance of line departments, ensuring equitable development and well-being for all."

1.2.3.7 Vision 2045 for Kurram District:

"A PATH TO PROSPERITY AND PEACE"

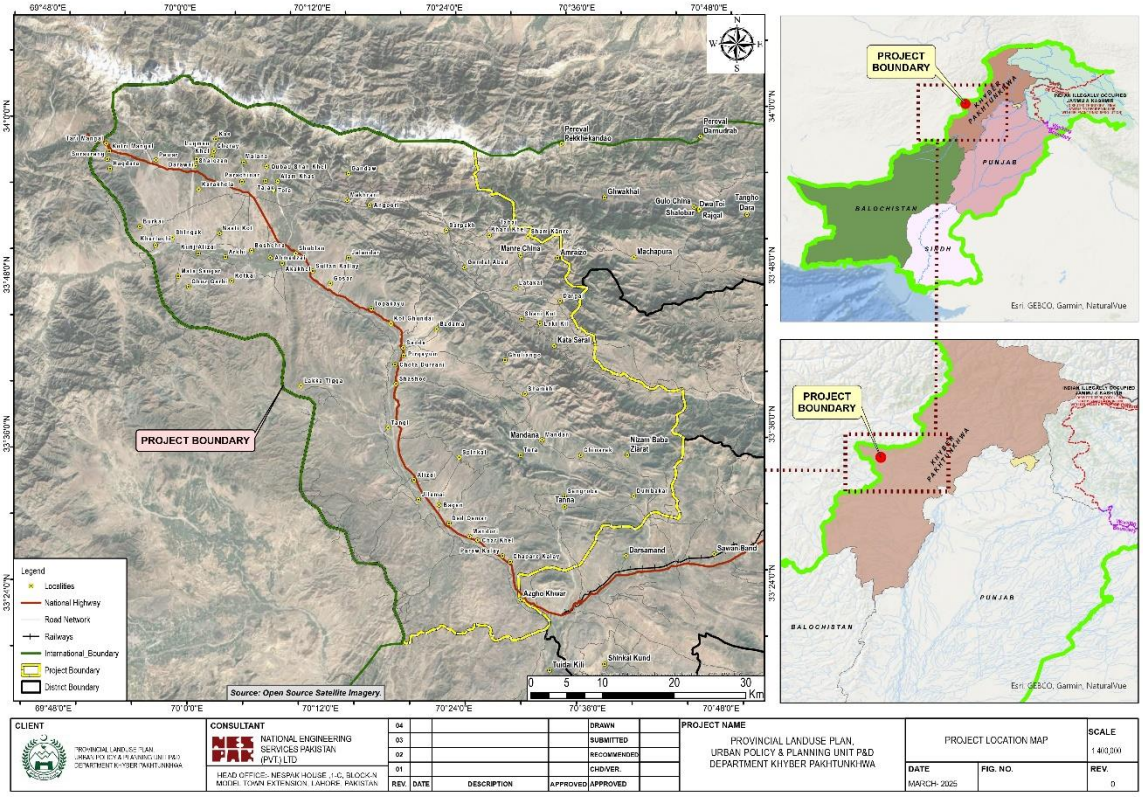
"A peaceful, prosperous, and inclusive Kurram District, committed to upholding the rule of law, fostering education, and ensuring the provision of essential services for the well-being of its residents. Vision is to transform Kurram into a vibrant hub of economic prosperity, social harmony, and environmental stewardship, where all stakeholders collaborate to cultivate a thriving community by 2045".

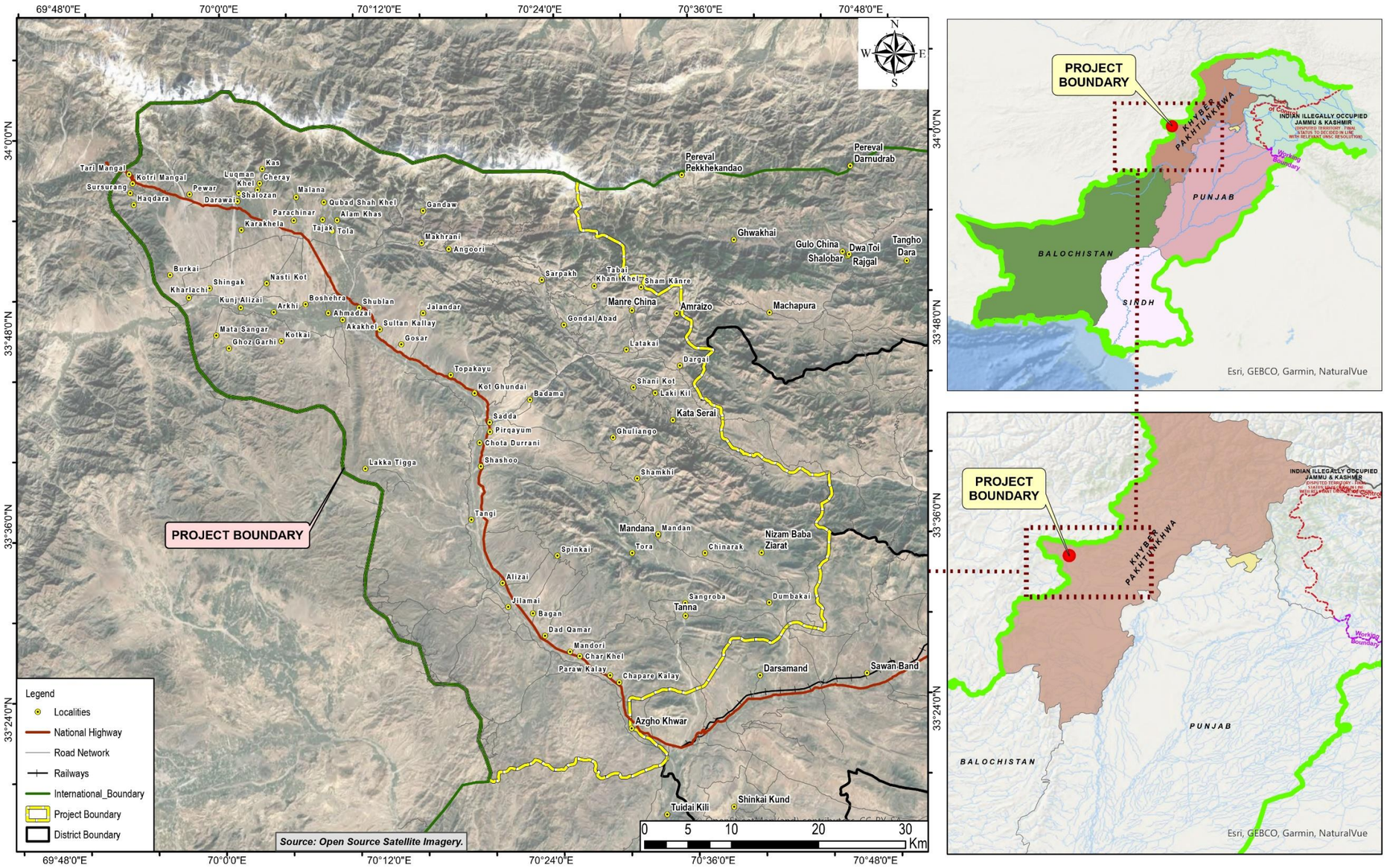
1.3 Physical Characteristic of the District

Kurram District is in Khyber Pakhtunkhwa, Pakistan and is a region of significant historical, geographical, and strategic importance. It is nestled along the Pak-Afghan border. Kurram serves as a vital gateway between Central and South Asia, historically functioning as a trade route and cultural corridor. The district derives its name from the Kurram River, which flows through its valleys, acting as a lifeline for agriculture, drinking water, and other essential needs.

Kurram is characterized by a rugged, mountainous landscape interspersed with fertile valleys. The district's terrain is dominated by the Safed Koh Mountain range, which presents dramatic elevations and natural beauty. These mountains not only contribute to the district's climate, which is generally semi-arid with cold winters and mild summers but also provide a natural border with Afghanistan. Its fertile valleys such as Parachinar and Sadda are key agricultural hubs, producing wheat, maize, and

various fruits like apples, apricots, and walnuts. Livestock farming, another economic mainstay, thrives in these fertile areas. The location map and elevation map of the project district is given in Map 1-2.





CLIENT: PROVINCIAL LANDUSE PLAN, URBAN POLICY & PLANNING UNIT P&D DEPARTMENT KHYBER PAKHTUNKHWA	CONSULTANT: NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	04		DRAWN		PROJECT NAME: PROVINCIAL LANDUSE PLAN, URBAN POLICY & PLANNING UNIT P&D DEPARTMENT KHYBER PAKHTUNKHWA
		03		SUBMITTED		PROJECT LOCATION MAP
		02		RECOMMENDED		SCALE: 1:400,000
		01		CHD/VER.		DATE: MARCH- 2025
		REV.	DATE / DESCRIPTION	APPROVED	APPROVED	FIG. NO. / REV.: 0

Map 1-2: Location Map of the Project Area

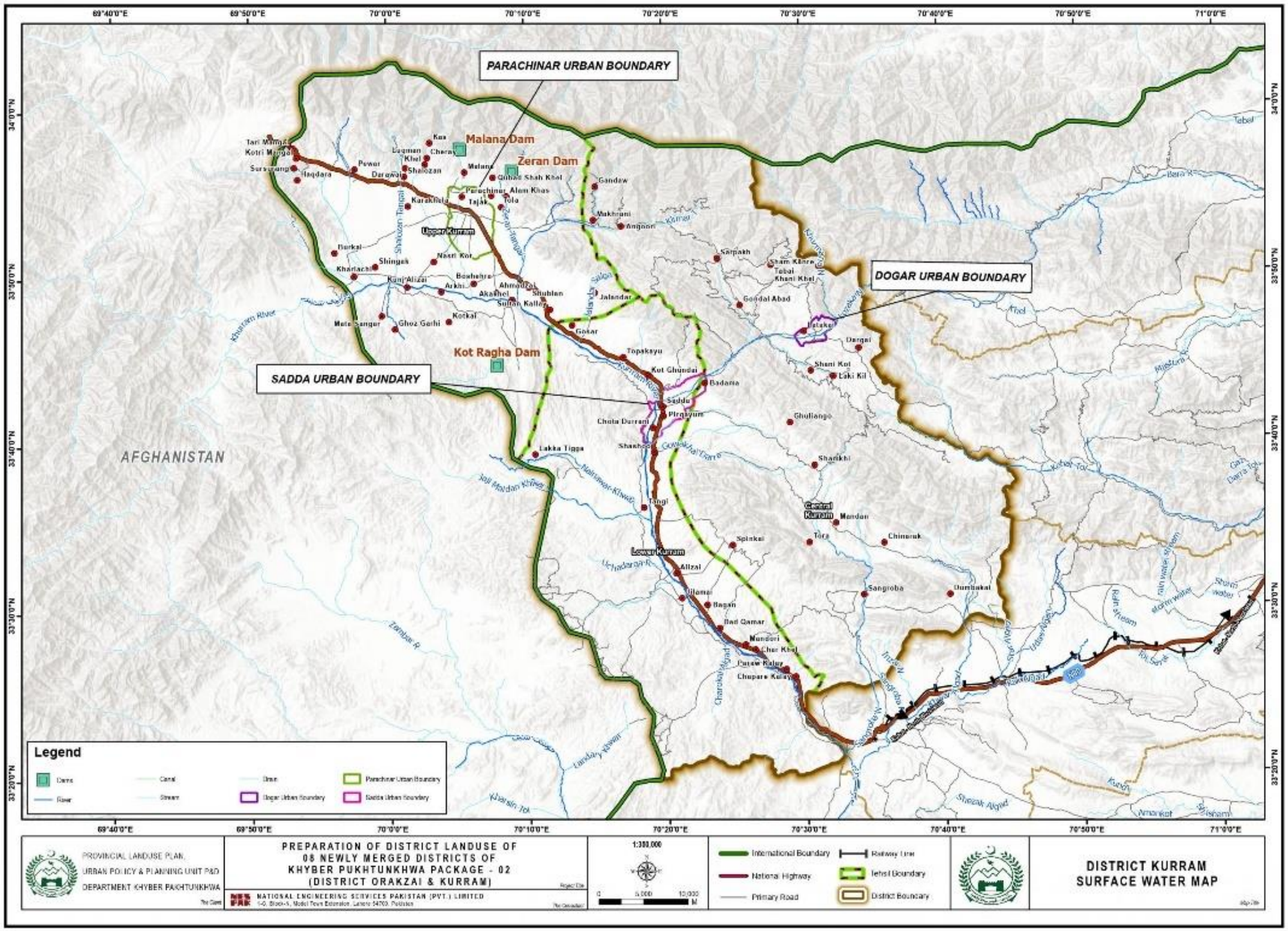
1.3.1 Hydrology and Water Resources

The hydrology of District Kurram is influenced by its diverse landscape and semi-arid climate, where water remains a critical yet limited resource. The development of a detailed land use map is therefore essential for sustainable water management, emphasizing the identification of rivers, streams, aquifers, and wetlands. Integrating hydrological data into land use planning will enable watershed delineation, groundwater recharge assessment, and floodplain management, helping to address issues of over-extraction, contamination, and seasonal water scarcity.

Hydrological studies play a central role in understanding the availability, quality, and distribution of water resources within Kurram. These insights support flood risk mitigation, erosion control, and the design of resilient infrastructure, while ensuring the efficient use of water for agricultural, domestic, and industrial needs. By guiding sustainable water resource utilization, these studies form the foundation for balanced development, environmental preservation, and improved community well-being across District Kurram.

1.3.1.1 Surface Water

Through an extensive desk study and detailed analysis using topographic maps and Google Earth, the identified water resources have been systematically documented and are visually represented in the accompanying Rivers, Dams, Nullahs.

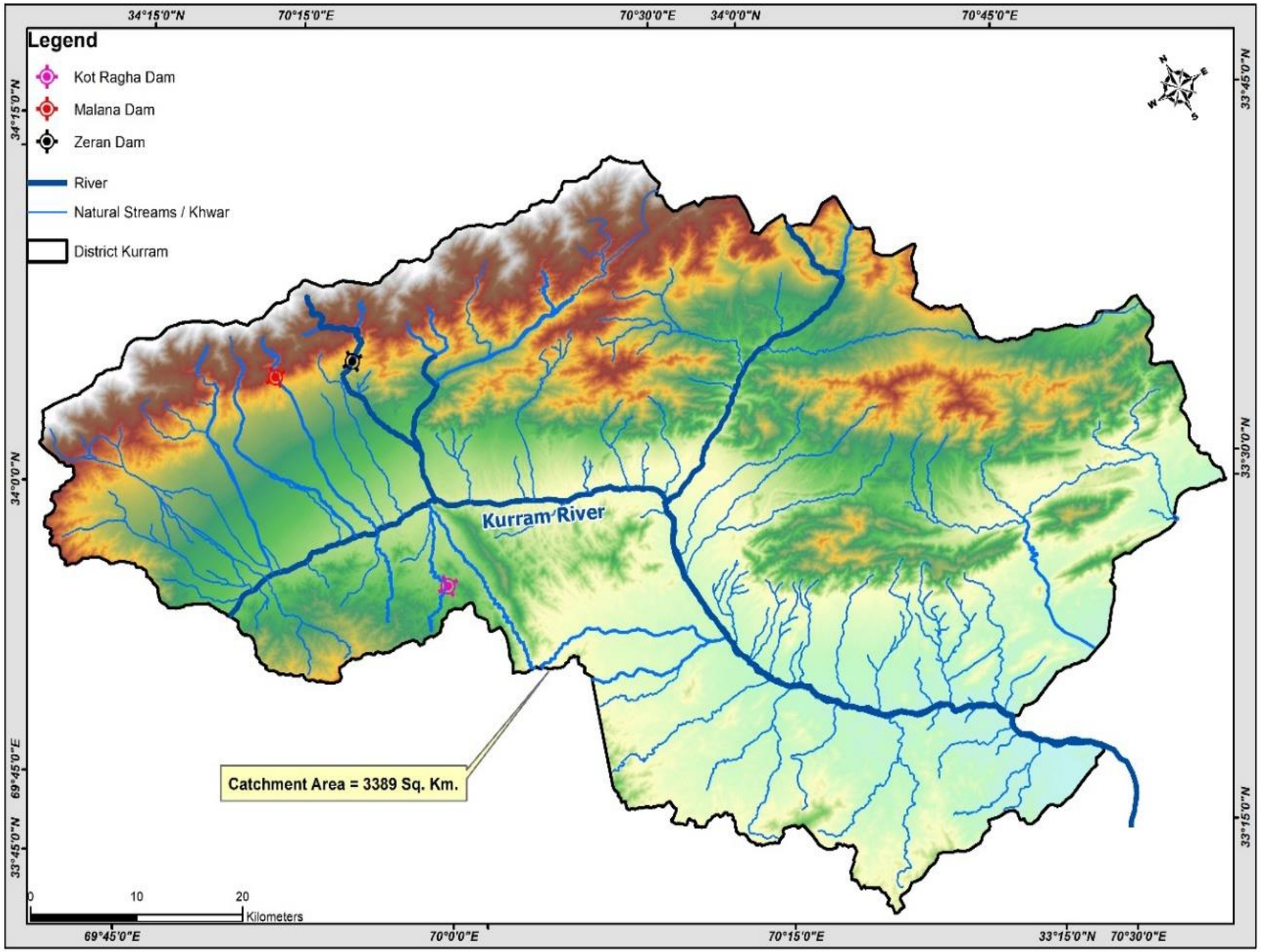


Map 1-3: Available Water Resources (Streams) in District Kurram

1.3.1.1.1 Kurram River

The Kurram River is the principal hydrological feature of District Kurram, forming the backbone of its water management and agricultural systems. Originating from the Koh Safed (White Mountain) range, it flows through the district's varied terrain before joining the Indus River system. Covering a catchment area of about 3,389 km^2, the river and its tributaries such as the Kirman and Khurmana rivers—support both mountainous and plain regions, providing essential water for irrigation, domestic use, and biodiversity.

The river irrigates approximately 32,000 hectares (80,000 acres) of land and significantly contributes to groundwater recharge and hydropower generation, particularly through the Kurram Hydropower Project. Its flow, largely governed by seasonal rainfall and snowmelt, makes it a vital component of the district's hydrological cycle. Several streams and nullahs also merge into the Kurram River, reinforcing its role as a key natural resource for the region.



Map 1-4: Kurram River Catchment Area Map

1.3.1.1.2 Khurmana River

The Khurmana River is a major tributary of the Kurram River, originating from the Koh Safed (White Mountain) range and flowing through rugged valleys and fertile plains before joining the main river. Covering a catchment area of about 382 km², it serves as an important source of irrigation, domestic water supply, and groundwater recharge, supporting both agriculture and local livelihoods.

The river also maintains the ecological balance of the region by providing habitat for aquatic species and contributing to biodiversity. Its flow, influenced by seasonal rainfall and snowmelt, plays a crucial role in soil moisture retention and flood mitigation. As part of the district's broader hydrological network, the Khurmana River remains a key natural asset essential for sustainable water management in District Kurram.

1.3.2 Climate of Project Area

District Kurram has a varied climate shaped by its rugged terrain and altitude, ranging from arid to semi-arid conditions. Summers in the lowlands are hot, often above 30°C, while higher elevations remain mild. Winters are cold, with frequent snowfall and temperatures dropping below freezing.

Rainfall is moderate and seasonal, occurring mainly during July–September monsoons and supplemented by winter precipitation from western disturbances. This pattern sustains agriculture and replenishes water resources, though the district remains prone to drought and scarcity. Climatic data from the Parachinar Weather Station (Pakistan Meteorological Department, 2021) highlights key trends in temperature, precipitation, and wind crucial for regional planning and water management.

1.3.2.1 Precipitation

Mean monthly rainfall data and the number of rainy days recorded at the Parachinar Meteorological Station are presented in Table 1-3. The area receives an average annual rainfall of about 1,150 mm, with a maximum monthly rainfall of 174.5 mm in March and a minimum of 28.1 mm in December. Around 61% of total rainfall occurs during February, March, April, July, and August, while December is typically the driest month. The distribution of average monthly rainfall and rainy days is illustrated in Figure 1-7 and Figure 1-8Figure 1-15.

Table 1-3: Mean Monthly Rainfall in Parachinar

Month	Mean Monthly Rainfall (mm)	Rainy Days (No.)
January	69.1	4.2
February	129.1	7.5
March	174.5	11.9
April	146.1	12.6
May	106.6	11.3
June	69.9	8.4
July	114.1	10.9
August	134.6	11.8
September	80.8	8.6
October	60.0	5.7
November	36.8	4.0
December	28.1	3.9

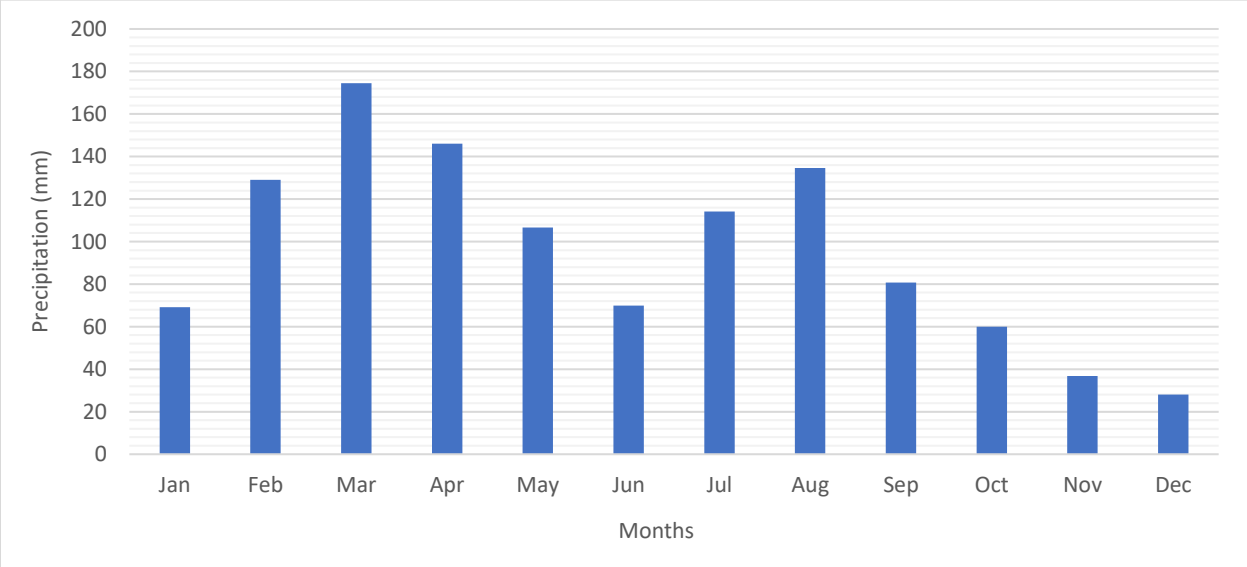


Figure 1-14: Monthly Distribution of Rainfall in Parachinar

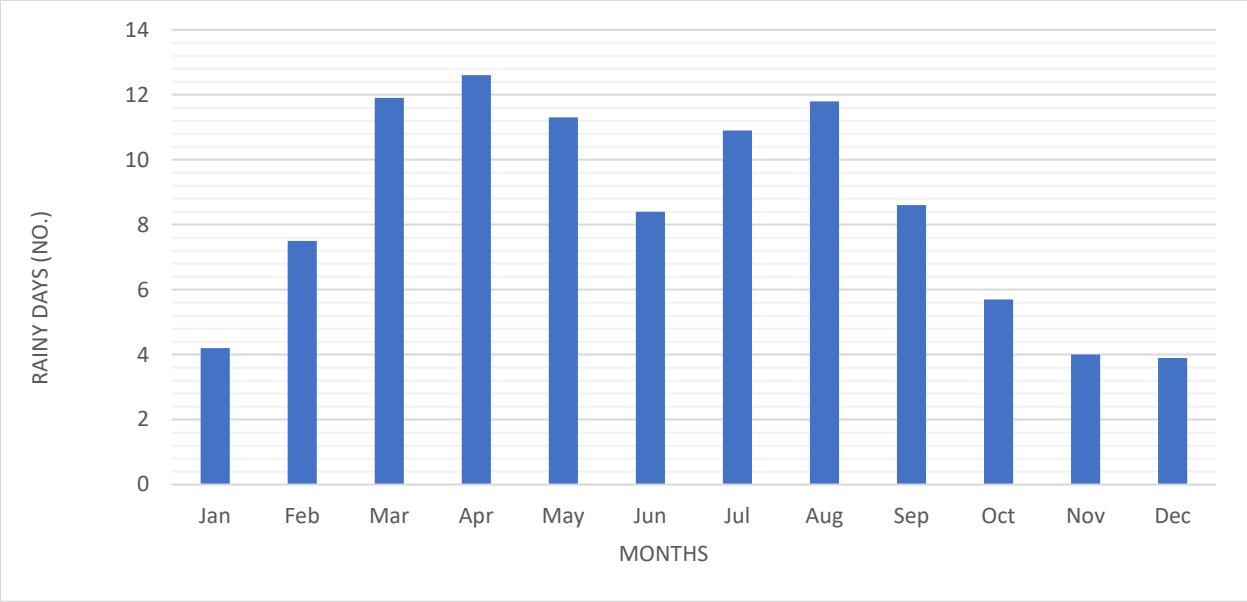
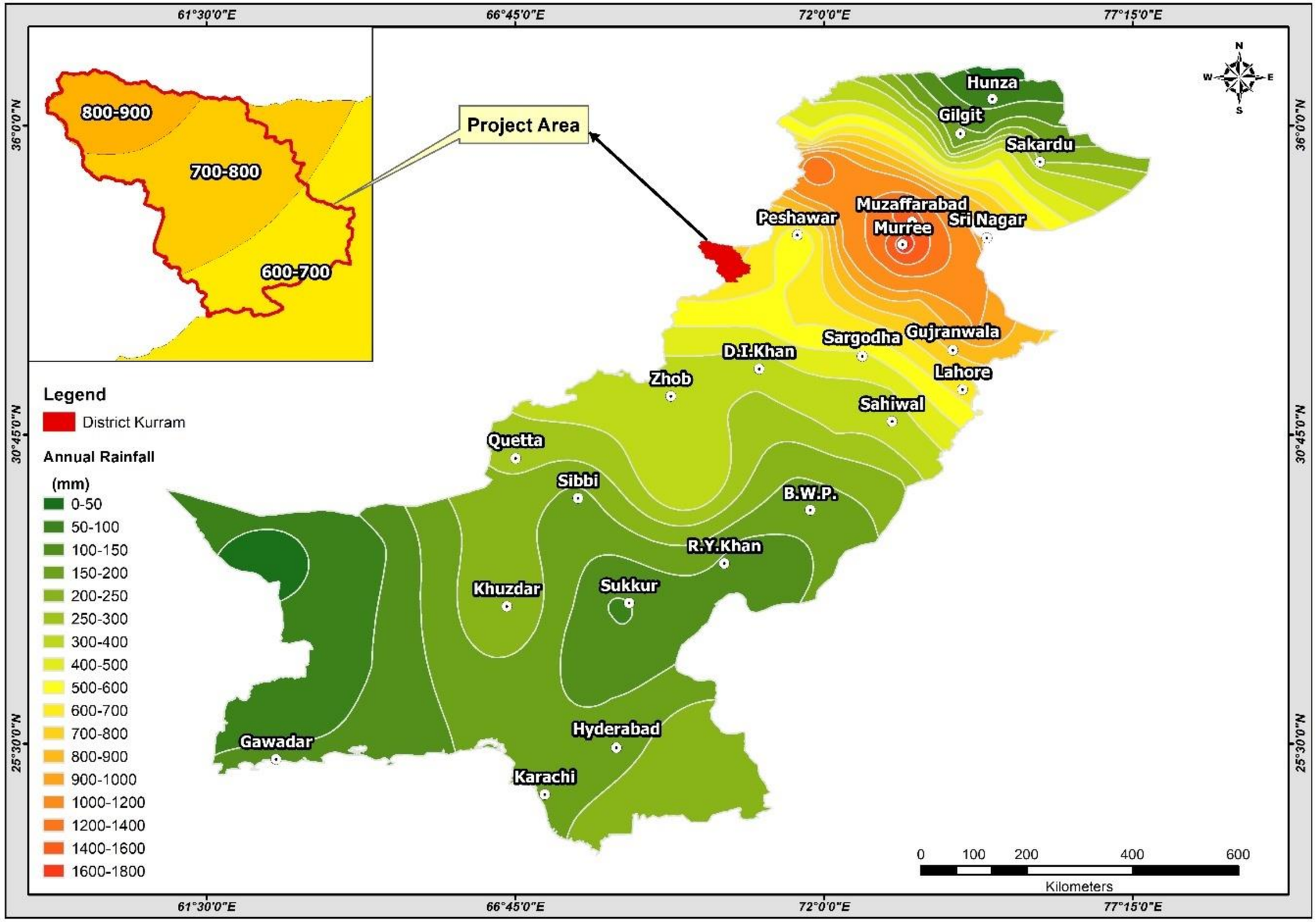


Figure 1-15: Total Number of Rainy Days

The annual normal rainfall isohyetal map (1981–2010) obtained from the Pakistan Meteorological Department (PMD) has been overlaid on Kurram District for analysis. This overlay reveals that the average annual rainfall in Kurram District ranges between 600 and 900 mm, providing valuable insights into the district's precipitation patterns and water resource potential. This has been shown in **Map 1-5.**



Map 1-5: Kurram District Overlayed on Annual Normal Isohyetal Map

1.3.2.2 Temperature

The mean daily temperature in District Kurram ranges from 19.6°C to 24.0°C during the summer months (June–September) and 2.0°C to 4.6°C in winter (December–February). The highest temperature, about 31.3°C, is recorded in June, while the lowest, –6.5°C, occurs in January. June, July, and August are the hottest months, whereas December, January, and February are the coldest. Monthly averages of minimum, maximum, and mean daily temperatures are presented in **Table 1-4** and illustrated in Figure 1-16.

Table 1-4: Mean Monthly Temperatures in Parachinar

Month	Temperature (°C)		
	Max	Max	Mean
January	9.9	-6.5	2.0
February	10.8	-3.8	3.6
March	15.3	1.4	8.7
April	21.1	7.1	14.1
May	26.4	11.6	19.0
June	31.3	16.1	23.8
July	30.9	16.9	24.0
August	29.1	15.8	22.5
September	26.6	13.0	19.6
October	22.4	7.8	15.1
November	16.8	2.3	9.5
December	12.4	-3.0	4.6

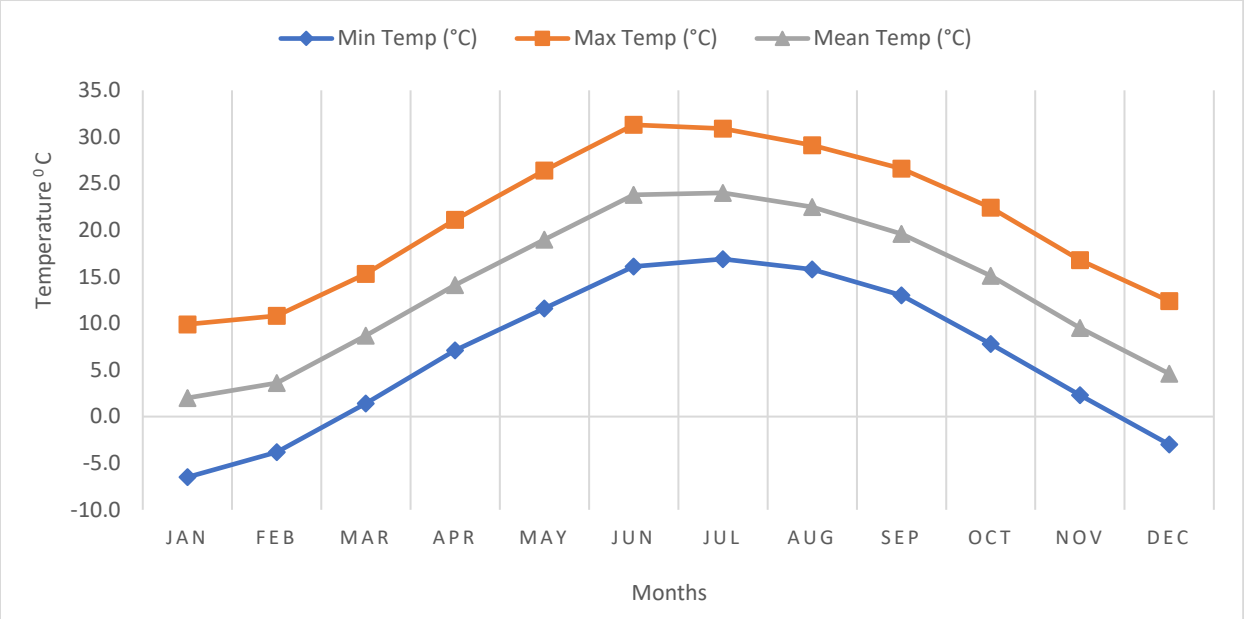


Figure 1-16: Mean Monthly Temperatures in Parachinar

1.3.2.3 Relative Humidity

The relative humidity data at 00:00, 03:00 and 12:00 hours has been collected from PMD as given in Table 1-5 and shown graphically in Figure 1-17. At 00:00 hour the relative humidity varies from lowest value of 53.5% in June to highest value of 73.5% in August. At 12:00 hour the lowest value is 40.7% in June to highest value of 60.6% in December.

Table 1-5: Mean Monthly Relative Humidity in Parachinar

Month	Relative Humidity (%)		
	00:00 UTC	03:00 UTC	12:00 UTC
January	60.8	61.2	47.5
February	66.8	65.9	53.1
March	65.6	63.7	50.9
April	65.0	57.4	48.1
May	59.2	51.3	43.2
June	53.5	48.0	40.7
July	65.8	62.6	53.8
August	73.5	69.5	60.6
September	67.3	61.3	53.1
October	57.2	53.9	44.7
November	56.3	53.1	44.4
December	56.3	54.3	45.5

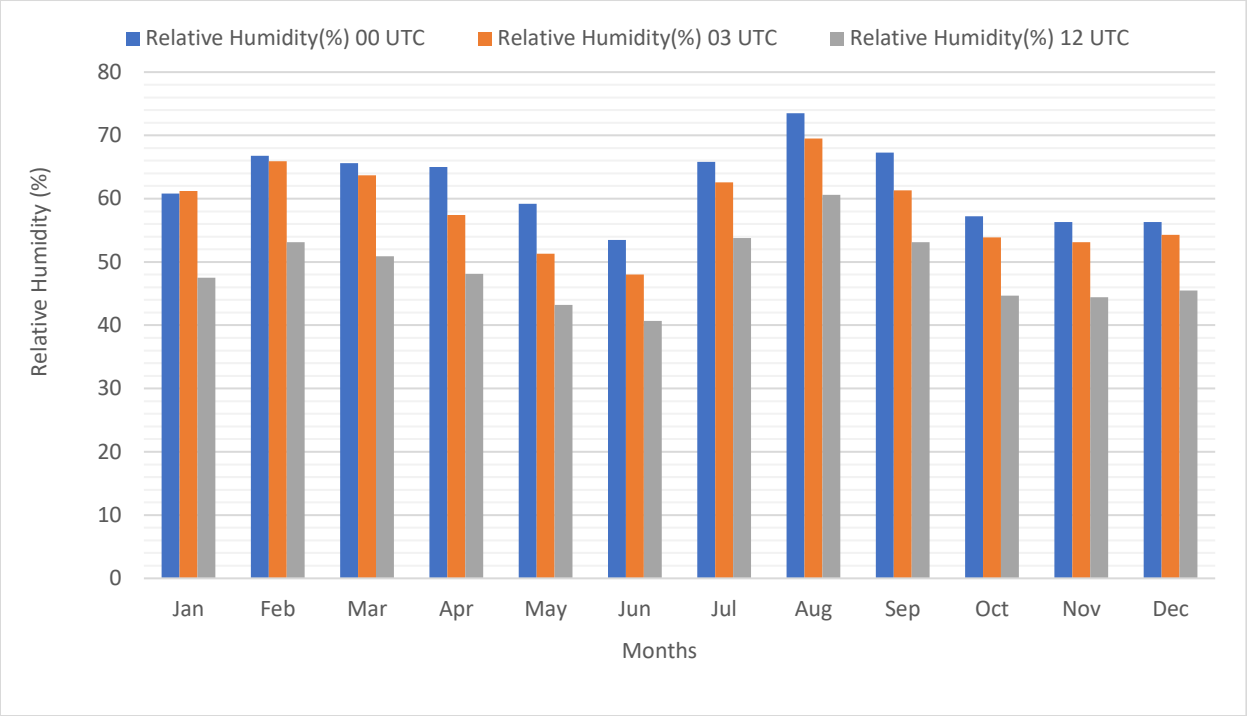


Figure 1-17: Mean Monthly Relative Humidity in Parachinar

1.3.2.4 Wind Speed

The mean monthly wind speed in knots is given in Table 1-6 and shown graphically in Figure 1-18. The data reveals that at 00:00 hours, the wind speeds are generally lower while higher wind speeds are recorded at 03:00 and 12:00 hours. During summers, wind speeds are generally higher than wind speeds in winters.

Table 1-6: Mean Wind Speed at Synoptic Hours in Parachinar

Month	Mean Wind at Synoptic Hours (Knots)		
	00:00	03:00	12:00
January	2.4	2.2	3.0
February	2.4	2.3	3.1
March	2.5	2.3	3.5
April	2.7	2.4	3.5
May	2.5	2.4	3.8
June	2.6	2.2	3.8
July	2.6	2.2	3.5
August	2.4	2.1	3.5
September	2.5	2.1	3.3
October	2.6	2.3	3.4
November	2.6	2.4	3.2
December	2.6	2.3	3

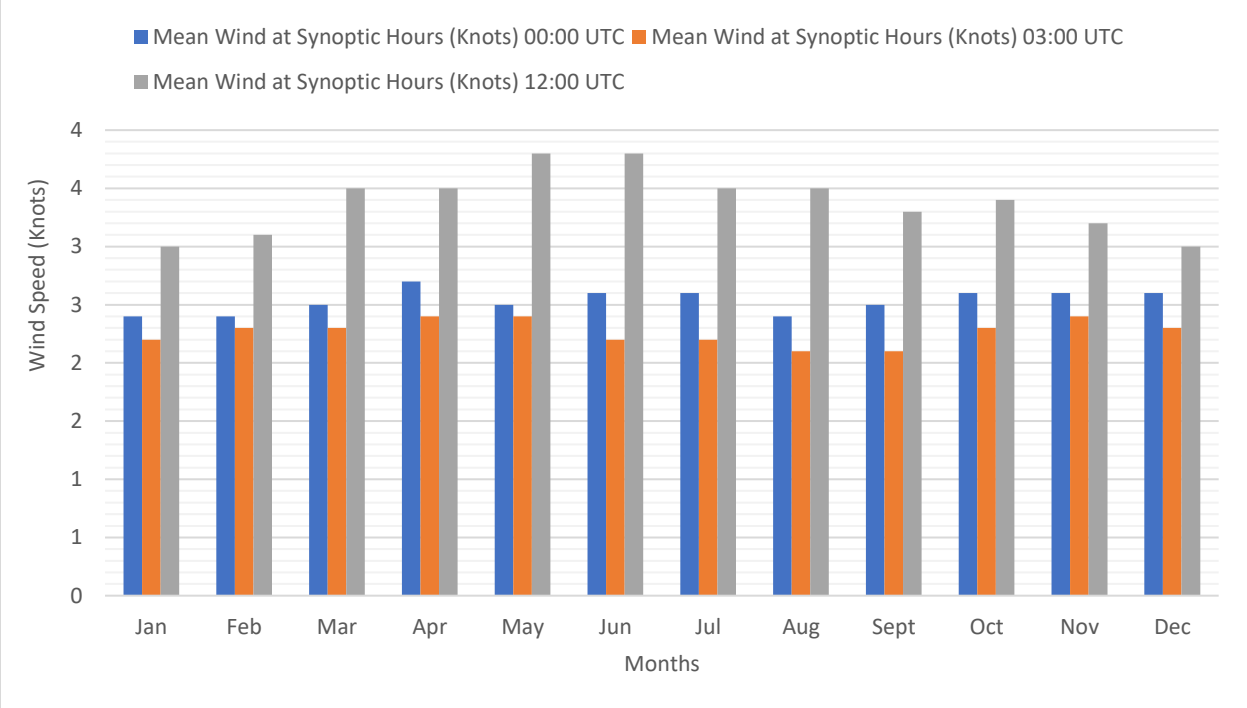


Figure 1-18: Mean Monthly Wind Speed in Parachinar

Similarly, the wind direction is presented in tabular form in the accompanying Table 1-7 and graphically illustrated in Figure 1-19, offering a comprehensive visual and numerical representation of the prevailing wind patterns in the region.

Table 1-7: Mean Wind Direction at Synoptic Hours in Parachinar

Month	Wind Direction at Synoptic Hours (Degree)		
	00:00 UTC	03:00 UTC	12:00 UTC
January	18	37	158
February	18	39	159
March	17	42	162
April	17	41	160
May	17	50	162
June	18	56	158
July	19	65	158
August	19	57	156
September	18	50	153
October	19	46	154
November	16	40	151
December	10	37	154
Annual	17	46	157

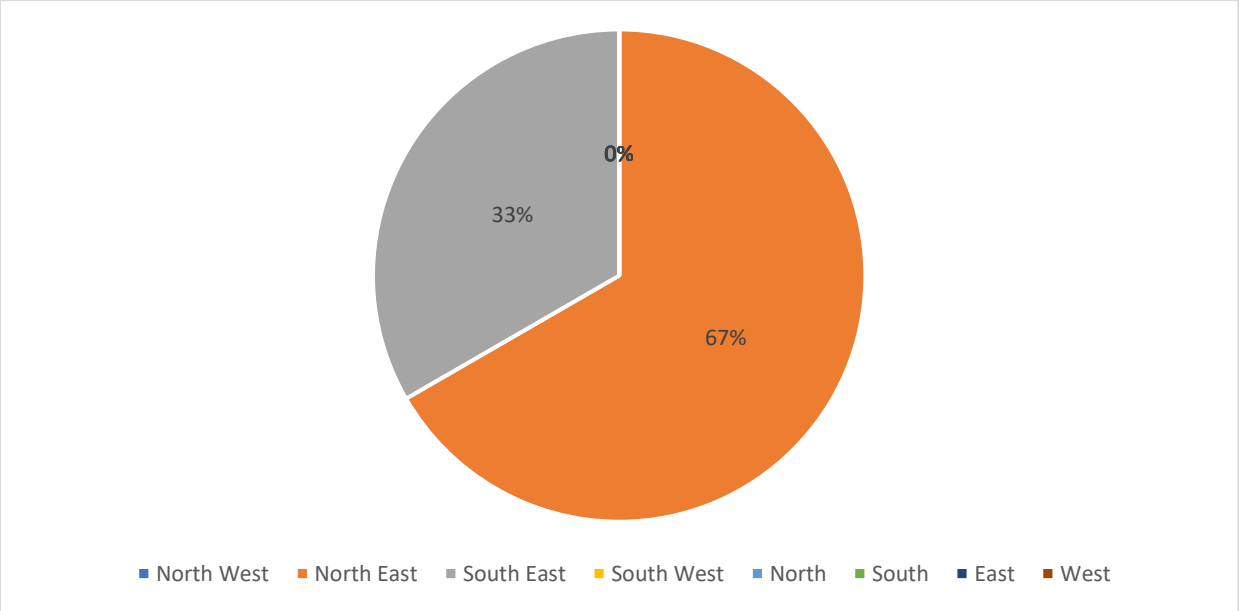


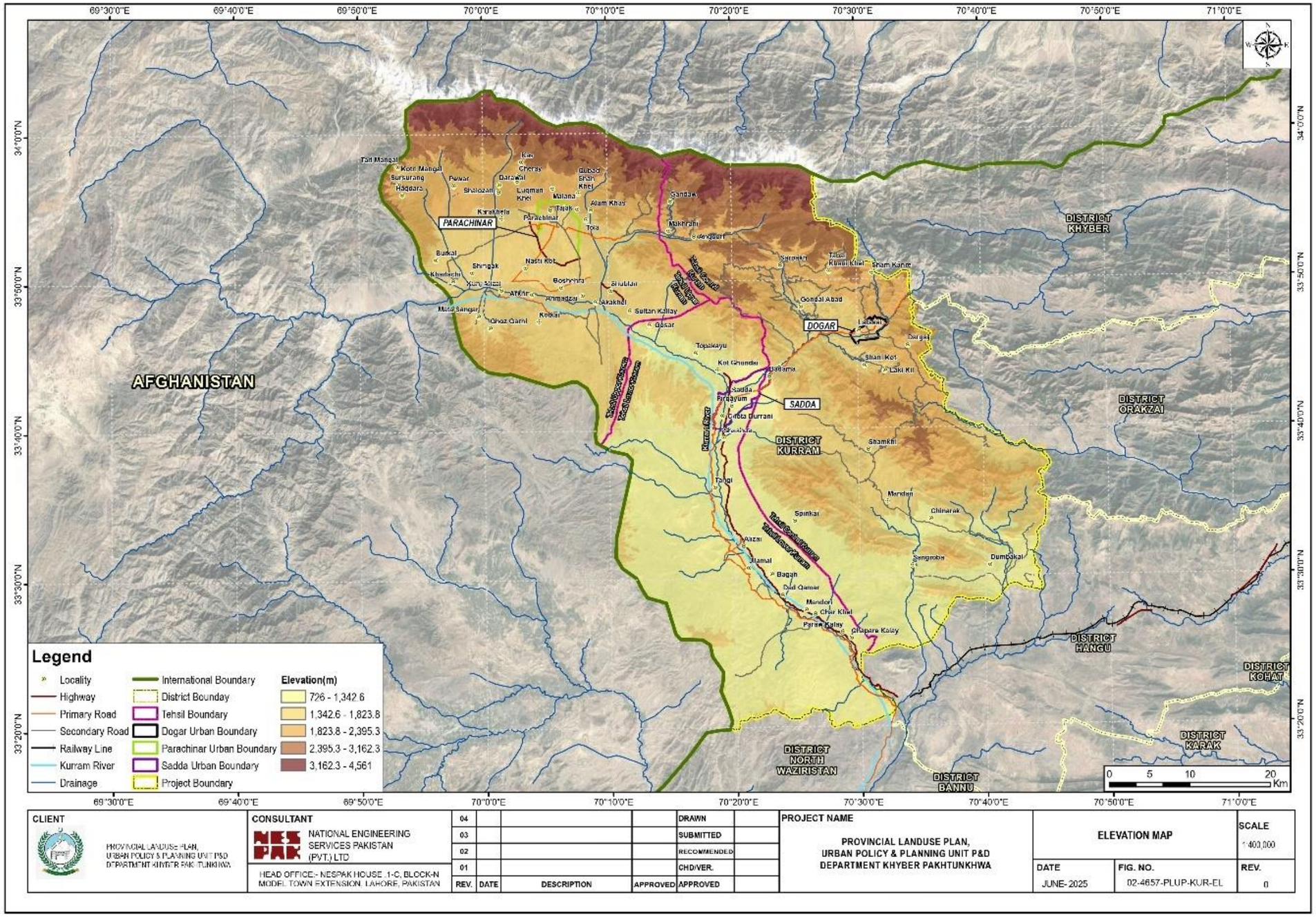
Figure 1-19: Prevailing Wind Directions

It is observed that the prevailing wind direction in the region predominantly flows from the northeast, shaping local climatic and environmental conditions.

1.3.3 Elevation

The elevation map of Kurram District uses color gradients to highlight height variations, ranging from 726 meters in the valleys to 4561 meters in the highlands. Lower elevations are mainly concentrated

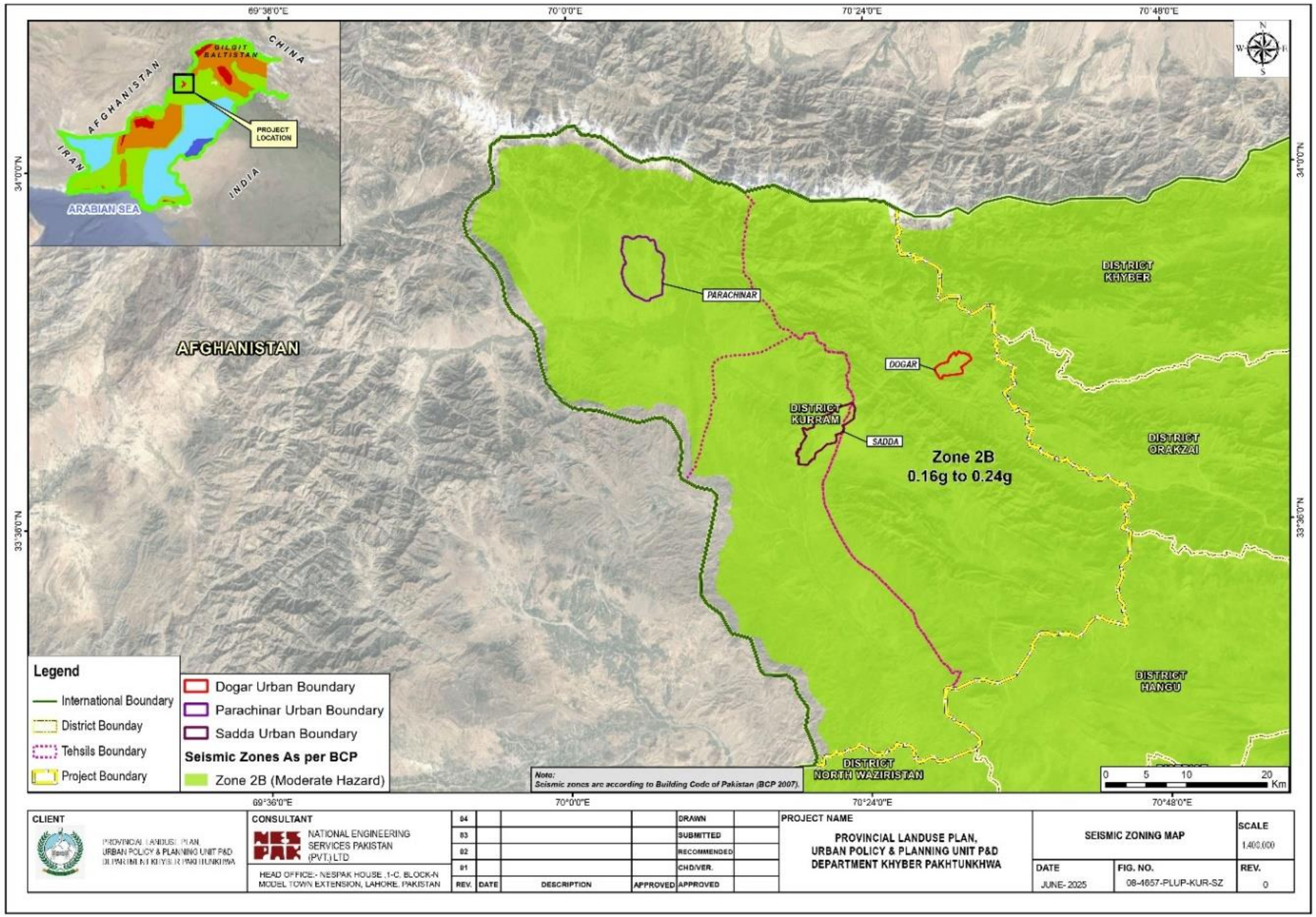
in the central and southern areas, while darker shades in the north and west represent higher ridges and rugged terrain.



Map 1-6: Elevation Map of the Project Area

1.3.4 Seismic Condition

District Kurram lies in Seismic Zone 2B, indicating a moderate earthquake risk. The district is influenced by the Main Boundary Thrust (MBT), a major tectonic feature passing through its central region, contributing to its seismic vulnerability. Past earthquakes in the area have typically ranged between magnitudes 3 and 5, reflecting moderate seismic activity. Although Kurram is not in the highest-risk zone, the presence of active fault lines necessitates earthquake-resistant construction and effective preparedness measures to minimize potential hazards.



Map 1-7: Seismic Zoning Map of District Kurram

1.4 Soil and Land use Properties of Project District

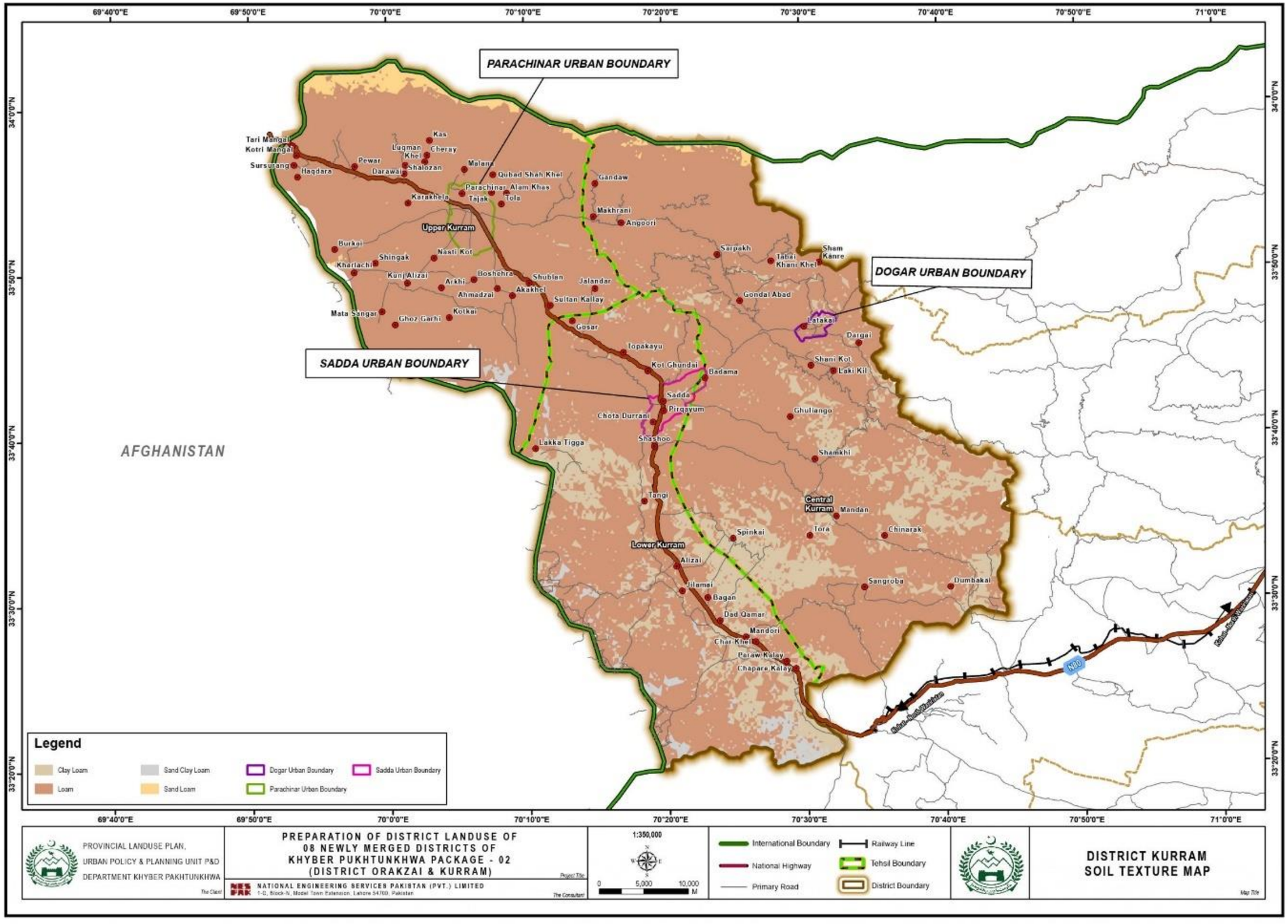
District Kurram's diverse topography and climate necessitate a detailed assessment of soil properties to understand the relationship between rainfall and runoff. Soil characteristics determine infiltration rates, which directly influence surface runoff behavior. Runoff in the district is affected by rainfall intensity, soil texture, moisture content, vegetation cover, temperature, and land development patterns. Vegetation enhances infiltration and reduces runoff, while built-up or rocky areas limit infiltration, increasing surface flow.

For accurate evaluation, data from soil survey maps, global land use datasets, satellite imagery, and field investigations are integrated. These assessments are vital for sustainable water resource management and for mitigating the impacts of extreme hydrological events. The findings guide effective land use and water conservation practices suited to Kurram's unique terrain.

According to the **Natural Resources Conservation Service (NRCS)**, soils are classified into four **hydrologic groups (A–D)** based on infiltration rates:

- **Group A:** Low runoff potential, high infiltration (7.6–11.4 mm/hr); deep sands and silts.
- **Group B:** Moderately low runoff, moderate infiltration (3.8–7.6 mm/hr); sandy loams.
- **Group C:** Moderately high runoff, slow infiltration (1.3–3.8 mm/hr); clay loams and fine-textured soils.
- **Group D:** High runoff, very slow infiltration (<1.3 mm/hr); heavy clays or soils with high water tables.

The soil properties of the project area are illustrated in Map 1-8



Map 1-8: Soil Properties Map of Kurram District

1.4.1 Land Cover of Project District

Land cover represents the surface features of an area, including vegetation, water bodies, barren lands, built-up zones, and other natural or modified surfaces. It provides essential insights into ecosystem distribution, agricultural practices, urbanization, and resource management. The land cover mapping for District Kurram, derived from remote sensing data and the Soil Survey Map of Pakistan, also identifies hydraulic soil types crucial for hydraulic modeling and infrastructure planning.

According to the **Anderson Land Cover Classification**, the project area comprises:

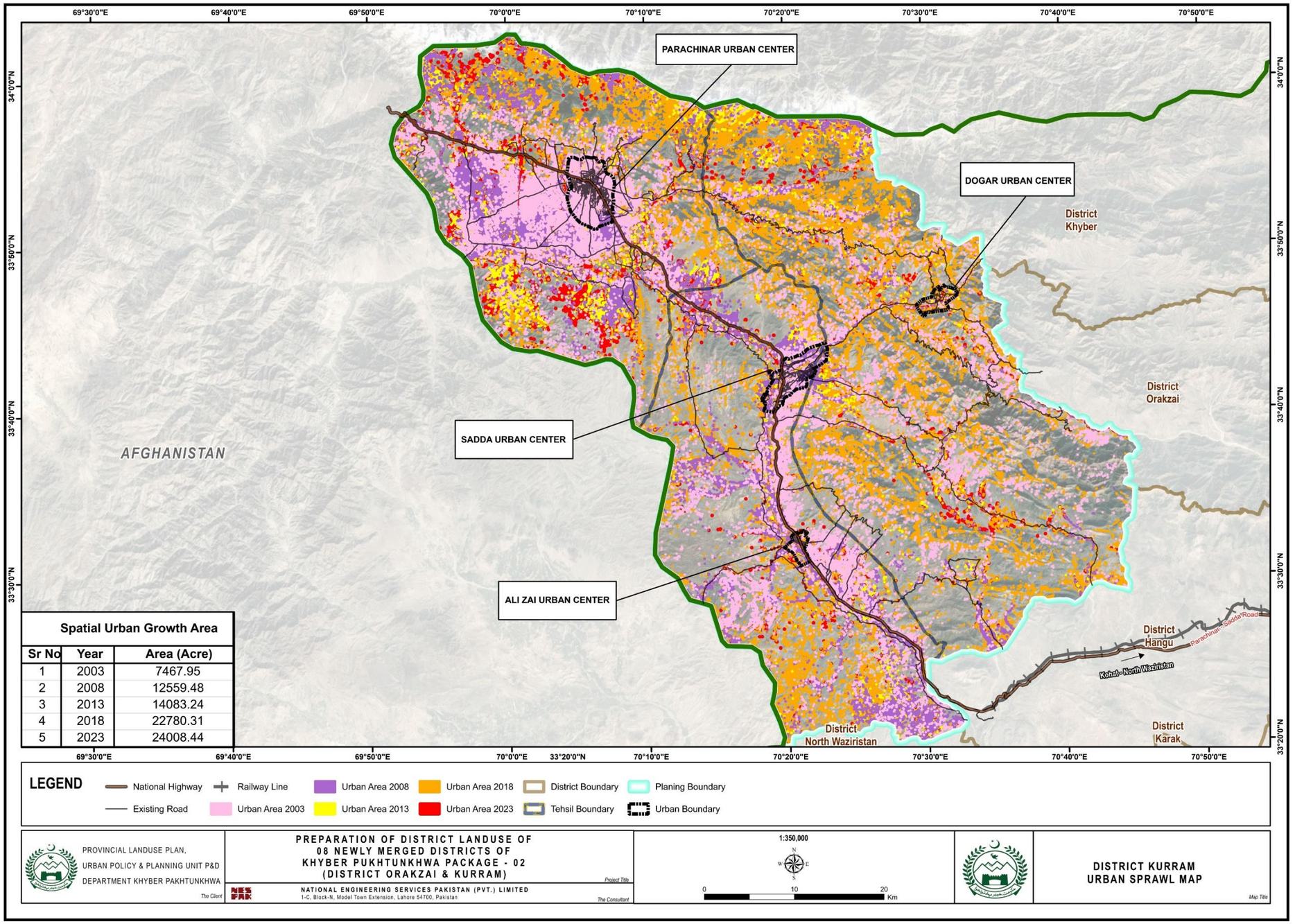
- Waterbodies
- Herbaceous Wetlands
- Bare Areas
- Built-up Areas
- Cropland
- Grassland
- Moss and Lichen
- Snow Covers
- Shrubland
- Tree Covers

The land cover characteristics are illustrated in Map 1-9.

Sub-surface soil texture significantly influences the district's **water-holding capacity** and **groundwater permeability**. Fine-textured soils like clay retain water effectively but limit its movement, while coarse-textured soils such as sand have high permeability but low retention.

Drainage density, defined as the total length of channels per unit area, further affects groundwater flow and soil-water dynamics. In District Kurram, it is classified into three categories:

- **Low (0–1 km):** Poor permeability and low water retention.
- **Medium (1–2 km):** Balanced permeability and retention.
- **High (>2 km):** Excellent permeability and water-holding capacity, ensuring efficient water movement.



Map 1-9: Land Cover Map of Kurram District

1.5 Socio Economic Profile

1.5.1 Historical Growth Trend in District Kurram

Kurram District, covering an area of 3,380 square kilometers, has experienced notable population growth over the decades. The population increased in the earliest recorded data to 614,372 in the 2017[2] census and 785,434 in 2023 with an annual average growth rate of 4.16%. While the district remains predominantly rural, with most residents living in villages, the recent designation of urban centers in 2020 such Parachinar TC has started to influence its socio-economic landscape.

Table 1-8: Population Distribution by Administrative Unit (1951–2023)

District Name	Area in SQ KM	Census Year and Population						
		1951	1961	1972	1981	1998	2017	2023
Kurram	3,380	158,000	201,000	279,998	294,362	448,310	615,372	785434
Rural		158,000	201,000	279,998	294,362	448,310	577327	739963
Urban		-	-	-	-	-	38,045	45471

The data indicates a steady increase in population over the decades, with rural areas consistently dominating the district's demographic structure.

Table 1-9: Population Growth Rates in District Kurram (1972–2023)

Census Year	Population	Intercensal Growth Rate (%)	Annual Growth Rate (%)	Years Between Censuses
1972		2.9%		
1981	294,362	5.0[3]%	0.55%	9
1998	448,310	173.47%	4.29%	17
2017	615,372	37.26%	3.48%	19
2023	785,434	27.64%	4.16[4]%	6

1.5.2 Population Growth of District Kurram

In the above table the population growth trends in District Kurram from 1972 to 2023 reveal distinct demographic shifts. During the 1972–1981 period, the district experienced average growth, with an intercensal increase of 5.0% and an annual growth rate of 0.55%. This growth trend continued through the 1981–1998 period, albeit at a significant pace with a 173.47% intercensal increase and an annualized rate of 4.29%. The 1998–2017 period marked a recovery, with a moderate intercensal growth rate of 36.26% and a corresponding annual growth rate of 3.48%. These trends underscore the dynamic and fluctuating population patterns in the district over time. The 2017 and 2023 period depict a significant increase of 26.77% intercensal growth rate with 4.16% increase of average annual growth rate with the 785,434 number of total populations.

[2] https://www.pbs.gov.pk/sites/default/files/population/2017/results/03001.pdf
[3] https://repository.lahoreschool.edu.pk/xmlui/handle/123456789/14739
[4] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_1_kp_districts.pdf

1.5.3 Tehsil Level Analysis

A comparative analysis at the tehsil level provides further insight into demographic trends within Kurram District. The district headquarters of Kurram i-e Parachinar is fall in the Upper tehsil of Kurram. Among the tehsils, Central Kurram has shown a remarkable population increase over the years, emerging as the most populated tehsil.

Table 1-10: Intercensal Population Statistics at Tehsil Level in District Kurram

Tehsils	Census Years and Population						
	1951	1961	1972	1981	1998	2017	2023
Upper Kurram	-	-	-	118,476	185,571	252,436	275,819
Centre Kurram	-	-	-	122,813	181,416	229,007	358,670
Lower Kurram	-	-	-	53,073	81,323	133,929	150,945

Note: Tehsil-wise population data for 1972 and earlier censuses is unavailable.

1.5.4 Population Distribution

According to the 2023 census, Kurram District, covering 3,380 km², has a population of 785,434 including 406,914 males, 378,505 females, and 15 transgender persons resulting in a sex ratio of 107.51 and a population density of 232.38 persons/km². The district remains largely rural, with 739,963 people (94.21%) in rural areas and 45,471 (5.79%) in urban centers.

Households are typically large, averaging 8.3 members, reflecting strong extended family traditions. Between 2017 and 2023, the population grew at an annual rate of 4.16%, higher than Khyber Pakhtunkhwa's 2.38% and the national 2.55%, mainly due to migration and socio-economic factors.

Overall, the population distribution reflects Kurram's balanced gender composition, rural predominance, and steady demographic growth, shaped by its geography and cultural structure.

Table 1-11: Tehsil Wise Population Density and Sex Ratio

NAME OF ADMINISTRATIVE UNIT	ALL SEXES	MALE	FEMALE	TRANS GENDER	SEX RATIO	POPULATION DENSITY PER SQ.K.M
KURRAM DISTRICT	785,434	406,914	378,505	15	107.51	232.38
RURAL	739,963	382,747	357,202	14	107.15	
URBAN	45471	24,167	21,303	1	113.44	
CENTRAL KURRAM F.R	358,670	190,453	168,210	7	113.22	243.99
TEHSIL	358,670	190,453	168,210	7	113.22	
RURAL	-	-	-	-	-	
URBAN	150,945	77,724	73,216	5	106.16	160.58
LOWER KURRAM TEHSIL	111,057	56,531	54,522	4	103.68	
RURAL	39888	21,193	18,694	1	113.37	
URBAN	275,819	138,737	137,079	3	101.21	284.35
UPPER KURRAM TEHSIL	270,236	135,763	134,470	3	100.96	
RURAL	5583	2,974	2,609	-	113.99	
URBAN	785,434	406,914	378,505	15	107.51	232.38
KURRAM DISTRICT	739,963	382,747	357,202	14	107.15	
RURAL	45471	24,167	21,303	1	113.44	

1.5.4.1 Age and Sex-Wise Population Distribution

The 2023 census of District Kurram records a total population of 785,434, comprising 406,901 males, 378,505 females, and 15 transgender individuals, with the entire population categorized as rural. The sex ratio stands at 107.51 males per 100 females, reflecting regional demographic trends.

Age-wise, the largest group is children aged 0–4 years (66,644; 18.4%), underscoring the need for strong healthcare and early education systems. The 5–9 years group includes 60,410, and 10–14 years totals 47,374, emphasizing continued investment in primary and middle education. The youth segment (15–24 years), numbering 65,575, highlights the demand for education and employment opportunities.

The young adult group (25–39 years) comprises 74,468, representing a vital part of the workforce and economic base. Meanwhile, senior citizens (60+ years) number 16,208, indicating the need for improved healthcare and social support services.

Overall, this demographic profile highlights the importance of targeted planning in health, education, and social welfare, ensuring balanced and sustainable development across all age groups in District Kurram.

Table 1-12 Kurram District Age and Sex Wise Population Distribution[5]

Age (Years)	MALE	FEMALE	TRANS GENDER	Total
ALL AGES	406914	378505	15	785434
00 – 04	78486	66644	0	145130
05 – 09	69918	60410	0	130328
10 – 14	55727	47374	2	103103
15 – 19	41814	37695	5	79514
20 – 24	29246	29880	1	59127
25 – 29	24955	27130	3	52088
30 – 34	23119	26259	0	49378
35 – 39	20393	21079	1	41473
40 – 44	15451	15910	0	31361
45 – 49	12413	12006	0	24419
50 – 54	9415	10149	2	19566
55 – 59	7545	7761	1	15307
60 – 64	6853	7232	0	14085
65 – 69	4990	3877	0	8867
70 – 74	3605	2979	0	6584
75 & ABOVE	2984	2120	0	5104

1.5.5 Population Density

Kurram District, covering an area of 3,380 square kilometers, has experienced notable population growth over the decades. The population has increased from 615,375 in earlier records to 785,434 in the 2023 census while projection upt0 2025 give the figure of 852,141 number of individuals. The district remains predominantly rural, with most residents living in villages. However, the designation of urban centers in 2020, including Sada and Parachinar, has begun to reshape the district's socio-economic landscape, indicating a gradual shift toward urbanization.

Population density, a key metric in urban and land use planning, refers to the number of people living per unit of land area. It is calculated using the formula:

Population Density = Total Population / Land Area (sq. km.)

In 2023, Kurram District had a population density of 232.38 people per square kilometer. This density provides valuable insight into the region's spatial distribution of resources, infrastructure, and services. While high-density areas often feature increased demands for housing, transportation, and utilities, Kurram's primarily rural composition presents an opportunity for balanced development with fewer pressures typically associated with urban overcrowding.

As urban centers develop within the district, population density patterns are expected to shift, necessitating careful planning to allocate resources, design transportation networks, and ensure

[5] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_4_kp_districts.pdf

equitable service distribution. Balancing population density is crucial for fostering sustainable growth, addressing challenges like congestion and service strain, and enhancing the quality of life for residents.

1.5.6 In Migration

According to the Labour Force Survey (2020–21), a total of 2,827 individuals were surveyed in District Kurram, of which 241 (8.52%) had migrated into the district during the reference period. This migration plays a vital role in shaping the district's demographic and development dynamics.

The in-migration data (2021–22) shows that 78.01% of migrants came from within Pakistan, while 21.99% arrived from abroad, reflecting both internal and external migration trends.

Internal Migration:

A majority of migrants (61.83%) originated from rural areas, particularly from Hangu (33.20%), Kohat (9.54%), and Karak (7.05%), indicating strong regional and socio-economic ties. Urban migrants (16.18%) mainly came from Peshawar (5.81%), Rawalpindi (4.56%), and Karachi Central (1.24%), often for land access, employment, or familial reasons. Overall, migration from both rural and urban regions highlights a preference for rural resettlement due to agricultural and livelihood opportunities.

Foreign Migration:

Internationally, 21.99% of in-migrants originated from abroad, led by the United Arab Emirates (14.11%) and Saudi Arabia (3.32%), followed by Iran, Iraq, Kuwait, Qatar, and the United Kingdom (each between 0.41–1.24%). These inflows reflect return migration patterns driven by Labour movement, economic opportunities, and family reunification.

Overall, migration in District Kurram demonstrates both regional interconnectedness and global linkages, influencing the district's demographic composition and socio-economic landscape.

Table 1-13: District Kurram District Wise in Migration from Labour Force Survey 2021-2022[6]

Previous residence was located in...	Rural Percentages	Urban Percentages	Total Percentages
Abbottabad	0.00%	0.41%	0.41%
Bagh	1.66%	0.00%	1.66%
Bajaur	0.41%	0.00%	0.41%
Bannu	2.90%	0.00%	2.90%
Charsada	0.83%	0.41%	1.24%
Gujranwala	0.41%	1.24%	1.66%
Hangu	33.20%	0.41%	33.61%
Islamabad	0.00%	0.83%	0.83%
Jhang	0.83%	0.00%	0.83%
karachi Central	0.00%	1.24%	1.24%
Karachi West	0.83%	0.00%	0.83%
Karak	7.05%	0.41%	7.47%
Khyber	0.83%	0.00%	0.83%
Kohat	9.54%	0.00%	9.54%
Lahore	0.00%	0.41%	0.41%
Mardan	0.41%	0.00%	0.41%
Nowshera	0.00%	0.41%	0.41%
Kurram	2.49%	0.00%	2.49%
Peshawar	0.41%	5.81%	6.22%
Rawalpindi	0.00%	4.56%	4.56%
Total	61.83%	16.18%	78.01%
Foreign			
Iran			1.24%
Iraq			1.24%
Kuwait			1.24%
Qatar			0.41%
Saudi Arabia			3.32%
United Arab Emirates			14.11%
United Kingdom			0.41%
Grand Total			21.99%

The 2021–2022 Labour Force Survey identifies several key reasons for migration to District Kurram, reflecting social, economic, and security-related factors. A major share (34.44%) of migrants returned to their home areas, showing strong cultural and familial ties. Security concerns (27.39%) also played

[6] Pakistan Bureau of Statistics. (March, 2022). Pakistan Labor Force Survey 2020-2021. Micro Data

a significant role, as many relocated due to law-and-order issues in their previous regions. Family-related migration remains prominent, with 16.18% moving to live with parents and 10.37% with spouses. Other reasons include marriage (5.39%), employment (4.14%), business (0.83%), and education (1.24%).

These migration trends carry important implications for land use and development planning. The high proportion of security-related migration underscores the need for enhanced stability measures, while the prevalence of family migration highlights the demand for family housing and community services. At the same time, policies promoting job creation, entrepreneurship, and educational infrastructure will be vital to support the district's growing and diversifying population.

Table 1-14: District Kurram Occupation Wise In-Migration from Labour Force Survey 2021-2022[7]

Reason for Migration	No of Responses	Percentages
Job transfer	5	2.07%
Found a job	5	2.07%
Education	3	1.24%
Business	2	0.83%
Marriage	13	5.39%
With parents	39	16.18%
With spouse	25	10.37%
Returned to his home	83	34.44%
Security/ Law & order	66	27.39%
Grand Total	241	100.00%

1.5.7 Out Migration

According to the Labor Force Survey (2020–21), a total of 6,606 individuals migrated out from their respective districts across Khyber Pakhtunkhwa. Among these, 197 persons originated from District Kurram, representing 2.98% of the province's total out-migrant population.

Spatial analysis of out-migration destinations reveals that 44.06% of these individuals relocated to the neighboring district of Hangu 61.93%, while 16.24% moved to Kohat. This pattern indicates strong socio-economic linkages between District Kurram and adjacent districts, with significant population flows directed towards these neighboring rural and semi-urban areas.

A detailed breakdown of out-migration statistics for District Kurram is provided in table 3.7, offering critical insights for planners and policymakers. Understanding these migration trajectories is vital for regional development planning, infrastructure provisioning, and the formulation of targeted interventions aimed at managing demographic shifts and addressing the underlying causes of out-migration.

[7] Pakistan Bureau of Statistics. (March, 2022). Pakistan Labor Force Survey 2020-2021. Micro Data

Table 1-15 District Kurram District Wise Out-Migration from Labour Force Survey 2021-2022

District/Country	Count of District	Percentages
BUNER	1	0.51%
DERA ISMAIL KHAN	2	1.02%
HANGU	122	61.93%
HARIPUR	1	0.51%
ISLAMABAD	7	3.55%
KHYBER	6	3.05%
KOHAT	32	16.24%
LORALAI	4	2.03%
NORTH WAZIRISTAN	1	0.51%
NOWSHERA	4	2.03%
KURRAM	2	1.02%
PESHAWAR	14	7.11%
RAWALPINDI	1	0.51%
Grand Total	197	100.00%

Out-migration from District Kurram is mainly family-driven, with 37.06% of respondents moving to live with parents. Security concerns (17.26%) are another major factor, emphasizing the need for improved safety and stability. Marriage-related migration (11.68%) points to the demand for suitable housing for newly married couples, while job-related movement (3.06%) highlights the importance of creating local employment opportunities. Additionally, 1.02% of migrants left in search of better agricultural land, stressing the need to safeguard fertile areas.

Overall, these trends indicate that effective land use planning should prioritize family housing, economic development, security enhancement, and agricultural land preservation to reduce out-migration and promote sustainable growth in District Kurram.

Table 1-16 District Kurram Occupation Wise Out-Migration from Labour Force Survey 2021-2022[8]

Reason of Migration	No of Respondents	Percentages
Job transfer	2	1.02%
Found a job	2	1.02%
Searching for a job	2	1.02%
Searching for a better agriculture land	2	1.02%
Marriage	23	11.68%
With parents	73	37.06%
With spouse	28	14.21%
With son/ daughter	5	2.54%
Change of residence	6	3.05%
Returned to his home	1	0.51%
Security/ Law & order situation	34	17.26%
Other	19	9.64%
Grand Total	197	100.00%

[8] Pakistan Bureau of Statistics. (March, 2022). Pakistan Labor Force Survey 2020-2021. Micro Data

1.5.8 Population Projection of 20 Year

To project the population of District Kurram over the next 20 years, three models have been applied: the exponential growth model, the geometric growth model, and the linear growth model. These methods allow for a more accurate understanding of future demographic trends.

The Exponential Growth Model is defined as:

$$P(t)=P_0 \times e \wedge (r \times t)$$

where:

$P(t)$ = population at time

P_0 = base year population

r = annual growth rate (decimal)

t = time in years

e = Euler's number (2.718)

Explanation: This model assumes that the population grows continuously at a constant rate over time. It's typically used in cases where growth is unrestricted, such as in an idealized, isolated population. However, it may not be realistic in the long run because it doesn't account for factors like resource limitations or changes in fertility or mortality rates.

The Geometric Growth Model is expressed as:

$$P(t)=P_0(1+G_R/100) \wedge n$$

Explanation: This model assumes that the population grows by a constant percentage over each time period. It's useful for understanding compounded growth over fixed intervals (e.g., annually).

The Linear Growth Model follows the formula:

$$P(t)=P_0 + (r \times t)$$

Explanation: This model assumes that the population grows by a fixed number each time period, which is a simple linear increase. It's best suited for populations with steady growth rates over time.

Based on the assessment of multiple projection models, the average of 3 models was selected for population forecasting in District Kurram, as it provides a balanced and realistic estimate. This approach ensures reasonable, adaptable, and sustainable population projections aligned with anticipated growth trends.

Using the average annual growth rate derived from the 1998, 2017, and 2023 censuses estimated at 2.78% and the 2023 census rate of 4.16%[9], the district's population is projected to increase from 785,434 (2023) to approximately 1,486,194 by 2045. Among tehsils, Central Kurram is expected to reach about 764,019, Upper Kurram around 416,823, and Lower Kurram about 305,352 residents by 2045.
This population growth will significantly increase density and development pressure, requiring strategic planning for resource management, infrastructure, and service delivery. As most growth will occur in

[9] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_1_kp_districts.pdf

rural areas, substantial investments in housing, transport, education, and healthcare will be necessary.

The projected expansion highlights the need for sustainable and integrated development strategies that balance population growth with environmental conservation, employment generation, and equitable land use. Effective planning based on these projections will be crucial to ensure that Kurram's future growth remains inclusive, resilient, and sustainable.

Table 1-17 Kurram District Population Projection for Plan Period (2025-2045), Using Geometric Growth Model

	AREA (SQ. KM.)	POPULATION - 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
KURRAM DISTRICT	3,380	785,434	834077	971281	1134516	1329417	1562987
RURAL		739,963	783263	904067	1045387	1210969	1405278
URBAN		45471	50815	67215	89130	118448	157709
CENTRAL KURRAM F.R TEHSIL	1,470	358,670	386298	465040	559834	673950	811327
RURAL		358,670	386298	465040	559834	673950	811327
URBAN							
LOWER KURRAM TEHSIL	940	150,945	160853	178286	225116	269613	325739
RURAL		111,057	115922	129036	143634	159883	177971
URBAN		39888	44931	60507	81482	109729	147769
UPPER KURRAM TEHSIL	970	275,819	286927	315310	349566	385855	425921
RURAL		270,236	281043	309990	341919	377136	415981
URBAN		5583	5884	6708	7647	8719	9940

Table 1-18 Kurram District Population Projection for Plan Period (2025-2045), Using Exponential Growth Model

NAME OF ADMINISTRATIVE UNIT	AREA SQ.K.M	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
KURRAM DISTRICT	3,380	785,434	834940	974949	1142185	1342720	1584154
RURAL		739,963	783959	906951	1051243	1220809	1420397
URBAN		45471	729257	818054	920382	1039149	1178099
CENTRAL KURRAM F.R TEHSIL	1,470	358,670	386834	467302	564509	681936	823791
RURAL		358,670	386834	467302	564509	681936	823791
URBAN							
LOWER KURRAM TEHSIL	940	150,945	161068	190518	227292	273648	332611
RURAL		111,057	115975	129243	144029	160507	178870
URBAN		39888	45093	61275	83263	113141	153741
UPPER KURRAM TEHSIL	970	275,819	287039	317130	350384	387135	427752
RURAL		270,236	281151	310406	342705	378366	417736
URBAN		5583	5888	6724	7679	8770	10015

Table 1-19 Kurram District Population Projection for Plan Period (2025-2045), Using Linear Growth Model

NAME OF ADMINISTRATIVE UNIT	AREA SQ.K.M	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
KURRAM DISTRICT	3,380	785,434	833253	952800	1072347	1191894	1311441
RURAL		739,963	782592	889165	995739	1102312	1208885
URBAN		45471	50661	63634	76608	89582	102556
CENTRAL KURRAM F.R TEHSIL	1,470	358,670	385785	453574	521363	589151	656940
RURAL		358,670	385785	453574	521363	589151	656940
URBAN							
LOWER KURRAM TEHSIL	940	150,945	160650	184914	209177	233441	257704
RURAL		111,057	115869	127901	139932	151963	163994
URBAN		39888	44781	57013	69246	81478	93710
UPPER KURRAM TEHSIL	970	275,819	286817	314312	341807	369302	396797
RURAL		270,236	280937	307691	334444	361197	387951
URBAN		5583	5880	6621	7363	8104	8846

Table 1-20 Kurram District Population Projection for Plan Period (2025-2045), Taking Average of the 3 Models

NAME OF ADMINISTRATIVE UNIT	AREA SQ.K.M	Population 2023	Average of 3 Methods (2025)	Average of 3 Methods (2030)	Average of 3 Methods (2035)	Average of 3 Methods (2040)	Average of 3 Methods (2045)
KURRAM DISTRICT	3,380	785,434	834090	966344	1116349	1288010	1486194
RURAL		739,963	783271	900061	1030789	1178030	1344854
URBAN		45471	276911	316301	362040	415726	479455
CENTRAL KURRAM F.R TEHSIL	1,470	358,670	386306	461972	548568	648346	764019
RURAL		358,670	386306	461972	548568	648346	764019
URBAN							
LOWER KURRAM TEHSIL	940	150,945	160857	184572	220528	258901	305352
RURAL		111,057	115922	128727	142532	157451	173612
URBAN		39888	44935	59598	77997	101449	131740
UPPER KURRAM TEHSIL	970	275,819	286927	315584	347253	380764	416823
RURAL		270,236	281044	309362	339689	372233	407223
URBAN		5583	5884	6684	7563	8531	9601

1.5.9 Household Size

According to the 2023 population census, the average household size in District Kurram is 8.3 persons per household, reflecting the prevalence of extended family systems typical of rural communities.

Across tehsils, Central Kurram records the highest household size at 8.7, likely due to larger family units and shared living arrangements shaped by cultural and economic factors. Lower Kurram shows an average of 7.8, indicating similar household dynamics with minor socio-economic variations, while Upper Kurram averages 8.0, possibly influenced by migration patterns and local economic conditions.

These variations highlight the district's diverse family structures and living patterns, offering valuable insights into its social and demographic fabric for future planning and development initiatives.

1.5.10 Literacy Analysis of Kurram District

According to the Pakistan Bureau of Statistics, a person is considered literate if they can read a newspaper or journal of ordinary complexity and write a simple letter in any language. This definition provides a practical measure of basic literacy skills, forming the basis for calculating literacy rates as the percentage of the population aged 10 years and above who are literate.

The 2023 census literacy analysis for District Kurram reveals notable gender disparities and a declining literacy trend with age. The 10–14 age group records the highest literacy rate at 53.82% (males 64.95%, females 40.73%), mainly at the primary and middle levels. Literacy drops sharply in

older groups, with those aged 40 and above showing rates below 15.73%, reflecting limited access to education in past decades. Higher educational attainment, especially beyond matriculation, remains rare, particularly among females whose literacy levels fall considerably in the 30+ age group.

These findings emphasize the urgent need for targeted educational interventions to reduce gender gaps and expand access to higher education across all age groups in District Kurram.

Table 1-21 Literacy Analysis of Kurram District by Age and Sex[10]

Age Group (Years)	Male Literacy (%)	Female Literacy (%)	Overall Literacy (%)	Educational Attainment Focus
10- 14	64.95%	40.73%	53.82%	Primary and middle education dominate.
15-19	63.10%	31.43%	48.09%	Matriculation level significant for males.
20-24	55.22%	21.98%	38.42%	Some progression to intermediate and graduate.
25-29	49.90%	15.69%	32.08%	Gradual drop with fewer advancing to higher education.
30-34	45.89%	11.12%	27.40%	Concentrated at matriculation and intermediate.
35-39	43.04%	9.10%	25.79%	Continued decline across all levels.
40 +	28.21%	3.01%	15.73%	Mostly limited to basic or no formal education.

[10] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_13_kp_districts.pdf

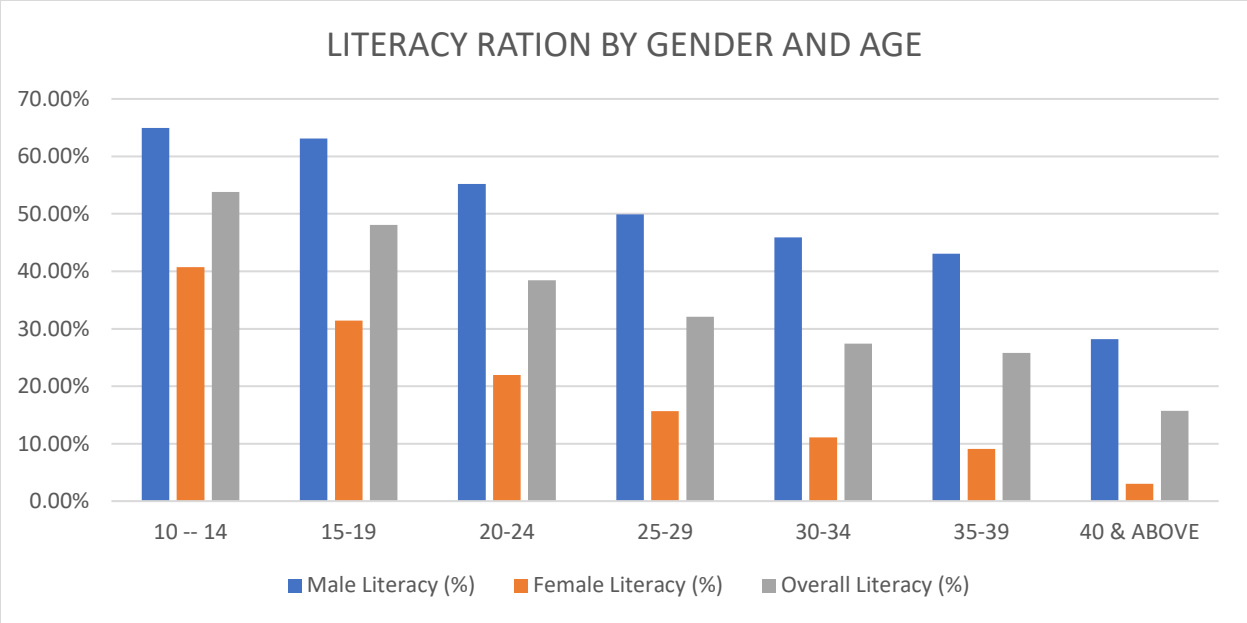


Figure 1-20: District Kurram Literacy Ration by Age and Sex

1.5.11 Education Attainment

Educational attainment denotes the highest level of formal education successfully completed by an individual. It serves as a key demographic indicator reflecting the population's overall educational qualifications, ranging from primary and secondary education to tertiary and postgraduate levels.

Assessing educational attainment is essential for policymakers, as it informs workforce skill profiling, human capital development, and the design of targeted educational and economic initiatives. Understanding the distribution of educational attainment within a community aid in aligning infrastructure, service provision, and employment strategies with the population's capabilities and growth potential.

1.5.11.1 Education Attainment (LFS 2021-22)

The 2021–2022 Labour Force Survey (LFS) highlights significant educational challenges across Kurram District's three tehsils Central, Lower, and Upper Kurram. The data underscores widespread educational deprivation and limited access to higher learning, which have direct implications for development planning.

A major concern is the high percentage of individuals who have never attended school, with 72.35% in Central Kurram, 45.89% in Lower Kurram, and 39.73% in Upper Kurram. This calls for urgent expansion of primary schools and community learning centers, particularly in rural areas, alongside measures to reduce dropout rates and boost attendance.

Early education also faces challenges, as 18.03% in Upper Kurram possess only K.G. or below primary education, indicating poor transition to formal schooling. Strengthening early childhood programs and improving access to nearby primary schools are key to addressing this gap.

Educational continuity remains weak, with 12.79% in Upper Kurram completing primary but not progressing further, and 9.82% in Lower Kurram completing matriculation but below intermediate.

Expanding middle and secondary school infrastructure, reducing economic barriers, and promoting gender-inclusive policies are vital to improve retention and advancement.

Participation in higher education is extremely low—only 0.04% in engineering, 0.13% in medicine, and 2.00% overall degree holders (rising to 3.04% in Upper Kurram). Similarly, just 1.00% hold M.A/M.Sc degrees and 0.13% have M.Phil qualifications. This reflects the severe shortage of colleges, universities, and technical institutes in the district. Establishing such institutions, along with vocational and technical training centers, is essential for building a skilled workforce.

To overcome these challenges, land use planning must integrate educational facilities within residential and commercial developments, ensuring equitable access to schools, colleges, and training centers. Investments in infrastructure, teacher training, and digital learning platforms can further enhance education quality and outreach.

In summary, the LFS 2021–2022 data reveals critical educational gaps in District Kurram, but also offers a clear roadmap for improvement. Prioritizing education in spatial and development planning, coupled with targeted policy interventions, can foster a more skilled, educated, and economically resilient population.

Table 1-22 Educational Attainment as per Labour Force Survey[11]

Education Level	CENTRAL KURRAM F.R	LOWER KURRAM TEHSIL	UPPER KURRAM TEHSIL	Grand Total
Degree in engineering	0.00%	0.18%	0.00%	0.04%
Degree in medicine	0.00%	0.54%	0.00%	0.13%
Degree in other subjects	0.45%	2.68%	3.04%	2.00%
Inter. but below degree	0.56%	4.82%	6.18%	3.79%
K.G but below primary	11.74%	14.29%	18.03%	14.83%
M.A/M.Sc	0.34%	1.07%	1.57%	1.00%
M.Phil	0.00%	0.18%	0.21%	0.13%
Matric but below intermediate	1.69%	9.82%	8.60%	6.33%
Middle but below matric	3.50%	8.21%	6.60%	5.83%
Never attended school	72.35%	45.89%	39.73%	53.21%
Nursery but below K.G.	1.81%	4.46%	3.25%	3.00%
Primary but below middle	7.56%	7.86%	12.79%	9.71%

[11] Calculated from Micro data LFS 2020-2021, Pakistan Bureau of Statistics

Grand Total	100.00%	100.00%	100.00%	100.00%

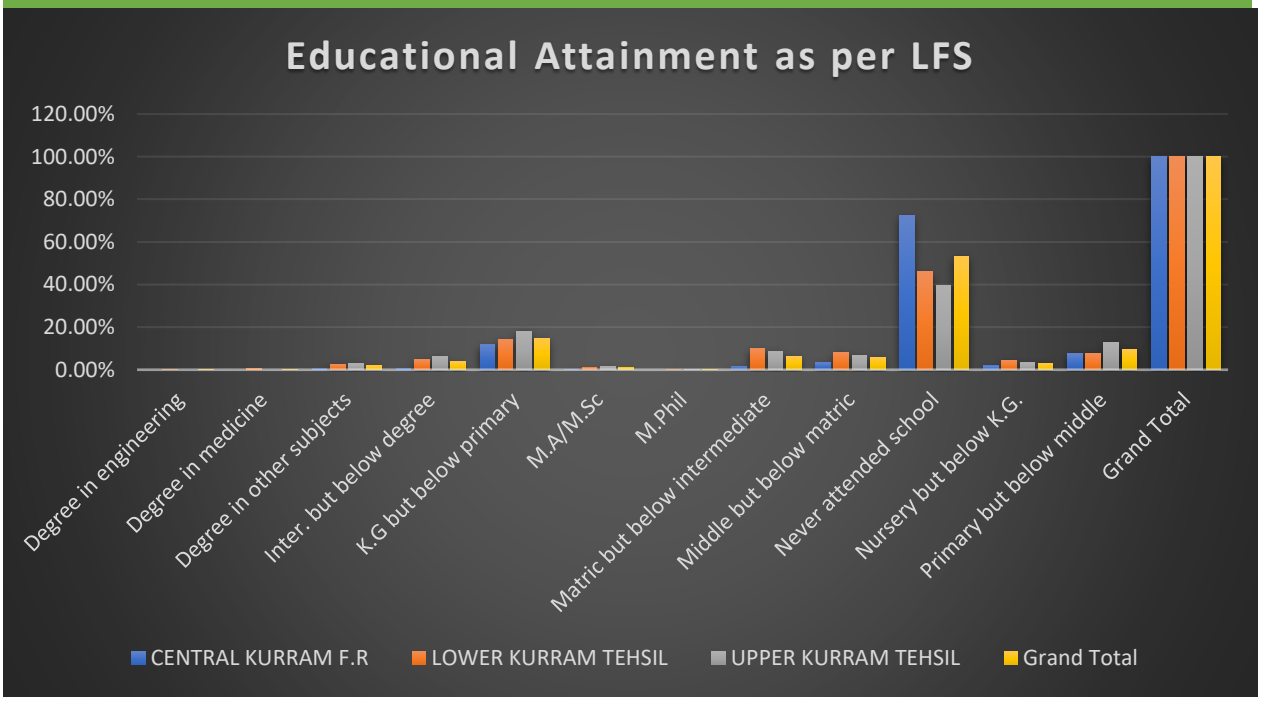


Figure 1-21 Educational Attainment of District Kurram as per LFS 2021 2022

1.5.11.2 Education Attainment (2023 Census)

The 2023 census data on educational attainment in District Kurram reveals clear disparities between urban and rural areas, which are crucial for inclusive land use planning. A large portion of the population has education levels below matriculation 33.91% in urban and 32.74% in rural areas highlighting limited access to secondary education and the need for more schools and vocational training centers.

Although urban areas perform slightly better at higher levels, with 7.89% completing matriculation and 7.79% in rural areas, overall attainment remains low. Only 1.62% of individuals hold a graduate degree, and 0.91% have a master's degree, underscoring the lack of opportunities for advanced education. Additionally, just 0.75% of the population possesses vocational diplomas or certificates, reflecting a major gap in skill-based training.

To address these challenges, land use planning should prioritize the development of secondary schools, technical institutes, and universities, particularly in rural regions. Establishing skill development centers focused on agriculture, construction, and trade, and integrating educational facilities within mixed-use developments, will enhance access and local capacity. Strengthening educational infrastructure and fostering partnerships between schools and industries are essential steps toward improving human capital, reducing inequalities, and promoting sustainable socio-economic growth in District Kurram.

Table 1-23 Educational Attainment as per Census 2023

Education Attainment from Census 2023																		
	District						Urban						Rural					
Education	Total	Percentages	Male	Percentages	Female	Percentages	Total	Percentages	Male	Percentages	Female	Percentages	Total	Percentages	Male	Percentages	Female	Percentages
Below Matric	161523	25.23%	109788	33.43%	51733	16.59%	12445	33.91%	8259	42.89%	4186	24.00%	53177	8.81%	101229	32.74%	47547	16.15%
Matric	33156	5.18%	26246	7.99%	6909	2.22%	2896	7.89%	2153	53.89%	743	4.26%	0	0.00%	24093	7.79%	6166	2.09%
Intermediate	18935	2.96%	13966	4.25%	4968	1.59%	1693	4.61%	1237	43.31%	456	2.61%	0	0.00%	12729	4.12%	4512	1.53%
Graduate 2 or 4 years	10356	1.62%	7231	2.20%	3125	1.00%	932	2.54%	682	29.01%	250	1.43%	0	0.00%	6549	2.12%	2875	0.98%
Master	5807	0.91%	4289	1.31%	1518	0.49%	508	1.38%	392	21.78%	116	0.66%	0	0.00%	3897	1.26%	1402	0.48%
Mphil/PhD	456	0.07%	415	0.13%	71	0.02%	37	0.10%	19	1.22%	18	0.10%	0	0.00%	396	0.13%	53	0.02%
Diploma Certificate and Othrs	4797	0.75%	1998	0.61%	2799	0.90%	408	1.11%	130	9.48%	278	1.59%	865	0.14%	1868	0.60%	2521	0.86%
Total	235030	36.71%	163933	49.91%	71123	22.81%	18919	51.55%	12872	201.58%	6047	34.67%	54042	8.95%	150761	48.76%	65076	22.10%

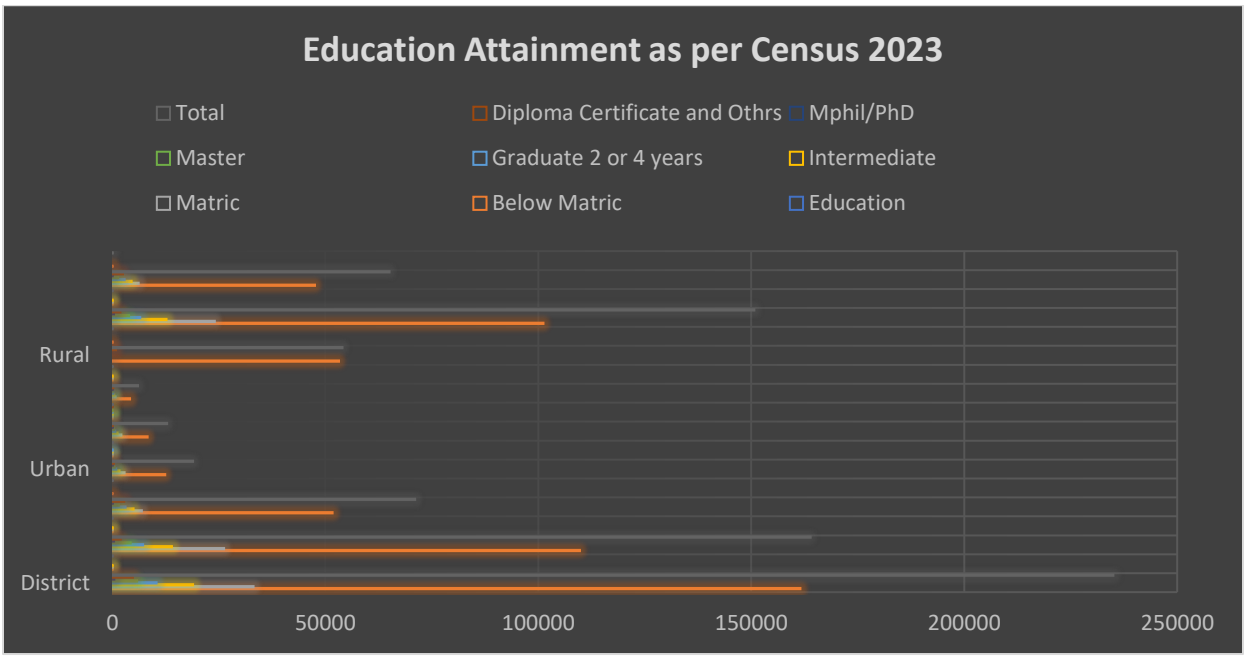


Figure 1-22 Educational Attainment of District Kurram as per Census 2023

1.5.11.3 Education Attainment (HIS Survey)

Data collected through the Household Interview Survey (HIS) provides an in-depth view of educational attainment across Kurram tehsils. The analysis shows that a significant portion of respondents lack formal education, with the None category dominating in all regions. Central records the highest number of respondents with no education (192), contributing 56.82% to the total, followed closely by Upper with 157 respondents. While the Lower report 130 respondents with no education, respectively.

The Below Matric category forms the second-largest group, with Lower (53 respondents) leading, followed by Central (30 respondents) and Upper (22 respondents). Matric education is most common in Lower (49 respondents), while higher educational qualifications, such as FA/FSc/FCS and university degrees, remain scarce, collectively representing less than 10% of the population in each tehsil.

The data highlights the critical need for targeted educational interventions to bridge these gaps and promote access to higher education across the tehsils.

Table 1-24 Education of Respondents (HIS-Kurram)[12]

Education Level	Central	Lower	Upper	Total	Percentage (%)
None	192	130	157	479	56.82%
Below Matric	76	40	92	208	24.67%
Matric	17	13	41	71	8.42%
Technical Diploma	3	2	12	17	2.02%
FA/FSc/FCS	2	3	11	16	1.90%
BA/BSc	8	4	15	27	3.20%
BS/MA/MSc	1	3	15	19	2.25%
MS/MPhil	1	0	3	4	0.47%
PHD/Post Doc	0	0	2	2	0.24%

1.5.11.4 Comparative Analysis of Educational Attainment (HIS, Census 2023 & LFS 2021-22)

The educational attainment data from the Household Information Survey (HIS), Census 2023, and Labor Force Survey (LFS) 2021–2022 provides a comprehensive overview of Kurram District's education profile, revealing persistent gaps and regional disparities.

Across all three sources, a high proportion of the population has never attended school 56.82% (HIS), 53.21% (Census 2023), and up to 72.35% in Central Kurram (LFS), compared to 45.89% in Lower and 39.73% in Upper Kurram. These figures underscore the urgent need to expand primary education infrastructure, particularly in Central Kurram, and enhance enrollment and retention efforts across the district.

Education below matriculation remains widespread, with HIS (24.67%) and Census 2023 (25.23%) showing similar results. The LFS, however, reflects sharp tehsil-level disparities, highlighting limited educational progression in rural areas and the need for improved access to secondary schooling.

For matriculation-level education, HIS (8.42%) and Census 2023 (5.18%) reveal moderate attainment, while LFS data indicates marked variation Central Kurram (1.69%), Lower Kurram (9.82%), and Upper Kurram (8.60%) pointing to the need for targeted secondary education investments in lagging regions.

At the intermediate level, attainment remains low 1.90% (HIS) and 2.96% (Census) though LFS shows slightly higher figures in Lower (4.82%) and Upper Kurram (6.18%). Expanding colleges and vocational centers in rural areas is critical to support continued education.

Higher education participation is minimal across all sources: 8.16% (HIS), 2.91% (Census 2023), and LFS showing 1.62% bachelor's and 0.91% master's degree holders. This highlights limited access to universities and professional programs in engineering, health, and technology, requiring the establishment of local higher education and technical institutions.

Finally, technical education accounts for only 2.02% (HIS), with no comparable Census or LFS data, underscoring the need to promote vocational training and skill development programs to enhance employment opportunities.

[12] Calculated from the Household Survey conducted by the Consultant in August, 2024

Overall, the combined data points to significant educational deprivation, especially in rural tehsils, emphasizing the need for integrated educational planning, institutional expansion, and skill-oriented programs to foster equitable human capital development in Kurram District.

1.5.12 Employment

Employment refers to the availability and distribution of work opportunities that enable residents to earn livelihoods, drive economic growth, and enhance community well-being. It encompasses both the quantity and quality of jobs, including formal, informal, industrial, and service sectors. Employment patterns significantly influence urban development, land use, transport planning, and social equity, shaping where people live and work. As such, employment is a core element of sustainable and inclusive development, aligning workforce needs with infrastructure, housing, and economic strategies.

1.5.12.1 Employment as Per Labor Force Survey 2021-22

The Labor Force Survey (LFS) 2021–2022 provides key insights into employment patterns across Central, Lower, and Upper Kurram, revealing significant disparities and persistent unemployment. Central and Upper Kurram each record the highest unemployment rate (28.37%), while Lower Kurram fares slightly better at 18.25%. These high rates underscore the district's limited job opportunities and reliance on informal and low-skilled sectors.

Elementary occupations dominate with 7.11% of the workforce, mainly in Central Kurram (4.67%), reflecting dependence on unskilled Labor. Craft and related trades workers form 3.25%, led by Central Kurram (1.66%), showing reliance on traditional manual skills. Skilled agricultural, forestry, and fishery workers comprise 5.98%, mostly in Upper Kurram (2.87%), highlighting agriculture's central role.

Other occupations remain minimal professionals (1.24%), technicians (1.31%), managers (1.31%), and clerical workers (0.18%) revealing a shortage of skilled and formal-sector jobs. Service and sales workers (2.69%) and machine operators (1.95%) show emerging but limited non-agricultural employment, primarily in Upper Kurram.

Overall, the LFS data reflects a workforce heavily concentrated in informal and agricultural activities, with scarce representation in professional, managerial, and technical roles. To reduce unemployment and diversify the economy, targeted investments in vocational training, higher education, industrial development, and service-sector growth are essential for creating sustainable and skilled employment across Kurram District.

Table 1-25 Occupation of District Kurram as per LFS 2021-2022[13]

Occupation	CENTRAL KURRAM F.R	LOWER KURRAM TEHSIL	UPPER KURRAM TEHSIL	Grand Total
Clerical support workers	0.00%	0.11%	0.07%	0.18%
Craft and related trades workers	1.66%	0.32%	1.27%	3.25%
Elementary occupations	4.67%	0.85%	1.59%	7.11%
Managers	0.07%	0.18%	1.06%	1.31%
Plant and machine operators, and assemblers	0.67%	0.28%	0.99%	1.95%
Professionals	0.21%	0.28%	0.74%	1.24%
Service and sales workers	0.32%	0.92%	1.45%	2.69%
Skilled agricultural, forestry and fishery workers	1.52%	1.59%	2.87%	5.98%
Technicians and associate professionals	0.28%	0.35%	0.67%	1.31%
Unemployed	28.37%	18.25%	28.37%	74.99%
Grand Total	37.78%	23.13%	39.09%	100.00 %

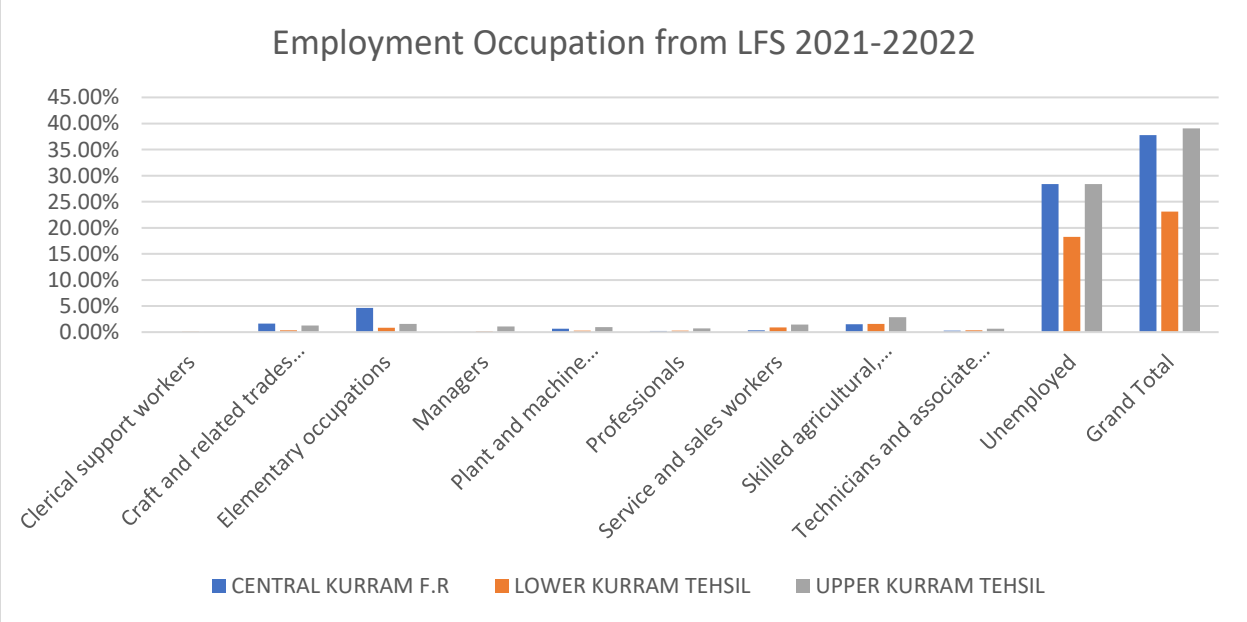


Figure 1-23 Occupation of District Kurram from LFS 2021-2022

[13] Calculated from Micro data LFS 2020-2021, Pakistan Bureau of Statistics

1.5.12.2 Employment as Per Census 2023

The Census 2023 employment data for Kurram District highlights significant disparities across its three tehsils—Central, Lower, and Upper Kurram revealing major employment and structural challenges. Overall, only 27.49% (140,212 persons) of the population is employed, indicating widespread unemployment. Central Kurram records the lowest employment rate (13.94%) and the highest unemployment (57.40%), while Lower and Upper Kurram each report higher employment (47.32%) but still face unemployment levels around 47.82%.

Formal sector jobs remain limited, with only 4.94% employed as paid workers (Central: 1.90%, Lower/Upper: 5.55% each). Agriculture continues to dominate livelihoods 3.46% of Central and 4.25% of Lower and Upper Kurram residents are self-employed in agriculture highlighting rural dependency. Non-agricultural self-employment is rising, especially in Lower and Upper Kurram (5.36% each), suggesting growing entrepreneurial activity in small businesses and services.

Persistent unemployment stems from limited formal job opportunities, weak infrastructure, and dependence on low-income agriculture. Addressing this requires economic diversification, vocational training, and support for small enterprises. Expanding infrastructure, improving agricultural productivity, and fostering formal employment can help create a more resilient and inclusive economy across Kurram District.

Table 1-26 Occupation of District Kurram from Census 2023[14]

Occupation	Central Tehsil	Percentage	Lower Tehsil	Percentage	Upper Tehsil	Percentage	District	Percentage
Employed	29543	13.94 %	48014	47.32 %	48014	47.32 %	140212	27.49 %
Paid Employee	4,037	1.90%	5,628	5.55%	5,628	5.55%	25,168	4.94%
Own Account (Agri)	7,343	3.46%	4,317	4.25%	4,317	4.25%	21,764	4.27%
Own Account (Non-A)	4,620	2.18%	5,437	5.36%	5,437	5.36%	18,734	3.67%
Unemployed	121672	57.40 %	48522	47.82 %	48522	47.82 %	237370	46.55 %

[14] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_14_kp_districts.pdf

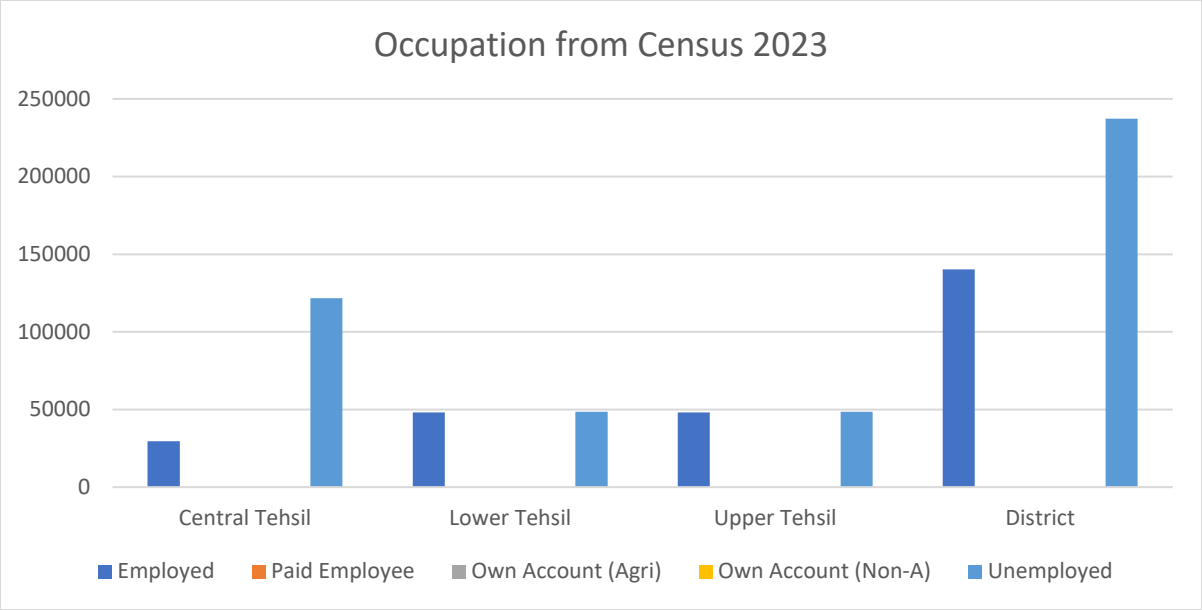


Figure 1-24 Occupation of District Kurram from Census 2023

1.5.12.3 Employment as Per HIS Survey

The Household Information Survey (HIS) of Kurram highlights significant occupational disparities across tehsils. Labor/Daily wage work is the dominant occupation, employing 14.83% of respondents, while 55.28% remain unemployed, indicating major socio-economic challenges. Students also comprise 14.83%, reflecting a growing focus on education, particularly in Central and Ismail Zai Tehsils. Other occupations include Agriculture/Livestock (1.54%), Private Jobs (1.66%), and Government Jobs (8.78%), while sectors like Transport (1.30%) and Business/Trade (1.42%) remain limited. Tehsil-wise, Central and Upper Tehsils show higher Labor and government job participation, whereas Central exhibits a more balanced occupational mix. Overall, the data underscores the need for economic diversification and job creation to reduce unemployment and dependency on informal labor.

Table 1-27 Occupation of Respondent Tehsil-Wise from HIS[15]

Occupation	Central	Lower	Upper	Total	Percentage
None	166	100	200	466	55.28%
Student	51	25	49	125	14.83%
Labor/Daily Wages	74	19	35	128	15.18%
Transport	2	4	5	11	1.30%
Business/Trade	1	0	11	12	1.42%
Agriculture/Livestock	3	3	7	13	1.54%
Private Job	0	7	7	14	1.66%
Government Job	3	37	34	74	8.78%
Total	300	195	348	843	100.00%
Occupation	Central	Lower	Upper	Total	Percentage

1.5.12.4 Comparative Analysis of Employment (HIS, Census 2023 and LFS)

The employment data from the Census 2023, Household Information Survey (HIS), and Labour Force Survey (LFS) 2021–2022 presents a comprehensive picture of the Labour market in Kurram District, revealing high unemployment, limited formal jobs, and dependence on low-skilled work. Across all three sources, a large share of the population remains without occupation 55.28% in HIS, 57.40% unemployed in Census 2023 (Central Kurram), and 28.37% in both Central and Upper Kurram per LFS highlighting the need for job creation, skills training, and infrastructure development.

Students comprise 14.83% of the population (HIS), mainly in Central Kurram, but limited employment pathways suggest challenges in workforce integration, emphasizing the importance of vocational and skill-based programs. Labour and daily wage workers form 15.18% of the population, with Central Kurram showing the highest proportion (8.79%), consistent with Census and LFS findings where elementary occupations (7.11%) dominate. Expanding formal job opportunities and improving skill levels are essential to shift workers from informal to stable employment.

The business/trade sector remains small (1.42% in HIS), though Upper Kurram shows promise with 5.36% self-employed non-agriculture workers (LFS). Supporting entrepreneurship through training and microfinance could strengthen this growing sector. Private jobs (1.66%) and government jobs (8.78%) remain limited, with the formal sector (4.94%) underdeveloped, reflecting heavy dependence on public employment and a weak private economy.

Agriculture and livestock employ a modest share (1.54% in HIS; ~6% in Census/LFS), especially in Upper Kurram, where skilled agricultural workers are concentrated. Investments in modern farming, agro-processing, and sustainable agriculture could boost productivity and diversify income sources.

Overall, the combined datasets highlight high unemployment, limited private sector growth, and reliance on informal labor, underscoring the urgent need for economic diversification, skill enhancement, and institutional support to build a resilient and inclusive workforce in Kurram District.

[15] Calculated from the Household Survey conducted by the Consultant in August, 2024

1.6 Urbanization and Hierarchy of Human Settlement

1.6.1 Urbanization

Urbanization is the process of transforming rural areas into urban centers, primarily driven by economic development, industrialization, and population migration. It represents a demographic shift where people move from rural to urban areas in search of better employment and living standards, leading to the expansion of towns and cities. Over the past five decades, rapid urbanization especially in developing countries has profoundly reshaped social and economic structures, replacing traditional rural lifestyles with urban patterns of living.

While urbanization promotes economic growth, innovation, and access to education and services, it also creates significant challenges. Rapid population influx often strains infrastructure, housing, and public services, resulting in overcrowding, inadequate housing, and pressure on resources like water, healthcare, and transport. To address these issues, sustainable urban planning is essential integrating housing, mobility, employment, and social services within a balanced framework. Thoughtful planning ensures that urban growth remains inclusive, resilient, and conducive to an improved quality of life for all residents.

1.6.2 Urbanization in District Kurram

In the context of Pakistan, urbanization has been marked by significant population growth in urban areas, primarily driven by rural-to-urban migration and high natural population growth. According to the 2023 Census by the Pakistan Bureau of Statistics (PBS), the urban population of Pakistan has witnessed a substantial rise, leading to the rapid expansion of cities and towns across the country. This urban growth, however, is accompanied by numerous challenges, including insufficient infrastructure, inadequate housing, and the rise of informal settlements. In Khyber Pakhtunkhwa (KP), this urbanization trend mirrors the national pattern, with cities like Peshawar experiencing significant population increases and urban sprawl.

The population growth of Kurram District has been significant over the decades. In 1951, the district had a population of 158,000, which steadily increased to 201,000 by 1961. By 1972, it had grown to 279,998, and by 1981, it reached 294,362. The population further surged in subsequent decades, reaching 448,310 in 1998, and 615,372 by 2017. By 2023, Kurram's total population stood at 785,434.

When looking at the breakdown between rural and urban areas, the rural population has grown from 158,000 in 1951 to 739,963 in 2023. The urban population, which was not recorded in earlier census years, has been documented starting from 2017, with 38,045 in that year, growing to 45,471 by 2023. This data reflects both the district's overall growth and a shift toward urbanization in recent years.

1.6.3 Urbanization Trend in Historical Perspective

For the preparation of Kurram District's 20-year land use plan, global and national urbanization trends have been carefully considered. In 2019, the United Nations estimated that over half of the world's population (4.2 billion) lived in urban areas, projected to reach 6 billion by 2041[16]. Pakistan mirrors this global trend, with 38.82% of its population now urban (Census 2023)[17] , up from 36.44% in

[16] United Nations. (2019). World Urbanization https://population.un.org/wup/publications/Files/WUP2018-Report.pdf Prospects: The 2018 Revision.
[17] Pakistan Bureau of Statistics. (2023, August 5). Announcement of Results of 7th Population and Housing Census-2023. Press Release.

2017[18]. Historically, urbanization has risen steadily from 17.74% in 1951 to 36.44% in 2017 driven by industrialization, migration, and improved infrastructure. Khyber Pakhtunkhwa (KP), however, remains below the national average, increasing from 11.08% in 1951 to 18.80% in 2017 due to its geography and agrarian economy.

Kurram District has followed a slow but steady urbanization trend. Predominantly rural until 1998, its urban population rose from 38,045 in 2017 to 45,471 in 2023. This shift reflects socio-economic transformation, improved infrastructure, and migration to emerging urban centers.

Looking ahead, Kurram's land use strategy must balance urban expansion with rural preservation through:

- **Urban Growth Management:** Plan sustainable expansion with proper housing, zoning, and infrastructure.
- **Rural–Urban Migration:** Strengthen small and medium towns to promote balanced regional development.
- **Infrastructure Development:** Invest in roads, education, healthcare, energy, and industrial zones to stimulate jobs and investment.
- **Agricultural Sustainability:** Preserve fertile land through agricultural zoning to maintain rural livelihoods.
- **Environmental Protection:** Integrate waste management, green spaces, and water conservation into urban planning.

Over the next two decades, strategic and sustainable planning will enable Kurram to accommodate urban growth while preserving its agricultural base ensuring balanced, inclusive, and environmentally sound development.

1.6.4 Urban Growth Trend

The spatial pattern of urban growth refers to the physical expansion of cities over time, encompassing changes in land use, population density, and infrastructure development. Analyzing these trends helps planners identify areas of rapid growth, stagnation, or future potential, supporting informed decisions on land use, zoning, transportation, and public service distribution to ensure sustainable development.

A key technique for studying urban growth is change detection analysis in Geographic Information Systems (GIS), which compares spatial datasets from different periods to reveal land use changes and expansion patterns. Alternatively, tools like Google Earth and historical satellite imagery can be used to manually delineate built-up boundaries across time, offering a practical, though less precise, approach for visualizing urban development where advanced GIS resources are limited.

Urban growth is influenced by economic development, migration, policies, and technology. Cities often transition from low-density sprawl to more compact urban forms, increasing demand for infrastructure such as transportation, water, and waste management systems. Growth is typically uneven—areas near transport hubs or economic centers expand faster, while remote or underdeveloped zones lag behind. Recognizing these disparities allows planners to allocate resources more efficiently and promote balanced regional development.

[18] Pakistan Bureau of Statistics. (2021, April 12). Final Results of Sixth Population and Housing Census-2017. Table-1: Area, Population by Sex, Sex Ratio, Population Density, Urban Proportion, Household Size and Annual Growth Rate.

Environmental considerations are integral to managing urban growth. Expansion can cause habitat loss, pollution, and higher energy consumption, making sustainable planning essential. Strategies such as preserving green spaces, promoting energy-efficient buildings, and encouraging mixed-use, walkable neighborhoods help reduce environmental impacts and enhance livability.

In essence, urban growth reflects not only the physical spread of cities but also their social, economic, and environmental evolution in response to changing population needs.

1.6.4.1 Parachinar Urban Area

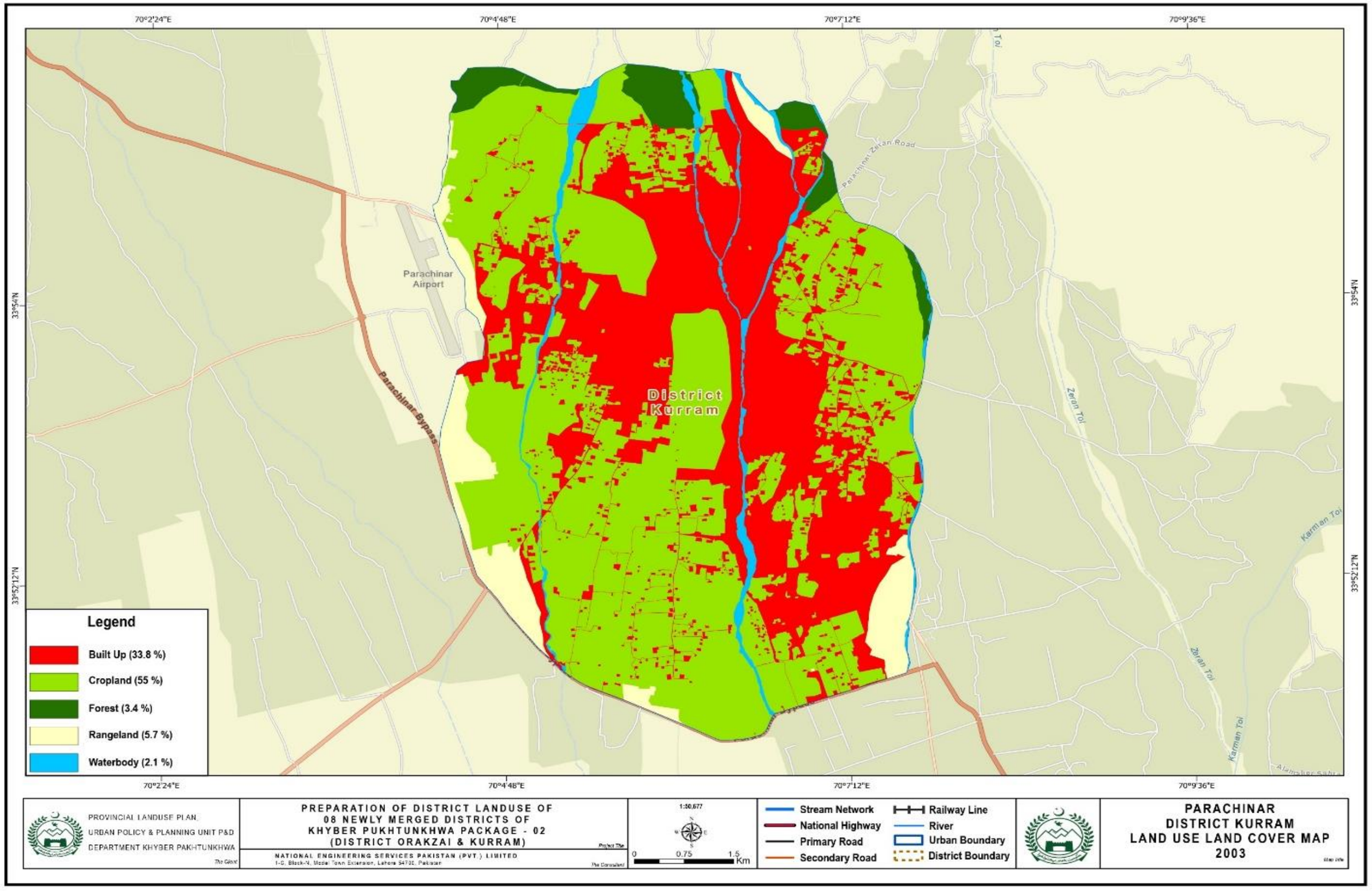
The temporal analysis of Parachinar Urban Area (2003–2023) shows a clear trend of urban expansion accompanied by the decline of agricultural and natural lands. Over this 20-year period, the built-up area increased from 33.80% in 2003 to 45.50% in 2023, reflecting rapid urbanization driven by population growth and infrastructure development.

Meanwhile, cropland declined slightly from 55% to 51.40%, primarily due to urban encroachment on agricultural land. Forest cover dropped sharply from 3.40% to 0.19%, and rangeland decreased from 5.70% to 0.21%, indicating substantial loss of natural and grazing areas. In contrast, waterbodies showed a minor increase from 2.10% to 2.70%, suggesting relative stability in water resources.

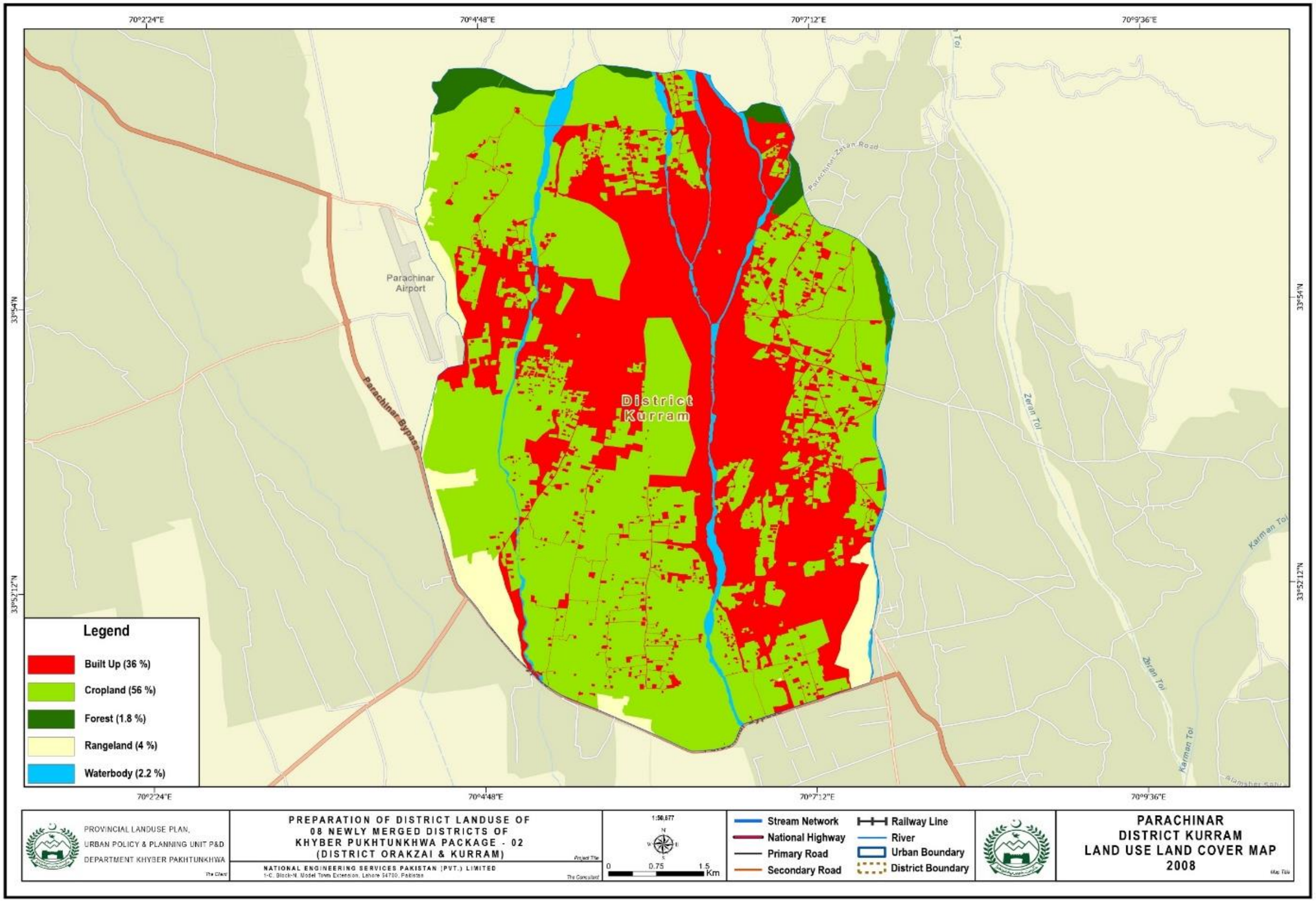
Overall, the data highlights a steady shift from rural to urban land use, emphasizing the need for sustainable urban planning to balance development with environmental conservation and agricultural preservation in Parachinar.

Table 1-28: Parachinar Urban Area Land Cover from 2003 to 2023

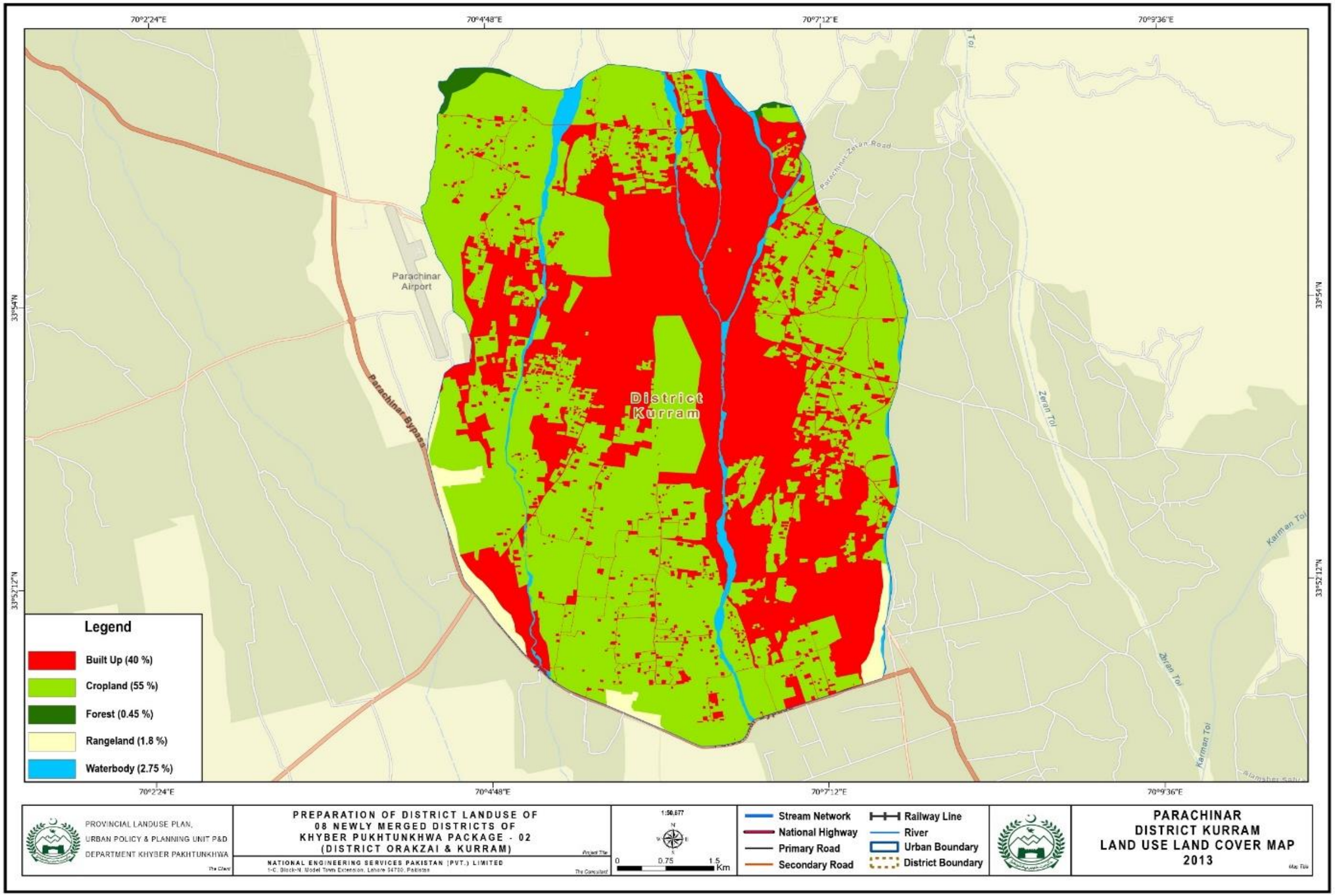
Year	Built-up	Cropland	Forest	Rangeland	Waterbodies
2003	33.80%	55.00%	3.40%	5.70%	2.10%
2008	36.00%	56.00%	1.80%	4.00%	2.20%
2013	4.00%	55.00%	0.45%	1.80%	2.75%
2018	42.40%	53.70%	0.21%	0.95%	2.75%
2023	45.50%	51.40%	0.19%	0.21%	2.70%



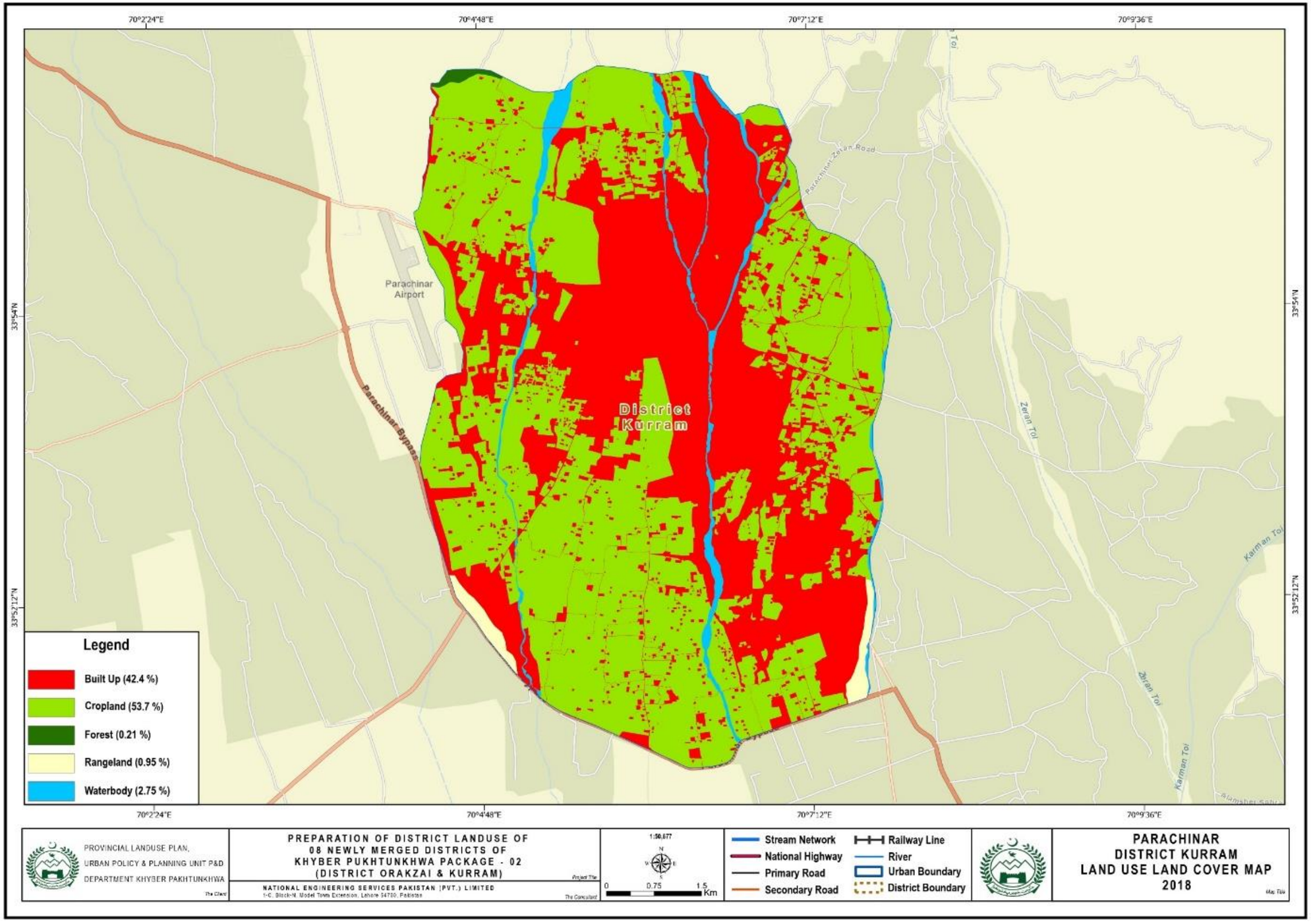
Map 1-10: Land Cover Map of Parachinar Urban Center 2003



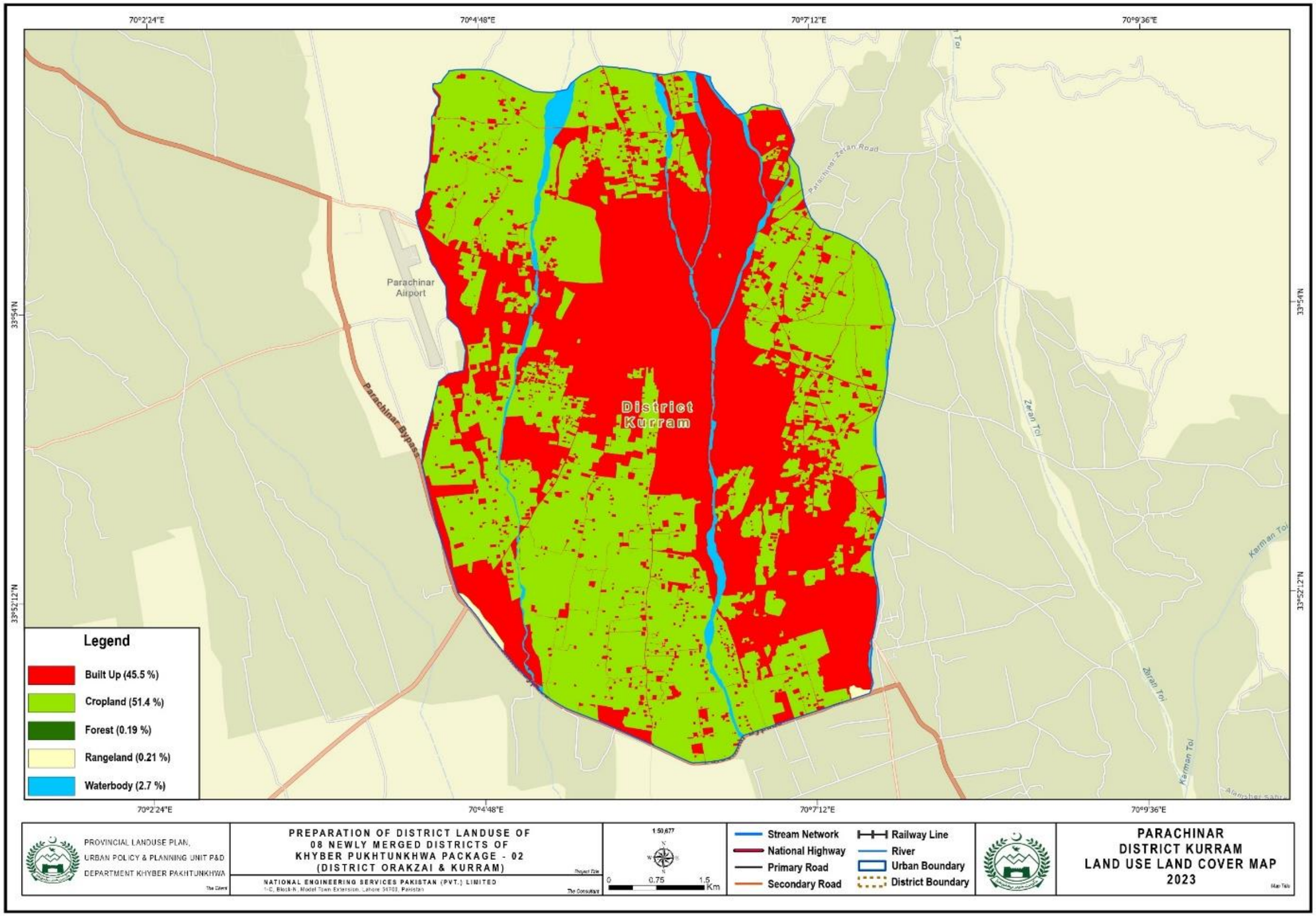
Map 1-11: Land Cover Map of Parachinar Urban Center 2008



Map 1-12: Land Cover Map of Parachinar Urban Center 2013



Map 1-13: Land Cover Map of Parachinar Urban Center 2018



Map 1-14: Land Cover Map of Parachinar Urban Center 2023

1.6.4.2 Sadda Proposed Urban Area

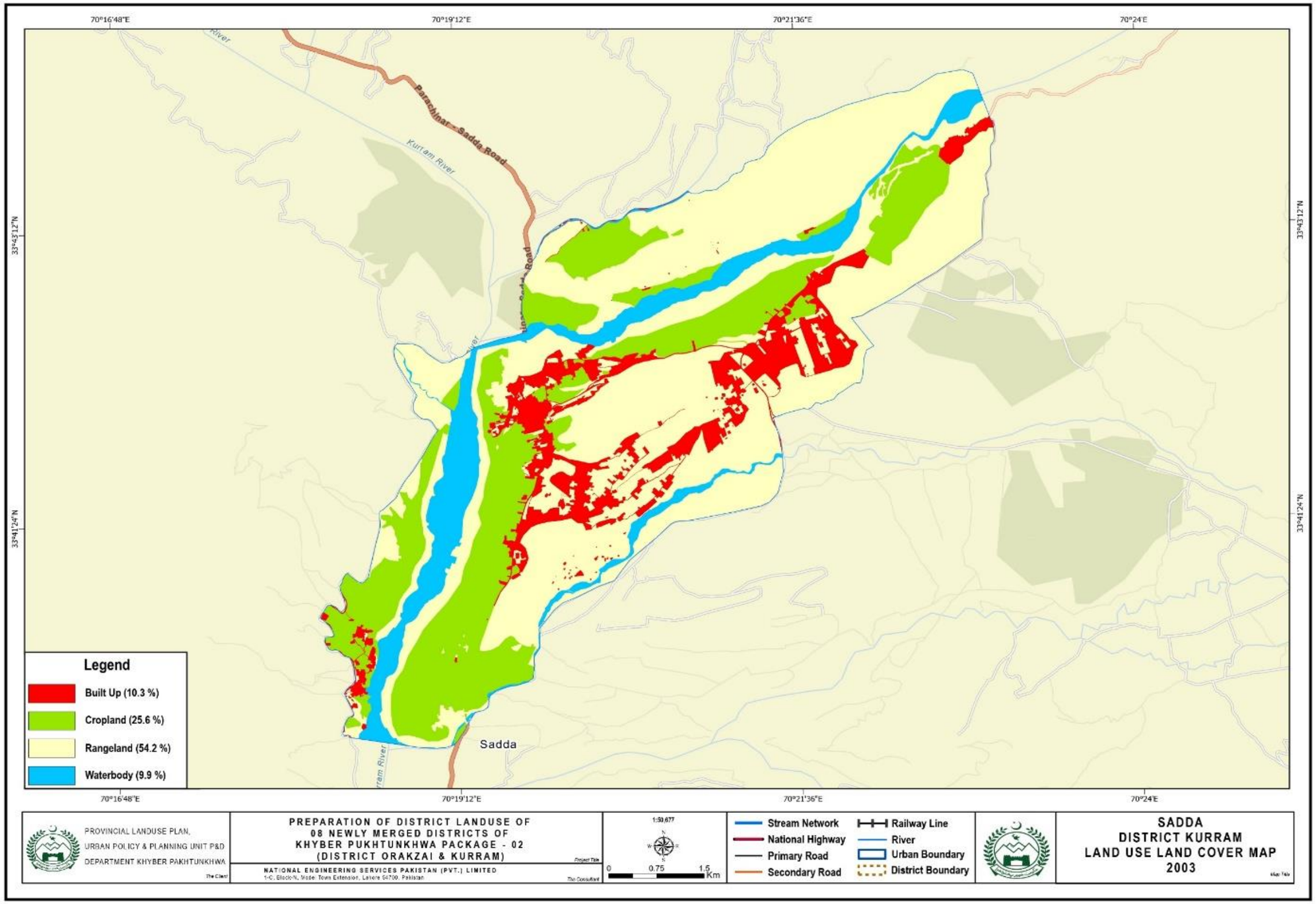
The land use analysis of Sadda Urban Area (2003–2023) shows a clear pattern of urban expansion and shifting land use dynamics. The built-up area increased from 10.30% in 2003 to 23.00% in 2023, reflecting rapid urban growth driven by rising population and infrastructure demand.

Cropland expanded moderately from 25.60% to 33.00%, indicating that agriculture continues to play an important role despite urban encroachment. In contrast, rangeland experienced a sharp decline from 54.20% to 33.88%, highlighting the conversion of grazing lands into urban or agricultural areas, which may affect livestock activities and biodiversity. Waterbodies remained relatively stable, with a slight decrease from 9.90% to 9.70%, suggesting that water resources have largely been preserved.

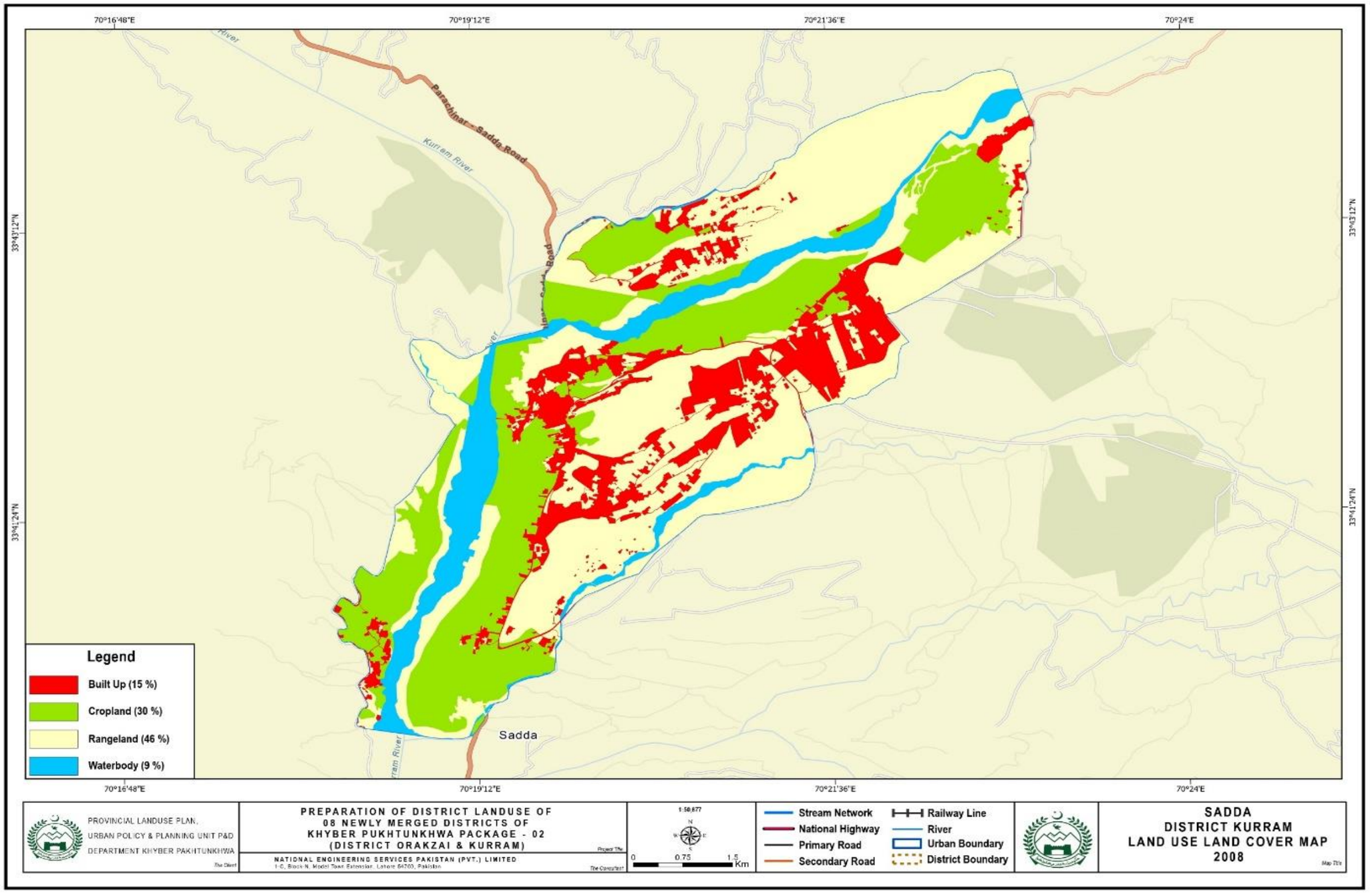
Overall, the data reflects a significant transition toward urbanization, where built-up areas are expanding at the expense of natural and grazing lands. This trend underscores the need for balanced land use planning to ensure sustainable growth, resource conservation, and environmental protection in Sadda Urban Area.

Table 1-29: Sadda Urban Area Land Cover from 2003 to 2023

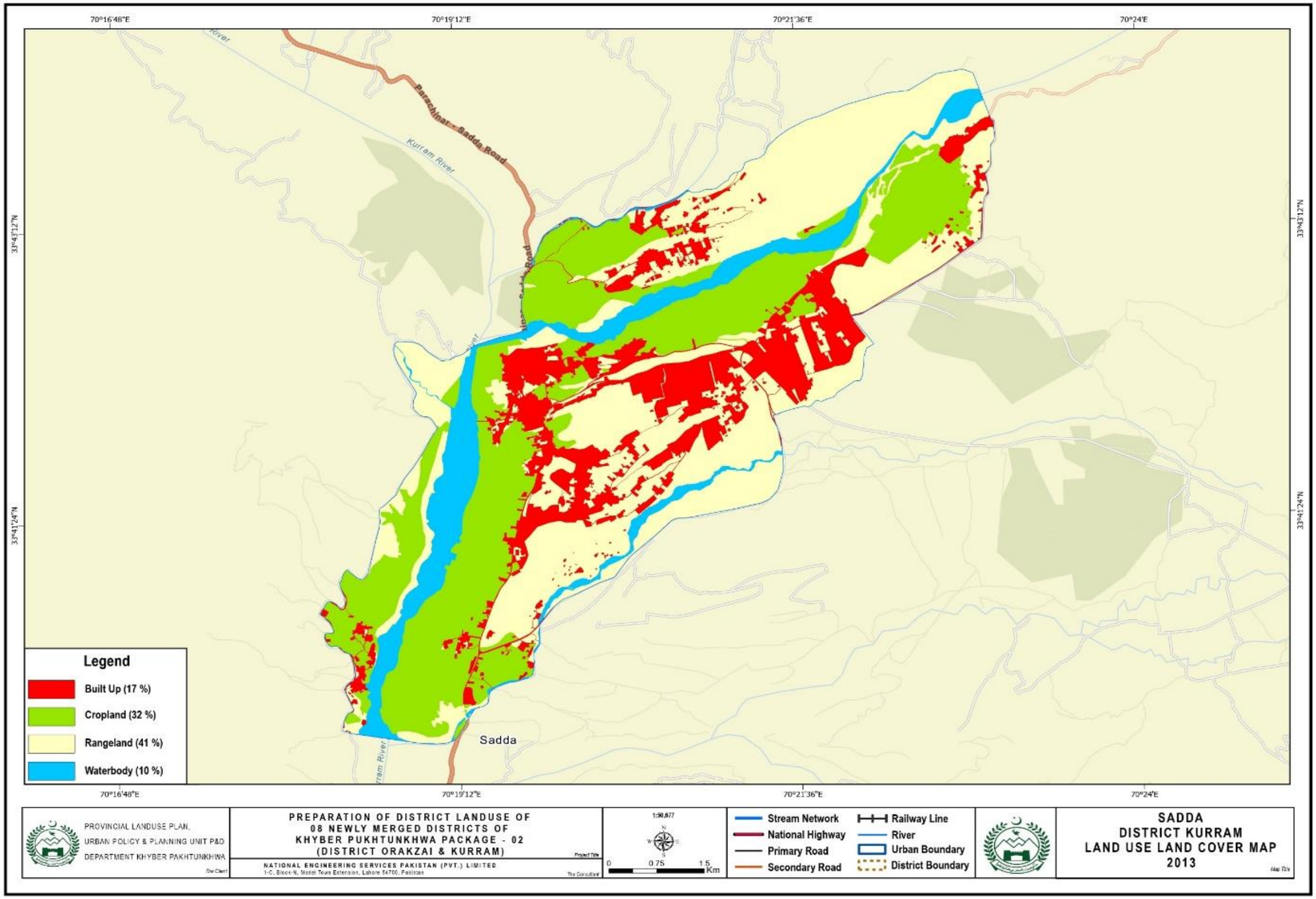
Year	Built-up	Cropland	Rangeland	Water Bodies
2003	10.30%	25.60%	54.20%	9.90%
2008	15.00%	30.00%	46.00%	9.00%
2013	17.00%	32.00%	41.00%	10.00%
2018	19.50%	33.30%	38.00%	9.20%
2023	23.00%	33.00%	33.88%	9.70%



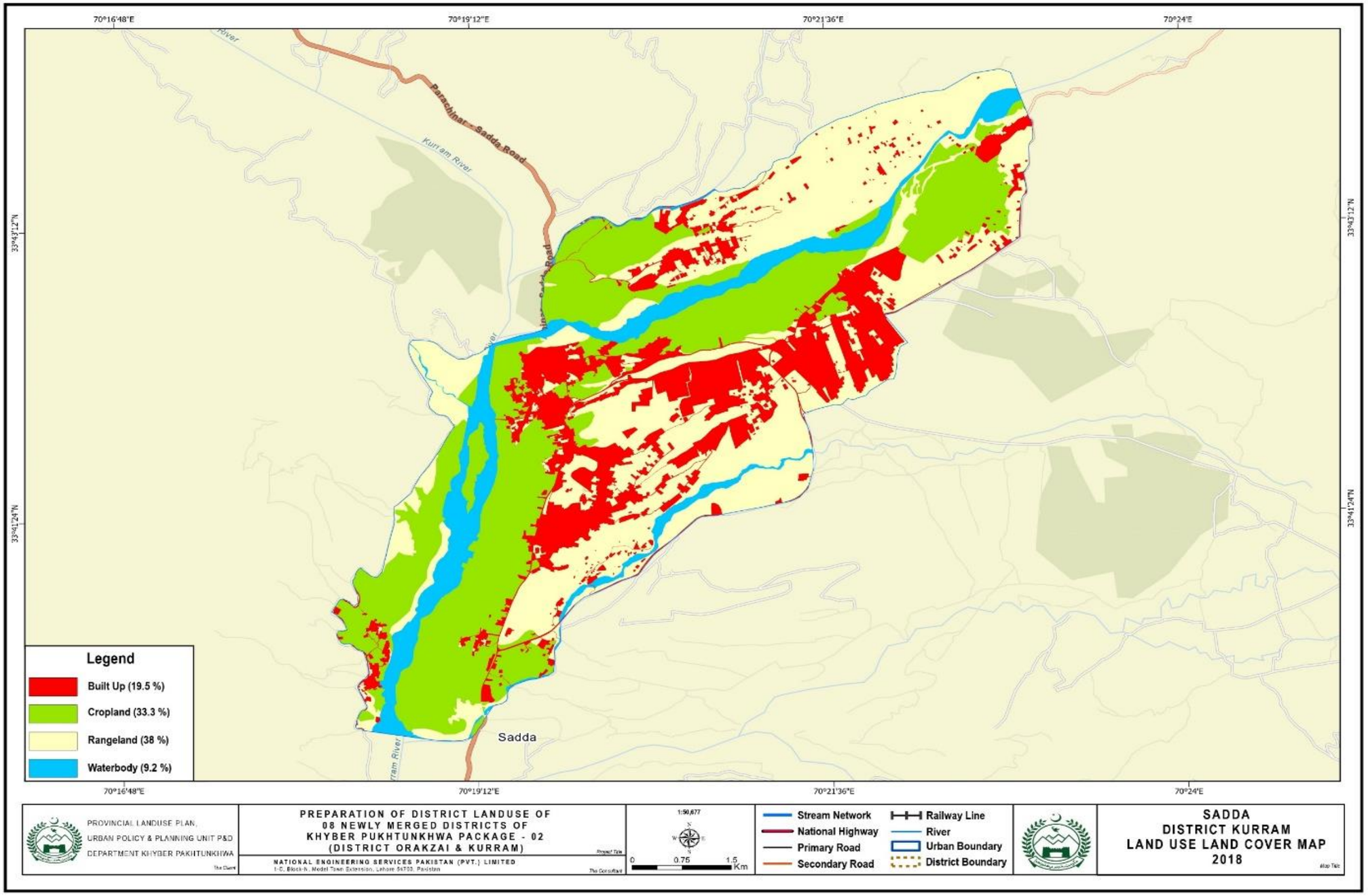
Map 1-15: Land Cover Map of Sadda Proposed Urban Center 2003



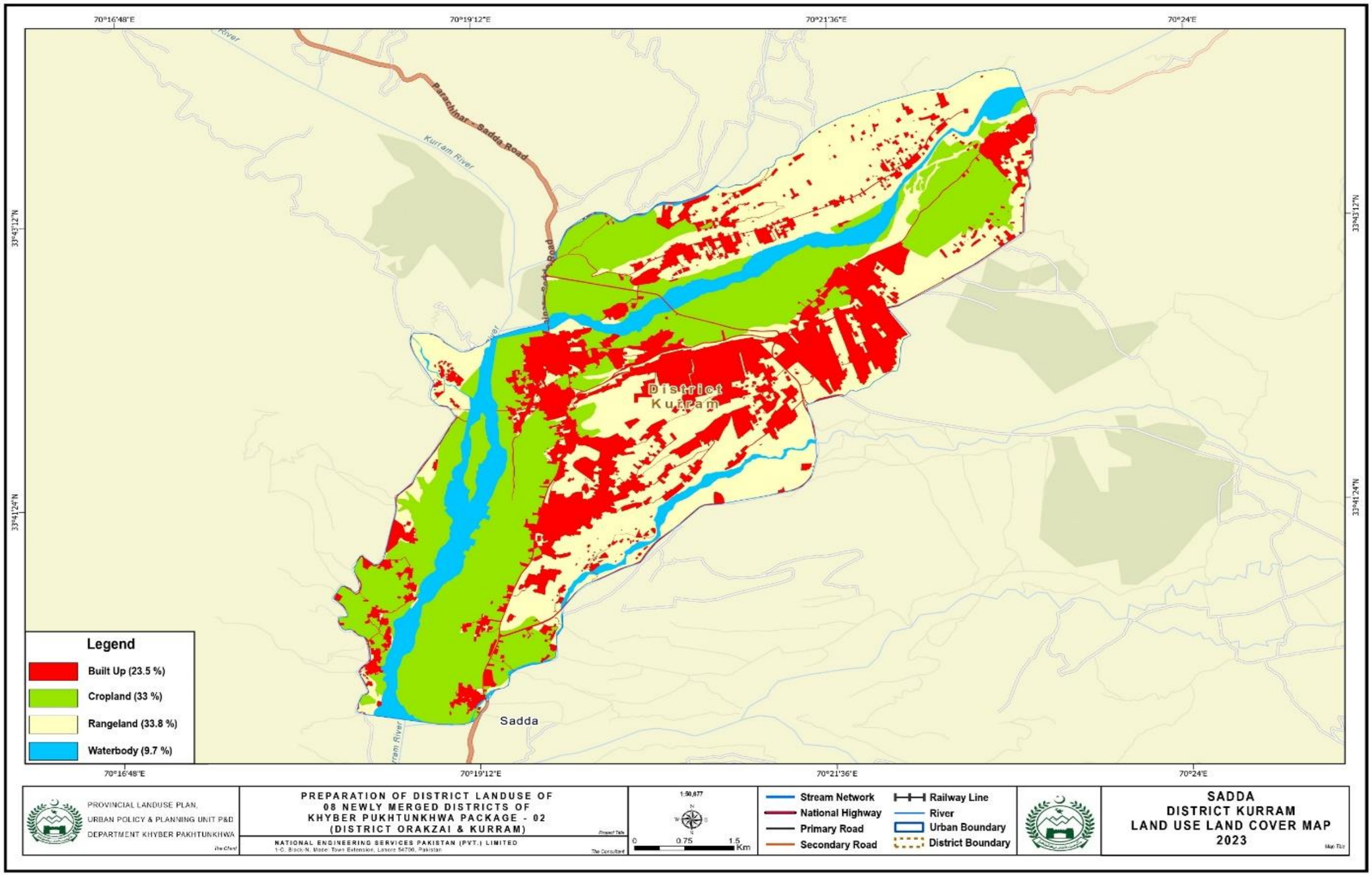
Map 1-16: Land Cover Map of Sadda Proposed Urban Center 2008



Map 1-17: Land Cover Map of Sadda Proposed Urban Center 2013



Map 1-18: Land Cover Map of Sadda Proposed Urban Center 2018



Map 1-19: Land Cover Map of Sadda Proposed Urban Center 2023

1.6.4.3 Dogar Proposed Urban Area

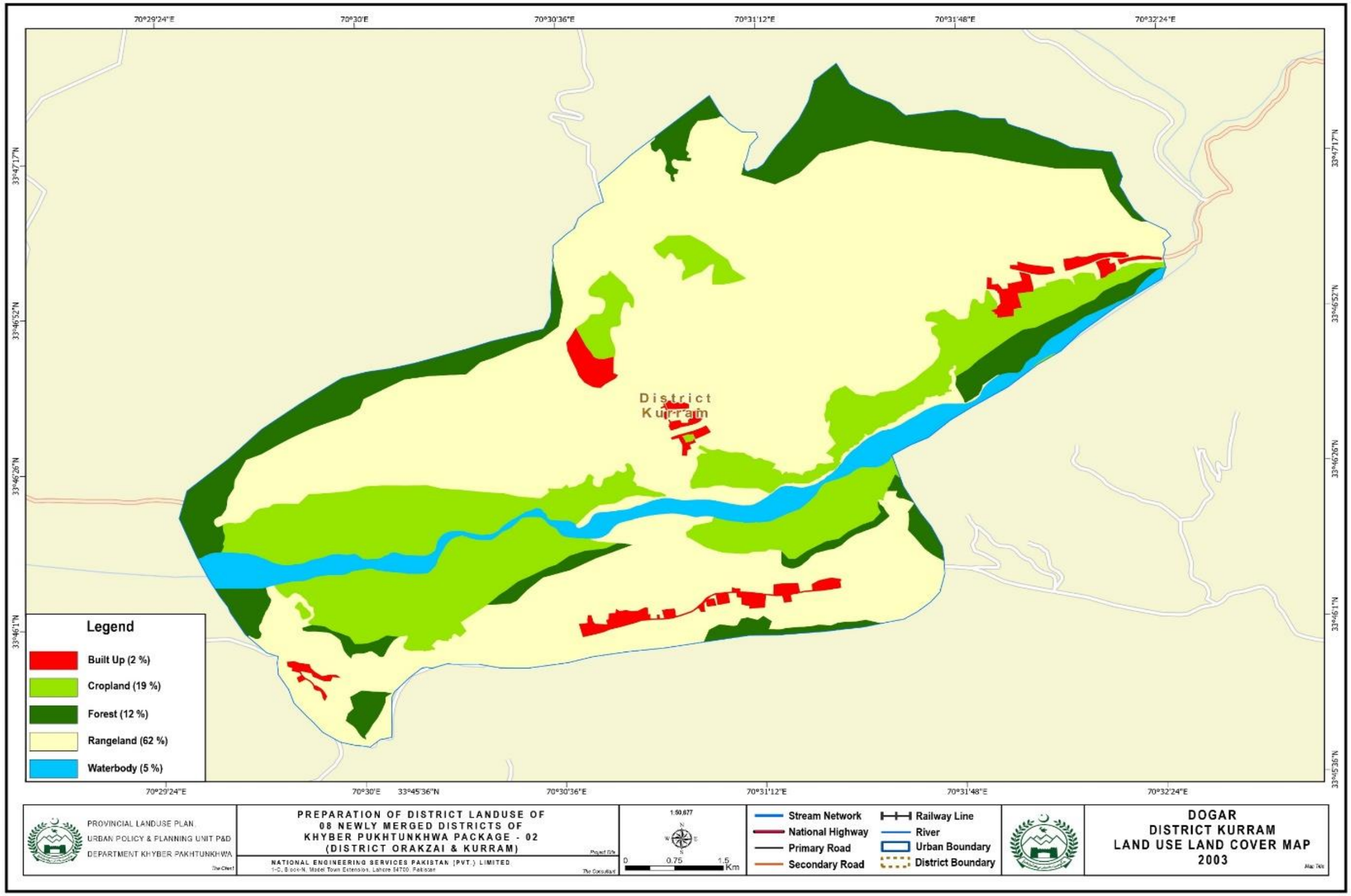
The land use analysis of Dogar Proposed Urban Area (2003–2023) shows gradual urban growth alongside changes in agricultural and natural lands. The built-up area increased from 2.00% in 2003 to 8.20% in 2023, reflecting ongoing development driven by population growth and infrastructure needs, though urbanization remains limited.

Cropland rose moderately from 19.00% to 30.60%, indicating continued reliance on agriculture, while forested land sharply declined from 12.00% to 1.30%, raising concerns about biodiversity loss and environmental impact. Rangeland decreased from 62.00% to 55.00%, showing some conversion to urban or agricultural use, whereas waterbodies remained stable at around 5%, suggesting preservation of water resources.

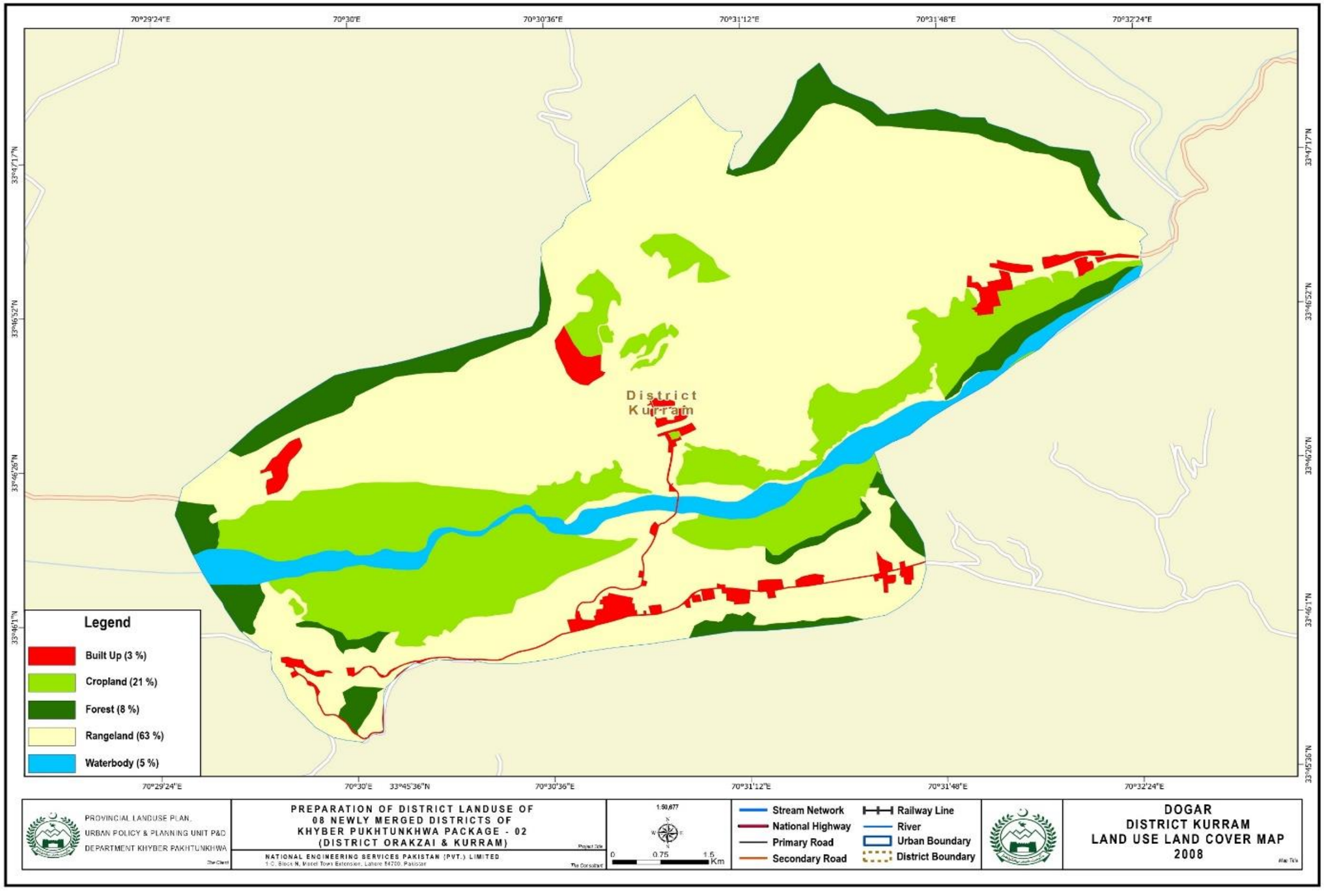
Overall, Dogar exhibits gradual urbanization, with significant loss of forests and moderate reduction in rangelands. Cropland and water bodies have remained relatively stable, but ongoing conversion of natural lands highlights the need for sustainable land management and environmental protection in the area.

Table 1-30: Dogar Proposed Urban Area Land Cover from 2003 to 2023

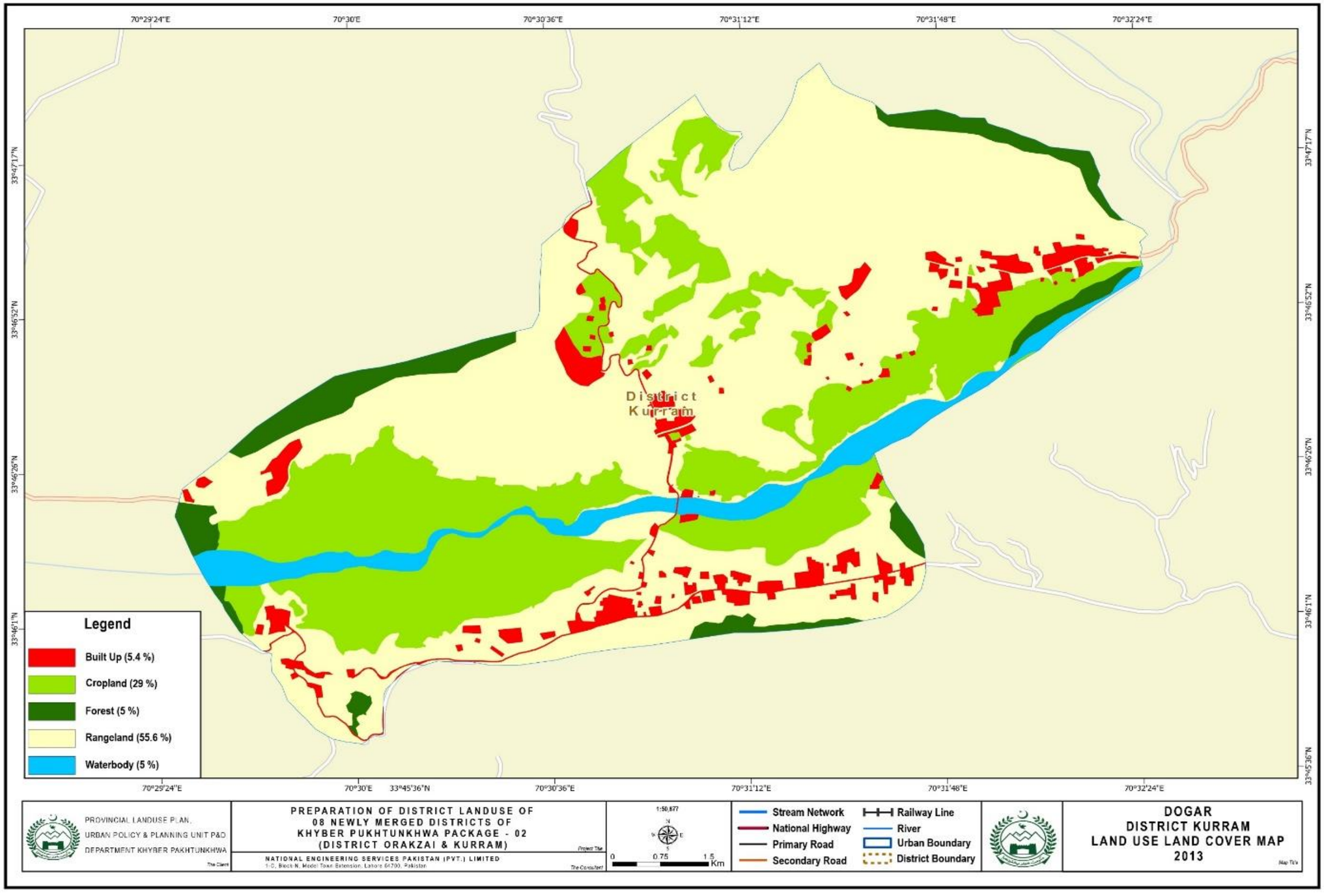
Year	Built-up	Cropland	Forest	Rangeland	Water Bodies
2003	2.00%	19.00%	12.00%	62.00%	5.00%
2008	3.00%	21.00%	8.00%	63.00%	5.00%
2013	5.40%	29.00%	5.00%	55.60%	5.00%
2018	7.00%	30.00%	3.50%	55.50%	4.00%
2023	8.20%	30.60%	1.30%	55.00%	4.90%



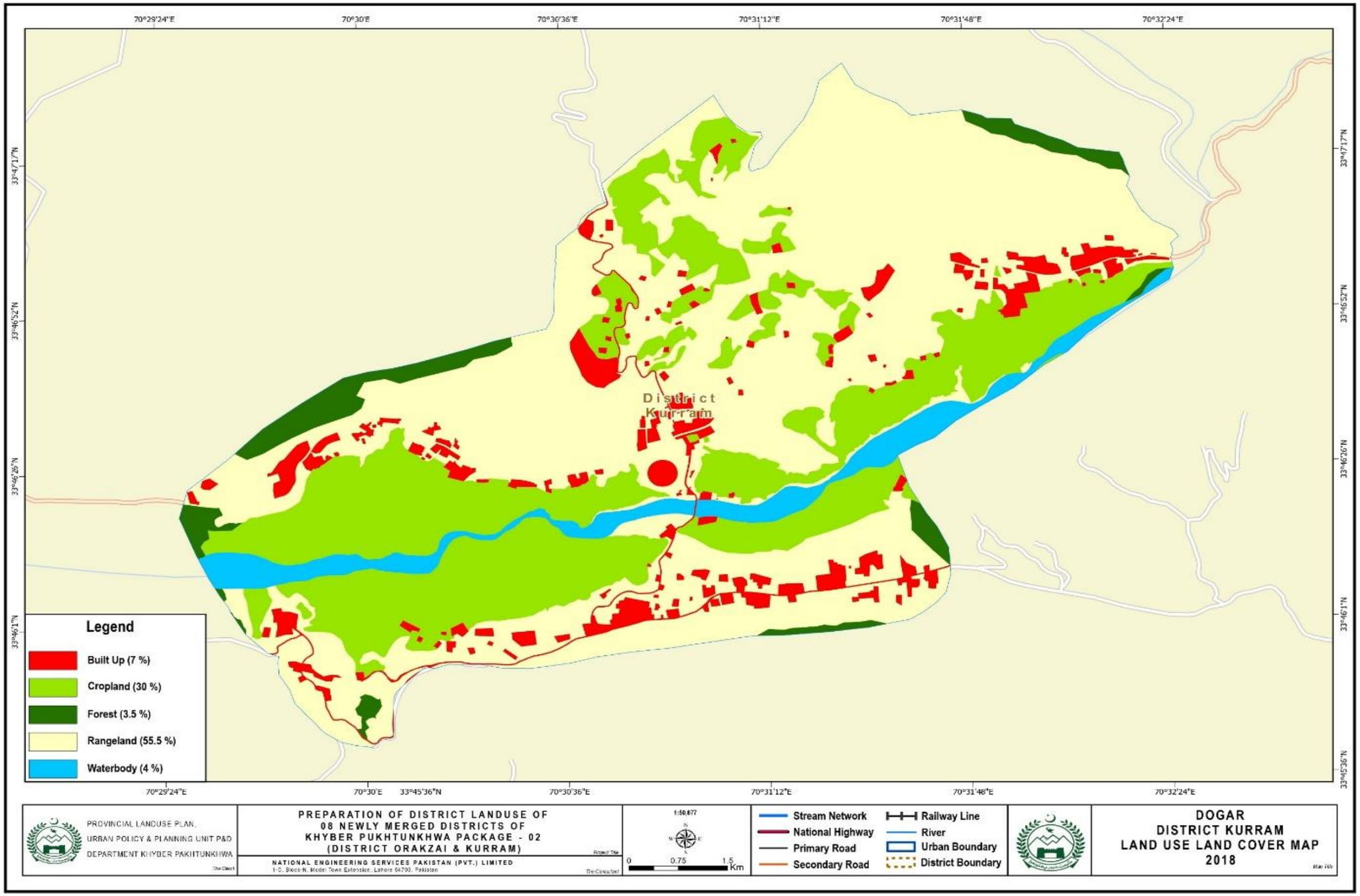
Map 1-20: Land Cover Map of Dogar Proposed Urban Center 2003



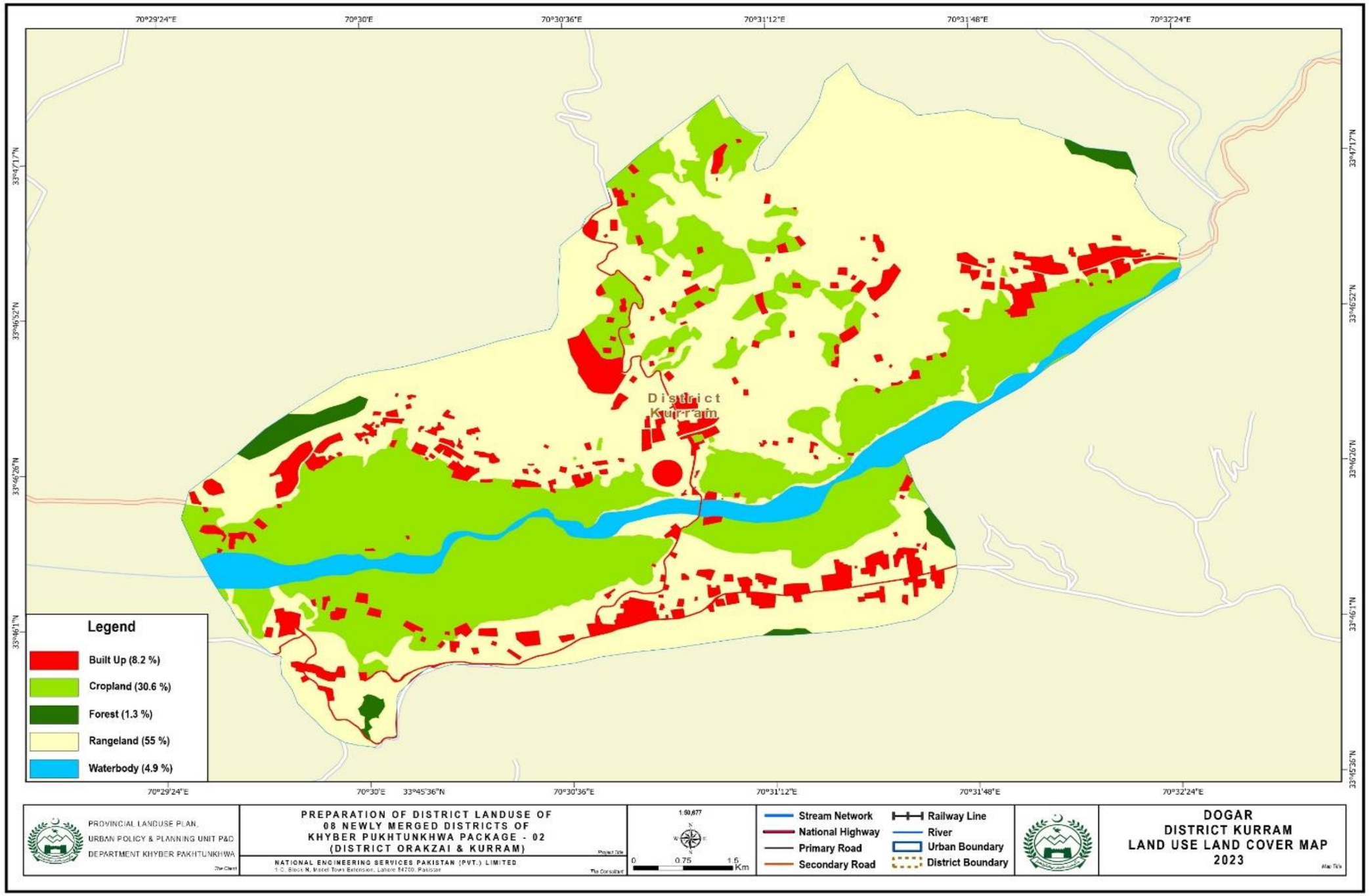
Map 1-21: Land Cover Map of Dogar Proposed Urban Center 2008



Map 1-22: Land Cover Map of Dogar Proposed Urban Center 2013



Map 1-23: Land Cover Map of Dogar Proposed Urban Center 2018



Map 1-24: Land Cover Map of Dogar Proposed Urban Center 2023

1.6.5 Human Settlement

Human settlements are areas where people live, work, and access services, ranging from small villages to large cities and megacities. They provide essential spaces for living, socializing, and economic activities. The study of settlements combines urban planning, geography, sociology, economics, and environmental science to understand and improve living environments.

Settlements are broadly categorized into rural (villages, hamlets, centered on agriculture) and urban (towns, cities, metropolitan areas, high-density economic hubs). Key characteristics include size, population density, functions, infrastructure, and governance.

Settlement growth is influenced by geography, economic opportunities, social dynamics, political stability, and technology. Current challenges include rapid urbanization, resource strain, environmental sustainability, infrastructure provision, affordable housing, and social inequality.

Planning is vital for sustainable development through zoning, land use regulation, and infrastructure development. Rural planning focuses on improving livelihoods, while urban planning increasingly emphasizes smart city concepts and technology integration to enhance services and quality of life. Sustainable practices aim to balance economic growth with environmental protection and social equity.

With digital technologies and data analytics, planners can monitor and guide settlement development using real-time data and satellite imagery, enabling efficient infrastructure, better urban management, and improved quality of life. Effective planning ensures settlements are resilient, inclusive, and sustainable, supporting growing and diverse populations.

1.6.5.1 Settlement Wise Demography Analysis

The **demography analysis of human settlements** in **Kurram District**, as detailed in the data, illustrates the varying population sizes and growth projections across different **mauzas, dehs, villages, and settlements**. The settlements are categorized based on their population size and growth trajectory, forming a clear hierarchy from smaller rural settlements to larger, more densely populated areas. This hierarchy reflects both current population figures and projected growth trends, which are influenced by various factors, including infrastructure development, economic opportunities, and access to services.

1.6.5.1.1 District Level Overview

At the highest level, **Kurram District** serves as the base for all settlements within the region. The district's population is projected to grow from **785,434** in 2023 to **1,486,194** by 2045. This significant population increase reflects both natural growth and migration trends driven by economic opportunities, infrastructure development, and improved access to social services. The district encompasses a diverse array of smaller settlements, each with its own growth characteristics, and these settlements are further categorized into tehsils and sections. The overall growth of Kurram District indicates a dynamic demographic change, influenced by both internal populations increase and the attraction of residents to urbanizing areas.

1.6.5.1.2 Tehsil Level

Kurram District is divided into **three tehsils**, and each tehsil shows varying rates of population growth. These tehsils represent different urbanization trends, with some experiencing rapid growth due to centralization, while others are seeing more gradual increases.

1. **Central Kurram F.R Tehsil**: With a population of **358,670** in 2023, this tehsil is expected to grow to **764,019** by 2045. This substantial growth is indicative of the ongoing urbanization and the availability of better infrastructure and services, which attract both internal migrants and natural population increases. Central Kurram is likely to become the central hub of the district, offering more economic and educational opportunities.

2. **Upper Kurram Tehsil**: This tehsil, with a population of **275,819** in 2023, is projected to increase to **416,823** by 2045. The rapid growth of Upper Kurram reflects a more widespread population distribution across rural settlements, which are experiencing moderate urbanization. As areas like **Parachinar** continue to develop, Upper Kurram will see continued growth in its rural and semi-urban settlements.

3. **Lower Kurram Tehsil**: The smallest of the three tehsils, Lower Kurram begins with a population of **416,823** in 2023 and is expected to reach **305,352** by 2045. While this tehsil shows slower growth compared to the others, it still reflects an overall increase due to better connectivity and local economic development.

1.6.5.1.3 Section Level

At the section level, Kurram's population distribution varies, with some sections experiencing higher growth rates due to better infrastructure and access to resources, while others continue to expand at a slower pace.

- **Ali Sher Zai Tribe**: The largest section in Kurram, with **76,724** people in 2023, is expected to grow to **154,037** by 2045. This section is likely to experience significant urbanization, especially around **Ali Sher Zai** and surrounding settlements, which offer employment opportunities and better services.

- **Masozai Tribe**: This section, home to **93,996** people in 2023, will see robust growth, reaching **188,714** by 2045. The growth here is driven by improved infrastructure and the expansion of agricultural and industrial opportunities.

- **Para Chamkani Tribe**: With **147,650** people in 2023, this section is expected to double its population by 2045, reaching **296,434**. Its growth is linked to its strategic location and economic development potential.

- **Zeran Hassanzai PC**: With **33,066** residents in 2023, this section is projected to grow to **49,828** by 2045. The moderate growth reflects a steady expansion due to local development projects and resource availability.

1.6.5.1.4 Settlement Level

At the settlement level, individual villages, dehs, and mauzas within each section demonstrate varying growth rates. Larger settlements tend to grow faster due to migration, urbanization, and economic development, while smaller, more rural communities show slower population increases.

- **Tutki**: As one of the largest settlements in Kurram, **Tutki** has a population of **26,762** in 2023 and is projected to grow to **40,328** by 2045. This settlement serves as a key urban hub and will likely continue to attract migrants from surrounding rural areas.

- **Bilyamin PC**: With a population of **7,443** in 2023, **Bilyamin PC** is expected to grow to **11,643** by 2045. This settlement has a significant growth rate, reflecting its centrality and development opportunities in the region.

- **Shanai**: This settlement has a population of **3,466** in 2023 and is projected to reach **5,223** by 2045. The relatively higher growth rate here indicates a continued trend toward urbanization in this area.
- **Saddar**: With **23,043** people in 2023, **Saddar** is expected to grow to **36,046** by 2045. Its central location and growing infrastructure make it one of the focal points for future development in Kurram.
- **Para Chamkani Tribe**: This area, with **147,650** people in 2023, is expected to continue its rapid growth, reaching **296,434** by 2045. The growth of this tribe's settlements will be driven by both populations increase and the development of surrounding areas.

1.6.5.2 Population Growth Trend and Implication

Settlements in Kurram with better infrastructure, such as Tutki, Bilyamin PC, and Shanai, are projected to experience the highest growth due to urbanization and improved access to services. In contrast, rural or peripheral settlements like Dare Plare and Farash Khel are expected to grow more slowly, relying primarily on agriculture and facing limited infrastructure development.

The concentration of population in larger settlements like Tutki and Bilyamin PC underscores the need for focused urban planning, addressing housing, transportation, healthcare, and education. Peripheral settlements will need targeted policies to prevent stagnation or depopulation caused by centralization of resources.

Rapid population growth in areas such as the Masozai and Para Chamkani Tribes highlights the importance of resource management and planning to support urban expansion while preserving the rural character and agricultural base of smaller settlements.

Table 1-31: Settlement Wise Population Projections

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
KURRAM DISTRICT	785,434	834090	966344	1116349	1288010	1486194
CENTRAL KURRAM F.R TEHSIL	358670	386306	461972	548568	648346	764019
ALI SHER ZAI TRIBE	76724	82636	98822	117346	138689	154037
MIRMAT KHEL SECTION	19375	20868	24955	29633	35023	38899
BEZDAI	1273	1371	1640	1947	2301	2556
DOGA	1208	1301	1556	1848	2184	2425
HASSAN ZAI	1198	1290	1543	1832	2166	2405
KADA	2844	3063	3663	4350	5141	5710
KHATOORI TANG	416	448	536	636	752	835
KOT	1545	1664	1990	2363	2793	3102
MARGHAN	4293	4624	5529	6566	7760	8619
MIRAZAI	3296	3550	4245	5041	5958	6617
SAYA	265	285	341	405	479	532
SHAWALI GARI	683	736	880	1045	1235	1371
SPIRARI	1010	1088	1301	1545	1826	2028
TANDAI	1344	1448	1731	2056	2429	2698
MISRI KHEL SECTION	24532	26422	31598	37521	44345	49252
BANDA	3346	3604	4310	5118	6048	6718
DAR KILI	1837	1979	2366	2810	3321	3688
DONGA	1465	1578	1887	2241	2648	2941
JABA	521	561	671	797	942	1046
JANGLE	944	1017	1216	1444	1706	1895
KHARA SHA	2111	2274	2719	3229	3816	4238
KOTKAI	2344	2525	3019	3585	4237	4706
MIRAN KHELA	2945	3172	3793	4504	5323	5913
NAVI KILI	1952	2102	2514	2985	3529	3919
SAMANDAR KILLI	1525	1643	1964	2332	2757	3062
SHAMKIKILI	2581	2780	3324	3948	4666	5182
TOOR NAZOOR	1997	2151	2572	3054	3610	4009
WAT	964	1038	1242	1474	1743	1935
UMAR KHEL SECTION	32817	35346	42269	50192	59321	65886
CHAPPER	4277	4607	5509	6541	7731	8587
GHOOI GHARA	1554	1674	2002	2377	2809	3120

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
KURRAM	1509	1625	1944	2308	2728	3030
MAZRINA	2974	3203	3831	4549	5376	5971
PATAI	780	840	1005	1193	1410	1566
RISHAKA	370	399	477	566	669	743
SHEGAI	1687	1817	2173	2580	3049	3387
TALPAKA	1453	1565	1871	2222	2626	2917
TATANG	1728	1861	2226	2643	3124	3469
TINDO ZOR/NARA KILLY	8482	9136	10925	12973	15332	17029
WAM	7607	8193	9798	11635	13751	15272
ZANGI	396	427	510	606	716	795
MASOZAI TRIBE	93996	101238	121068	143762	169911	188714
ASH KHEL SECTION	42609	45892	54881	65168	77022	85545
AMBLAKO KILLI	222	239	286	340	401	446
ATARO KILLI	1379	1485	1776	2109	2493	2769
AUDH	1300	1400	1674	1988	2350	2610
BADAMA	18806	20255	24222	28763	33994	37756
BARI ZOONS	984	1060	1267	1505	1779	1976
BELMOZ KOOT	520	560	670	795	940	1044
DARGAI	738	795	951	1129	1334	1482
DAWIGARA	3207	3454	4131	4905	5797	6439
MAROZANDA KILLI	472	508	608	722	853	948
MIR BAGH	6300	6785	8114	9636	11388	12648
PAKHI KILLI	3327	3583	4285	5088	6014	6680
SAMO KILLI	315	339	406	482	569	632
WRASTA MELLA	2879	3101	3708	4403	5204	5780
MELLA SANDY KHEL	208	224	268	318	376	418
SHENALI KALLI	1454	1566	1873	2224	2628	2919
SURKANI	262	282	337	401	474	526
TANGA	236	254	304	361	427	474
MUSTU KHEL SECTION	51387	55346	66187	78594	92889	103169
DONGAR GOOD	3604	3882	4642	5512	6515	7236
NAWI VYALLA	635	684	818	971	1148	1275
RAJA KOT/WAM	1519	1636	1956	2323	2746	3050
SHAHBAZ SAM	1538	1657	1981	2352	2780	3088
SHAM KANI	467	503	602	714	844	938

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
STAR SAM	1096	1180	1412	1676	1981	2200
SULTANI	883	951	1137	1351	1596	1773
YAQIN KILLI/FAZAL KILLI	1918	2066	2470	2933	3467	3851
ALWARA MELLA	1621	1746	2088	2479	2930	3254
ASSAR KILLI	976	1051	1257	1493	1764	1959
CHAPPER	1911	2058	2461	2923	3454	3837
KHAWRI SAM KALLA	1161	1250	1495	1776	2099	2331
MARG JAI	2351	2532	3028	3596	4250	4720
TAGHU	2404	2589	3096	3677	4346	4826
TARALI	3673	3956	4731	5618	6639	7374
TARI TANG	3963	4268	5104	6061	7164	7956
TAWDI OBA	955	1029	1230	1461	1726	1917
ZERA MELLA	2494	2686	3212	3814	4508	5007
BABRO KHAPA	1074	1157	1383	1643	1941	2156
BARHOSI	1111	1197	1431	1699	2008	2231
DOGAR	2883	3105	3713	4409	5211	5788
GHAKAI	1429	1539	1841	2186	2583	2869
HUSSEY	2200	2370	2834	3365	3977	4417
JARJORI/CHOTO KILLI	611	658	787	934	1104	1227
JODARA	3208	3455	4132	4906	5799	6441
KALAT	580	625	747	887	1048	1164
KALAYA	1820	1960	2344	2784	3290	3654
KHAWRI KALLI	1254	1351	1615	1918	2267	2518
MADO KOOT	961	1035	1238	1470	1737	1929
SAR PANARY	1087	1171	1400	1663	1965	2182
PARA CHAMKANI TRIBE	147650	159027	190175	225824	266898	296434
ALI SIANI SECTION	25682	27661	33079	39279	46424	51561
BAGH KILLI	1167	1257	1503	1785	2110	2343
BAZA KILLI	10126	10906	13042	15487	18304	20330
GAWDARI	5536	5963	7130	8467	10007	11115
GONDAL	5073	5464	6534	7759	9170	10185
LOKHA KILI	3780	4071	4869	5781	6833	7589
AVIDARA KHEL SECTION	19914	21448	25650	30457	35997	39981
AWI DARRA (STAR KALI)	4527	4876	5831	6924	8183	9089
DADWAZ	1578	1700	2032	2413	2852	3168

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
GHAKAI	3839	4135	4945	5872	6940	7707
KHARKI	1786	1924	2300	2732	3228	3586
REGO	2197	2366	2830	3360	3971	4411
SAR PAKHA	4969	5352	6400	7600	8982	9976
SRA KHAWARA	1018	1096	1311	1557	1840	2044
HAJI KHEL SECTION	43627	46988	56192	66725	78862	87589
ANGORI	4030	4341	5191	6164	7285	8091
ARGHANJA	1198	1290	1543	1832	2166	2405
DIRI MANRI	1540	1659	1984	2355	2784	3092
GANDAO	9031	9727	11632	13812	16325	18131
GOGANI	6737	7256	8677	10304	12178	13526
KOODA	2052	2210	2643	3138	3709	4120
KOT MERAN	3359	3618	4326	5137	6072	6744
MAKHRANI	7897	8505	10171	12078	14275	15855
MEKHKAI	1557	1677	2005	2381	2814	3126
RIZENDA	2104	2266	2710	3218	3803	4224
SIRAK	2620	2822	3375	4007	4736	5260
TANORAK	1502	1618	1935	2297	2715	3016
KHAWAJAK SECTION	30033	32347	38683	45934	54289	60297
ARWAZA	2882	3104	3712	4408	5210	5786
DAD MIR KILLI	1010	1088	1301	1545	1826	2028
GURDA GHONAI	1006	1084	1296	1539	1818	2020
JANAN CHINA	1961	2112	2526	2999	3545	3937
KHAZANA	1071	1154	1379	1638	1936	2150
KIMAL BAZA	4879	5255	6284	7462	8819	9795
LANDI TANGI	4555	4906	5867	6967	8234	9145
SAID KARAM	3265	3517	4205	4994	5902	6555
SHANDAWANI	2430	2617	3130	3717	4393	4879
TABAI TANGI	2236	2408	2880	3420	4042	4489
TOTKAI	1167	1257	1503	1785	2110	2343
KHAZA KHELA	881	949	1135	1347	1593	1769
MIAN PATI	2690	2897	3465	4114	4863	5401
KHONI KHEL SECTION	28394	30582	36572	43427	51326	57006
PASS MELA	11237	12103	14473	17186	20312	22560
SAM KHATAK	4982	5366	6417	7620	9006	10002

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
TABAI KHANI KHEL	4981	5365	6416	7618	9004	10000
TAKHTI	7194	7748	9266	11003	13004	14443
ZIAMOSHT TRIBE	40300	43405	51907	61637	72848	80909
KHOIDAD KHEL SECTION	3341	3598	4303	5110	6039	6708
DAND MENJAKI	853	919	1099	1305	1542	1713
MIRAHDI	1094	1178	1409	1673	1978	2196
QURAT	1184	1275	1525	1811	2140	2377
SPIR KET	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
SURMAI	210	226	270	321	380	422
ZAWA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
MANDAN SECTION	21284	22924	27414	32553	38474	42731
CHINIRAK	1499	1614	1931	2293	2710	3010
GAWAKAI	4114	4431	5299	6292	7437	8260
JALAMOI	2606	2807	3357	3986	4711	5232
MANATOO	6267	6750	8072	9585	11328	12582
NORARI	1509	1625	1944	2308	2728	3030
QIRAT	2891	3114	3724	4422	5226	5804
SATTAR MANDAN	2398	2583	3089	3668	4335	4814
WAZIR SECTION	15675	16883	20190	23974	28335	31470
GULA SHING WAZIR	3593	3870	4628	5495	6495	7214
KANDALI BABA	1795	1933	2312	2745	3245	3604
MANDARA	598	644	770	915	1081	1201
PALOSIN WAZIR	7427	7999	9566	11359	13425	14911
PASTAWANI	2262	2436	2913	3460	4089	4541
LOWER KURRAM TEHSIL	150,945	160857	184572	220528	258901	305352
LOWER KURRAM QH	111057	115930	254727	142584	157532	173725
ALIZAI PC	19541	20398	44820	25088	27718	30568
ALIZAI	3656	3816	8386	4694	5186	5719
BAGAN	9608	10030	22038	12336	13629	15030
BAGZAI	3058	3192	7014	3926	4338	4784
CHARDIWAR	107	112	245	137	152	167
DRAZRAWAZ	233	243	534	299	331	364
JILAMAI	542	566	1243	696	769	848
SARAGHORGA	1911	1995	4383	2454	2711	2989
TAUDA CHINA	426	445	977	547	604	666

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
BILYAMIN PC	7443	7770	17072	9556	10558	11643
ARAWALI	2105	2197	4828	2703	2986	3293
BILYAMIN	2347	2450	5383	3013	3329	3671
GALA	173	181	397	222	245	271
KAS	218	228	500	280	309	341
MAIDANI	17	18	39	22	24	27
MANDURI BANGASH	423	442	970	543	600	662
MARO KHEL	780	814	1789	1001	1106	1220
MUZAFFAR KOT	310	324	711	398	440	485
TANGI	469	490	1076	602	665	734
WALI CHINA	601	627	1378	772	853	940
HASSAN ALI PC	9061	9459	20783	11633	12853	14174
BISATTU	1761	1838	4039	2261	2498	2755
GHULAM HAIDAR KILA	622	649	1427	799	882	973
HASSAN ALI KILA	3185	3325	7305	4089	4518	4982
MAHOORA	1666	1739	3821	2139	2363	2606
TOPAKI	1465	1529	3360	1881	2078	2292
YAQUBI	362	378	830	465	513	566
IBRAHIMZAI PC	15933	16632	36545	20456	22601	24924
BALISH KHEL	11399	11899	26145	14635	16169	17831
GHARBINA	502	524	1151	645	712	785
IBRAHIMZAI	1927	2012	4420	2474	2733	3014
SANGINA	576	601	1321	740	817	901
SHAKAR DARA	1529	1596	3507	1963	2169	2392
MANDURI PC	16008	16710	36717	20552	22707	25041
AHMADI SHAMA	1754	1831	4023	2252	2488	2744
BADSHAH KOT	570	595	1307	732	809	892
CHAPRI	5977	6239	13709	7674	8478	9350
KHAP YANGA	1672	1745	3835	2147	2372	2615
MANDURI	5500	5741	12615	7061	7802	8604
THALL	535	558	1227	687	759	837
RAMAKI KILA (PART) PC	4921	5137	11287	6318	6980	7698
AHMED KHAN KILA	439	458	1007	564	623	687
AMAL KOT	1353	1412	3103	1737	1919	2116
RAMAKI KILA	2816	2940	6459	3615	3994	4405

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
SHERJAN KILA	313	327	718	402	444	490
SADDA PC	23043	24054	52853	29585	32686	36046
KOCHI KILA	4599	4801	10549	5905	6524	7194
SAID ALI KILA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
SATIN	14624	15266	33543	18776	20744	22876
SHAH NAWAZ KILA	3820	3988	8762	4904	5419	5976
SHASHI PC	15107	15770	34650	19396	21429	23632
DURRANI KILA	4245	4431	9737	5450	6021	6640
GIDARA	290	303	665	372	411	454
JILAM ZAI	1493	1559	3424	1917	2118	2335
MAKHI ZAI GHARBI	1563	1632	3585	2007	2217	2445
MAKHI ZAI SHARQI	1794	1873	4115	2303	2545	2806
SAKHI AHMAD SHAH KILA	2818	2942	6464	3618	3997	4408
SHASHI KILA	2904	3031	6661	3728	4119	4543
UPPER KURRAM TEHSIL	275,819	286927	315584	347253	380764	416823
DAMAN QH	152518	158618	319472	191717	210084	229832
ALISHERI PC	6262	6512	13117	7871	8626	9436
ALISHERI	6218	6467	13025	7816	8565	9370
NARI MELA	44	46	92	55	61	66
BOGHAKI PC	8889	9245	18619	11174	12244	13395
BOGHAKI	3866	4021	8098	4860	5325	5826
BULBULAK	309	321	647	388	426	466
DARADAR	1022	1063	2141	1285	1408	1540
DHAND	84	87	176	106	116	127
KHAN SAIDA	44	46	92	55	61	66
KINA KAI	366	381	767	460	504	552
RAJU MELA	69	72	145	87	95	104
SHAH NASAR MELA	7	7	15	9	10	11
TANDAR	844	878	1768	1061	1163	1272
WACHA DARA	2278	2369	4772	2863	3138	3433
KIRMAN PC	12347	12841	25863	15520	17007	18606
ASALAT KILA	559	581	1171	703	770	842
AZIM SAID NOOR KILA	317	330	664	398	437	478
AZIZ KILA	19	20	40	24	26	29
BIZOT KILA	1151	1197	2411	1447	1585	1734

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
DAULAT KHAN KILA	89	93	186	112	123	134
GRAM	738	768	1546	928	1017	1112
HAMZA KHEL	2667	2774	5586	3352	3674	4019
KIRMAN YOUSAF KHEL	1795	1867	3760	2256	2472	2705
KIRMANI	698	726	1462	877	961	1052
MAMU ZAI	828	861	1734	1041	1141	1248
MANA	1139	1185	2386	1432	1569	1716
MASTO KHEL	985	1024	2063	1238	1357	1484
MIRANWAN KILA	244	254	511	307	336	368
SAFDAR KILA	197	205	413	248	271	297
TEZANA	577	600	1209	725	795	869
ZIARAT KILA	344	358	721	432	474	518
LUQMAN KHEL PC	9577	9960	20060	12038	13192	14432
LANDIWAN	3	3	6	4	4	5
LUQMAN KHEL	9574	9957	20054	12035	13188	14427
MALANA PC	22249	23139	46604	27967	30647	33527
MALANA	22249	23139	46604	27967	30647	33527
QUBAD SHAH KHEL PC	6041	6283	12654	7594	8321	9103
MULAH BAGH	1384	1439	2899	1740	1906	2086
QUBAD SHAH KHEL	4657	4843	9755	5854	6415	7018
SHALAZAN TANGI PC	78	81	163	98	107	118
DARBAND TOI MELA	2	2	4	3	3	3
JEWAN TANGI MELA	2	2	4	3	3	3
KHERA DIN	8	8	17	10	11	12
KHEWAS	26	27	54	33	36	39
SHAFI ABAD	4	4	8	5	6	6
SHIN ALI TANGI MELA	36	37	75	45	50	54
SHALOZAN PC	10029	10430	21007	12607	13814	15113
SHALOZAN	10029	10430	21007	12607	13814	15113
TUTKI PC	33743	35093	70680	42415	46479	50848
MAIDANAK	280	291	587	352	386	422
PARACHINAR	1560	1622	3268	1961	2149	2351
SHANAI	3466	3605	7260	4357	4774	5223
SHINKI KILA	154	160	323	194	212	232
TUTKI	26762	27832	56057	33640	36863	40328

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
YARDAH KILA	1521	1582	3186	1912	2095	2292
ZERAN HASSANZAI PC	33066	34388	69262	41564	45546	49828
ZERAN HASSANZAI	33066	34388	69262	41564	45546	49828
ZERAN YOUSAF KHEL PC	10237	10646	21443	12868	14101	15426
ZERAN YOUSAF KHEL	10237	10646	21443	12868	14101	15426
SHINGAK QH	117718	122426	246578	147973	162149	177391
AHMADZAI PC	18299	19031	38330	23002	25206	27575
AHMADZAI	6715	6984	14066	8441	9249	10119
AKA KHEL	1029	1070	2155	1293	1417	1551
DRIPLARI	1080	1123	2262	1358	1488	1627
HAIDER ALI KILA	250	260	524	314	344	377
MALI KHEL	8742	9092	18311	10989	12042	13173
SHAKAR KOT	483	502	1012	607	665	728
BUSHERA PC	14083	14646	29499	17702	19398	21222
ARABI KILA	124	129	260	156	171	187
AYAZ KHAN KILA	528	549	1106	664	727	796
BUSHERA	876	911	1835	1101	1207	1320
DANDAR	724	753	1517	910	997	1091
GUL KILA	1284	1335	2690	1614	1769	1935
HAKIM KILA	275	286	576	346	379	414
MARU KHEL BALA	2492	2592	5220	3132	3433	3755
MIRZA KHAN KILA	1902	1978	3984	2391	2620	2866
MUSA KHAN KILA	866	901	1814	1089	1193	1305
SHAKH	3990	4150	8358	5015	5496	6013
TAPU KILA	1022	1063	2141	1285	1408	1540
KACHKINA PC	10459	10877	21908	13147	14407	15761
KACHKINA	3722	3871	7796	4679	5127	5609
KARA KHEL	5070	5273	10620	6373	6984	7640
SAFDAR SEHRA	1667	1734	3492	2095	2296	2512
SHAMIR KILA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
KHARLACHI PC	10471	10890	21933	13162	14423	15779
BOGHDI	3734	3883	7821	4694	5143	5627
BURKI	3204	3332	6711	4027	4413	4828
KHARLACHI	1583	1646	3316	1990	2180	2385
LALMI	1912	1988	4005	2403	2634	2881

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
SHAKHALO	38	40	80	48	52	57
MANGLAT PEWAR PC	10397	10813	21778	13069	14321	15667
GHUJARGHUNA	2399	2495	5025	3016	3304	3615
GIDO	432	449	905	543	595	651
GOBAZANA	798	830	1672	1003	1099	1203
HAQDARA	379	394	794	476	522	571
KHERAWA	440	458	922	553	606	663
KOTRI	1664	1731	3486	2092	2292	2508
MIRMAI	790	822	1655	993	1088	1190
NAFIA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
SURSURANG	1710	1778	3582	2149	2355	2577
TARI	1785	1856	3739	2244	2459	2690
NASTI KOT PC	11131	11576	23316	13992	15332	16773
KUNJ ALI ZAI	4319	4492	9047	5429	5949	6508
NASTI KOT	6103	6347	12784	7672	8406	9197
TAIDA	709	737	1485	891	977	1068
PEWAR PC	6879	7154	14409	8647	9475	10366
GANDA KILA	1322	1375	2769	1662	1821	1992
PEWAR	5557	5779	11640	6985	7654	8374
RAMAKI KILA (PART) PC	7093	7377	14857	8916	9770	10689
JALLANDHAR	3748	3898	7851	4711	5163	5648
SULTAN	3345	3479	7007	4205	4608	5041
SHINGAK PC	15555	16177	32582	19553	21426	23440
BASU KILA	249	259	522	313	343	375
GHOZGARHY	7897	8213	16541	9927	10878	11900
GHULAM KILA	400	416	838	503	551	603
JAPAK KILA	357	371	748	449	492	538
KANDA	736	765	1542	925	1014	1109
MATA SANGAR	2130	2215	4462	2677	2934	3210
SHINGAK	3317	3450	6948	4170	4569	4998
TITAM	74	77	155	93	102	112
TOTAK	395	411	827	497	544	595
SHUBLAN PC	13351	13885	27966	16782	18390	20119
AGRA	2022	2103	4235	2542	2785	3047
ALAM SHER	1779	1850	3726	2236	2450	2681

NAME OF MAUZA/ DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
ALIDAD KILA	105	109	220	132	145	158
AMIR KHAN KILA	772	803	1617	970	1063	1163
ASHUR KILA	815	848	1707	1024	1123	1228
DANGILA	1911	1987	4003	2402	2632	2880
FEROZ KHEL	1110	1154	2325	1395	1529	1673
LAT KILA	109	113	228	137	150	164
MIRDO KILA	1061	1103	2222	1334	1461	1599
MULAN KILA	1256	1306	2631	1579	1730	1893
SAFDAR SHIKARI	235	244	492	295	324	354
SHER KILA	1094	1138	2292	1375	1507	1649
ZAID ALI KILA	1082	1125	2266	1360	1490	1630

1.6.6 Hierarchy of Human Settlement

Establishing a hierarchy of human settlements is essential for effective resource allocation, infrastructure development, and land use planning. Typically, settlements are classified based on size, function, services, and accessibility. In the absence of spatial boundaries, population size and housing stock serve as reliable proxies for settlement classification and urbanization levels.

Common Methods for Settlement Classification

1.6.6.1 Population-Based Classification:

The simplest and most common approach, it categorizes settlements by population size larger populations typically indicate more services and infrastructure. For example, settlements under 5,000 people may be small, while those above 500,000 qualify as metropolitan areas. [19]

1.6.6.2 Housing Stock-Based Classification:

Settlements are ranked based on the number of housing units, assuming that larger housing stocks correspond to higher urbanization and better infrastructure. [20]

1.6.6.3 Combined Population and Housing Stock Classification:

This approach integrates both indicators into a composite score, offering a balanced view of demographic and physical development. Standardized data are combined (via averaging or weighting) to classify settlements into small, medium, or large categories. [21]

1.6.6.4 Central Place Theory (CPT):

Developed by Walter Christaller, CPT ranks settlements based on their centrality and the services they provide. Higher-order settlements (e.g., those with hospitals or higher education institutions) serve as regional hubs for smaller settlements. [22]

1.6.6.5 Fuzzy Analytic Hierarchy Process (FAHP):

A multi-criteria decision-making tool that uses fuzzy logic to handle uncertainty in data. It evaluates settlements based on multiple factors (e.g., population, housing, infrastructure) to generate a ranked hierarchy. [23]

1.6.6.6 Composite Characteristic Approach:

This method integrates multiple attributes population, housing, economic role, and land use into a single index for a more holistic classification of settlements. [24]

1.6.6.7 Density-Based Classification:

Based on population density (population-to-housing ratio), this method distinguishes between urban and rural settlements. High-density areas are typically more urbanized, though density alone may not fully capture variations in service provision. [25]

---

[19] Mesev, V., & Longley, P. A. (2001). *Measuring the 'Urban': Measuring and Modelling a Regional Settlement Hierarchy*. *Modelling Scale in Geographical Studies*

[20] Kawashima, T., & Korcelli, P. (1982). Human Settlement Systems: Spatial Patterns and Trends. IIASA

[21] Tang, L., Ruth, M., He, Q., & Mirzaee, S. (2017). *Comprehensive Evaluation of Trends in Human Settlements Quality Changes*. *Habitat International*

[22] Newman, P., Birrell, B., Spessa, A., & Tait, D. (1996). *Human Settlements*. *Transport*

[23] Zhang, Y., & Fan, Q. (2020). *The Application of the Fuzzy Analytic Hierarchy Process in the Assessment and Improvement of the Human Settlement Environment*. *Sustainability*

[24] Newton, P., Baum, S., Bhatia, K., Brown, S., & Cameron, S. (2001). *Human Settlements*

[25] Douglas, I. (1994). *Changes in Land Use and Land Cover: A Global Perspective*. *Urban Geography*

1.6.7 Defining Characteristics and Scores

The population scores of settlements are determined by projecting populations to the end of the planning period and dividing each by 1,000 to assign a ranking score. Settlements are categorized as follows: 0–10 (5th order), 11–20 (4th order), 21–30 (3rd order), 31–40 (2nd order), and above 40 (1st order). This hierarchical system classifies settlements by projected population size, enabling structured planning and prioritization. Higher-order settlements, with larger populations, are prioritized for infrastructure and services, while lower-order settlements require tailored strategies to address their specific development needs.

Table 1-32 Scoring for Population Size

Scores	Settlement Orders
Above 40	1st Order
31-40	2nd Order
21-30	3rd Order
11-20	4th Order
0 -10	5th Order

1.6.8 Hierarchy of Human Settlement District Kurram

After evaluating various international methods for classifying human settlements, a population-based hierarchy was identified as the most suitable approach for Kurram District, given the limited spatial data and absence of defined settlement boundaries. This method enables flexible, data-driven classification based on projected population growth, supporting effective planning, resource allocation, and understanding of demographic patterns.

With the district's population expected to rise from 785,434 in 2023 to 1,486,194 by 2045, settlements are categorized into five hierarchical orders to guide land-use and infrastructure development.

- **1st Order Settlements** (e.g., *Zeran Hassanzai, Shingak QH*)—projected to exceed 100,000 will serve as major urban centers requiring comprehensive plans for housing, transport, industry, and services.
- **2nd Order Settlements** (*Zeran Yousaf Khel, Alisheri*)—30,000–60,000 will function as regional growth hubs focusing on connectivity, business expansion, and utility upgrades.
- **3rd Order Settlements** (*Tundar, Gawakai*)—20,000–30,000 will need infrastructure improvements and balanced urban-rural integration.
- **4th Order Settlements** (*Wam, Sham Kani*)—10,000–20,000 will experience moderate growth with emphasis on mixed-use development and essential infrastructure.
- **5th Order Settlements** (*Miramai, Kherawa*)—below 10,000 will retain rural characteristics, prioritizing rural infrastructure and agricultural preservation.

In land-use planning, 1st and 2nd Order Settlements should be designated for major urban development, 3rd and 4th Orders for gradual urbanization with infrastructure support, and 5th Orders for rural enhancement and agricultural protection. Integrating sustainable development, green

infrastructure, and regional coordination will ensure a balanced and resilient growth framework for Kurram District over the next 20 years.

Table 1-33 Hierarchy of Settlements

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
KURRAM DISTRICT	785,434	834090	966344	1116349	1288010	1486194		
CENTRAL KURRAM F.R TEHSIL	358670	386306	461972	548568	648346	764019		
ALI SHER ZAI TRIBE	76724	82636	98822	117346	138689	154037		
MIRMAT KHEL SECTION	19375	20868	24955	29633	35023	38899		
BEZDAI	1273	1371	1640	1947	2301	2556	3	5th Order
DOGA	1208	1301	1556	1848	2184	2425	2	5th Order
HASSAN ZAI	1198	1290	1543	1832	2166	2405	2	5th Order
KADA	2844	3063	3663	4350	5141	5710	6	5th Order
KHATOORI TANG	416	448	536	636	752	835	1	5th Order
KOT	1545	1664	1990	2363	2793	3102	3	5th Order
MARGHAN	4293	4624	5529	6566	7760	8619	9	5th Order
MIRAZAI	3296	3550	4245	5041	5958	6617	7	5th Order
SAYA	265	285	341	405	479	532	1	5th Order
SHAWALI GARI	683	736	880	1045	1235	1371	1	5th Order
SPIRARI	1010	1088	1301	1545	1826	2028	2	5th Order
TANDAI	1344	1448	1731	2056	2429	2698	3	5th Order
MISRI KHEL SECTION	24532	26422	31598	37521	44345	49252		
BANDA	3346	3604	4310	5118	6048	6718	7	5th Order
DAR KILI	1837	1979	2366	2810	3321	3688	4	5th Order
DONGA	1465	1578	1887	2241	2648	2941	3	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
JABA	521	561	671	797	942	1046	1	5th Order
JANGLE	944	1017	1216	1444	1706	1895	2	5th Order
KHARA SHA	2111	2274	2719	3229	3816	4238	4	5th Order
KOTKAI	2344	2525	3019	3585	4237	4706	5	5th Order
MIRAN KHELA	2945	3172	3793	4504	5323	5913	6	5th Order
NAVI KILI	1952	2102	2514	2985	3529	3919	4	5th Order
SAMANDAR KILLI	1525	1643	1964	2332	2757	3062	3	5th Order
SHAMKIKILI	2581	2780	3324	3948	4666	5182	5	5th Order
TOOR NAZOOR	1997	2151	2572	3054	3610	4009	4	5th Order
WAT	964	1038	1242	1474	1743	1935	2	5th Order
UMAR KHEL SECTION	32817	35346	42269	50192	59321	65886		
CHAPPER	4277	4607	5509	6541	7731	8587	9	5th Order
GHOOI GHARA	1554	1674	2002	2377	2809	3120	3	5th Order
KURRAM	1509	1625	1944	2308	2728	3030	3	5th Order
MAZRINA	2974	3203	3831	4549	5376	5971	6	5th Order
PATAI	780	840	1005	1193	1410	1566	2	5th Order
RISHAKA	370	399	477	566	669	743	1	5th Order
SHEGAI	1687	1817	2173	2580	3049	3387	3	5th Order
TALPAKA	1453	1565	1871	2222	2626	2917	3	5th Order
TATANG	1728	1861	2226	2643	3124	3469	3	5th Order
TINDO ZOR/NARA KILLY	8482	9136	10925	12973	15332	17029	17	4th Order
WAM	7607	8193	9798	11635	13751	15272	15	4th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
ZANGI	396	427	510	606	716	795	1	5th Order
MASOZAI TRIBE	93996	101238	121068	143762	169911	188714	189	1st Order
ASH KHEL SECTION	42609	45892	54881	65168	77022	85545		
AMBLAKO KILLI	222	239	286	340	401	446	0	5th Order
ATARO KILLI	1379	1485	1776	2109	2493	2769	3	5th Order
AUDH	1300	1400	1674	1988	2350	2610	3	5th Order
BADAMA	18806	20255	24222	28763	33994	37756	38	4th Order
BARI ZOONS	984	1060	1267	1505	1779	1976	2	5th Order
BELMOZ KOOT	520	560	670	795	940	1044	1	5th Order
DARGAI	738	795	951	1129	1334	1482	1	5th Order
DAWIGARA	3207	3454	4131	4905	5797	6439	6	5th Order
MAROZANDA KILLI	472	508	608	722	853	948	1	5th Order
MIR BAGH	6300	6785	8114	9636	11388	12648	13	4th Order
PAKHI KILLI	3327	3583	4285	5088	6014	6680	7	5th Order
SAMO KILLI	315	339	406	482	569	632	1	5th Order
WRASTA MELLA	2879	3101	3708	4403	5204	5780	6	5th Order
MELLA SANDY KHEL	208	224	268	318	376	418	0	5th Order
SHENALI KALLI	1454	1566	1873	2224	2628	2919	3	5th Order
SURKANI	262	282	337	401	474	526	1	5th Order
TANGA	236	254	304	361	427	474	0	5th Order
MUSTU KHEL SECTION	51387	55346	66187	78594	92889	103169		
DONGAR GOOD	3604	3882	4642	5512	6515	7236	7	5th Order
NAWI VYALLA	635	684	818	971	1148	1275	1	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
RAJA KOT/WAM	1519	1636	1956	2323	2746	3050	3	5th Order
SHAHBAZ SAM	1538	1657	1981	2352	2780	3088	3	5th Order
SHAM KANI	467	503	602	714	844	938	1	5th Order
STAR SAM	1096	1180	1412	1676	1981	2200	2	5th Order
SULTANI	883	951	1137	1351	1596	1773	2	5th Order
YAQIN KILLI/FAZAL KILLI	1918	2066	2470	2933	3467	3851	4	5th Order
ALWARA MELLA	1621	1746	2088	2479	2930	3254	3	5th Order
ASSAR KILLI	976	1051	1257	1493	1764	1959	2	5th Order
CHAPPER	1911	2058	2461	2923	3454	3837	4	5th Order
KHAWRI SAM KALLA	1161	1250	1495	1776	2099	2331	2	5th Order
MARG JAI	2351	2532	3028	3596	4250	4720	5	5th Order
TAGHU	2404	2589	3096	3677	4346	4826	5	5th Order
TARALI	3673	3956	4731	5618	6639	7374	7	5th Order
TARI TANG	3963	4268	5104	6061	7164	7956	8	5th Order
TAWDI OBA	955	1029	1230	1461	1726	1917	2	5th Order
ZERA MELLA	2494	2686	3212	3814	4508	5007	5	5th Order
BABRO KHAPA	1074	1157	1383	1643	1941	2156	2	5th Order
BARHOSI	1111	1197	1431	1699	2008	2231	2	5th Order
DOGAR	2883	3105	3713	4409	5211	5788	6	5th Order
GHAKAI	1429	1539	1841	2186	2583	2869	3	5th Order
HUSSEY	2200	2370	2834	3365	3977	4417	4	5th Order
JARJORI/CHOTO KILLI	611	658	787	934	1104	1227	1	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
JODARA	3208	3455	4132	4906	5799	6441	6	5th Order
KALAT	580	625	747	887	1048	1164	1	5th Order
KALAYA	1820	1960	2344	2784	3290	3654	4	5th Order
KHAWRI KALLI	1254	1351	1615	1918	2267	2518	3	5th Order
MADO KOOT	961	1035	1238	1470	1737	1929	2	5th Order
SAR PANARY	1087	1171	1400	1663	1965	2182	2	5th Order
PARA CHAMKANI TRIBE	147650	159027	190175	225824	266898	296434		
ALI SIANI SECTION	25682	27661	33079	39279	46424	51561		
BAGH KILLI	1167	1257	1503	1785	2110	2343	2	5th Order
BAZA KILLI	10126	10906	13042	15487	18304	20330	20	4th Order
GAWDARI	5536	5963	7130	8467	10007	11115	11	4th Order
GONDAL	5073	5464	6534	7759	9170	10185	10	5th Order
LOKHA KILI	3780	4071	4869	5781	6833	7589	8	5th Order
AVIDARA KHEL SECTION	19914	21448	25650	30457	35997	39981		
AWI DARRA (STAR KALI)	4527	4876	5831	6924	8183	9089	9	5th Order
DADWAZ	1578	1700	2032	2413	2852	3168	3	5th Order
GHAKAI	3839	4135	4945	5872	6940	7707	8	5th Order
KHARKI	1786	1924	2300	2732	3228	3586	4	5th Order
REGO	2197	2366	2830	3360	3971	4411	4	5th Order
SAR PAKHA	4969	5352	6400	7600	8982	9976	10	5th Order
SRA KHAWARA	1018	1096	1311	1557	1840	2044	2	5th Order
HAJI KHEL SECTION	43627	46988	56192	66725	78862	87589		
ANGORI	4030	4341	5191	6164	7285	8091	8	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
ARGHANJA	1198	1290	1543	1832	2166	2405	2	5th Order
DIRI MANRI	1540	1659	1984	2355	2784	3092	3	5th Order
GANDAO	9031	9727	11632	13812	16325	18131	18	4th Order
GOGANI	6737	7256	8677	10304	12178	13526	14	4th Order
KOODA	2052	2210	2643	3138	3709	4120	4	5th Order
KOT MERAN	3359	3618	4326	5137	6072	6744	7	5th Order
MAKHRANI	7897	8505	10171	12078	14275	15855	16	4th Order
MEKHKAI	1557	1677	2005	2381	2814	3126	3	5th Order
RIZENDA	2104	2266	2710	3218	3803	4224	4	5th Order
SIRAK	2620	2822	3375	4007	4736	5260	5	5th Order
TANORAK	1502	1618	1935	2297	2715	3016	3	5th Order
KHAWAJAK SECTION	30033	32347	38683	45934	54289	60297		
ARWAZA	2882	3104	3712	4408	5210	5786	6	5th Order
DAD MIR KILLI	1010	1088	1301	1545	1826	2028	2	5th Order
GURDA GHONAI	1006	1084	1296	1539	1818	2020	2	5th Order
JANAN CHINA	1961	2112	2526	2999	3545	3937	4	5th Order
KHAZANA	1071	1154	1379	1638	1936	2150	2	5th Order
KIMAL BAZA	4879	5255	6284	7462	8819	9795	10	5th Order
LANDI TANGI	4555	4906	5867	6967	8234	9145	9	5th Order
SAID KARAM	3265	3517	4205	4994	5902	6555	7	5th Order
SHANDAWANI	2430	2617	3130	3717	4393	4879	5	5th Order
TABAI TANGI	2236	2408	2880	3420	4042	4489	4	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
TOTKAI	1167	1257	1503	1785	2110	2343	2	5th Order
KHAZA KHELA	881	949	1135	1347	1593	1769	2	5th Order
MIAN PATI	2690	2897	3465	4114	4863	5401	5	5th Order
KHONI KHEL SECTION	28394	30582	36572	43427	51326	57006		
PASS MELA	11237	12103	14473	17186	20312	22560	23	3rd Order
SAM KHATAK	4982	5366	6417	7620	9006	10002	10	5th Order
TABAI KHANI KHEL	4981	5365	6416	7618	9004	10000	10	5th Order
TAKHTI	7194	7748	9266	11003	13004	14443	14	4th Order
ZIAMOSHT TRIBE	40300	43405	51907	61637	72848	80909		
KHOIDAD KHEL SECTION	3341	3598	4303	5110	6039	6708		
DAND MENJAKI	853	919	1099	1305	1542	1713	2	5th Order
MIRAHDI	1094	1178	1409	1673	1978	2196	2	5th Order
QURAT	1184	1275	1525	1811	2140	2377	2	5th Order
SPIR KET	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
SURMAI	210	226	270	321	380	422	0	5th Order
ZAWA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
MANDAN SECTION	21284	22924	27414	32553	38474	42731		
CHINIRAK	1499	1614	1931	2293	2710	3010	3	5th Order
GAWAKAI	4114	4431	5299	6292	7437	8260	8	5th Order
JALAMOI	2606	2807	3357	3986	4711	5232	5	5th Order
MANATOO	6267	6750	8072	9585	11328	12582	13	4th Order
NORARI	1509	1625	1944	2308	2728	3030	3	5th Order
QIRAT	2891	3114	3724	4422	5226	5804	6	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
SATTAR MANDAN	2398	2583	3089	3668	4335	4814	5	5th Order
WAZIR SECTION	15675	16883	20190	23974	28335	31470		
GULA SHING WAZIR	3593	3870	4628	5495	6495	7214	7	5th Order
KANDALI BABA	1795	1933	2312	2745	3245	3604	4	5th Order
MANDARA	598	644	770	915	1081	1201	1	5th Order
PALOSIN WAZIR	7427	7999	9566	11359	13425	14911	15	4th Order
PASTAWANI	2262	2436	2913	3460	4089	4541	5	5th Order
LOWER KURRAM TEHSIL	150,945	160857	184572	220528	258901	305352		
LOWER KURRAM QH	111057	115930	254727	142584	157532	173725		
ALIZAI PC	19541	20398	44820	25088	27718	30568		
ALIZAI	3656	3816	8386	4694	5186	5719	6	5th Order
BAGAN	9608	10030	22038	12336	13629	15030	15	4th Order
BAGZAI	3058	3192	7014	3926	4338	4784	5	5th Order
CHARDIWAR	107	112	245	137	152	167	0	5th Order
DRAZRAWAZ	233	243	534	299	331	364	0	5th Order
JILAMAI	542	566	1243	696	769	848	1	5th Order
SARAGHORGA	1911	1995	4383	2454	2711	2989	3	5th Order
TAUDA CHINA	426	445	977	547	604	666	1	5th Order
BILYAMIN PC	7443	7770	17072	9556	10558	11643		
ARAWALI	2105	2197	4828	2703	2986	3293	3	5th Order
BILYAMIN	2347	2450	5383	3013	3329	3671	4	5th Order
GALA	173	181	397	222	245	271	0	5th Order
KAS	218	228	500	280	309	341	0	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
MAIDANI	17	18	39	22	24	27	0	5th Order
MANDURI BANGASH	423	442	970	543	600	662	1	5th Order
MARO KHEL	780	814	1789	1001	1106	1220	1	5th Order
MUZAFFAR KOT	310	324	711	398	440	485	0	5th Order
TANGI	469	490	1076	602	665	734	1	5th Order
WALI CHINA	601	627	1378	772	853	940	1	5th Order
HASSAN ALI PC	9061	9459	20783	11633	12853	14174		
BISATTU	1761	1838	4039	2261	2498	2755	3	5th Order
GHULAM HAIDAR KILA	622	649	1427	799	882	973	1	5th Order
HASSAN ALI KILA	3185	3325	7305	4089	4518	4982	5	5th Order
MAHOORA	1666	1739	3821	2139	2363	2606	3	5th Order
TOPAKI	1465	1529	3360	1881	2078	2292	2	5th Order
YAQUBI	362	378	830	465	513	566	1	5th Order
IBRAHIMZAI PC	15933	16632	36545	20456	22601	24924		
BALISH KHEL	11399	11899	26145	14635	16169	17831	18	4th Order
GHARBINA	502	524	1151	645	712	785	1	5th Order
IBRAHIMZAI	1927	2012	4420	2474	2733	3014	3	5th Order
SANGINA	576	601	1321	740	817	901	1	5th Order
SHAKAR DARA	1529	1596	3507	1963	2169	2392	2	5th Order
MANDURI PC	16008	16710	36717	20552	22707	25041		
AHMADI SHAMA	1754	1831	4023	2252	2488	2744	3	5th Order
BADSHAH KOT	570	595	1307	732	809	892	1	5th Order
CHAPRI	5977	6239	13709	7674	8478	9350	9	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
KHAP YANGA	1672	1745	3835	2147	2372	2615	3	5th Order
MANDURI	5500	5741	12615	7061	7802	8604	9	5th Order
THALL	535	558	1227	687	759	837	1	5th Order
RAMAKI KILA (PART) PC	4921	5137	11287	6318	6980	7698		
AHMED KHAN KILA	439	458	1007	564	623	687	1	5th Order
AMAL KOT	1353	1412	3103	1737	1919	2116	2	5th Order
RAMAKI KILA	2816	2940	6459	3615	3994	4405	4	5th Order
SHERJAN KILA	313	327	718	402	444	490	0	5th Order
SADDA PC	23043	24054	52853	29585	32686	36046		
KOCHI KILA	4599	4801	10549	5905	6524	7194	7	5th Order
SAID ALI KILA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
SATIN	14624	15266	33543	18776	20744	22876	23	3rd Order
SHAH NAWAZ KILA	3820	3988	8762	4904	5419	5976	6	5th Order
SHASHI PC	15107	15770	34650	19396	21429	23632		
DURRANI KILA	4245	4431	9737	5450	6021	6640	7	5th Order
GIDARA	290	303	665	372	411	454	0	5th Order
JILAM ZAI	1493	1559	3424	1917	2118	2335	2	5th Order
MAKHI ZAI GHARBI	1563	1632	3585	2007	2217	2445	2	5th Order
MAKHI ZAI SHARQI	1794	1873	4115	2303	2545	2806	3	5th Order
SAKHI AHMAD SHAH KILA	2818	2942	6464	3618	3997	4408	4	5th Order
SHASHI KILA	2904	3031	6661	3728	4119	4543	5	5th Order
UPPER KURRAM TEHSIL	275,819	286927	315584	347253	380764	416823		
DAMAN QH	152518	158618	319472	191717	210084	229832		

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
ALISHERI PC	6262	6512	13117	7871	8626	9436		
ALISHERI	6218	6467	13025	7816	8565	9370	9	5th Order
NARI MELA	44	46	92	55	61	66	0	5th Order
BOGHAKI PC	8889	9245	18619	11174	12244	13395		
BOGHAKI	3866	4021	8098	4860	5325	5826	6	5th Order
BULBULAK	309	321	647	388	426	466	0	5th Order
DARADAR	1022	1063	2141	1285	1408	1540	2	5th Order
DHAND	84	87	176	106	116	127	0	5th Order
KHAN SAIDA	44	46	92	55	61	66	0	5th Order
KINA KAI	366	381	767	460	504	552	1	5th Order
RAJU MELA	69	72	145	87	95	104	0	5th Order
SHAH NASAR MELA	7	7	15	9	10	11	0	5th Order
TANDAR	844	878	1768	1061	1163	1272	1	5th Order
WACHA DARA	2278	2369	4772	2863	3138	3433	3	5th Order
KIRMAN PC	12347	12841	25863	15520	17007	18606		
ASALAT KILA	559	581	1171	703	770	842	1	5th Order
AZIM SAID NOOR KILA	317	330	664	398	437	478	0	5th Order
AZIZ KILA	19	20	40	24	26	29	0	5th Order
BIZOT KILA	1151	1197	2411	1447	1585	1734	2	5th Order
DAULAT KHAN KILA	89	93	186	112	123	134	0	5th Order
GRAM	738	768	1546	928	1017	1112	1	5th Order
HAMZA KHEL	2667	2774	5586	3352	3674	4019	4	5th Order
KIRMAN YOUSAF KHEL	1795	1867	3760	2256	2472	2705	3	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
KIRMANI	698	726	1462	877	961	1052	1	5th Order
MAMU ZAI	828	861	1734	1041	1141	1248	1	5th Order
MANA	1139	1185	2386	1432	1569	1716	2	5th Order
MASTO KHEL	985	1024	2063	1238	1357	1484	1	5th Order
MIRANWAN KILA	244	254	511	307	336	368	0	5th Order
SAFDAR KILA	197	205	413	248	271	297	0	5th Order
TEZANA	577	600	1209	725	795	869	1	5th Order
ZIARAT KILA	344	358	721	432	474	518	1	5th Order
LUQMAN KHEL PC	9577	9960	20060	12038	13192	14432		
LANDIWAN	3	3	6	4	4	5	0	5th Order
LUQMAN KHEL	9574	9957	20054	12035	13188	14427	14	4th Order
MALANA PC	22249	23139	46604	27967	30647	33527		
MALANA	22249	23139	46604	27967	30647	33527	34	4th Order
QUBAD SHAH KHEL PC	6041	6283	12654	7594	8321	9103		
MULAH BAGH	1384	1439	2899	1740	1906	2086	2	5th Order
QUBAD SHAH KHEL	4657	4843	9755	5854	6415	7018	7	5th Order
SHALAZAN TANGI PC	78	81	163	98	107	118		
DARBAND TOI MELA	2	2	4	3	3	3	0	5th Order
JEWAN TANGI MELA	2	2	4	3	3	3	0	5th Order
KHERA DIN	8	8	17	10	11	12	0	5th Order
KHEWAS	26	27	54	33	36	39	0	5th Order
SHAFI ABAD	4	4	8	5	6	6	0	5th Order
SHIN ALI TANGI MELA	36	37	75	45	50	54	0	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
SHALOZAN PC	10029	10430	21007	12607	13814	15113		
SHALOZAN	10029	10430	21007	12607	13814	15113	15	4th Order
TUTKI PC	33743	35093	70680	42415	46479	50848		
MAIDANAK	280	291	587	352	386	422	0	5th Order
PARACHINAR	1560	1622	3268	1961	2149	2351	2	5th Order
SHANAI	3466	3605	7260	4357	4774	5223	5	5th Order
SHINKI KILA	154	160	323	194	212	232	0	5th Order
TUTKI	26762	27832	56057	33640	36863	40328	40	4th Order
YARDAH KILA	1521	1582	3186	1912	2095	2292	2	5th Order
ZERAN HASSANZAI PC	33066	34388	69262	41564	45546	49828		
ZERAN HASSANZAI	33066	34388	69262	41564	45546	49828	50	1st Order
ZERAN YOUSAF KHEL PC	10237	10646	21443	12868	14101	15426		
ZERAN YOUSAF KHEL	10237	10646	21443	12868	14101	15426	15	4th Order
SHINGAK QH	117718	122426	246578	147973	162149	177391	177	1st Order
AHMADZAI PC	18299	19031	38330	23002	25206	27575		
AHMADZAI	6715	6984	14066	8441	9249	10119	10	5th Order
AKA KHEL	1029	1070	2155	1293	1417	1551	2	5th Order
DRIPLARI	1080	1123	2262	1358	1488	1627	2	5th Order
HAIDER ALI KILA	250	260	524	314	344	377	0	5th Order
MALI KHEL	8742	9092	18311	10989	12042	13173	13	4th Order
SHAKAR KOT	483	502	1012	607	665	728	1	5th Order
BUSHERA PC	14083	14646	29499	17702	19398	21222		
ARABI KILA	124	129	260	156	171	187	0	5th Order
AYAZ KHAN KILA	528	549	1106	664	727	796	1	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
BUSHERA	876	911	1835	1101	1207	1320	1	5th Order
DANDAR	724	753	1517	910	997	1091	1	5th Order
GUL KILA	1284	1335	2690	1614	1769	1935	2	5th Order
HAKIM KILA	275	286	576	346	379	414	0	5th Order
MARU KHEL BALA	2492	2592	5220	3132	3433	3755	4	5th Order
MIRZA KHAN KILA	1902	1978	3984	2391	2620	2866	3	5th Order
MUSA KHAN KILA	866	901	1814	1089	1193	1305	1	5th Order
SHAKH	3990	4150	8358	5015	5496	6013	6	5th Order
TAPU KILA	1022	1063	2141	1285	1408	1540	2	5th Order
KACHKINA PC	10459	10877	21908	13147	14407	15761		
KACHKINA	3722	3871	7796	4679	5127	5609	6	5th Order
KARA KHEL	5070	5273	10620	6373	6984	7640	8	5th Order
SAFDAR SEHRA	1667	1734	3492	2095	2296	2512	3	5th Order
SHAMIR KILA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
KHARLACHI PC	10471	10890	21933	13162	14423	15779		
BOGHDI	3734	3883	7821	4694	5143	5627	6	5th Order
BURKI	3204	3332	6711	4027	4413	4828	5	5th Order
KHARLACHI	1583	1646	3316	1990	2180	2385	2	5th Order
LALMI	1912	1988	4005	2403	2634	2881	3	5th Order
SHAKHALO	38	40	80	48	52	57	0	5th Order
MANGLAT PEWAR PC	10397	10813	21778	13069	14321	15667		
GHUJARGHUNA	2399	2495	5025	3016	3304	3615	4	5th Order
GIDO	432	449	905	543	595	651	1	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
GOBAZANA	798	830	1672	1003	1099	1203	1	5th Order
HAQDARA	379	394	794	476	522	571	1	5th Order
KHERAWA	440	458	922	553	606	663	1	5th Order
KOTRI	1664	1731	3486	2092	2292	2508	3	5th Order
MIRMAI	790	822	1655	993	1088	1190	1	5th Order
NAFIA	-	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
SURSURANG	1710	1778	3582	2149	2355	2577	3	5th Order
TARI	1785	1856	3739	2244	2459	2690	3	5th Order
NASTI KOT PC	11131	11576	23316	13992	15332	16773		
KUNJ ALI ZAI	4319	4492	9047	5429	5949	6508	7	5th Order
NASTI KOT	6103	6347	12784	7672	8406	9197	9	5th Order
TAIDA	709	737	1485	891	977	1068	1	5th Order
PEWAR PC	6879	7154	14409	8647	9475	10366		
GANDA KILA	1322	1375	2769	1662	1821	1992	2	5th Order
PEWAR	5557	5779	11640	6985	7654	8374	8	5th Order
RAMAKI KILA (PART) PC	7093	7377	14857	8916	9770	10689		
JALLANDHAR	3748	3898	7851	4711	5163	5648	6	5th Order
SULTAN	3345	3479	7007	4205	4608	5041	5	5th Order
SHINGAK PC	15555	16177	32582	19553	21426	23440		
BASU KILA	249	259	522	313	343	375	0	5th Order
GHOZGARHY	7897	8213	16541	9927	10878	11900	12	4th Order
GHULAM KILA	400	416	838	503	551	603	1	5th Order
JAPAK KILA	357	371	748	449	492	538	1	5th Order

NAME OF MAUZA / DEH / VILLAGE / SETTLMENT	Population 2023	Projected Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045	Settlement Score	Settlement Order
KANDA	736	765	1542	925	1014	1109	1	5th Order
MATA SANGAR	2130	2215	4462	2677	2934	3210	3	5th Order
SHINGAK	3317	3450	6948	4170	4569	4998	5	5th Order
TITAM	74	77	155	93	102	112	0	5th Order
TOTAK	395	411	827	497	544	595	1	5th Order
SHUBLAN PC	13351	13885	27966	16782	18390	20119		
AGRA	2022	2103	4235	2542	2785	3047	3	5th Order
ALAM SHER	1779	1850	3726	2236	2450	2681	3	5th Order
ALIDAD KILA	105	109	220	132	145	158	0	5th Order
AMIR KHAN KILA	772	803	1617	970	1063	1163	1	5th Order
ASHUR KILA	815	848	1707	1024	1123	1228	1	5th Order
DANGILA	1911	1987	4003	2402	2632	2880	3	5th Order
FEROZ KHEL	1110	1154	2325	1395	1529	1673	2	5th Order
LAT KILA	109	113	228	137	150	164	0	5th Order
MIRDO KILA	1061	1103	2222	1334	1461	1599	2	5th Order
MULAN KILA	1256	1306	2631	1579	1730	1893	2	5th Order
SAFDAR SHIKARI	235	244	492	295	324	354	0	5th Order
SHER KILA	1094	1138	2292	1375	1507	1649	2	5th Order
ZAID ALI KILA	1082	1125	2266	1360	1490	1630	2	5th Order

1.6.9 Declaration of Human Settlement

As cities and towns grow in population and complexity, designating urban centers in land use planning becomes essential for sustainable development and effective management. In a 20-year land use plan, declaring urban centers serves as a strategic tool for organizing spatial growth and providing essential infrastructure for future populations.

1.6.9.1 Defining Urban Centers

Urban centers are areas within a city or region that act as hubs for economic, social, and cultural activities. They feature higher population densities, mixed-use developments, and access to key services like healthcare, education, transport, and employment. Such centers drive the economy and serve as focal points for urban growth.

1.6.9.2 Importance of Urban Centers in Land Use Planning

- Declaring urban centers helps address key issues:
- **Efficient Land Utilization:** Concentrating population and services minimizes sprawl and environmental impact. [26]
- **Improved Infrastructure:** Focused growth supports efficient development of transport, utilities, and mobility systems. [27]
- **Economic Growth:** Concentrated economic activity creates jobs, attracts investment, and enhances quality of life.
- **Social Integration:** Centralized access to education, healthcare, and services promotes inclusion and equity. [28]

1.6.9.3 Key Components of a 20-Year Land Use Plan

- **Strategic Location:** Identify areas with growth potential, good accessibility, and existing infrastructure. [29]
- **Zoning and Mixed-Use:** Ensure multifunctional spaces integrating residential, commercial, and recreational uses.[30]
- **Sustainability:** Include parks, green areas, and eco-friendly practices such as renewable energy and waste management. [31]
- **Public-Private Partnerships:** Encourage collaboration among government, private sector, and communities to align development goals. [32]

1.6.9.4 The Role of Technology in Shaping Urban Centers

Over the next two decades, technological advancements will redefine how urban centers are planned and developed. The rise of smart cities, digital infrastructure, and data-driven planning tools will enhance efficiency, livability, and resilience. [33]

Integrating smart technologies will improve resource management, transportation, and waste systems, while high-speed connectivity and intelligent infrastructure will make cities more innovative and adaptable.

As part of the 20-year land use plan, designating urban centers as hubs of sustainable, efficient, and inclusive growth is essential. With strategic planning and technological integration, these centers can

[26] Bertaud, A. (2004). *The Spatial Structure of Cities: What We Know and What We Don't Know*. World Bank.
[27] Lundqvist, L., et al. (2012). *Urban Planning and Management in the 21st Century*. Routledge.
[28] Cheshire, P. (2011). *Urban Economics*. Routledge.
[29] Batty, M., et al. (2012). *Planning Support Systems and Urban Planning*. Springer.
[30] Harrison, C., et al. (2010). *Urban Regeneration and Sustainability: New Challenges for Cities*. Springer.
[31] Williams, K. (2014). *Sustainable Cities: Integrating Design, Planning, and Policy*. Wiley-Blackwell.
[32] Stone, W., et al. (2013). *The Role of Public-Private Partnerships in Urban Development*. Oxford University Press.
[33] Zhang, X., et al. (2018). *Smart Cities and Urban Technology: Integration and Challenges*. Elsevier.

provide a high quality of life, drive economic growth, and evolve into sustainable, future-ready cities for generations to come.

1.6.10 Settlements to be Urbanized up to 2045

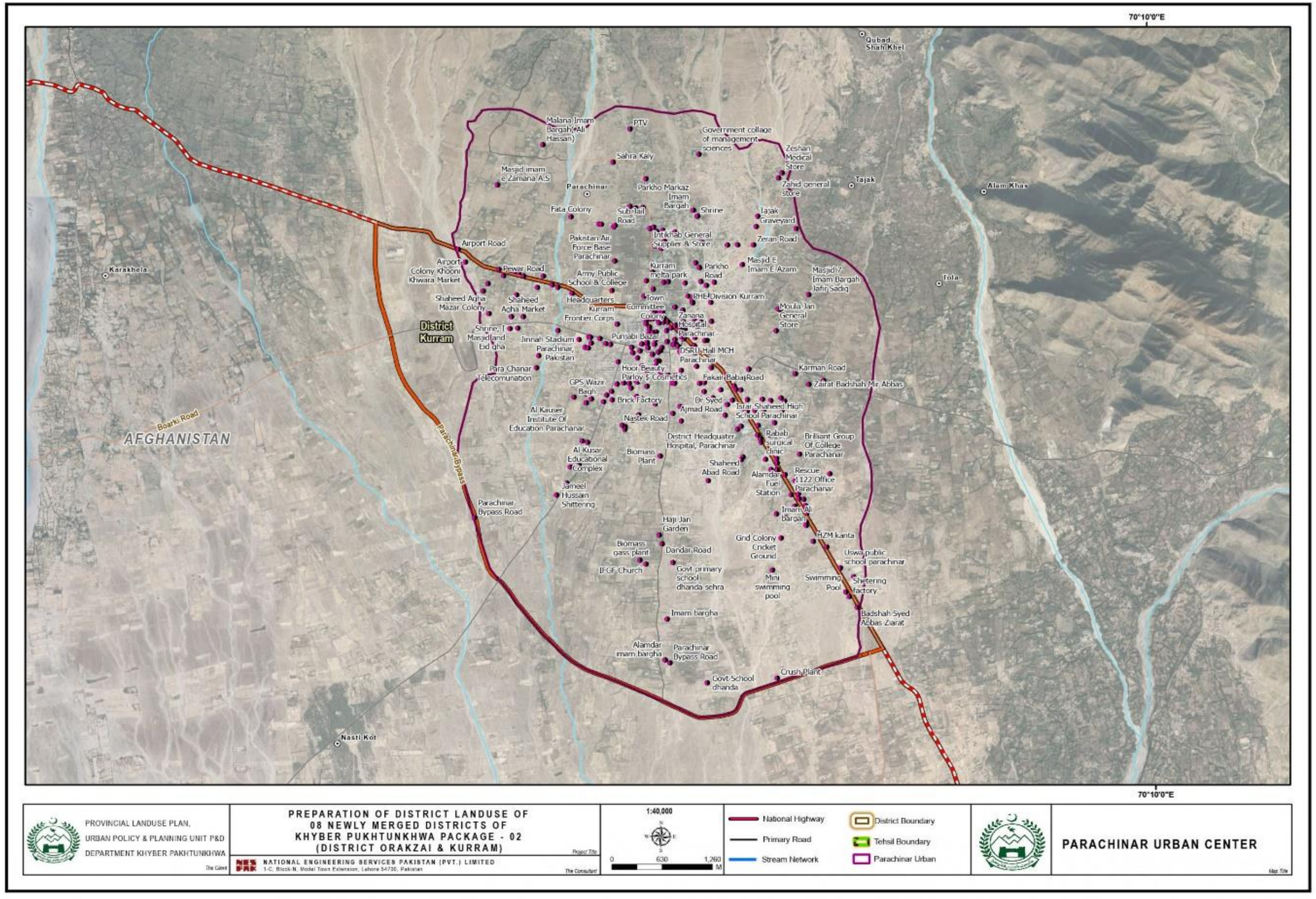
In order to establish a robust framework for the land use plan, a thorough and systematic procedure was followed for identifying settlement hierarchies. This process involved classifying settlements into five orders (1st, 2nd, 3rd, 4th, and 5th) based on population data derived from the most recent census. The decision to rely solely on population data was necessitated by the absence of clear boundaries for each settlement, which posed challenges for precise delineation. To further strengthen the proposed urbanized boundaries and ensure alignment with regional development goals, the district administration was consulted. Through this collaboration, key areas with significant potential for urbanization were identified, considering factors such as population growth, infrastructure capacity, and environmental suitability. These identified areas will play a crucial role in the development and implementation of the land use plan over the designated planning period, ensuring a sustainable and orderly expansion of urban spaces

1.6.10.1 Currently Declared Urban Centers

As per the 2023 census, there are two declared urban centers in Kurram District: Parachinar and Sadda. Parachinar is located within the Central Kurram Tehsil, while Sadda falls under the Lower Kurram Tehsil. Notably, there is currently no designated urban area within the Lower Kurram Tehsil. Looking ahead to the next 20 years, it is crucial to plan for the potential urbanization of these areas, especially given the growing need for infrastructure development and land-use management to accommodate future population growth and urban expansion.

1.6.10.1.1 Parachinar Urban Center

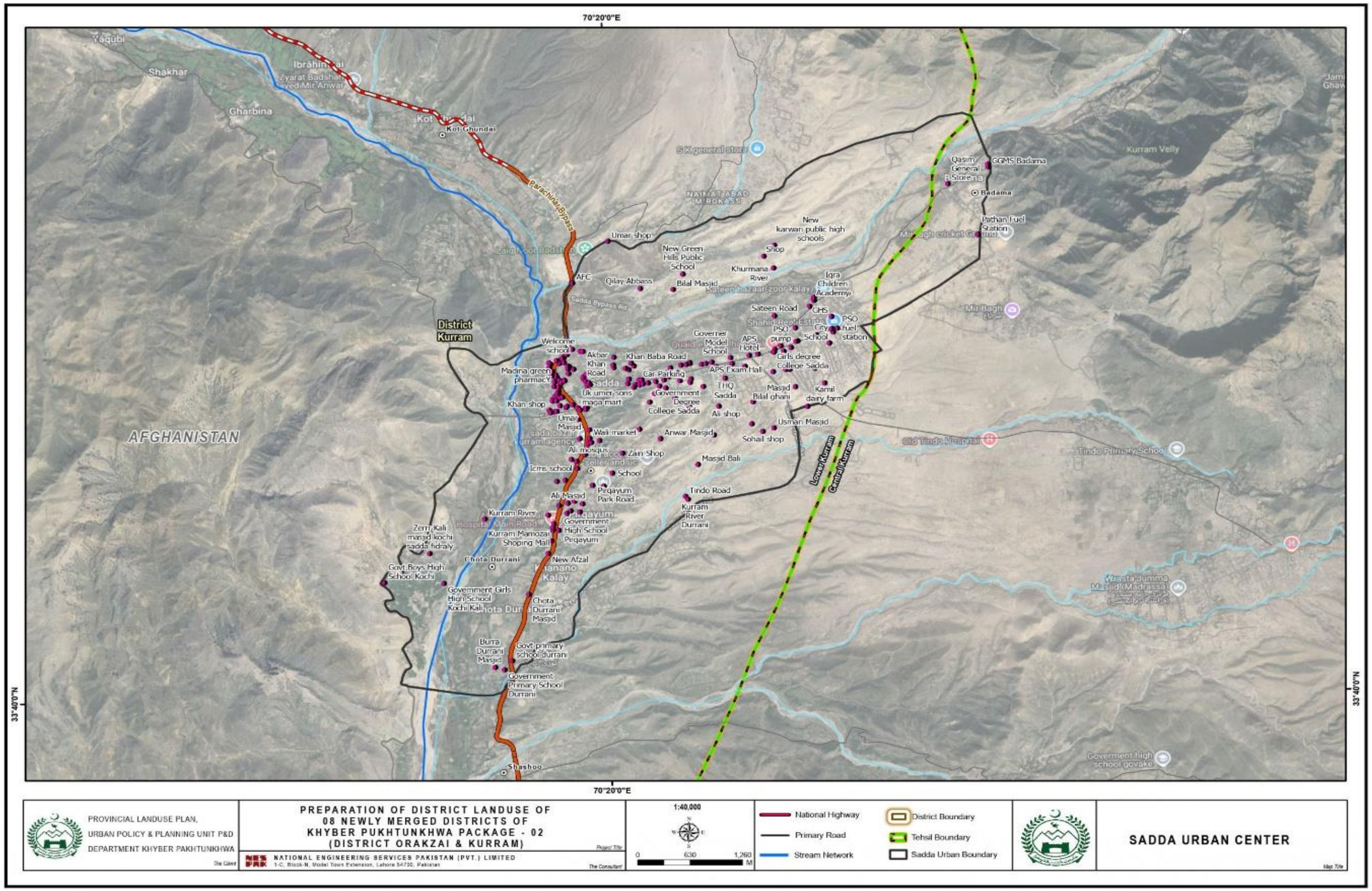
Parachinar urban area is not only the principal urban center of Kurram District but also functions as the district headquarters, making it a critical hub for administrative, economic, and social activities. According to the 2025 census, the current population of Parachinar is approximately 5,585. However, based on projected growth trends and urbanization patterns, the population is expected to increase to 9,601 by the end of the planning period. This significant population growth necessitates a strategic approach to urban planning, ensuring that infrastructure, public services, and amenities are developed and expanded to meet the needs of both current and future residents. Key areas of focus will include housing, transportation, utilities, healthcare, education, and employment opportunities, all of which will play a vital role in maintaining the quality of life and fostering sustainable development. Proper zoning regulations and land-use planning will be essential in managing the spatial expansion of the urban area, while also addressing environmental concerns and maintaining a balance between urban growth and the preservation of natural resources.



Map 1-25: Parachinar Urban Area Map

1.6.10.1.2Sadda Urban Area

Sadda urban area is situated within the jurisdiction of Lower Kurram Tehsil and serves as the tehsil headquarters, playing a central role in the administration, economy, and social services of the region. According to the 2023 census, Sadda has a current population of approximately 39,888. Based on projected growth patterns, it is anticipated that the population will increase substantially, reaching around 131,740 by the end of the planning period. This considerable population growth underscores the need for robust urban planning to address the expanding demand for infrastructure, public services, and amenities. Key urban planning strategies will focus on accommodating this growth through the provision of adequate housing, efficient transportation systems, enhanced healthcare and educational facilities, and the expansion of economic opportunities. Zoning regulations and land-use planning will need to be carefully devised to ensure the sustainable development of Sadda, balancing urban expansion with environmental preservation and ensuring that the growing population has access to essential services. The urbanization of Sadda will require a comprehensive approach, integrating both short-term and long-term planning to create a livable, sustainable, and thriving urban environment.



Map 1-26 Sadda Urban Area Map

1.6.10.2 Proposed Urban Centers

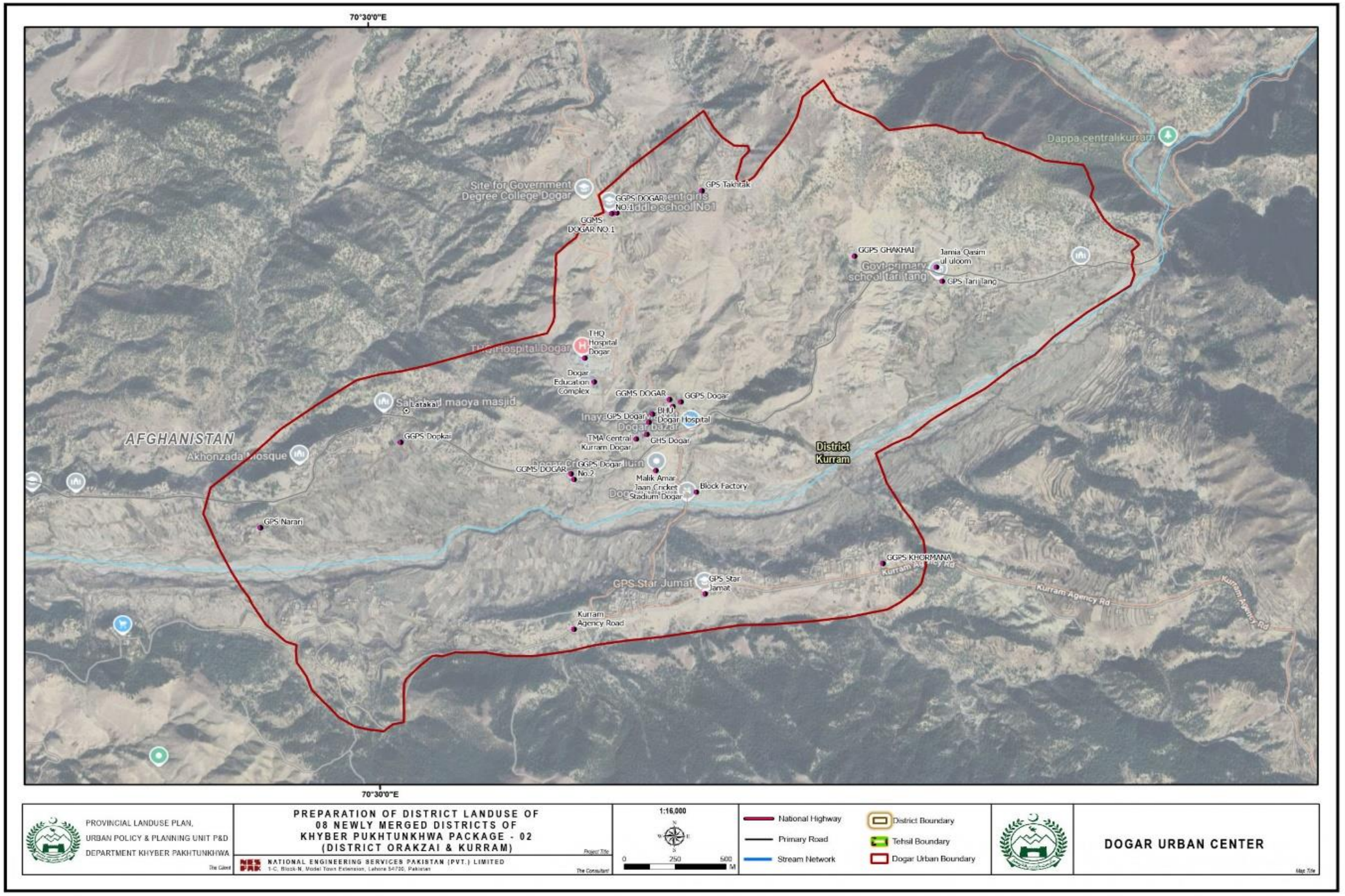
Currently, Kurram District is home to two established urban centers: Parachinar, which is located within the Upper Kurram Tehsil, and Sadda, which lies within the Lower Kurram Tehsil. Following a systematic analysis and evaluation of urbanization patterns, we propose the designation of Dogar and Ali Zai as an additional urban center by the end of the planning period. Dogar, situated within the jurisdiction of Central Kurram Tehsil & Ali Zai in Lower Kurram tehsil, is also set to serve as the tehsil headquarters. This proposal aligns with the district's long-term development goals, considering factors such as population growth, infrastructure needs, and the strategic location of Dogar in relation to surrounding areas. Designating Dogar and Ali Zai as an urban center will play a crucial role in improving administrative efficiency and facilitating better access to services for the residents of Lower Kurram Tehsil. The development of Dogar as an urban center will require comprehensive planning to ensure that it meets the demands of future urbanization while balancing sustainable growth with environmental and social considerations.

1.6.10.2.1 Dogar Proposed Urban Area

Following a systematic approach and extensive consultations with the district administration and relevant departments, the consultants have put forward a proposal to urbanize Dogar during the planning period. This proposal is driven by the need to accommodate anticipated population growth and ensure the effective delivery of essential services and infrastructure to the area. In addition to proposing the urbanization of Dogar, the consultants have also addressed the absence of clearly defined settlement boundaries, which has been a significant concern for urban planning in the region. As a result, they have developed a proposed boundary for the Dogar urban center that will better delineate the area for future development.

The proposed boundary aims to provide a comprehensive framework for urban growth, ensuring that land-use planning, infrastructure development, and service provision are aligned within a clearly defined spatial context. This boundary proposal will be shared with the district administration for their review and approval, ensuring that all stakeholders are in agreement with the designated urban limits.

Once approved, this boundary will serve as a critical tool for guiding urban expansion, ensuring that Dogar develops in a sustainable, organized, and efficient manner. The proposed urban area will also be integrated into broader regional planning efforts to ensure that connectivity, transportation, and utilities are well-coordinated with surrounding areas. The proposed urban boundary for Dogar is attached below for reference, and further adjustments may be made as the planning process progresses, based on feedback from the district administration and other relevant authorities.



Map 1-27 Dogar Proposed Urban Center Map

1.6.10.2.2 Ali Zai Proposed Urban Area

Following a systematic approach and extensive consultations with the district administration and relevant departments, the consultants have put forward a proposal to urbanize Ali Zai during the planning period, as it is already served as a rural growth center and have multiple public institutional. This proposal is driven by the need to accommodate anticipated population growth and ensure the effective delivery of essential services and infrastructure to the area. In addition to proposing the urbanization of Ali Zai, the consultants have also addressed the absence of clearly defined settlement boundaries, which has been a significant concern for urban planning in the region. As a result, they have developed a proposed boundary for the Ali Zai urban center that will better delineate the area for future development.

The proposed boundary aims to provide a comprehensive framework for urban growth, ensuring that land-use planning, infrastructure development, and service provision are aligned within a clearly defined spatial context. This boundary proposal will be shared with the district administration for their review and approval, ensuring that all stakeholders are in agreement with the designated urban limits.

Once approved, this boundary will serve as a critical tool for guiding urban expansion, ensuring that Dogar develops in a sustainable, organized, and efficient manner. The proposed urban area will also be integrated into broader regional planning efforts to ensure that connectivity, transportation, and utilities are well-coordinated with surrounding areas.

2 Existing Land Use Distribution

2.1 LANDUSE DISTRIBUTION IN THE DISTRICT

The land use profile of District Kurram reflects the relationship between human activities and spatial organization, playing a crucial role in effective regional planning and zoning. Land use patterns in Kurram are shaped by the nature of land use, its distribution, and spatial accumulation, indicating intensity and concentration. Transportation significantly influences activity locations and is closely linked to land use dynamics.

Key factors influencing land use in Kurram include:

- **Transport System:** Infrastructure and connectivity supporting movement and accessibility across the district.
- **Spatial Interactions:** Movement patterns of people and goods, influenced by transport accessibility and land use characteristics.
- **Land Use:** Distribution of activities, mobility needs, and links to demographic and economic attributes.

Table 2-1: Land use Distribution in District Kurram

Sr No.	Land use	Area (**Acre**)	**Percentages**
1	Agriculture Land	94336.44	11.2376%
2	Bus Terminal / Stop	6.22	0.0007%
3	Commercial	282.73	0.0337%
4	Education	500.96	0.0597%
5	Forest	199136.07	23.7216%
6	Government Building	163.09	0.0194%
7	Graveyard	783.99	0.0934%
8	Health	120.54	0.0144%
9	Industry	44.53	0.0053%
10	Livestock & Fisheries	1.59	0.0002%
11	Open Spaces	21159.35	2.5206%
12	Park & Playground	241.78	0.0288%
13	Range Land	490369.12	58.4141%
14	Religious	133.39	0.0159%
15	Residential	10324.34	1.2299%
16	Restricted Area	381.01	0.0454%
17	Tourism & Historical Building	10.64	0.0013%
18	Transport	3459.10	0.4121%
19	Utilities	25.09	0.0030%
20	Water Bodies	17990.15	2.1430%
Total		**839470.13**	**100.0000%**

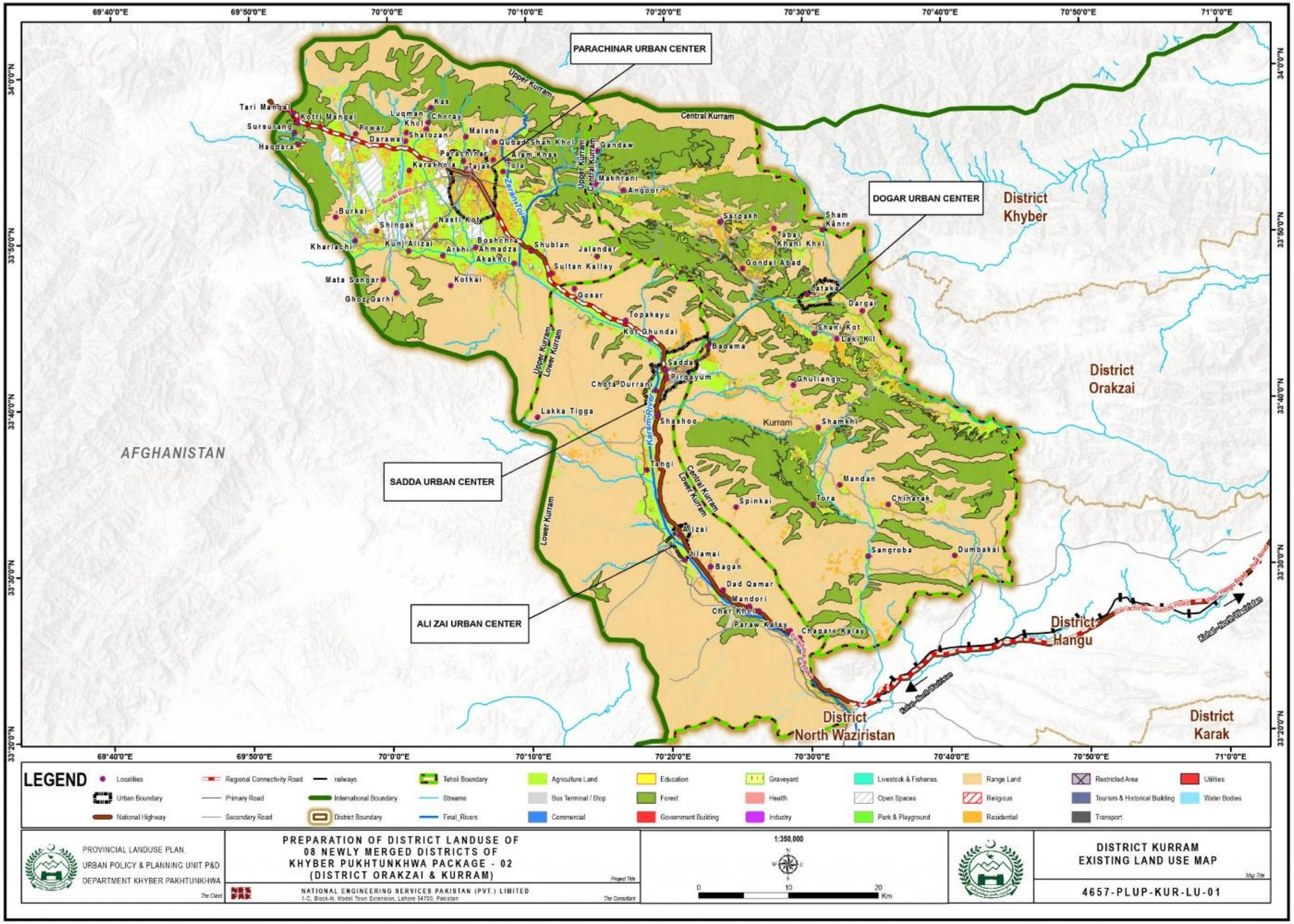
The land-use profile of District Kurram continues to reflect a predominantly natural and rural landscape, strongly influenced by mountainous terrain and pastoral livelihoods. Rangeland remains the dominant land-use category, covering 58% of the total area, which highlights the extensive presence of grazing lands and the importance of livestock-based activities across the district.

Forest areas constitute the second largest land-use at 24%, underscoring the district's ecological significance in terms of biodiversity conservation, watershed protection, and climate regulation. Agricultural land accounts for 11%, indicating that cultivation is present but largely constrained to suitable valleys and plains where soil fertility and water availability permit farming.

Open spaces make up 3% of the land area, contributing to environmental balance and offering potential for future planned development. Water bodies, covering 2%, play a vital role in supporting agriculture, livestock, and domestic water needs.

Built-up land uses occupy a very small proportion of the district. Residential areas account for only 1%, while land allocated to commercial, industrial, institutional, transport, utilities, and recreational uses is negligible in comparison. This clearly indicates a low level of urbanization and limited infrastructure development.

Overall, the updated land-use structure of District Kurram highlights a region dominated by rangelands and forests, with limited agricultural and urban development. The pattern emphasizes the need for sustainable land management, protection of natural resources, and carefully planned development to balance environmental conservation with socio-economic growth.



Map 2-1: District Kurram Existing land use Map

2.2 TEHSIL WISE LAND USE DISTRIBUTION

The Kurram District is administratively divided into three tehsils: Upper Kurram, Central Kurram, and Lower Kurram. Each tehsil exhibits distinct spatial characteristics and patterns of land utilization, reflecting variations in topography, settlement distribution, economic activities, and natural resource availability. The overall land use distribution across these three tehsils provides a comprehensive understanding of the district's development dynamics, highlighting the extent of agricultural, residential, commercial, industrial, forest, and open land areas. The detailed land use composition for each tehsil is presented below, serving as an essential foundation for future spatial planning and sustainable land management within the district.

2.2.1 Tehsil Upper Kurram Land Use Distribution

The updated land-use profile of Tehsil Upper Kurram shows a landscape that is predominantly natural and rural, with development concentrated in limited pockets. Rangeland remains the dominant land-use category, covering 42% of the total area, reflecting extensive grazing lands and the continued importance of livestock-based livelihoods. Forest areas account for a significant 24%, highlighting the tehsil's ecological value in terms of biodiversity conservation, watershed protection, and climate regulation.

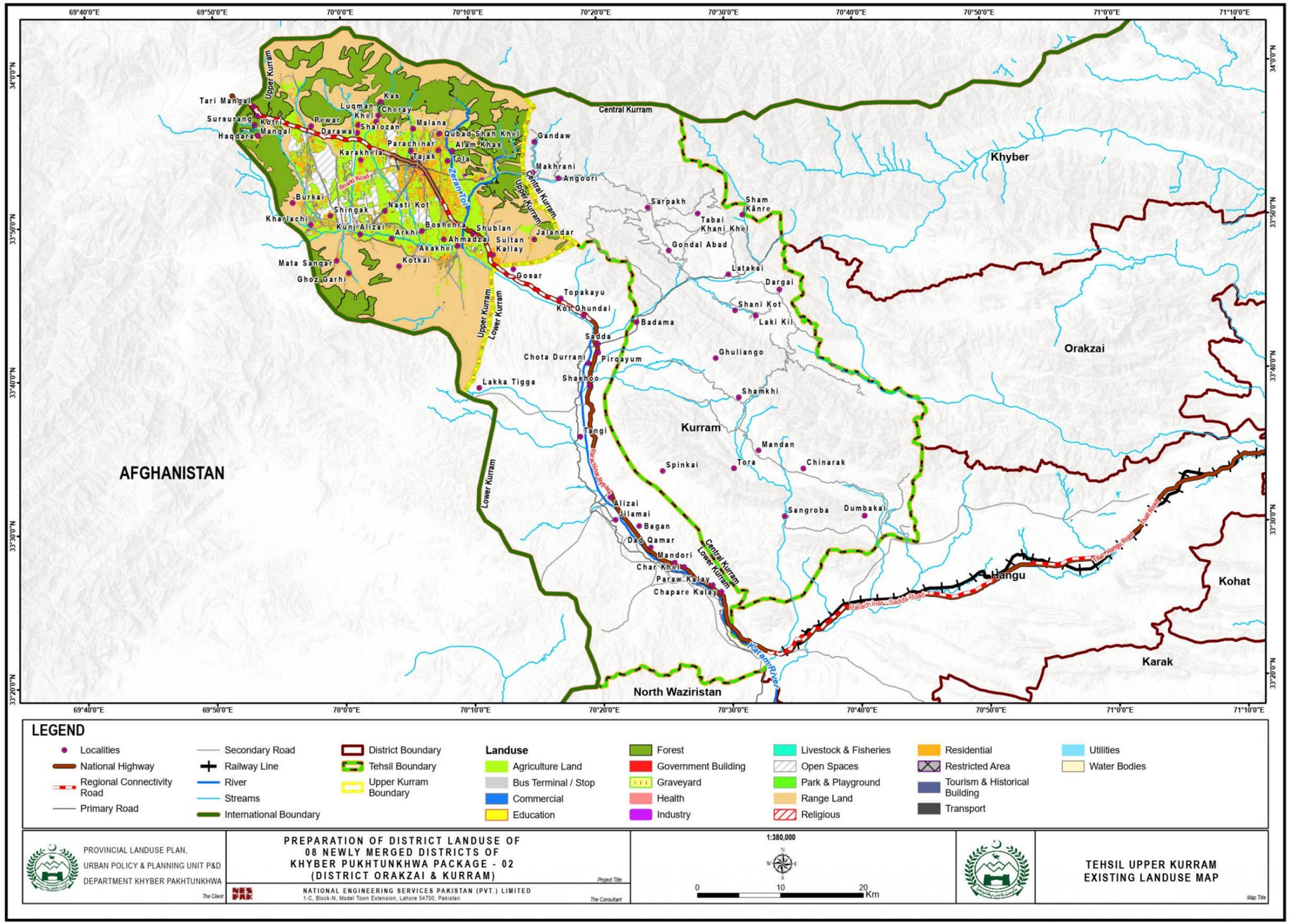
Agricultural land constitutes 21% of the total area, indicating comparatively favorable conditions for cultivation in valleys and plains. This suggests that agriculture is a major economic activity in the tehsil, though still constrained by terrain and water availability. Open spaces, covering 7%, and water bodies, accounting for 3%, further contribute to environmental stability and provide opportunities for future planned development and water resource management.

Built-up land uses occupy a relatively small share of the total area. Residential land covers only 2%, indicating low population density and dispersed settlement patterns. Transport infrastructure accounts for 1%, while land allocated to commercial, education, health, government buildings, industry, utilities, and recreational uses remains negligible. This reflects limited urbanization and modest availability of institutional and economic infrastructure.

Overall, the updated land-use structure of Tehsil Upper Kurram highlights a region strongly characterized by rangelands, forests, and agriculture, with minimal urban development. The pattern underscores the need for sustainable management of natural resources, protection of forest and grazing lands, and carefully planned infrastructure development to support socio-economic growth while preserving the tehsil's environmental integrity.

Table 2-2 Tehsil Upper Kurram Land Use Stats

Sr No.	Land use	Area(Acre)	Percentage
1	Agriculture Land	50318.04	20.7624%
2	Bus Terminal / Stop	3.41	0.0014%
3	Commercial	191.50	0.0790%
4	Education	273.26	0.1128%
5	Forest	57754.19	23.8308%
6	Government Building	136.95	0.0565%
7	Graveyard	511.19	0.2109%
8	Health	61.38	0.0253%
9	Industry	41.72	0.0172%
10	Livestock & Fisheries	0.84	0.0003%
11	Open Spaces	17906.30	7.3886%
12	Park & Playground	96.01	0.0396%
13	Range Land	101775.21	41.9949%
14	Religious	79.25	0.0327%
15	Residential	4695.77	1.9376%
16	Restricted Area	345.81	0.1427%
17	Tourism & Historical Building	1.19	0.0005%
18	Transport	1471.21	0.6071%
19	Utilities	15.67	0.0065%
20	Water Bodies	6672.59	2.7533%
Total		**242351.51**	**100.0000%**



LEGEND

- Localities
- National Highway
- Regional Connectivity Road
- Primary Road
- Secondary Road
- Railway Line
- River
- Streams
- International Boundary
- District Boundary
- Tehsil Boundary
- Upper Kurram Boundary

Landuse

- Agriculture Land
- Bus Terminal / Stop
- Commercial
- Education
- Forest
- Government Building
- Graveyard
- Health
- Industry
- Livestock & Fisheries
- Open Spaces
- Park & Playground
- Range Land
- Religious
- Residential
- Restricted Area
- Tourism & Historical Building
- Transport
- Utilities
- Water Bodies

PROVINCIAL LANDUSE PLAN,
URBAN POLICY & PLANNING UNIT P&D
DEPARTMENT KHYBER PAKHTUNKHWA
The Client

PREPARATION OF DISTRICT LANDUSE OF
08 NEWLY MERGED DISTRICTS OF
KHYBER PUKHTUNKHWA PACKAGE - 02
(DISTRICT ORAKZAI & KURRAM)
Project Title

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LIMITED
1-C, Block-N, Model Town Extension, Lahore 54700, Pakistan
The Consultant

1:380,000
0 10 20 Km

TEHSIL UPPER KURRAM
EXISTING LANDUSE MAP
Map Title

Map 2-2 Tehsil upper Kurram Existing Land Use Map

2.2.2 Tehsil Central Kurram Land Use Distribution

The land-use pattern of Tehsil Central Kurram is strongly dominated by natural landscapes, reflecting its mountainous terrain and environmentally sensitive character. Rangeland is the largest land-use category, covering 51% of the total area, which highlights the extensive presence of grazing lands and the importance of pastoral and livestock-based activities in the local economy.

Forest land constitutes a substantial 37%, emphasizing the tehsil's critical ecological role in biodiversity conservation, watershed protection, climate regulation, and soil stabilization. Together, forests and rangelands account for nearly 88% of the total land area, clearly indicating that Tehsil Central Kurram is predominantly an environmentally rich and conservation-oriented region.

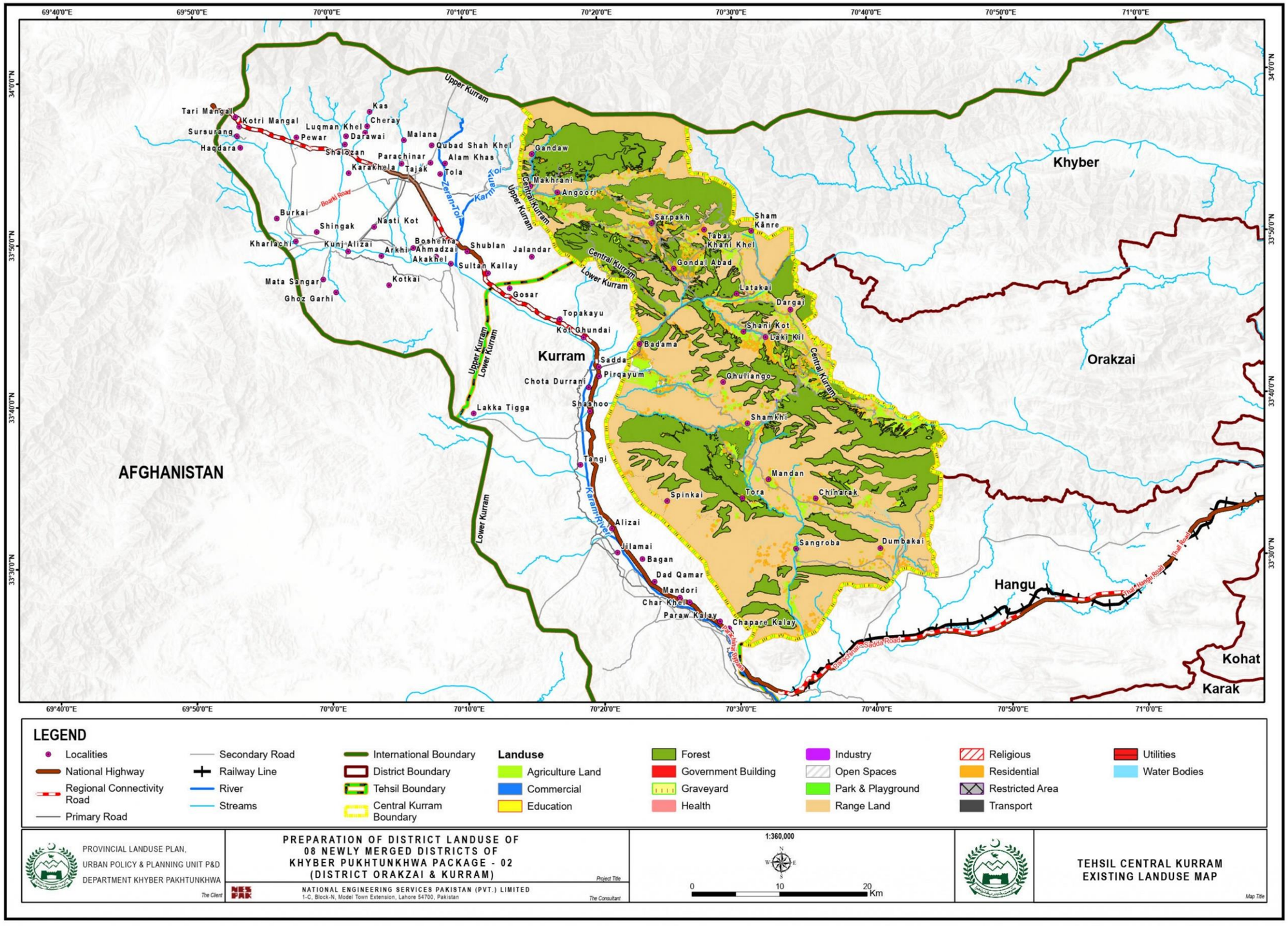
Agricultural land covers 9%, suggesting that farming activities are limited and largely confined to valley floors and areas with suitable soil and water availability. Water bodies, accounting for 1%, support irrigation, domestic use, and ecological balance.

Built-up and infrastructure-related land uses occupy a very small proportion of the tehsil. Residential areas cover only 1%, reflecting low population density and dispersed settlement patterns. Land allocated to commercial, education, health, industry, transport, utilities, and other institutional uses remains negligible, indicating minimal urbanization and limited infrastructure development.

Overall, the updated land-use structure of Tehsil Central Kurram highlights a region overwhelmingly shaped by forests and rangelands, with limited agriculture and urban development. This pattern underscores the importance of environmentally sustainable planning, protection of forest and grazing resources, and carefully managed development to balance ecological preservation with local livelihood needs.

Table 2-3 Tehsil Central Kurram Land Use Stats

Sr No.	Land use	Area (**Acre**)	**Percentage**
1	Agriculture Land	31908.60	8.7801%
2	Commercial	8.87	0.0024%
3	Education	84.31	0.0232%
4	Forest	135222.97	37.2083%
5	Government Building	2.76	0.0008%
6	Graveyard	37.05	0.0102%
7	Health	21.30	0.0059%
8	Industry	2.36	0.0007%
9	Open Spaces	989.91	0.2724%
10	Park & Playground	23.71	0.0065%
11	Range Land	186771.66	51.3926%
12	Religious	18.85	0.0052%
13	Residential	3027.37	0.8330%
14	Restricted Area	2.58	0.0007%
15	Transport	1023.84	0.2817%
16	Utilities	1.15	0.0003%
17	Water Bodies	4274.16	1.1761%
Total		**363421.43**	**100.0000%**



Map 2-3 Tehsil Central Kurram Land Use Map

2.2.3 Tehsil Lower Kurram Land Use Distribution

The updated land-use profile of Tehsil Lower Kurram clearly indicates a landscape overwhelmingly dominated by natural and grazing lands. Rangeland is the most prominent land-use category, occupying 86% of the total area, which reflects extensive open grazing areas and highlights the central role of livestock and pastoral activities in the local economy. This dominance also indicates limited suitability for intensive cultivation due to terrain and climatic conditions.

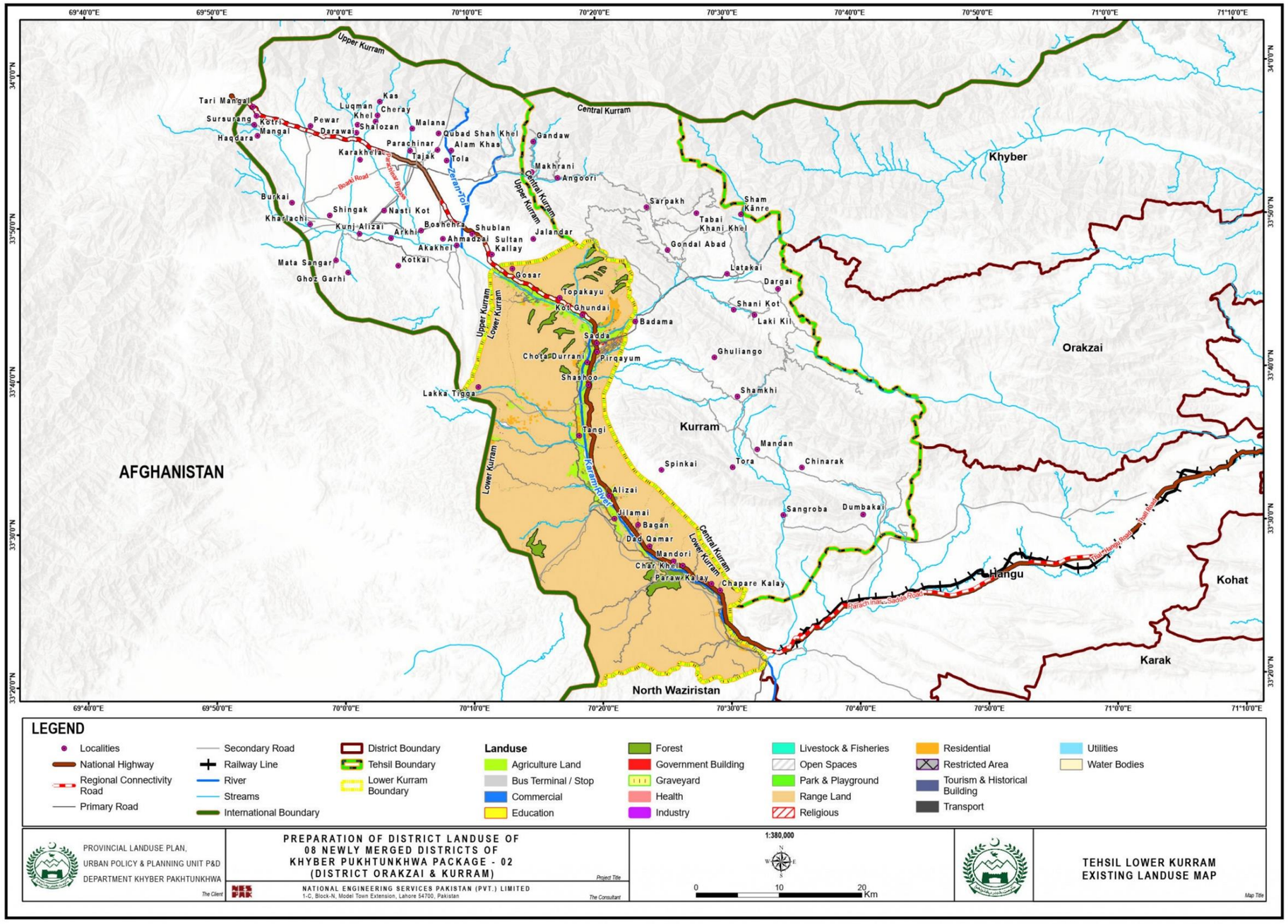
Agricultural land accounts for only 5%, suggesting that farming is confined to small pockets where soil quality and water availability allow cultivation. Forest cover is relatively limited at 3%, indicating sparse natural vegetation compared to other tehsils of the district. Water bodies, also covering 3%, are important for supporting livestock, agriculture, and domestic water needs, and contribute to the ecological balance of the area.

Built-up land uses remain minimal. Residential areas cover just 1%, reflecting low population density and scattered settlement patterns. Open spaces also account for 1%, while land allocated to commercial, educational, health, industrial, transport, utilities, and other institutional uses is negligible. This highlights a very low level of urbanization and limited infrastructure development.

Overall, the updated land-use structure of Tehsil Lower Kurram portrays a predominantly rural and resource-based region, strongly dependent on rangelands and natural resources. The pattern underscores the importance of sustainable rangeland management, water resource conservation, and carefully planned development to support livelihoods while preserving the fragile natural environment.

Table 2-4 Tehsil Lower Kurram Land Use Stats

Sr No.	Land use	Area(Acre)	Percentage
1	Agriculture Land	12109.80	5.1819%
2	Bus Terminal / Stop	2.81	0.0012%
3	Commercial	82.37	0.0352%
4	Education	143.39	0.0614%
5	Forest	6158.63	2.6353%
6	Government Building	23.38	0.0100%
7	Graveyard	235.75	0.1009%
8	Health	37.86	0.0162%
9	Industry	0.43	0.0002%
10	Livestock & Fisheries	0.75	0.0003%
11	Open Spaces	2263.14	0.9684%
12	Park & Playground	122.06	0.0522%
13	Range Land	201818.99	86.3606%
14	Religious	35.27	0.0151%
15	Residential	2601.20	1.1131%
16	Restricted Area	32.62	0.0140%
17	Tourism & Historical Building	9.45	0.0040%
18	Transport	964.23	0.4126%
19	Utilities	8.26	0.0035%
20	Water Bodies	7043.10	3.0138%
Total		**233693.49**	**100.0000%**



Map 2-4 Tehsil Lower Kurram Existing Land Use Map

2.3 LANDUSE DISTRIBUTON IN URBAN CENTER

Land use refers to how humans utilize land for activities like agriculture, settlements, industry, forestry, and recreation, reflecting economic and cultural practices that can change over time. Dogar, an important urban center in Lower Kurram Tehsil at 1,645 m elevation, plays a key administrative and economic role in the district. While 2023 census data is unavailable, the 2017 population was 17,575 (16% of Lower Kurram), with a projected 2023 population of ~20,700 at a 2.63% annual growth rate. Land use in Dogar is generally stable, but land market dynamics make planned land distribution essential for sustainable urban development.

2.3.1 Existing Land use Distribution of Parachinar Urban Center

Parachinar is the administrative capital of Kurram District in Upper Kurram Tehsil, serving as a key center for governance, trade, and community life. Part of Upper Kurram (970 km², population 275,819 in 2023), it hosts a diverse population, mainly Pashtun tribes with a significant Shia Muslim community. The city has a history of sectarian tensions, which have improved due to security and peace efforts. Parachinar remains a vital hub for administration, education, commerce, and cultural heritage in the district.

Parachinar's land use is characterized by a diverse mix of administrative buildings, residential neighborhoods, commercial areas, and agricultural lands. As the district and tehsil headquarters of Upper Kurram, Parachinar plays a central role in governance and regional service delivery. In recent years, the city has witnessed several development initiatives, including the installation of solar street lights, upgrading of road infrastructure, and the construction of modern commercial markets. These improvements reflect a focused effort to enhance infrastructure, public services, and overall urban functionality.

While specific land use statistics for Parachinar are not separately documented, its importance as the primary urban center in Upper Kurram is evident in its continuous urban expansion and administrative significance.

The land-use pattern of Urban Center Parachinar reflects a mixed and transitional urban structure, where agricultural and open lands continue to dominate alongside expanding urban development. Agricultural land remains the largest land-use category, occupying 50% of the total area, indicating the strong presence of peri-urban farming and the gradual conversion of rural land into urban uses.

Open spaces account for a substantial 19%, playing a vital role in environmental quality, urban ventilation, flood absorption, and providing opportunities for future planned development. Residential land covers 14%, representing the primary built-up component of the urban center and indicating a growing population concentration. Restricted areas (4%) and transport infrastructure (4%) further define the urban form and support administrative control and mobility within the city.

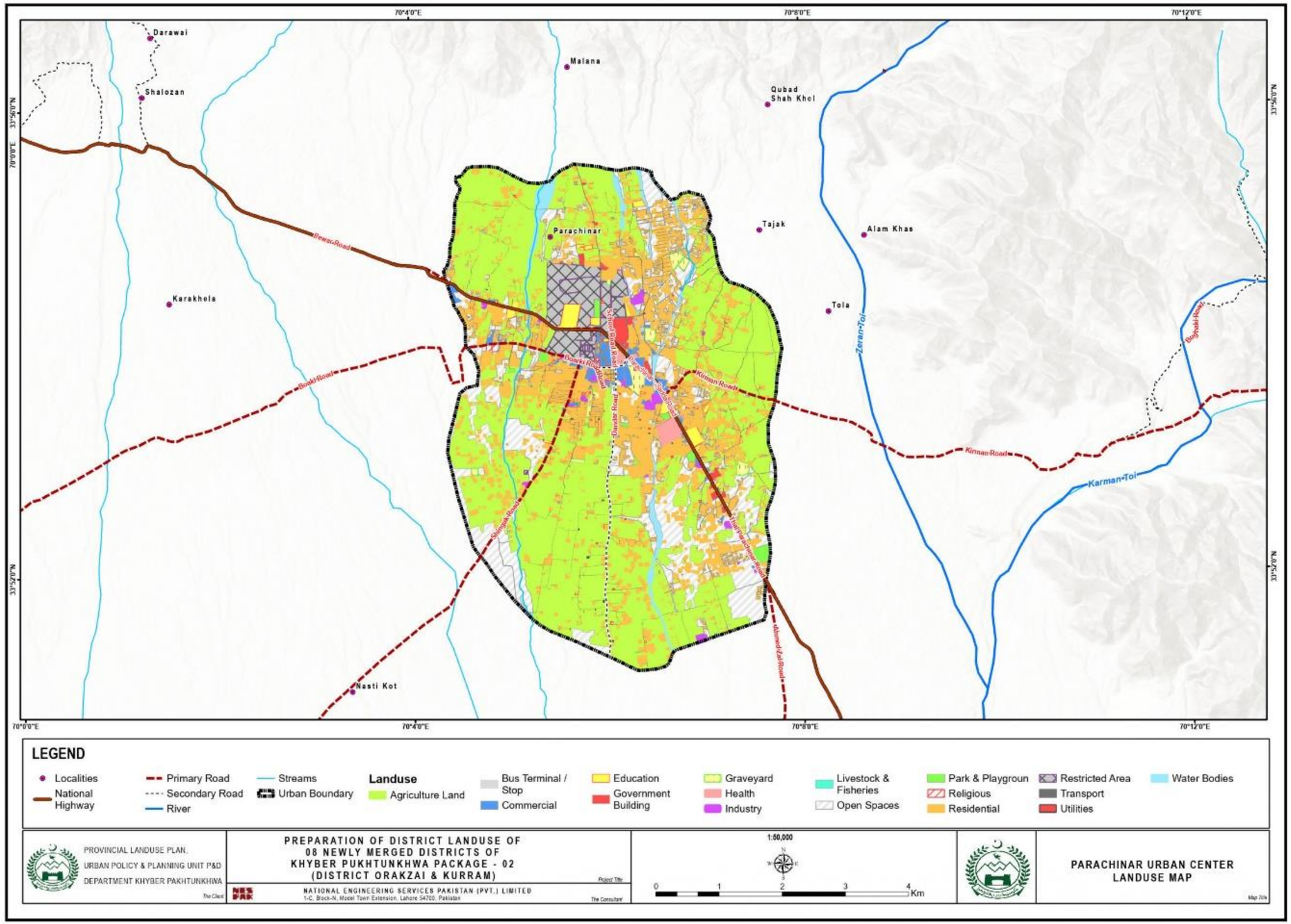
Institutional and service-related land uses, including commercial (2%), education (1%), health (1%), government buildings (1%), parks and playgrounds (1%), and graveyards (1%), collectively support the social and economic needs of the population. Water bodies, covering 3%, contribute to water supply, drainage, and ecological balance. Industrial and livestock-related uses remain negligible, reflecting the service-oriented nature of the urban economy.

Overall, the updated land-use structure of Urban Center Parachinar highlights a city in transition, where agriculture and open spaces still play a dominant role, while residential, commercial, and transport-related land uses are steadily increasing. This pattern underscores the need for integrated urban

planning to manage growth, protect valuable open and agricultural lands, and enhance urban services and infrastructure in a sustainable manner.

Table 2-5: Landuse Distribution in Urban Center Parachinar

Sr No	Landuse	AreaAcre)	Percentages
1	Agriculture Land	4219.36	50.356%
2	Bus Terminal / Stop	3.39	0.040%
3	Commercial	148.10	1.768%
4	Education	104.59	1.248%
5	Government Building	63.13	0.753%
6	Graveyard	81.97	0.978%
7	Health	46.19	0.551%
8	Industry	19.83	0.237%
9	Livestock & Fisheries	0.06	0.001%
10	Open Spaces	1570.86	18.747%
11	Park & Playground	44.61	0.532%
12	Religious	14.38	0.172%
13	Residential	1208.11	14.418%
14	Restricted Area	317.61	3.791%
15	Transport	304.47	3.634%
16	Utilities	2.29	0.027%
17	Water Bodies	230.11	2.746%
Total		**8379.07**	**100.000%**



Map 2-5: Land use Index Map (Urban Center: Parachinar)

2.3.2 Existing Land use Distribution of Sadda Urban Center

Sadda is a key urban center in Lower Kurram Tehsil, Kurram District, Khyber Pakhtunkhwa. It functions as an administrative and commercial hub, supporting governance, trade, and community life. While specific population data is not reported, Lower Kurram Tehsil spans 940 km² with a population of 150,945 (2023 census). Historically significant as a regional marketplace and connection point, Sadda has recovered from past conflict and now serves as a growing center for administration, education, trade, and culture in the district.

Sadda features a mix of administrative, residential, commercial, and agricultural areas, serving as a key hub for governance, trade, and daily life in Lower Kurram Tehsil. Recent developments, including solar street lights, market upgrades, and road improvements, reflect efforts to enhance urban services and support ongoing growth, despite the absence of detailed land use statistics.

The land-use pattern of Urban Center Sadda shows a balanced and transitional urban structure where agricultural and open lands still dominate, alongside steadily growing residential and service functions. Agricultural land constitutes the largest share at 29%, indicating the continued importance of peri-urban farming within the town's boundary. Closely following, open spaces cover 27%, playing a crucial role in environmental regulation, drainage, and providing reserve land for future planned development.

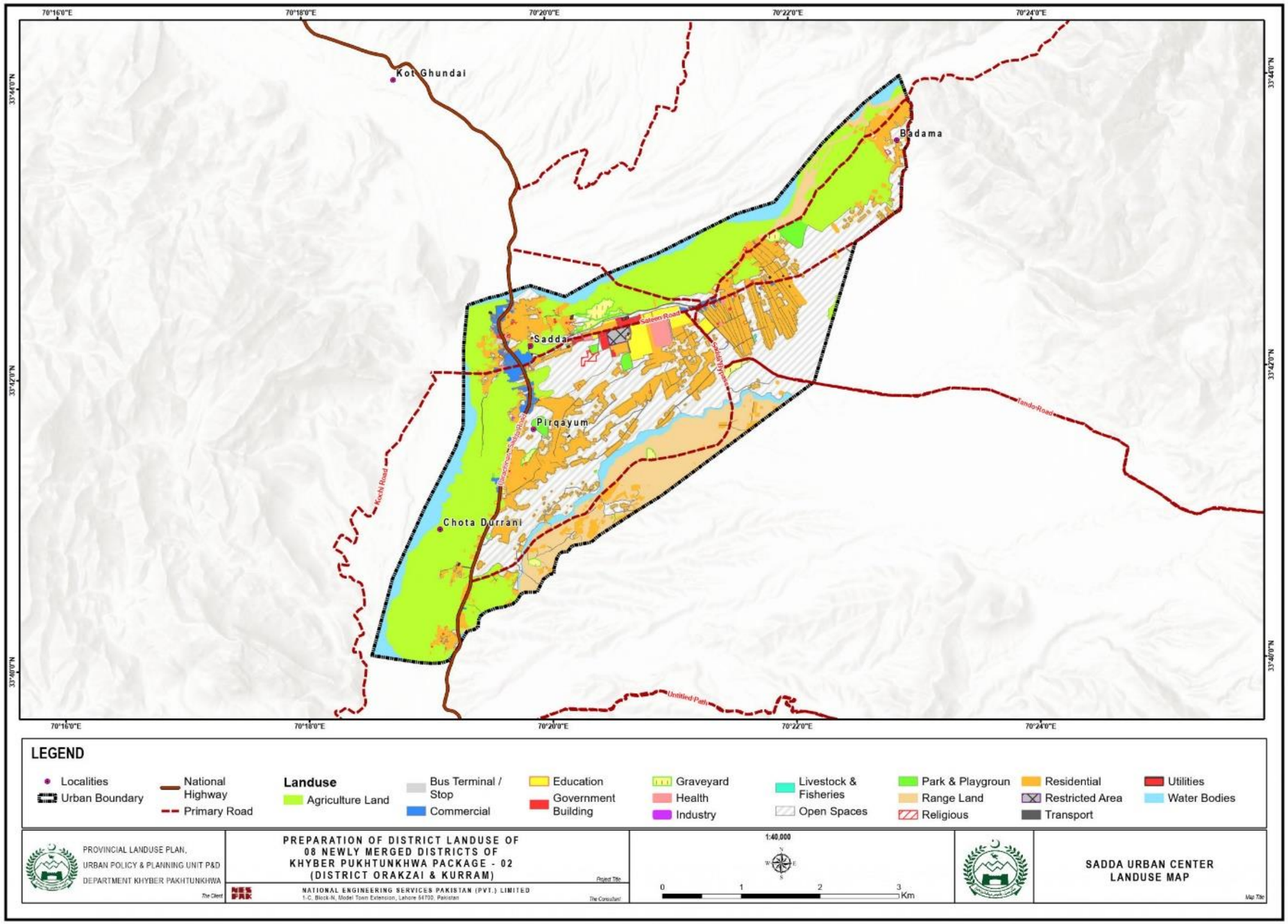
Residential areas account for 16%, representing a significant built-up component and reflecting moderate population concentration. Rangeland, covering 10%, indicates the presence of undeveloped or grazing land within the urban perimeter, while water bodies (7%) contribute to water supply, flood management, and ecological stability. Transport infrastructure, at 4%, highlights the town's internal and external connectivity.

Institutional and service-oriented land uses such as commercial (1%), education (1%), health (1%), parks and playgrounds (1%), and graveyards (1%) occupy relatively small but essential proportions, supporting the social and economic needs of residents. Industrial, utility, and livestock-related uses remain negligible, reflecting a service-oriented and low-intensity urban economy.

Overall, Urban Center Sadda exhibits a mixed urban-rural land-use character, where agriculture and open spaces coexist with expanding residential and service areas. This pattern underscores the importance of integrated urban planning to guide future growth, protect open and agricultural lands, and strengthen urban infrastructure and public services in a sustainable manner. An index map of Land use is show in map 2.7And the details land use maps are attached as Compendium of the report.

Table 2-6: Land use Distribution in Urban Center Sadda

Sr No.	Landuse	Area(Acre)	Percentages
1	Agriculture Land	1333.79	28.96%
2	Bus Terminal / Stop	2.79	0.06%
3	Commercial	65.96	1.43%
4	Education	67.69	1.47%
6	Government Building	16.75	0.36%
7	Graveyard	45.42	0.99%
8	Health	25.66	0.56%
9	Industry	0.43	0.01%
10	Livestock & Fisheries	0.75	0.02%
11	Open Spaces	1257.89	27.32%
12	Park & Playground	39.76	0.86%
13	Range Land	469.39	10.19%
14	Religious	14.50	0.31%
15	Residential	755.35	16.40%
16	Restricted Area	12.41	0.27%
17	Transport	161.79	3.51%
18	Utilities	2.17	0.05%
19	Water Bodies	332.54	7.22%
Total		**4605.03**	**100.00%**



Map 2-6: Landuse Index Map (Urban Center: Sadda)

2.3.3 Existing Land use Distribution of Dogar Urban Center

The core city center occupied with commercial areas, administrative buildings, bus stands, historic settlements, and open and recreation areas. It is reported that urban center has been growing in unplanned manner instead of following any physical development plan or any planning policy resulting in haphazard and uncoordinated development in different sectors. This scattered growing trend resulted in inefficient provision and accessibility of services like water, electricity, roads, sewerage, drainage, etc. No municipal committee or town committee has been given/assigned functions to control and guide developments in the town.

The land-use pattern of Urban Center Dogar reflects a predominantly semi-rural and low-density urban character, with natural and agricultural land uses continuing to dominate the urban boundary. Rangeland is the largest land-use category, covering 47% of the total area, indicating extensive open and grazing lands and limited urban consolidation. Agricultural land follows closely at 31%, highlighting the strong presence of farming activities and the persistence of peri-urban agriculture within the urban center.

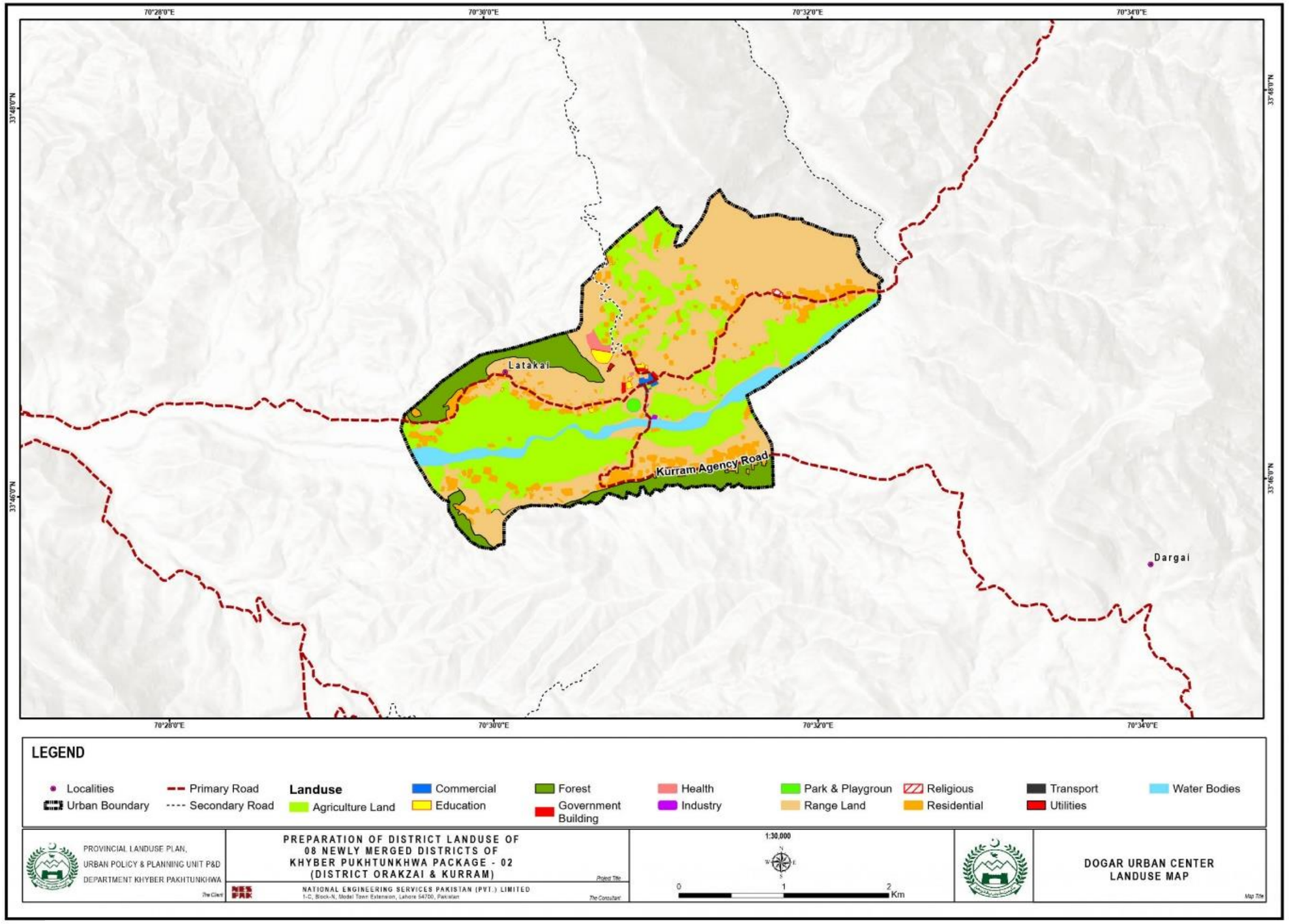
Forest areas, accounting for 9%, add ecological value to the urban landscape by supporting biodiversity, climate moderation, and environmental stability. Water bodies, covering 5%, play an important role in local water supply, drainage, and flood regulation. Residential land constitutes 6%, reflecting a relatively small and dispersed built-up area with low population density.

Land allocated to urban services and infrastructure remains minimal. Education (1%) and transport (1%) occupy modest proportions, while commercial, health, industrial, government, utility, and recreational uses together account for a negligible share of land. This indicates limited urban intensity and a service base that is still in an early stage of development.

Overall, Urban Center Dogar exhibits a transitional land-use structure where agriculture, rangeland, and natural features dominate, and urban functions are modest and scattered. The pattern underscores the need for planned and compact urban growth, protection of agricultural and forest lands, and gradual strengthening of urban services and infrastructure to support sustainable development.

Table 2-7: Land Use Distribution in Dogar Proposed Urban Boundary

Sr No.	Land use	Area(Acre)	Percentages
1	Agriculture Land	602.24	30.72%
2	Commercial	4.41	0.22%
3	Education	10.15	0.52%
4	Forest	179.05	9.13%
5	Government Building	2.40	0.12%
6	Health	6.62	0.34%
7	Industry	0.52	0.03%
8	Park & Playground	3.63	0.19%
9	Range Land	924.41	47.16%
10	Religious	1.23	0.06%
11	Residential	118.73	6.06%
12	Transport	12.87	0.66%
13	Utilities	0.82	0.04%
14	Water Bodies	93.01	4.75%
Total		**1960.09**	**100.00%**



Map 2-7: Location Index Map Urban Center Dogar

2.3.4 Existing Land use Distribution of Ali Zai Urban Center

The updated land-use pattern of Urban Center Ali Zai reflects a predominantly semi-rural urban setting, where natural and agricultural land uses remain dominant and urban development is relatively limited. Rangeland is the most extensive land-use category, covering 52% of the total area, indicating large open and grazing lands within the urban boundary. This highlights the continued importance of livestock and open land systems in the local economy.

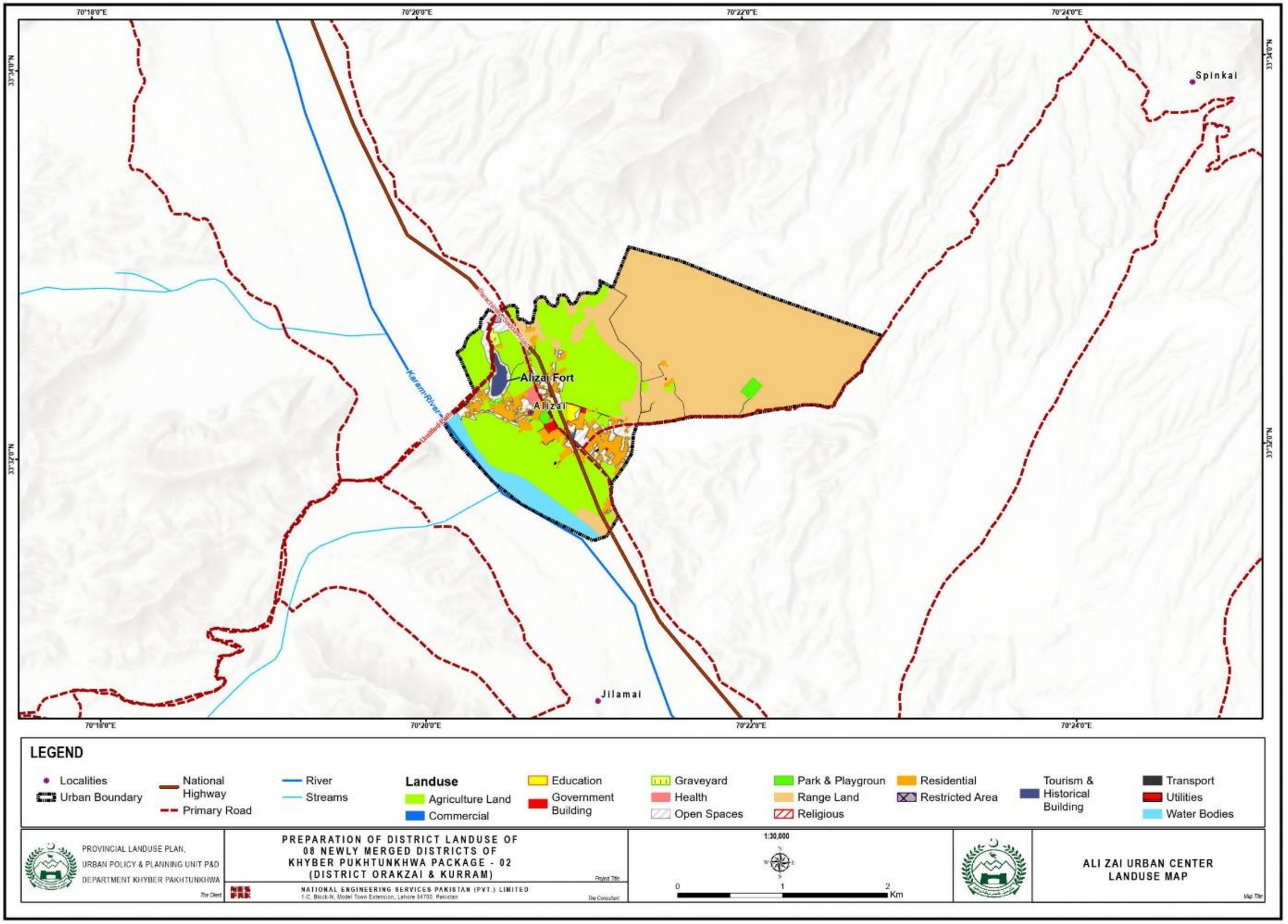
Agricultural land accounts for 28%, demonstrating a strong presence of peri-urban farming and reinforcing the rural character of the settlement. Open spaces and water bodies, each covering 5%, contribute positively to environmental quality, drainage, and local water availability, while also offering potential for planned future development.

Built-up land uses occupy a modest share of the area. Residential land covers 5%, reflecting a low-density and compact settlement pattern. Transport infrastructure, at 3%, supports basic mobility and connectivity. Social and community facilities such as parks and playgrounds (1%) and tourism and historical buildings (1%) add recreational and cultural value, though their overall spatial footprint remains limited.

Institutional and service-oriented uses—including commercial, education, health, government buildings, and utilities—occupy negligible proportions, indicating low urban intensity and limited service concentration. Overall, Urban Center Ali Zai exhibits a transitional land-use structure where agriculture and rangelands dominate, and urban functions are emerging gradually. This pattern underscores the need for controlled and sustainable urban planning to enhance services while conserving agricultural land and natural open areas.

Table 2-8: Land use Distribution in Urban Center Ali Zai

Sr No.	Land use	Area (**Acre**)	Percentages
1	Agriculture Land	399.13	28.23%
2	Commercial	1.29	0.09%
3	Education	3.94	0.28%
4	Government Building	2.90	0.20%
5	Graveyard	4.35	0.31%
6	Health	3.64	0.26%
7	Open Spaces	76.40	5.40%
8	Park & Playground	8.47	0.60%
9	Range Land	730.47	51.66%
10	Religious	0.27	0.02%
11	Residential	67.48	4.77%
12	Restricted Area	1.34	0.09%
13	Tourism & Historical Building	9.45	0.67%
14	Transport	37.07	2.62%
15	Utilities	0.18	0.01%
16	Water Bodies	67.59	4.78%
Total		**1413.97**	**100.00%**



Map 2-8: Landuse Map (Urban Center: Ali Zai)

3 Sectoral Studies

3.1 Housing

Housing is a fundamental necessity for all individuals, regardless of whether they reside in urban or rural areas, and is intricately linked to various land uses. Consequently, the housing sector is diverse and encompasses all urban activities associated with employment, education, and recreation. To adequately address housing needs, it is essential to consider other land uses, as a significant amount of land is required for residential purposes, which in turn supports these activities.

Given the critical importance of housing, it is vital to examine its current characteristics and spatial dynamics to inform future Land Use Plans. Both qualitative and quantitative dimensions of the housing sector must be analyzed to assess land suitability, as well as any limitations and constraints.

In District Kurram, the characteristics of the existing housing stock have been evaluated using a range of data sources, including secondary data from the census and primary data from the Household Information Survey. Key characteristics studied include average household size, housing stock, ownership trends, growth patterns, density trends, the existing housing backlog, and projected future housing demand for the planning period.

3.1.1 Current Housing Stock by Type

The housing stock data from the Population and Housing Censuses of 1998, 2017, and 2023 for District Kurram provide critical insights into the evolution of residential infrastructure within the district. Understanding these trends is fundamental for the formulation of an effective land use plan that addresses housing needs, construction standards, and sustainable spatial development.

The housing stock is classified into three main categories based on construction quality and material durability: Katcha (traditional or temporary construction), Semi-Pakka (partially durable construction), and Pakka (permanent and durable construction). Katcha housing, characterized by non-permanent materials such as mud, thatch, or bamboo, has consistently constituted the majority of the housing stock in District Kurram. In 1998, Katcha houses represented 6.18% of the total housing units. This proportion increased significantly to 43.71% in 2017 and further escalated to 48.07% in 2023. The marked rise in Katcha housing highlights the district's reliance on traditional construction methods, possibly driven by economic constraints, cultural preferences, and the availability of local materials.

Semi-Pakka houses, which combine both temporary and durable materials, showed a substantial increase over the 25-year period. From a modest 9.66% in 1998, the share of Semi-Pakka housing surged to 38.79% in 2017, before slightly declining to 28.79% in 2023. This growth indicates a transitional phase where residents are progressively adopting more resilient construction techniques, yet full permanence remains limited. The slight decrease observed in 2023 may reflect data collection nuances or a shift back towards more affordable housing solutions. Pakka housing, indicative of fully durable structures made from permanent materials like brick and concrete, has historically constituted a smaller fraction of the housing stock. The percentage of Pakka houses fell from 84.16% in 1998 to 17.50% in 2017, with a marginal increase to 23.14% in 2023. This decline suggests limited access to resources or technical capacity for constructing permanent housing and underscores the need for policy interventions to improve housing quality and resilience.

Table 3-1 District Kurram Previous Housing Stock

Housing Type	1998 Census	Percentage (1998)	2017 Census	Percentage (2017) [34]	2023 Census	Percentage (2023) [35]
Katcha	1,573	6.18%	27,566	43.71%	45,447	48.07%
Semi-Pakka	2,456	9.66%	24,466	38.79%	27,221	28.79%
Pakka	21,406	84.16%	11,038	17.50%	21,880	23.14%
Total	25,435	100.00%	63,070	100.00%	94,548	100.00%

3.1.1.1 Housing Stock Projection of District Kurram (2025)

Housing is a critical component of urban and rural development, and understanding its growth dynamics is essential for effective planning. In Kurram District, the housing stock has historically grown steadily. Between 2017 and 2023, the number of housing units increased from 63,070 to 94,548, reflecting a significant rise over six years. Using the Compound Annual Growth Rate (CAGR) formula, the average annual growth rate is calculated at approximately 2.78% per year.

This growth rate is used to project future housing stock. Applying it to the 2023 figures, the housing stock in 2025 is expected to reach around 99,878 units, while projections for 2045 indicate approximately 172,839 units.

These projections are essential for land use and infrastructure planning, enabling policymakers to anticipate residential needs, utilities, and public services. Understanding current and future housing demands allows planners to develop strategies that ensure adequate housing supply, promote sustainable growth, and enhance living conditions across Kurram District over the next two decades.

3.1.1.2 Distribution of Housing Types in 2025

The housing stock in Kurram District is categorized into three types: Katcha, Semi-Pakka, and Pakka. Based on the proportions recorded in the 2023 census, the projected distribution of housing types in 2025 is as follows:

- **Katcha Housing:** Approximately 48,011 units, representing the largest share of the housing stock.
- **Semi-Pakka Housing:** Around 28,755 units, indicating moderate-quality housing.
- **Pakka Housing:** About 23,112 units, the smallest proportion, representing durable and high-quality construction.

Table 3-2 Projected Housing Stock by Type (2025)

Housing Type	Percentage (2023)	Projected Units (2025)
Katcha	48.07%	48,011 units
Semi-Pakka	28.79%	28,755 units
Pakka	23.14%	23,112 units
Total	100.00%	99,878 units

3.1.2 Housing Stock Verification and Shortfall in 2025

To verify the projected housing stock in Kurram District for 2025, the calculation can be based on the projected population and the average household size. With a population of 834,090 and an average

[34] /www.pbs.gov.pk/sites/default/files/population/2017/results/03024.pdf
[35] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_20_kp_districts.pdf

household size of 8.3, the housing stock is estimated at approximately 100,492 units. This reveals a housing shortfall of about 615 units, highlighting the urgent need for strategic interventions to meet the growing demand. Addressing this gap requires the development of affordable housing schemes, the promotion of sustainable construction practices, and the allocation of sufficient land resources. Meeting this demand is essential to ensure adequate shelter, improve living conditions, and support the district's socio-economic development. Failure to address the shortfall could lead to the growth of informal settlements, increased pressure on existing infrastructure, and challenges to sustainable urban and rural growth.

3.1.2.1 Average Household Size

The average household size is a critical factor in housing planning, as it determines the number of housing units needed to accommodate a population. In Kurram District, the average household size is **8.3**.

3.1.2.2 Ownership Pattern

According to HIS, the analysis of house ownership in Kurram district reveals significant insights into the region's residential landscape. House ownership and description provide a multifaceted view of properties, not just in terms of physical structure but also reflecting the socio-economic, cultural, and historical contexts.

Table 3-3 House Ownership Tehsil-Wise Analysis

Tehsil	Owned	Lease	Rented	Total
Central Tehsil	35.45%	0.23%	1.13%	36.81%
Lower Tehsil	17.44%	0.91%	3.85%	22.20%
Upper Tehsil	32.16%	0.57%	8.27%	41.00%
Grand Total	85.05%	1.70%	13.25%	100.00%

Source: HIS Kurram, 2024

The housing tenure data from the Household Information Survey (HIS) for District Kurram offers key insights for land use planning. Overall, 85.05% of households own their homes, 13.25% rent, and 1.70% lease, indicating strong residential stability.

Central Tehsil, holding 36.81% of the district's housing, is predominantly owner-occupied (35.45%) with minimal renting or leasing, suggesting a stable core zone suitable for infrastructure upgrades and controlled densification rather than expansion.

Lower Tehsil, with 22.20% of the housing, has the lowest ownership rate (17.44%) and higher renting/leasing, reflecting a more transient population. Planning here should focus on affordable rental housing, basic infrastructure, and long-term residential stability.

Upper Tehsil, the largest housing zone (41%), shows 32.16% ownership and the highest rental proportion (8.27%), indicating growing urbanization and flexible housing demand. It requires infrastructure expansion, improved transport, and support for the rental market.

Overall, Kurram's land use strategy should tailor interventions to each tehsil: reinforce infrastructure and densify in Central, promote affordable housing in Lower, and support urban growth and rental formalization in Upper, integrating housing with transport, utilities, and economic development for sustainable urban growth.

3.1.2.3 Housing Current Backlog

The housing demand and supply projections for District Kurram in the year 2023 provide vital insights into the current status and future requirements for residential infrastructure. According to the demographic projections, the district's population is approximately 784,434 by 2023. Correspondingly, the estimated housing demand calculated based on projected household sizes stands at 94,631 housing units by 2023.

Comparatively, the available housing stock for the same period is estimated at 94,584 units. This suggests that the district's housing supply slightly exceeds the immediate demand, with a calculated housing backlog of 86 units. While this backlog is relatively modest, it nonetheless represents a critical gap that must be addressed to ensure adequate housing availability for all households.

The presence of a housing backlog, even if limited, indicates that a portion of the population may be living in overcrowded, inadequate, or informal housing conditions. This gap highlights the need for targeted interventions to bridge the shortfall, improve housing quality, and prevent the emergence or expansion of substandard settlements. Although the housing backlog projected for 2025 is relatively small at 86 units, proactive planning and policy measures are required to maintain equilibrium between housing demand and supply. Integrating housing considerations into the broader land use plan will support the district's goal of sustainable urban and rural development, ensuring that all residents have access to safe, adequate, and affordable shelter.

Housing Stock (Units from Census)

Table 3-4 Current Housing Backlog

Year	Population	Housing Demand (Units)	Available Housing Stock (Census 2023)	Housing Backlog
2023	785,434	94,631	94,548	86

3.1.2.4 Plan Period Requirement

The demographic projections for District Kurram over the next two decades indicate substantial population growth, with the population expected to rise from approximately 834,090 in 2025 to 1,486,194 by 2045. This growth poses challenges and opportunities for urban planners, housing authorities, and policymakers in managing residential development sustainably and equitably.

Housing demand estimates, based on projected population and average household size, show a rising need for residential units from 100,492 in 2025 to 179,060 by 2045. These figures reflect population growth and changing household formation patterns, including declining household sizes and increasing prevalence of nuclear families, which increase pressure on housing stock.

Housing stock projections, accounting for existing units plus anticipated new construction, are expected to grow from 100,492 units in 2025 to 179,060 units by 2045. Despite this increase, supply will lag behind demand, resulting in a progressively widening housing backlog.

The housing backlog, defined as the difference between demand and available stock, is projected as follows:

- **2025:** A relatively minimal of 5,945 units suggests a near equilibrium between supply and demand in the short term.

- **2030:** The demand escalates sharply to 21,879 units, signaling emerging shortages that may start to impact affordability and living conditions.
- **2035:** With a demand of 39,952 units, the deficit becomes critical, risking increased informal settlements and housing insecurity.
- **2040:** The demand reaches 60,634 units, posing substantial challenges to infrastructure, services, and social cohesion.
- **2045:** At 84,512 units, the demand represents a significant housing crisis demanding urgent, large-scale interventions.

The growing backlog reflects both demographic momentum and systemic constraints in housing production, financing, and land availability.

These projections highlight the urgent need for a comprehensive housing and land use strategy. Proactive policy formulation, strategic investment, and multi-sector collaboration are crucial to bridging the housing gap and ensuring residential development supports equitable socio-economic growth and environmental sustainability. The district's ability to address these challenges will determine its urban form, quality of life, and long-term resilience.

Table 3-5 Housing Projection

Year	Population	Housing Demand (Units)	Additional Housing Demand
2025	834,090	100,493	5,945
2030	966,344	116,427	21,879
2035	1,116,349	134,500	39,952
2040	1,288,010	155,182	60,634
2045	1,486,194	179,060	84,512

Key observations indicate a growing housing deficit in District Kurram, rising from 5,945 units in 2025 to 84,512 units by 2045. To meet this demand, approximately 84,512 additional units must be constructed over this period, averaging about 4,226 units per year alongside the natural housing growth of 2.60%.

3.1.2.5 Housing Affordability and Adequacy Relative to Income Level

Housing is a basic human necessity and a critical component of socio-economic well-being. According to the World Health Organization (WHO), housing includes not only the physical shelter but also all necessary services, facilities, and environmental conditions required for the physical and mental health of a family. Globally, housing is considered affordable if a basic housing unit providing a minimum personal space of 250–500 square feet and essential amenities is accessible at 20–40 percent of gross monthly household income, either for rent or mortgage.[36]

Affordability also refers to the adequacy and habitability of a dwelling. A house cannot be considered affordable if it is overcrowded, unhealthy, or lacks essential services such as water, electricity, gas, and sanitation. Therefore, in addition to financial factors, the assessment of affordability also considers the adequacy of physical and social infrastructure.[37]

[36] A framework for affordable housing in Pakistan, International Growth Center, 2019
[37] What is affordable Housing? Habitat for Humanity.

According to the Household Information Survey (HIS) 2024 conducted in District Kurram, a very small percentage of households live in rented houses, while the overwhelming majority own their homes. This trend reflects strong socio-cultural preferences for ownership and limited dependence on the rental market. The average monthly household income in the district is Rs 38,700, while the average monthly rent (for those renting) ranges between Rs 4,000 – Rs 18,000, with an average of Rs 9,800 per month. Thus, the share of income spent on rent is about 25%, which falls within the internationally accepted range for affordable housing.

To assess adequacy, physical characteristics of the houses were analyzed from the HIS dataset. These include structure type, covered area, rooms and bathrooms per house, and period of construction.

Table 3-6: Physical Criteria for Affordable Housing (District Kurram)

Structure of House (Pacca)	Avg. Covered Area (Marla)	Avg. Rooms per House	Avg. Bathrooms per House	Avg. Kitchens per House	Avg. Persons per Room	Period of Construction (11–50 Years)
39 %	10	4	2	1	3	48 %

Source: (HIS) District Kurram, 2024[38]

The HIS analysis shows that about 39% of houses in Kurram District are Pakka (permanent), while the rest are semi-pakka or katcha. The average covered area is around 10 marla (≈ 2,720 sq. ft.), accommodating an average of four rooms and two bathrooms per house. With an average household size of 9 persons, this provides roughly 302 sq. ft. per person, aligning with international adequacy standards.

Approximately 48% of houses were built between 11 – 50 years ago, remaining within a typical functional lifespan. These indicators confirm that, despite moderate income levels, housing adequacy in Kurram meets acceptable norms for healthy living.

Table 3-7: Availability of Basic Facilities (District Kurram)

Potable Water	Electricity	Gas	Sanitation
58 %	92 %	17 %	53 %

Source: (HIS) District Kurram, 2024[39]

Survey results indicate that more than half of households (58%) have access to potable water, although accessibility and reliability vary across tehsils. Electricity coverage is high (92%), but daily supply remains inconsistent due to prolonged outages. Access to gas remains limited (17%), forcing most households to rely on wood or LPG cylinders. Sanitation coverage stands at 53%, implying that nearly half of the population still disposes of waste and wastewater in open spaces or drains. While these figures suggest a generally improving situation compared to previous years, significant gaps remain in water supply, sanitation, and clean energy access all essential for sustainable housing quality in District Kurram.

[38] Calculated from the Household Survey conducted by the Consultant in 2024
[39] Calculated from the Household Survey conducted by the Consultant in 2024

3.1.3 Constraints and Recommendations for Housing in Kurram District

3.1.3.1 Constraints

Limited Housing Stock: The existing housing stock in Kurram District is inadequate to meet the growing population's needs. The current projections indicate a significant shortfall, with a discrepancy of the estimated housing demand and available supply.

Prevalence of Katcha Housing: A substantial portion of the housing stock consists of Katcha units, which are often constructed with temporary materials and lack durability. As of 2017, approximately 66.7% of housing units were classified as Katcha, reflecting ongoing challenges in improving housing quality.

Economic Barriers: Many residents, especially those from low- and middle-income backgrounds, face financial constraints that prevent them from accessing adequate housing. High construction costs, coupled with limited access to financing options, exacerbate the housing deficit.

Land Tenure Issues: The complex land tenure system in Kurram, characterized by tribal ownership and customary laws, poses significant challenges to land acquisition for housing development. This complexity often leads to delays in project implementation and limits the availability of land for new housing initiatives.

Lack of Public and Private Investment: There is a notable absence of organized public and private housing schemes in the district. This lack of investment hampers the development of new housing projects and contributes to the ongoing shortfall.

Inadequate Infrastructure: Insufficient infrastructure, including roads, utilities, and sanitation facilities, further complicates housing development efforts. Many areas lack essential services that are critical for sustainable living conditions.

Weak Policy Implementation: Existing national and provincial housing policies have faced challenges in effective implementation due to gaps in coordination among various governmental levels and insufficient monitoring mechanisms.

3.1.3.2 Recommendations

Increase Housing Stock: Develop targeted programs aimed at significantly increasing the housing stock through public-private partnerships (PPPs). This could involve incentivizing private developers to invest in affordable housing projects tailored to low- and middle-income families.

Focus on Durable Construction: Promote the construction of Pakka and Semi-Pakka houses by providing subsidies or financial incentives to builders and homeowners. This will help transition residents from Katcha structures to more durable housing options.

Enhance Access to Financing: Establish innovative financing mechanisms such as microcredit schemes or low-interest loans specifically designed for low-income households to facilitate home ownership and construction.

Streamline Land Acquisition Processes: Simplify land acquisition procedures by establishing clear guidelines for land use that respect tribal customs while enabling efficient access to land for development purposes.

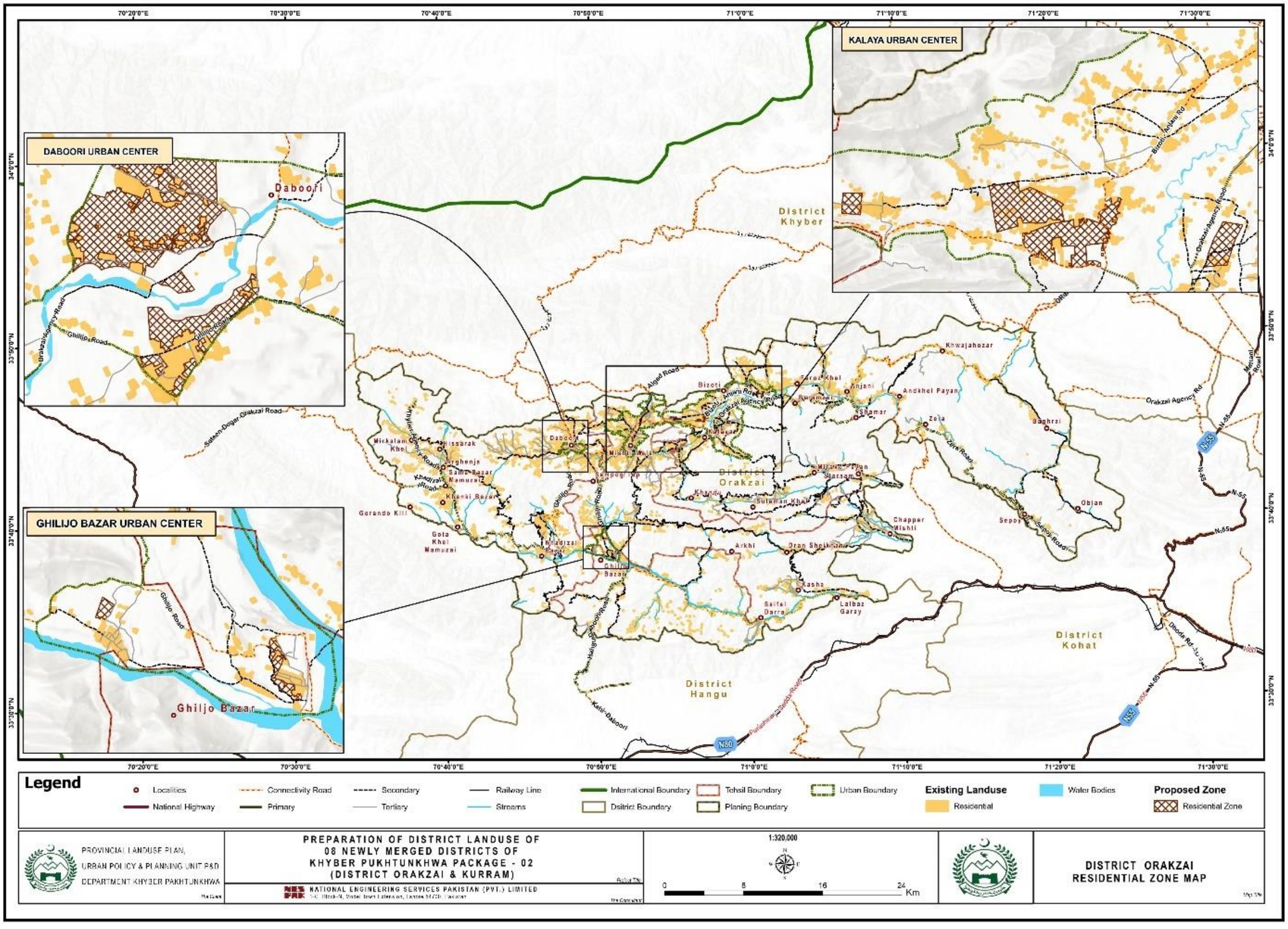
Invest in Infrastructure Development: Prioritize infrastructure improvements in conjunction with housing projects to ensure that new developments are equipped with necessary utilities and services, promoting sustainable living conditions.

Strengthen Policy Implementation: Improve coordination among federal, provincial, and local governments to enhance the implementation of existing housing policies. Establish a robust monitoring framework to track progress and make necessary adjustments based on real-time data.

Community Engagement: Involve local communities in the planning process for new housing developments to ensure that projects align with residents' needs and preferences. This engagement can foster a sense of ownership and responsibility toward new developments.

Regular Review of Policies: Conduct periodic reviews of national and provincial housing policies to ensure they remain relevant and effective in addressing current challenges in the housing sector. Focus on setting measurable targets and improving regulatory frameworks.

By addressing these constraints through targeted recommendations, Kurram District can work towards alleviating its housing deficit, improving living conditions for its residents, and fostering sustainable community development over the long term.

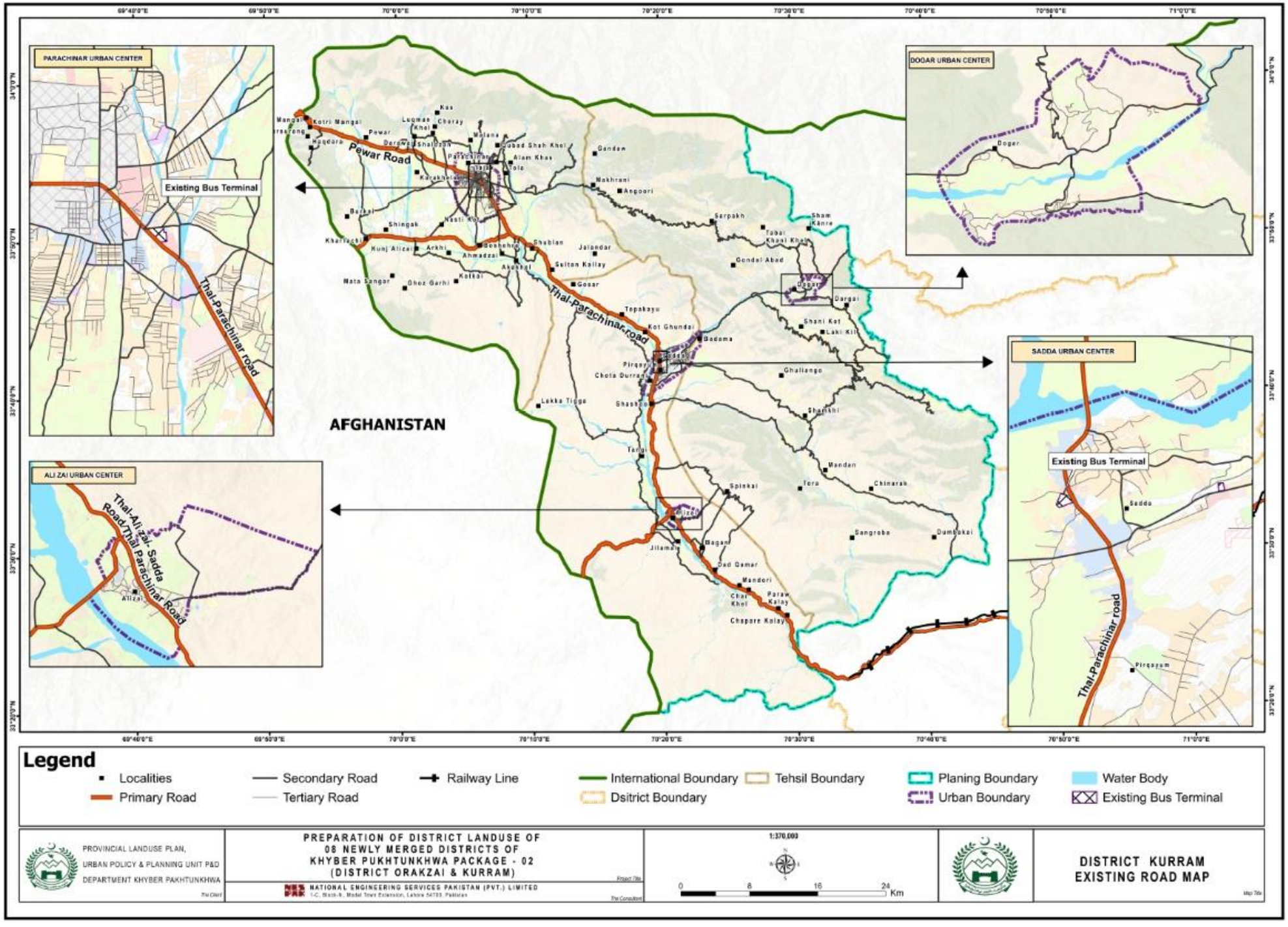


Map 3-1 Proposed Residential Zones

3.2 Communication

3.2.1 Major Road Network of Kurram

Kurram, a region in Pakistan's tribal areas, is known for its rugged terrain and scenic beauty. The region's road network plays a critical role in connecting its people, facilitating trade, and ensuring access to essential services. Below is an overview of the major roads in Kurram: The hierarchy of roads in Kurram District are given in following Map 3.2.



Map 3-2 The Hierarchy of Roads in Kurram

The road network in Kurram District has historically faced challenges due to its mountainous terrain, security concerns, and infrastructure limitations. However, efforts have been made over the years to improve and expand the road network to boost economic activity, enhance connectivity, and improve access to basic services.

1. Thal - Parachinar Road

The primary road of Kurram District runs parallel to the Kurram River, starting from Thall (Hangu District) and passing through Alizai, Sadda, Khar Kali, Bagzai, Shalozan, to Parachinar (Upper Kurram). It connects all three tehsils and links the district to Khyber Pakhtunkhwa, Afghanistan, and Central Asia, facilitating movement of people and goods. The road provides access to DHQ Hospital Parachinar, FC Cantonments, educational and health facilities, and government institutes. Traffic data shows most travel relies on private vehicles (motorcycles, cars, jeeps), while public transport (Hiace vans, Mazda pickups, small coaches) serves inter-city routes; larger vehicles like buses and trolleys are rarely used.

2. Pewar Road

The second primary road of Kurram, extending from Parachinar to the Afghanistan border, passes through Shalozan, Naray, Lachay, and Zeran. It is crucial for cross-border trade, especially agricultural goods, and connects directly to the Pak-Afghan border gate (Shaheedano Dand). Local access to Parachinar Bazar and BHU relies on private vehicles like motorcycles, cars, jeeps, and small vans. Larger public transport such as trolleys, buses, and coasters are not used, while 2-axle and 3-axle trucks travel in limited numbers.

3. Cantonment Road (Sadda)

It begins from Ajab Khan Chowk and extends eastward through Sadda town. It connects Ajab Khan Chowk to Sateen and Shaheen Housing Clusters. It runs parallel to Dogar Road and intersects with Sadda–Parachinar Road. On this road, THQ Sadda), FC Fort, Govt. Degree College, Vocational/Technical College and government offices (Irrigation Office, Zakat Office, Education Office) are located.

4. Boarki Road

It connects residential clusters in Sadda town to the main Thall–Sadda Road. It connects with Akbar Khan Road, Tindo Road, and Karkhano Road. In this way, it facilitates internal town circulation with access to both residential and commercial areas. It is located close to Tablighi Markaz.

5. Malana Road

It provides local connectivity between the Cantt. area and Malana village. It branches off from the broader urban road network and is essential for intra-city mobility. It is fully paved but requires repairs in patches, reducing its service quality and operational safety. Traffic volume on this road is low, primarily consisting of motorcycles, cars, and light goods vehicles. It facilitates daily commuting for local residents in Malana, especially those working in the cantonment, shops, schools, and health units. No rickshaw or Qingqi is travelling on this road. However, Private vehicles like motorcycles and car/taxi/jeep are used by the majority of people on this road.

6. Zeran Road

It serves as a feeder route connecting central Parachinar to Zeran village, passing important public service points such as the NADRA office. It is paved and functional, but requires patch maintenance, especially near intersections and shoulders. The road serves light to medium traffic, mostly comprised of government employees, local residents, and service vehicles.

7. Dandar Road

It connects the main Parachinar bazaar area with Boshehra village, acting as a link between commercial and residential areas. It branches off from the Thall-Parachinar Road, providing access to Dandar, Boshehra, and adjoining settlements. Currently, the road is patched but deteriorating, requiring urgent surface and edge repairs. Drainage issues also contribute to surface erosion. Traffic volume is medium to low, with a mix of motorcycles, rickshaws, pickups, and light vans.

8. Punjabi Bazar Road

It is a key local access route within Parachinar's core commercial zone. It connects RP Chowk to the main bazaar and then splits toward Chargano Chowk and adjacent marketplaces. It is fully paved and in reasonable condition, handling low to moderate volumes of slow-moving traffic. The road primarily serves pedestrians, shopkeepers, rickshaws, motorcycles, and small delivery vehicles.

3.2.2 Road Inventory

The study area road network inventory survey covered major roads. Small streets and roads inside the closed settlements were not surveyed. For each key section of road, the geometrical features of the existing road network were also studied. The inventory data collected includes:

• Road Name	• Starting Ending Point	• Start/End Coordinates
• Length	• Right of wayt	• Hierarchy
• Road Condition		

Table 3-8: Road Inventory of Kurram

Sr No.	Road Name	Length(km)	Starting point	Ending Point	Start_XY	End_XY	Road Type	ROW (m)	Condition
1	Thal-Ali zai- Sadda Road/Thal Parachinar Road	48.195905	Thal	Sadda	33.3633488004,70.5595459004	33.6764309223,70.3222870177	Primary	8.0-9.0	Under Construction
2	Pewar Road	25.424749	Parachinar	Border	33.9017356158,70.0913778815	33.9688112997,69.8730270788	Primary	8.0-9.0	Fair
3	Kharlachi/Shigark Road	19.890961	Shublan	Kharlachi Border	33.8289525293,69.9535947383	33.8250982242,69.9483127096	Primary	8.0-10.0	Under Construction
4	Thal-Parachinar Road	37.696195	Sadda	Parachinar	33.6764073484,70.3222083828	33.9017356158,70.0913778815	Primary	8.0-9.0	Fair
5	Ali zai Border Road	16.82184	Ali Zai	Border	33.4758764132,70.2309899698	33.5456720998,70.3417751999	Primary	7.0-8.0	Poor
6	Girls Degree College Road	1.735149	Thal Parachinar Road (Ali Zai)	Sports Complex Ali Zai	33.5365119999,70.3675175	33.5336203,70.3497783997	Secondary	5.0-6.0	Poor
7	Dandar Road	7.837364	Parachinar Main Road (Shaheed Park)	Parachinar Bypass	33.8263542926,70.1007033619	33.8960419,70.1015154002	Secondary	6.5	Fair
8	Shingak Road	8.839623	Chinar Institute of Engineering Sciences (Boarki Road)	Kharlachi Road	33.8970331004,70.0955375841	33.8353451488,70.0378525248	Secondary	6.0-7.0	Fair
9	Parachinar Bypass	10.77193	Mehdi Abad Turn	KMU-IHS Kurram	33.9117293734,70.0618603441	33.8607197523,70.1298779473	Secondary	9	Good
10	Sadda Bypass	8.281064	Chota Durrani	Near Nadra Office Khar Kalay	33.6763820307,70.3223584014	33.7143570741,70.3281160104	Secondary	10.0-13.0	Good
11	Bourke Road	9.297748	Chinar Institute of Engineering Sciences	Kharlachi Road	33.8588144003,69.9522316996	33.9394680004,69.9507550002	Secondary	9	Good
12	Parachinar Zeran Road	9.519511	Parachinar Adda	Barawta Colony	33.8975159004,70.1039020004	33.9454238468,70.1638230294	Secondary	7.0-9.0	Fair
13	Parachinar-Makhrani Road	17.152576	Shashu	Makhrani	33.8850007402,70.187593445	33.8672580038,70.2893349068	Secondary		Fair
14	Main Sadda Road	9.561058	Palosotong	Near Nadra Office Khar Kalay	33.843915934,70.3649287463	33.8289291,70.4078953997	Secondary	8.0-9.0	Fair with Potholes
15	Shashu Road	44.521913	Thal Parachinar Road (Shasho)	Ghuloango	33.6571744561,70.3211948873	33.6793183999,70.5842829	Secondary	8	Fair
16	Doaba-Kurram Agency Road	30.149474	Kurram Agency Road	torawari	33.6103657257,70.5121162284	33.48871994,70.696792603	Secondary	8	Fair
17	Malana Road	7.832542	FG Public School Parachinar	Fata Colony	33.9015235003,70.0989432	33.9336504004,70.0586765003	Secondary	8.0-10.0	Good
18	Boarki Road/Karakhela road	19.536162	Chinar Institute of Engineering Sciences	Kharlachi Road	33.8389495991,69.9655906818	33.8970204715,70.0955987019	Secondary	9.0-11.0	Fair
19	Sateen Road	30.024841	Sadda / Hazrat Ameer Muaviya Chowk	Badama	33.7009666896,70.3296079479	33.8179318918,70.5715442457	Secondary	10.0-14.0	Under Construction
20	Kochi Road	25.37102	Sadda / Hazrat Ameer Muaviya Chowk	Muhazia old check post	33.5311338001,70.3249097996	33.7009666896,70.3296079479	Secondary	5.0-7.0	Good
21	Defence Road	11.811186	Thal	Ali Zai	33.4660137002,70.4001975003	33.5209827001,70.3180155997	Secondary	10	Poor
22	Kurram Agency Road	71.196603	Sateen Road	Dargai	33.6437886,70.6754832996	33.716664893,70.5923020311	Secondary	8	Fair

3.2.3 Public transport in Kurram District

Public transport in Kurram mainly relies on small private vehicles, particularly Toyota touring wagons (Ghwagay) and Hiace vans, operating without formal schedules or dedicated stops. Shared rides dominate, especially in towns like Parachinar, Malana, Shalozan, Sadda, and Pewar, while smaller villages and rugged areas depend on motorcycles, private cars, or walking due to poor roads.

The Parachinar Master Plan 2040 highlights gaps in mobility, citing long waits, limited coverage, unsafe travel, and overcrowding. It recommends a formal intra-district system with small buses or vans on primary and secondary roads, and designated stops every 500 meters in populated areas.

For inter-district travel to Peshawar, Kohat, or Punjab, residents use Hiace vans and private cars from informal terminals, valued for privacy and convenience but unregulated. The plan suggests formalizing routes under the KP Motor Vehicle Ordinance 1965 to improve safety and service planning.

Kurram lacks formal bus stands; vehicles load/unload on roadsides, causing congestion in markets. The master plan proposes upgrading informal terminals to Class C transport stands with ticketing, shaded waiting areas, restrooms, drinking water, and CCTV-managed security.

3.2.4 Railways

The Khushalgarh–Kohat–Thall Railway in Kurram District was abandoned in 1991, leaving passengers and freight dependent on the deteriorating Thall–Parachinar Road. This reliance increases travel times, transport costs, and risks during emergencies, while limiting trade and industrial growth. Reopening the line, potentially extending it to Parachinar as a scenic "Thal Safari," could boost tourism, employment, and regional trade.

Short-term alternatives include improving roads with widening, slope stabilization, guardrails, and better signage, while formalizing shuttle vans and minibuses on fixed routes. A phased rail revival, starting with Kohat–Thall, upgrading stations, and introducing small mixed-use trains, could generate early revenue and demonstrate viability.

3.2.5 Airport

District Kurram is served by Parachinar Airport, a small domestic facility that previously operated limited flights to Peshawar. Due to security concerns, inadequate infrastructure, and low demand, regular commercial operations have been suspended, leaving the airport semi-active for occasional military or emergency use.

Its short runway, limited terminal, and outdated systems force residents to travel hours by road to Peshawar for air travel. Reviving the airport would reduce travel time, improve emergency access, support trade and tourism, and enhance regional connectivity. Even limited weekly flights could relieve road congestion and provide vital access for business, healthcare, and disaster response.

3.2.6 TRAFFIC AND TRANSPORTATION SURVEYS

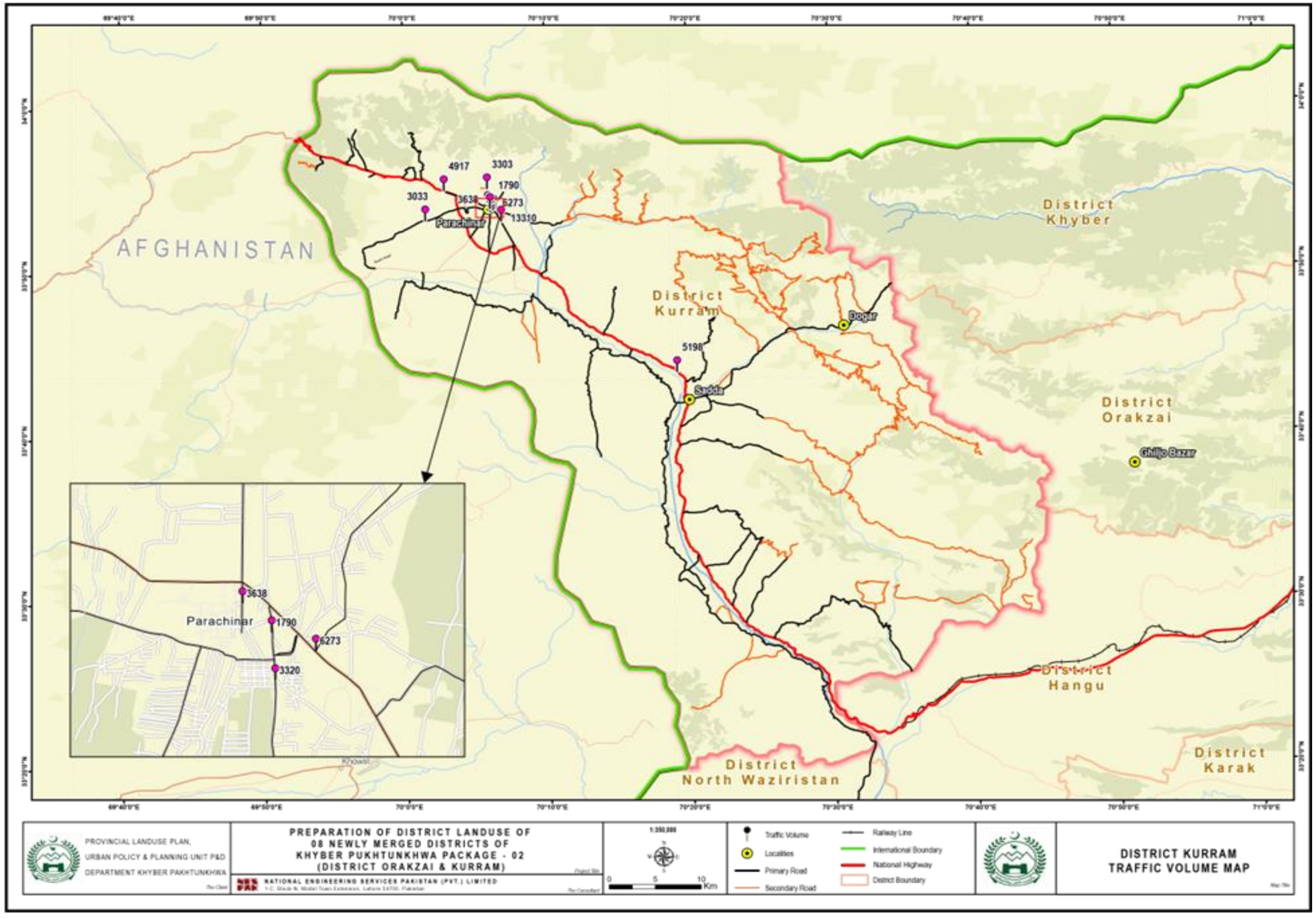
3.2.6.1 Traffic volume on major transport corridors

Understanding traffic volume is central to designing an efficient and safe transport system. In District Kurram, traffic data has been collected from key road segments to assess **daily volumes, peak-hour flows, and mode split**. This information has proven vital for identifying congestion hotspots, to understand the travel pattern and proposing effective traffic management strategies.

The **Background Study Report of Parachinar** serves as the primary source for this data. Surveys were conducted at major corridors to capture both **inbound and outbound traffic**. This includes the number and types of vehicles using each road segment, helping planners visualize the actual load and usage pattern on the network. below table shows the daily volume, peak hour volume and Truck percentage at each major corridor:

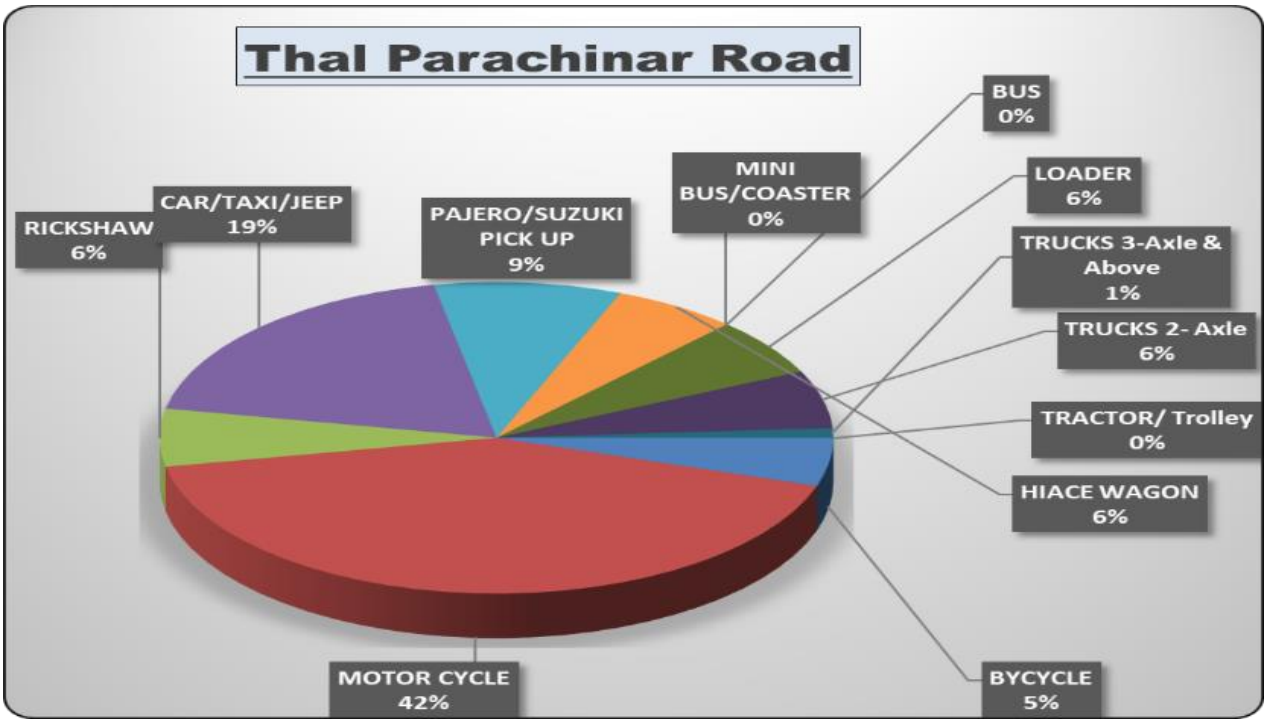
Table 3-9: Vehicles Per Day (VPD) at Selected Data Count Locations in Kurram

ROAD	Daily Traffic volume	Peak Hour Traffic	Truck %
Thal Parachinar Road	5198	536	7
Boarki Road	3033	313	7
Pewar Road	4220	302	7
Malana Road	3303	193	3
Dandar Road	3323	120	2
Punjabi Bazar Road	3637	219	0
Zeeran Road	13311	813	3

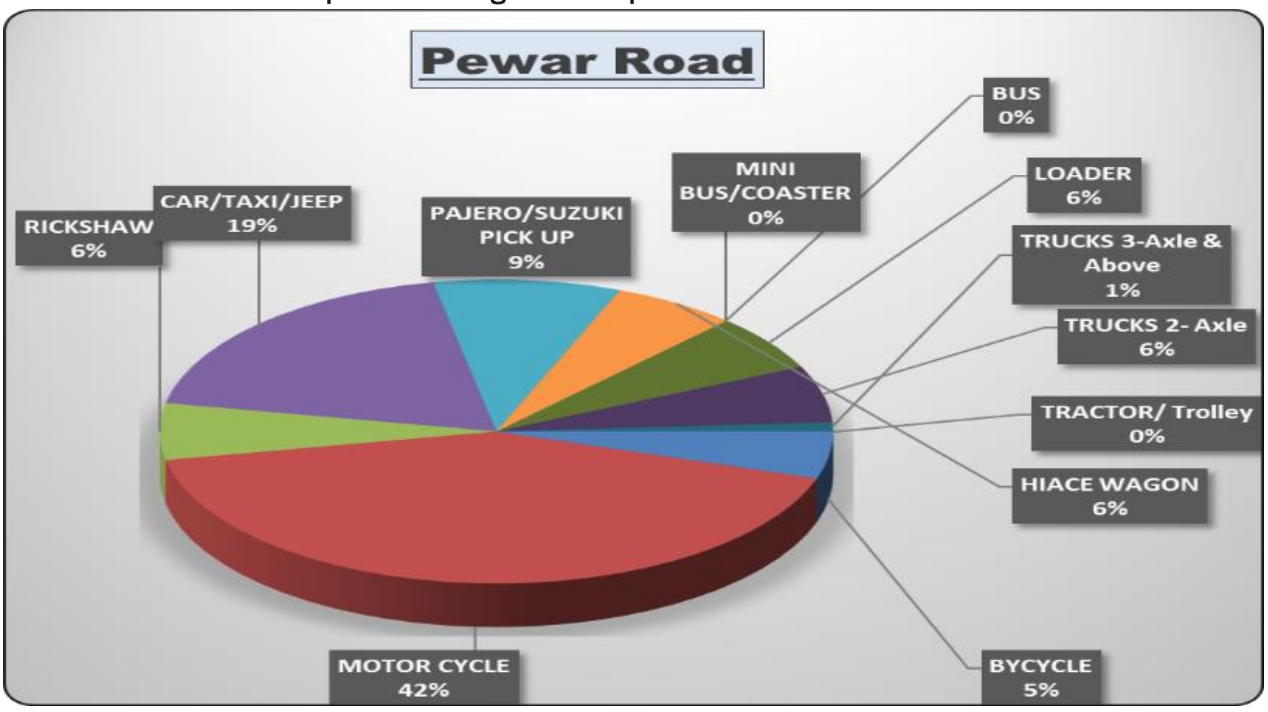


Map 3-3: Traffic Volume of Major Corridors

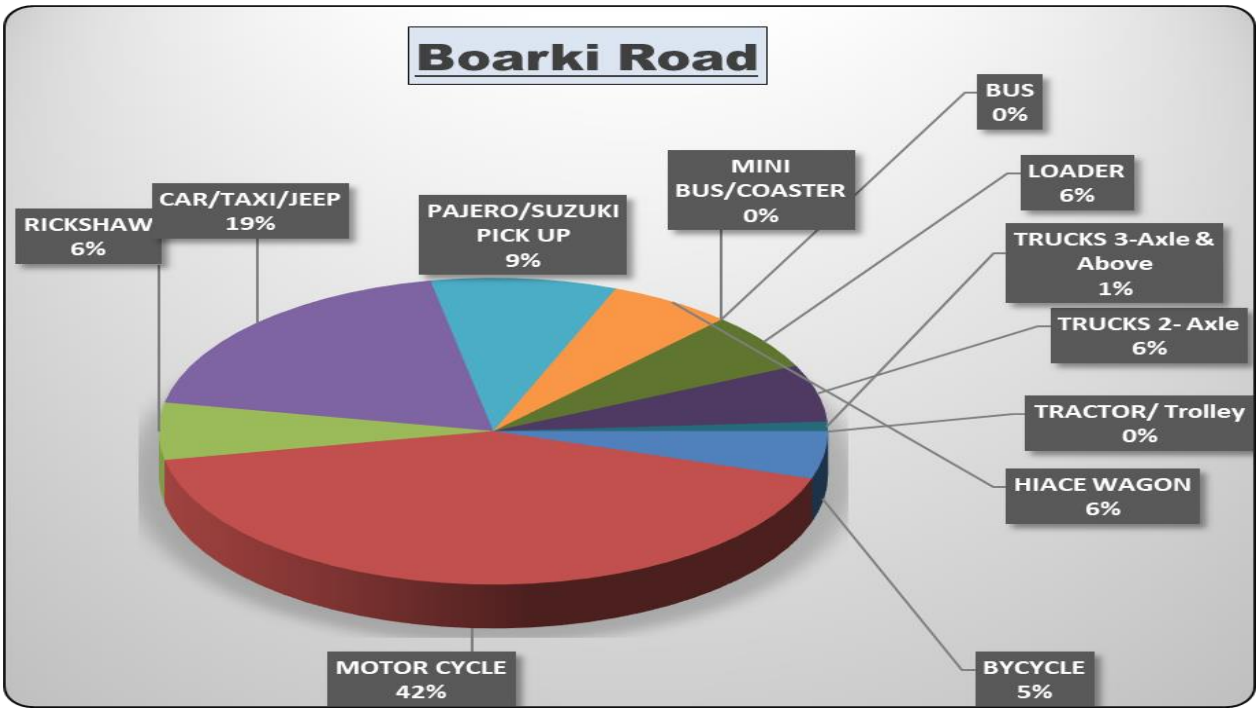
The following graphs show the model split on each road segment. Most of the users rely on private mode of vehicle that is car/taxi/Suzuki/pickup/jeep/Pajero and motorcycle to travel.



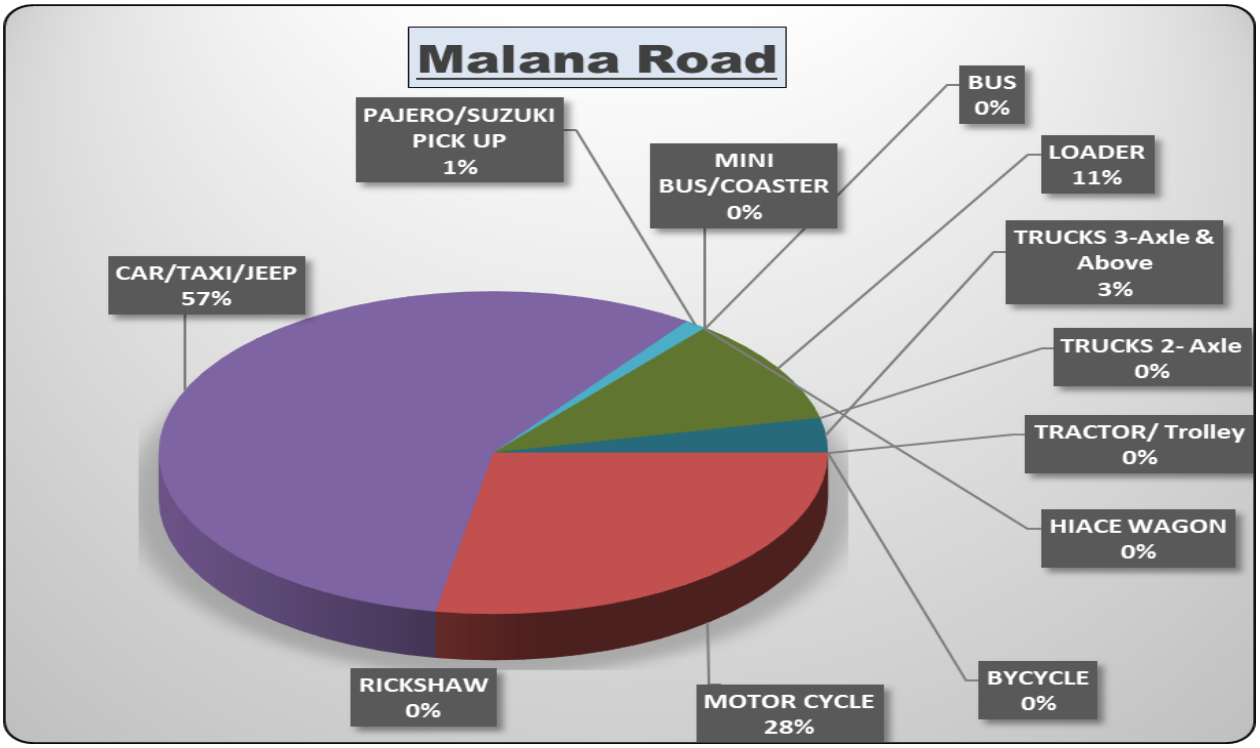
Graph 3-1: Average Traffic Split at Thal Parachinar Road



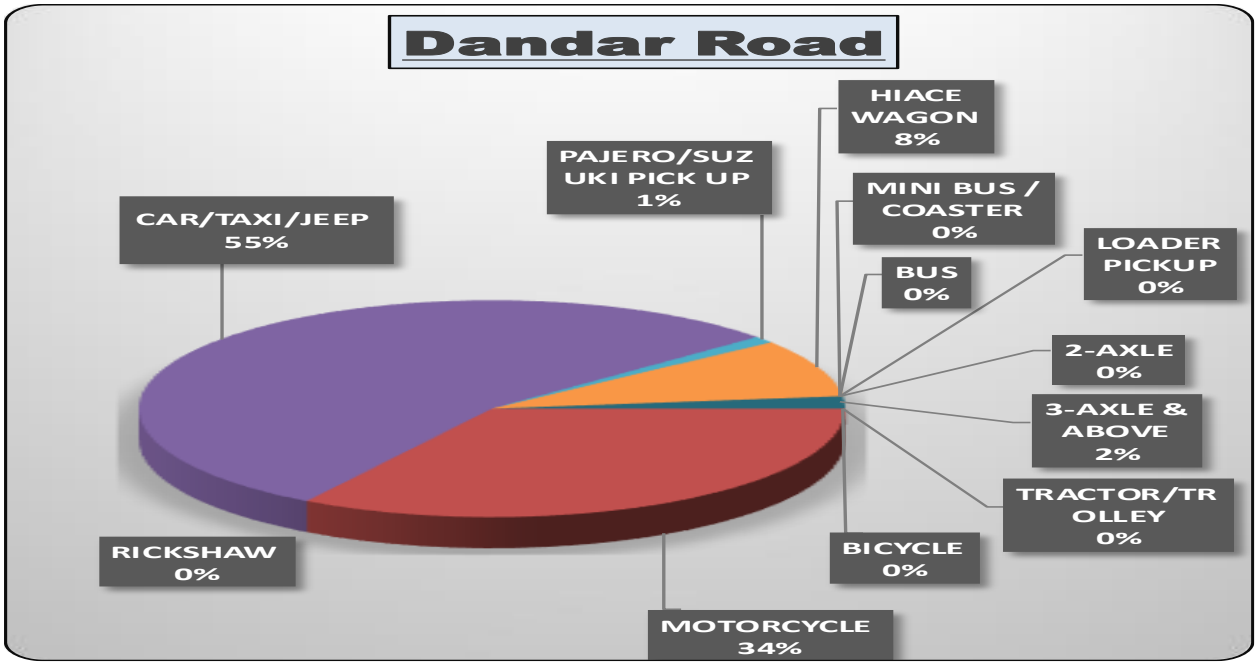
Graph 3-2: Average Traffic Split at Pewar Road



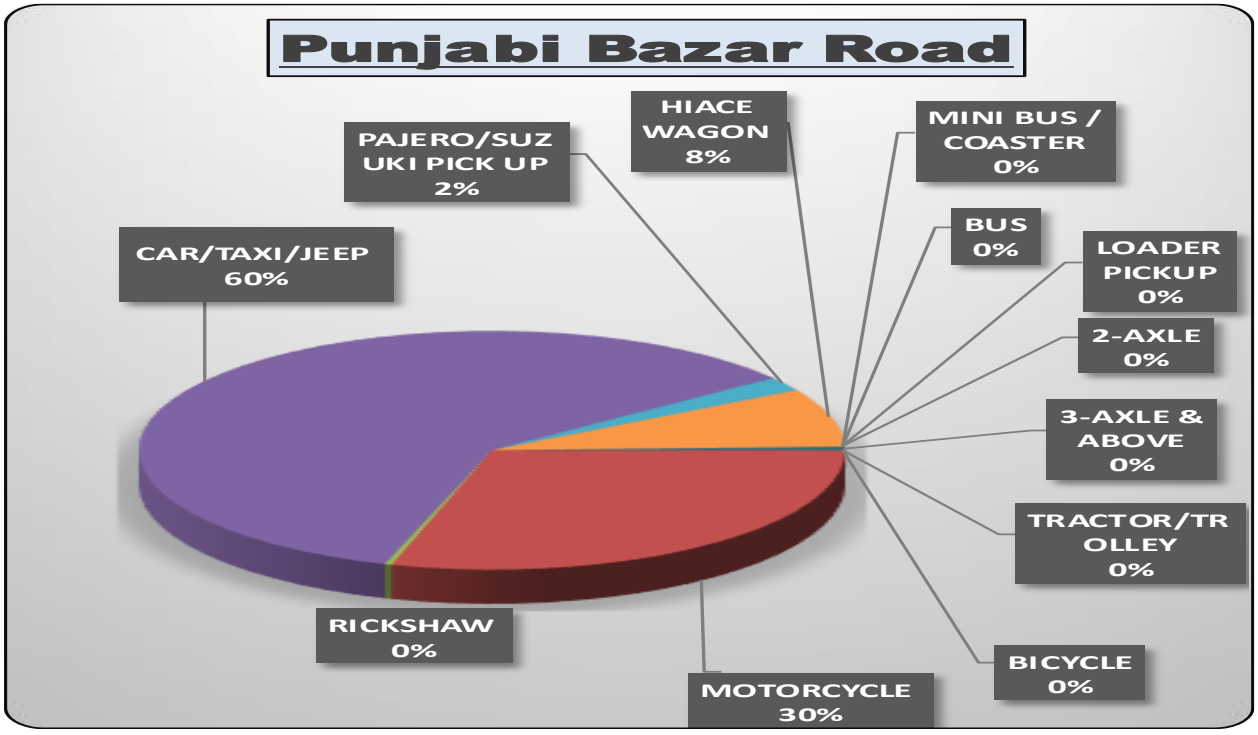
Graph 3-3: Average Traffic Split at Boarki Road



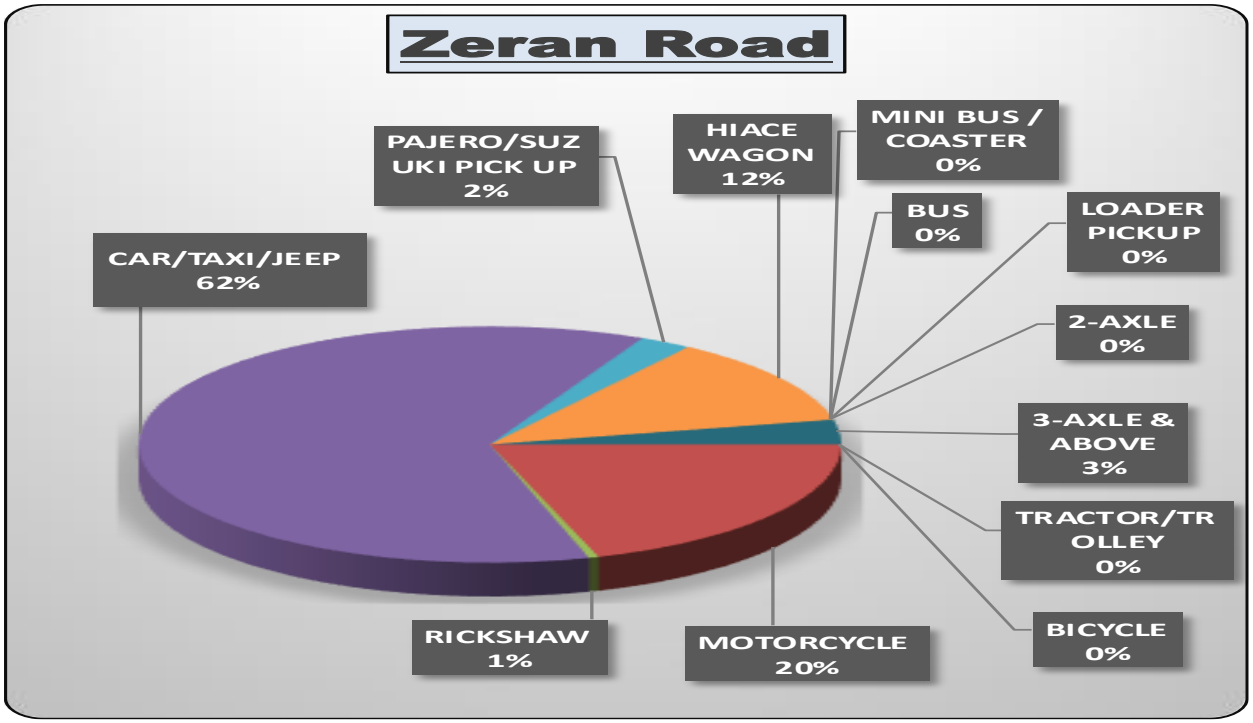
Graph 3-4: Average Traffic Split at Malana Road



Graph 3-5: Average Traffic Split at Dandar Road



Graph 3-6: Average Traffic Split at Punjabi Bazar Road



Graph 3-7: Average Traffic Split at Zeran Road

3.2.6.2 Future Traffic Growth Estimates

Traffic forecasts have been made for 25 years period by using the growth rates based on the following macro as well as regional level factors affecting traffic growth.

- Growth of registered vehicles in Pakistan, KP and kurram.
- Rate of increase in fuel consumption by the transport sector in Pakistan.
- Trend in growth in GDP.

Table 3-10: Summary of Future Traffic Growth Estimate of Kurram

YEARS	MOTOR CYCLE	RICKSHAW	CAR/JEEP/TAXI/ PICK-UP/	BUS / MINI-BUS	DILIVERY VAN / LOADER PICK-UP	TRUCK / TRAILER
2025	6.16	5.56	1.77	1.64	4.14	2.17
2026	5.85	5.31	1.73	1.6	4.03	2.14
2027	5.58	5.08	1.7	1.57	3.93	2.1
2028	5.34	4.87	1.67	1.55	3.84	2.07
2029	5.11	4.68	1.64	1.52	3.75	2.05
2030	4.91	4.51	1.62	1.49	3.67	2.02
2031	4.72	4.35	1.59	1.47	3.59	1.99
2032	4.55	4.21	1.57	1.45	3.52	1.97

2033	4.39	4.07	1.54	1.43	3.45	1.94
2034	4.24	3.94	1.52	1.41	3.38	1.92
2035	4.11	3.82	1.5	1.39	3.32	1.9
2036	3.98	3.71	1.48	1.37	3.26	1.88
2037	3.86	3.61	1.46	1.35	3.2	1.85
2038	3.75	3.51	1.44	1.33	3.15	1.83
2039	3.65	3.42	1.42	1.32	3.09	1.82
2040	3.55	3.33	1.4	1.3	3.04	1.8
2041	3.46	3.25	1.39	1.29	2.99	1.78
2042	3.37	3.18	1.37	1.27	2.95	1.76
2043	3.29	3.1	1.35	1.26	2.9	1.74
2044	3.21	3.03	1.34	1.24	2.86	1.73
2045	3.13	2.97	1.32	1.23	2.82	1.71
2046	3.06	2.9	1.31	1.22	2.78	1.69
2047	2.99	2.84	1.29	1.2	2.74	1.68
2048	2.93	2.78	1.28	1.19	2.7	1.66
2049	2.87	2.73	1.27	1.18	2.67	1.65
2050	2.81	2.68	1.25	1.17	2.63	1.63

3.2.6.3 Traffic Forecast

Based on the existing traffic volume and observed growth trends, traffic forecasts have been developed to estimate future travel demand on major roads in District Kurram. The forecasting process considers current traffic counts, mode split, and vehicle types collected.

Table 3-11: Summary of Traffic forecast of Kurram

Road name	Daily Traffic 2030	Daily Traffic 2035	Daily Traffic 2040	Daily Traffic 2045
Malana Road	3830	4377	4944	5584
Punjabi Bazar Road	4180	4739	5314	5959
Zeeran Road	15048	16824	18645	20663
Dandar Road	3849	4391	4950	5580
Thal ParaChinar Road	6569	7762	9003	10442
Pewar Road	5332	6301	7309	8478
Boarki Road	3833	4529	5254	6095

3.2.6.4 Existing and Future Capacity Analysis

The Highway Capacity Manual (HCM) methodology for analyzing 1+1 roads, two-lane, two-way undivided roads, focuses on key performance indicators such as traffic volume, free-flow speed, truck percentage, road geometry and average travel speed. Under ideal conditions, a single lane in each direction typically supports up to 1,700 vehicles per hour. The analysis evaluates how often drivers are delayed behind slower vehicles and classifies performance using the Level of Service (LOS) scale from A (free flow) to F (severe congestion).

Table 3-12: Road Network Analysis of Kurram

ROAD	Types of roads	Road Hierarchy	Daily Traffic volume	Peak Hour Traffic	V/C ratio	LOS
Thal Parachinar Road	Single lane	Primary	5198	536	0.28	B
Pewar Road	Single lane	Primary	4220	302	0.18	A
Boarki Road	Single lane	Secondary	3033	313	0.16	A
Malana Road	Single lane	Secondary	3303	193	0.10	A
Dandar Road	Single lane	Secondary	3323	120	0.06	A
Punjabi Bazar Road	Single lane	Local	3637	219	0.11	A
Zeeran Road	Single lane	Secondary	13311	813	0.41	C

The table summarizes traffic on District Kurram's key roads by type, hierarchy, daily/peak volumes, V/C ratios, and LOS. Primary roads like Thall–Parachinar and Pewar carry higher volumes, with Thall–Parachinar at V/C 0.28 (LOS B) and Pewar at LOS A. Zeeran Road, a secondary road, has the highest traffic (13,000+ vehicles/day) with V/C 0.41 (LOS C), showing growing congestion. Other secondary and local roads, including Malana, Dandar, Boarki, and Punjabi Bazar, have low V/C ratios (<0.20) and LOS A, indicating smooth flow. These highlights roads needing upgrades where capacity limits are approached.

Table 3-13: Future Road Network Analysis of Kurram

Road Name	Daily Traffic 2030	Peak hour 2030	V/c 2030	Daily Traffic 2035	Peak hour 2035	V/c 2035	Daily Traffic 2040	Peak hour 2040	V/c 2040	Daily Traffic 2045		V/c 2045
Malana Road	3830.48	223.82	0.12	4376.97	255.75	0.13	4943.78	288.87	0.15	5584	326	0.17
Punjabi Bazar Road	4180.44	251.72	0.13	4739.03	285.36	0.14	5313.99	319.98	0.16	5959	359	0.18
Zeeran Road	15047.60	919.07	0.46	16824.11	1027.57	0.52	18645.01	1138.79	0.57	20663	1262	0.63
Dandar Road	3849.11	139.00	0.07	4391.14	158.57	0.08	4950.20	178.76	0.09	5580	202	0.1
Thal ParaChinar Road	6569.00	677.37	0.35	7762.00	800.39	0.42	9003.00	928.36	0.48	10442	1077	0.56
Pewar Road	5332.00	381.58	0.23	6301.00	450.92	0.27	7309.00	523.06	0.31	8478	607	0.36
Boarki Road	3833.00	395.56	0.20	4529.00	467.38	0.24	5254.00	542.20	0.28	6095	629	0.32

The table summarizes traffic on key Kurram roads by type, hierarchy, volumes, V/C ratios, and LOS. All roads are single-lane two-way. Primary roads, Thall–Parachinar and Pewar, carry higher volumes, with Thall–Parachinar at LOS B and Pewar at LOS A. Zeeran Road, a secondary road, has the highest daily traffic (13,000+ vehicles) with LOS C, showing growing congestion. Other secondary and local roads like Malana, Dandar, Boarki, and Punjabi Bazar maintain LOS A with low V/C ratios, indicating smooth flow. This highlights road needing capacity upgrades.

3.2.7 ORIGIN-DESTINATION SURVEY AT CORDON POINTS

Origin-Destination (OD) data is one of the most effective tools in transport planning. It helps identify **where people are coming from and where they are going**, giving a clear picture of travel demand patterns. This data is especially useful for planning **public transport routes, road improvements, and land use strategies**, as it highlights the key trip generators and attractors within a district. By understanding travel flows, planners can design systems that reduce congestion, improve connectivity, and better serve the needs of commuters.

In the case of District Kurram, OD data has been **collected from the Background Analysis Report**. It includes detailed information on trip patterns across the region, covering both daily movements and peak-hour trends.

Below table shows the total number of trips generated from each origin, helping identify which areas of the district produce the highest outbound movement.

Below table shows the distribution of trips to each destination, highlighting where people are traveling to most frequently and the number of trips attracted per destination. This information is critical for balancing infrastructure supply with actual demand across different zones of the district.

Table 3-14: Trips Count from each origin

Origin	No. of trips per origin	Origin	No. of trips per origin	Origin	No. of trips per origin
Parachinar Bazar	125	Bannu	2	Ghonda Kheil	1
Zeedan	41	Chargan Chowk	2	Govt School	1
College/ Commerce College	37	Christain Sarai	2	Hazara Mall	1
Malana	20	Complex colony	2	Irani Agha	1
Dandar Road	18	FC Colony	2	islamia girl school	1
Shalozan	16	Fruit mandai	2	Kachakai	1
Army Cantt	14	Ghulam jan market	2	Kadma	1
Mali Kalai	11	Khadman Adda	2	Karaiz	1
Peshawar	9	Khwar kali	2	Kunch Lezai	1
Pewar	9	Mandaye	2	kunjlazai	1
agra	7	Mardan	2	Kuram Maidan	1
Jalandar	7	Mirba khel	2	lamsher	1
Kohat	7	Mulaba	2	Leshari	1
Eidgah Bazar	6	Police Check Post	2	main khel	1
Hospital	6	Sabzai mandi	2	Mohmand Agency	1
sadda	6	Sameer kali	2	Multan Punjab	1
Adda Peshawar	5	Shablan	2	Nanqi	1
Alam Sher	5	Sri Gadai	2	Norki	1
Bypass	5	Sultan	2	Nukmal Kheil	1
Luqman Khail	5	Women Hospital	2	Kurram	1
Nasti kheil	5	Adinar Khan	1	Otmal Kheil	1

sara gala	5	Airport	1	Panjgali Zai	1
Tor Qabristan	5	Aka Kheil	1	patwar khana	1
Ahmad zai	4	Amal got	1	perkho	1
Bara	4	Ameer Ahmad Zai	1	pewar adda	1
Grid station	4	Bahur	1	piroob	1
karman	4	Baram zai	1	satrangi	1
Parkha Kali	4	Barki	1	Shaheen	1
Shakh	4	Bata Chara	1	shaker dara	1
Alizai	3	Bero Kheil	1	shalam	1
Hussainia colony	3	Bijligar	1	shalear dara	1
kalman	3	Bila amin lower kurram	1	Shekho Pura	1
Kara Khail	3	Bishara	1	stadium calony	1
Khalasai	3	Bishaws	1	Subedar Kalai	1
Lalmai	3	Biwarh	1	tahidi	1
malaka	3	Bolan Kheil	1	tangi	1
Peshawar Adda	3	Botki	1	Tewar Adda	1
School	3	Bushara	1	Thanda Road	1
Sheblan	3	Dall	1	wacha darra	1
Shena Colony	3	Dalmai	1	wazir bagh	1
Shinga Aadda	3	dangela	1	DC office	1
Tal Adda	3	darsamand	1	eyeday	1
Thal Adda	3	Dasti Kot	1	Fata calony	1
Airport Colony	2	Gamnil	1	gad malei	1

According to the data, the highest number of vehicles, 125, originates from Parachinar Bazar, followed by 41 from Zeedan, 37 from Commerce College, 20 from Malana, and 18 from Dandar. These figures highlight the main areas where daily trips begin, indicating zones with high travel activity and potential congestion during peak hours. On the other hand, destinations show a slightly different distribution. A significant 226 vehicles are destined for Parachinar Bazar, making it the busiest destination in the area. Other notable destinations include Pewar with 17 vehicles, Dandar with 20, College Colony with 19, and Malana with 16. This destination data helps identify key attractor points where infrastructure, public transport access, traffic and parking facilities may need to be strengthened.

Table 3-15: Trips Count from each destination

Destinations	No. of Trips per Destination	Destinations	No. of Trips per Destination	Destinations	No. of Trips per Destination
Agra	3	Grid Station	6	Maatam Khana	1
Ahmad zai	1	Gunja	1	Madnro	2
Alam Sher	2	Hazara Gate	3	Maikay	1
Ali Zai	1	Hospital Zulfiqar	7	Malana	16
Army Colony	1	Hussaini Colony	1	Mali kali	3
Badar kheil	1	imam bargah	2	Maranzai Kali	1
Baghakai	1	Irani Colony	1	Markazi Imam Bargah	1
Bannu	1	Irfani Plaza	1	Masingh chowk	1
Bara Kali	2	Jumat Chowk	2	Mazai	1
Bata Chara	2	Kadman	1	Mesran Kali	1
Beshari	1	Kakheil	1	Mirajan calony	1
BHU Hospital	3	kalman adda	2	Mishti kot	6
Bijlighar	1	kara khel	2	Nadra office	1
Butki	1	karman	3	Noor Market	2
By Pass Road	2	Kashmir Bazar	8	Kurram	1
Cadat college	1	Kerman	1	P.A Chowk	2
Changari chowk	1	Khadman	2	Parachinar Bazar	226
Chargano chowk	16	Khar Bazar	4	Patak	1
City Women Hospital	1	kharlachi road	1	Perkho	1
CNW	3	KMU	1	Peshawar	2

College Colony	19	Kohat	4	Peshawar Adda	1
complex	2	Kunazai	1	Pewar	17
Dandar Road	20	Kungh Alizai	1	Piolet School	1
Dangali Kali	2	kurram bazar	2	Punjabi Bazar	7
eidgah colony	1	Ladies Hospital	1	Sadda	12
Faqeer Baba	1	lahore adda	1	Sameer Kali	2
Fata Colony	3	Lam Sher	1	Sara Colony	2
tandaro	1	Lati Kot	1	School Chowk	16
tarakhel	1	Luqman Kheil	1	shah palace	1
Tatan	1	Wazir Bagh	2	Shaheed Abad	3
tawleavane chowk	1	Women Hospital	1	Shakh	1
taxi stand	1	workshop	1	Shalozan	5
thal adda	3	Yosafgol	1	Shanga Adda	1
Tori Market	6	Zanana Hospital	2	Sheikla Mal	1
Town Community	1	Zeedan	16	shelozan	2
Sri Gadai	1	supervision polio team	1	Shena	7
stadium calony	2	Tall	1	Shewaza Kali	1
sultan	1	speen shage	1	shingaak	3
Sunni Masjid	1	sports complex	1	shuplan	1

3.2.8 Annual Development Programme Projects in Kurram

The Annual Development Programme (ADP) for Khyber Pakhtunkhwa includes several projects aimed at enhancing the road infrastructure and transportation network in Kurram District. Notable initiatives are included in the below table.

Table 3-16: Annual Development Program Projects in Kurram

Project Name	Year of Approval	Capital Involved ($ Million)	Status
Pakistan: Green Public Transport in Khyber Pakhtunkhwa Cities	--	200	Proposed
Pakistan: Khyber Pakhtunkhwa Provincial Roads Improvement Project	2017	215	Active
Pakistan: NWFP Road Development Sector and Subregional Connectivity	2004	301.20	closed
Pakistan: Khyber Pakhtunkhwa Rural Roads Development Project	2024	320	Active

The ADB projects in Kurram, including ongoing rural roads and city development initiatives, indicate a focus on expanding and upgrading the road network to improve connectivity and reduce congestion. These improvements aim to facilitate smoother traffic flow, better accessibility, and regional growth.

3.2.9 National Highway Authority Projects in Kurram

Currently, there are no specific National Highway Authority (NHA) projects listed for Kurram District. The NHA oversees numerous infrastructure projects across Pakistan, including road rehabilitation and construction, but none are currently planned for Kurram.

3.2.10 Telecommunication, Postal Services & Telegraphs

In Kurram District, telecommunication, postal services, and telegraphs are essential components of the infrastructure that support communication and information exchange within the region. However, due to the district's geographical location, historical challenges, and security issues, the services have had to overcome various obstacles. Here's an overview of the telecommunication, postal services, and telegraphs in Kurram District:

3.2.10.1 Telecommunication Services

- Mobile Networks:
    - **Mobile phone services** are widely available in Kurram District, and major Pakistani mobile networks such as Jazz, Telenor, Zong, and Ufone operate in the area. These networks provide coverage for voice calls, text messaging, and mobile data, although the quality and availability of service can vary, especially in more remote or mountainous regions.
    - The service quality is generally better in larger towns like Parachinar (the district capital) and along main roads. However, in more isolated or mountainous areas, coverage may be limited or unstable.
- Internet Services:
    - **Internet access** is available in Kurram, though its speed and reliability can vary based on location. Mobile data is the primary method for accessing the internet, especially in

rural areas. The availability of broadband internet (via landline or fiber optics) may be limited to more urbanized parts of the district.
    - In the past, internet access has been constrained by poor infrastructure, but improvements are being made with the expansion of mobile broadband networks (4G and 3G services).
- **Landline Services:**
    - **Pakistan Telecommunication Company Limited (PTCL)** provides landline telephone services, and this service is available in major urban areas such as **Parachinar**. However, the coverage and reach of landline networks are limited in remote areas due to infrastructure constraints.

3.2.10.2 Postal Services

- **Pakistan Post:**
    - **Pakistan Post** is the national postal service and operates in Kurram District, providing essential services such as sending and receiving mail, parcels, and money transfers. There are post offices in major towns and tehsils, including **Parachinar** and other key areas within the district.
    - Postal services are essential for the local population, especially for sending and receiving documents and packages, as well as for remittances. However, the **speed of service and delivery times** can be affected by infrastructure challenges, and remote areas may face delays or inconsistent service.

3.2.10.3 Money Orders and Financial Services:

- Pakistan Post offers money transfer services through Western Union and MoneyGram, allowing people in Kurram District to receive remittances from family members working in other parts of Pakistan or abroad.

3.2.10.4 Telegraph Services:

- **Telegraph Services (PTCL):**
    - Although telegraph services were once an important mode of long-distance communication, the use of telegraphs has significantly declined in Kurram and other parts of Pakistan due to the widespread adoption of mobile phones, the internet, and other modern communication technologies.

Pakistan's telegraph network, once managed by PTCL, has been phased out in most regions in favour of more efficient and contemporary forms of communication like email, SMS, and instant messaging. Consequently, the importance of telegraph services in Kurram is minimal today, and their presence is limited, if any, in the district.

3.2.11 Major transport elements requiring upgradation in Kurram:

Kurram District occupies a strategically vital position in western Khyber Pakhtunkhwa, sharing an international border with Afghanistan's Khost Province. The district serves as a key transit and trade corridor under Pakistan's broader connectivity agenda, linking domestic markets with Afghanistan and, by extension, Central Asia. The main cross-border passage at Kharlachi Border Point provides a direct route to Khost and onward to Gardez and Kabul, offering a shorter and potentially more secure alternative to traditional routes through Torkham and Chaman.

Internally, the district's road network faces challenges of poor pavement quality, accessibility, and inadequate maintenance. Key intra-district routes—linking Parachinar, Sadda, Tal, and Thall—require rehabilitation to ensure smooth movement of goods, people, and agricultural produce.

1) **Feasibility Study for a Parachinar Airstrip Upgrade / Small Airfield Development**

To explore the viability of upgrading the existing Parachinar airstrip for small aircraft operations to improve accessibility.

Key components/activities

- Technical assessment of runway extension and navigation facilities.
- Development of terminal building and security infrastructure.
- Coordination with CAA and PIA for regional connectivity.

Impacts

- Enhanced emergency and passenger mobility.
- Improved access for investors and officials.
- Strengthened linkages to Peshawar and Islamabad.

Implementation Strategy

Civil Aviation Authority (CAA), GoKP, Federal Aviation Division.

2) **Development of Defense Road**

To Develop and rehabilitation of linkage between Thal, Ali Zai, Sadda & Parachinar on other side of the Kurram River

Key components/activities

- Upgradation/ rehabilitation of existing road portion
- Development of missing link between Sadda & Ali Zai

Impacts

- Alternative Route to Thal Parachinar that will ease the traffic as well as provide mobility during the emergency
- Improved access for freight traffic
- Improved connectivity for rural access on the other side of Kurram River

Implementation Strategy

Communication & works Department KPK.

3) **New Kurram Khyber Road**

Development of a new strategic road corridor titled **Kurram–Khyber Link Road** to establish direct connectivity between **Kurram District, Orakzai District and Khyber District** in Khyber Pakhtunkhwa. The proposed road will improve regional accessibility, enhance inter-district mobility, and provide an alternative connection to the existing **Thal–Parachinar Road corridor**.

Key components/activities

- Development of a 70 km link between Kurram District, Khyber District and Orakzai District. The proposed ROW is 6.5m
- Construction of a two-lane paved road corridor connecting Kurram, Orakzai and Khyber districts
- Development of bridges / culverts across seasonal streams and tributaries
- Earthwork including cutting, embankment formation and slope stabilization in hilly terrain as per provided cross section of Figure 14 & Figure 15

Impacts

- Provision of an alternative route to Thal–Parachinar Road, reducing congestion and improving travel reliability
- Improved mobility during emergency situations such as natural disasters or security-related closures
- Improved accessibility to healthcare, education and public services for remote communities
- Improved connectivity across the Kurram District, enhancing rural accessibility

Implementation Strategy

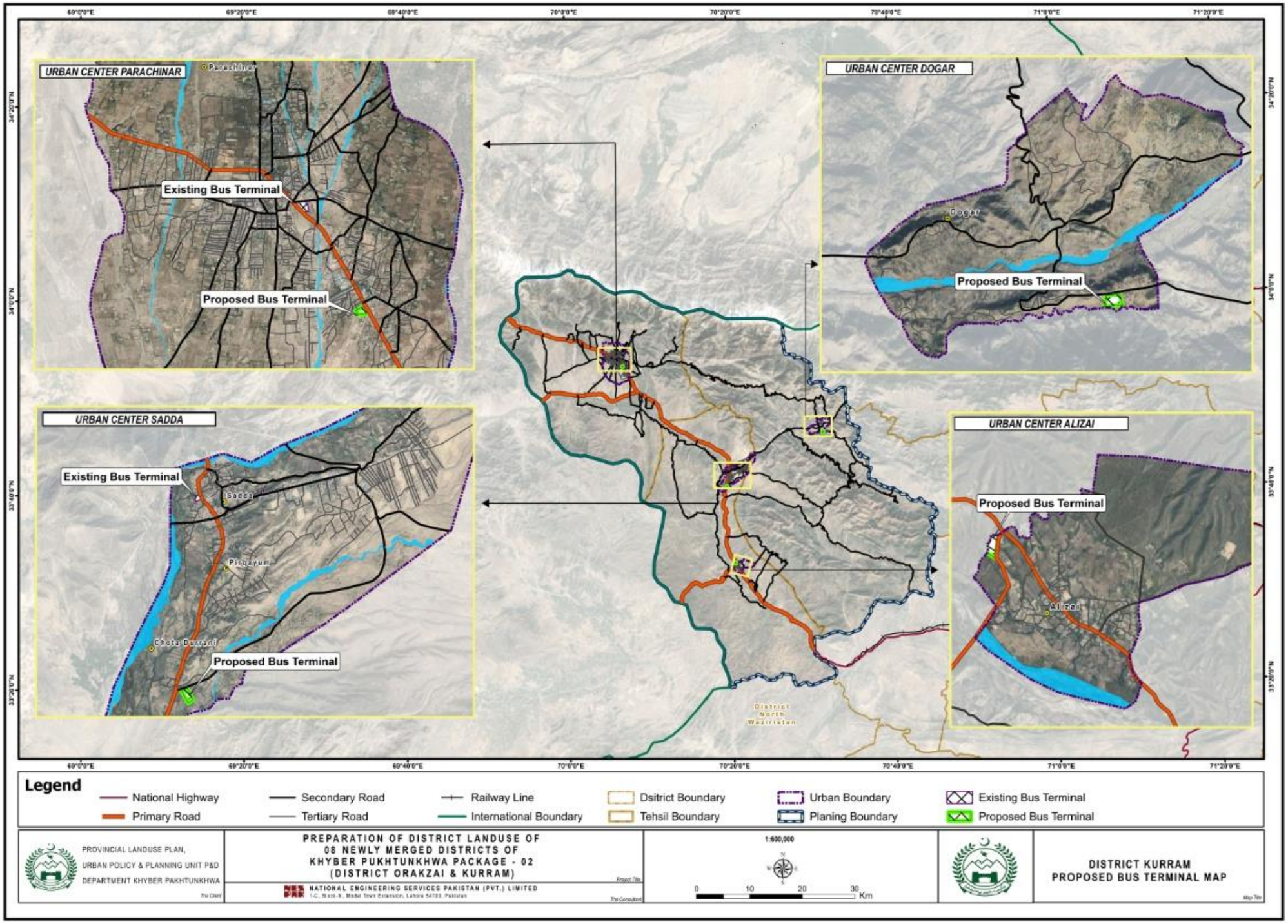
Communication & works Department KPK.

3.2.12 Proposed Bus Terminals

Parachinar and Sadda currently operate bus terminals within built-up market areas, which creates operational and traffic management challenges. In Parachinar, the existing terminal is located inside the city near Edhi Park on the main Parachinar Road, on a constrained 1+1 carriageway corridor; its proximity to the adjacent Sabzi Mandi further intensifies roadside activity, conflicts, and recurring congestion. The terminal is already overcrowded and lacks basic passenger amenities, despite regular intercity operations (approximately 30 HiAce/ACE services per day to Peshawar, Hangu, and Kohat) under a PPP operating arrangement. To address these constraints, a new Parachinar terminal is already under development on the main Parachinar Road, away from the congested CBD, with a planned site area of approximately 3.29 acres, incorporating essential facilities and improved internal circulation to reduce on-street stopping, improve accessibility, and mitigate congestion and safety conflicts.

In Sadda, the existing terminal is situated around 386 m north of Hazrat Muavia Chowk near dense commercial activity (including Hashmat Market and Akbar Khan Market), generating recurrent congestion on the main road due to informal stopping, boarding/alighting, and vehicle queuing. Based on stakeholder input, the terminal supports approximately 40 HiAce/ACE services per day to Peshawar, 8–10 to Tal, and around 10 to Kohat, and is currently located on TMA land with limited space for organized circulation and passenger handling. To resolve these issues, a new Sadda bus terminal is proposed at the start of the Sadda bypass, near the new intersection of Thal–Parachinar Road and the Sadda Bypass, with an allocated area of approximately 5.34 acres. This peripheral location is expected to divert intercity vehicles away from the market core, improve access management, reduce congestion at key junctions, and enable provision of basic passenger amenities and safer pick-up/drop-off operations. Both proposed terminal locations are marked on the map below.

An area of 6.34 acres in Dogar and 5.92 acres in the Ali Zai transport terminal has been dedicated to ensure adequate space for future expansion, public transport demand, and operational requirements of the transport terminal in the future years.



Map 3-4 Proposed Bus Terminals Map

3.2.13 Communication Network Proposals

3.2.13.1 Summary

The existing road network in Kurram District, located in the rugged northwestern region of Khyber Pakhtunkhwa, suffers from serious maintenance challenges. The main transportation route, the Thall–Parachinar Highway, is the district's only major link to the rest of the province, serving as a critical corridor for trade, travel, and public services. However, the condition of this highway and its connecting link roads is severely degraded. Many sections are damaged with potholes, cracks, and uneven surfaces, causing frequent vehicle breakdowns and road accidents. Seasonal flooding, heavy rainfall, and landslides often wash away parts of the road, cutting off access to several villages for days or even weeks.

The link roads and internal routes, especially in Upper and Central Kurram, are mostly unpaved and poorly maintained, making travel extremely difficult, particularly during winter and rainy seasons. Public transport services are minimal, and freight costs remain high due to the poor road surface and long detours required to avoid damaged stretches. The lack of proper drainage systems, retaining walls, and road signage also contributes to further deterioration. Overall, the road network in Kurram remains vital yet vulnerable, serving as a lifeline for the district but in urgent need of comprehensive rehabilitation, regular maintenance, and better security coordination to ensure safe, reliable, and year-round connectivity for its people.

3.2.13.2 Major Transport Elements Requiring Upgradation in Kurram:

3.2.13.2.1Road's Proposals:

Following the road network assessment, it was observed that certain existing roads in the study area are not performing at the desired level due to pavement deterioration, localized surface failures, drainage constraints, and limited effective width on some segments. Therefore, the road proposal places primary emphasis on targeted rehabilitation of critical corridors, including pavement rehabilitation, shoulder/edge restoration, drainage improvements, and road safety measures (e.g., markings, signage, and junction-level spot improvements) to enhance connectivity, travel time reliability, and all-weather accessibility.

In addition, a number of new road links are proposed to address network gaps and improve direct connectivity between key nodes, including bypass connections and major corridors. These new links are intended to improve connectivity between zones, traffic distribution, reduce pressure on inner urban routes, and support future travel demand. The table presents details for both rehabilitation roads and new proposed roads, including key attributes such as road name, starting & ending coordinates, length, existing & proposed ROW, priority/phasing, and proposal type.

After the table, two typical cross-sections are provided for the new road links. The first cross-section represents a cut & fill condition, showing a 6.5 m formation width consisting of a 4.5 m carriageway with 1.0 m shoulders on both sides, designed with a 2% cross-fall. This section also includes typical hillside protection and stability measures where required, such as a breast wall with 150 mm thick mortared riprap, and a retaining wall with weep holes, along with a stable cut slope arrangement.

The second cross-section represents a fill condition, also adopting a 6.5 m formation width (4.5 m carriageway + 1.0 m shoulders each side) with 2% cross-fall, and includes edge protection (e.g., parapet wall) and typical side slope treatment. In addition, the cross-section details illustrate how the new pavement ties into an existing pavement section (by removing existing bituminous layers and

reconstructing the overlay layers as specified). The pavement layer is just for the sake of illustration. Pavement thickness should be as per the detail design parameterws

Finally, all rehabilitation segments and new proposed road links are marked on the Road Proposals Map to clearly show their locations and overall network integration.

Sr No.	Name	Proposal Type	Start_XY	End_XY	Length(km)	Existing ROW (m)	Proposed ROW (m)	Proposed Road Hierarchy	Priority Phasing	Landuse
1	Parachinar Khyber Link	New Road	33.805109714,70.73825117	33.833285841,70.159590131	70.689679	-	6.5	Primary	Medium	Mix Landuse
2	Kot Ragha Dam Road	New Road	33.809474918,70.150813938	33.647653258,70.1619460791	20.452173	-	6.5	Secondary	Long Term	Rural/ Agriculture & Range Land
3	Defence Road	Rehabilitation	33.836155595,70.128225579	33.5754493,70.3041905	89.107375	4.0-7.0	6.5	Primary	Short	Mix landuse
4	Border Road	New Road	33.4507129,70.440698517	33.395564907,70.315399656	16.294943	-	6.5	Secondary	Medium	Forest & Range Land
5	Boarki Road	Rehabilitation	33.838992714,69.96549706	33.939407784,69.950955276	12.353765	6.0-7.0	6.0-7.0	Secondary	Short	Rural & Agriculture
6	Kochi Road	Rehabilitation	33.632535243,70.302201245	33.6212773493,70.2440813003	6.645532	5	6.5	Secondary	Short	Rural & Range Land
7	THQ Dogar Road	New Road	33.781555071,70.525253349	33.782306506,70.513342236	1.192737	-	6.5	Secondary	Medium	Agriculture & Urban
8	Girls degree college road (Existing patch)	Rehabilitation	33.53111427,70.353128536	33.5447264121,70.3526253408	1.684097	6	6.5	Secondary	Short	Agriculture & Urban
9	Archietect Road	New Road	33.766627519,70.511580147	33.766538578,70.493330145	2.49292	-	6.5	Secondary	Medium	Agriculture & Urban
10	Mehdi Turi Road	Rehabilitation	33.756287846,70.225367138	33.621094855,70.244200942	17.046649	7	6.5	Secondary	Long Term	Range Land & Rural
11	Grid Station Road	Rehabilitation	33.537205785,70.346326311	33.535654367,70.354571018	0.811065	5	6.5	Secondary	Medium	Agriculture & Urban
12	Kochi Road	New Road	33.6212773493,70.2440813003	33.616562303,70.193587025	4.827675	-	6.5	Secondary	Medium	Rural & Range Land
13	Girls degree college road Extension	New Road	33.5447264121,70.3526253408	33.545577185,70.341916352	1.577002	-	6.5	Secondary	Medium	Agriculture & Urban

All development along the proposed road corridor shall comply with the building line and setback requirements specified under the National Highways & Strategic Roads (Control) Rules, 1998 (as amended). Construction shall not be permitted within the designated Right-of-Way (ROW) and the area between the ROW and the prescribed building line without approval of the competent authority. Building height restrictions, where applicable, shall be governed by the relevant local planning and building regulations whereas it is prescribed that prior to the approval of any land use other than residential, a Traffic Impact Assessment (TIA) shall be mandatory to evaluate the potential traffic and transportation impacts of the proposed development. The proposed projects may be implemented through both local funding sources and the Annual Development Programme (ADP) scheme, subject to approval by the competent authority.

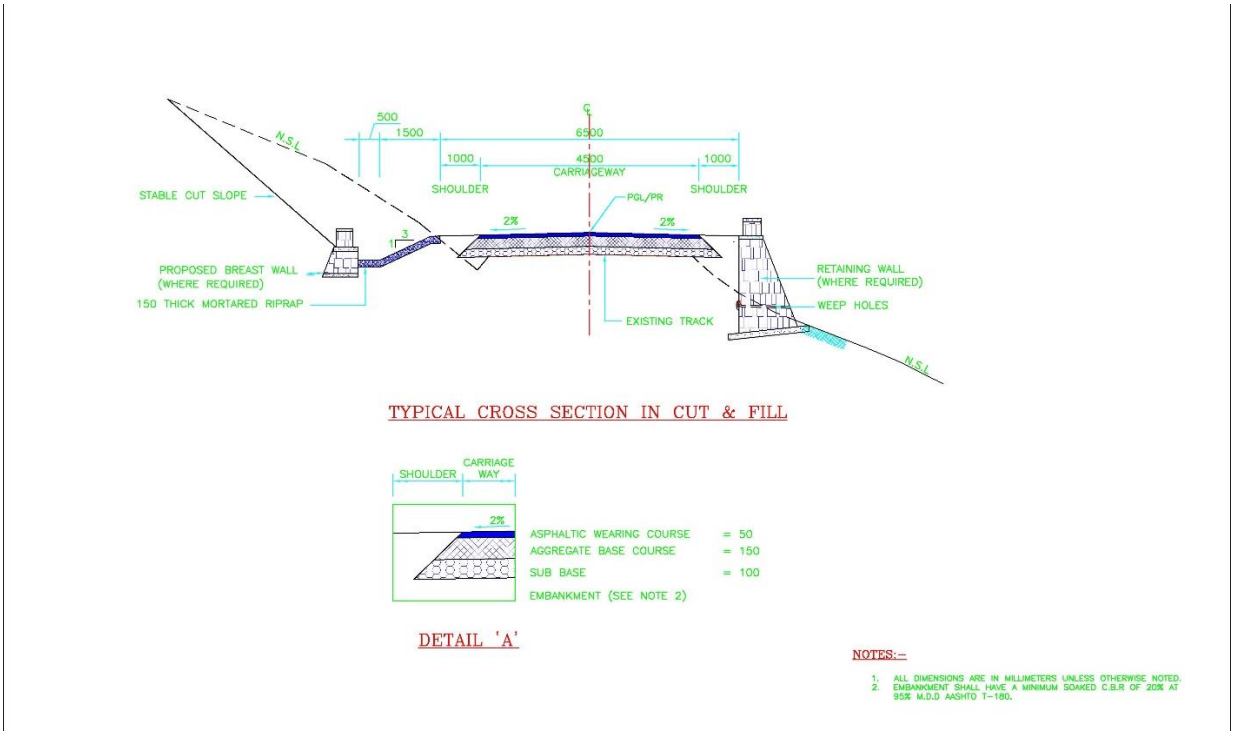


Figure 25: Typical Cross-section of Hilly Terrain

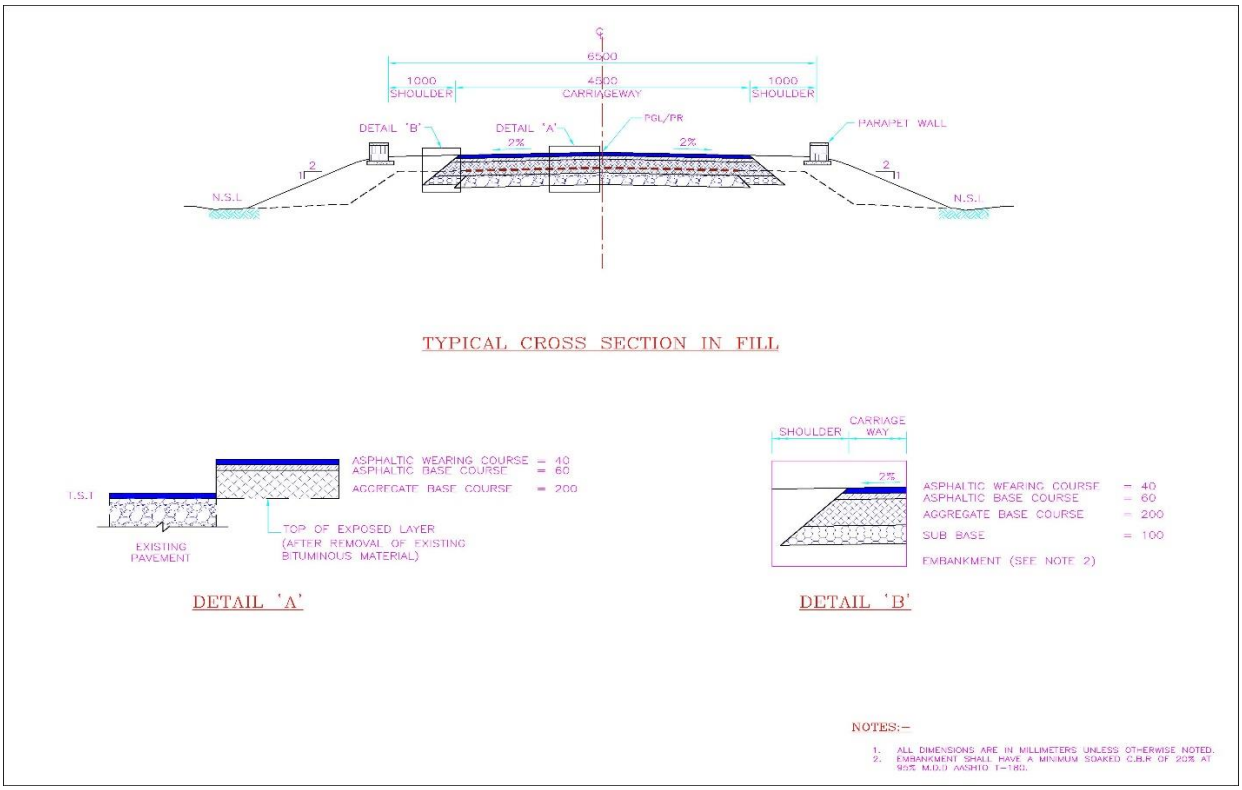
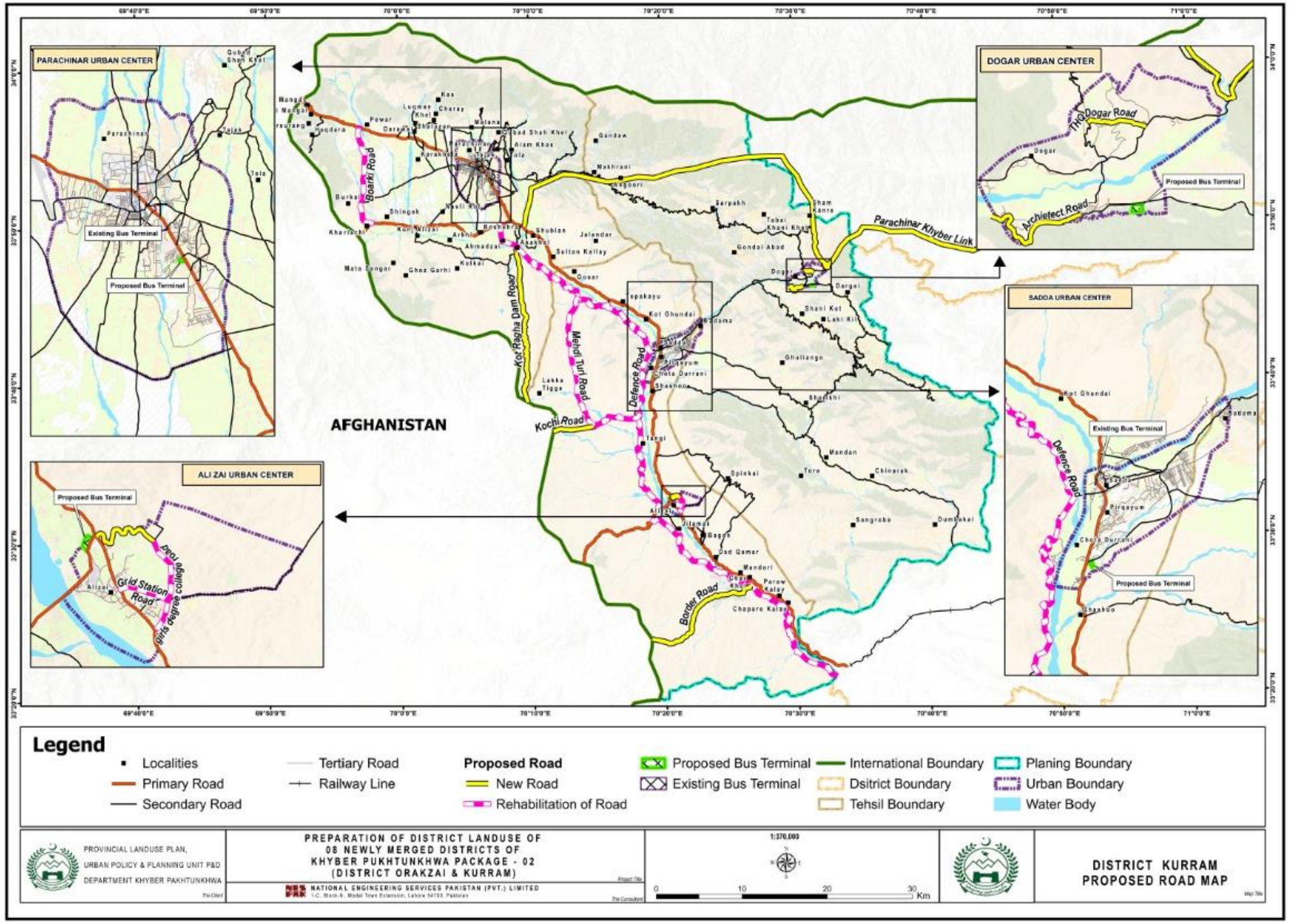


Figure 26: Typical Cross-section of Rolling Terrain



Map 3-5 District Kurram Proposed RDistrict Kurram Proposed Roads Map

3.3 Social Infrastructure

3.3.1 Education

Education is a fundamental pillar of human development and serves as a vital tool for alleviating poverty, reducing inequality, and fostering employment opportunities. It plays a crucial role in enhancing health outcomes, promoting economic stability, and improving overall living standards. Consequently, prioritizing investment in education is essential for any effective development strategy.

3.3.1.1 Schools

In Khyber Pakhtunkhwa, there are 34,068 government schools, of which 33,778 are operational and 778 non-functional. In settled districts, there are 28,239 schools (28,054 functional), mostly primary (22,410, of which 22,230 functional), mainly in rural areas (21,073). Secondary schools total 5,829, with 5,824 operational, including 2,709 Middle, 2,291 High, and 829 Higher Secondary Schools. Non-functional schools are primarily primary (180), with a few middle (4) and high (1). Functional schools generally have boundary walls (93%), water supply (97%), electricity (92%), and toilets (96%). There are 10,944 private schools: 722 boys', 171 girls', and 10,051 co-educational. Total government school enrollment is about 5.14 million students (3.23 million Primary, 1.62 million Secondary), with 192,069 sanctioned teaching positions and 169,064 employed teachers (106,107 male, 62,957 female). Private schools employ 141,500 teachers.[40]

Newly merged districts have 6,394 government schools (6,036 functional), including 5,088 primary (4,769 functional), mostly rural (4,963) and 125 urban. Secondary schools total 1,306 (1,267 functional), including 847 Middle (458 boys, 389 girls), 422 High (314 boys, 108 girls), and 37 Higher Secondary (27 boys, 10 girls). Non-functional schools include 319 primary (127 boys, 192 girls), 34 middle (16 boys, 18 girls), and 5 high (2 boys, 3 girls). Functional schools mostly have boundary walls (99%), water supply (81%), electricity (57%), and toilets (90%). Enrollment totals 692,295 (493,571 Primary, 139,040 Secondary, 60,314 nursery). Sanctioned teaching positions are 27,335, with 19,568 currently employed (13,236 male, 6,350 female), broken down as: primary 10,403 (6,632 male, 3,771 female), mosque 95 (93 male, 3 female), middle 3,643 (2,141 male, 1,502 female), high 4,613 (3,690 male, 923 female), Higher Secondary 832 (681 male, 151 female).

According to the Annual Statistical Report of Government Schools for the 2021-2022 academic year, Khyber Pakhtunkhwa is home to 34,183 government schools, of which 33,405 are operational while 778 are non-functional. The province also boasts 9,021 registered private schools, consisting of 600 boys' schools, 173 girls' schools, and 8,248 co-educational institutions. In terms of educational levels, there are 1,848 Primary Schools, 3,144 Middle Schools, 2,803 High Schools, and 1,226 Higher Secondary Schools/Inter Colleges, with many institutions offering both Primary and Middle education. The total enrollment in government schools across Khyber Pakhtunkhwa stands at approximately 5.974 million students. This includes 832,200 in Nursery programs, 3.456 million (67.22%) in Primary education, and 1.685 million (32.77%) in Secondary education. Within the Secondary category, there are 1.077 million (20.96%) enrolled in Middle Schools, 485,000 (9.44%) in High Schools, and 121,900 (2.37%) in Higher Secondary Schools.

The total number of teachers employed in government schools throughout Khyber Pakhtunkhwa is 174,278, comprising 111,260 male teachers and 63,018 female teachers. Of these educators, 111,297 work in boys' schools while 62,981 serve in girls' schools. Additionally, registered private

[40] Annual School Census Report 2023-24 (http://175.107.63.45/newimusite/images/reports/ASC2023-24.pdf)

schools employ 126,475 teachers, including 12,965 at the Primary level, 32,522 at the Middle level, 51,637 at the High School level, and 29,351 at the Higher Secondary level.[41]

3.3.1.2 Literacy Ratio

The Pakistan Bureau of Statistics defines a person as literate based on their ability to read a newspaper or a comparable publication and to write a simple letter in any language. Literacy is quantified as the percentage ratio of the literate population to the total population aged 10 years and older.

3.3.1.2.1 Literacy Ratio from Population Census-2023 for Kurram

According to the Population Census of 2023 conducted by the Pakistan Bureau of Statistics, the literacy ratio in Kurram district reveals notable disparities across age and gender groups. The total population aged 10 years and above in Kurram is 509,976, with an overall literacy rate of 29.92%. This means there are 152,598 literate individuals compared to illiterate individuals.

Breaking down the literacy by age group:

- **Ages 10-14**: Out of 103,103 individuals, 66,131 are illiterate, leaving 36,972 literate individuals. The literacy rate in this age group is 35.86%.
- **Ages 15-19**: Among 79,514 individuals, the literacy rate is higher at 45.91%, with 36,508 literate individuals.
- **Ages 20-24**: Of 59,127 individuals, 36,283 are illiterate, and 21,844 are literate, resulting in a literacy rate of 36.94%.
- **Ages 25-29**: Out of 52,088 individuals, 36,045 are illiterate, and only 16,043 are literate, with a literacy rate of 30.80%.
- **Ages 30-34**: The literacy rate in this group is 26.08%, with 12,876 literate individuals out of 49,378.
- **Ages 35-39**: Among 41,473 individuals, the literacy rate drops to 24.15%, with 10,015 literate individuals.
- **Ages 40 and above**: Only 14.64% of individuals aged 40 and above are literate, with 18,340 out of 125,293 being literate.

Analyzing the gender-specific data:

- For **males aged 10 and above** (258,510 total population), the literacy rate is 43.52%, with 112,498 literate males.
- For **females aged 10 and above** (251,451 total population), the literacy rate is significantly lower at 15.95%, with only 40,096 literate females.
- The literacy rate for **transgender individuals aged 10 and above** in Kurram is 26.67%, with 4 out of 15 individuals being literate.

[41]Khyber Pakhtunkhwa Education Monitoring Authority (KPEMA). (2023). *Annual Statistical Report of Government Schools 2021-2022*. Executive Summary

The data underscores a clear educational gap between males and females, with males having a substantially higher literacy rate. Additionally, transgender individuals in Kurram show a relatively lower literacy rate, suggesting that targeted efforts are needed to address educational disparities for this community.

Table 3-17: Literacy Ratio from Population Census-2023 for Kurram

SEX/AGE GROUP (IN YEARS)	TOTAL POPULATION	ILLITERATE	LITERATE	TOTAL FORMAL	INFORMAL/NON-FORMAL	LITERACY RATIO (%)
ALL SEXES 10 AND ABOVE	509976	357378	152598	144086	1527	29.92%
10-14	103103	66131	36972	35445	1527	35.86%
15 - 19	79514	43006	36508	34982	868	45.91%
20 - 24	59127	37283	21844	20616	429	36.94%
25 - 29	52088	36045	16043	15587	185	30.80%
30 - 34	49378	36502	12876	12039	106	26.08%
35 - 39	41473	31458	10015	7825	80	24.15%
40 AND ABOVE	125293	106953	18340	17592	183	14.64%

Table 3-18 Kurram Literacy Ratio by Age and Sex Group from Population Census 2023[42]

Category	Male	Female	Transgender
Total Population (10 and above)	258510	251451	15
Literate Population	112498	40096	4
Illiterate Population	146012	211355	11
Literacy Rate (%)	43.52%	15.95%	26.67%

3.3.1.2.2 Literacy Ratio from Household Information Survey

The HIS survey of District Kurram highlights significant educational disparities affecting land use planning. Overall, 43.24% of respondents have no formal education, with Central Tehsil having the highest number of illiterate individuals. Around 20% have below-matric education, 18.07% have matriculation, while higher secondary, technical diplomas (4.31%), bachelor's degrees (4.43%), and postgraduate qualifications account for less than 6% combined. This underscores the need for allocating land for new and expanded primary and secondary schools, especially in Central and Upper Tehsils. Establishing vocational and technical training centers is essential to improve employment prospects, and gradual expansion of higher education institutions will enhance the district's overall educational profile, supporting equitable and sustainable development.

[42] https://www.pbs.gov.pk/sites/default/files/population/2023/tables/table_13_kp_districts.pdf

Table 3-19: Education of Respondents (HIS-Kurram) [43]

Education Level	Central Tehsil	Lower Tehsil	Upper Tehsil	Total	Percentage (%)
None	175	71	125	371	43.24%
Below Matric	62	48	58	168	19.58%
Matric	26	40	89	155	18.07%
Technical Diploma	8	5	24	37	4.31%
FA/FSC/FCS	6	15	22	43	5.01%
BA/BSc	13	8	17	38	4.43%
BS/MA/MSc	15	5	16	36	4.20%
MS/MPhil	1	1	7	9	1.05%
PhD/Post Doc	0	0	1	1	0.12%
Total	306	193	359	858	100.00%

3.3.1.3 Existing Educational Institutes

Educational infrastructure is crucial for achieving educational objectives, encompassing the availability of school buildings, qualified teachers, laboratories, playgrounds, and other essential facilities at various educational levels. The structure of education can be visualized as a vertical hierarchy resembling a pyramid, where the base consists of numerous primary schools and the apex includes a limited number of universities that provide specialized education to a smaller group of postgraduate students. It is noteworthy that specialized institutions, such as universities, are predominantly located in metropolitan areas.

As stated in the *National Reference Manual for Planning and Infrastructure Standards*, each unit at a specific level is sustained by a catchment area consisting of 3 to 7 facilities from the subsequent lower level[44]. For universities, this lower level corresponds to degree colleges. The educational infrastructure in District Kurram comprises various levels of government schools, as well as degree colleges which are essential for providing quality education to the local population. The current statistics for government educational institutions are as follows:

[43] Calculated from the Household Survey conducted by the Consultant in August, 2024

[44] Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Section 6.1.2, Page 102.

Table 3-20 Government Schools in District Kurram[45]

Category	Total Schools (Boys)	Non-Functional (Boys)	Total Schools (Girls)	Non-Functional (Girls)	Total Schools	Non-Functional
Government Primary Schools	319	18	198	13	517	31
Government Middle Schools	46	2	46	3	92	5
Government High Schools	53	1	17	0	70	1
Government Higher Secondary Schools	5	0	2	0	7	0

3.3.1.4 Summary of Findings

3.3.1.4.1 Government Primary Schools

There are a total of 517 government primary schools in Kurram, with 319 for boys and 198 for girls. Among these, 18 boys' schools and 13 girls' schools are non-functional, indicating a need for improvements in infrastructure and resources.

Government Middle Schools: The district has 92 government middle schools, with 46 designated for boys and 46 for girls. A total of 2 middle schools are currently non-functional.

Government High Schools: There are 70 government high schools, consisting of 53 boys' schools and 17 girls' schools, with 1 non-functional high schools.

Government Higher Secondary Schools: The district includes 7 higher secondary schools, with 5 for boys and 2 for girls, all of which are functional.

These statistics highlight the critical need for targeted interventions to enhance the operational capacity of existing schools and improve educational access for both boys and girls in Kurram. Degree Colleges in District Kurram

Addressing the issue of non-functional schools is vital to ensuring that all children in the district have the opportunity to receive a quality education.

3.3.1.4.2 Degree Colleges in District Kurram

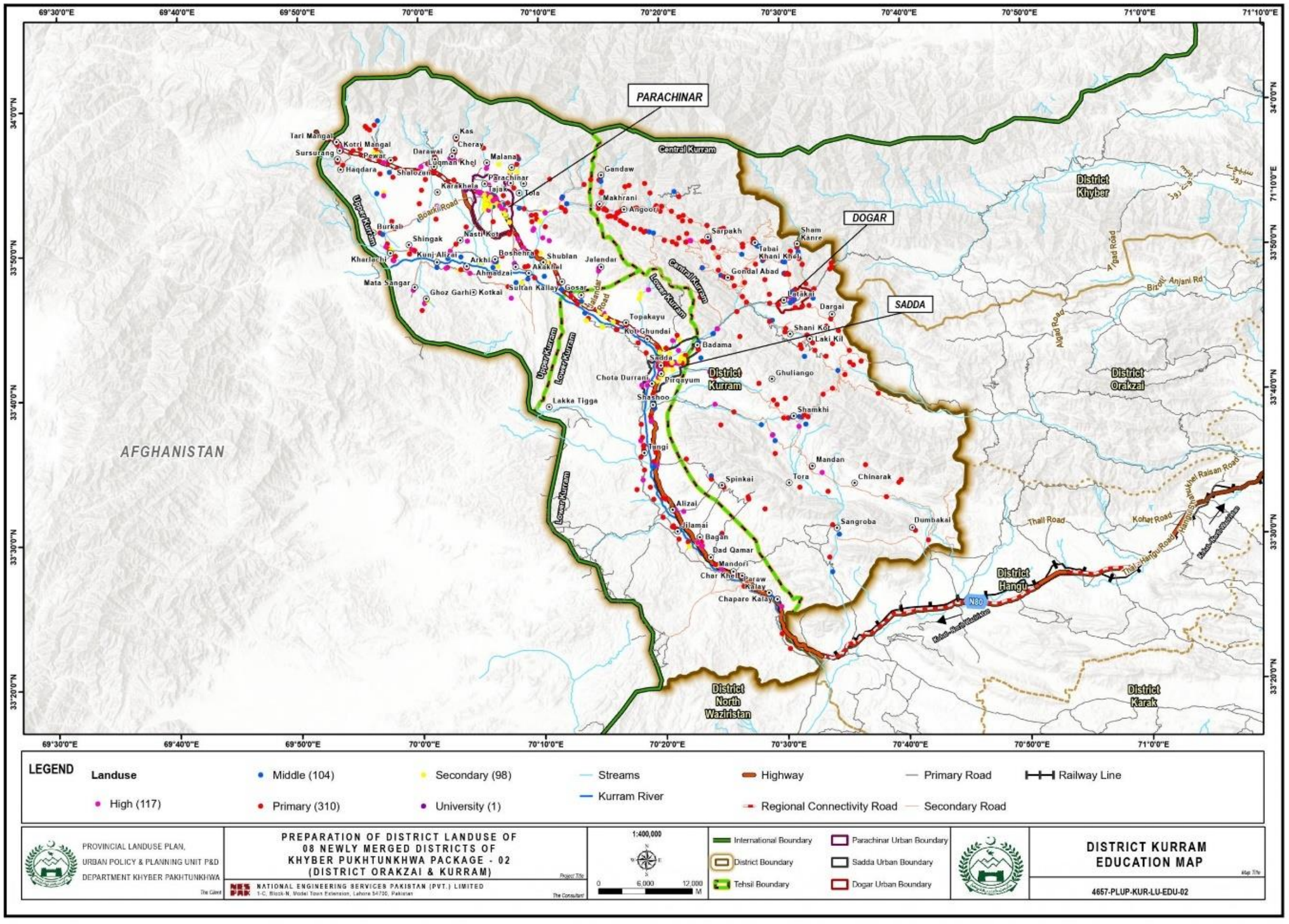
District Kurram is home to 14-degree colleges, which provide higher education opportunities to the local population. The following is a list of these institutions:

1. Girls degree College Sadda
2. Government Degree College Sadda
3. Govt Degree College
4. GDC Baggan
5. Girls' degree college
6. Govt. Degree College for Girls

[45] Annual School Census Report 2023-24 (http://175.107.63.45/newimusite/images/reports/ASC2023-24.pdf)

7. FG College
8. Govt Girls Degree college No 2 Parachinar
9. Govt Degree College No 2 For Boy Parachinar
10. GPI, KMU Campus Parachinar
11. Brilliant Group of College Parachinar
12. Govt.Post Graduate College Parachinar
13. Government college of management sciences
14. Govt College For Girls Luqman Khel

These colleges play a vital role in enhancing educational access and promoting higher learning in the district, contributing to the overall development of the community.



Map 3-6 Existing Education Facilities in District Kurram

3.3.1.4.3 Private Schools in District Kurram

According to the Khyber Pakhtunkhwa Private Schools Regulatory Authority (KP PSRA), there are 33 private schools in rural areas and 47 are operating in urban areas of District Kurram. These institutions contribute to the educational landscape of the district and provide additional options for students seeking education outside the government school system. The below table of private schools includes:

Table 3-21: Private Schools in District Kurram[46]

School Name	District	Location
Aims School System Chinar Abad	Kurram	Rural
Superior Model Public School Parachinar District Kurram	Kurram	Rural
The Excellence Model School And College	Kurram	Rural
Islamia Public High School Sadda	Kurram	Rural
Pewar Children Academy Pewar	Kurram	Rural
Shah Public High School Gosar Parachinar	Kurram	Rural
Allama Iqbal Public High School Parachinar	Kurram	Rural
Iqra Public High School Uchat Kurram	Kurram	Rural
Al Kausar Institute Of Education Parachinar	Kurram	Rural
Imperial Public School	Kurram	Rural
University Model College Parachinar	Kurram	Rural
Edward School And College Parachinar	Kurram	Rural
Hamad Model High School	Kurram	Rural
Al Noor Public High School And College Baggan Lower Kurram	Kurram	Rural
Paradise Children Academy Middle Public School Dargai	Kurram	Rural
The Brilliant Group Of Colleges, Parachinar	Kurram	Rural
Guardian Public School	Kurram	Rural
Gul Shan Madina Public School Gundal District Central Kurram	Kurram	Rural
Federal Model College Parachinar	Kurram	Rural
Islamic Girls Public School And College Parachinar	Kurram	Rural
Habib International School & College	Kurram	Rural
Uswa Public School, Luqmankhel	Kurram	Rural
Uswa Public High School Parachinar	Kurram	Rural
Alghazi Educatonal Academy Malana	Kurram	Rural
Usmania Public School And College Sadda (Marokass) Kurram	Kurram	Rural
The Knowledge City School & College	Kurram	Rural
New Karwan Public High School Masood Abad District Kurram	Kurram	Rural
New Jaffaria Educationa;Academy Parachinar	Kurram	Rural
The Prime Educator School System	Kurram	Rural
Al-Beruni Science Academy Shalozan	Kurram	Rural
Ali Beacon Academy	Kurram	Rural
Oxford School And College Parachinar District Kurram	Kurram	Rural
Oxford Public High School Sadda District Kurram	Kurram	Rural
City Model School	Kurram	Urban
Cambridge Public School And College	Kurram	Urban
Iqra Children Academy Sadda	Kurram	Urban

[46] KP PSRA 2024

School Name	District	Location
Allama Iqbal Public School & College Pir Qayum	Kurram	Urban
New Kohsar Public School & College	Kurram	Urban
Kurram Public School Zeran	Kurram	Urban
New Al Muslim Public School	Kurram	Urban
Hassan Public School	Kurram	Urban
Welcome Public School Sadda District Kurram	Kurram	Urban
Iqra Childran Academy Hakim Abad Arwaza	Kurram	Urban
Bloom's International Schools	Kurram	Urban
Concept Based School & College Parachinar	Kurram	Urban
Ali Public High School Parachinar	Kurram	Urban
Glorious School And College Parachinar	Kurram	Urban
Wali Asar School & College Parachinar	Kurram	Urban
Chinar Public High School	Kurram	Urban
Al-Kausar Public School Parachinar	Kurram	Urban
John Doltan School And College Parachinar	Kurram	Urban
Edhi Superior School And College Parachinar	Kurram	Urban
Community Model High School Pewar	Kurram	Urban
Quaid-E-Azam Public High School, Parachinar	Kurram	Urban
International Public School Teri Mangal	Kurram	Urban
Forward Collegiate School Parachinar	Kurram	Urban
Kohsar Public School Parachinar Kurram	Kurram	Urban
Pilot Model High School Parachinar	Kurram	Urban
Paragons Innovative Public School	Kurram	Urban
Akhtar Children Academy Sewak	Kurram	Urban
Federal Model School	Kurram	Urban
Bab Ul Illam Public School Samir	Kurram	Urban
Kurram Paradise Beacon Public School	Kurram	Urban
Islamia Public High School Parachinar	Kurram	Urban
Al-Madina Public High School Baggan Kurram	Kurram	Urban
Al Jannat Public Academy	Kurram	Urban
Kurram School & College Parachinar	Kurram	Urban
Suffah Public School, Kurram	Kurram	Urban
Kurram Children Academy	Kurram	Urban
Army Public School Sadda	Kurram	Urban
Falcon Children Academy	Kurram	Urban
The Smart School, Parachinar Campus	Kurram	Urban
Iqra Public School Wachadara Kurram	Kurram	Urban
Shah Public School Kurram	Kurram	Urban

School Name	District	Location
Iqra Rozatul Atfal Manray	Kurram	Urban
Al-Zahra Public School	Kurram	Urban
Ittehad Model Public School	Kurram	Urban
Muslim Children Academy	Kurram	Urban
Paradise Public High School	Kurram	Urban
Decent Public High School Shublan Kurram	Kurram	Urban

These private schools play a significant role in enhancing educational access and diversity within the district, providing various curricula and educational opportunities for students in Kurram.

3.3.1.5 Gross and Net Enrollment Rates

Enrolment statistics are essential indicators of educational access and participation within a region. The data for Kurram District provides insights into the state of education, covering both primary and secondary levels for boys and girls, across different types of institutions: government schools, private schools, and Deeni Madaris.

The overall Gross Enrollment Ratio (GER) for the population aged 5-9 years in Khyber Pakhtunkhwa, as projected from the Population Census 2023 growth rates, stands at **82.72%**. Specifically, the GER for government primary schools in the region is **52.51%**. The Net Enrollment Ratio (NER) at the primary level is recorded at **67.42%**. For the population aged 10-14 years, the overall GER for government secondary schools and private schools in Khyber Pakhtunkhwa is **45.60%**, while the GER for government secondary schools alone is **30.04%**. The NER at the secondary level is noted to be **44.90%**.

These enrollment statistics highlight significant trends in educational access and participation within the province, indicating areas where improvements are necessary to enhance educational outcomes for children and adolescents.

3.3.1.5.1 Gross Enrollment Ratios (GER) at the Primary Level

The Gross Enrollment Ratio (GER) measures the total enrollment in primary education, irrespective of age, as a percentage of the eligible population. This indicator highlights the overall capacity and participation in the education system.

Table 3-22 Gross Enrollment Ratios (GER) at the Primary Level[47]

Institution Type	Boys	Girls	Total	GER (%) Boys	GER (%) Girls
Government Schools	33797	27217	61014	37.38 %	30.10 %
Private Schools	19526	8218	27744	21.59%	9.09%
Deeni Madaris	1186	456	1641	1.31%	0.50%
Total	54509	35891	90399	60.39 %	39.70%

[47] Annual School Census Report 2023-24 (http://175.107.63.45/newimusite/images/reports/ASC2023-24.pdf)

3.3.1.5.1.1 Observations:

- Government schools enroll the largest share of students, with boys significantly outnumbering girls.
- Private schools play a significant role, particularly for boys, who constitute only a large fraction of the total enrollment in these institutions.
- Deeni Madaris report no enrollment at the primary level in this data, indicating no significant participation in formal education.

3.3.1.5.1.2 Gross Enrolment Ratios (GER) at the Secondary Level

At the secondary level, the GER reflects similar patterns but with a sharper decline in participation, especially for girls:

Table 3-23 Gross Enrolment Ratios (GER) at the Secondary Level [48]

Institution Type	Boys	Girls	Total	GER (%) Boys	GER (%) Girls	GER (%) Total
Government Schools	12198	7745	19952	26.23%	18.62%	22.65%
Private Schools	12150	4344	16494	26.13%	10.44%	18.72%
Total	24348	12098	36446	52.36%	29.08%	41.37%

3.3.1.5.1.3 Observations:

- Participation drops significantly at the secondary level compared to primary education.
- Girls face particularly limited access to secondary education, as evidenced by their low GER percentages.
- Private schools, while contributing to boys' education, also provide almost same support for girls.

3.3.1.6 Gender Parity Index (GPI)

The GPI quantifies gender equality in education:

Table 3-24 GPI quantifies gender equality in education.

Education Level	GER (%) Boys	GER (%) Girls	GPI
Primary	88.20%	65.78%	0.75
Secondary	53.27%	29.09%	0.56

3.3.1.6.1 Observations:

- At the primary level, the GPI indicates moderate gender disparity.
- At the secondary level, gender disparity widens, reflecting lower access for girls.

3.3.1.6.2 NET Enrolment Ratios (NET)

In the year 2023-24, the Net Enrollment Ratio (NER) for the population aged 10-14 years in Kurram reflects significant educational trends. For government schools, the NER stands at 22.62% for boys and 14.14% for girls, indicating a substantial gender disparity in enrollment within public education. In private schools, the NER is 9.12% for boys and 0.29% for girls, further emphasizing the challenges

[48] Annual School Census Report 2023-24 (http://175.107.63.45/newimusite/images/reports/ASC2023-24.pdf)

faced by female students in accessing educational opportunities. In Deeni Madaris, the NER is recorded at 0.35% for boys and 0.57% for girls, resulting in a combined NER of 0.46% for this age group. Overall, when combining government, private, and Deeni Madaris institutions, the total NER reaches 32.09% for boys and 15.01% for girls, culminating in an overall NER of 24.02% for the district. These figures highlight critical areas requiring intervention to improve educational access and gender equity in Kurram's schooling system.

Table 3-25: Net Enrollment Ratios (NER) in Kurram (2023-24) [49]

Institution Type	NER (%) Boys	NER (%) Girls	NER (%) Total
Government Schools	22.62%	14.14%	18.61%
Private Schools	9.12%	0.29%	4.95%
Deeni Madaris	0.35%	0.57%	0.46%
Total (Govt., Private, Deeni Madaris)	32.09%	15.01%	24.02%

This table summarizes the Net Enrollment Ratios for boys and girls in Kurram across different types of educational institutions at the primary level for the year 2023-24.

The enrollment data for Kurram reveals substantial disparities in educational participation, particularly for girls, at both primary and secondary levels. Government schools play a dominant role in enrollment figures, yet private schools also contribute significantly to boys' enrollment. Efforts to improve gender parity and overall enrollment, especially at higher educational levels, remain critical for advancing educational equity in the region.

3.3.1.7 Dropout Rate, Promotion Rate, and Repetition Rate

The dropout rate, promotion rate, and repetition rate are key indicators used to assess educational outcomes. Together, these indicators should total 100%. The dropout rate represents the percentage of students who enrolled but did not complete their class due to various socioeconomic challenges. In Khyber Pakhtunkhwa, the primary-level dropout rate is 9.26% for boys and 13.94% for girls. Conversely, at the secondary level, the trend reverses, with the dropout rate for boys at 11.27% and for girls at 9.08%.

3.3.1.7.1 Student Flow Analysis in Kurram at Primary Level (Boys):

The following table summarizes the promotion rate, repetition rate, and dropout rate for boys at the primary level in Kurram District across different grades:

Table 3-26 Student Flow Analysis in Kurram at Primary Level (Boys)

Class	Promotion Rate	Repetition Rate	Dropout Rate
Prep	70.8%	2.3%	26.9%
Class 1	88.1%	1.4%	10.4%
Class 2	90.8%	0.9%	8.3%
Class 3	86.1%	1.1%	12.7%
Class 4	87.8%	1.0%	11.2%
Class 5	82.6%	0.1%	17.3%

[49] Annual School Census Report 2023-24 (http://175.107.63.45/newimusite/images/reports/ASC2023-24.pdf)

3.3.1.7.2 Key Observations:

Prep Class Challenges:

The promotion rate is significantly low (70.8%), with a high dropout rate of 26.9%. This indicates challenges in transitioning children from preparatory levels to formal schooling.

Improved Retention in Higher Grades:

From Class 1 onwards, the promotion rate improves significantly, reaching a **peak of 90.8% in Class 2.**

Dropout rates decrease steadily from **12.7% in Class 3 to a low of 8.3% in Class 2**, before slightly increasing in subsequent grades.

Repetition Rates:

Repetition rates remain relatively low across all grades, ranging between 0.1% and 2.3%, indicating minimal grade repetition overall.

Dropout Rate Trends:

After a sharp reduction in dropouts from Prep to Class 3, there is a slight increase in dropout rates in Classes 4 and 5.

Student Flow Analysis in Kurram at Primary Level (Girls)

The table below summarizes the promotion rate, repetition rate, and dropout rate for girls at the primary level in Kurram District across different grades:

Table 3-27 Student Flow Analysis in Kurram at Primary Level (Girls)

Class	Promotion Rate	Repetition Rate	Dropout Rate
Prep	68.5%	4.6%	26.9%
Class 1	85.5%	3.6%	10.6%
Class 2	88.3%	2.8%	8.9%
Class 3	81.7%	3.5%	14.8%
Class 4	81.0%	2.9%	16.1%
Class 5	75.5%	2.7%	21.9%

3.3.1.7.3 Key Observations:

Prep Class Concerns:

The promotion rate for girls in Prep class is very low (68.5%), while the dropout rate is alarmingly high at 26.9%, suggesting significant barriers to early education access or retention.

Improved Performance in Lower Grades:

- From Class 1 to Class 2, there is a noticeable improvement in promotion rates, peaking at 88.3% in Class 2, while dropout rates drop to 8.9%.

Fluctuating Trends in Higher Grades:

- Class 3 shows a decline in promotion rate (81.7%) and a rise in dropout rate (14.8%) compared to Class 2.

- Class 4 records the best figures, with a promotion rate of 81.0% and the lowest dropout rate of 16.1%.
- Class 5 sees a sharp decline in promotion rate (75.5%) and a corresponding rise in dropout rate (21.9%).
-

Repetition Rates:

Repetition rates are consistently low across all grades, ranging from 2.4% to 4.6%, suggesting limited instances of students repeating a grade.

Student Flow Analysis in Kurram at Secondary Level (Boys and Girls)

The following table presents the promotion rate, repetition rate, and dropout rate for students (boys and girls combined) at the secondary level in Kurram District across Classes 6 to 9:

Table 3-28 Student Flow Analysis in Kurram at Secondary Level (Boys and Girls from class 6 - 9)

Class	Promotion Rate	Repetition Rate	Dropout Rate
Class 6	85.2%	2.4%	12.4%
Class 7	84.1%	1.3%	14.6%
Class 8	78.5%	0.7%	20.8%
Class 9	88.8%	0.1%	11.2%

3.3.1.7.4 Key Observations:

High Promotion Rates:

The promotion rate remains consistently high across all grades, peaking in Class 9 at 88.8%. This suggests that students who remain in the system are generally progressing successfully.

Minimal Repetition Rates:

Repetition rates are very low throughout, ranging from 0.1% in Class 9 to a maximum of 2.4% in Class 6. This indicates that most students who stay in school advance to the next grade without repeating.

Dropout Rates:

Dropout rates are higher in earlier grades, starting at 12.4% in Class 6 and reducing to 11.2% in Class 9.

Class 8 sees a significant increase in dropout rates (20.8%), which may reflect challenges in retaining students as they approach the transition to higher secondary education.

The dropout rate drastically reduces to 11.2% in Class 9, suggesting better retention among students who make it to higher grades.

Student Flow Analysis in Kurram at Secondary Level (Boys)

The table below summarizes the promotion rate, repetition rate, and dropout rate for boys at the secondary level in Kurram District across Classes 6 to 9:

Table 3-29 Student Flow Analysis in Kurram at Secondary Level for Boys (Class 6 - 9)

Class	Promotion Rate	Repetition Rate	Dropout Rate
Class 6	85.4%	1.8%	12.7%
Class 7	80.9%	0.8%	18.3%
Class 8	79.2%	0.6%	20.2%
Class 9	88.7%	0.1%	11.1%

3.3.1.7.5 Key Observations:

Promotion Rates:

The promotion rate for boys remains high throughout the secondary levels, peaking at 88.7% in Class 9.

However, there is a noticeable dip in Class 8, where the promotion rate falls to 79.2%.

Repetition Rates:

Repetition rates are consistently low, ranging from 0.1% in Class 9 to 1.8% in Class 6, indicating minimal grade repetition among students.

Dropout Rates:

Dropout rates show a concerning trend in Class 8, rising to 20.2%, the highest among all grades.

The dropout rate decreases significantly in Class 9 to 11.1%, suggesting improved retention among students progressing to higher grades.

3.3.1.7.6 Student Flow Analysis in Kurram at Secondary Level (Girls)

The following table provides the promotion rate, repetition rate, and dropout rate for girls at the secondary level in Kurram District across Classes 6 to 9:

Table 3-30 Student Flow Analysis in Kurram at Secondary Level for Girls (Class 6 - 9)

Class	Promotion Rate	Repetition Rate	Dropout Rate
Class 6	84.9%	3.3%	11.8%
Class 7	89.7%	2.3%	8.0%
Class 8	77.4%	0.8%	21.8%
Class 9	88.8%	0.0%	11.2%

3.3.1.7.7 Key Observations:

High Promotion Rates:

Promotion rates for girls are consistently high across all classes, peaking in Class 7 at an exceptional 89.7%.

Minimal Repetition Rates:

Repetition rates are negligible, with a maximum of 0.0% in Class 9 and 3.3 % in class 6.

Dropout Rates:

Dropout rates are low across all grades, starting at 8.0% in Class 7 and reaching a 11.8 in Class 6 The dropout rate suggests that additional students may have joined the system.

3.3.1.8 Teacher-Student Ratio

The ASC2023-24 report provides detailed insights into the educational landscape in Kurram, particularly focusing on the challenges and statistics related to primary education. The data indicates a significant gap between sanctioned teaching posts and the actual number of working teachers, which contributes to a high student-teacher ratio.

Table 3-31 Teacher-Student Ratio in Primary Schools

Category	Boys Enrollment	Girls Enrollment	Total Enrollment	Boys Working Teachers	Girls Working Teachers	Total Working Teachers	Student-Teacher Ratio
Kurram	33737	27215	60952	814	452	1239	1:49.1

In the above table, in Kurram, the total enrollment in primary education is approximately 60952 students, while the number of working teachers is 1239. This results in a student-teacher ratio of about 1:49.1, indicating that nearly 49 students are assigned to each teacher.

Table 3-32 Teacher-Student Ratio in Middle, High and Higher Secondary Schools[50]

Category	Boys Enrolment	Girls Enrolment	Total Enrolment	Boys Working Teachers	Girls Working Teachers	Total Working Teachers	Student-Teacher Ratio
Kurram	12575	7501	20076	939	386	1325	1:15.1

Thus, the student-teacher ratio for Middle, High, and Higher Secondary Schools in Kurram for the year 2023-24 is approximately **1:15.1**. This means that there is roughly one teacher for every 15 students in these educational institutions.

3.3.1.9 Education Facilities Satisfaction Tehsil-Wise Analysis (HIS Kurram)

The survey results on satisfaction with existing educational facilities present a mixed picture. Overall, 57% of households are satisfied with the current infrastructure, while 43% express dissatisfaction with education in their locality. Tehsil-wise analysis shows higher dissatisfaction in Central, Lower, and Upper Tehsils with Central recording 43 satisfied and 53 dissatisfied households, and Lower and Upper reporting 64 and 90 dissatisfied households, respectively. These figures highlight the need for improvements through better infrastructure, more schools, and enhanced education quality to create a more equitable and effective learning environment across the district.

Table 3-33 Education Facilities Satisfaction HIS Kurram

Tehsil	Satisfied (Yes)	Dissatisfied (No)	Total Responses
Central	91	234	325
Lower	126	70	196
Upper	303	59	362
Total	520	363	883

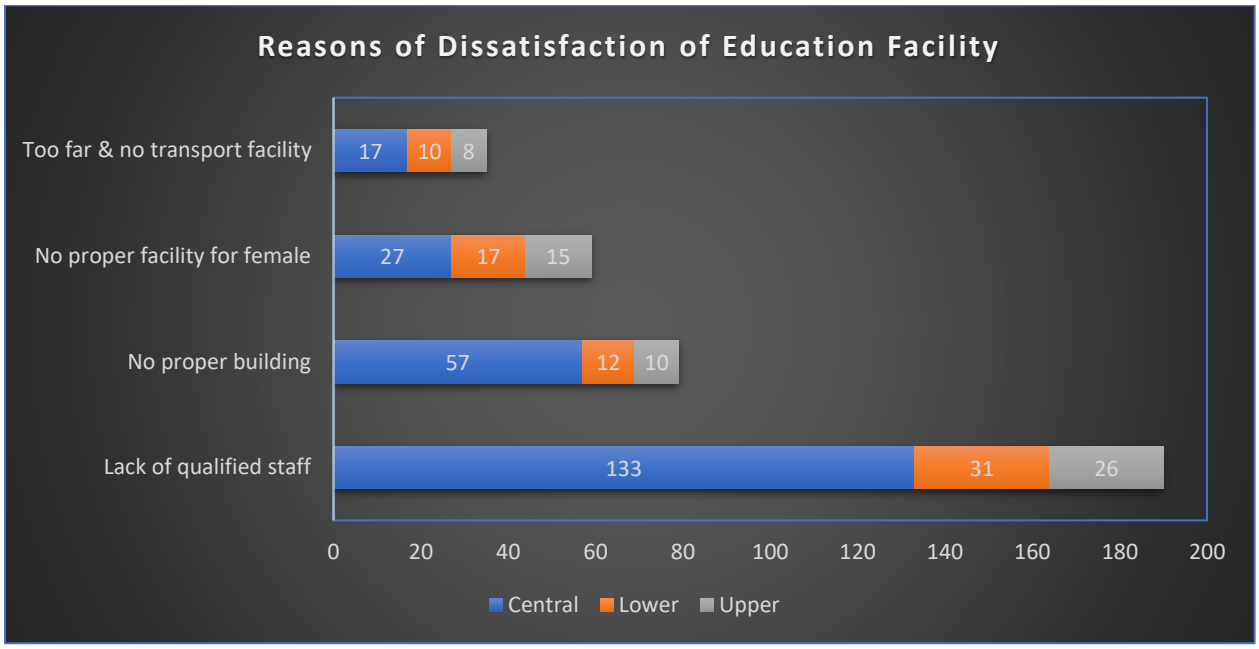
The survey findings show that 59% of respondents are satisfied with existing educational facilities, while 41% express dissatisfaction. The main cause of dissatisfaction (22%) is the lack of qualified teachers, particularly in Central Kurram, where 133 respondents highlighted this issue. The absence of trained staff affects education quality and student outcomes. Another major concern (9%) is the

[50] ANNUAL SCHOOL CENSUS 2023-24

lack of proper school buildings, especially in Central Kurram, where 57 respondents reported overcrowding and poor infrastructure. Additionally, 7% of respondents cited inadequate facilities for female students such as separate toilets, female teachers, and safe spaces highlighting gender disparities in education. A further 4% identified long travel distances and lack of transport as key barriers, particularly in remote areas of Lower and Upper Kurram. Addressing these issues through improved staffing, infrastructure, female-friendly facilities, and better school accessibility is essential for ensuring equitable and quality education across the district.

Table 3-34 Reasons of Dissatisfaction- Tehsil-Wise

Response	Central	Lower	Upper	Total	Percentages
Lack of qualified staff	133	31	26	190	22%
No proper building	57	12	10	79	9%
No proper facility for female	27	17	15	59	7%
Too far & no transport facility	17	10	8	35	4%
Total	234	70	59	363	41%



Graph 3-8: Reasons of Dissatisfaction of Education Facility

The table below presents the responses regarding the affordability of education across different tehsils. Overall, **56%** of respondents indicated that education is affordable, while **44%** disagreed, highlighting a significant concern regarding educational expenses. The Upper tehsil shows the highest number of respondents affirming affordability, whereas the Central tehsil has the largest proportion of those perceiving education as unaffordable. This disparity suggests that while many households feel education is accessible financially, there are notable areas, particularly in Upper, where affordability remains a pressing issue.

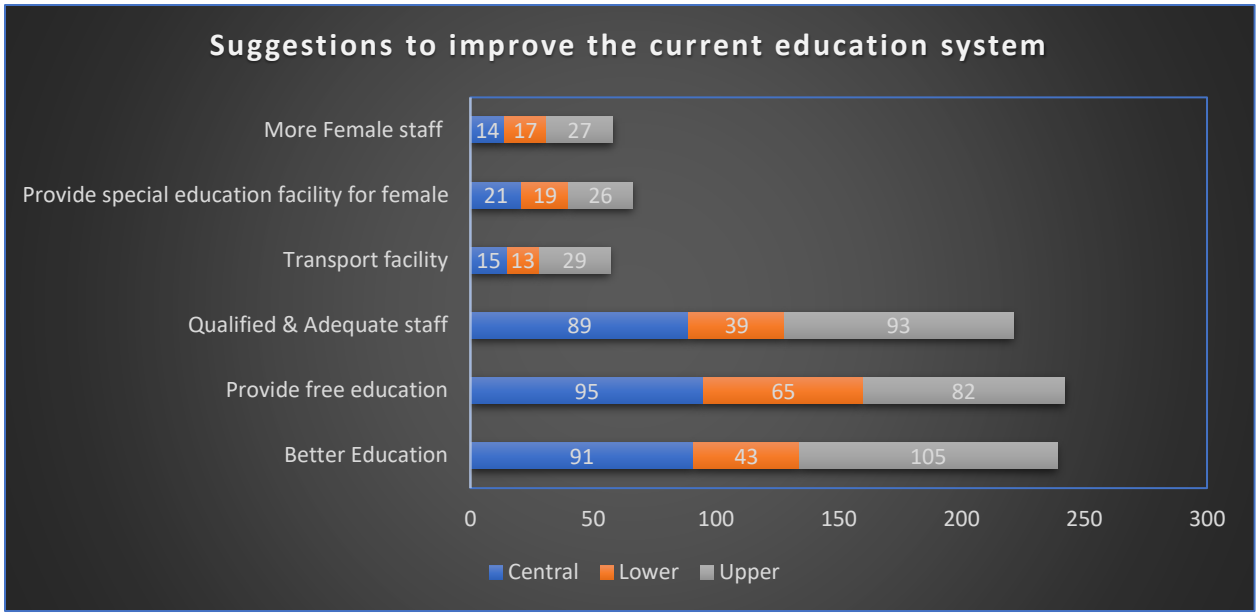
Table 3-35 Education Facility Affordability- Tehsil-Wise

Tehsil	Affordable (Yes)	Not Affordable (No)	Total Responses
Central	62	34	96
Ismail Zai	29	19	48
Lower	145	72	217
Upper	60	92	152
Total	296	217	513

The community's recommendations for improving education in Kurram District emphasize quality, accessibility, and equity. The top suggestion (27%) is to improve the quality of education, particularly in Upper Kurram, where 105 respondents highlighted the need for better teaching methods and curricula. Another 27% recommended providing free education, with 242 respondents mainly from Central Kurram stressing the need to remove financial barriers for low-income families. Ensuring qualified and adequate staff (25%) was also a major concern, as the shortage of trained teachers directly affects learning outcomes. Additionally, 6% of respondents called for better transport facilities, especially for students in remote areas, while 7% emphasized the need for special education facilities and more female staff to support girls' education. Collectively, these recommendations highlight the urgent need to improve teaching quality, affordability, accessibility, and gender inclusivity in Kurram's education system.

Table 3-36 Suggestion to Improve Current Education System- Tehsil-Wise

Response	Central	Lower	Upper	Total	Percentages
Better Education	91	43	105	239	27%
Provide free education	95	65	82	242	27%
Qualified & Adequate staff	89	39	93	221	25%
Transport facility	15	13	29	57	6%
Provide special education facility for female	21	19	26	66	7%
More Female staff	14	17	27	58	7%
Total	325	196	362	883	100%



Graph 3-9: Suggestions to improve the current education system

3.3.1.10 Planning Standards for Establishing New Educational Institutions

According to the National Reference Manual of Planning and Infrastructure Standards, primary schools should be situated within existing or well-planned residential areas to effectively serve their communities. These institutions must be within a reasonable walking distance from homes and positioned away from busy roads. Secondary schools, on the other hand, need to be accessible by vehicles and provide safe pedestrian access, while also being distanced from high-traffic roads. Both primary and secondary schools are considered residential uses, and their optimal locations should be determined during the detailed planning phase of future housing developments. Colleges and universities that offer undergraduate and graduate programs should ideally be located in the Town Center. The following table presents location guidelines for establishing new educational institutions.

Table 3-37 Location Guidelines for New Educational Institutes[51]

Educational Institutions	Locational Guidelines
Primary School	-Proximity to existing and planned housing schemes. -Within walking distance from residences. -Centrally located in residential areas, away from busy roads. -Urban catchment area: 0.55-1 km; Rural catchment area: 2.2 km.
Secondary School	-Good vehicular access and safe pedestrian pathways. -Distance from opposite-gender schools. -Located away from main roads with heavy traffic. -Favorable Road linkages to their catchment area. -Urban catchment area: 1.25-2.45 km; Rural catchment area: 5-10 km.
Intermediate Colleges	-Urban boys' catchment area: 2.75-4 km; Rural boys' catchment area:10-15 km. -Urban girls' catchment area: 3.25-5 km.
Degree College	-Located in large cities.
University	-Situated in metropolitan areas.

[51] Government of Pakistan, Ministry of Housing and Works, Environment and Urban Affairs Division. *National Reference Manual of Planning and Infrastructure Standards (NRM).* 6.1.6.1 Allocation Criteria

The National Reference Manual of Planning and Infrastructure Standards provides a uniform framework for educational planning that takes into account population needs, educational levels, and resource allocation. It outlines land requirements essential for the effective establishment and management of educational facilities at various stages. For optimal planning, primary schools should be allocated 1.5 acres in rural areas and 2 acres in urban areas, middle schools require 2 acres, high schools should occupy 5 acres in urban and 4 acres in rural areas, while colleges should have approximately 15 acres. These allocations ensure sufficient space for infrastructure and essential facilities across all educational levels in both rural and urban contexts.

The Elementary and Secondary Education Department (E&SED) of Khyber Pakhtunkhwa bases its planning criteria for establishing or upgrading government schools primarily on enrollment thresholds, ensuring that schools are developed only in areas with adequate student populations to maintain viability and effective resource utilization.

The following table presents a comparative summary of the planning standards for establishing new educational institutions.

Table 3-38 Planning Standards for Establishing New Education Institutes

Standards	Education Level	Population	Enrollment	Distance from Nearby PS/SS	Land Requirement
National Reference Manual of Planning Standards	Primary (I-V)	7500 (Boys), 8200 (Girls)	-	(Urban) 0.5 Km; (Rural) 2.2 Km	1.5 Acre (Rural), 2 Acre (Urban)
	Secondary School (VI-X)	23,000 (Boys), 31,000 (Girls)	-	(Urban) 1.25 Km; (Rural) 5 Km	2 Acre
	Secondary School (XI-XII)	30,000 - 80,000 (Boys), 70,000 - 350,000 (Girls)	-	-	4 Acre (Urban), 5 Acre (Rural)
	College	0.4 Million-1 Million (Males); 0.75 Million - 3.5 Million (Females)	-	10 Km	15 Acre
Elementary & Secondary Education Department Standards for Plain Areas	Primary (I-V)	1000	-	160	Urban (1-2 Kanal), Rural (2 Kanal)
	Secondary (VI-XII)	Boys:50; Girls:40	Feeder Primary School: Boys:35; Girls:25 Feeder Middle School: Boys:150; Girls:100 Feeder High School: Boys:235; Girls:165	5 Km	Urban (4 Kanal), Rural (8 Kanal)
Elementary & Secondary Education Department Standards for Backward and Hilly Areas	Primary (I-V)	800	-	80	Urban (1-2 Kanal), Rural (2 Kanal)
	Secondary (VI-XII)	Boys:50; Girls:40	Feeder Primary School: Boys:25; Girls:20 Feeder Middle School: Boys:150; Girls:100 Feeder High School: Boys:100; Girls:80	2.5 Km	Urban (4 Kanal), Rural (8 Kanal)

The National Reference Manual of Planning and Infrastructure Standards offers a practical framework by considering population dynamics, educational levels, and land requirements for schools. This approach ensures efficient allocation of educational resources tailored to the specific needs of diverse communities, enhancing accessibility and effectiveness in education delivery. By projecting population growth and addressing existing gaps, educational authorities can strategically plan for future needs, thereby preventing shortages in educational resources and ensuring timely establishment of necessary facilities where they are most needed.

3.3.1.11 Need for New Education facilities in District Kurram

To evaluate the future requirements for educational infrastructure in District Kurram, a comprehensive assessment has been conducted to determine the adequacy and distribution of existing educational facilities ranging from Primary schools to higher secondary and university.

This evaluation follows the National Reference Manual (NRM) standards ensuring compliance with national benchmarks for accessibility and service delivery. The analysis incorporates demographic data from the 2023 Population Census**,** with population projections extended to 2025, 2030, and 2045, providing a long-term planning horizon for sustainable educational development.

In order to determine the existing educational gaps and the future demand for school infrastructure in District Kurram, a comprehensive assessment was conducted at the tehsil level. The evaluation covers three tiers of education Primary, Middle/Secondary, and High Schools and is based on demographic projections for the years 2025, 2030, and 2045.

The analysis follows a standardized **normative approach**, employing population-based ratios for boys and girls separately, in line with the recommended planning standards used for educational infrastructure development in Pakistan.

3.3.1.11.1 Methodology and Analytical Approach

The consultant applied a stepwise calculation procedure to estimate both existing backlogs and future requirements of educational facilities across all tehsils. The methodology integrates population projections with gender-based school coverage standards, as outlined below:

Primary Schools

- One Boys Primary School per 7,500 population
- One Girls Primary School per 8,300 population

Middle/Secondary Schools

- One Boys Middle/Secondary School per 23000population
- One Girls Middle/Secondary School per 31000 population

For each tehsil, the following steps were undertaken:

1. The total projected population for 2025, 2030, and 2045 was divided by the corresponding gender-based ratios to estimate required facilities.
2. The existing number of schools was subtracted from the calculated requirement to determine the current backlog.

3. The same procedure was repeated for the 2030 and 2045 horizons, identifying the short-term (up to 2030) and long-term (up to 2045) infrastructure needs.
4. Finally, the existing stock of schools was subtracted from the 2045 requirement to derive the additional demand for the plan period.

3.3.1.11.2 Tehsil-Wise Analysis & Requirements

A. Primary Schools

Table 3-39 District Kurram Primary School Backlog & Requirement

Tehsil	Population (2025)	Population (2030) Short Term	Population (2045)	Existing Primary Schools	Boys	Girls	Gap 2025	Boys	Girls	Boys	Girls	Additional Demand	Additional Demand	Demand 2045
					Existing Requirements 2025	Existing Requirements 2025		Requirements 2030	Requirements 2030	Requirements2045	Requirements2045	Boys	Girls	
Upper	286927	315584	416823	93	38	35	-20	14	10	18	13	6	4	-10
Lower	160857	184572	305352	51	21	20	-10	8	6	13	10	6	5	1
Central	386306	461972	764019	166	52	47	-67	20	15	33	25	16	12	-39
Overall	834090	962128	1E+06	310	111	102	-97	42	31	65	48	28	21	-48

B. Middle and Secondary Schools

Table 3-40 District Kurram Middle/Secondary School Backlog & Requirement

Tehsil	Population (2025)	Population (2030) Short Term	Population (2045)	Existing Middle/Sec Schools	Boys	Girls	Gap 2025	Boys	Girls	Boys	Girls	Additional Demand	Additional Demand	Demand 2045
					Existing Requirements 2025	Existing Requirements 2025		Requirements 2030	Requirements 2030	Requirements2045	Requirements2045	Boys	Girls	
Upper	286927	315584	416823	163	12	9	-141	14	10	18	13	6	4	-131
Lower	160857	184572	305352	81	7	5	-69	8	6	13	10	6	5	-58
Central	386306	461972	764019	75	17	12	-46	20	15	33	25	16	12	-17
Overall	834090	962128	1E+06	319	36	27	-256	42	31	65	48	28	21	-206

3.3.1.11.3 Proposed Urban Areas Analysis & Requirements

A. Primary Schools

Table 3-41 District Kurram Urban Areas Primary School Backlog

Urban Area	Population (2025)	Population (2030) Short Term	Population (2045)	Existing Primary Schools	Boys	Girls	Gap 2025	Boys	Girls	Boys	Girls	Additional Requirement 2045	Additional Requirement 2045	Demand 2045
					Existing Requirements 2025	Existing Requirements 2025		Requirements 2030	Requirements 2030	Requirements2045	Requirements2045	Boys	Girls	
Parachinar	60010	71848	99682	7	8	7	8	10	9	13	12	5	5	18
Sadda	44935	50621	114286	9	6	5	2	7	6	15	14	9	8	20
Dogar	15150	19514	52884	11	2	2	-7	3	2	7	6	5	5	3
Ali zai	29337	36632	60270	1	4	4	6	5	4	8	7	4	4	14
Overall	149432	178614	327122	28	20	18	10	24	22	44	40	24	22	56

B. Middle and Secondary Schools

Table 3-42 District Kurram Urban Areas Middle and Secondary Schools Backlog

Urban Area	Population (2025)	Population (2030) Short Term	Population (2045)	Existing Middle/Secondary Schools	Boys	Girls	Gap 2025	Boys	Girls	Boys	Girls	Additional Requirement 2045	Additional Requirement 2045	Demand
					Existing Requirements 2025	Existing Requirements 2025		Requirements 2030	Requirements 2030	Requirements2045	Requirements2045	Boys	Girls	
Parachinar	60010	71848	99682	64	3	2	-59	3	2	4	3	2	1	-56
Sadda	44935	50621	114286	34	2	1	-31	2	2	5	4	3	2	-25
Dogar	15150	19514	52884	5	1	0	-4	1	1	2	2	2	1	-1
Ali Zai	29337	36632	60270	1	1	1	1	2	1	3	2	1	1	4
Overall	149432	178614	327122	104	6	5	-93	8	6	14	11	8	6	-79

3.3.1.11.4 Area Required for Educational institutes

3.3.1.11.4.1 Tehsil Wise Area Requirements

A. Primary Schools Area Requirements 2045

The Below table indicates the projected requirements for primary schools across the three tehsils of District Kurram by 2045. The analysis shows that Upper Tehsil has a surplus of 10 primary schools, while Central Tehsil reflects a larger surplus of 39 schools. In contrast, Lower Tehsil shows a marginal deficit of 1 primary school, resulting in a required land area of 0.25 acres to meet future needs.

Overall, the district shows a net surplus of 48 primary schools by 2045. However, despite this overall surplus, a small additional land requirement of 0.25 acres is identified due to localized demand in Lower Tehsil. This suggests that while the district as a whole is adequately served in terms of primary education infrastructure, spatial imbalances exist at the tehsil level. Therefore, redistribution, rationalization, or upgrading of existing facilities may be more appropriate than large-scale new construction.

B. Middle/Secondary Schools Area Requirements 2045

The Middle and Secondary Schools Requirements table presents a significantly different picture. All three tehsils; Upper, Lower, and Central show substantial surpluses of middle and secondary schools. Upper Tehsil shows a surplus of 131 institutions, Lower Tehsil 58, and Central Tehsil 17.

Collectively, the district reflects an overall surplus of 206 middle and secondary schools by 2045. As a result, no additional land area is required for middle and secondary educational facilities. This indicates that the existing infrastructure capacity is more than sufficient to accommodate projected population growth at this level of education.

Table 3-43 Tehsil Wise Educational Facilities Area Requirements

Primary Schools Requirements		
Tehsil	**Required Institutes 2045**	**Required Area (Acres)**
Upper	-10	0.00
Lower	1	0.25
Central	-39	0.00
Overall	**-48**	**0.25**
Middle/Secondary Schools Requirements		
Tehsil	**Required Institutes 2045**	**Required Area (Acres)**
Upper	-131	0.00
Lower	-58	0.00
Central	-17	0.00
Overall	**-206**	**0.00**
Total Area Requirements		**0.25**

3.3.1.11.4.2 Urban Areas Requirements

A. Primary Schools Area Requirements 2045

The table below presents the projected requirement for primary schools within the major urban areas of District Kurram by the year 2045. Unlike the tehsil-level analysis, the urban-level assessment indicates a clear deficit of primary educational facilities. A total of 56 additional primary schools will be required across urban centers, corresponding to a land requirement of 9.78 acres.

Sadda shows the highest demand, requiring 20 new primary schools and approximately 5.0 acres of land. This reflects significant projected population growth and increasing demand for basic educational infrastructure. Parachinar requires 18 additional primary schools, translating into a land requirement of 4.50 acres. Although Parachinar is already relatively well-developed, continued urban expansion necessitates further investment in primary education. Alizai requires 14 additional schools (3.50 acres), while Dogar requires 3 schools (0.75 acres), indicating moderate but important localized needs.

Overall, the data demonstrates that primary education infrastructure expansion is primarily an urban phenomenon, driven by concentrated population growth in towns rather than rural areas. Strategic land reservation within planning frameworks will therefore be essential to accommodate future primary education demand.

B. Middle/Secondary Schools Area Requirements 2045

The middle and secondary school projections present a contrasting pattern. Most urban areas show a surplus of middle and secondary institutions. Parachinar reflects a surplus of 56 institutions, Sadda 25, and Dogar 1, indicating that existing infrastructure is more than adequate to meet projected demand at this level. Consequently, no additional land is required in these urban centers for middle and secondary education.

However, Alizai shows a deficit of 4 middle/secondary schools, requiring approximately 1.78 acres of additional land. This indicates localized educational infrastructure gaps despite overall district-level surpluses. The imbalance suggests that while aggregate capacity appears sufficient, spatial distribution does not evenly match projected population growth.

Table 3-44 Urban Centers Educational Facilities Area Requirements

Primary Schools Requirements		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
Parachinar	18	4.50
Sadda	20	5.00
Dogar	3	0.75
Ali Zai	14	3.50
Overall	**56**	**13.75**
Middle/Secondary Schools Requirements		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
Parachinar	-56	0.00
Sadda	-25	0.00
Dogar	-1	0.00
Ali Zai	4	1.78
Overall	**-79**	**1.78**
Total Area Requirements		**11.56**

3.3.1.11.5 District-Level Synthesis

Cumulatively, the analysis indicates that by 2045, District Kurram will require:

- 379 Primary Schools (165 additional)
- 469 Middle/Secondary Schools (205 additional)
- 113 High Schools (50 additional)

The total additional demand across all levels amounts to approximately 420 new educational institutions by the plan horizon of 2045, excluding requirements for infrastructure rehabilitation and qualitative improvements.

3.3.1.11.6 Planning Implications and Recommendations

1. **Short-Term (2025–2030):**
    - Address the most critical gaps in Primary and Middle Schools, particularly in Central Kurram, where school-to-population ratios fall below provincial standards.
    - Implement gender-sensitive planning, ensuring each tehsil receives an equitable share of girls' schools.
2. **Medium-Term (2030–2045):**
    - Upgrade existing Middle Schools to High Schools based on enrollment trends and catchment population growth.

- Improve school infrastructure standards, including classrooms, sanitation, boundary walls, and access roads.
- Establish composite education complexes in remote areas to integrate primary, middle, and high-level education under one management structure.
- Encourage public-private partnerships (PPP) and community-led school initiatives for sustainable expansion.

3.3.1.11.7 Conclusion

The education sector of District Kurram faces a substantial infrastructure and service delivery deficit that could widen with population growth if timely interventions are not implemented. The outlined plan provides a quantitative roadmap for addressing both gender and spatial disparities through phased investment and capacity enhancement by 2045. Effective implementation of these recommendations will not only improve educational access and quality but also contribute significantly to the district's social development and human capital formation.

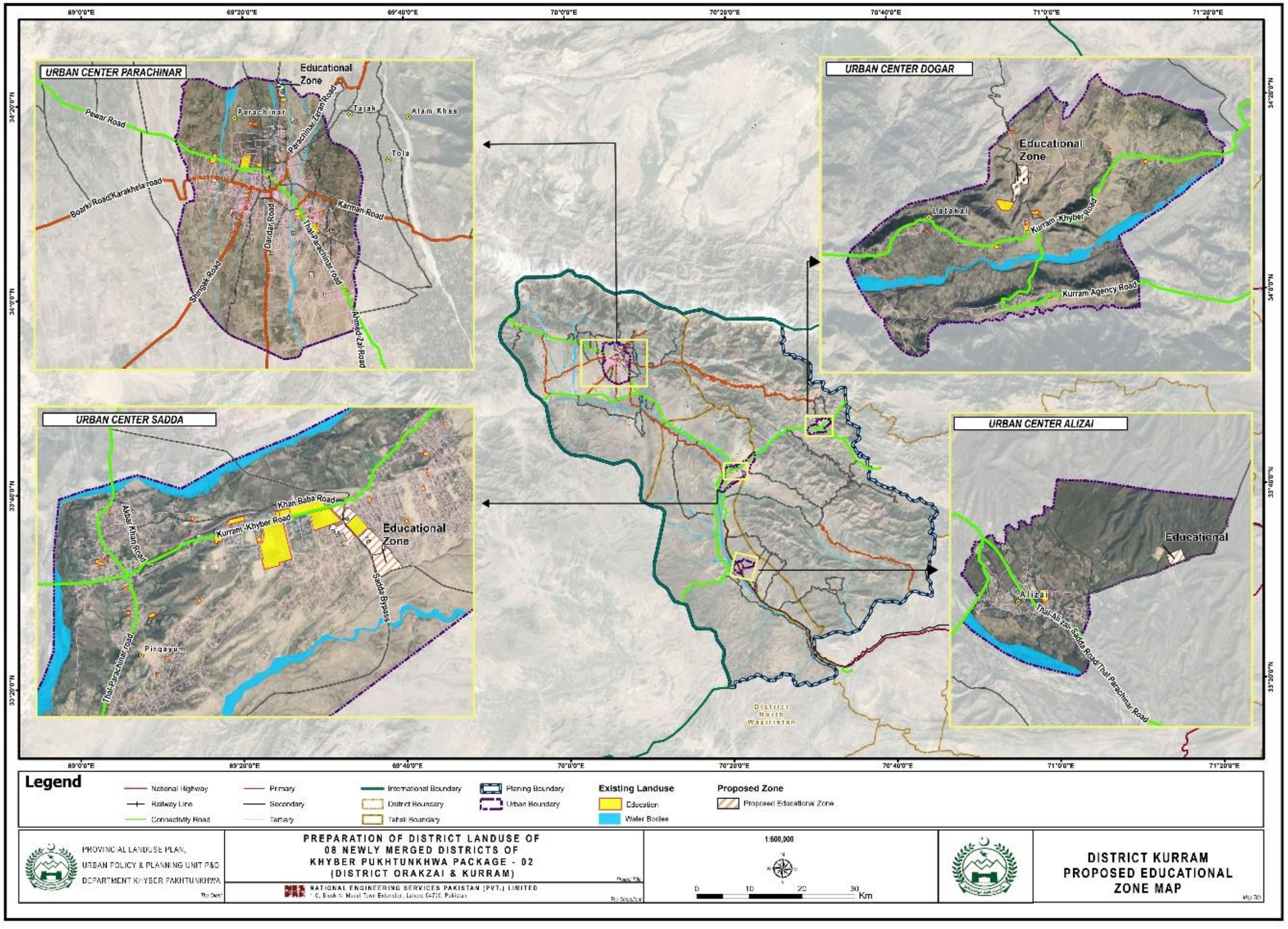
3.3.1.12 Constraints

1. **Uneven Spatial Distribution of Educational Facilities:**
   Educational institutions are concentrated mainly in Parachinar (Upper Kurram), while Central and Lower Kurram face shortages, resulting in accessibility gaps for rural and remote communities.
2. **Inadequate Infrastructure**:
   Many existing schools and colleges operate in poor physical conditions, with insufficient classrooms, sanitation facilities, boundary walls, and furniture particularly in girls' schools and rural areas.
3. **Limited Access for Female Students:**
   Cultural and mobility barriers restrict female enrollment, and the number of girls' secondary and higher secondary schools remains below demand.
4. **Shortage of Qualified Teaching Staff:**
   A deficit of trained teachers and subject specialists reduces the quality of education, especially in science, IT, and technical fields.
5. **Insufficient Higher Education Institutions:**
   The district has few colleges and no full-fledged university, forcing students to travel long distances for higher education, leading to dropouts.
6. **Lack of Connectivity and Transport Facilities:**
   Remote settlements are not well-connected to educational centers, limiting daily attendance, particularly for students from mountainous and border regions.
7. **Limited Technical and Vocational Training Opportunities:**
   There is minimal linkage between education and employment, with few institutions offering skill-based or vocational programs relevant to local economic activities.

3.3.1.13 Recommendation

1. **Equitable Spatial Planning of Schools:**
   Establish new primary and secondary schools in underserved areas of Central and Lower Kurram, ensuring uniform educational access across the district.

2. **Upgradation of Existing Facilities:**
   Renovate and expand current institutions with adequate classrooms, laboratories, libraries, and sanitation facilities — prioritizing gender-friendly and inclusive infrastructure.
3. **Promotion of Female Education:**
   Introduce stipend programs, community-based schools, and safe transport services to increase female enrollment and retention, especially at the secondary level.
4. **Capacity Building and Teacher Training:**
   Conduct regular professional development programs for teachers and introduce incentive mechanisms to attract skilled educators to remote regions.
5. **Development of Higher Education and Technical Institutions:**
   Propose the establishment of a degree college or sub-campus of a public university in Parachinar, and set up vocational training centers focusing on trades like carpentry, tailoring, IT, and solar technology.
6. **Public-Private Partnerships (PPP):**
   Encourage collaboration with non-governmental organizations (NGOs) and the private sector to improve infrastructure, teacher training, and digital literacy initiatives.
7. **Digital Learning and Smart Classrooms:**
   Introduce ICT-based education and e-learning facilities in secondary schools to modernize the learning environment and reduce the rural-urban education gap.
8. **Monitoring and Evaluation Framework:**
   Establish a District Education Management Information System (EMIS) for continuous monitoring of school performance, enrollment rates, and infrastructure needs.



Map 3-7 District Kurram Proposed Educational Zones

3.3.2 Health

While all social sectors in land use planning are important, the health sector deserves particular attention because of its crucial role in sustainability. The link between health and sustainability is so strong that many often overlook how the design, structure, and functionality of communities directly affect human well-being. Land use decisions shape the physical development of communities and profoundly influence the health of residents and workers. There is a clear connection between healthy eating, physical activity, and the growing incidence of obesity, diabetes, heart disease, asthma, and other health issues. Increasing evidence shows that certain development practices and land use patterns contribute to these problems especially when they discourage physical activity, restrict access to nutritious food, or expose neighborhoods to environmental pollutants that aggravate conditions like asthma.

Recognizing this relationship, it is vital to adopt comprehensive policies and strategies that promote healthy community design and sustainable construction practices. Such measures should address challenges related to physical inactivity, poor diet, and environmental risks. Ongoing initiatives to educate policymakers, media, and the public on these issues are gaining strength, while efforts to bridge collaboration between public health experts and planning professionals continue to expand, fostering healthier and more sustainable communities.

3.3.2.1 Existing Health Facilities

Improved human health is closely associated with overall happiness and well-being, significantly contributing to economic and social progress. A healthy population tends to be more efficient and productive. The factors influencing the health status of a region and its inhabitants are diverse, encompassing nutrition, access to clean drinking water, sanitation facilities, environmental conditions, sports, education, public awareness, health services, resources, and technology. These elements are essential not only for preventing communicable diseases but also for enhancing the quality of life.

In Khyber Pakhtunkhwa, the government's health infrastructure has seen fluctuations in the number of hospitals and their bed capacities over the past three years. As of January 2023, there are 192 government hospitals with a total of 22,266 beds, a slight decrease from 204 hospitals and 21,267 beds in 2022. The number of dispensaries has remained unchanged at 0 for 2022 and 2023, while Rural Health Centers (RHCs) have decreased to 75 in 2023 from 118 in 2022. Tuberculosis clinics have also seen a reduction in numbers, with 126 clinics operating in 2023 compared to 1835 beds allocated for TB treatment. This data reflects ongoing challenges and adjustments within the health sector, particularly in addressing the healthcare needs of merged areas within the province, as reported by the Director General Health Services, Khyber Pakhtunkhwa, Peshawar.

A health facility is defined as an institution that delivers both curative and preventive health services to various segments of the population, catering to both outpatient and inpatient needs. In District Kurram, health facilities are categorized into government and private institutions.

3.3.2.2 Government Health Facilities

Kurram District in Khyber Pakhtunkhwa has a structured healthcare system with a total of 77 health facilities catering to its population. Among these, there are 5 hospitals with a combined bed strength of 552, 47 dispensaries, 1 MHC with 0 beds, and 3 T.B clinics. Notably, the district also hosts 21 Basic Health Units (BHUs), which currently do not have any designated beds for patients. The health department has allocated significant funding to improve healthcare services, ensuring that the facilities are equipped to meet the needs of the community.

Table 3-45 Existing Government Health Institutions and Bed Strength in Kurram[52]

Facility Type	Number	Bed Strength
Hospitals	5	552
Dispensaries	47	0
Rural Health Centers	0	0
T.B Clinics	3	0
MCH Centers	1	0
Sub Health Centers	0	0
Basic Health Units	21	0
Leprosy Clinics	0	0

The above table summarizes the number of government health institutions and their bed strengths specifically in Kurram District.

Importantly, there is no data available regarding registered private health facilities within Kurram, indicating a potential gap in healthcare service provision outside of the public sector. This lack of information may reflect limited private healthcare options for the local population.

Kurram District, with an estimated population of 834,090, faces significant healthcare challenges given its current infrastructure. The district is equipped with 5 government hospitals that provide a total of 552 beds. This results in a population-to-bed ratio of approximately 1,511 people per bed. Such a ratio indicates that the healthcare facilities may be under considerable strain, as the available beds may not adequately accommodate the healthcare needs of the community. Addressing this gap is crucial for improving health outcomes and ensuring that residents have access to necessary medical services.

Table 3-46 District Wise Population per Government Hospital/Dispensary Bed in Kurram[53]

Metric	Value
Estimated Population	834,090 (2025)
Total Beds in Government Hospitals	552
Population per Bed	1,511

The table highlights Kurram District's limited healthcare capacity relative to its population. The district has 73 doctors, 1 radiologist, 3 dental surgeons, 46 nurses, 59 nurse dais, 14 Lady Health Visitors (LHVs), and 272 other paramedical staff. This shortage of medical professionals underscores the strain on the healthcare system and its inability to adequately meet community health needs.

[52] Development Statistics Khyber Pakhtunkhwa, 2024
[53] Development Statistics Khyber Pakhtunkhwa, 2024 Table No. 108

Table 3-47 Healthcare Professionals in Kurram District[54]

Profession	Number
Doctors	73
Radiologists	1
Dental Surgeons	3
Nurses	46
Nurse Dais	0
Dais	59
Lady Health Visitors (LHVs)	14
Other Paramedical Staff	272

This table summarizes the available healthcare professionals in Kurram District, reflecting the need for more trained personnel to enhance healthcare delivery in the region.

3.3.2.2.1 Community Satisfaction Survey

The HIS survey on healthcare satisfaction in District Kurram reveals that 48% of respondents are satisfied with existing health facilities, while 52% express dissatisfaction, indicating notable gaps in service quality across tehsils.

Below table summarizing the satisfaction assessment regarding existing health facilities in District Kurram, broken down by town/tehsil:

Table 3-48 Town/Tehsil wise Health Satisfactory Survey

Town/Tehsil	Yes (Satisfied)	No (Not Satisfied)	Total Responses
Central	93	232	325
Lower	107	89	196
Upper	224	138	362
Total	424	459	883
Satisfaction	48%	52%	100%

The table highlights satisfaction levels with existing health facilities across District Kurram, showing variations among tehsils. Upper Kurram reports the highest satisfaction, while Central and Lower tehsils show lower levels, indicating the need for targeted service improvements. Overall, the findings stress addressing community concerns, enhancing healthcare quality, and ensuring continuous monitoring to improve satisfaction across all tehsils.

3.3.2.2.2 Reason for Dissatisfaction

The table on “Reasons for Dissatisfaction with Health Facilities” highlights key issues affecting healthcare in Kurram District based on 459 responses from Central, Lower, and Upper Kurram. The main concern, cited by 29% of respondents, is the lack of proper health facilities most notably in Central Kurram reflecting inadequate infrastructure and limited access to essential services. Another major issue is the shortage of qualified staff (11%), followed by staff unavailability (6%), both of which hinder effective and timely healthcare delivery. Distance to health centers (3%) and lack of proper medicine (3%) further contribute to public dissatisfaction, particularly in remote areas like Upper Kurram.

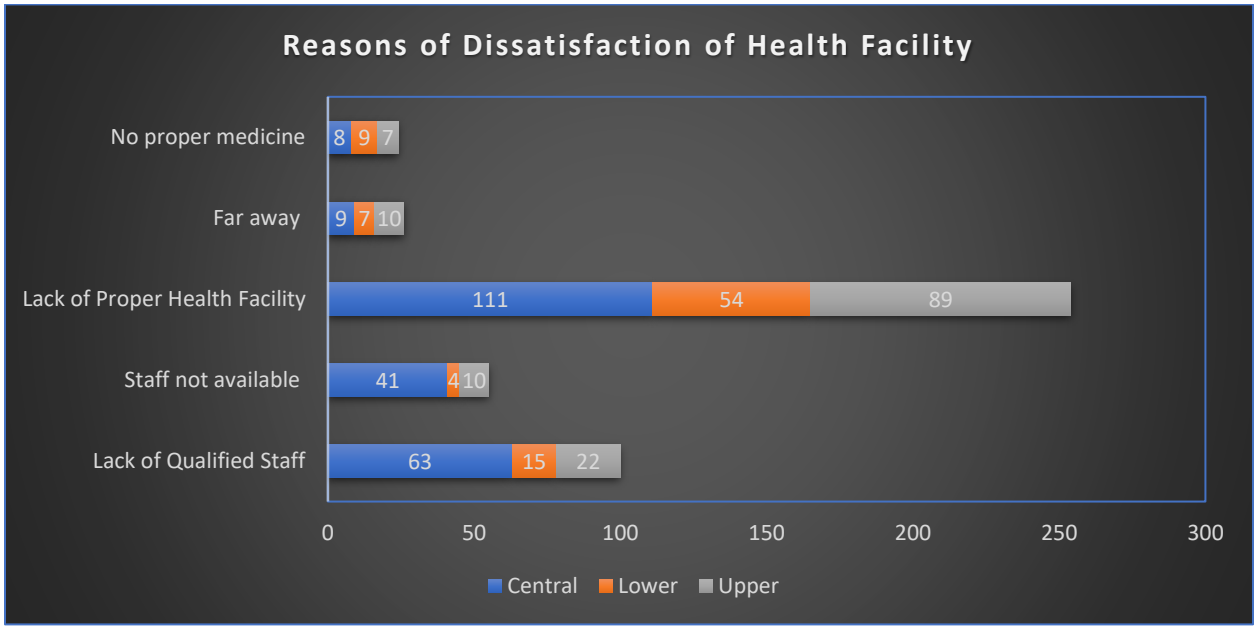
Overall, the findings point to a need for better-equipped facilities, more qualified and available staff,

[54] D.H.I.S, DG Health Services, Khyber Pakhtunkhwa, Peshawar

improved accessibility, and consistent medicine supply to strengthen healthcare delivery and raise satisfaction across the district.

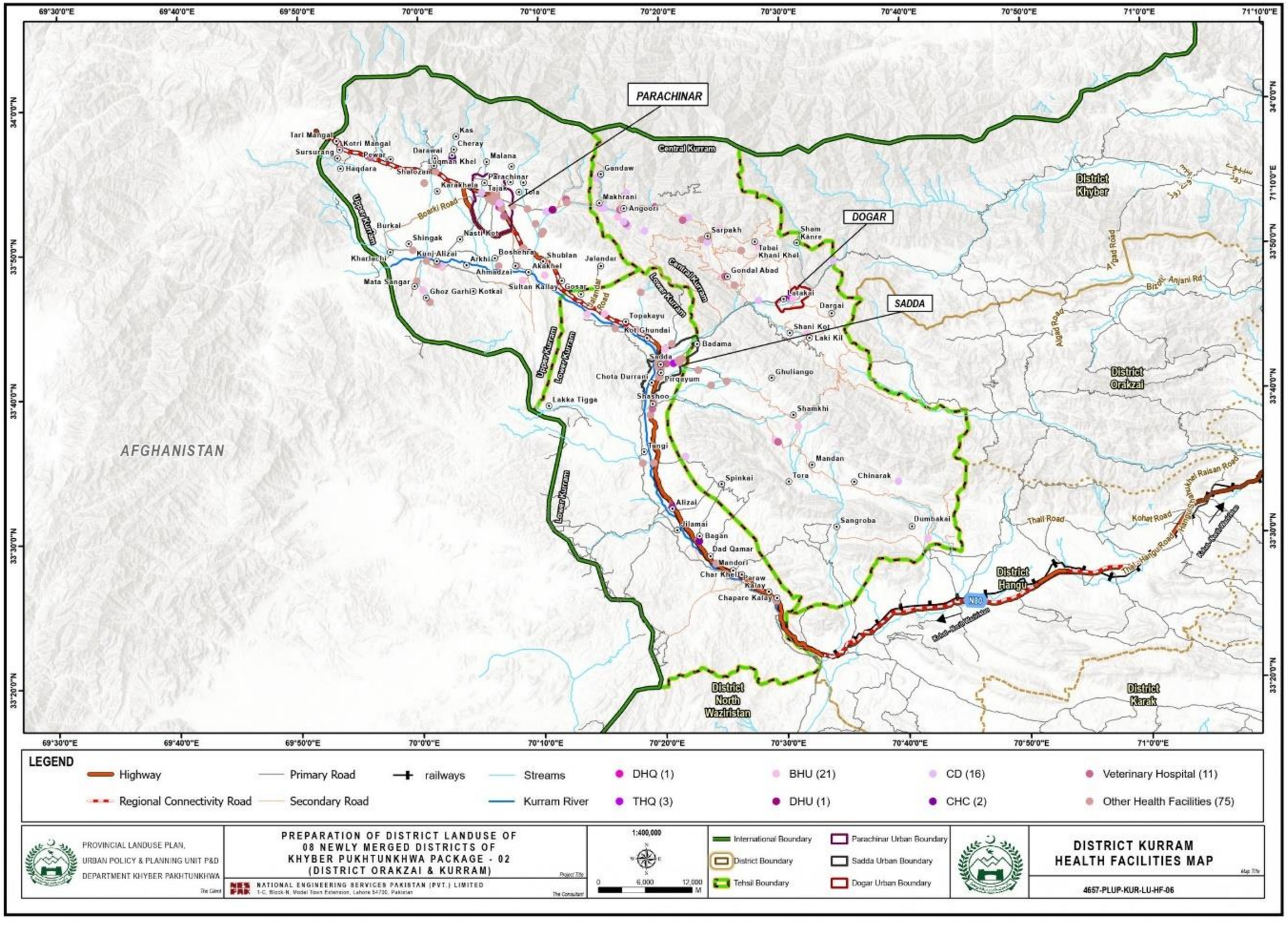
Table 3-49 Reasons for Dissatisfaction of Health Facilities - Tehsil-Wise[55]

Response	Central	Lower	Upper	Total	Percentages
Lack of Qualified Staff	63	15	22	100	11%
Staff not available	41	4	10	55	6%
Lack of Proper Health Facility	111	54	89	254	29%
Far away	9	7	10	26	3%
No proper medicine	8	9	7	24	3%
Total	232	89	138	459	52%



Graph 3-10: Reasons for Dissatisfaction of Health Facilities

[55] HIS survey (Kurram)



Map 3-8 Existing Health Facilities, District Kurram

3.3.2.3 Planning Standards for Establishing New Health Facilities

The allocation of new health facilities varies significantly across provinces and countries, with distinct standards established to address specific regional needs. This divergence is evident in criteria such as population thresholds, bed capacities, land requirements, and proximity to existing health facilities. The following table outlines the standards set forth by authoritative bodies, including the National Reference Manual for Infrastructure and Planning, the Khyber Pakhtunkhwa Minimum Service Delivery Standards (MSDS) Reference Manual, and the Punjab Government Standards. These standards reflect the nuanced considerations governing the establishment of new healthcare infrastructure.

Table 3-50 Planning Standards for Establishing New Health Facilities

Standards	Type of Health Facility	Population	Number of Beds	Land Requirement
National Reference Manual of Planning and Infrastructure Standards	BHU	5,000 to 10,000	N/A	1,250 - 2,500 m^2
	RHC	50,000 to 73,000	Up to 25	0.6 Hectare
	THQ	1 per tehsil	60	2 Hectares
	DHQ	1 per district	100 - 250	5 - 8 Hectares
	General Hospital	In large cities	100 - 250	3 - 7 Hectares
	Specialized Hospital	In metropolitan city	N/A	55 - 75 m^2/bed
Khyber Pakhtunkhwa Minimum Service Delivery Standards (MSDS) Reference Manual	BHU	N/A	N/A	5 - 6 Kanals
	RHC	N/A	20	10 - 12 Kanals
	Category-D	N/A	43	20 - 30 Kanals
	Category-C	N/A	112	40 - 50 Kanals
	Category-B	N/A	222	60 Kanals
	Category-A	1 million	350	70 Kanals

Based on the data presented in the table above, the consultant has chosen to utilize the National Reference Manual (NRM) standards for the allocation of new health facilities. These standards delineate specific criteria, including population thresholds, required bed numbers, and necessary land area tailored to meet the unique needs of respective regions. The consultant's approach extends beyond numerical considerations; it also incorporates a thorough review of the accessibility of first aid units to nearby population centers. By integrating established NRM standards with accessibility considerations, the consultant aims to ensure a comprehensive and well-informed decision-making process in allocating new health facilities.

This strategic planning is essential for improving healthcare access and ensuring that health services are effectively distributed across regions, ultimately contributing to better health outcomes for the population.

3.3.2.4 Need for New Health Facilities in District Kurram

To evaluate the future requirements for healthcare infrastructure in District Kurram, a comprehensive assessment has been conducted to determine the adequacy and distribution of existing health facilities ranging from Basic Health Units (BHUs) to hospitals and specialized healthcare centers.

This evaluation follows the National Reference Manual (NRM) standards and the Khyber Pakhtunkhwa Minimum Service Delivery Standards (MSDS), ensuring compliance with national benchmarks for accessibility and service delivery. The analysis incorporates demographic data from the 2023 Population Census, with population projections extended to 2025, 2030, and 2045, providing a long-term planning horizon for sustainable healthcare development.

3.3.2.4.1 Tehsil Wise Health Facilities Gap and Demand as per the NRM (National Reference manual)

District Kurram is administratively divided into three tehsils, namely Upper Kurram, Lower Kurram, and Central Kurram. A detailed gap analysis was carried out for each tehsil based on the NRM population-to-facility ratio where:

- One BHU serves 10,000 people
- One Rural Health Centre (RHC) serves 73,000 people

Using these standards, the consultant identified the existing service gaps and projected short-term (2030) and long-term (2045) requirements. The procedure involved dividing the projected population by the NRM-defined threshold for each facility type and then subtracting the number of existing facilities to determine the backlog and demand.

The results indicate significant disparities in facility distribution and highlight the urgent need for capacity enhancement, especially in Central Kurram, which demonstrates the largest service gap due to a growing population base and limited infrastructure.

Key Findings (NRM-Based Assessment):

Upper Kurram: Requires expansion of both BHUs and RHCs to address service deficits by 2045. Existing DHQ and specialized hospitals need upgradation to meet future demands.

Lower Kurram: Demonstrates similar trends, with a marked shortage of BHUs and RHCs. Upgradation of existing THQ hospitals is recommended.

Central Kurram: Exhibits the widest gap, with substantial demand for new BHUs and RHCs by 2045. Existing facilities will require both quantitative expansion and qualitative enhancement to achieve equitable access.

Table 3-51 Tehsil Upper Kurram Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	11	286927	18	315584	32	416823	28
RHC	1		3		4		4
DHQ	1		0		0		Upgradation
Specialized Hospital	3		-3		0		

Table 3-52 Tehsil Lower Kurram Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	5	160857	11	184572	18	305352	23
RHC	2		0		3		2
THQ	1		-1		0		Upgradation
Specialized Hospital	1		-1		0		0

Table 3-53 Tehsil Central Kurram Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	22	386306	17	461972	46	764019	47
THQ	1		0		0		Upgradation
Specialized Hospital	6		0		0		0

3.3.2.4.2 Urban Area Wise Health Facilities Gap and Demand as per the NRM (National Reference manual)

A detailed gap analysis was carried out for each Urban Area based on the NRM population-to-facility ratio, where:

- One BHU serves 10,000 people
- One Rural Health Centre (RHC) serves 73,000 people

Using these standards, the consultant identified the existing service gaps and projected short-term (2030) and long-term (2045) requirements. The procedure involved dividing the projected population by the NRM-defined threshold for each facility type and then subtracting the number of existing facilities to determine the backlog and demand.

The results indicate significant disparities in facility distribution and highlight the urgent need for capacity enhancement, which demonstrates the largest service gap due to a growing population base and limited infrastructure.

Table 3-54 Parachinar Urban Canter Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	2	60010	4	71848	7	99682	7
DHQ	1		0		0		Upgradation
THQ	1		0		0		0

Table 3-55 Sadda Urban Canter Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	3	44935	1	50621	5	114286	8
THQ	1		1		0		Upgradation
Specialized Hospital	1		0		0		0

Table 3-56 Dogar Urban Canter Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	1	15150	1	19514	2	52884	4
THQ	1		1		0		Upgradation

Table 3-57 Ali Zai Urban Canter Health Facilities Backload and Requirements 2045

Type of Health Facility	Existing Health Facility	Population (2025)	Backlog 2025	Population (2030)	2030 Requirement (Short Term)	Population (2045)	Demand 2045 (long term)
BHU	0	29937	3	36632	4	60270	5
THQ	1		0		0		Upgradation

3.3.2.5 Area Requirements for Health Facilities

3.3.2.5.1 Tehsil Wise Area Requirements

The below table presents the projected health facility requirements for District Kurram at the tehsil level by the year 2045, covering Basic Health Units (BHUs), Rural Health Centers (RHCs), and higher-level hospitals (DHQ/THQ). The projections indicate substantial expansion needs in primary and secondary healthcare infrastructure to accommodate anticipated population growth.

A. Tehsil Upper Kurram

In Tehsil Upper Kurram, a total of 32 additional health institutions are required by 2045, covering 27.00 acres of land. This includes 28 Basic Health Units (BHU), requiring 21.00 acres, and 4 Rural Health Centers (RHC), requiring 6.00 acres. Instead of constructing a new District Headquarters (DHQ) hospital, the plan proposes upgradation of the existing facility. This suggests that while primary and secondary healthcare access needs expansion, tertiary-level services be strengthened through qualitative improvements rather than new land allocation. Overall, Upper Kurram shows significant demand for decentralized primary healthcare infrastructure.

B. Tehsil Central Kurram

Tehsil Central Kurram reflects the highest healthcare demand among the three tehsils. A total of 51 additional institutions are required, covering 41.25 acres of land. This includes 47 BHUs (35.25 acres) and 4 RHCs (6.00 acres). Similar to Upper Kurram, the Tehsil Headquarters (THQ) hospital is proposed for upgradation rather than expansion on new land, with no additional area required for this purpose. The high number of required BHUs indicates strong population concentration and the need for improved primary healthcare coverage. Central Kurram, therefore, represents the major focus area for future healthcare expansion within the district.

C. Tehsil Lower Kurram

Tehsil Lower Kurram requires 25 additional health institutions, with a total land requirement of 20.25 acres. This includes 23 BHUs requiring 17.25 acres and 2 RHCs requiring 3.00 acres. The existing THQ hospital is proposed for upgradation rather than new construction. Compared to Central Kurram, Lower Kurram shows relatively moderate demand, but the requirement remains substantial in terms of primary healthcare coverage.

D. Overall District Health Infrastructure Requirement

Collectively, District Kurram requires 108 additional health institutions (32 in Upper, 51 in Central, and 25 in Lower Kurram), with a total land requirement of 88.50 acres by 2045. The majority of this requirement is concentrated in Basic Health Units, highlighting a strong emphasis on strengthening primary healthcare services at the community level. RHC requirements are comparatively limited but essential for secondary care support. Higher-level hospitals (DHQ/THQ) are proposed for upgradation rather than expansion, indicating that capacity enhancement and service improvement are prioritized over new tertiary facility construction.

Overall, the projections emphasize a decentralized healthcare development strategy focused on expanding primary health coverage while improving the quality and capacity of existing higher-tier hospitals to meet future population demands.

Table 3-58 Tehsil Wise Health Facilities Area Requirements

Tehsil Upper Kuram		
Facility	**Required Institutes 2045**	**Required Area (Acres)**
BHU	28	21.00
RHC	4	6.00
DHQ	Upgradation	
Overall	**32**	**27.00**
Tehsil Central Kuram		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
BHU	47	35.25
RHC	4	6.00
THQ	Upgradation	0.00
Overall	**51**	**41.25**
Tehsil Lower Kuram		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
BHU	23	17.25
RHC	2	3.00
THQ	Upgradation	
Overall	**25**	**20.25**
Total Area Requirements		**88.50**

3.3.2.5.2 Urban Areas Requirements

The below table presents the projected healthcare facility requirements for the major urban areas of District Kurram by 2045. The projections focus primarily on Basic Health Units (BHUs), along with the upgradation of higher-level hospitals (DHQ and THQ), indicating a strategy centered on strengthening primary healthcare access while enhancing existing secondary and tertiary facilities.

A. Parachinar Urban center

In Parachinar Urban Center 7 additional BHUs are required by 2045, covering approximately 5.25 acres of land. Instead of establishing a new District Headquarters (DHQ) hospital, the plan proposes upgradation of the existing DHQ facility. This reflects Parachinar's role as the district's primary urban and administrative center, where healthcare expansion is oriented toward improving service capacity and quality rather than acquiring additional land for tertiary care.

B. Sadda Urban canter

In Sadda Urban Center 8 new BHUs are required, with a total land allocation of 6.00 acres. The existing Tehsil Headquarters (THQ) hospital is proposed for upgradation, suggesting enhancement of service delivery to meet rising population demand. The comparatively higher BHU requirement in Sadda reflects rapid urban growth and increasing need for accessible primary healthcare services.

C. Dogar Proposed Urban Center

For the Dogar Proposed Urban Center 4 additional BHUs are required, requiring 3.00 acres of land. No explicit land allocation is indicated for THQ expansion, implying that existing higher-level facilities may be sufficient or that residents may rely on nearby urban centers for secondary care services. The focus here remains on strengthening primary healthcare coverage.

D. Ali Zai Proposed Urban Center

In Ali Zai Proposed Urban Canter 5 BHUs are projected to be required by 2045, with a total land requirement of 3.75 acres. The THQ hospital is proposed for upgradation rather than expansion through new land allocation. This indicates a planning approach aimed at qualitative improvements in healthcare services while expanding primary care access.

Overall, the total additional land requirement for urban healthcare facilities across District Kurram amounts to 18.00 acres. The majority of this requirement is allocated to BHUs, underscoring a decentralized healthcare development strategy focused on improving primary healthcare accessibility within urban centers. Simultaneously, upgradation of DHQ and THQ hospitals reflects an emphasis on strengthening institutional capacity and service quality without extensive new land acquisition.

Table 3-59 Urban Centers Health Facilities Area Requirements

Parachinar Urban Area		
Facility	**Required Institutes 2045**	**Required Area (Acres)**
BHU	7	5.25
DHQ	Upgradation	
Sadda Urban Area		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
BHU	8	6.00
THQ	Upgradation	
Dogar Proposed Urban Area		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
BHU	4	3.00
THQ		
Ali Zai Proposed Urban Area		
Urban Area	**Required Institutes 2045**	**Required Area (Acres)**
BHU	5	3.75
THQ	Upgradation	
Total Area Requirements		**18.00**

3.3.2.6 Constraints and Challenges in Healthcare for District Kurram

Limited Healthcare Infrastructure: The existing healthcare facilities in District Kurram are insufficient to meet the needs of the population, with only **5 hospitals** providing a total of **522 beds** for an estimated population of **834,090**, resulting in a high population-to-bed ratio of approximately **1,511 people per bed**. This indicates a significant strain on available resources.

Shortage of Healthcare Professionals: The district has a limited number of healthcare professionals, including only **73 doctors**, **46 nurses**, and **3 dental surgeons**, which is inadequate for addressing the healthcare needs of the community effectively. This shortage contributes to longer wait times and reduced quality of care.

Inadequate Access to Essential Medicines: There is a lack of access to essential medicines in primary healthcare facilities, which hampers the ability to provide comprehensive care and manage both communicable and non-communicable diseases effectively.

Poor Road Infrastructure: The lack of adequate road infrastructure poses challenges for patients trying to reach healthcare facilities, particularly in emergencies, which can lead to delays in treatment and increased morbidity.

High Prevalence of Non-Communicable Diseases: The district faces a concerning level of non-communicable diseases, with normal blood pressure prevalence at **69%** and normal blood sugar at **39%**, indicating an urgent need for preventive health services and health education.

Low Health Service Coverage Index: The Universal Health Coverage (UHC) index for District Kurram stands at **34.34**, ranking it **112nd nationally** and **27th provincially**, highlighting significant gaps in health service delivery compared to other regions.

3.3.2.7 Recommendations for Improvement

Enhance Healthcare Infrastructure: Increase the number of hospitals and expand existing facilities to accommodate more beds and services. This could involve constructing new hospitals or upgrading current ones to meet the growing healthcare demands.

Recruit More Healthcare Professionals: Implement recruitment drives and training programs to increase the number of qualified healthcare providers in the district. This could include incentives for medical professionals to work in underserved areas.

Improve Access to Essential Medicines: Ensure that primary healthcare facilities are stocked with essential medicines by establishing supply chains that facilitate regular deliveries and inventory management.

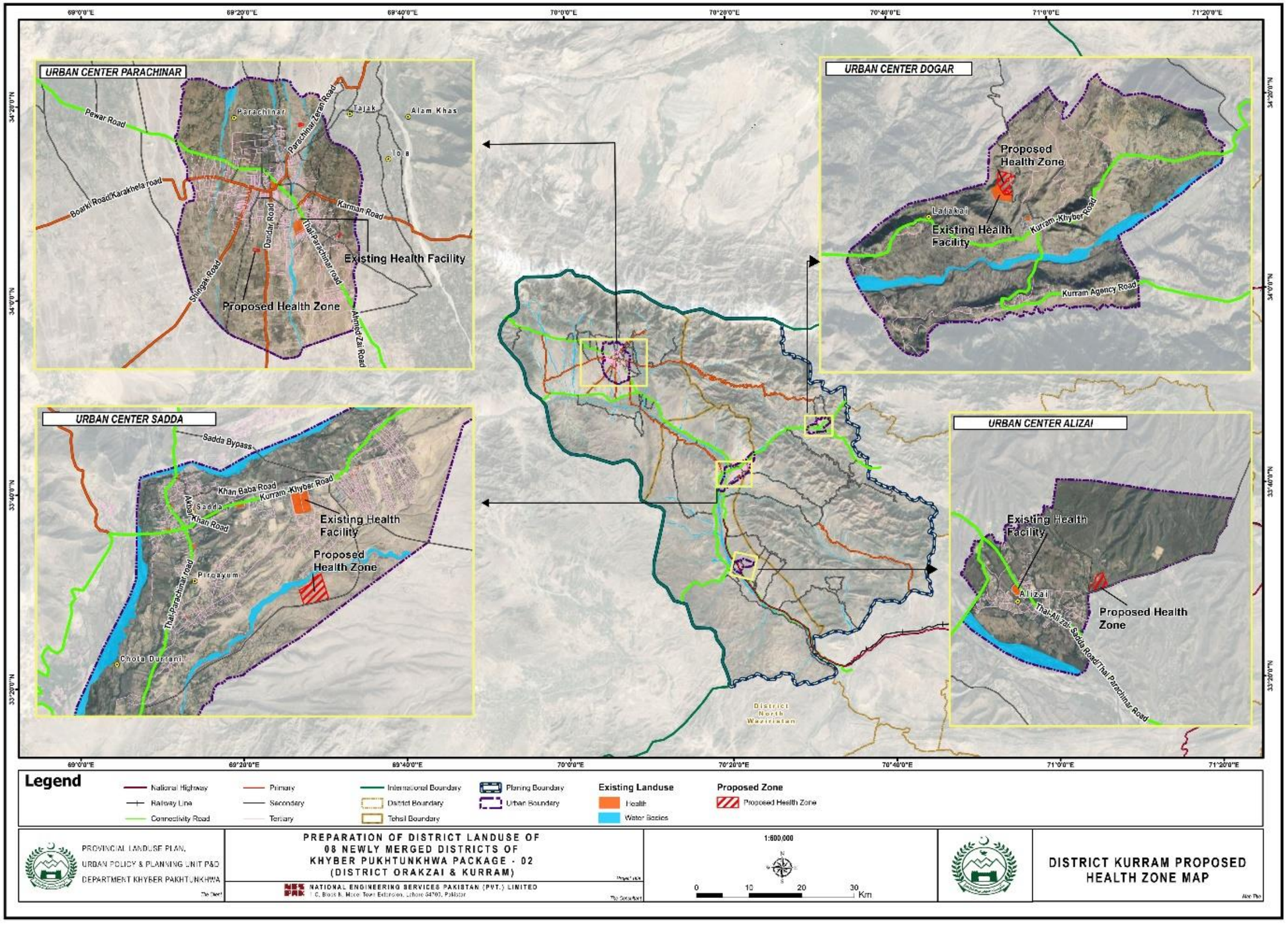
Invest in Road Infrastructure: Collaborate with local government authorities to improve road access to healthcare facilities, ensuring that patients can reach hospitals quickly, especially during emergencies.

Focus on Preventive Health Services: Launch community health education programs aimed at promoting healthy lifestyles, nutrition, and regular health screenings to address the rising prevalence of non-communicable diseases.

Strengthen Data Collection and Monitoring: Establish robust systems for collecting data on health service utilization, disease prevalence, and patient outcomes to inform policy decisions and resource allocation effectively.

Engage Community Stakeholders: Involve community leaders and stakeholders in health planning processes to ensure that local needs are addressed and that health initiatives are culturally appropriate and well-received.

By addressing these constraints and implementing the recommended strategies, District Kurram can significantly improve its healthcare delivery system, ultimately enhancing health outcomes for its residents.



Map 3-9 District Kurram proposed Health Zon

3.3.3 Recreation

The relationship between the built environment and the overall health of a community encompassing physical, social, and economic well-being is significant. Over the past few decades, urban planning has predominantly focused on vehicle-dependent environments, which have inadvertently fostered issues such as obesity, poor health outcomes, social isolation, and increased infrastructure costs. This sprawling land use has altered travel behaviors, contributed to physical inactivity, and led to escalating healthcare costs for both individuals and the community at large.

In contrast, planning for parks and recreational facilities can play a pivotal role in promoting active lifestyles, fostering healthy communities, and reducing healthcare and transportation expenses. Recreational facilities are vital components of human life, taking various forms influenced by individual interests as well as the surrounding environment.

A diverse range of recreational activities includes:

- **Sports**: Facilities for team sports, individual sports, and fitness activities.
- **Hotels and Hill Resorts**: Accommodations that provide leisure activities and relaxation opportunities.
- **Historical and Religious Places**: Sites that offer cultural enrichment and promote community heritage.
- **Libraries**: Spaces that encourage learning, literacy, and community engagement.
- **Museums**: Institutions that preserve cultural artifacts and provide educational experiences.
- **Zoos**: Facilities that promote wildlife conservation and education about biodiversity.
- **Open Spaces**: Areas that provide opportunities for outdoor activities and community gatherings.
- **Parks**: Green spaces designed for recreation, relaxation, and environmental sustainability.
- **Playgrounds**: Safe areas for children to engage in physical activity and play.

By prioritizing the development of these recreational facilities, communities can enhance residents' quality of life, encourage social interaction, promote physical activity, and ultimately contribute to a healthier population. Investing in recreation not only benefits individual well-being but also strengthens community ties and fosters economic growth through increased tourism and local business support.

3.3.3.1 Sports Facilities

Sporting events play a vital role in fostering healthy, active communities. With growing awareness of health and longevity, such events have gained popularity, and governments increasingly see them as valuable investments in community well-being. Sports promote physical fitness, social cohesion, and overall health.

In District Kurram, Khyber Pakhtunkhwa, significant progress has been made in developing sports infrastructure as part of broader land use and zoning plans. Major facilities like the Parachinar Sports Complex and Jinnah Stadium host local and regional events, serving as key centers for youth engagement and community building. The Parachinar Sports Complex, in particular, offers training and event facilities that promote fitness and unity among residents.

Several football grounds across the district also cater to the growing interest in sports, ensuring accessibility for both urban and rural populations. Their inclusion in zoning plans enhances recreational opportunities and supports youth development.

Looking ahead, the provincial government aims to expand sports infrastructure through new playgrounds and regional tournaments, fostering a stronger sports culture and boosting local economies. These initiatives form an essential part of Kurram's land use strategy, contributing to residents' physical, social, and economic well-being while nurturing local talent and encouraging a healthy, active lifestyle.

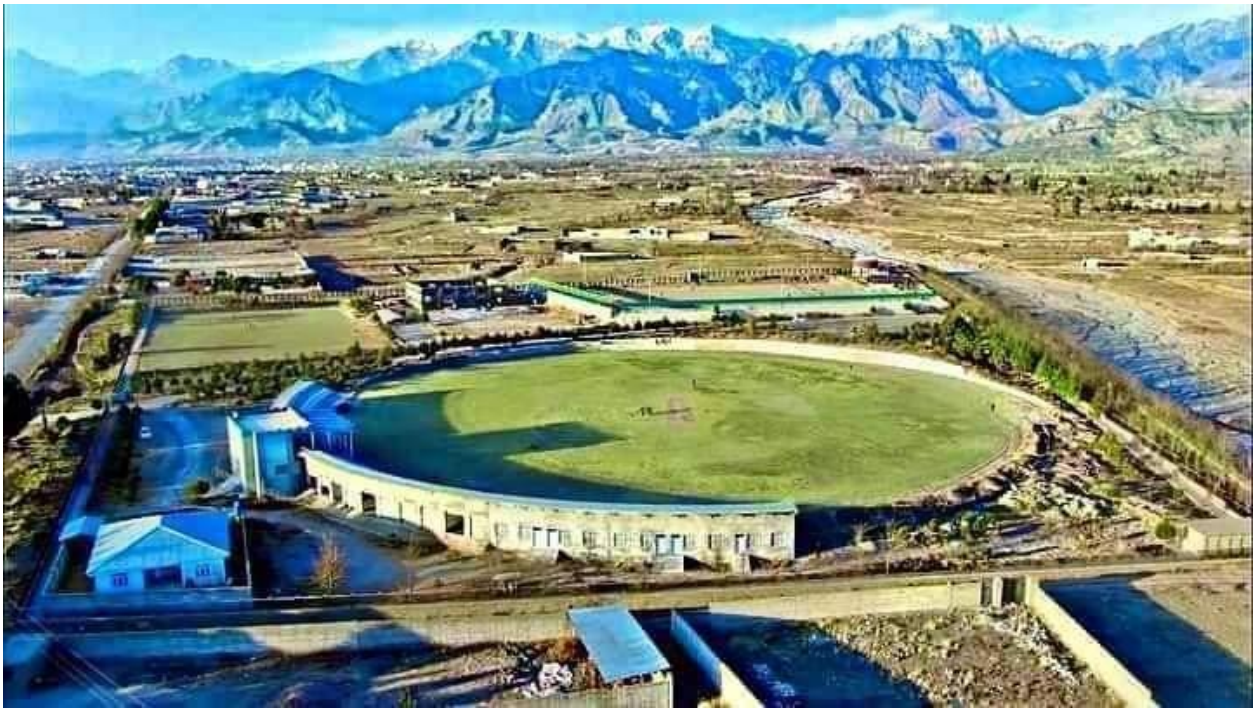
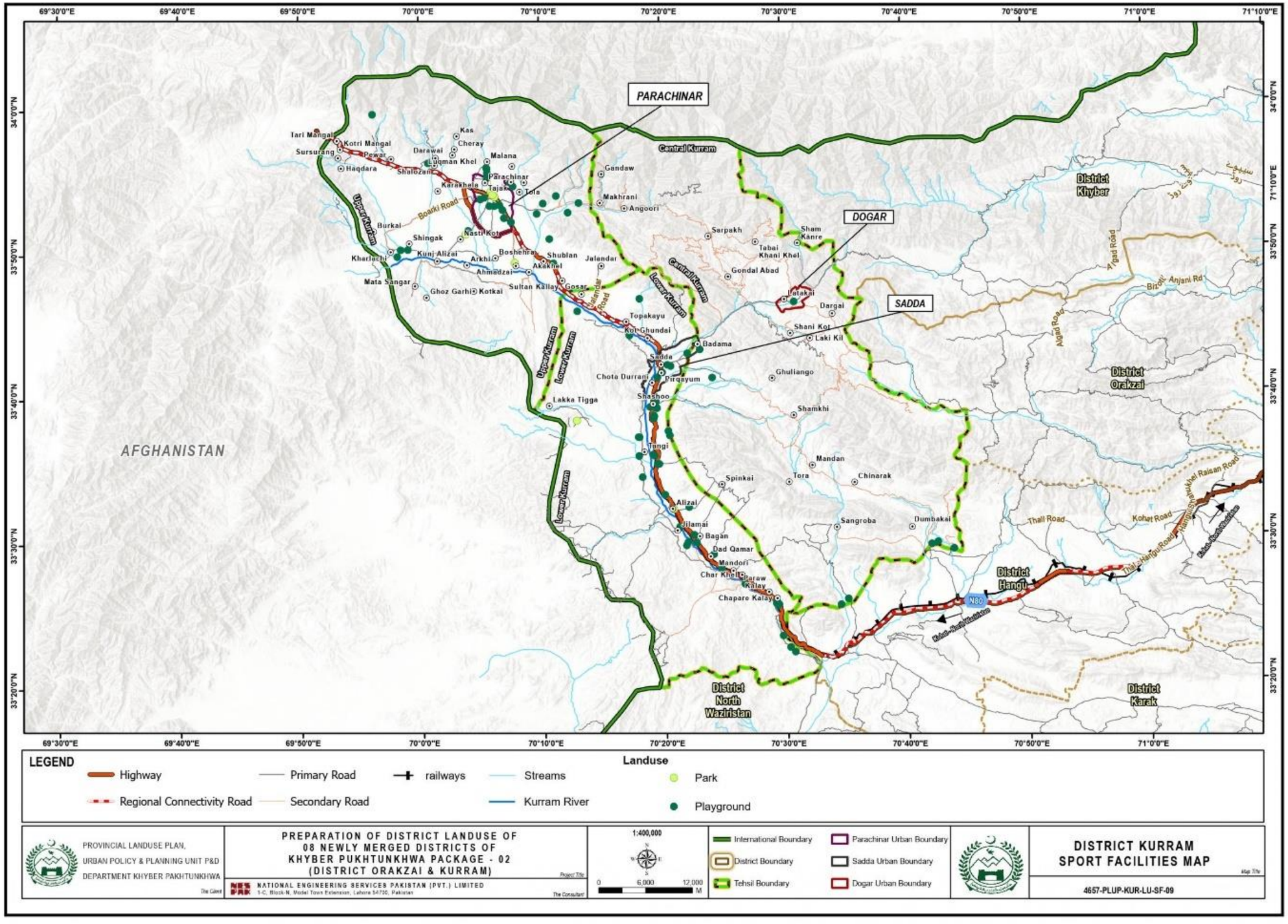


Figure 3-27 Parachinar sport complex



Map 3-10 Existing Sports Facilities Map

3.3.3.2 Entertainment and Tourism

The tourism and entertainment industries are closely linked, as entertainment enhances the appeal and marketability of tourist destinations. For instance, heritage sites can attract more visitors through complementary experiences such as documentaries or cultural performances. Integrating entertainment into tourism not only enriches visitor experiences but also supports the preservation of natural and cultural resources by diversifying attractions and reducing pressure on overused sites.

District Kurram in Khyber Pakhtunkhwa, Pakistan, offers immense tourism potential with its scenic landscapes, historical landmarks, and rich cultural heritage. The district provides a unique blend of adventure, serenity, and tradition, making it an emerging destination for travelers seeking both recreation and cultural immersion. Below is a list of notable tourist attractions in the district.

3.3.3.3 Recommendations

To address these challenges and unlock the tourism potential of District Kurram, several recommendations can be implemented:

Enhance Security Measures: Collaborate with local law enforcement agencies to improve safety in tourist areas, thereby boosting visitor confidence. Establishing a visible security presence can help reassure tourists.

Invest in Infrastructure Development: Prioritize the construction and maintenance of roads leading to tourist sites. Improving transportation options will facilitate easier access for visitors and enhance their overall experience.

Expand Accommodation Facilities: Encourage private investment in hospitality services by providing incentives for building hotels, motels, and guesthouses near popular tourist destinations. This will help accommodate more visitors and improve their stay.

Promote Sustainable Tourism Practices: Implement eco-friendly practices in tourism development to protect natural resources. This includes creating guidelines for sustainable tourism activities that minimize environmental impact while promoting conservation efforts.

Increase Marketing Efforts: Develop a comprehensive marketing strategy to promote Kurram tourist attractions through digital platforms, social media, and travel agencies. Highlighting unique features such as natural beauty, cultural heritage, and recreational opportunities can attract more visitors.

Engage Local Communities: Involve local communities in tourism planning and development processes to ensure that their needs are met while fostering a sense of ownership over local resources. Training programs can be established to equip residents with skills related to hospitality and tourism management.

Develop Tourist Packages: Create attractive tour packages that combine visits to various sites within Kurram, including cultural experiences, adventure activities, and nature exploration. This can enhance the appeal of the region as a comprehensive travel destination.

By addressing these constraints through targeted strategies, District Kurram can enhance its tourism sector, promote economic growth, and improve the quality of life for its residents while preserving its rich natural and cultural heritage.

3.3.3.4 Historical and Cultural Heritage

District Kurram, rich in history and cultural heritage, is home to several significant historical and cultural sites that offer a glimpse into the region's past and traditions. These sites reflect the district's strategic importance, unique cultural practices, and the historical significance of the tribes and communities that have inhabited the area for centuries.

1. Peiwar Pass

Peiwar Pass, located in Kurram District, is a historically significant mountain pass that has played a crucial role in regional conflicts, particularly during the Second Anglo-Afghan War. Its strategic location connects Pakistan's Kurram Valley with Afghanistan's Paktia Province, making it an important trade and military route. The pass offers breathtaking views of the surrounding mountains and valleys, adding to its appeal as a scenic destination for photography and nature lovers. However, its accessibility remains a major weakness. Due to its remote location, getting to Peiwar Pass can be challenging, and limited infrastructure around the area further reduces its attractiveness for tourists. Additionally, given its proximity to conflict zones, the security situation may deter international visitors from exploring the pass.

2. Khar Lachi Fort

Khar Lachi Fort is an ancient fortification situated in Kurram District that has held strategic importance throughout history, particularly during military conflicts. The fort's elevated position provides stunning panoramic views of the surrounding landscapes, making it a prime spot for photography enthusiasts. Its historical significance, tied to the defense of the region, offers visitors a glimpse into the past. However, the fort faces several challenges. It suffers from neglect, with much of the structure in a state of disrepair, which hampers its appeal to history lovers and tourists. The lack of proper tourist infrastructure, including clear access roads and amenities, makes it difficult for visitors to reach and fully experience the site.

3. Chapri Fort

Chapri Fort, located in the Kurram District, is a significant historical site due to its military importance in the region. The fort's elevated location offers commanding views of the surrounding valleys and serves as an excellent spot for photography. Visitors can learn about the region's military history and its role in various historical conflicts. Despite its historical value, the fort is somewhat neglected, and its condition has deteriorated over time. This, along with the limited accessibility and absence of tourist services such as guides, makes it a less appealing destination for travelers. The fort's remote location adds to the challenge of reaching the site, limiting its potential for tourism.

4. Mount Sikaram

Mount Sikaram, standing at 4,755 meters, is the highest peak in the Spīn Ghar mountain range and offers some of the most challenging treks in the region. Known for its spectacular views and rugged terrain, it attracts adventure seekers and trekkers looking for an off-the-beaten-path experience. The area is steeped in historical significance due to its role in military campaigns during the British colonial era. However, its accessibility is a major challenge. The trek to Mount Sikaram is physically demanding, requiring experienced hikers, which limits its appeal to casual tourists. Additionally, the security concerns due to the proximity of conflict zones near the Afghanistan border may discourage international tourists from visiting the area.

5. Tari Mangal

Tari Mangal, located near the Durand Line, holds historical importance for its role during the Soviet-Afghan War, serving as a camp for the Mujahideen. The town's unique location near the border between Pakistan and Afghanistan offers a blend of cultural experiences influenced by both nations. The region provides an opportunity for cultural immersion and understanding of the geopolitical significance of the area. However, the town faces significant challenges for tourism development. Tari Mangal lacks proper infrastructure, including roads and accommodations, which makes it difficult for visitors to explore the site comfortably. Moreover, the ongoing security concerns in the region due to its proximity to conflict zones may deter tourists from visiting.

6. Shalozan

Shalozan is a picturesque area in Kurram District, known for its lush green fields and tranquil environment. It is an ideal destination for nature walks, picnics, and experiencing the rural lifestyle of the Kurram Valley's inhabitants. The peaceful and serene atmosphere of Shalozan offers a perfect retreat for those seeking a break from urban life. However, the area is isolated, and its lack of basic infrastructure, such as hotels, transport services, and tourist amenities, makes it a challenging destination for tourists. The absence of clear tourist routes and organized services further limits the area's potential as a mainstream tourist destination.

7. Zairan

Zairan, a village in Kurram District, offers visitors a chance to experience the traditional lifestyle of local tribes. Surrounded by forests and rivers, Zairan is a peaceful and scenic village where eco-tourism can thrive. Visitors can interact with the local communities, learning about their customs and traditions. Despite its cultural richness, Zairan faces several challenges. The village is not equipped with modern tourism infrastructure, such as accommodation, dining options, or transport services, which makes it difficult for tourists to visit comfortably. The lack of awareness about the village's potential as a cultural and eco-tourism destination further limits its growth.

8. Parachinar

Parachinar, the capital of Kurram District, is rich in cultural and historical significance. The town is a melting pot of Afghan and Pakistani cultures, offering a unique experience for visitors. Parachinar's local markets, vibrant culture, and proximity to Afghanistan make it an intriguing destination for cultural immersion. The town is also home to several historical landmarks that reflect the region's military and cultural past. However, security concerns due to its location near the Afghanistan border have posed a challenge for tourism. While Parachinar offers a unique cultural experience, the lack of comprehensive tourism infrastructure, such as organized tours and guides, limits its accessibility for many visitors.

9. Koh-e-Sufaid

Koh-e-Sufaid, meaning 'White Mountain,' is a snow-capped mountain range in Kurram District known for its rugged terrain and breathtaking views. The range offers challenging trekking opportunities for adventure enthusiasts. The pristine environment and less-frequented nature of the area make it an ideal destination for those seeking solitude and a connection with nature. However, Koh-e-Sufaid's remoteness and difficult access pose significant challenges for tourism development. The lack of infrastructure, such as roads, accommodations, and proper signage, limits the potential for tourists to

explore the region safely and comfortably. Furthermore, the absence of local tourism management means that the site remains largely unknown to the wider public.

10. Jinnah Stadium (Cultural Venue)

Jinnah Stadium, located in Parachinar, plays a vital role in the cultural and social life of Kurram District. It hosts a variety of local events, including sports competitions, tribal gatherings, and cultural celebrations. The stadium is a hub for community engagement, offering a platform for the local population to showcase their traditions and talents. However, despite its importance, the stadium faces challenges in terms of its appeal to international tourists. The limited tourism infrastructure and the focus on local events mean that it may not attract a wide variety of international visitors. Additionally, the lack of modern facilities and amenities reduces its overall tourist appeal for those seeking a more comfortable visit.

Each of Kurram District's historical and cultural heritage sites offers a unique opportunity to experience the region's rich history and traditions. However, several challenges hinder their full potential as tourism destinations, including limited infrastructure, remote locations, and security concerns. With proper investment in infrastructure and greater focus on enhancing accessibility and safety, these sites could play a pivotal role in the district's tourism development. Addressing these challenges would allow visitors to fully appreciate the historical significance and natural beauty that Kurram has to offer.

3.3.3.5 Parks and Zoos in kurram

District Kurram has significant potential for developing parks, playgrounds, and zoos, which can enhance the quality of life for residents and promote community engagement. These recreational facilities play a crucial role in fostering physical activity, social interaction, and environmental awareness among local populations.

3.3.3.5.1 Parks

Kurram currently features four notable parks that serve the community:

1. Alizai Park Kurram

Alizai Park, situated in a region of Kurram that is more rural, acts as an anchor in terms of recreational development for the community. This park can be seen as a local public amenity that contributes to the mental and physical well-being of residents. Given that Alizai is in a relatively underdeveloped area, the establishment and maintenance of green spaces like Alizai Park can also serve as a step toward promoting equitable access to recreational resources. This park has a potential for sustainable development that blends recreational use with natural resource preservation. This green space might also offer opportunities for ecotourism and education on local biodiversity, aligning with sustainable and community-centered urban growth principles.

2. Kurram Melta Park

Kurram Melta Park, likely situated in a more central location within Kurram District, plays a significant role in enhancing the urban fabric of the area. Kurram Melta serve as vital public spaces that promote social interaction and collective community activities. They can also have multifunctional uses, from serving as venues for cultural festivals to acting as venues for sports and wellness activities. With Kurram District being a mountainous region, ensuring that parks like Melta Park offer accessible pathways for diverse users (including those with mobility impairments) would be an important planning

consideration. Furthermore, Melta Park can be integrated into broader urban mobility frameworks, ensuring it's easily reachable from surrounding neighborhoods via pedestrian and bicycle pathways.

3. Edhi Park

Named after the legendary philanthropist, Edhi Park carries symbolic weight in terms of community values and human welfare. This park presents opportunities for strengthening social infrastructure by promoting a sense of unity, shared history, and collective responsibility. The park's design would need to reflect these values, offering inclusive spaces where different community groups – from youth to elderly individuals – can engage in various activities. The fact that it is named after Abdul Sattar Edhi further suggests the importance of community care, and need to consider incorporating spaces for charitable events, health outreach programs, and volunteer-driven activities. Proper landscaping, including shaded areas and walking trails, would ensure that the park serves as both a recreational and social hub for the local population.

4. Shaheed Park

Shaheed Park stands as a tribute to those who have sacrificed their lives for the community or country. Shaheed Park provide an important space for commemoration, education, and reflection. They often become central to community identity and pride. The administration would approach Shaheed Park with a focus on creating a space that honors its historical significance while also providing a sanctuary for relaxation and reflection. Its integration into the broader urban environment could include developing pedestrian-friendly routes that lead to the park, ensuring it is a space that fosters quiet contemplation and community remembrance.

Potential Benefits:

Physical Activity: Parks encourage outdoor activities such as walking, jogging, and sports, contributing to improved physical health.

Social Interaction: They serve as communal spaces where families and friends can gather, fostering social ties within the community.

Environmental Awareness: Parks can be designed to include educational components about local flora and fauna, promoting conservation efforts.

3.3.3.5.2 Zoos

Currently, there are no zoos in District Kurram. The establishment of a zoo would not only serve as an attraction for tourists but also promote wildlife conservation and education about biodiversity. A zoo could provide an opportunity for residents to learn about various species and the importance of protecting their habitats.

Potential Benefits of a Zoo:

Wildlife Conservation: Zoos play a critical role in conservation efforts by educating the public about endangered species and their ecosystems.

Educational Programs: They can offer educational programs for schools and community groups to raise awareness about wildlife preservation.

Tourism Attraction: A well-managed zoo could attract visitors from neighboring districts and provinces, boosting local tourism.

The development of parks in District Kurram presents an opportunity to enhance community well-being while promoting physical activity, social interaction, and environmental awareness. While there is currently no zoo in the district, establishing one could further enrich the recreational landscape. By investing in these facilities, local authorities can create vibrant spaces that contribute positively to the quality of life for residents and attract visitors to the region. Prioritizing these developments will not only foster a healthier population but also strengthen community ties and support economic growth through increased tourism.

3.3.3.6 Existing Recreational Facility Satisfaction Tehsil-Wise

3.3.3.6.1 Satisfaction Levels

Based on the field data, satisfaction levels with the existing recreational facilities in District Kurram show that out of a total of 513 respondents, 229(34%) expressed satisfaction, while the majority, 584 (66%), indicated dissatisfaction. This indicates a significant opportunity for improvement in the recreational amenities available in the area.

Table 3-60: Tehsil wise Recreation Satisfaction Level

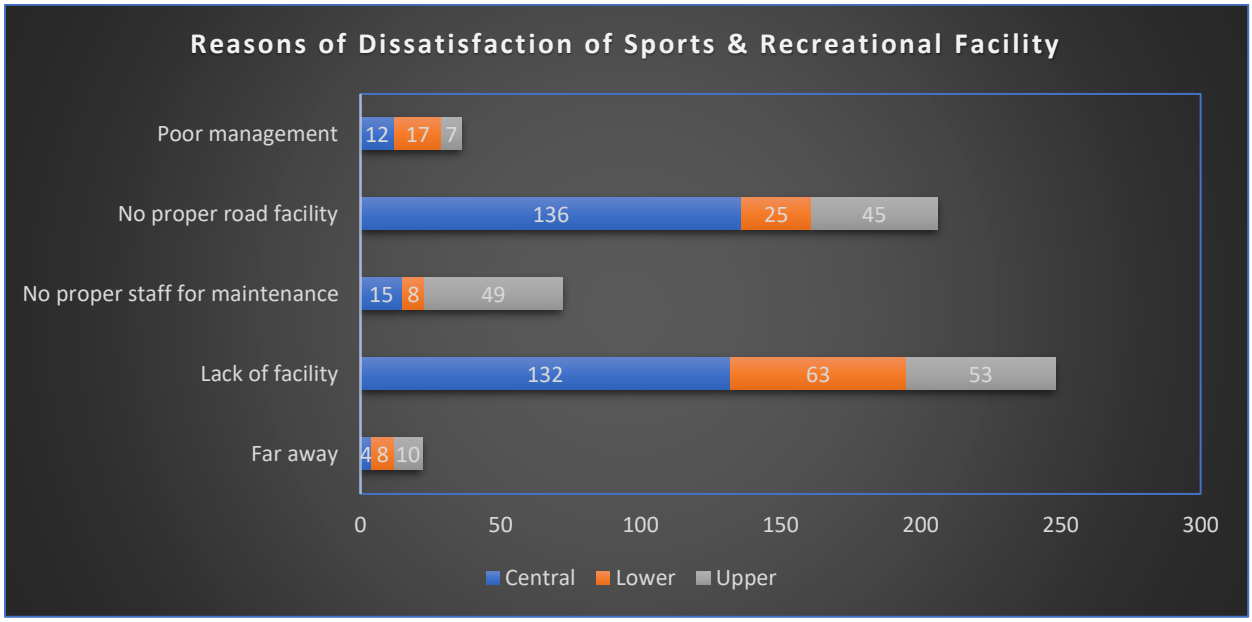
Satisfaction Level	Central	Lower	Upper	Total
Yes	26	75	198	229
No	229	121	164	584
Total	325	196	362	883

3.3.3.6.2 Reasons for Dissatisfaction

The major reasons for dissatisfaction among respondents regarding sports and recreational facilities are outlined in the table below:

Table 3-61:Tehsil wise Recreation Dissatisfaction Level

Response	Central	Lower	Upper	Total	Percentages
Far away	4	8	10	22	2%
Lack of facility	132	63	53	248	28%
No proper staff for maintenance	15	8	49	72	8%
No proper road facility	136	25	45	206	23%
Poor management	12	17	7	36	4%
Total	299	121	164	584	66%



Graph 3-11: Reasons of Dissatisfaction of Sports & Recreational Facility

The table and graph highlight major issues affecting recreational spaces in Kurram District. The primary concern, cited by 28% of respondents, is the lack of proper facilities, particularly in Central Kurram where 132 people expressed dissatisfaction. Another key issue, noted by 23%, is poor road access to these areas, limiting residents' ability to reach sports and recreation sites. Additionally, 8% pointed to a lack of maintenance staff, while 4% cited poor management, leading to deteriorating conditions. A smaller portion (2%) mentioned long distances to facilities.

Overall, dissatisfaction mainly arises from inadequate facilities, poor accessibility, and weak maintenance and management, underscoring the need for improved infrastructure and effective administration of recreational spaces in Kurram District.

3.3.3.7 Planning Standards for Establishing New Park and Playgrounds

Traditional standards that allocate 10% of the gross area for parks and playgrounds have become outdated and impractical. The development of recreational facilities should instead be linked to actual demand rather than fixed ratios. Space allocation must be tailored to community needs and population thresholds to ensure effective and sustainable use.

Recreational space standards should depend on facility size and specific local demand. For passive recreation areas, flexible sizing is essential and should reflect community characteristics. For instance, a tot-lot can be as small as 250 square meters, but it must be integrated into a larger Mohalla open space to function effectively. These Mohalla spaces should ideally be located within 200 meters of residential areas and have an average size of 4,000 square meters (about one acre).

Neighborhood parks should support activities like brisk walking and jogging for up to two hours, requiring 8–10 acres of land. In high-density areas, they may utilize up to 7.5% of the gross neighborhood area. Community parks, which include picnic facilities, are also vital but require greater capital investment compared to smaller recreation spaces.

The following table outlines the National Reference Manual standards for passive recreation facilities at various settlement levels based on population thresholds:

Table 3-62 Passive Recreation Facilities Allocation Criteria

Type of Facility	Description	Allocation Criteria (Population)	Area (Hectares)	Hectare/1000 Pop
City Park	Wide range of amusement facilities, fountains, lakes, landscaping, etc.	400,000	12 to 15	0.03 to 0.037
Community Park	Selected amusement facilities, fountains, lakes, landscaping, etc.	100,000	4 to 5	0.04 to 0.05
Neighborhood Park	Wide range of child play fixtures, walking & jogging paths.	25,000	3.25 to 4	0.13 to 0.16
Mohalla Parks (3-8 per Mohalla; average size 0.45 ha each)	Tot lots with slides, swings, seesaws; other spaces with some turf	6,250	1.6 to 3.6	0.26 to 0.58

By adopting these updated planning standards, communities can create recreational spaces that are not only functional but also responsive to the needs of their residents.

3.3.3.8 Area Requirements and Proposal for Reactional Facilities

The planning of recreational facilities for the urban areas of District Kurram has been carried out using population-based allocation standards as per NRM. According to the recreational planning criteria, community parks require approximately 0.04–0.05 hectares per 1,000 population. For planning calculations, an average value of 0.045 hectares (0.10-0.12 acre) per 1,000 population has been applied. The resulting hectare values were then converted into acres (1 hectare = 2.471 acres) to estimate the minimum recreational land requirement for each urban center by 2045.

A. Parachinar Urban Area

Parachinar is projected to have a population of 99,682 by 2045. Based on the community park standard of 0.045 hectares per 1,000 population, the estimated recreational land requirement is approximately 4.49 hectares, which is equivalent to about 11.10 acres. The existing recreational area in Parachinar is 44.61 acres, already exceeding the minimum population-based requirement. However, to enhance recreational accessibility and improve the distribution of open spaces, an additional 7.55 acres has been proposed for parks. While no new playgrounds or sports complexes are proposed in the current Parachinar approved master plan, the additional park area will support passive recreation, community gatherings, and urban green space development. With this proposed allocation, the total recreational area in Parachinar will increase to 52.16 acres, strengthening its role as a major recreational center within the district.

Table 3-63 Parachinar Reactional Area Requirements and Proposals

Type	Population 2045	Required Area (Acres)	Existing area (Acres)	Proposed Area (Acre)	Sub Total
Parks	99682	10-12.5 acres	44.61	7.55	**Sub Total**
Playground		Minimum 5.28 Acres			
Sport Complex					
Total		**18.3**	**44.61**	**7.55**	**52.16**

B. Sadda Urban Area

Sadda is projected to have a population of 140,901 by 2045. Applying the community park standard, the required recreational area is approximately 6.34 hectares, which equals about 15.67 acres. The existing recreational land in Sadda is 39.76 acres, which already exceeds the minimum requirement. Nevertheless, due to the significant projected population growth and the need for diversified recreational facilities, additional land allocations have been proposed. These include 21.5 acres for parks, 9.2 acres for playgrounds, and 15 acres for a sports complex, resulting in a total proposed recreational expansion of 45.7 acres. After incorporating these proposals, the total recreational land in Sadda will reach 85.46 acres, providing improved recreational opportunities and supporting the development of organized sports and community activities.

Table 3-64 Sadda Reactional Area Requirements and Proposals

Type	Population 2045	Required Area (Acres)	Existing area (Acres)	Proposed Area (Acre)	Sub Total
Parks	140901	10-12.5 acres	39.76	21.5	
Playground		Minimum 5.28 Acres		9.2	
Sport Complex				15	
Total		**18.3**	**39.76**	**45.7**	**85.46**

C. Dogar Proposed Urban Area

Dogar is expected to have a population of 52,884 by 2045. Based on the community park planning standard, the minimum recreational land requirement is approximately 2.38 hectares, equivalent to about 5.88 acres. Currently, Dogar has only 3.63 acres of recreational space, indicating a deficit in recreational infrastructure. To address this shortfall and support the development of the proposed urban area, 21 acres of additional recreational land have been proposed. This includes 5 acres for parks, 5 acres for playgrounds, and 11 acres for a sports complex. These additions will increase the total recreational area to 24.63 acres, ensuring adequate recreational facilities and enhancing urban livability for future residents.

Table 3-65 Dogar Reactional Area Requirements and Proposals

Type	Population 2045	Required Area (Acres)	Existing area (Acres)	Proposed Area (Acre)	Sub Total
Parks	52884	10-12.5 acres	3.63	5	
Playground		Minimum 5.28 Acres		5	
Sport Complex				11	
Total		**18.3**	**3.63**	**21**	**24.63**

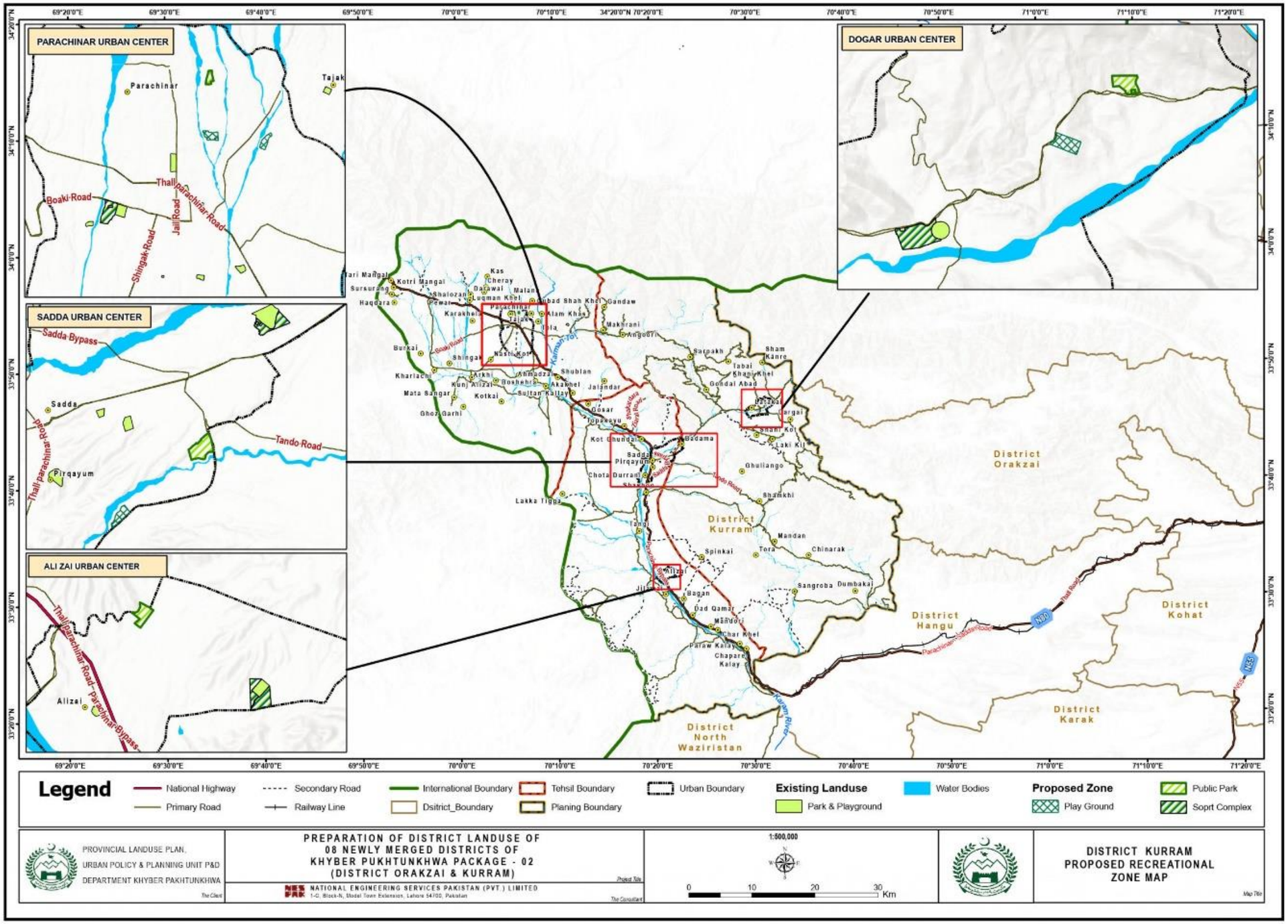
D. Ali Zai Proposed Urban Area

Ali Zai is projected to reach a population of 60,270 by 2045. Using the community park allocation standard, the required recreational land is approximately 2.71 hectares, or about 6.70 acres. The existing recreational land in Ali Zai is 8.74 acres, which already satisfies the minimum population-based requirement. However, further expansion has been proposed to improve recreational infrastructure and accommodate future growth. The proposal includes 8.2 acres for parks, 5 acres for playgrounds, and 14 acres for a sports complex, totaling 27.2 acres of additional recreational land. With these additions, the total recreational area in Ali Zai will increase to 35.94 acres, significantly enhancing access to open spaces and organized recreational activities.

Table 3-66 Ali Zai Reactional Area Requirements and Proposals

Type	Population 2045	Required Area (Acres)	Existing area (Acres)	Proposed Area (Acre)	Sub Total
Parks	60270	10-12.5 acres	8.74	8.2	
Playground		Minimum 5.28 Acres		5	
Sport Complex				14	
Total		**18.3**	**8.74**	**27.2**	**35.94**

The population-based analysis indicates that most urban centers in District Kurram either meet or exceed the minimum recreational land requirements based on community park standards. However, the proposed recreational development strategy goes beyond minimum requirements by incorporating additional parks, playgrounds, and sports complexes to improve spatial distribution, support organized sports activities, and enhance urban environmental quality. The proposed allocations will therefore contribute to healthier urban environments, improved public well-being, and more balanced urban development across the district's major towns.



Map 3-11 District Kurram Proposed Recreational Zone Map

3.3.4 Security Facilities

The institutional capacity of the District Police refers to its overall ability, resources, and infrastructure to effectively perform law enforcement duties. This includes personnel strength, training, infrastructure, inter-agency collaboration, and professional development. Personnel form a key component, covering officers' skills in investigation, community policing, and traffic management. Infrastructure includes police stations, posts, vehicles, communication systems, and forensic facilities, which are essential for efficient operations.

Coordination with other law enforcement bodies, government departments, and communities is vital for addressing crime, counterterrorism, and maintaining public order. Continuous training ensures officers stay updated on laws, techniques, and best practices.

At the provincial level, the Central Police Office (CPO) Peshawar, headed by the Provincial Police Officer (PPO/IGP), oversees operations through multiple branches including Administration, Operations, Investigation, IT, Infrastructure, and Training. The province is divided into seven regions Peshawar, Malakand, Mardan, Hazara, Bannu, Kohat, and D.I. Khan each led by a Regional Police Officer (RPO). Every district, including those in the Newly Merged Districts (NMDs), is managed by a District Police Officer (DPO).

The KP Police also operate specialized units such as the Counter Terrorism Department, Special Branch, Elite Force, and Special Security Unit (SSU) to support district-level policing and ensure effective law and order management.

3.3.4.1 Standards for Establishing New Security Facilities

The criteria for determining the locations of new police stations are influenced by the specific needs, priorities, and policies of the governing authority responsible for law enforcement. However, several common factors typically guide the decision-making process. These include population density, crime rates, geographic size and terrain, response times, community needs and concerns, strategic considerations, and resource availability.

By considering these factors alongside local context, data analysis, community feedback, and strategic planning, authorities can develop allocation criteria that prioritize the establishment of new police stations in areas where they are most needed. This approach is essential for maximizing the impact on public safety and security.

The Khyber Pakhtunkhwa Police have established specific regulations regarding the formation of new police stations and check posts. A committee composed of seven senior police officers, chaired by the Additional Inspector General of Police Headquarters (KP), has been formed to oversee this process. Before approval by this committee, the following requirements must be submitted by the relevant Superintendents of Police:

Explanatory Note

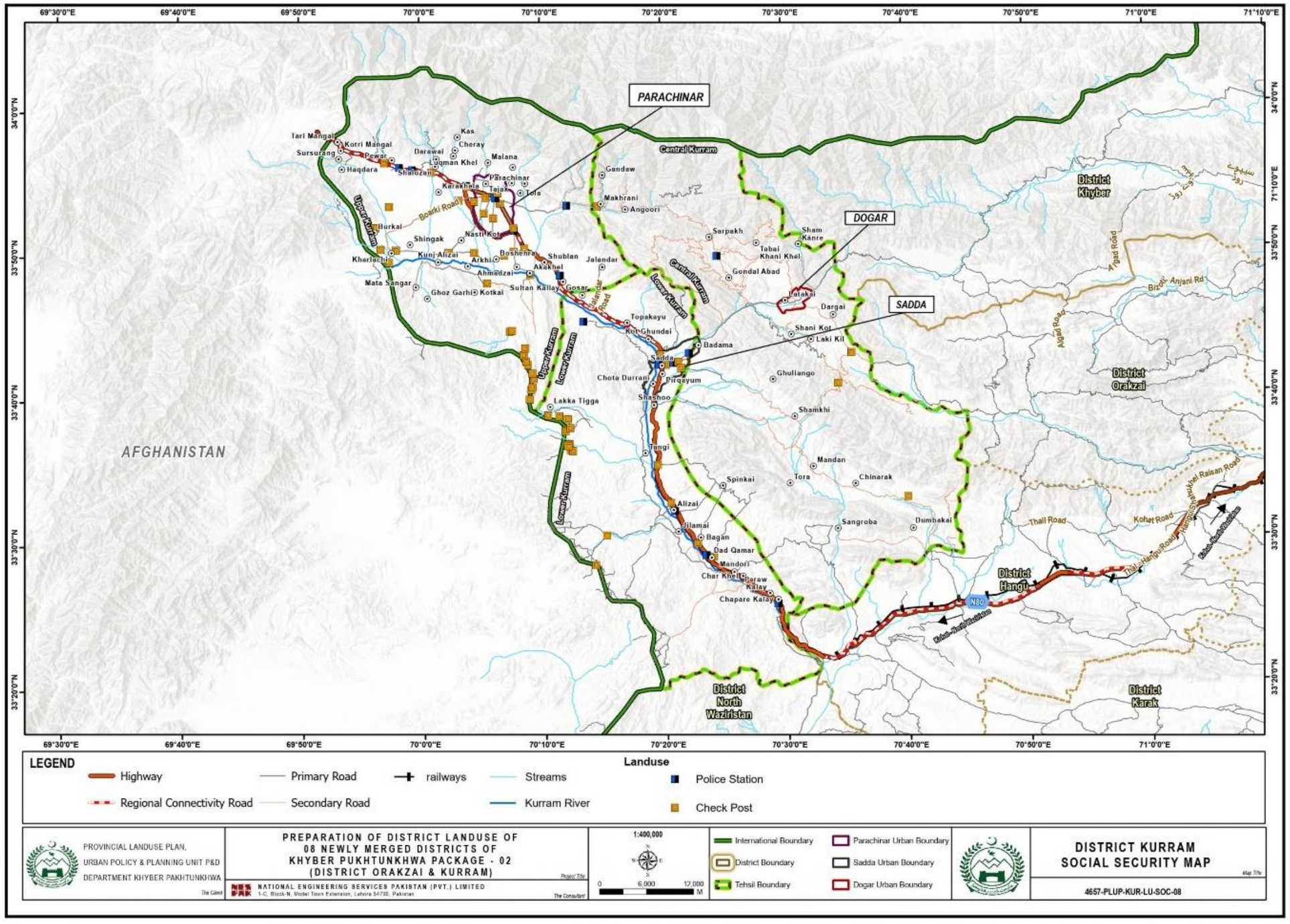
- Five years of crime statistics
- Population data for the area
- List of villages
- Area for attachment and detachment
- Cost estimate

- Required personnel and logistics
- Availability of land along with documentation

The allocation of new police stations varies significantly across provinces and countries, with distinct standards tailored to address specific regional needs. Differences can be seen in criteria such as required population thresholds, crime rates, land requirements, and proximity to existing police stations.

According to the National Reference Manual for Infrastructure and Planning, it is recommended that one police station with staff quarters/barracks and a judicial lock-up be established for every 50,000 residents. The site area may range from 0.4 to 0.8 hectares depending on the prevailing density in the locality. Additionally, police posts without judicial lock-ups may be established in areas with scattered populations or high crime rates, with a site area not exceeding 500 square kilometers.

By adhering to these standards and criteria, authorities can ensure that new police stations are effectively positioned to meet community needs while enhancing overall law enforcement capabilities.



Map 3-12 Social Security Points in District Kurram

3.3.5 Religious Facilities

Religious facilities play a key role in shaping Kurram District's cultural and social fabric. Their distribution reflects the region's diverse communities and spiritual needs. The presence of 3 churches highlights the Christian community's practices, though their number remains small. The single Eid Gah serves as an important site for communal prayers and religious rituals rooted in local traditions.

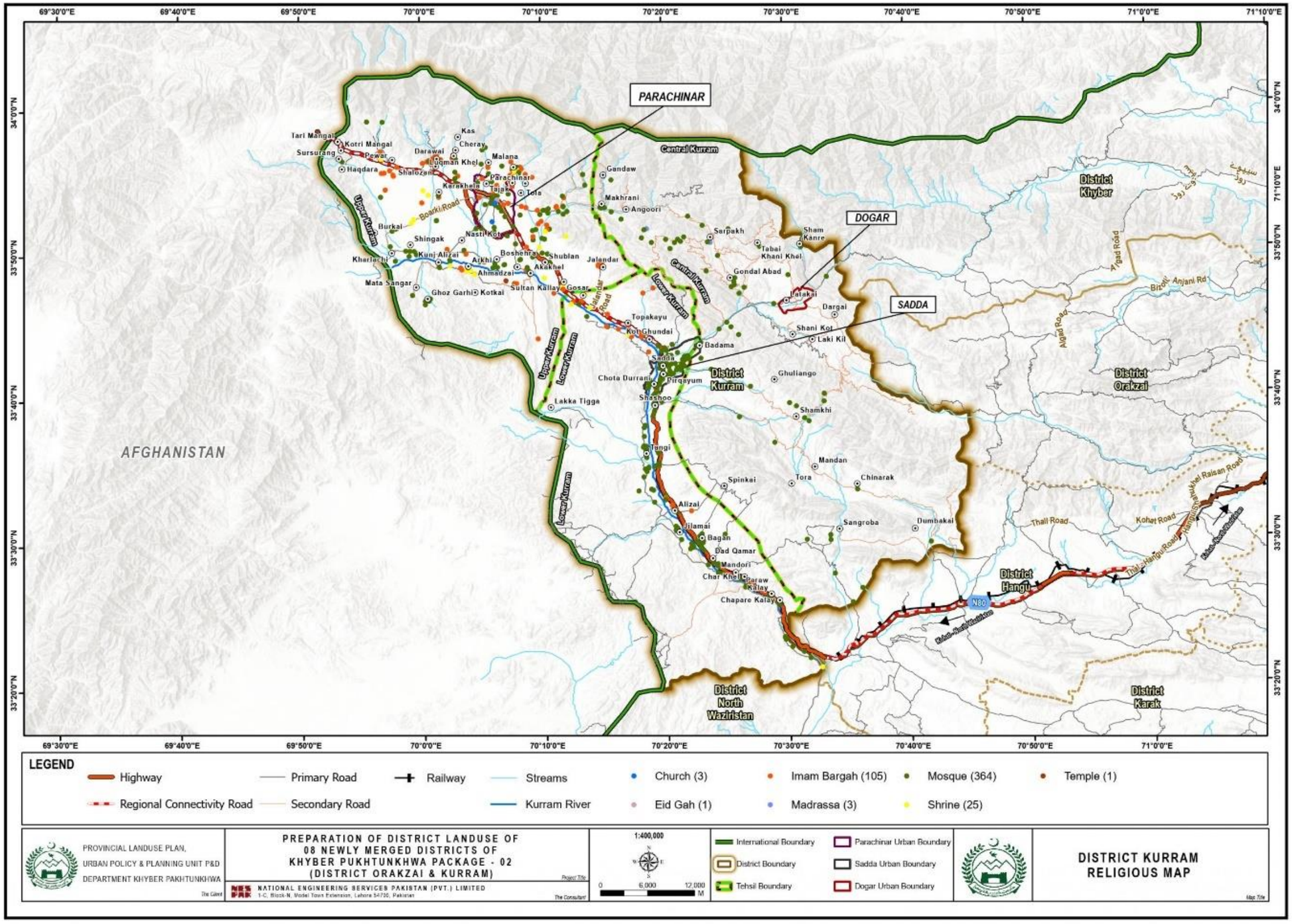
The 106 Imam Bargahs underscore the significance of Shia Muslim traditions, especially during events like Muharram. Similarly, the 3 madrassas provide religious education, contributing to spiritual development though more institutions may be needed to meet growing demands.

With 364 mosques, Sunni Islam dominates Kurram's religious landscape. These mosques serve as centers for daily prayers, gatherings, and community activities. Additionally, the 2 shrines act as places of pilgrimage and reflection, while the single temple represents the presence of a small Hindu community.

In total, Kurram hosts 480 religious facilities, reflecting the district's cultural and spiritual diversity. This extensive network highlights the need for proper maintenance and expansion to ensure continued religious harmony and meet the needs of its growing population.

Table 3-67 Existing Religious Facilities

Facilities	Numbers
Church	3
Eig Gah	1
Imam Bargah	106
Madrassa	3
Mosque	364
Shrine	2
Temple	1
Total	480



Map 3-13 Religious Facilities Map

3.3.6 Graveyards

Graveyards, also referred to as cemeteries, are designated areas specifically allocated for the burial of deceased individuals. These spaces are treated with respect and reverence across many cultures and societies worldwide, serving as final resting places. Graveyards hold significant cultural, religious, and historical importance and often act as sites for remembrance and reflection, connecting the living with their ancestors and heritage.

Burial practices vary widely among different cultures, encompassing various interment methods (such as burial or cremation), rituals, and grave markers. Graveyards frequently feature distinctive architectural elements, including mausoleums, monuments, tombstones, and landscaped gardens. The design and layout of these spaces often reflect the cultural and religious beliefs of the community, as well as aesthetic considerations.

Ongoing maintenance is essential to ensure that graveyards remain respectful and dignified spaces. This includes groundskeeping, restoration of aging monuments, and conservation efforts to protect historical gravesites. While primarily serving as places for the deceased, graveyards also provide spaces for the living to visit and pay their respects to loved ones. Many individuals find solace in visiting graveyards, particularly during times of mourning or remembrance.

Legal regulations often govern the establishment and maintenance of graveyards, encompassing zoning laws, environmental regulations, and cemetery management guidelines. As societal norms evolve and technology advances, the concept of graveyards is also changing. Alternative burial practices, such as green burials and virtual memorials, are gaining traction in some communities.

3.3.6.1 Existing Graveyards

Graveyards have a profound historical connection to the local community. They help residents gain a deeper understanding of their past and offer insights into how people in the area once lived.

The data indicates the availability of graveyard facilities across different areas within the town or tehsil. The results show a distribution of 47% and 53%, with 47% of individuals having access to a graveyard facility while the other 53% do not have access in the surveyed areas. This highlights a significant need for improvement in graveyard accessibility and provision in the region.

Table 3-68 Availability of Graveyard Facility[56]

Town/Tehsil	Total	Central	Lower	Upper
Graveyard	Yes	163	103	145
	No	162	93	217
Total		325	196	362

The table below, "Numbers of Graveyard Facility," offers a comprehensive overview of the graveyard facilities in Kurram District, broken down by tehsil. It presents both the number of graveyards and their total area in acres for each tehsil, providing valuable insights into land use and community needs for burial spaces in the region. Let's explore the data and its implications from an urban planning and community development perspective.

[56] HIS Survey

In **Central Kurram**, there are 31 graveyards covering 37.05 acres, representing the smallest number among the three tehsils. The average area per graveyard is 1.19 acres, suggesting compact land utilization and possibly higher population density or limited availability of land for burial purposes. The smaller graveyards may also indicate efficient land use or constraints in expanding such facilities due to terrain or settlement patterns.

Lower Kurram contains 100 graveyards spread over 235.75 acres, with an average area of 2.36 acres per graveyard. This tehsil occupies a middle position in both the number and total area of graveyards, reflecting moderate land availability and community preferences for larger burial plots. The relatively higher number of graveyards could be associated with a denser population distribution and the region's semi-rural character, where multiple small communities maintain their own burial spaces.

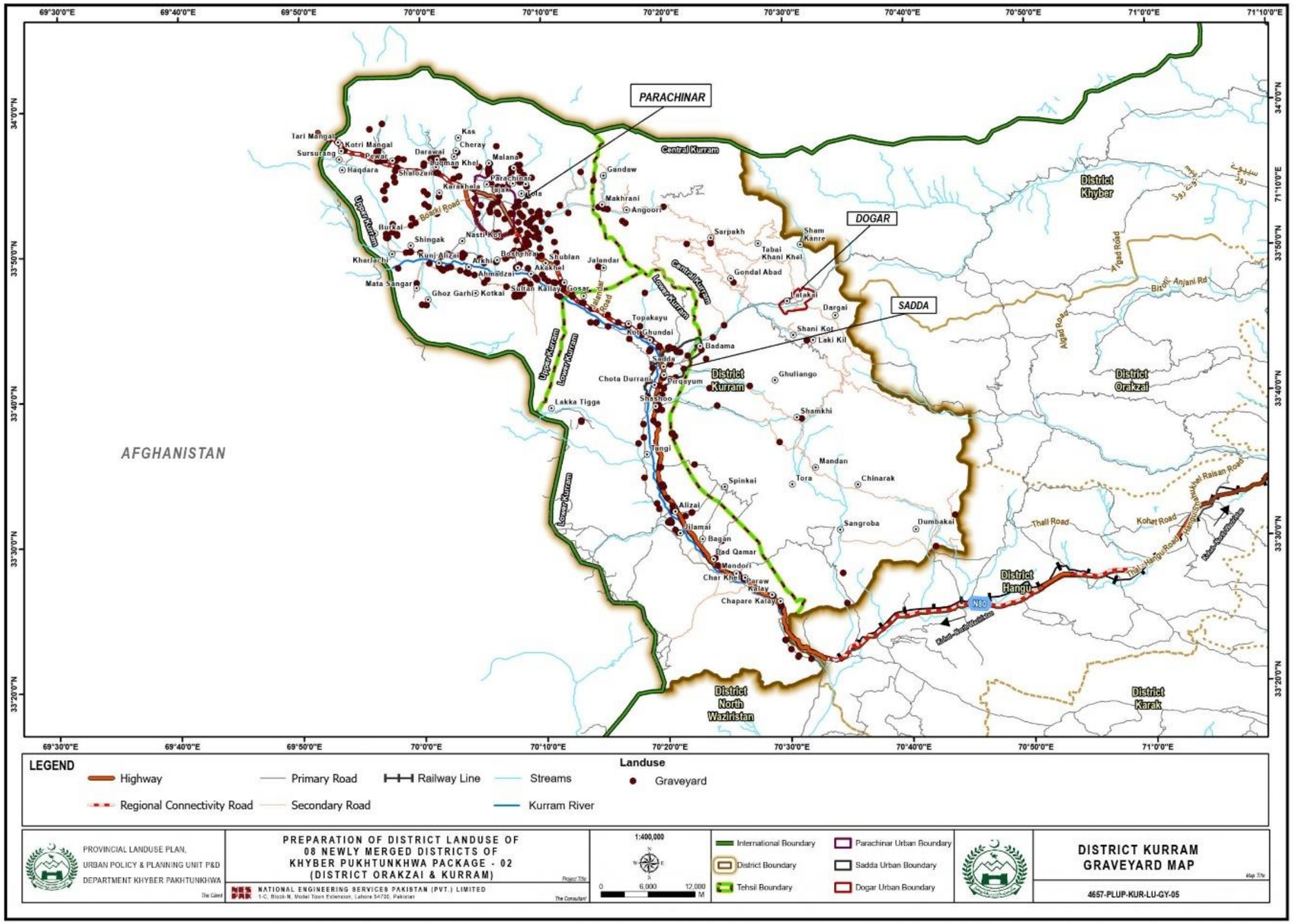
Upper Kurram stands out with 242 graveyards occupying a vast 511.19 acres, the highest in both number and area. Each graveyard averages about 2.11 acres, indicating ample land resources and possibly a tradition of allocating larger spaces for burials. The abundance of graveyards may also reflect the region's wider geographical spread and cultural preference for spacious, family-based burial grounds.

Overall, **Kurram District** hosts 373 graveyards covering a total of 783.99 acres, averaging 2.1 acres per graveyard. This extensive allocation demonstrates the social and cultural importance of burial grounds in the district. The data underscores the need for effective planning to ensure these spaces are equitably distributed, well-maintained, and sustainably managed. Local authorities should consider factors like population density, terrain, and accessibility to maintain respect for cultural practices while promoting efficient land use.

Table 3-69: Numbers of Graveyard Facility[57]

Tehsil	No's of Graveyards	Sum of Area (Acres)
Central Kurram	31	37.05
Lower Kurram	100	235.75
Upper Kurram	242	511.19
Grand Total	**373**	**783.99**

[57] Land use Survey



Map 3-14 Existing Graveyards in District Kurram

3.4 Agriculture

Agriculture is the backbone of Pakistan's economy, contributing 24% to the national GDP and employing a large portion of the labor force (Pakistan Economic Survey 2023–24). Ensuring food security and controlling food inflation remain key policy goals, requiring a comprehensive strategy to make the sector efficient, competitive, and sustainable.

In Khyber Pakhtunkhwa, only 1.82 million hectares of cultivable land are under cultivation, while 1.37 million hectares remain uncultivated highlighting the need to expand agricultural activity for long-term food security and rural development. Despite its importance, the sector receives just 4.56% of the provincial development budget for FY 2024–25, which is insufficient to tackle low productivity and livelihood challenges.

Agriculture contributes 22.7% to KP's GDP and employs 37.4% of its workforce, yet it faces issues such as outdated technology, limited research facilities, and poor disaster management capacity. In District Kurram, agriculture employs 27% of the workforce[58], underscoring its central role in local livelihoods and the urgent need for greater investment and modernization.

3.4.1 Agriculture Land Utilization

Agricultural land utilization refers to the various ways in which land is used for farming and related activities. It includes categorizing land based on its current and potential uses for agriculture. This classification helps in understanding and managing land resources effectively.

Cultivated areas are those actively used for growing crops and can be further divided into irrigated and barrani (rain fed) areas. Irrigated areas are supported by artificial watering systems, while barrani areas depend solely on natural rainfall. Uncultivated areas are not currently farmed but may have the potential for future use. Cultivated waste is land that was once used for farming but is now abandoned and not available for cultivation. Barren land, on the other hand, is unsuitable for agriculture due to its inherent qualities. The category "other" includes land that does not fit into the primary classifications, often designated for non-agricultural purposes. Forest areas are designated for the conservation of natural vegetation, contributing to environmental balance. Lastly, culturable waste refers to land that has potential for farming but is currently underutilized.

The total reported area of District Kurram district is 338,061 hectares out of which 26,712 is cultivated and 311,349 remains uncultivated. Irrigation sources cover 16,247 hectares. Uncultivated areas include 3,117 hectares of culturable waste, 295,093 hectares unavailable for cultivation, and 13,139 hectares under forest, constituting 3.89% of the reported area.59

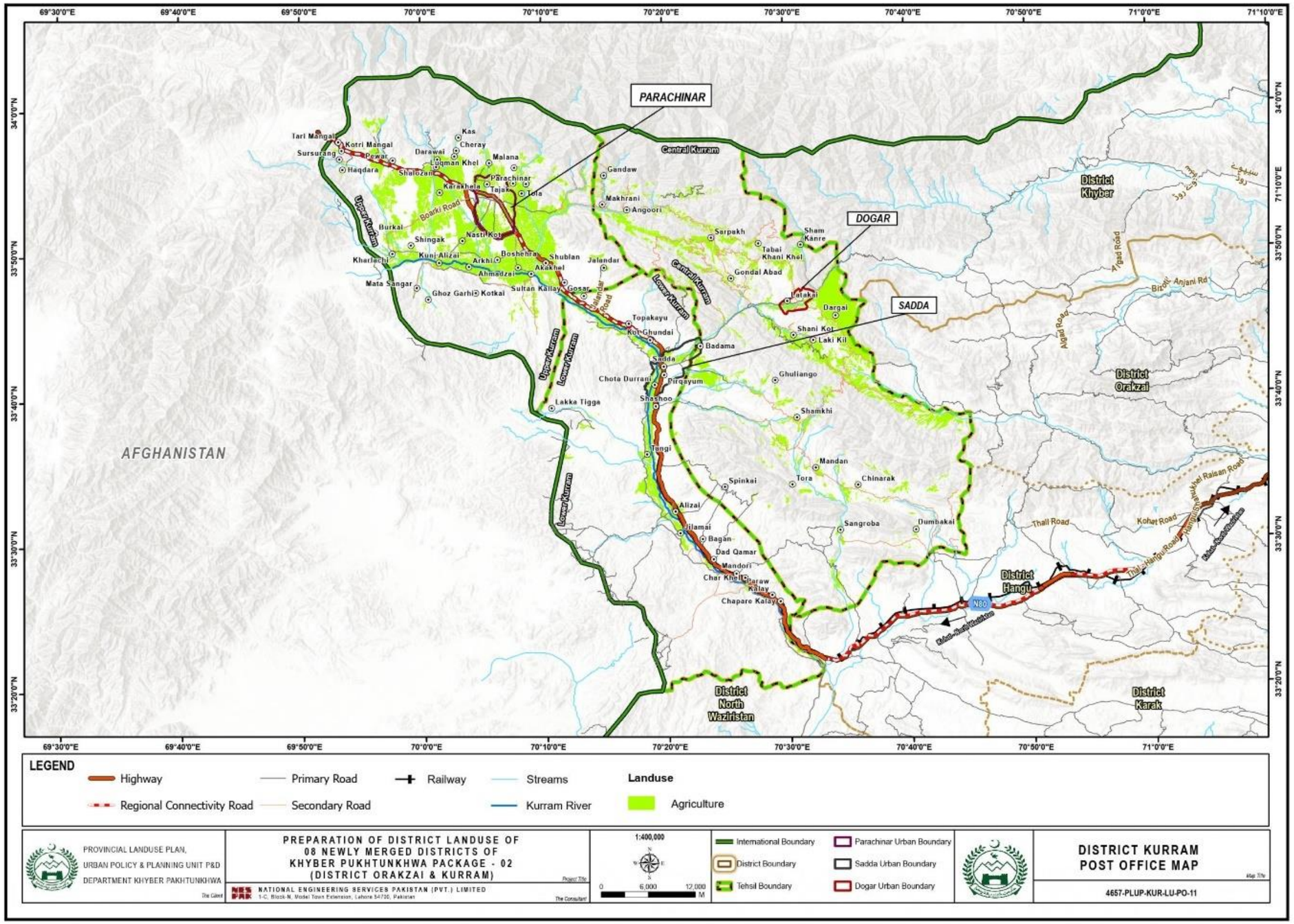
Table 3-70 shows the agricultural land utilization from 2020 till 2023, while Map 3-15 illustrates the agricultural land use of District Kurram.

[58] Pakistan Bureau of Statistics. (2022). *Pakistan Labor Force Survey 2020-2021.* Annexure-I Key Indicators of Labor Market (KILM) at District Level, District Kurram

[59] - Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. *Development Statistics of Khyber Pakhtunkhwa 2024*. Table No. 38 & 41
- Data received from Agriculture Department through letter no. CPO (AD) Gen-04/2024/KC dated June 28, 2024.

Table 3-70: District Kurram Agriculture Land Utilization From 2020-21 till 2022-23 (In Hectares)

Year	Cultivated			Uncultivated				Total Reported Area
	Irrigated	Unirrigated	Total Cultivated	Culturable Waste	Forest	Not available for cultivation	Total Uncultivated	
2020-21	15,468	11,163	26,631	3,275	13,141	295,014	311,430	338,061
2021-22	16,183	10,526	26,709	3,132	13,146	295,074	311,352	338,061
2022-23	16,247	10,465	26,712	3,117	13,139	295,093	311,349	338,061



Map 3-15: District Kurram Agriculture Land Use

3.4.2 Production Profile

In District Kurram the major crops include wheat and barley for the Rabi season, and maize and rice, for the Kharif season. The district also grows a wide variety of vegetables such as onions, potatoes, chilies, garlic. Reliable irrigation is crucial for the region's economic and social development.

According to the Crop Reporting Service[60], the production profile of crops in Kurram shows notable trends. Wheat production was 42,021 tonnes in 2020-21, increasing to 43,132 tonnes in 2021-22, and further to 54,117 tonnes in 2022-23. Maize production followed a similar pattern, increasing from 3,793 tonnes in 2020-21 to 4,504 tonnes in 2021-22, 4,505 tonnes in 2022-23. Barley production was relatively low, with figures of 780 tonnes and 354 tonnes in 2020-21 and 2021-22 respectively, and 28 tons in 2022-23, suggesting it may not be well-suited to the region. Rice production, a Kharif crop, was 18,350 tonnes in 2020-21, 17,910 tonnes in 2021-22, and then 17,454 tonnes in 2022-23.

Overall, the District Kurram has the potential for fruit and vegetable production, and farmers can benefit from focusing more on these crops. However, they may need to consider crop diversification and crop rotation to improve soil fertility and yield. Table 3-71 below, provides data on the area, production, and yield per hectare for various crops in three consecutive years from 2020-21 to 2022-23 across different crops.

Table 3-71: District Kurram Agricultural Production Profile From 2020-21 till 2021-23

Years	Crops	Wheat	Maize	Rice	Barley
2020-21	Area (In Hectares)	23,700	2497	5915	503
	Production (In Tons)	42,021	3793	18350	780
	Yield per Hectare (In KG)	1,773	1519	3102	1551
2021-22	Area (In Hectares)	24,294	2992	5965	494
	Production (In Tons)	43,132	4504	17910	354
	Yield per Hectare (In KG)	1,775	1505	3003	1717
2022-23	Area (In Hectares)	27,130	3016	5996	27
	Production (In Tons)	54,317	4505	17454	28
	Yield per Hectare (In KG)	2,002	1494	2911	1037

3.4.3 Type of Irrigation and Water Management Issues

The total cultivated area of District Kurram is 26,631 hectares in 2020-21, 26,709 hectares in 2021-22 and 26,712 hectares in 2022-23, Out of the total cultivated area of 26,712 hectares, 16,247 hectares area is irrigated. The major chunk of cultivation is done by other sources. Around 1014

[60] - Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. *Development Statistics of Khyber Pakhtunkhwa 2024*. Table No. 15, 16, 17, 18, 19, 20, 21, 23, and 25
- Data received from Agriculture Department through letter no. CPO (AD) Gen-04/2024/KC dated June 28, 2024.

hectares through tube wells, and 768 hectares using government irrigation canals.[61] Table 3-72 below, shows the total irrigated area of District Kurram, by different sources.

Table 3-72: District Kurram Irrigated Area by Different Types of Irrigation From 2020-21 till 2022-23

Years	Total	Canal		Tube Wells	Wells
		Govt.	Private		
2020-21	15,468	756	13,901	356	79
2021-22	16,183	759	13,935	992	84
2022-23	16,247	768	13,956	1014	86

District Kurram's agricultural productivity is significantly impacted by water management issues, particularly the erratic availability of irrigation water during dry seasons and prolonged droughts. Insufficient water supply limits farmers' ability to irrigate their crops adequately, leading to reduced yields and overall agricultural output. The unequal distribution of water resources further exacerbates socio-economic disparities in rural communities. Additionally, water sources are often contaminated by agricultural runoff, improper use of agrochemicals, and inadequate waste management practices. This pollution affects crop health, soil quality, and human health, causing crop damage and reduced yields while posing risks to consumers. The district also faces water management challenges such as limited resources, inadequate infrastructure, and a lack of technical and financial support for modern irrigation technologies. To address these issues, various irrigation techniques, such as efficient water use practices and advanced irrigation systems, could be employed to improve water management and enhance agricultural productivity.

Surface irrigation involves applying water to the soil through channels, furrows, or flooding, and is commonly used for crops such as wheat and rice. Sprinkler irrigation distributes water over crops using pipes and sprinkler heads, making it suitable for areas with low water availability, windy conditions, or uneven terrain. Drip irrigation delivers water directly to plant roots through pipes and emitters, making it ideal for water-efficient crops like vegetables and fruits.

3.4.4 Agriculture Employment

Agricultural employment includes the workforce engaged in farming, livestock rearing, and agro-industrial activities such as crop production, animal care, and agricultural services. It is a major source of livelihood in rural areas, contributing significantly to GDP, food security, and community development. However, the sector faces issues like low wages, seasonal dependence, and limited technological advancement, which can be addressed through better training, modernization, and infrastructure improvement.

According to the Labor Force Survey (LFS) 2020–21[62], agriculture employs 31.8% of Khyber Pakhtunkhwa's workforce, compared to 68.2% in non-agriculture sectors. Nationally, agriculture accounts for 37.4% of total employment, while provincial variations exist Punjab (39%), Sindh (36.5%),

[61] Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. *Development Statistics of Khyber Pakhtunkhwa 2024*. Table No. 37

[62] Pakistan Bureau of Statistics. (2022). *Pakistan Labor Force Survey 2020-2021*. Chapter-4: Employment

and Balochistan (40.1%). These figures illustrate the continued dependence on agriculture across provinces despite increasing growth in other sectors.

The Labor Force Survey also provides valuable insights into employment patterns, unemployment rates, and labor participation across regions. It serves as an essential tool for shaping labor policies, economic planning, and employment-related initiatives nationwide. The survey highlights the role of agriculture as a stabilizing sector that sustains millions, especially in rural settings.

In District Kurram, agriculture remains a cornerstone of employment. Out of a working-age population of 432,000, around 136,512 individuals are employed in this sector, representing 31.6% of the labor force. The total labor force is 175,100, with 162,400 employed and 12,700 unemployed. The refined participation rate stands at 40.5%, particularly higher in rural areas, reflecting the strong reliance on agriculture for livelihoods and economic stability.[63]

3.4.5 Constraints

District Kurram faces several significant constraints that hinder agricultural productivity and economic growth. Addressing these challenges is essential to unlock the region's potential and improve the livelihoods of its residents.

- The district suffers from water scarcity due to inadequate water management and irrigation systems. This shortage reduces agricultural productivity and limits the potential for crop diversification, making water management a critical priority for sustainable agriculture.
- Climate change poses a growing threat to Kurram's agriculture, with shifts in temperature and rainfall patterns leading to lower crop yields and increased vulnerability to pests and diseases. More frequent heatwaves, droughts, and floods further exacerbate these challenges, threatening both agriculture and the overall well-being of the community.
- Many small-scale farmers in Kurram struggle with limited access to credit, preventing them from investing in modern farming techniques and technologies. This limitation constrains their productivity, profitability, and ability to compete in more developed agricultural markets.
- The high costs associated with crop production, including expensive inputs, technology, and market uncertainties, place a significant financial burden on farmers. This results in lower income levels and ongoing financial strain, hindering long-term agricultural growth.
- Soil erosion is a major issue in Kurram, driven by deforestation, overgrazing, flooding, and improper land use. This has led to declining soil fertility, reducing the productive capacity of the land and threatening sustainable agricultural practices.
- The district's lack of proper roads, storage facilities, and markets limits farmers' ability to transport and sell their produce. This poor infrastructure curbs economic opportunities and reduces the potential for profit, limiting the district's overall agricultural development.

[63] Pakistan Bureau of Statistics. (2022). Pakistan Labor Force Survey 2020-2021. Annexure-I Key Indicators of Labor Market (KILM) at District Level, District Kurram

- Rapid urbanization, industrialization, and the conversion of agricultural land for non-agricultural purposes reduce the amount of available farmland. This land use change threatens agricultural growth and food security in the region.
- The lack of an agro-industrial zone in Kurram represents a missed opportunity for economic development. An industrial zone could stimulate investments, create jobs, and foster infrastructure development, but its absence leaves the district reliant on traditional sectors with limited diversification and growth prospects.
- Projected temperature increases and shifts in precipitation patterns present additional challenges for Kurram. Rising temperatures may result in more frequent and severe heatwaves, affecting health and agricultural productivity, while altered rainfall patterns could lead to water shortages, increased droughts, and floods, further damaging infrastructure and the local economy.
- The gradual disappearance of local crop germplasm due to the adoption of hybrid varieties is a significant concern. These local strains are valued for their superior taste and disease resistance, making their preservation essential for long-term agricultural sustainability.
- The reliance on outdated farming methods and inefficient practices by untrained farmers negatively impacts future crop production. Poor soil management, improper pest control, and inefficient water usage contribute to reduced crop yields, environmental degradation, and lower income levels.
- Water scarcity continues to harm future crop production in Kurram District by leading to lower yields, stunted growth, and reduced crop quality. This stress on crops exacerbates food security concerns and negatively impacts local economies.
- Urbanization in Kurram District has led to the reduction of productive agricultural land, disruption of traditional farming practices, and increased pollution. It also contributes to water scarcity, changes in climate, and labor shortages, further affecting agricultural productivity and leading to land conflicts.
- While private seed companies in Kurram District can introduce better seed varieties and advanced technology, there is a risk of increased dependency and higher costs for farmers. Competition from these companies may benefit farmers, but market dominance could limit options, making proper regulation essential to protect farmers' rights and prevent negative social and environmental impacts.

To overcome these challenges, a combination of government action and community efforts is necessary. Specific policies focusing on better water management, soil conservation, and access to credit and infrastructure are needed. Encouraging sustainable land use practices, promoting crop diversification, and improving resilience to climate change are also essential to ensuring a prosperous future for Kurram District. These constraints are not only affecting agricultural productivity but also the livelihoods and well-being of the local community.

3.4.6 Recommendations

District Kurram with its abundant natural resources and strategic importance, holds vast potential for agricultural development. Improving the livelihoods of the local community requires targeted

interventions in various areas. The following recommendations aim to address key challenges and unlock this potential:

- Addressing water scarcity through the construction of well-designed watercourses is essential for enhancing irrigation management. Efficient water distribution systems can significantly reduce water wastage, ensuring that agricultural fields receive adequate water, thus improving crop yields.
- Introducing subsidies for essential inputs like seeds, fertilizers, pesticides, and machinery can alleviate the financial burden on farmers, particularly small-scale and resource-constrained ones. This support will enhance their productivity and income, fostering agricultural growth across the district.
- Setting up dedicated research centers for cereals and stone fruits in District Kurram could greatly benefit local agriculture. These centers would focus on improving crop varieties, introducing modern farming techniques, managing pests and diseases, and optimizing resource utilization, ultimately boosting the local economy.
- Embracing solar energy for agricultural operations, such as powering offices and tubewells, offers a sustainable solution that can increase productivity and reduce costs. By investing in solar power.
- Establishing value-addition and processing units for fruits will enhance the profitability of local produce. This could involve supporting local entrepreneurs or farmers in setting up processing facilities, offering training and technical assistance, and facilitating access to financing for the establishment of these units.
- Setting up an agro-industrial zone in District Kurram could stimulate economic growth by attracting investments, creating jobs, and fostering innovation. This zone would provide a platform for agribusinesses to thrive and contribute to the overall development of the region.
- Immediate recruitment of additional staff for agriculture offices in Kurram District is crucial for better farmer support and timely implementation of key agricultural programs. Filling these vacancies will ensure that the district's agricultural sector continues to progress efficiently.

Implementing these recommendations will enhance agricultural productivity, create economic opportunities, and improve the quality of life for the people of District Kurram.

3.4.7 Future Proposals for Agriculture Sector

Kurram District, with its fertile valleys, diverse climatic zones, and abundant water resources, holds significant potential for becoming a regional agricultural hub. However, the sector remains underdeveloped due to traditional practices, poor infrastructure, limited market access, and weak institutional support.

To transform agriculture into a high-growth, employment-generating, and food-secure sector, the following strategic interventions are proposed under key thematic areas:

3.4.7.1 Modernization of Farming Practices

Intervention	Proposed Actions	Impact

Agricultural Mechanization	- Provide subsidized or shared access to tractors, threshers, and harvesters. - Promote conservation agriculture and precision farming techniques.	Increased productivity, reduced labor burden, especially for women.
Crop Diversification	- Promote high-value crops such as off-season vegetables, fruits (apple, apricot, pomegranate), and medicinal plants. - Introduce low-water crops in arid areas.	Improved farmer income, risk reduction from climate shocks.
Seed and Input Quality Improvement	- Strengthen linkages with national research institutions for quality seeds. - Promote organic and bio-fertilizer usage.	Better yield, reduced environmental degradation.

3.4.7.2 Water Resource Management and Irrigation Development

Intervention	Proposed Actions	Impact
Rehabilitation of Canals & Karezes	- Rehabilitate and maintain traditional irrigation systems like karezes and small canals.	Improved irrigation coverage and water-use efficiency.
Efficient Water Use Technologies	- Promote drip irrigation and solar-powered tube wells. - Construct small check dams and water harvesting ponds.	Water conservation, enhanced resilience to droughts.
Community Water Management Committees	- Establish water user associations for equitable water distribution and conflict resolution.	Sustainable and inclusive water governance.

3.4.7.3 Post-Harvest Management and Value Addition

Intervention	Proposed Actions	Impact
Storage and Cold Chains	- Establish community-based cold storage and warehouses for fruits and perishables.	Reduced post-harvest losses, price stability.

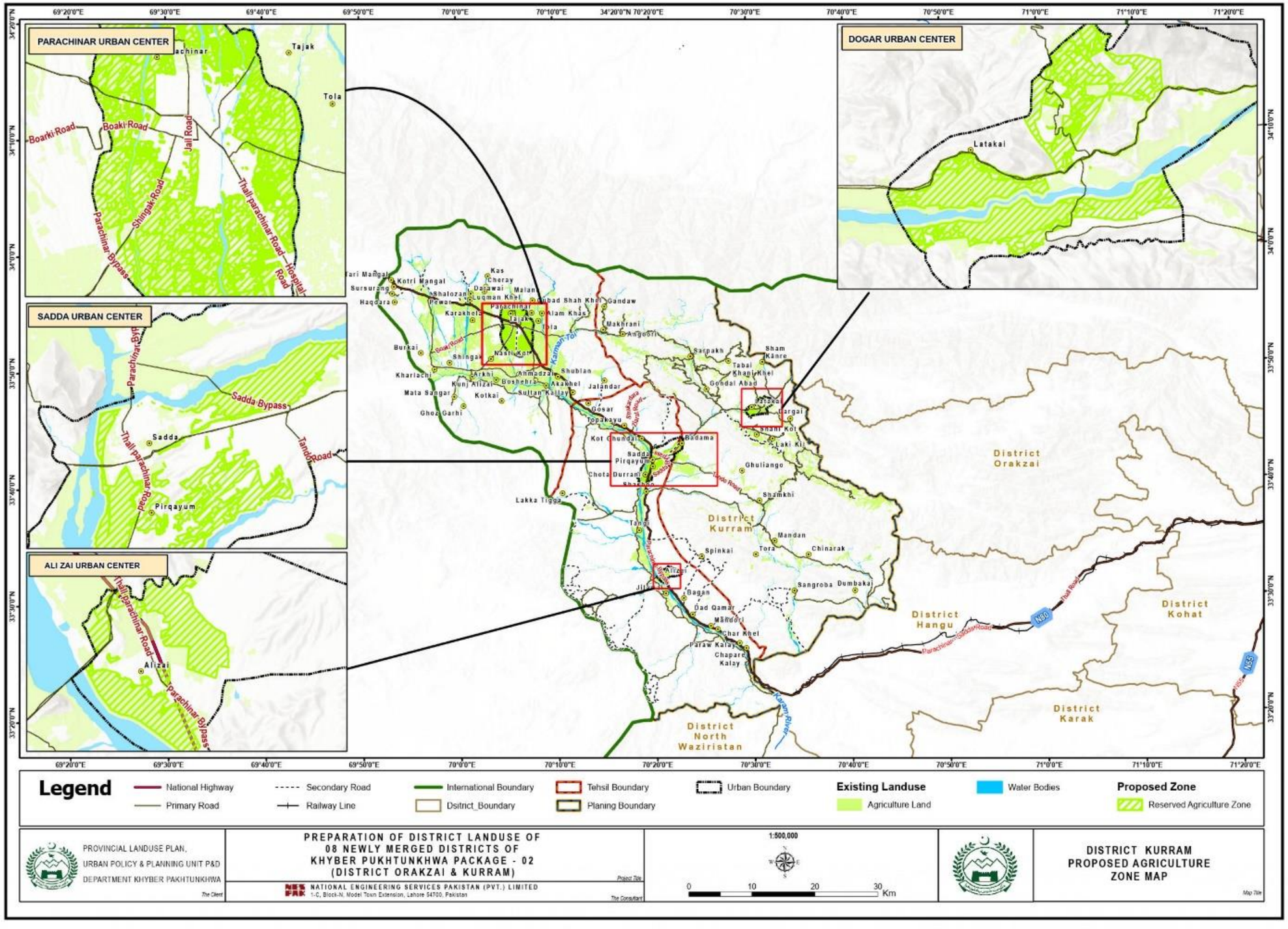
Agro-Processing Units	- Set up small-scale units for fruit drying, pickling, and juice production under PPP model.	Local value addition, women-led micro-enterprises.
Packaging and Branding	- Train farmers and cooperatives in proper grading, labeling, and organic certification.	Improved marketability and export potential.

3.4.7.4 Market Access and Agribusiness Development

Intervention	Proposed Actions	Impact
Market Infrastructure	- Upgrade local markets with facilities for weighing, grading, and auctioning. - Establish rural aggregation centers.	Better price realization, reduced dependence on middlemen.
Digital Agriculture Platforms	- Introduce mobile-based platforms for market prices, weather forecasts, and input supplies.	Real-time information access and farmer empowerment.
Agricultural Cooperatives and Farmer Producer Organizations (FPOs)	- Promote formation of FPOs for collective bargaining and access to finance.	Enhanced economies of scale and market leverage.

3.4.7.5 Climate-Smart and Sustainable Agriculture

Intervention	Proposed Actions	Impact
Climate-Resilient Practices	- Promote drought-tolerant varieties and soil moisture conservation techniques.	Mitigated impact of climate change on productivity.
Afforestation and Agroforestry	- Plant fruit and fodder trees in degraded areas and along farm boundaries.	Improved soil health, income diversification.
Early Warning and Disaster Preparedness	- Establish local weather stations and disaster response plans.	Enhanced preparedness and reduced crop loss.



Map 3-16: District Kurram Proposed Agriculture Zone

3.5 Livestock

Livestock products such as meat, milk, bones, fat, hides, and skin yield substantial profits for investors, especially with the growing demand in the international halal food market, which presents significant export opportunities for the livestock industry. In this context, the district Kurram has enormous potential that can be harnessed through appropriate livestock policies. The livelihoods of farmers in the Kurram district are directly impacted by the livestock sector, which provides food, wool, fuel, and farming resources. This sector offers consistent daily financial support, employment opportunities, and a stable food source. Additionally, it serves as a safeguard against the risks associated with crop failure or other unforeseen events.

3.5.1 Available Livestock

The livestock population in District Kurram represents a modest portion of the overall livestock numbers in Khyber Pakhtunkhwa. District Kurram's livestock population is 975,649, which constitutes 2.04% of the overall livestock in Khyber Pakhtunkhwa.[64] Cows and sheep also play a prominent role in the district's livestock sector, with 194,253 cows and 106,086 sheep, contributing 2.20% and 2.51% of the provincial totals, respectively. Goats are similarly well-represented, with 155,532 goats making up 1.55% of the goat population in Khyber Pakhtunkhwa. Buffaloes, while fewer in number, also form a notable part of Kurram's livestock profile, with 4,522 animals representing 0.13% of the province's buffalo population. The district's camel population stands at 6,527, making up 5.23% of the provincial total. Other livestock such as donkeys, horses, and mules are present in smaller numbers, 6863, 1203, and 927 respectively.

Table 3-73 below, shows the details of the livestock population in District Kurram and Khyber Pakhtunkhwa.

Table 3-73: District Kurram Livestock Population Comparison with Khyber Pakhtunkhwa

Livestock	Khyber Pakhtunkhwa	District Kurram	Percentage of Livestock in District Kurram w.r.t KP
Cow	8,837,231	194,253	2.20%
Buffaloes	3,402,135	4,522	0.13%
Sheep	4,219,238	106,086	2.51%
Goats	10,041,682	155,532	1.55%
Camel	124,660	6,527	5.23%
Donkey	502,821	6,863	1.36%
Horse	268,953	1,203	0.45
Mule	302,174	927	0.31%
Other	1,112,325	13,955	7.18%

3.5.1.1 Assessment of Poultry and Fisheries

Poultry and fisheries are vital components of the agricultural sector, contributing significantly to food security and income generation. Poultry farming provides a steady supply of eggs and meat, addressing protein needs and offering livelihood opportunities, particularly in rural areas. Fisheries, both inland and marine, are crucial for nutritional balance, providing a rich source of protein, essential fatty acids, and micronutrients. These sectors also support economic development through

64. *Livestock Baseline Survey Khyber Pakhtunkhwa 2021.*

employment and trade, though they face challenges like disease management, climate change, and resource sustainability that require strategic interventions for long-term growth.

3.5.1.1.1 Fisheries

While the fisheries sector plays a crucial role in providing food, generating jobs, boosting the economy, supporting trade, conserving biodiversity, fostering rural development, and preserving cultural and recreational aspects, it is regrettable that District Kurram does not currently contribute to fish production. This absence underscores the untapped potential for the district to benefit from the many advantages the fisheries sector offers. Addressing this gap could bring about positive changes, providing new opportunities for food security, livelihoods, economic growth, and environmental sustainability within the district. Whereas, in the neighboring district of Kohat, in the 2020-21 fiscal year, District Kohat contributed 210 metric tons of non-trout fish, valued at Rs. 53 million. By 2021-22, this production increased significantly to 350 metric tons, with a corresponding value of Rs. 87.53 million and in the 2022-23 fiscal year, District Kohat contributed 255 metric tons of non-trout fish, valued at Rs. 64 million.[65]

Table 3-66 below compares the fisheries production of District Kurram with District Kohat and Khyber Pakhtunkhwa.

Table 3-74: District Kurram Fisheries Production Comparison with District Kohat and Khyber Pakhtunkhwa

Years	Production	Type	Khyber Pakhtunkhwa	District Kohat	District Kurram
2020-21	Production (In Metric Tons)	Trout	603.99	-	-
		Non-Trout	2,899.98	210	-
		Total	3,053.97	210	-
	Value (In Million Rs.)	Trout	603.99	-	-
		Non-Trout	725.00	53	-
		Total	1328.99	53	-
2021-22	Production (In Metric Tons)	Trout	780.00	-	-
		Non-Trout	4,209.96	350	-
		Total	4,989.96	350	-
	Value (In Million Rs.)	Trout	780.000	-	-
		Non-Trout	1052.49	88	-
		Total	1832.49	88	-
2022-23	Production (In Metric Tons)	Trout	795.00	-	-
		Non-Trout	4,435.00	255	-
		Total	5,230.00	255	-
	Value (In Million Rs.)	Trout	1193.00	-	-
		Non-Trout	1109.00	64	-
		Total	2301.00	64	-

[65] Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. *Development Statistics of Khyber Pakhtunkhwa 2024*. Table No. 53

3.5.1.1.2 Poultry

The poultry sector in District Kurram plays a vital role in the local economy. Poultry population of District Kurram is 485,741 birds, representing 2.54% of Khyber Pakhtunkhwa's total poultry sector.[66] This substantial contribution highlights the district's potential to further expand poultry farming, which is crucial for food security and economic development.

Poultry farming in Kurram District is primarily driven by local demand for poultry products, including meat and eggs, which are staples in the region's diet. The sector provides livelihoods for many families, contributing to income generation and employment opportunities. The growing demand for poultry products presents an opportunity for further investment and expansion of the sector, which could lead to increased productivity and profitability.

However, challenges remain, including limited access to modern poultry farming techniques, infrastructure, and veterinary services. Addressing these issues through targeted interventions, such as training programs for farmers, improved access to credit, and better infrastructure, can help unlock the full potential of the poultry sector in Kurram. With the right support, the district's poultry industry can continue to grow, enhancing food security and contributing to the broader economic development of the region.

3.5.2 Livestock Facilities

District Kurram has developed a range of facilities to support its livestock sector, reflecting an ongoing commitment to animal husbandry and veterinary services. The available data on these facilities highlights the district's infrastructure and services dedicated to maintaining and improving livestock health and productivity.

3.5.2.1 Veterinary Facilities

District Kurram in 2022-23 period 52 veterinary facilities, including 4 hospitals, 23 dispensaries, and 25 veterinary centers. This represents a decrease from previous years, where the district had 53 facilities in both 2020-21 and 2021-22, comprising 4 hospitals, 24 dispensaries, and 25 centers. These facilities are crucial for providing medical care, diagnostic services, and disease management to local farmers. In 2022-23, the district's veterinary health facilities treated 108,000 animals and protected 87,000 animals and 83,000 birds.[67] This demonstrates a significant role in safeguarding animal health through treatment and vaccination programs. Despite the absence of specific data on mobile veterinary clinics' activities, these services are integral to disease prevention and control. The district also focuses on breed improvement through artificial insemination, there are 22 Animal Insemination Centers. This process supports genetic enhancement and productivity improvements in livestock.

3.5.3 Economic Potential of Livestock

District Kurram, though contributing a modest portion of the overall livestock population in Khyber Pakhtunkhwa, holds significant economic potential due to its diverse livestock sector. The district's total livestock population stands at 975,649, representing 2.03% of the provincial total. This includes 194,253 cows, 106,086 sheep, 155,532 goats, 4,522 buffaloes, donkeys 6,863 and 2,747 camels.

[66] Directorate General (Ext), Livestock and Dairy Development Department, Khyber Pakhtunkhwa. (2022). *Livestock Baseline Survey Khyber Pakhtunkhwa 2021.* Table 1-1: Livestock Population.

[67] Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. *Development Statistics of Khyber Pakhtunkhwa 2024*. Table No. 2

While horses, and mules make up smaller fractions of the livestock population, their presence still contributes to the district's agricultural landscape.

The cattle sector plays a critical role in dairy production. At the household level. Milk production supports local consumption and provides a basis for further dairy industry development.

The sheep and goat populations also contribute to the district's economic activity, providing meat and wool. With 106,086 sheep and 155,532 goats, there is a significant supply of meat and other by-products.

Poultry farming, with a population of 485,741 birds, represents 2.54% of Khyber Pakhtunkhwa's poultry sector. This sector supports local demand for meat and eggs contributing to the local economy through job creation and income generation.

Despite these positive indicators, the sector faces challenges such as limited access to modern farming techniques, infrastructure deficiencies, and the need for improved veterinary services. Enhancing these areas through targeted interventions can unlock the full economic potential of livestock in Kurram District. Investments in veterinary facilities, such as the 52 available facilities including 4 hospitals, 23 dispensaries, and 25 centers are crucial for maintaining animal health and boosting productivity.

Overall, the livestock sector in District Kurram holds significant promise for economic growth. By addressing current challenges and leveraging the existing resources, the district can enhance its agricultural output, contribute to food security, and support local economic development.

3.5.4 Plans existing/ ongoing and New Schemes[68]

- Ongoing
  - Scholarships for Vets and Para - Vets students in Merged Districts.
  - Establishment and Construction/ reconstruction of Veterinary Facilities and provision of de-wormer Vaccine for all existing regular veterinary institutions in Merged Districts.

- New Schemes
  - Strengthening of Disease preparedness and response mechanism in Merged Areas.
  - Employment Opportunities through climate smart and gender sensitive Livestock Interventions in Merged Areas.

3.5.5 Constraints

- The livestock population in District Kurram, while contributing to the local economy, represents a small fraction (2.03%) of the total livestock in Khyber Pakhtunkhwa. This limited population constrains the potential for scaling up production and leveraging the sector's economic benefits.

[68] Data received from Directorate General (Ext), Livestock and Dairy Development Department, Khyber Pakhtunkhwa. (2024) through letter No. 10913 15/498 dated August 15, 2024.

- The district does not currently contribute to fish production, highlighting a significant gap in the fisheries sector. This absence of fish production limits opportunities for enhancing food security, generating income, and supporting economic growth through fisheries.
- The livestock sector in Kurram District suffers from infrastructure challenges, including inadequate veterinary services, limited access to modern farming techniques, and insufficient facilities for livestock processing and marketing. These deficiencies hinder the sector's ability to reach its full potential.
- Despite the presence of poultry farms, the poultry sector in Kurram District faces challenges such as limited access to modern farming techniques, infrastructure constraints, and inadequate veterinary services. These issues restrict the sector's growth and impact on local food security and economic development.
- The livestock sector's potential is constrained by fluctuations in market prices, limited investment, and inadequate support for expanding the industry. Addressing these economic challenges is crucial for unlocking the sector's full potential and enhancing profitability.
- Although there are veterinary facilities in the district, there is a need for continuous improvement and expansion to ensure comprehensive animal healthcare. Limited veterinary services and infrastructure can restrict disease management and overall productivity.
- The management of resources such as grazing lands, fodder, and feed is critical for the sector's sustainability. Suboptimal management practices may lead to inefficiencies and reduced productivity, affecting the sector's long-term viability.

3.5.6 Recommendations

To bolster the livestock sector in District Kurram and enhance its contribution to rural livelihoods and food security, the following recommendations are proposed:

- Implement vocational training programs to educate farmers and herders on advanced livestock management practices. These programs should focus on improved feeding techniques, breeding practices, and healthcare to boost productivity and animal welfare.
- Develop and execute breeding programs aimed at conserving and enhancing the genetic diversity of native livestock breeds. This will help maintain the adaptability and resilience of local livestock populations.
- Invest in problem-oriented research to address specific issues faced by native livestock, such as diseases, pests, and nutritional deficiencies. This research should focus on identifying and applying optimal feeding, healthcare, and husbandry practices.
- Encourage the expansion of backyard poultry farming in rural areas by offering training in poultry management, ensuring access to affordable feed and vaccines, and establishing market linkages to facilitate product sales.
- Conduct targeted research to improve poultry nutrition, disease prevention, and management practices. Addressing these areas will help overcome existing challenges and enhance the overall productivity of the poultry sector.
- Promote national and international cooperation to increase cold-water fish production. Collaboration with governments, international organizations, and local communities can foster sustainable fishing practices and expand fish production.

- Initiate research focused on improving fish health, feeding practices, and husbandry methods. Identifying and addressing challenges in these areas will support the development and sustainability of the fisheries sector.

These recommendations aim to address current constraints, leverage opportunities, and support the sustainable development of the livestock, poultry, and fisheries sectors in District Kurram.

3.5.7 Proposed Future Interventions Livestock

Livestock is a critical component of rural livelihoods in Kurram District. It provides food (milk, meat, eggs), draft power, manure for farming, and income for thousands of households—especially in areas where crop farming is limited. However, the sector faces numerous challenges including low productivity, poor veterinary services, limited market access, and lack of modern practices.

To transform livestock into a dynamic and income-generating sector, the following future interventions are proposed:

3.5.7.1 Animal Health and Veterinary Services

Intervention	Description	Impact
Mobile Veterinary Units (MVUs)	Deploy district-level mobile vet teams with vaccines, diagnostics, and basic medicines to reach remote areas.	Improved animal health, reduced mortality, early disease detection.
Vaccination and Deworming Campaigns	District-wide seasonal vaccination and deworming drives for cattle, sheep, goats, and poultry.	Control of major diseases (FMD, PPR, HS), higher productivity.
Community Animal Health Workers (CAHWs)	Train and deploy local youth (especially women) to provide basic animal care and report outbreaks.	Last-mile veterinary coverage and employment creation.

3.5.7.2 Breed Improvement and Genetic Upgradation

Intervention	Description	Impact
Artificial Insemination (AI) Services	Establish AI centers and provide mobile AI services for cattle and buffalo.	Improved milk/meat yield, stronger and disease-resistant breeds.
Distribution of Improved Breeds	Promote cross-breeds of cattle, goats, poultry suited to local climate.	Rapid genetic improvement and enhanced income.
Livestock Breed Mapping and Conservation	Identify and preserve native breeds (e.g., local goats or sheep) with unique traits.	Biodiversity conservation and heritage protection.

3.5.7.3 Breed Improvement and Genetic Upgradation

Intervention	Description	Impact
Artificial Insemination (AI) Services	Establish AI centers and provide mobile AI services for cattle and buffalo.	Improved milk/meat yield, stronger and disease-resistant breeds.
Distribution of Improved Breeds	Promote cross-breeds of cattle, goats, poultry suited to local climate.	Rapid genetic improvement and enhanced income.
Livestock Breed Mapping and Conservation	Identify and preserve native breeds (e.g., local goats or sheep) with unique traits.	Biodiversity conservation and heritage protection.

3.5.7.4 Fodder and Feed Development

Intervention	Description	Impact
Promotion of High-Yield Fodder Crops	Encourage cultivation of multi-cut varieties of fodder like maize, sorghum, and oats.	Year-round feed availability and better animal nutrition.
Silage and Hay Making Units	Train farmers in silage making and provide small-scale storage units.	Feed security during dry and winter seasons.
Utilization of Crop Residues	Introduce urea-treated straw and feed blocks from agricultural waste.	Reduced feed cost and better resource use.

3.5.7.5 Dairy Development

Intervention	Description	Impact
Milk Collection and Chilling Centers	Establish village-level milk collection points with basic cooling equipment.	Reduced spoilage, quality preservation, and access to larger markets.
Training in Hygienic Milk Handling	Educate farmers, especially women, on clean milking, storage, and transportation.	Improved milk quality and consumer trust.
Dairy Cooperatives Formation	Organize dairy farmers into cooperatives for collective sales and procurement.	Better prices, economies of scale, and empowerment of smallholders

3.5.7.6

3.5.7.7 Livestock Market Development and Value Chains

Intervention	Description	Impact
Upgrading Local Livestock Markets (Mandis)	Improve infrastructure (pens, weighing scales, veterinary desks, auction systems).	Better prices, reduced exploitation by middlemen.

Linkage with Urban and Regional Markets	Facilitate connections to Peshawar, Kohat, and cross-border buyers.	Expanded sales opportunities and better price realization.
Training in Meat Processing and Halal Certification	Build local skills in meat hygiene, packaging, and value addition.	Local enterprise development and export potential.

3.5.8 Proposal: Sustainable Rangelands Development

Lurram District's rangelands are a critical natural asset supporting pastoral livelihoods, livestock productivity, biodiversity, and climate resilience. This proposal outlines a 5-year, integrated rangelands development program to restore degraded pastures, increase sustainable livestock productivity, diversify incomes, strengthen local institutions and governance, and build climate-adaptive management systems. The program combines community-led restoration, fodder and water infrastructure, adaptive grazing management, animal health and value-chain strengthening, and capacity building. Implementation will be led by district authorities in partnership with provincial livestock/wildlife departments, local communities (Khyber-Pakhtunkhwa tribal structures), NGOs, and potential donors (ADB, FAO, EU, UK FCDO).

- **Geography & livelihood context:** Orakzai District is mountainous with extensive rangelands used for seasonal grazing, transhumance and smallholder livestock rearing. Livestock (goats, sheep, cattle) is a major income source and food security asset.
- **Problems identified:** Overgrazing, shrub encroachment, rangeland degradation, erosion, reduced water availability, weak veterinary services, limited fodder reserves, insecure access rights and conflict over grazing, and limited market linkages.
- **Climate risks:** Increasing frequency of droughts and erratic rainfall reduces pasture productivity and heightens pressure on remaining biomass.
- **Opportunities:** Strong local institutions, traditional grazing rules (which can be revived/adapted), available communal land, and demand for livestock products in nearby urban centers.

Objective is to restore and sustainably manage Orakzai's rangelands to increase livestock productivity, improve household incomes, and strengthen climate resilience.

Other major objectives are:

- Restore productivity
- Increase average livestock productivity
- Establish fodder production
- Strengthen veterinary and extension services
- Formalize community-based grazing management institutions

3.5.8.1 Major Components:

3.5.8.1.1 Component 1: Participatory Rangeland Restoration

Detailed rangeland baseline survey and mapping using participatory GIS. - Identification and prioritization of degraded sites for restoration. - Community mobilization and formation/strengthening of Pasture Management Committees (PMCs). - Restoration techniques: controlled grazing (temporary enclosures), reseeding with native grasses and legumes, shrub management (selective cutting), soil and water conservation (contour bunds, gully plugging, micro-check dams), and planting of palatable shrubs/forage trees. - Demonstration plots and farmer field schools for adaptive learning.

Outputs: Restored pasture hectares; trained PMCs; demonstration sites.

3.5.8.1.2 Component 2: Fodder Security and Improved Water Access

Establishment of community fodder nurseries and seed multiplication (local forage species, drought-resistant varieties). - Promotion of improved fodder systems: silage, hay-making, rotational fodder plots. - Construction/rehabilitation of water harvesting structures: check dams, ponds, spring protection, small gabion structures and solarized pumps for livestock watering points. - Provision of fodder seed kits and simple equipment for hay/silage.

Outputs: Increased on-farm fodder stocks; functional watering points; reduced seasonal fodder gaps.

3.5.8.1.3 Component 3: Sustainable Grazing Management and Land Tenure

Facilitate locally agreed grazing plans (seasonal use maps, stock limits, rotation schedules), integrating transhumant users. - Conflict-sensitive interventions to harmonize grazing across clans/communities; revive/adapt customary institutions. - Support for legal recognition of PMCs where feasible and linkages to district authorities. - Training on by-law development, enforcement mechanisms, and community monitoring.

Outputs: Agreed grazing plans; conflict reduction; recognized PMCs.

3.5.8.1.4 Component 4: Livestock Health, Nutrition and Value Chain Support

Strengthen veterinary outreach: mobile vet camps, cold-chain for vaccines, community animal health workers (CAHWs) training. - Targeted supplementation programs during lean seasons (mineral licks, feed blocks for lactating animals). - Animal breeding and husbandry trainings to improve genetic potential (selective mating, basic record keeping). - Market linkages: organize producer groups, support access to markets, cold storage and aggregation points, value addition (small-scale dairy processing, halal slaughter links), and access to microfinance for livestock enterprises.

Outputs: Reduced mortality, higher productivity, better market access.

3.5.8.1.5 Component 5: Institutional Strengthening, Capacity Building & Knowledge Management

Capacity building for district/provincial livestock, forestry, and rangeland staff. - Training PMCs in governance, finance, M&E, and sustainable management practices. - Establish rangeland monitoring protocol (biophysical indicators, participatory monitoring) and a data portal (simple dashboard). - Knowledge products, best-practice manuals, and outreach campaigns.

Outputs: Institutional capacities enhanced; accessible monitoring data.

3.5.8.1.6 Component 6: Climate Adaptation & Disaster Risk Reduction

Integrate climate-resilient species and practices into restoration and fodder programs. - Early-warning links for drought, contingency fodder reserves, and rapid response protocols for mass mortality events. - Payment for ecosystem services pilots (e.g., watershed protection incentives).

Outputs: Increased resilience; drought contingency plans.

Implementation Strategy:

- **Lead Implementer:** District Government of Orakzai (District Livestock/Forestry Division) with oversight from Provincial departments.
- **Partners:** Local NGOs, community organizations, academic institutions (for monitoring), donor agencies (ADB/FAO/EU/FCDO), and private sector service providers (vets, feed suppliers).
- **Governance:** Project Steering Committee (district level), Technical Advisory Group (rangeland/livestock experts), and Local PMCs.
- **Procurement & Financial Management:** Follow donor or government procurement rules depending on funding source; establish transparent financial management systems.

3.6 FUELS, MINERALS, AND ENERGY OF KURRAM DISTRICT

Kurram District, nestled in the Kohat Division of Khyber Pakhtunkhwa province, Pakistan, is a region of significant geographical and historical importance. Formerly part of the Federally Administered Tribal Areas (FATA), Kurram attained the status of a district following the merger of FATA with Khyber Pakhtunkhwa. The district, characterized by its mountainous terrain and fertile valleys, spans an area of 3,380 square kilometers and is inhabited by the Kurram tribe, from whom it derives its name. This chapter delves into the fuels, minerals, and energy resources of Kurram District, exploring their potential, challenges, and the path towards sustainable development.

3.6.1 Fuels and Minerals

3.6.1.1 Existing and Potential Fuel and Mineral Resources

3.6.1.1.1 Existing Resources:

Coal deposits: Kurram District holds estimated coal reserves of approximately **2 million tons**, primarily found in the area around **Para Chamkani** and **Makhran** regions[69]. The coal is mainly located in layers embedded in sedimentary rocks such as limestone and sandstone. The carbon content of the coal in Kurram varies, typically ranging between 40% to 45%. Coal extraction in this region was dormant for many years due to security concerns, but recent efforts have aimed to revive mining operations. In 2023, the Pakistani Army supported the reopening of 62 coal mines in Kurram, which had been inactive for 16 years. This initiative has revitalized the coal industry, leading to employment for over 5,000 individuals and benefiting many local families.[70]

Iron ore: The Kurram District also holds **iron ore deposits**, although the reserves are less prominent compared to neighboring districts. The iron ore found here is of **low grade**, primarily used in local construction activities. The estimated reserves of iron ore in Kurram are scattered and not extensively documented, with some reports indicating the presence of small deposits around the **Makhran and Para Chamkani** regions. The iron ore is found in **Cretaceous rocks** and has a varying iron content, averaging around **12% to 18%** iron[71]. These reserves could be useful in supporting local industries with proper beneficiation.

Oil and gas: Kurram District, is considered **prospective for oil and gas** reserves. While exploration is still in early stages, the region's geological setup suggests potential for discoveries, especially in the **Tirah Valley** areas. However, unlike, Kurram's oil and gas potential is less developed, and there is no active extraction at this time[72].

Alum: Alum is also found in **Kurram District**, particularly near **Para Chamkani** and **Makhran**, where it occurs within **quartzite sandstone**. The mineral could be used in small-scale industries, especially in water purification and textile dyeing. However, its economic viability for large-scale industry is limited due to the smaller deposits compared to other minerals.[73].

3.6.1.1.2 Potential Resources:

Metallic minerals: Geological surveys have indicated the presence of various untapped metallic minerals within the tribal areas, including copper, gold, manganese, chromite, iron ore, lead, barite,

[69] https://kpboit.gov.pk/kurram-district/
[70] https://tribune.com.pk/story/2423612/62-coal-mines-to-reopen-after-16-years?utm
[71] https://kpboit.gov.pk/kurram-district/
[72] https://kpogcl.gov.pk/
[73] https://kpboit.gov.pk/kurram-district/

soapstone, dolomite, feldspar, quartz, silica sand, bentonite, marl, emerald, and graphite. A comprehensive geological mapping and resource assessment program is crucial to quantify these reserves and determine their economic viability.

Natural gas/oil: There is potential for natural gas and oil exploration in sedimentary basins.

The Kohat sub-basin and northern Sulaiman fold belt mostly includes the sedimentary rocks and show promising petroleum exploration targets[74].

3.6.1.2 Economic Impact Assessment

An Economic Impact Assessment (EIA) evaluates the economic effects of a particular project, policy, or resource exploitation on a region. When applied to the context of mineral extraction and resource development in Kurram District, the EIA can have both positive and negative implications.

Here's a breakdown of the positive and negative impacts of Economic Impact Assessment in Kurram District.

3.6.1.2.1 Positive Impacts:

Employment: Mining activities, particularly in coal and iron ore, provide direct employment for a segment of the local workforce. However, due to the informal nature of many operations, the actual number of employed individuals is often underestimated. Formalizing the mining sector would allow for accurate data collection and better labor protections.

KP has already seen substantial job creation from its mining sector, with increasing revenues from **royalties and taxes** contributing to more jobs in the sector. A similar boost in Kurram's economy could mirror the success seen in other parts of KP.

Revenue generation: Revenue generation from mineral extraction plays a key role in supporting local and provincial finances through royalties and taxes. In 2004–05, significant income was earned from the auction of mineral check-posts, though the true potential remains untapped due to outdated extraction methods and royalty systems. Currently, there is no detailed public record of mineral revenues specific to Kurram District. However, at the provincial level, Khyber Pakhtunkhwa recorded a 200% increase in mineral royalties in the 2024–25 fiscal year, reflecting growing revenue potential from the mining sector. [75]

Growth of ancillary industries: Mineral extraction can stimulate the growth of related industries, such as transportation, construction, and equipment supply. Establishing a mineral processing facility in Kurram would create additional employment opportunities and add value to the extracted resources before they are transported elsewhere.

Sustainable Resource Management: EIA helps assess the long-term sustainability of resource extraction (e.g., coal, marble) by ensuring that mining activities do not deplete natural resources beyond their capacity to regenerate. Sustainable practices can be integrated to balance economic growth with environmental protection.

KP has implemented various measures for sustainable mining. Kurram can benefit from these practices, ensuring that it doesn't face similar depletion or environmental degradation. Promoting

[74] http://nceg.uop.edu.pk/GeologicalBulletin/Vol-Special-2013/Abstract22.pdf
[75] https://www.pakp.gov.pk/wp-content/uploads/2024/05/f-Estimates-of-Receipts-2024-25.pdf?utm

sustainable mining in Kurram could attract more responsible investments and safeguard the long-term prosperity of local communities.

3.6.1.2.2 Negative Impacts:

Environmental degradation: Unsustainable mining practices, including deforestation, soil erosion, water contamination, and air pollution, pose a significant threat to Kurram's environment. These impacts can offset the economic benefits of mining in the long term, necessitating the implementation of stricter environmental regulations and responsible mining practices.

Informal mining sector: The prevalence of informal mining operations leads to revenue leakage, exploitation of workers, and environmental damage. Formalizing these operations through licensing, training, and financial support is crucial for ensuring equitable and sustainable resource management.

Displacement of Local Communities: Large-scale resource extraction could lead to the displacement of local communities or disrupt their way of life. If not carefully assessed through the EIA, mining projects may not take into account the livelihoods of local populations, leading to potential social unrest. In Kurram, without a proper social impact assessment, mining could result in unrest, disruption, and a loss of cultural heritage.

Unclear Economic Benefit Distribution: One negative impact of EIA is that benefits of mining might not be distributed equally within the district. If mining activities are managed by large corporations or external investors, local communities may not see the direct economic benefits (e.g., job creation, revenue generation). The EIA would highlight these disparities but addressing them could be difficult. In KP, there have been instances where the benefits from mining have not been equally distributed, especially in remote areas. Similarly, Kurram could face inequality in wealth distribution if local governance is not robust, leading to economic inequality and social dissatisfaction.

Over-reliance on Mining: Mining revenue could become a dominant source of income in Kurram, making the district overly dependent on this sector. If resource extraction is not diversified, it could make Kurram's economy vulnerable to market fluctuations in global commodity prices (e.g., coal, marble). economic instability could result from an over-reliance on a volatile industry, leading to future economic decline in the event of a commodity price slump.

3.6.1.2.3 Recommendations:

Formalize artisanal mining: Implement a program to formalize artisanal mining operations through licensing, training, and access to financing. This would improve safety standards, reduce environmental impact, and increase revenue generation.

Invest in value-added processing: Establish a mineral processing facility in Kurram to add value to extracted resources before they are transported elsewhere. This would create additional employment opportunities and boost the local economy.

3.6.2 Constraints and Recommendations

3.6.2.1 Constraints:

- **Outdated technology:** The use of outdated technology limits productivity, increases costs, and contributes to environmental damage.
- **Illegal mining**: Illegal mining operations undermine legal businesses, evade taxes, and cause significant environmental damage.

- **Limited infrastructure**: A lack of adequate infrastructure, including roads, electricity, and water supply, hinders mining operations and limits the potential for value-added processing.
- **Conflicts over land rights**: Disputes over land ownership and resource distribution can delay or halt mining projects.
- **Non-availability of land records:** The absence of reliable land records complicates land acquisition and contributes to land disputes.

3.6.2.2 Recommendations:

- **Strengthen EPA monitoring:** Increase the capacity of the Environmental Protection Agency (EPA) to monitor mining operations and enforce environmental regulations.
- **Adopt modern extraction techniques:** Promote the adoption of modern, environmentally friendly extraction techniques through training programs, financial incentives, and technology transfer initiatives.
- **Launch awareness campaigns:** Conduct awareness campaigns to educate local communities about sustainable mining practices and the importance of environmental conservation.
- **Develop infrastructure:** Invest in infrastructure development, including roads, electricity, and water supply, to support mining operations and promote value-added processing.

3.6.3 Energy and Power Development

3.6.3.1 Identification of Energy Sources

Kurram District, situated in Khyber Pakhtunkhwa (KP), Pakistan, is endowed with both **renewable** and **non-renewable** energy resources. Here's an overview of these energy sources

3.6.3.1.1 Renewable:

Hydro: Kurram has potential for micro-hydropower projects, particularly in the Boshera, Shakar Dara, Gundal and Sakhi Ahmad Shah valleys. These streams could be utilized for irrigation purposes. Micro-hydropower plants (MHPs) have an energy output of no more than 0.15 MW. Pakistan possesses a hydropower potential of up to 60,000 MW, with about 40% of it coming from Gilgit-Baltistan and the Kashmir region.

Table 3-75 Existing Micro Hydle Power Units Kurram

Name of MPH	Capacity	Location/Village Name
Installation of Micro Hydle Power Unit at Boshera in Upper Kurram	10-15 KW	Boshera in Upper Kurram
Installation of Micro Hydle Power Unit at Shakar Dara in lower Kurram	10-15 KW	Shakar Dara in lower Kurram
Installation of Micro Hydle Power Unit at Gundal in Central Kurram	10-15 KW	Gundal in Central Kurram
Installation of Micro Hydle Power Unit at Sakhi Ahmad Shah in Lower Kurram	10-15 KW	Sakhi Ahmad Shah in Lower Kurram

Source: PEDO

Kurram has potential for micro-hydropower projects, particularly in the Boshera, Shakar Dara, Gundal and Sakhi Ahmad Shah valleys. A feasibility study should be conducted to assess the viability of constructing micro-hydropower plants in these areas.

Solar: The high insolation levels in Kurram make it ideal for solar farms. The government should provide incentives for solar adoption, such as tax exemptions and subsidies.

Table 3-76:Installation of Solar Mini-Grids in Kurram

S.No	Area	Sector	Scheme Code	Scheme Name	Status	Approved Cost (Million PKR)	District	Capacity of Each Mini-Grid	No. of Allocated Sites
1	Kurram	Power	191403	Installation of 13 Solar Mini Grids in Merged Areas of Khyber Pakhtunkhwa	Approved	490.2	Kurram	175 kW	1

Source: PEDO

The Khyber Pakhtunkhwa Energy Development Organization (PEDO) is implementing the installation of solar mini-grids in various merged areas, including Kurram. The project aims to provide uninterrupted and low-cost electricity through solar power generation, enhancing economic activities in targeted areas, particularly those that are poverty-stricken and have been affected by conflict.

This initiative includes a total of 13 solar mini-grids across the newly merged districts, with each mini-grid having a capacity of 175 kW. The project is expected to significantly improve the energy access for local communities, facilitating business activities and contributing to poverty alleviation.

Current Status

As of now, the project is approved with an estimated cost of PKR 490.2 million for the installation in Kurram, with work nearing completion in various locations across the region. However, several constraints such as social issues, security concerns, and poor infrastructure remain challenges that need to be addressed for successful implementation.

This table format provides a clear overview of the solar mini-grid project specific to Kurram while summarizing key details and constraints associated with the initiative.

Wind: While the terrain limits the overall potential for wind energy, specific elevated zones may be suitable for small-scale wind power generation.

3.6.3.1.2 Non-Renewable:

- Coal-fired plants utilizing local coal reserves.
- Limited oil/gas infrastructure, with reliance on imported fuels.

ii. Thermal/Coal/Oil/Gas

- Coal dominates thermal energy production.
- Proposals exist for gas pipeline extensions from nearby regions.

iii. Demand, Generation, and Shortfall

- There is a shortfall in energy, leading to load-shedding.

iv. Review of National/Provincial Policies

- National Power Policy 2021 emphasizes renewables but is skewed toward grid-based projects.
- KP Solar Energy Initiatives include tax exemptions for solar adoption but have limited implementation in Kurram.

v. Existing/Ongoing/Future Plans

- Ongoing micro-hydropower projects in villages by the Pakhtunkhwa Energy Development Organization (PEDO).
- Proposed solar parks under CPEC (2030 timeline) in specific locations.

3.6.4 Constraints and Recommendations

3.6.4.1 Constraints:

- High upfront costs for renewables and transmission losses.
- Political instability deterring investors.

3.6.4.2 Recommendations:

- Subsidies for solar adoption and hybrid energy systems.
- Upgrade grid infrastructure and promote community-led microgrids.

Conclusion

Kurram's fuels, minerals, and energy sectors require balanced development prioritizing sustainability, enforcement of regulations, and investment in renewables. Collaborative governance and community engagement are critical to mitigating environmental risks and ensuring equitable growth.

3.6.4.3 Kurram District: Challenges and Opportunities in Fuel, Mineral, and Energy Resource Development

Kurram District possesses rich reserves of coal, soapstone, marble, magnesite, and potential oil and gas deposits, yet these remain largely underexploited due to outdated techniques, limited technology, and poor infrastructure.

The district's coal reserves estimated at 2 million tons offer potential for thermal energy, but traditional, labor-intensive extraction methods limit efficiency and safety while increasing environmental risks. Similarly, soapstone and marble mining rely on small-scale, unregulated operations with minimal processing facilities, reducing economic returns and productivity.

In the energy sector, Kurram shows promise in renewable sources like hydropower and solar energy. The Kurram Tangi Dam, expected to generate 83.4 MW, and smaller micro-hydel and solar projects are important steps, though expansion is constrained by financial and logistical barriers. Oil and gas exploration is still in early stages but could diversify the district's energy mix if pursued strategically.

To unlock this potential, modernization of extraction methods, stronger regulation, investment partnerships, and training for local workers are essential. A balanced focus on sustainable mining and renewable energy can position Kurram as a vital contributor to Khyber Pakhtunkhwa's economic and energy development while ensuring environmental preservation.

3.6.5 Future Proposed Intervention

Kurram District, part of the formerly Federally Administered Tribal Areas (FATA), possesses significant untapped natural resources including coal, chromite, and potential for renewable energy. However, to transform these raw materials into sustainable economic value, a holistic and phased development strategy is essential. This strategy must be comprehensive, inclusive, and implemented through well-coordinated stages that address both current gaps and long-term opportunities.

3.6.5.1 Institutional and Regulatory Strengthening

The mining and energy sectors in Kurram remain largely informal and under-regulated. Weak governance, lack of clear licensing procedures, and limited oversight result in low revenues, unsafe working conditions, and environmental degradation.

Intervention Area	Proposed Actions	Lead Stakeholders
Formalization of Mining Sector	• Implement a One-Window Licensing System under KP Mineral Governance Act 2022 to streamline artisanal and small-scale miner registration. • Enforce licensing compliance with safety, labor, and environmental norms.	KP Mines & Minerals Dept., Deputy Commissioner Kurram, Mineral Directorate
Transparent Revenue Governance	• Set up District Mineral Revenue Monitoring Cell to track mineral royalties and taxes. • Deploy e-payment systems and GPS-tracking for mineral transport to curb leakages.	KP Revenue Authority, Local Government Kurram

3.6.5.2 Technology Upgradation and Value Addition

Most mining and energy extraction activities in Kurram rely on outdated and manual techniques, which are inefficient, unsafe, and yield low productivity. Additionally, the absence of value-added processing means raw materials are exported without generating significant local benefits.

Table 3-77 Proposed Technology Upgradation

Priority Area	Short-Term Actions	Medium to Long-Term Actions
Chromite & Coal Processing	• Provide leasing schemes for shared mechanized tools (e.g., crushers, transport vehicles).	• Establish small-scale Chromite Beneficiation and Coal Washing Units through PPPs.
Local Industry Development	• Support setting up of small processing units (e.g., refractory materials, ceramics, cement blocks).	• Plan and develop a Mineral-Based Industrial Cluster along Parachinar–Sadda–Thall Road Corridor.

3.6.5.3 Energy Sector Development

Given the district's terrain and off-grid challenges, a decentralized, mixed-energy approach is recommended.

Table 3-78 Proposed Energy Sector Development

Energy Source	Key Proposal	Estimated Benefit
Solar Mini-Grids	Expand PEDO's solar village model to 25–30 more off-grid settlements, focusing on schools and clinics.	Reduced diesel usage, promotion of women-led home businesses.
Micro Hydropower (Tochi & Kurram Rivers)	Conduct feasibility studies for small hydro units using community-managed models.	Boosts irrigation and reliable electricity for rural areas.
Clean Coal-to-Power Pilot	Explore installation of modular clean coal gasification units in coal-rich areas.	Decentralized power for agro-processing and local markets.
Oil/Gas Exploration	Incentivize exploration via risk-sharing contracts with KPOGCL and private partners.	Enhances provincial energy security and local employment.

Kurram's natural wealth can become a cornerstone of its development but only through systematic efforts that align governance, technology, infrastructure, and community needs. A phased and inclusive strategy not only increases economic output but also ensures social harmony, environmental sustainability, and long-term resilience.

3.7 Industry

3.7.1 Categorization of Industrial Establishments

Industries are the backbone of economic growth, and classifying them by type and scale is essential for understanding the industrial landscape and formulating targeted development policies.

District Kurram, located in the northern part of Khyber Pakhtunkhwa, is largely hilly but contains fertile agricultural land and abundant natural resources, offering strong potential for industrial expansion. Industrial establishments can be classified based on production processes, ownership, market orientation, size, and environmental impact each providing insight into their economic roles and operational dynamics.

3.7.1.1 Categorization by Size

Industries are classified by workforce size into small, medium, and large categories:

- **Small industries:** fewer than 50 employees.
- **Medium industries:** 50–250 employees.
- **Large/heavy industries:** more than 250 employees.

3.7.1.1.1 Light Industries

Small-scale industries in District Kurram play a vital role in local economic growth and job creation. The district hosts 1 flour mill, 1 ice factory, 1 ice cream factory, and 5 crush plants, all contributing to entrepreneurship and community livelihoods. Defined as enterprises employing fewer than 50 workers, these industries strengthen economic resilience and support inclusive development in the district.

3.7.1.1.2 Medium Industries

There are no medium-scale industries in District Kurram yet, as all of the existing industries have less than 50 employees, and thus those industries are categorized as small-scale industries.

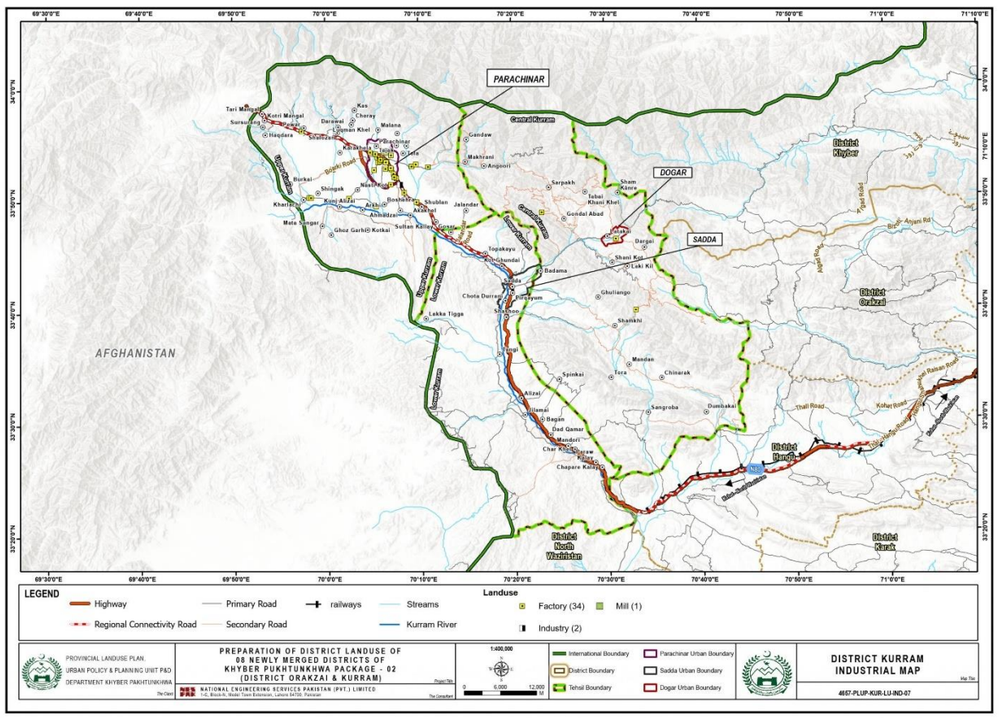
3.7.1.1.3 Heavy Industries

District Kurram presently has no heavy industries, though it possesses significant potential for their future establishment. Based on employment criteria, industries with over 250 workers are classified as heavy or large-scale; however, since the existing industries in Kurram employ fewer workers, they all fall under the category of small-scale industries.

Table 3-79: District Kurram Industries Categorization by Size[76]

Industrial Sector	Light Industries	Medium Industries	Heavy Industries	Total Units
Flour Mills	1	-	-	1
Ice Factory	1	-	-	1
Ice Cream Factory	1	-	-	1
Crush Plants	5	-	-	5
Total	**8**	**-**	**-**	**8**

[76] Secondary data were collected from the Directorate General of Industries and Commerce in January 2025.



Map 3-17: Industries in Kurram District

3.7.1.2 Categorization by Type

Another way of classifying industries is based on their type. They are classified according to primary, secondary, and tertiary. Now, this classification system helps understand the nature and scope of different industries and their roles in the economy. Primary industries are industries that use the extraction of minerals or natural resources directly from the earth, such as agriculture, mining, fishing, and forestry to create finished products. Secondary industries are where activities or manufacturing convert raw materials obtained from the primary industries. These deal with production to provide consumer goods. The textile industry and the leather industry are common examples of this sector. Tertiary industries, on the other hand, are those that provide services to individuals and businesses, such as transportation, healthcare, banking, advertising, and retail trade.

There are a total of 8 industries, and all are classified as primary industries. These are classified in Table 3-80, below,

Table 3-80: District Kurram Industries Categorization by Type[77]

Industrial Sector	Primary Industries	Secondary Industries	Tertiary Industries	Total Units
Flour Mills	1	-	-	1
Ice Factory	1	-	-	1
Ice Cream Factory	1	-	-	1
Crush Plants	5	-	-	5
Total	**8**	**-**	**-**	**8**

3.7.2 Industrial Growth Pattern

Industrial growth patterns encompass the evolution of industries in terms of size, structure, output, and technological advancement, influenced by factors such as economic policies, technological innovations, market demand, and external conditions like globalization and environmental changes. Technological advancements and government policies play crucial roles in shaping industrial growth, while shifts in consumer preferences influence which industries grow and how they adapt. Understanding these patterns helps in analyzing past and present industrial trends and forecasting future developments, providing valuable insights for policymakers, businesses, and researchers.

By looking at data on establishment, overall industrial units have been increasing in this district. There were only 5 operational units in 2020-21 which has increased to 9 units in 2022-23.

It could be said that the industrial sector in District Kurram is growing looking at the overall industrial units, but the growth in recent past is not significant as for the last two years there is no growth in number of industrial units in the district

The year-wise industrial growth pattern of District Kurram is given in Table 3-81, below,

[77] Secondary data collected from the Directorate General of Industries and Commerce in January 2023.

Table 3-81: District Kurram Industrial Growth Pattern[78]

Year	Operational Units	Non-Operational Units	Total Industrial Units
2020-21	5	0	5
2021-22	8	1	9
2022-23	8	1	9

3.7.3 Ownership Pattern

Industries ownership patterns describe how industrial enterprises are structured and controlled, varying according to industry type, economic systems, and policies. Ownership forms include private (individual or family-owned), public (state-owned enterprises), foreign (multinational corporations or joint ventures), cooperative (worker or consumer-based), and mixed (public-private partnerships). These patterns evolve through privatization, nationalization, and liberalization, influencing investment trends and industrial development.

District Kurram's industries are entirely privately owned, consisting mainly of small- and medium-scale establishments such as stone crushing and food processing units. Operated by individuals or private entities, these industries rely on market-driven approaches and significantly contribute to local employment and economic growth.

Currently, there are 8 industries, all of which are owned by private entities or persons, the details of these industries are given in Table 3-82, below.

Table 3-82: District Kurram Industries Ownership Pattern

Industrial Sector	Private Owned	Government Owned	Total Units
Flour Mills	1	-	1
Ice Factory	1	-	1
Ice Cream Factory	1	-	1
Crush Plants	5	-	5
Total	**8**	**-**	**8**

3.7.4 Industrial Employment

Industrial employment covers a wide range of jobs across manufacturing and production sectors, from unskilled labor to specialized technical roles. It plays a key role in economic growth, spanning primary, secondary, and tertiary industries.

In District Kurram, industrial employment is mainly concentrated in 8 primary sector units employing about 91 workers. These include 5 crush plants with 50 workers, 1 flour mill with 35 employees, and ice and ice cream factories employing 3 workers each. This shows the district's dependence on small-scale, raw material processing and food production industries.

[78] Bureau of Statistics, Planning & Development Department, Government of Khyber Pakhtunkhwa. Development Statistics of Khyber Pakhtunkhwa 2023. Table No. 139 and secondary data collected from the Directorate General of Industries and Commerce in January 2023.

Table 3-83: District Kurram Industries Ownership Pattern

Industrial Sector	Number of Industries	No. of Employees
Flour Mills	1	35
Ice Factory	1	3
Ice Cream Factory	1	3
Crush Plants	5	50
Total	**8**	**91**

3.7.5 Raw Material Availability

Having access to raw materials is crucial for industrial development, as it affects production, costs, and supply chains. These materials include natural resources (such as minerals, fossil fuels, timber, and agricultural products), processed materials (like steel, aluminum, and plastics), and renewable resources (including biomass and water). Being close to the sources of these materials can reduce costs, but sourcing globally can offer advantages while introducing risks. Industries are increasingly pressured to adopt sustainable practices and utilize renewable resources due to fluctuating costs and environmental concerns. Advancements in extraction, processing, and recycling technologies are improving efficiency and reducing reliance on virgin materials. Effective supply chain management, including logistics and inventory, is essential. Material availability is also impacted by regulatory factors such as trade policies and environmental regulations, which require careful navigation. Future trends in this area focus on sustainable sourcing, innovative materials, and circular economy practices to minimize waste and ensure long-term sustainability. This understanding helps industries maintain efficiency, manage costs, and adapt to changes in the landscape.

3.7.5.1 Raw Material for Crush Plants

In District Kurram, there are 5 crush plants that process rocks and minerals into construction aggregates. Most plants use limestone, a sedimentary rock composed of calcium carbonate, commonly used in cement, road bases, and other construction materials.

The raw materials are extracted from quarries and transported to crushers, where they undergo primary, secondary, and tertiary crushing to produce aggregates of various sizes. Understanding these materials is essential for optimizing production and ensuring high-quality outputs.

3.7.5.2 Raw Material for Flour Mill

There is 1 flour mill in District Kurram that processes grains and seeds into flour for baking and cooking. Wheat is the primary raw material, used to produce different flours such as all-purpose, bread, and cake flour, while maize is also used for corn flour and cornmeal. During 2022–23, the district produced 54,317 tons of wheat and 4,505 tons of maize.

These materials are sourced from farms and transported to the mill, where they undergo cleaning, milling, and sifting to produce flours of various textures and qualities, ensuring high standards for diverse culinary uses.

3.7.6 Industrial Workforce

Industrial employment and workforce dynamics refer to the roles, characteristics, and trends of workers in different industrial sectors. These dynamics are affected by factors such as technological

advancements, economic policies, globalization, and demographic changes. Policymakers, business leaders, and educators must understand these dynamics to develop strategies that foster economic growth, job creation, and workforce development in a rapidly changing industrial environment.

The Labor Force Survey (LFS) 2020-21 by the Pakistan Bureau of Statistics provides crucial insights into employment and unemployment rates, labor force participation, and employment structure across various sectors and regions in Pakistan. The survey collects data on employed and unemployed individuals, employment rates in different regions and sectors, labor force participation rates, demographic details of the workforce, and the informal sector. The LFS uses a representative sample of households from different provinces and regions and the data collected is used for statistical reports and publications. This data is essential for formulating employment policies, labor laws, social protection programs, economic planning, and monitoring employment initiatives in Pakistan.

The details of the type of workforce and labor working in District Kurram according to the Labor Force Survey (LFS) 2020-21[79] are discussed below.

3.7.7 Employment Distribution by Sector

According to the Labor Force Survey (LFS) 2020-21, in District Kurram, agriculture employs 31.6% of the workforce, indicating that it is a major contributor to employment. In contrast, the industrial sector employs 26.6 % of the workforce, suggesting presence of industries such as manufacturing, construction, and energy production. The services sector is the largest employer, with 41.8% of the workforce engaged in activities like retail, healthcare, education, hospitality, and finance.

3.7.8 Workforce Distribution by Area

In rural areas, agriculture is the dominant sector, accounting for 31.6% of the economy, while industry and services account for 26.8% and 40.8%, respectively. On the other hand, in urban areas, services dominate, accounting for 82.0 % of the economy, while industry and agriculture account for 16.2% and 1.8%, respectively.

3.7.9 Formal and Informal Workforce

According to LFS data, 18.8% of individuals in Kurram were engaged in formal employment, while 82.1% worked in the informal sector. In rural areas, 18% had formal jobs compared to 81.2% informal, whereas in urban areas, formal employment was higher at 33.3%. Among males, 20.2% were in formal employment versus 15.1% of females, with the majority in informal work.

In 2020–21, 0.7% of Kurram's employed population were employers, 47.8% own-account workers, 15.6% contributing family workers, and 36.0% employees. Gender-wise, 41.9% of males were employees compared to 20.8% of females, while more females (54.9%) were own-account workers than males (45.0%).

3.7.10 Future Proposed Interventions

Kurram District has rich mineral resources, a growing agricultural base, and a strategic border location, making it ideal for small- to medium-scale industrial development. However, industrial activity remains minimal due to lack of infrastructure, energy, technical skills, and investment incentives.

[79] Pakistan Bureau of Statistics. (2022). *Pakistan Labor Force Survey 2020-2021*. Annexure-I Key Indicators of Labor Market (KILM) at District Level, District Kurram

Strategic interventions are needed to:

- Create employment
- Add value to local resources
- Strengthen supply chains
- Attract private investment
- Reduce dependency on imports

3.7.10.1 Development of Industrial Infrastructure

Intervention	Description	Impact
Establish a Small Industrial Estate	Develop an industrial zone in Parachinar, Sadda, or along Hangu-Kurram Road with roads, electricity, water, and security.	Provide space for SMEs, attract investors, and formalize industrial activity.
Industrial Land Allotment Policy	Allocate subsidized land for startups and local investors.	Encourage local entrepreneurship and inclusive industrial growth.
Utility Access for Industry	Ensure reliable electricity, gas (if feasible), and water for industrial users.	Reduce operational costs and increase competitiveness.

3.7.10.2 Agro-Based and Mineral-Based Industries

Intervention	Description	Impact
Fruit and Vegetable Processing Units	Set up units for drying, canning, juicing, and pickling of local produce (apricots, tomatoes, pomegranates, onions).	Reduce post-harvest losses, increase value addition, and open export potential.
Cold Storage and Warehousing	Establish storage hubs for agricultural and processed products.	Extend shelf life, stabilize prices, and ensure year-round supply.
Brick Kilns and Construction Material Units	Encourage environment-friendly brick kilns and cement blocks using local clay, lime, and stone.	Generate local jobs and support the construction industry.
Stone Crushing and Marble Units	Utilize local stone deposits for tiles, construction material.	Promote mineral value addition and local employment.

3.7.10.3 Livestock and Dairy-Based Industries

Intervention	Description	Impact
Dairy Processing Plants	Establish small-scale plants for milk packaging, yogurt, and cheese production.	Strengthen dairy value chains and create rural employment.
Meat Processing and Halal Certification Units	Encourage hygienic slaughterhouses and packaging facilities.	Promote meat export, especially to the Gulf region.
Leather Goods Micro-Units	Encourage processing of hides for leather craft and accessories.	Empower skilled youth and women for home-based industries.

3.7.10.4 Handicrafts and Cottage Industry Support

Intervention	Description	Expected Impact
Revival of Traditional Crafts	Promote embroidery, wood carving, carpet weaving, and metalwork.	Preserve cultural heritage and create income for women and artisans.
Craft Development Centers	Offer training, design support, and market access for artisans.	Build skills and modernize traditional products for national/international markets.
E-commerce & Online Sales Training	Help artisans and small producers sell online via platforms like Daraz, Facebook Marketplace.	Broaden market access and increase profits for micro-enterprises.

3.7.10.5 Skills Development and Industrial Workforce Training

Intervention	Description	Impact
Technical and Vocational Training Institutes (TVET)	Establish or strengthen institutes offering training in welding, machinery, carpentry, packaging, and food processing.	Develop a skilled industrial workforce and reduce unemployment.
Apprenticeship Programs with Industries	Link youth with industrial units for on-the-job learning.	Enhance practical skills and employability of local youth.
Entrepreneurship and Start-Up Support	Conduct business planning workshops and provide incubation support.	Promote innovation and self-employment in the industrial sector.

3.7.10.6 Border Trade and Export Facilitation

Intervention	Description	Expected Impact
Develop Border Trade Terminal	Build infrastructure for formal trade with Afghanistan (Ghulam Khan crossing).	Boost legal exports and generate customs revenue.
Promote Export-Oriented Units	Support sectors with export potential (dried fruits, handicrafts, halal meat).	Increase foreign exchange earnings and district visibility.
Customs & Logistics Support Center	Set up a center for traders to handle documentation and compliance.	Streamline trade and reduce delays.

The proposed interventions aim to transform Kurram's industrial sector from an underutilized segment into a dynamic driver of inclusive economic growth. By leveraging the district's local resources—agriculture, minerals, livestock, and crafts alongside strategic investments in infrastructure, skills, and value chains, Kurram can foster a sustainable, employment-rich, and diversified industrial economy. These interventions will not only create thousands of jobs but also reduce poverty, empower women and youth, promote formal trade, and position Kurram as a regional hub for small-scale industry and cross-border commerce.

3.7.11 Propose Future Demand

3.7.11.1 District Industrial Requirements

This Section presents the projected industrial land requirements for District Kurram up to the year 2045 and compares them with existing and proposed allocations. With a projected rural population of 1,132,457 by 2045, the total industrial land requirement for the district is estimated at 566 acres. However, the existing industrial area is only 20.8 acres, indicating a severe deficit in industrial infrastructure. This means that the current industrial land constitutes only a very small fraction of the total projected requirement, highlighting the district's limited industrial base and underdeveloped manufacturing capacity.

To address this shortfall, 211 acres have been proposed under Urban Light Manufacturing Zones (LMZs). These LMZs are intended to promote small and medium-scale industries within urban areas, thereby supporting employment generation and localized economic activity. Despite this allocation, there remains an additional requirement of 334 acres to fully meet the projected demand. In response, a larger proposed industrial zone of 351 acres has been identified, which slightly exceeds the remaining requirement. This suggests a planning approach that allows flexibility for phased development and future expansion. Additionally, a proposed SIDE (Small Industries Development Estate) site covering 111 acres has been included, likely aimed at promoting small-scale industries. Overall, the table reflects a structured industrial expansion strategy combining urban-based manufacturing zones with district-level industrial estates to meet long-term growth demands.

Table 3-84 District Kurram Required & Proposed Industrial Areas

District Population 2045	Total Industrial Requirements	Existing Industrial Area	Proposed Urban LMZ	Additional Requirements for District	Proposed Industrial Zone	Proposed SIDE Site
1,132,457	566	20.8	211	334	**351**	**111**

3.7.11.2 Urban Area Industrial Requirements

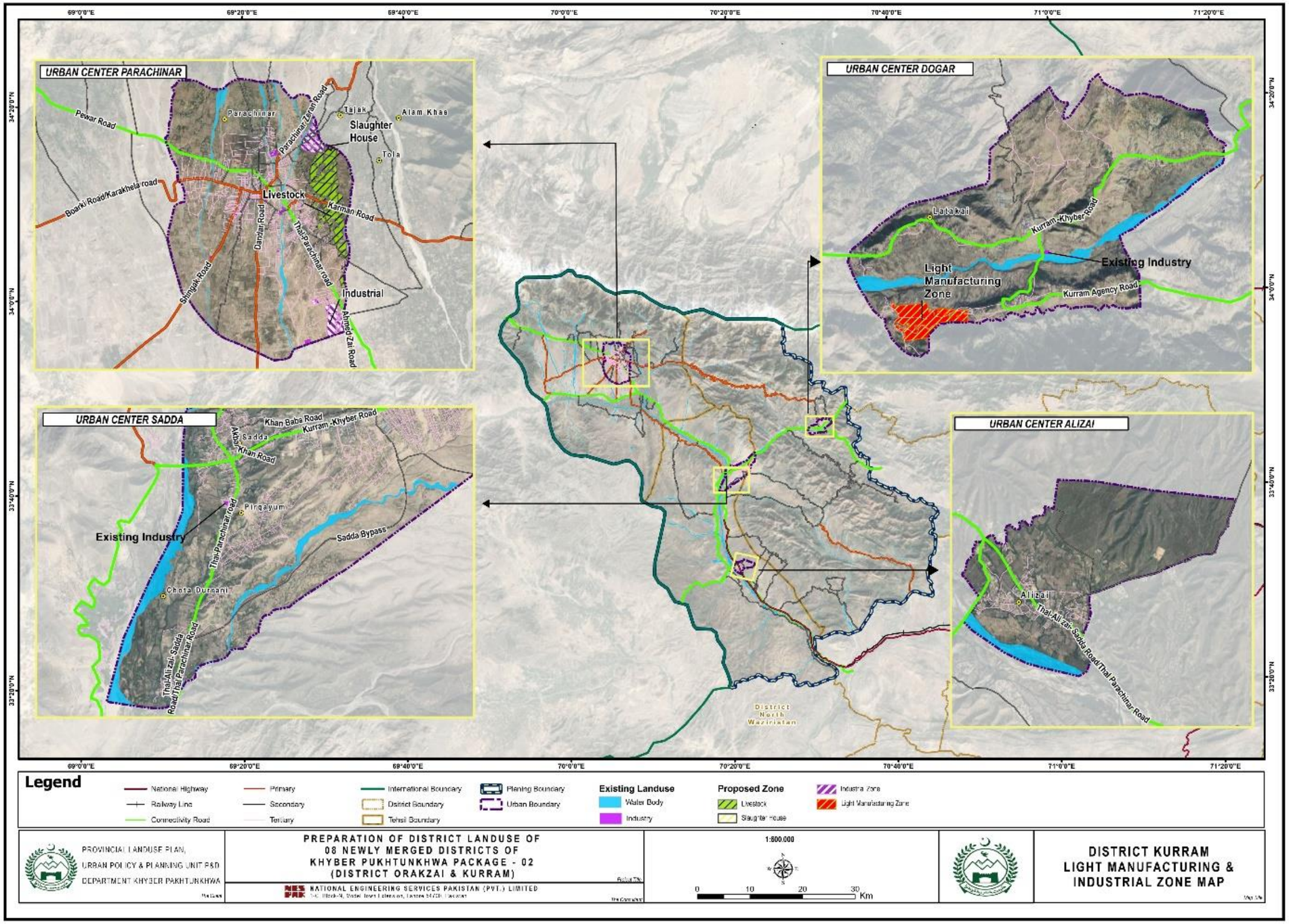
This Section disaggregates Light industrial land allocation at the urban level and compares population projections for 2025 and 2045. The total urban population of District Kurram is projected to increase significantly from 149,432 in 2025 to 353,736 in 2045, indicating rapid urban growth and increasing pressure on employment generation and infrastructure. Despite this substantial population increase, industrial land allocation across urban centers is unevenly distributed.

Parachinar, which is likely the district's primary administrative and commercial hub, receives the largest share of industrial land, with 181 acres allocated by 2045. Given its projected population of 99,682 in 2045, this allocation positions Parachinar as the main industrial center within the district. In contrast, Sadda, despite having the highest projected population of 140,901 in 2045, has no industrial land allocated due to adjacent SIDB Site.

Dogar is allocated 30 acres of industrial land for its projected 2045 population of 52,884, suggesting a moderate and proportionate level of industrial development. Meanwhile, Alizai, with a projected population of 60,270, has no industrial land allocation. Overall, the total industrial land allocated to urban areas by 2045 amounts to 211 acres, which aligns with the Urban LMZ allocation mentioned in Table 3-76. The analysis reveals that industrial development is heavily concentrated in Parachinar, while secondary towns receive limited or no industrial provision. This pattern may lead to spatial and economic disparities within the district unless future planning initiatives aim to distribute industrial growth more evenly across urban centers.

Table 3-85 District Kuram Urban Areas Required & Proposed Industrial Areas

Urban Area	Year	Population	Existing & Proposed Industrial (Acres)
Parachinar	2025	60010	20
	2045	99,682	181.0 (As per PAMP)
Sadda	2025	44935	0
	2045	140,901	0.0
Dogar	2025	15,150	1
	2045	52,884	30.0
Alizai	2025	29,337	0
	2045	60,270	0.0
Total	2025	149432	21
	2045	353736	211



Map 3-18 District Kurram Proposed Light manufacturing Zones

3.7.12 Constraints

- Kurram District shares a border with Afghanistan, and inconsistent trade policies impact industrial and commercial activities. Smuggling and informal trade impact local industries by creating unfair competition.
- District Kurram only has small-scale industries, with no medium or heavy industries present. This limits the economic diversity and the potential for large-scale industrial growth.
- There is no special economic zone or industrial estate currently present in the district
- The region has faced security issues in the past, which has deterred investment in industries
- All existing industries are categorized as primary, focusing on raw material processing rather than manufacturing or services. This restricts the district's industrial diversification and value addition.
- The raw materials available, such as limestone and wheat, are specific to certain industries (crush plants and flour mills). This dependence could limit the development of a broader industrial base.
- There is a significant need for improved infrastructure, such as roads, rail links, and industrial zones, to support industrial activities and growth.
- The industrial sector is entirely privately owned, which may limit the scope for state intervention or public-private partnerships to drive growth.
- The workforce is predominantly engaged in informal employment, and there might be a mismatch between the skills available and the skills required for advanced industrial activities.
- Although the number of industrial units has increased over the years, there is a significant proportion of non-operational units, reflecting instability in industrial growth.
- Industries face challenges in adhering to strict environmental regulations and ensuring sustainable practices, especially given the emphasis on environmental sustainability in the KP Industrial Policy.
- Attracting both local and international investors remains a challenge, particularly in underdeveloped areas like District Kurram. Financial and regulatory incentives are needed to boost investment.
- Lack of technical education and vocational training means there are not enough skilled workers to support industrial growth
- The focus on primary industries limits economic diversification. Expanding into secondary and tertiary industries could be challenging due to existing constraints.
- A significant portion of the workforce is engaged in informal employment, which can affect job security and productivity. Transitioning to formal employment and improving working conditions are ongoing challenges.

These constraints and challenges highlight the need for comprehensive industrial and economic policies to address the specific needs of District Kurram and foster sustainable industrial development.

3.7.13 Recommendations

- Bring stability in the district by solving security related issues and create policies to bring investment and raw material from neighboring country
- Develop industrial estates or Special Economic Zone (SEZ) to attract investors.

- Enhancing industrial and trade cooperation with Afghanistan will also bring investor through border economies
- Implement policies to attract medium and heavy industries to District Kurram. This must include providing incentives for businesses to establish operations in the region, such as tax breaks, subsidies, and infrastructure support. Dedicated industrial zones with the necessary infrastructure and utilities must be established to support larger-scale industries. These zones should be equipped with facilities for research, development, and advanced manufacturing.
- Develop initiatives to support the growth of secondary (manufacturing) and tertiary (services) industries. Grants or subsidies must be offered to businesses in these sectors, and their market entry should be facilitated. Existing primary industries should be encouraged to invest in value-added processes, such as developing processed products from raw materials like limestone and wheat.
- Research and promote the use of alternative raw materials that support a broader range of industries. This should involve partnerships with research institutions and investments in technology for material processing and recycling. Efficient supply chain management systems must be developed to ensure a steady and cost-effective supply of raw materials to various industries.
- While Kurram is not direct part of CPEC, it has significant potential to benefit from cross border trade and industrial growth.
- Prioritize the development of essential infrastructure, including roads, rail links, and industrial parks. Connectivity must be enhanced to facilitate the movement of goods and support industrial activities. The investment must be made in modernizing existing industrial facilities and creating new ones with state-of-the-art equipment and amenities.
- Facilitate public-private partnerships to leverage both public support and private sector efficiency. Private entities must be engaged in infrastructure development, technology adoption, and industrial management. The potential for cooperative ownership models should be explored to enable more collaborative and community-focused industrial initiatives.
- Implement comprehensive skill development and technical training programs tailored to the needs of emerging industries. Collaboration with educational institutions and industry experts is essential to design relevant curricula. Policies must be developed to transition workers from informal to formal employment, improving job security and working conditions. Incentives should be offered to businesses to formalize their employment practices.
- Provide assistance to operational units to enhance their efficiency and sustainability. This must include financial aid, technical support, and market access. The reasons behind non-operational units must be investigated, and targeted interventions should be developed to address issues such as financial instability or operational challenges.
- Develop and enforce regulations that encourage sustainable industrial practices. Training and resources must be provided to help industries comply with environmental standards. Investment in research and development focused on sustainable technologies and practices is required to minimize environmental impact.
- Create a favorable investment climate by offering financial incentives, reducing bureaucratic hurdles, and highlighting the region's potential to investors. District Kurram must be promoted as a viable investment destination through targeted marketing campaigns and investor outreach programs.

- Identify and support emerging sectors that could complement the existing industrial base. Incentives must be provided for businesses in these sectors to establish operations in the district. Strategies should be developed to diversify the local economy by attracting businesses in sectors such as technology, services, and manufacturing.

3.8 ``Trade and Commerce

3.8.1 Distribution of Commerce and Trade Centers

Land use planning significantly influences trade and commerce by shaping the physical and economic landscape of urban and rural areas. Effective land use planning can facilitate commercial growth by ensuring that businesses have access to essential infrastructure, such as transportation networks, utilities, and communication systems. Well-planned commercial zones reduce congestion and enhance accessibility, making it easier for goods and services to flow efficiently, which attracts investment and boosts local economies. Conversely, poor land use planning can lead to fragmented development, congestion, and inadequate infrastructure, which can hinder business operations and deter investment. Furthermore, strategic land use planning can create vibrant mixed-use areas that integrate residential, commercial, and recreational spaces, fostering economic synergies and increasing the quality of life for residents. By balancing the needs of various stakeholders and ensuring sustainable development, land use planning plays a crucial role in shaping the competitive advantage and economic vitality of a region.

3.8.2 International Commerce and Trade Center in Khyber Pakhtunkhwa

Peshawar, the capital of Khyber Pakhtunkhwa, is strategically located near the Khyber Pass, serving as a gateway to Afghanistan and Central Asia, making it a key hub for international trade. The city has developed significant infrastructure, including the Peshawar Dry Port and Bacha Khan International Airport, to support trade in agricultural products, textiles, handicrafts, industrial goods, and minerals such as marble, limestone, and coal. Its markets handle high-quality fruits, vegetables, wheat, rice, and spices, while local artisans produce hand-woven carpets, embroidered fabrics, pottery, and metalwork for international buyers. Industrial goods include machinery, pharmaceuticals, and cement, with surrounding districts like Mardan, Charsadda, Dera Ismail Khan, Swat, Bannu, and Kohat contributing through textiles, food processing, and marble production. The Khyber Pass Economic Corridor (KPEC), featuring a 48-kilometer, 4-lane expressway between Peshawar and Torkham, is set to enhance regional trade, reduce congestion, improve transportation efficiency, and create up to 100,000 jobs, aligning with Pakistan's commitments under CAREC and promoting economic growth.

3.8.3 National Commerce and Trade Centers in Khyber Pakhtunkhwa

Khyber Pakhtunkhwa hosts several key national trade centers that drive economic activity across Pakistan. Peshawar, the provincial capital, is the most prominent hub, historically serving as a gateway to Afghanistan and Central Asia via the Khyber Pass. The city thrives on agricultural trade, handling high-quality fruits, vegetables, and staple crops, while also supporting textiles, handicrafts, and growing industrial sectors. Mardan is noted for its textile industry, including cotton ginning and weaving, and for agricultural produce, efficiently connecting local farmers to national markets. Swat combines trade with tourism, exporting high-quality fruits like apples and peaches, marble, and handicrafts such as embroidery and shawls. Charsadda is a vital agricultural center producing pomegranates and sugarcane, while gradually developing small-scale industries. Kohat supports cement production and manufacturing, leveraging its strategic location near the Indus Highway. Dera Ismail Khan is a hub for wheat, rice, pulses, and food processing, serving southern KP. Bannu contributes through textile manufacturing, food processing, and agricultural trade, connecting southern KP with broader markets. Collectively, these centers strengthen the province's integration into national commerce and support employment, production, and economic development.

3.8.4 Regional Commerce and Trade Centers

In southern Khyber Pakhtunkhwa, Kohat, Dera Ismail Khan, and Bannu serve as crucial regional trade centers. Kohat, located in southern KP, is a significant industrial and agricultural hub, renowned for cement production and fertile lands producing wheat, maize, and vegetables. Its strategic location along the Indus Highway enhances connectivity, allowing efficient movement of goods across the province and to other regions of Pakistan, and its markets cater to diverse consumer needs. Dera Ismail Khan, situated at the southern tip of KP along the Indus River, is a vital agricultural and trade center. Its economy is driven by wheat, sugarcane, rice, dates, and citrus production, supported by year-round irrigation from the river. The city also hosts a thriving livestock sector and food processing units, benefiting from its strategic transit position linking Punjab, Balochistan, and KP. Bannu, in the southern region, is an important commercial hub with a rich history of trade and industry. The city's economy includes textile manufacturing, food processing, and agricultural trade, while its strategic location near major transportation routes ensures effective distribution and strengthens its role in regional commerce. Together, these three cities form a network that supports economic activity, connects local producers to national markets, and plays a pivotal role in the trade and development of southern Khyber Pakhtunkhwa.

3.8.5 Sub-Regional Commerce and Trade Center

Sub-Regional Commerce and Trade Centers (SCTCs) in districts like Kurram are an important aspect of enhancing regional trade, providing economic infrastructure, and creating employment opportunities. Although Kurram District currently lacks a fully developed Sub-Regional Commerce and Trade Center (SCTC), it has the potential to be part of an emerging economic hub in Khyber Pakhtunkhwa. Developing such a center could be part of a larger vision that links local agriculture, mining, and manufacturing to broader regional and global trade. With investments in infrastructure, logistics, and trade facilitation, Kurram could play a key role in promoting economic activity and commerce in the KP region. The establishment of such centers would also contribute significantly to the local economy, job creation, and business development.

3.8.5.1 Major Trade Sectors

Khurlachi Border Kurram

Parachinar border is a key trade route with Afghanistan therefore one of the most important trade sector in Parachinar is border trade with Afghanistan. The Customs Station at Kharlachi is located nearby Parachinar city in Kurram District of Khyber Pakhtunkhwa. Kurram District is bordered by Khost, Ghazni, Gardez and Paktia on Afghan side. The Afghan capital city, Kabul is located around 253 km away from Kharlachi and is comparatively developed border station in terms of availability of internet connectivity and commercial infrastructure. Custom Station Kharlachi has been designated for rebate able exports of cement in addition to simple exports. This has resulted in expansion of new trade opportunities for the area and expansion of bilateral trade with Afghanistan through this trade route.

Table 3-86: Cross Border Vehicular Movement from Khurlachi

No	Month	Import Trucks				Export Trucks			
		2019-20		2020-21		2019-20		2020-21	
		Monthly	Avg Per Day	Monthly	Avg Per Day	Monthly	Avg Per Day	Monthly	Avg Per Day
1	July	257	9	241	8	1854	62	850	28
2	August	273	9	376	13	1015	34	1443	48
3	September	516	17	1161	39	898	30	1959	65
4	October	899	30	1578	53	1173	39	1917	64
5	November	503	17	659	22	1518	51	1712	57
6	December	502	17	436	15	1610	54	2408	80
7	January	376	13	536	18	2096	70	3787	126
8	February	458	15	277	9	1751	58	2243	75
9	March	256	9	1692	56	1272	42	4202	140
10	April	0	0	1492	50	0	0	3818	127
11	May	0	0	1814	60	0	0	3025	101
12	June	0	0	2636	88	0	0	3591	120
Grand Total		**4040**	**11**	**12898**	**36**	**13187**	**37**	**30955**	**86**

Imports and export trade volume data by using available data from secondary source for Kharlachi border crossing is given below has shown that Kharlachi border has shown significant trade volume with dutiable commodities

Table 3-87: Trade Volume at land Border Crossing KP (Rs.Million)

Customs Station	Exports Value 2020-21	Import Volume 2020-21
Torkham	104325.8	68230
Kharlachi	26889.29	7328.89
Ghulam Khan	8256.01	5280.74
Angoor Adda/Tank	3815.39	3286.7
Total	**143286.49**	**84126.28**

As seen from Table 3-87 above Kharlachi border crossing plays pivotal role in Pakistan Afghanistan trade, second highest volume trade is handled through Kharlachi border. This border crossing play vital role to economy of the district.

Minerals and Mining

District Kurram has considerable deposits of minerals especially coal[80]. Coal is crucial for local energy production and various industrial processes, yet its extraction has been irregular, with notable peaks

[80] Development Statistics of KP 2023-24

in production occurring sporadically. There is also some mining of Soap stone and Copper in the district but with limited quantity.

Table 3-88: Mining in District Kurram (Tonnes)

Type of Minerals	Kurram		
	2020-21	2021-22	2022-23
Coal	16,852	16,650	38,390
Copper			71
Soap Stone		38,812	4,149

The district holds substantial mineral resources, including coal, copper and soap stone. While the mining sector faces challenges, there are concerted efforts to harness these resources for economic development. Development of the mining industry could significantly boost the district's economy, but it requires careful planning and investment to overcome existing challenges.

Agricultural and Livestock

Agriculture and horticulture is the primary trade sector in Kurram District in Khyber Pakhtunkhwa, Pakistan, has considerable potential for agricultural and horticultural activities, benefiting from fertile soil, favorable climate conditions for growing a variety of crops, including wheat, maize, vegetables. Kurram district is known for its fruit variety of fruits i.e. Apples, Peaches, Apricot, and Cherries etc. These fruits contribute to the local economy and provide a source of livelihood for many farmers in the district. The fertile valleys and streams in Kurram support the growth of these fruits, making agriculture an important economic activity in the region. The district's livestock sector is an important part of its economy. Key livestock includes 194,253 cows, 106,086 sheep, and 155,532 goats, alongside smaller populations of buffaloes, camels, and other animals. Poultry makes about 50% (485,741) of total population of livestock of the district.

Manufacturing and Industries

In Kurram there is no such industrial sector and has no economic zone. The current landscape comprises 9 small-scale industrial units, all within the primary sector, emphasizing the district's reliance on natural resources and agriculture. These industries, while modest in scale, provide an essential economic foundation, offering a pathway for future industrial growth and diversification

The manufacturing and industrial landscape in Kurram District is still evolving. The district has abundant mineral resources, including coal and copper. However, challenges such as poor infrastructure, safety concerns in mining, and limited industrial diversification hinder the full development of the sector. With focused efforts on mineral processing, oil and gas extraction, and the development of industrial zones, Kurram has the potential to emerge as a key player in the region's industrial growth.

3.8.6 Commercial Activities in District Kurram

Kurram district is centred around markets and Bazaars these markets play a crucial role in the district's economy, facilitating the exchange of goods between residents and traders from neighbouring regions, including Afghanistan. Here's an overview of the key markets in Kurram.

Commercial activities in Kurram District are primarily centered around agriculture, border trade, mineral resources, and retail businesses. The district benefits from its agricultural produce, mineral wealth (marble & coal), and the growing demand for construction and consumer goods. With improved infrastructure and market access, the commercial landscape in Kurram has the potential for significant growth, particularly in small-scale industries, food processing, and construction-related commerce. Markets are hubs for daily trading and have a significant role in local commerce. Some of the notable markets include:

3.8.6.1 Various Types of Markets

3.8.6.1.1 Central Marketplaces

A) Parachinar Bazaar

It is the largest and most prominent market in the district, located in the headquarters, Parachinar. It is known for selling agricultural products, fruits (especially apples and walnuts), clothing, household items, and imported goods from Afghanistan. Due to the proximity to the Afghan border, Afghan products such as carpets, dry fruits, and herbs are often available.

B) Sadda Bazaar

Located in Lower Kurram, Sadda is a bustling market town. Farmers bring fresh produce, including vegetables and grains, to sell here. It is also a center for livestock trade. Goods from Kurram and neighboring tribal areas are often traded in Sadda.

3.8.6.1.2 Local Community Markets

A) Bagan Market:

Situated in the Bagan area, this market is renowned for its vibrant atmosphere and diverse array of local products. It serves as a central hub where residents gather to purchase daily necessities, socialize, and stay informed about community affairs. Recent social media highlights have showcased the bustling nature of Bagan Market, emphasizing its role in the local economy and culture.

B) Alizai Bazaar

This market is famous for the sale of fruits, particularly apples, as well as vegetables and other local produce. Handicrafts, embroidery, and woodwork products are often sold here.

C) Kharlachi Market

Situated close to the Kharlachi border crossing with Afghanistan, it facilitates trade between the two countries. With the potential for increased legal trade activities, this market could grow further as cross-border trade stabilizes.

D) Teri Mangal Market

Located near the border with Afghanistan, this market has been historically significant for cross-border trade. Items like dry fruits, Afghan rugs, and other imported goods often flow through this market.

E) Shalozan Market

Shalozan is known for its orchards, and the local market is a primary point for the sale of apples, apricots, and walnuts. Business activity peaks during the harvest season when fruits are transported to other regions.

3.8.6.2 Specialized Markets

A) Nadar Market:

Located at Chinar Chowk in Sadda Bazaar, Nadar Market is notable for housing the Kurram Chamber of Commerce and Industries (KCCI). KCCI plays a pivotal role in supporting the business community and fostering economic prosperity in the region.

3.8.6.3 Sunday Bazaar and Other Occasional Markets

In Kurram District, Sunday bazaars (or weekly markets) and occasional markets are an important part of the local economy and social fabric. These bazaars typically operate on Sundays/Specific times and locations and offer a wide variety of goods, catering to both daily needs and occasional purchases. Such bazaars are especially crucial for people living in more remote areas, as they provide an opportunity to buy and sell goods that may not be available in smaller local shops or markets. In summary, while weekly markets like those held on Sundays have been integral to Kurram's social and economic fabric, the current security situation has severely impacted their operation.

1. **Fresh Produce** – Locally grown fruits, vegetables, and herbs, including seasonal items.
2. **Meat and Livestock** – Fresh meat (goat, sheep, poultry), as well as live animals for sale.
3. **Spices and Grains** – A range of spices, grains, and pulses, often bought in bulk.
4. **Household Goods** – Items like kitchenware, utensils, fabrics, and clothing.
5. **Traditional Crafts** – Handcrafted items like carpets, woven goods, and pottery, which are representative of the local culture.
6. **Personal Care Products** – Cosmetics, soaps, and other essentials.

3.8.6.4 Highway-Oriented Ribbons

Highway-oriented ribbons are those that are characterized by goods and services attracted via traffic. This includes low-priced products like eatables for the people in transit. It also includes services like auto repair shops and tire pressure shops to facilitate travelers.

Being a district with heavy traffic coming in and going out, Kurram District has clusters of auto-repair shops, welding shops, and tire shops in the major bazaar and urban areas.

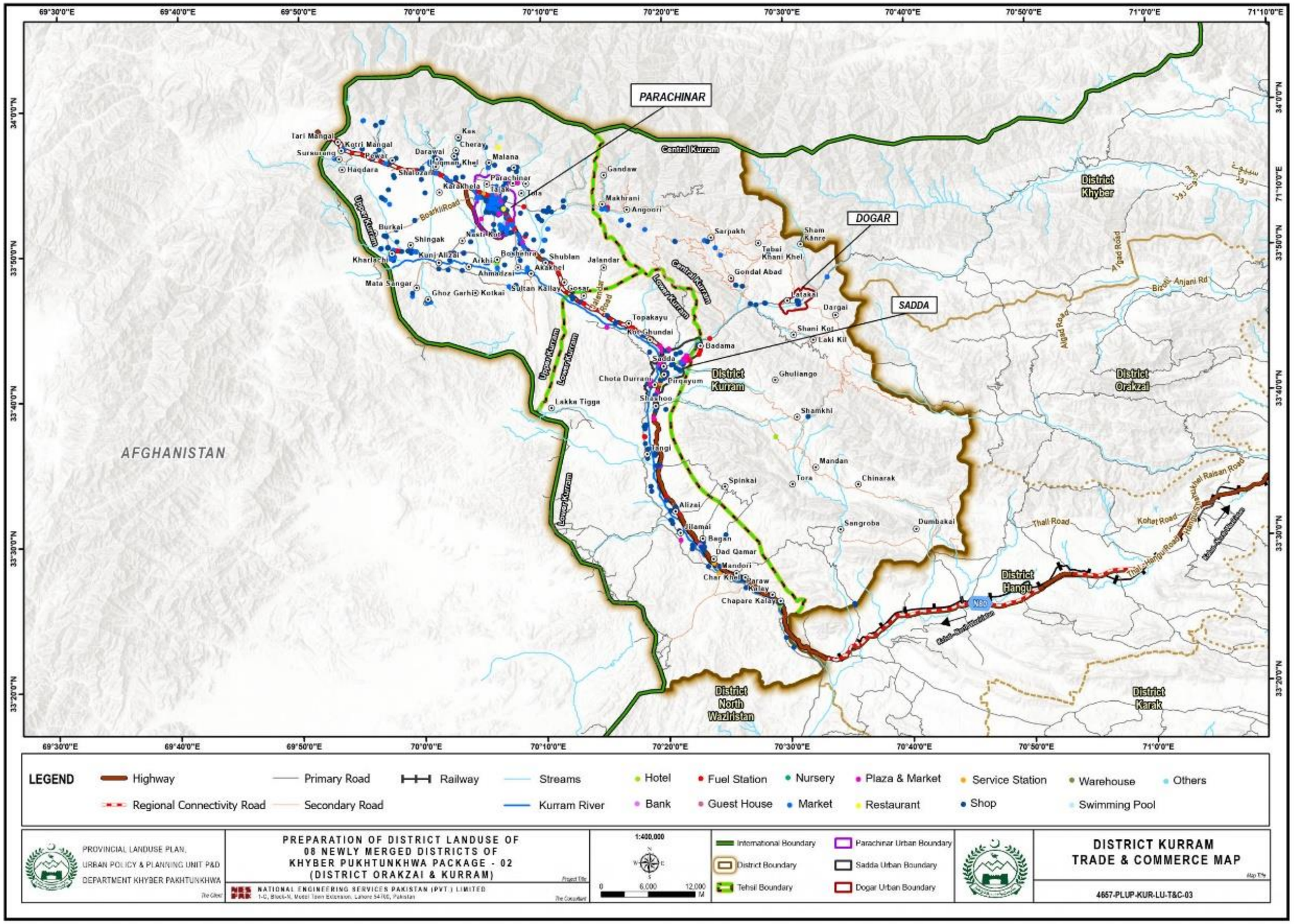
3.8.7 Assessment of Existing Commercial Activities

Kurram District commercial activities are diverse, ranging from agriculture and livestock to cross-border trade and retail markets. However, the district faces challenges such as poor infrastructure, security concerns, and limited industrial capacity. To unlock its economic potential, Kurram District needs to invest in improving market infrastructure, fostering local industries, and expanding its trade networks. With the right interventions, the district can significantly enhance its commercial activities and contribute to the broader regional economy.

3.8.7.1 Growth Pattern of Trade and Commerce

Understanding the growth pattern of trade and commerce is crucial for several reasons. It provides insights into the economic health and development trajectory of a region or country. By analyzing trends, businesses can identify opportunities for expansion, investment, and innovation, while policymakers can make informed decisions to foster sustainable growth. It also helps in understanding

shifts in consumer behavior, technological advancements, and global market dynamics, which are vital for maintaining competitiveness. Additionally, comprehending these patterns enables effective resource allocation, supports job creation, and enhances international trade relations, contributing to overall economic stability and prosperity. Spatial Distribution of Trade and Commerce Activity in Kurram District is elaborated in Map 3-20 below.



Map 3-19: Spatial Distribution of Trade and Commerce Activity in Kurram District

3.8.7.2 Border Trade Centers

Recognized as the busiest commercial center in Kurram after Torkham, Kharlachi serves as a crucial conduit for bilateral trade. Its strategic importance is underscored by its status as the shortest and safest route to Kabul, enhancing its role in regional commerce. These trade centers at border and at important urban centers will collectively contribute to the economic and social fabric of Kurram District. Investment in these trade and logistic centers will transform Kurram into regional trade and logistic hub and will revive the local economy and transform its strategic advantages and resource wealth into sustainable economic development, benefiting both local communities and the broader region

3.8.7.3 Expansion of Commercial Areas

The expansion of commercial areas in Kurram District presents significant opportunities for economic growth and development. Focusing on industrial zones, agro-processing, cross-border trade, transport infrastructure, and retail development can enhance the district's economic base. Investments in modern infrastructure, technological advancements, and capacity-building are crucial to creating a thriving commercial environment that serves the needs of local residents while attracting both national and international business.

3.8.8 Proposed Future Demand

3.8.8.1 District Commercial Requirements

This section presents the district-level commercial land requirements for District Kurram for the years 2025 and 2045. In 2025, the district population is recorded at 834,090, with 280 acres of existing commercial land. Based on the applied planning standard (approximately 1 acre per 1,000 population), the commercial demand for 2025 is calculated at 834.09 acres. This indicates that the existing 280 acres fall significantly short of the required commercial land, revealing an immediate shortfall of commercial infrastructure even in the base year.

By 2045, the district population is projected to increase substantially to 1,486,194. Correspondingly, commercial demand rises to 1,486.194 acres. After adjusting for existing and planned allocations, the total district commercial requirement for 2045 is estimated at 1,206 acres. Out of this requirement, 726 acres are proposed under urban commercial allocations, while an additional 480 acres remain as district-level requirements. This suggests that although a significant proportion of commercial growth is planned within urban centers, additional land will still be required at the broader district scale to meet long-term demand. Overall, the table highlights rapid population-driven commercial expansion needs and emphasizes the importance of strategic commercial land reservation to support economic growth, retail services, wholesale markets, and mixed-use development.

Table 3-89 District Kurram Commercial Requirements

Year	Population	Existing Commercial (Acres)	Commercial Demand (Acres)	District Commercial Requirements 2045	Proposed Urban Commercial	Additional District Requirements
2025	834,090	280	834.09	554		
2045	1,486,194	-	1486.194	1,206	726	480

3.8.8.2 Urban Areas Commercial Demand

This section provides a detailed breakdown of commercial land requirements at the urban level, comparing 2025 and 2045 conditions for Parachinar, Sadda, Dogar, and Alizai. In 2025, the total urban population of 149,432 requires approximately 149 acres of commercial land, while the existing commercial land is 219.79 acres. This results in a surplus of about 70 acres at the aggregate urban level in 2025. However, this surplus is not evenly distributed across urban areas.

In Parachinar, which serves as the district's headquarter, the existing commercial area in 2025 (148.10 acres) exceeds its demand (60.01 acres), creating a surplus. Even by 2045, with a projected population of 99,682 and demand of 99.68 acres, Parachinar still shows a notional surplus relative to existing land. Nevertheless, a substantial 548.3 acres of commercial land is proposed for Parachinar by 2045 *(As per Parachinar Approved Master Plan).* This indicates a strategic decision to position Parachinar as the primary commercial hub of the district, accommodating higher-order commercial functions, wholesale trade, and regional markets beyond population-based standards.

Sadda, on the other hand, shows a different pattern. In 2025, it has a commercial surplus, but by 2045, its projected population of 140,901 generates a demand of 140.90 acres, resulting in an additional requirement of 75 acres. Consequently, 67 acres of commercial land are proposed to address this growing demand. Dogar and Alizai both demonstrate commercial deficits even in 2025, which increase significantly by 2045 due to population growth. Dogar requires an additional 48 acres by 2045, and 49 acres are proposed. Similarly, Alizai shows a 59-acre additional demand by 2045, with 62 acres proposed to meet future needs.

At the aggregate urban level, total commercial demand in 2045 reaches 354 acres against the existing 219.79 acres, creating an additional requirement of 134 acres. However, the total proposed commercial area for urban centers is 726 acres, which significantly exceeds the calculated demand. This indicates that commercial planning is not solely based on population standards but also considers economic centrality, future market expansion, trade corridors, and the role of urban centers in regional development. The allocation pattern suggests strong commercial concentration in Parachinar, while secondary towns are provided with moderate expansions to meet localized demand.

Table 3-90 District Kurram Proposed Urban Commercial Requirements

Urban Area	Year	Population	Existing Commercial (Acres)	Commercial Demand (Acres)	Additional Commercial Demand	Proposed Commercial Area
Parachinar	2025	60010	148.10	60.01	-88	
	2045	99,682	148.10	99.68	-48	548.3
Sadda	2025	44935	66.00	44.94	-21	
	2045	140,901	66.00	140.90	75	67.0
Dogar	2025	15,150	4.40	15.15	11	
	2045	52,884	4.40	52.88	48	49.0
Alizai	2025	29,337	1.29	29.34	28	
	2045	60,270	1.29	60.27	59	62.0
Total	2025	149432	219.79	149	-70	0
	2045	353736	219.79	354	134	726

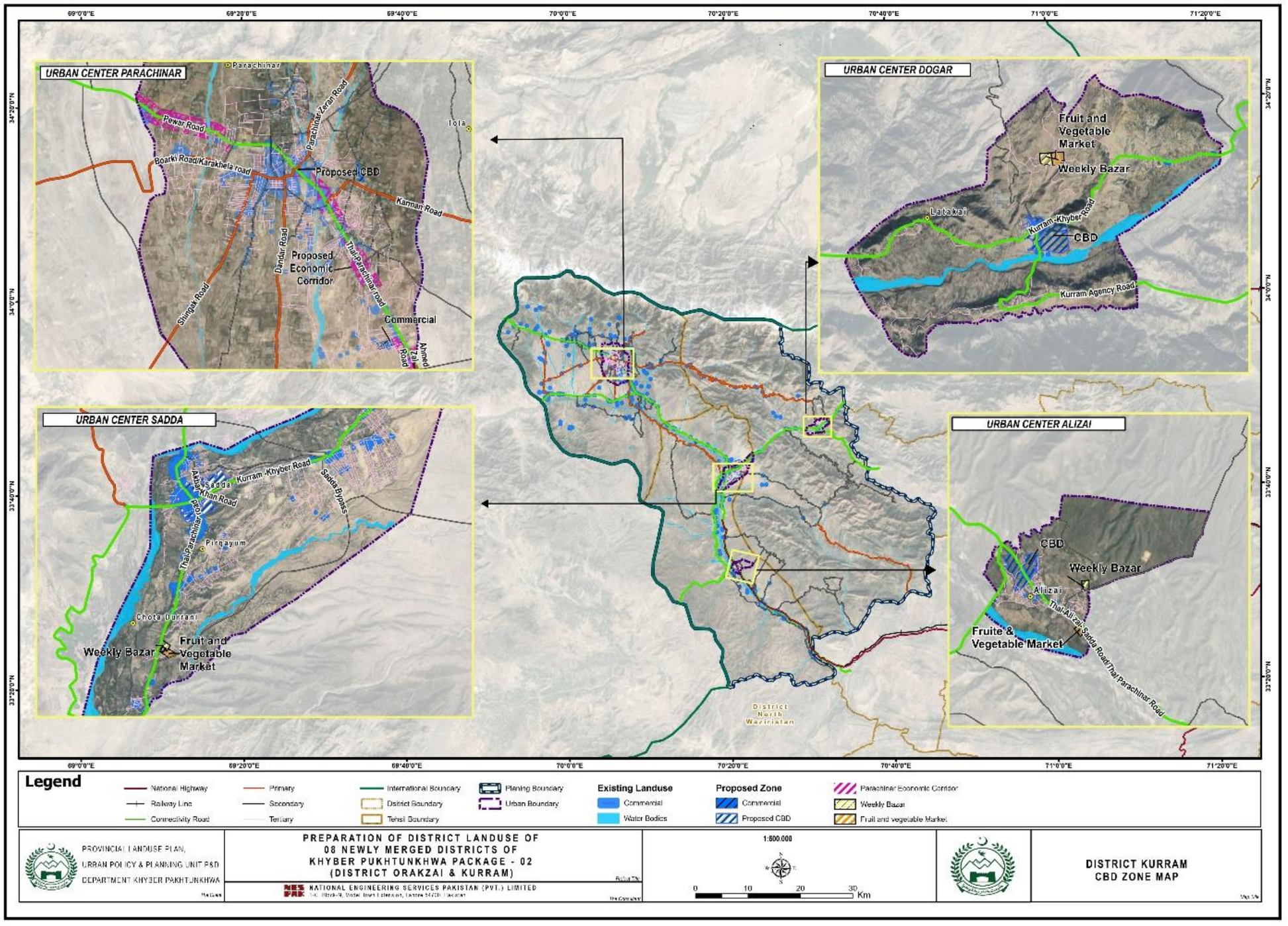
3.8.9 Future Proposed Interventions

Trade and commerce are the key sector for the whole district. The district economy is highly dependent on this sector, but the sector is neglected that needs to be boosted. The following interventions are proposed to boost this sector:

Table 3-91 Future Proposed Commercial Interventions

Intervention	Objective	Key Actions / Components	Expected Outcomes / Impact	Lead / Supporting Agencies
1. Establishment of Cross-Border Trade & Logistics Corridor (Kharlachi–Burqi Route Expansion)	Formalize and scale trade with Afghanistan & Central Asia	- Upgrade road linking Parachinar to Kharlachi - Develop multi-purpose trade terminal with customs, warehousing, and cold chain - Introduce digital customs clearance system	- Reduces smuggling and increases formal trade - Generates customs revenue for KP govt - Strengthens inter-regional economic connectivity	Planning & Dev Dept, Customs, NLC, ADB
2. Development of Kurram Wholesale Agri Market & Auction System (Sadda / Parachinar)	Improve price transparency & link producers to exporters	- Construct centralized fruits, beans & chillies trading hub - Digital auction platform for real-time price discovery - Cold storage & sorting sheds	- Farm gate price improvement - Formal trade documentation improves taxation - Reduces middlemen exploitation	Agriculture Dept, Industries Dept, SMEDA
3. Kurram Handicrafts & Women Trade Expo Network	Commercialize traditional crafts into market-ready products	- Monthly handicraft bazaars in Kohat, Peshawar, Islamabad - Branding & packaging booths for embroidery, wool weaving, herbal products - E-commerce integration with Daraz/Amazon	- Women-led home businesses become formal sellers - Increased household income through exports	Women Development Dept, KP-BOIT, TDAP
4. Licensing of Cross-Border Cooperative Trade Bodies (Local Trade Unions)	Regulate informal trade at border points	- Register village-level trade groups as legal entities - Train them on customs documentation & export packaging - Provide group-based trade financing	- Formalization of undocumented economy - Increased buyer confidence across border	Local Govt Dept, Chamber of Commerce
5. Mobile Trade Facilitation Desks (Market-to-Market Outreach Program)	Bring government services directly to traders & SMEs	- Mobile units offering Business Registration, Tax ID creation - Packaging design, barcode, and export advisory - Legal guidance on Afghan trade policy	- Accelerates SME formalization - Reduces travel cost/time for rural entrepreneurs	SMEDA, FBR, KP-IT Board
6. Kurram Product Branding & Regional GI Certification Initiative	Position Kurram as a unique export identity	- Register "Kurram Red Beans", "Parachinar Honey", "Sadda Chilli" as Geographic Indication (GI) brands - Promote through national & Gulf trade fairs	- Higher export pricing due to origin recognition - International marketing visibility	IPO Pakistan, TDAP, KP Commerce Dept
7. Cross-Border Business Matchmaking Platform (Digital & Physical)	Link Afghan buyers with Kurram producers	- Host bi-monthly Buyer-Seller Meetups at Kharlachi - Develop online business directory of suppliers - Translation & logistics support	- Faster trade deals - Direct export contracts secured	Chamber of Commerce, USAID/UNDP Trade Programs
8. Youth Trade Apprenticeship & Freight Training Program	Train young people for logistics, customs & warehousing jobs	- 6-month certification courses in freight forwarding, customs handling, inventory management - Placement with local transport companies	- Creates modern skilled workforce - Reduces dependency on tribal-style informal labor	

These interventions aim to formalize and diversify Kurram's economy, leveraging its strategic trade routes, agricultural strength, cultural industries, and youth potential. Implementing this package in phases will promote sustainable growth, create thousands of jobs, boost cross-border trade, and position Kurram as a regional economic corridor between Pakistan and Afghanistan/Central Asia.



Map 3-20 Proposed Commercial Zones Map of District Kurram

3.8.10 Constraints

District Kurram has immense potential to become a regional leader in mineral extraction, agriculture, and hospitality sectors. By leveraging its natural resources and improving key sectors, the district can significantly enhance employment opportunities and economic growth. However, several major constraints hinder this progress:

- The prolonged closure of trade routes has not only affected the availability of goods but also hindered economic activities in the region. Local businesses have suffered due to the inability to procure supplies, leading to a downturn in commerce and trade
- The district's rugged terrain and underdeveloped infrastructure pose additional challenges to trade. Poor road conditions hinder the efficient movement of goods, while the lack of modern market facilities limits commercial growth. Investment in infrastructure is crucial to unlocking Kurram's economic potential and facilitating smoother trade operations.
- Lack of trade centers and logistic center poses a great challenge for commercial activities
- Kurram lacks the presence of large-scale industrial hubs, factories, or manufacturing zones. Without such facilities, the district struggles to generate mass employment opportunities in industrial sectors.
- The hospitality sector in Kurram lacks modern standards and international best practices. The absence of family-oriented hotels and guesthouses deters both domestic and international tourists, limiting the growth of the tourism industry.
- A large portion of the population in Kurram is involved in subsistence farming, which is subject to the vagaries of weather, land fertility, and market access. The district struggles with outdated farming techniques, lack of irrigation facilities, and limited access to high-quality seeds and fertilizers. This makes agricultural employment unstable and inadequate for addressing the growing population's needs.
- The district continues to struggle with poor telecommunication services, which impedes business operations and dissuades investors. Reliable communication infrastructure is essential for attracting business interest and enabling modern economic activities.
- Local business owners, especially those in the mineral mining sector, face difficulties in accessing financing facilities. This lack of financial support hinders their ability to expand operations, invest in technology, and improve productivity.
- Frequent power outages and underdeveloped infrastructure severely hamper economic activities, particularly in the industrial sector. This lack of reliable infrastructure reduces the district's competitiveness and discourages investment.
- The district's value chains lack compliance with international best practices and certifications, making it less attractive to investors. This gap limits the ability to access global markets and reduces overall competitiveness.
- Due to limited access to gas, many locals rely on wood and tree logging to meet their energy demands. This reliance on unsustainable energy sources leads to deforestation, negatively impacting the region's environment and long-term ecological balance.
- Forest owners in the district are largely unaware of the opportunities presented by international carbon markets. There are no facilities or programs in place to educate them or provide access to these markets, resulting in missed opportunities for economic and environmental benefits.

3.8.11 Recommendation

The following recommendations focus on addressing the key constraints in District Kurram and maximizing its economic potential across various sectors. These proposed projects, when implemented, will enhance the district's infrastructure, promote investment, and drive growth in industries such as minerals, agriculture, tourism, and hospitality.

- Implementing sustainable peace initiatives and strengthening law enforcement can help restore stability, encouraging the resumption of trade activities.
- Development of trade center especially near the border crossing will not only enhance the bilateral trade but will also support locals for trading of agriculture and industrial goods
- Investing in road networks and market facilities will improve accessibility and attract business ventures.
- To attract investors, financial feasibility studies on mineral extraction should be conducted. These studies will help establish fact books on existing mineral reserves, making the region more appealing to investors. Offering incentives to investors will further encourage exploration and development in the mineral sector.
- providing financial incentives and facilitating trade agreements, can stimulate economic growth and integration with broader markets.
- Setting up an industrial estate with a focus on mineral processing is essential. This estate should prioritize cluster development and promote research in relevant fields. Establishing such a hub will support the processing of extracted minerals, boosting the local economy and creating employment opportunities.
- Investments in cold storage facilities and food processing plants and local produce, should be incentivized. These investments will ensure that agricultural products are preserved and processed efficiently, leading to increased market reach and
- Establishing local offices for tourism promotion, in collaboration with national tourism bodies, will help unlock Kurram’s tourism potential. Areas like Parachinar should be actively promoted to attract visitors and develop the local tourism sector.
- Local offices of regional and national mineral departments should be established to streamline operations and increase efficiencies in sectors like coal and limestone extraction. These offices will facilitate better management and regulatory oversight.
- Enhancing infrastructure along existing trade routes and commercial spaces is essential for improving trade efficiency. Allied facilities such as parking, service areas, and management systems should be developed to support commercial growth. Vertical parking solutions may be implemented where space is limited.
- Targeted development of commercial areas along highways will help tap into untapped economic opportunities. Developing these highway-oriented commercial ribbons in the short term will drive regional commerce and attract investment.
- Designating areas near Kurrams urban center for occasional markets, exhibitions, and festivals will help promote the district's economic values and attract investments. These opportunities can also support the women-led handicrafts sector.
- A local regulatory body, with a focus on women’s participation, should be established to oversee and promote the handicrafts sector. Providing opportunities for entrepreneurs, especially women, in regional exhibitions will help scale the industry and attract investment.

- Demarcating specific commercial zones with a long-term commercialization roadmap will help prevent haphazard growth. This planned approach will promote agglomeration within optimal commercial areas, fostering sustainable economic development.
- Establishing forward and backward linkages in industries such as agriculture and manufacturing will reduce freight costs and improve accessibility to consumers. Strengthening these connections will enhance the efficiency of local businesses.
- The mining sector can be revitalized by increasing investor accessibility and developing business centers that connect stakeholders. These centers will facilitate knowledge and skill transfer within the industry, promoting innovation and growth.
- Investment in infrastructure for research, laboratories, and startup centers is crucial for the district's long-term development. These facilities will drive innovation in key industries like mineral processing and agriculture, helping Kurram District gain a competitive advantage.
- Training programs should be implemented to develop a skilled labor force for the hospitality and industrial sectors. Increasing the supply of skilled workers will improve operational efficiency and support the district's economic development.

3.9 CHAPTER 15 Solid Waste Management

3.9.1 Solid Waste Management in Kurram District

Solid waste management in Kurram District is currently underdeveloped, with no formal collection, segregation, or disposal systems in place. Waste generated from households, markets, and small commercial activities is typically dumped in open spaces, drains, or nearby watercourses, leading to environmental degradation and health hazards. The lack of designated landfill sites, waste bins, and municipal oversight further exacerbates the problem, especially in growing urban centers like Parachinar and Sadda. To address this, an integrated solid waste management system is urgently needed—one that includes community-based collection, waste segregation at source, designated transfer stations, and environmentally compliant disposal or recycling methods tailored to both urban and rural settings.

3.9.1.1 Current and Projected Solid Waste Generation in Urban Settlement

Kurram District currently generates an estimated 85,244 tons of solid waste annually (2025 baseline), with no formal system for waste collection, treatment, or disposal in place. As the population increases, waste generation is projected to rise significantly, reaching approximately 182,267 tons per year by 2045. Over the 20-year period from 2025 to 2045, the district is expected to generate a cumulative total of more than 2.57 million tons of solid waste.

To sustainably manage this increasing waste volume, a minimum of 10 acres should be allocated for an integrated solid waste management facility. This facility should support collection, segregation, recycling, composting, and safe disposal operations. Immediate strategic planning and investment are essential to mitigate environmental risks and safeguard public health.

Table 3-92: Current and Future Solid Waste Generation in Rural Settlements

Year	Population	Generation (kg/c/d)	SW (ton/year)
2025	684,659	0.28	69,972
2030	787,728	0.29	84,531
2035	902,126	0.31	101,417
2040	1,031,678	0.32	121,253
2045	1,159,073	0.34	142,148
Total SW (tons/year)			519,322
Area (acre) Required for Landfill site			10

3.9.1.2 Proposed Solid Waste Management Strategy for Rural Settlement

To support the phased implementation of the solid waste management system in rural settlements, a gradual enhancement of collection and transportation resources is proposed over the planning horizon. The system will initially rely on manually operated hand carts for primary waste collection, which will be progressively augmented to improve coverage and operational efficiency. Communal

storage bins will be introduced and expanded in a phased manner to facilitate hygienic temporary storage of waste at designated collection points. For secondary collection and transportation, skip lifter vehicles will be deployed with phased strengthening to ensure efficient transfer of waste from communal points to disposal or treatment facilities. This staged approach allows the system to evolve in line with service expansion while maintaining operational feasibility and sustainability.

Table 3-93: Resource Evaluation for Waste Collection and Transportation in Rural Settlements (2025-2045)

Year	2025-2030	2030-2035	2035-2040	2040-2045
Hand Carts	69	83	99	117
Communal bins (5 m3)	78	94	112	131
Skip Lifter	13	16	19	22

3.9.1.3 Current and Projected Solid Waste Generation in Urban Settlement

The current and future solid waste generation for each urban center along with the landfill area requirement is shown in tables below.

Table 3-94: Current and Future Solid Waste Generation in Parachinar

Year	Population	Generation (kg/c/d)	SW (ton/year)
2025	60010	0.28	6199
2030	71848	0.30	7793
2035	81293	0.31	9237
2040	91697	0.33	10893
2045	99682	0.34	12356
		Total SW	46477
		Landfill Area (acre)	0.88

Table 3-95: Current and Future Solid Waste Generation in Sadda

Year	Population	Generation (kg/c/d)	SW (ton/year)
2025	44935.00	0.28	4641
2030	50621.00	0.30	5490
2035	67139.00	0.31	7628
2040	87866.00	0.33	10437
2045	114286.00	0.34	14166
		Total SW	42364
		Landfill Area (acre)	0.80

Table 3-96: Current and Future Solid Waste Generation in Dogar

Year	Population	Generation (kg/c/d)	SW (ton/year)
2025	15150.00	0.28	1564
2030	19514.00	0.30	2116
2035	23172.00	0.31	2632
2040	27386.00	0.33	3253
2045	52884.00	0.34	6555
		Total SW	16122
		Landfill Area (acre)	0.305

Table 3-97: Current and Future Solid Waste Generation in Dogar

Year	Population	Generation (kg/c/d)	SW (ton/year)
2025	29337.00	0.28	3030
2030	36632.00	0.30	3973
2035	42619.00	0.31	4843
2040	49383.00	0.33	5866
2045	60270.00	0.34	7471
		Total SW	25183
		Landfill Area (acre)	0.477

3.9.1.4 Proposed Solid Waste Management Strategy for Urban Centers

The solid waste management system for District Kurram adopts a decentralized, urban-center-wise approach, with each urban center which are Parachinar, Sadda, Dogar, and Alizai operating independently. Door-to-door primary collection will use handcarts, while 5 m^3 communal bins will serve as secondary storage. Skip lifter trucks will transport waste to dedicated landfills, with limited use of compactor trucks in high-density areas like Parachinar. Dedicated landfills for each urban center will ensure safe disposal, reduce long-haul transport, and allow phased upgrades. This strategy ensures efficient service delivery, operational flexibility, cost-effectiveness, and improved environmental sanitation across all urban centers.

3.9.1.5 Proposed Waste Collection and Transportation System in Sadda

The Sadda urban center will adopt a phased waste collection system from 2025 to 2045. Handcarts will handle door-to-door collection, 5 m^3 communal bins will provide secondary storage, and skip lifter trucks will transport waste to the landfill. This ensures efficient, flexible, and cost-effective solid waste management. The proposed landfill site in shown below

Table 3-98 Resource Evaluation for Waste Collection and Transportation in Sadda (2025-2045)

Year	2025-2030	2030-2035	2035-2040	2040-2045
Hand Carts	4	6	8	11
Communal bins (5 m3)	5	7	10	13
Skip Lifter	1	1	2	2

3.9.1.6 Proposed Waste Collection and Transportation System in Dogar

The Dogar urban center will implement a phased waste collection system from 2025 to 2045. Door-to-door collection will be carried out using handcarts, with 5 m^3 communal bins for secondary storage. Skip lifter trucks will transport waste to the dedicated landfill. The system is designed for flexibility and efficiency, considering Dogar's settlement pattern and road conditions. Only one skip lifter is required in dogar as required capacity for solid waste collection will be fulfilled by communal bins. The proposed landfill site in shown below

Table 3-99 Resource Evaluation for Waste Collection and Transportation in Dogar (2025-2045)

Year	2025-2030	2030-2035	2035-2040	2040-2045
Hand Carts	2	2	3	5
Communal bins (5 m3)	2	2	3	6
Skip Lifter	0	0	0	1

3.9.1.7 Proposed Waste Collection and Transportation System in Ali Zai

The Alizai urban center will adopt a compact and efficient waste collection system from 2025 to 2045, suited to its smaller population and semi-rural settlement pattern. Handcarts will provide door-to-door collection, while strategically placed 5 m^3 communal bins will serve secondary storage. Skip lifter trucks will transfer waste to the local landfill. The system emphasizes simplicity, cost-effectiveness, and ease of operation in areas with limited road access. The proposed landfill site in shown below.

Table 3-100 Resource Evaluation for Waste Collection and Transportation in Ali Zai (2025-2045)

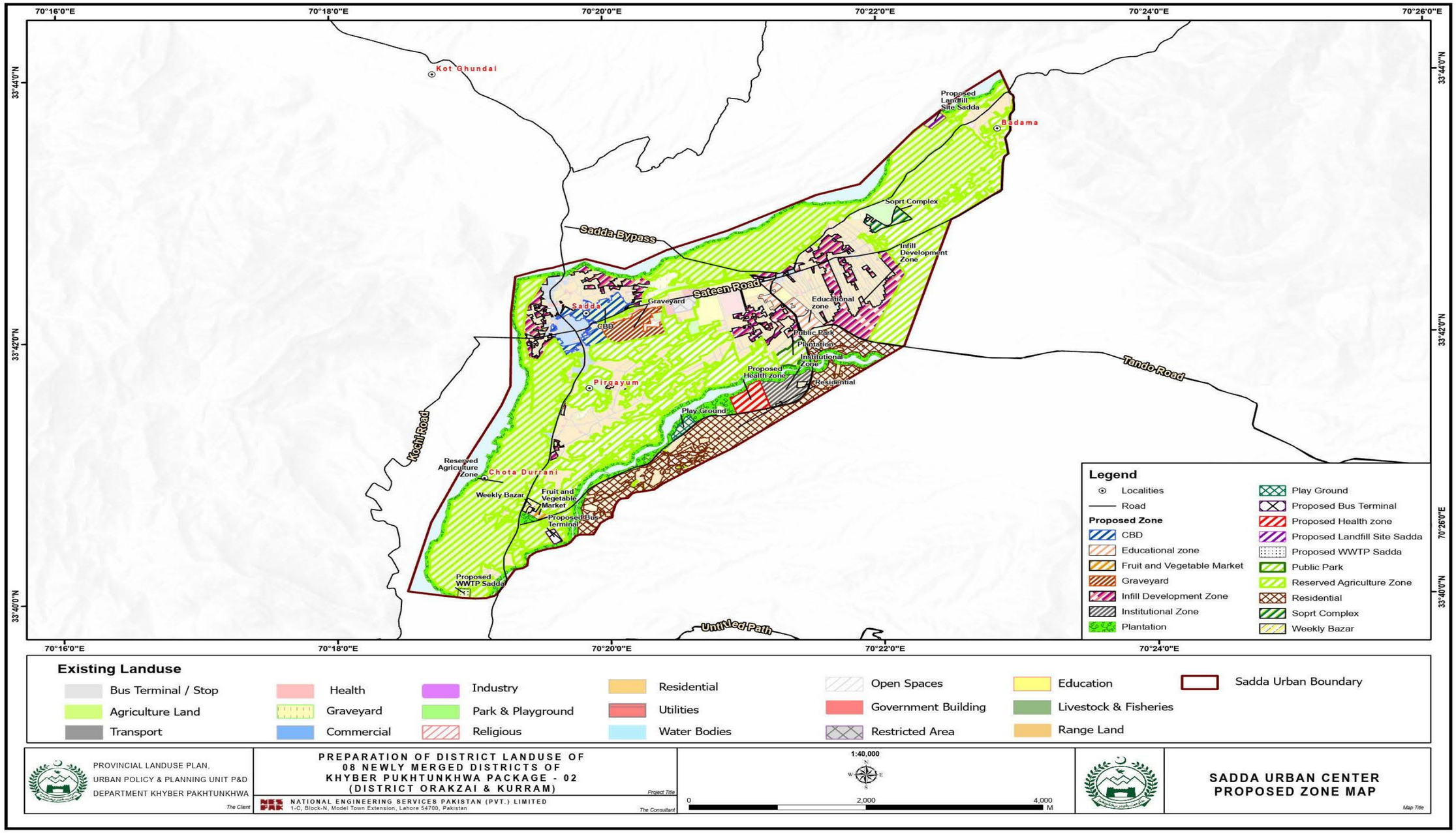
Year	2025-2030	2030-2035	2035-2040	2040-2045
Hand Carts	3	4	5	6
Communal bins (5 m3)	4	4	5	7
Skip Lifter	1	1	1	1

3.9.1.8 Proposed Waste Collection and Transportation System in Parachinar

Parachinar urban center will implement a phased waste collection system from 2025 to 2045 to meet high population density and commercial activity. Handcarts will provide door-to-door collection, supplemented by 5 m^3 communal bins for secondary storage. Skip lifter trucks will manage transport to the dedicated landfill. The system ensures efficient coverage, operational flexibility, and improved environmental sanitation in the city's dense urban areas. The proposed landfill site in shown below

Table 3-101 Resource Evaluation for Waste Collection and Transportation in Parachinar (2025-2045)

Year	2025-2030	2030-2035	2035-2040	2040-2045
Hand Carts	6	7	9	10
Communal bins (5 m3)	7	8	10	11
Skip Lifter	1	1	2	2



Map 3-21 :Proposed Landfill and WWTP Site in Sadda

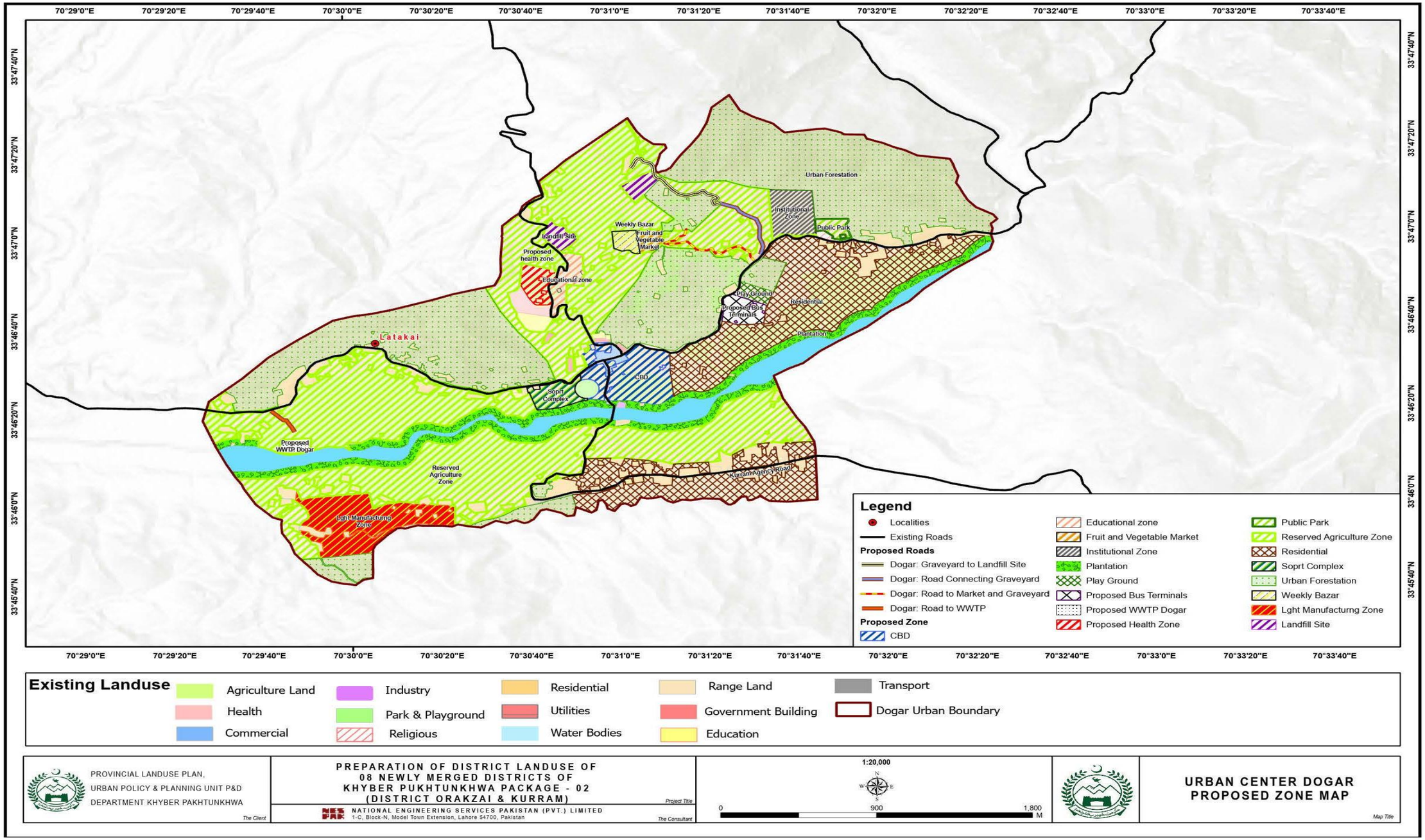


Figure 3-28:Proposed Landfill and WWTP Site in Dogar

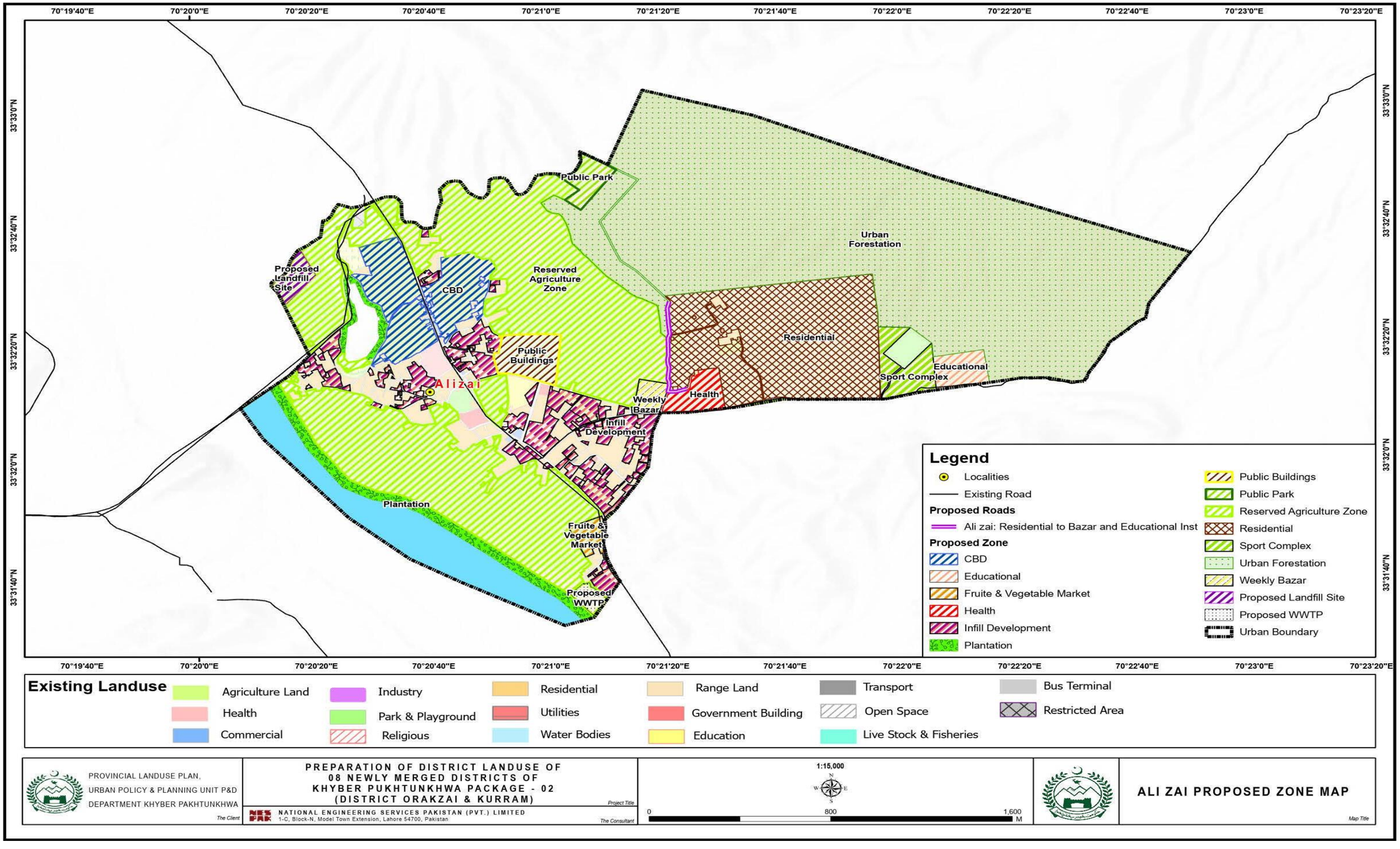


Figure 3-29:Proposed Landfill and WWTP Site in Ali Zai

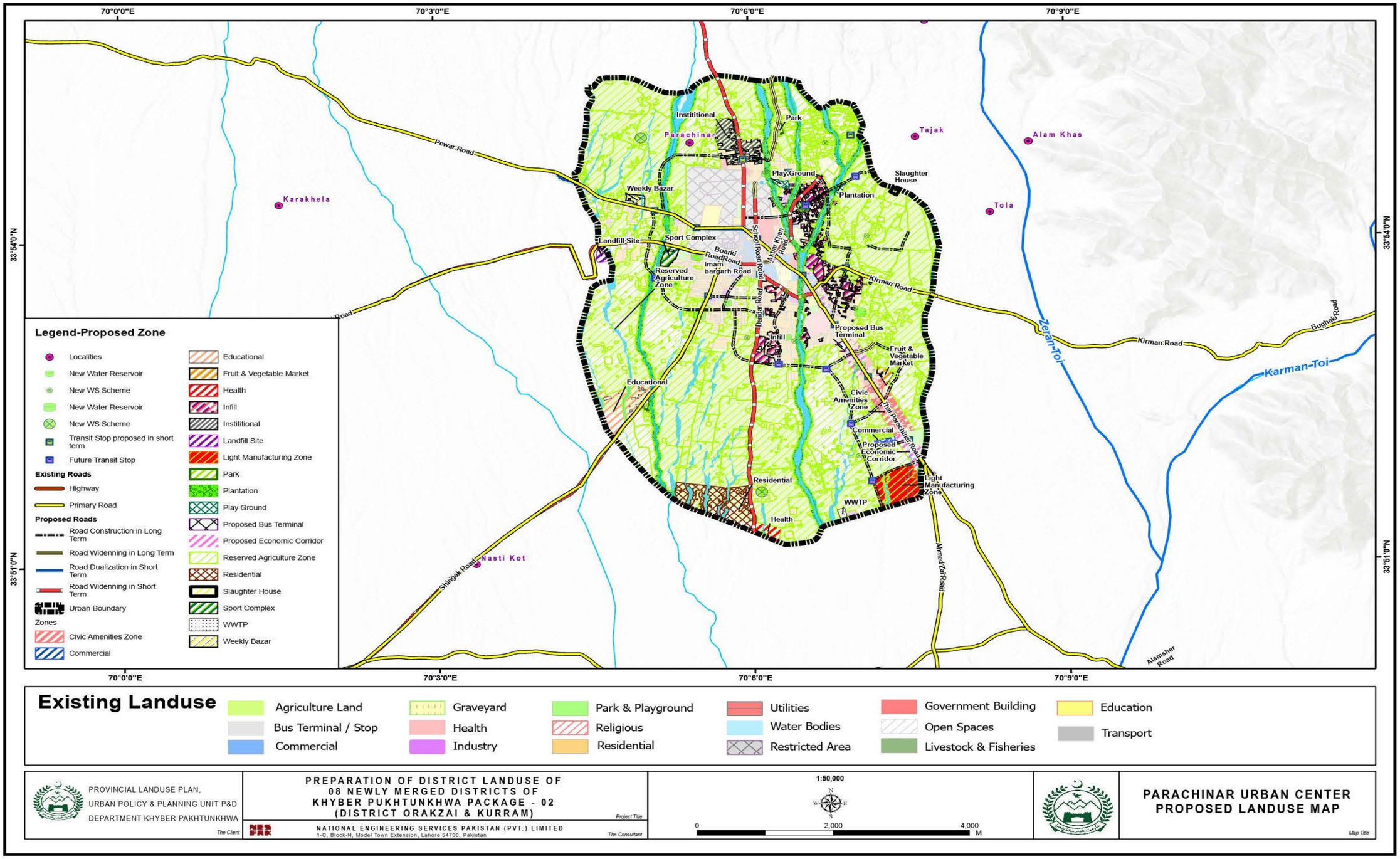


Figure 3-30:Proposed Landfill Site and WWTP in Parachinar

3.9.2 Constraints

- The Kurram District faces several challenges in managing its water resources, including maintaining water quality, adapting to the impacts of climate change, and ensuring compliance with regulatory frameworks. Key constraints are as follows:
- The district's dependence on surface water sources, such as the Kurram River, Zeran Toi, and seasonal nullahs, creates vulnerability due to limited and variable water availability. This scarcity hampers the ability to meet increasing demands for agriculture, domestic use, and livestock.
- Seasonal fluctuations, influenced by rainfall and snowmelt, lead to uneven water distribution, contributing to flood risks during heavy rains and shortages during dry periods. Proactive measures are necessary to address these hydrological challenges and sustain water supply reliability.
- The lack of widespread water quality monitoring across the district limits the identification and mitigation of pollution sources, posing risks to public health and environmental sustainability.
- Sedimentation in small reservoirs and rivers, such as the Kurram River, reduces their capacity to store water effectively, impacting their role in flood control, irrigation, and water supply.
- Climate change exacerbates these constraints by altering precipitation patterns, increasing the unpredictability of water resources, and challenging traditional water management practices.

3.9.3 Recommendations

Outlined below are key recommendations to address water resource management challenges in Kurram District.

- Integrated Water Resource Management

Develop and implement a comprehensive IWRM plan to optimize the allocation an sustainable use of water resources across agricultural, domestic, and industrial sectors.

Establish a district-wide water quality monitoring network with regular sampling and analysis to identify pollution sources, assess water safety, and ensure compliance with environmental standards.

- Infrastructure Development

Construct and rehabilitate small reservoirs, check dams, and irrigation canals to enhance water storage, reduce sedimentation, and improve water distribution efficiency.

- Flood Management Strategies

Develop floodplain zoning and early warning systems to mitigate flood risks. Promote afforestation and watershed management in upstream areas to reduce runoff and soil erosion.

- Groundwater Recharge Initiatives

Promote artificial recharge through infiltration basins and recharge wells to enhance groundwater reserves and reduce reliance on surface water during dry periods.

- Climate Resilient Practices

Adopt climate-resilient agricultural practices, such as water-efficient irrigation methods (drip and sprinkler systems) and drought-resistant crop varieties, to mitigate the impacts of climate variability.

- **Data Collection and Research**

Invest in hydrological and sedimentological studies to improve understanding of water availability, sedimentation rates, and climate change impacts on the district's water resources.

- **Capacity Building and Training**

Provide training programs for local authorities and communities to enhance technical skills in water management, monitoring, and conservation practices.

- **Public Awareness and Community Engagement**

Conduct awareness campaigns to educate communities about water conservation, pollution prevention, and sustainable practices. Involve local stakeholders in decision-making processes for water resource management.

- **Policy and Regulatory Compliance**

Strengthen enforcement of water-related policies and regulations, including measures to control industrial and agricultural pollution, and ensure equitable access to water resources.

3.10 DRINKING WATER SUPPLY

3.10.1 Analysis and Background Studies

This section primarily provides a general overview, data analysis, and background studies of the existing water supply system in District Kurram.

3.10.2 Drinking Water

Water is one of the most significant natural resource available at the disposal of human. It is facing increasing global demands and challenges, thus a considerable decline in its availability is observed due to mismanagement/misuse which has culminated in an intricate scenario, in terms of water availability to various regions. The situation is considered to have serious implications for global and regional peace being a glaring politico-economic issue of the current century.

3.10.2.1 Sources of Drinking Water Supply

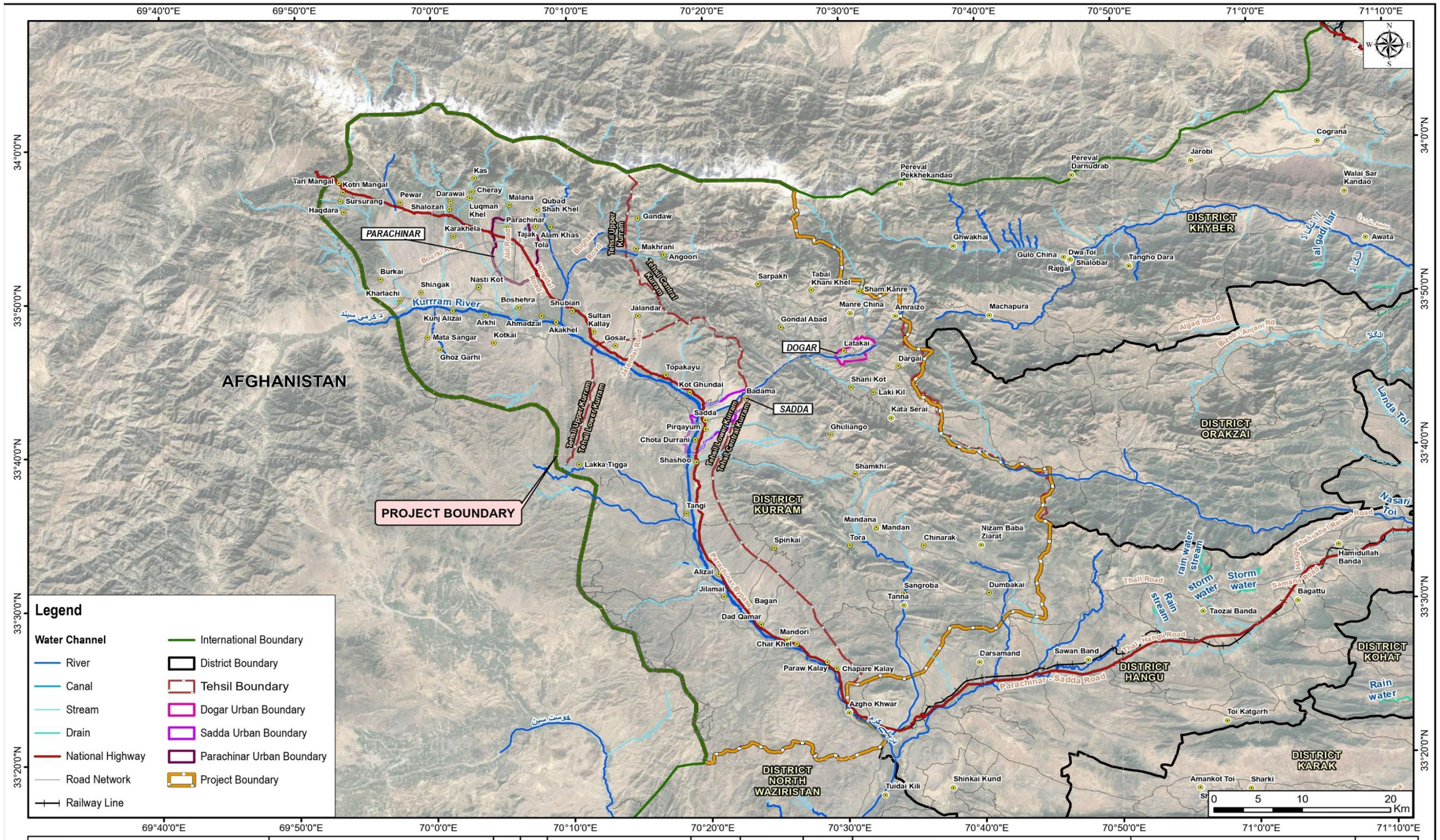
Kurram District relies primarily on a combination of surface water and groundwater sources to meet its drinking water needs. The most significant surface water body in the district is the Kurram River, which originates from the Koh-e-Safed (White Mountain) range. This river, along with its major tributaries—the Khurmana River, Zeran Toi, and Karman Toi, serves as a critical source for irrigation and, to a lesser extent, domestic water supply. Although not always treated for potable use, surface water from these rivers is frequently used in rural communities, particularly in areas where groundwater access is limited.

In addition to the main rivers, a network of natural streams and seasonal nullahs (khwars) such as Peiwar Khwar, Chor China Toi, and Yaqubi Toi also contribute to the local water availability. These streams are often harnessed through small-scale diversions or gravity flow systems to supply water to nearby villages.

Groundwater also plays an important role in drinking water supply across Kurram. The district's sub-soil water potential varies depending on soil texture and drainage characteristics, with coarse-textured soils showing higher permeability and better groundwater recharge potential. However, in some areas with clayey soils or low drainage density, groundwater availability is more limited. Hand pumps, dug wells, and tube wells are common in the more developed or accessible regions, especially in the lower valleys around Sadda and central Kurram.

The district also hosts small dams, such as Zeran Dam, Malana Dam, and Kot Ragha Dam, which are designed to store water for multiple purposes including irrigation, flood control, and potentially drinking water. While not all are currently equipped for drinking water treatment, they represent potential future sources if appropriate infrastructure is developed.

Despite the presence of these diverse sources, water quality remains a challenge due to limited monitoring and infrastructure. Many communities depend on untreated water, making the improvement of treatment and distribution systems a critical need in the district. The available water sources are visually represented in the below map.



Legend

Water Channel
- River
- Canal
- Stream
- Drain
- National Highway
- Road Network
- Railway Line
- International Boundary
- District Boundary
- Tehsil Boundary
- Dogar Urban Boundary
- Sadda Urban Boundary
- Parachinar Urban Boundary
- Project Boundary

CLIENT	CONSULTANT	04				DRAWN		PROJECT NAME
PROVINCIAL LANDUSE PLAN, URBAN POLICY & PLANNING UNIT P&D DEPARTMENT KHYBER PAKHTUNKHWA	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD	03				SUBMITTED		PROVINCIAL LANDUSE PLAN, URBAN POLICY & PLANNING UNIT P&D DEPARTMENT KHYBER PAKHTUNKHWA
		02				RECOMMENDED		SURFACE WATER RESOURCE MAP
	HEAD OFFICE:- NESPAK HOUSE ,1-C, BLOCK-N MODEL TOWN EXTENSION, LAHORE, PAKISTAN	01				CHD/VER.		SCALE 1:400,000
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE MARCH- 2025 / FIG. NO. 03-4657-PLUP-KUR-SWR / REV. 0

Map 3-22 Available Water Resources in District Kurram

3.10.3 Existing Coverage of Water Supply

Kurram District's existing water supply coverage is limited and uneven, with most formal water supply schemes concentrated in urban areas such as Parachinar. These schemes typically serve a small number of households and are based on either gravity flow or motorized systems. While many of them are operational, they often lack regular maintenance and technical staffing, resulting in inconsistent service.

In contrast, rural areas have minimal access to piped water supply. Residents mostly rely on traditional sources such as springs, hand pumps, and shallow wells, many of which are unprotected and untreated. The absence of structured water systems in these regions underscores the need for expanded infrastructure and improved management to ensure safe and equitable access across the district shows the existing water sources in Kurram District; and Map 13-3 shows Location of Existing Tube wells in District Kurram. A detail of existing water supply system (as per PHED Kurram) is given below:

3.10.3.1 Summary of Existing Water Supply System

A summary of the overall existing water supply system is given below:

Table 3-102: Summary - Existing Water Supply System Kurram

ABSTRACT -EXISTING WATER SUPPLY SYSTEM DISTRICT KHURRAM											
Sr. #	District	No. of Completed Schemes	Functioal	Non - Functional	Nature of Scheme			Population as per latest Census Report	Project Population	Population Served	%age Coverage
					Pumping Based		Gravity Based				
					Electric Based	Solar Based					
1	Upper Kurram	134	131	3	13	74	47	293478	394410	213599	72.78
2	Lower Kurram	45	44	1	5	35	5	158719	213305	87909	55.39
3	Central Kurram	66	63	3	2	7	57	266035	357529	100638	37.83
	PHE DIVISIONKURRAM	245	238	7	20	116	109	718232	965244	402146	56.0

3.10.3.2 Existing Water Supply System in Upper Kurram

Table 3-103: Existing Water Supply System in Upper Kurram

DETAILS - EXISTING WATER SUPPLY SYSTEM (UPPER KURRAM)							
S. No	Name of Scheme	Year of Completion	Served Population (Persons)	NATURE OF SCHEME			Functionality
				Pumping Based		Gravity Based	
				Solar Based	Electric Based		
1	DWSS Mirjamal UK	1986-87	1439	...	Electric Based	...	Functional
2	DWSS Shublan UK	1986-87	1320	...	Electric Based	...	Functional
3	DWSS Noor Khna Kanda UK	1986-87	1740	...	Electric Based	...	Functional
4	DWSS Gosar UK	1987-88	1680	...	Electric Based	...	Functional
5	DWSS Karakhella-Kachkina(Karakhella) UK	1988-89	1476	...	Electric Based	...	Functional
6	DWSS Samir Area UK	1992-93	1410	...	Electric Based	...	Non Functional
7	DWSS Stadium Colony UK	2001-02	1850	...	Electric Based	...	Functional
8	DWSS Karakhella UK	2006-07	1960	...	Electric Based	...	Functional
9	DWSS Mali Kali UK	2006-07	1170	...	Electric Based	...	Functional
10	DWSS Akbar jan Colony UK	2011-12	2659	...	Electric Based	...	Functional
11	DWSS Bughara & Major Kally UK	2012-13	2250	...	Electric Based	...	Functional
12	DWSS Mirajan Colony Uk	2012-13	2156	...	Electric Based	...	Functional
13	DWSS: Dindo Park Tube Well UK	2023-24	2156	...	Electric Based	...	Functional
		TOTAL =	**23266**				
SOLAR BASED							
1	DWSS Degree College PCR UK	1984-85	1950	E.(Solarised)	...	...	Functional
2	DWSS Gharbina UK	1985-86	1850	E.(Solarised)		...	Functional

3	DWSS Balich Khel UK	1986-87	2547	E.(Solarised)		…	Functional
4	DWSS Topaki UK	1987-88	2256	E.(Solarised)		…	Functional
5	DWSS Mahoora & Bisatoo UK	1987-88	1500	E.(Solarised)		…	Functional
6	DWSS Ahmad Zai UK	1988-89	2211	E.Solar	…..	…	Functional
7	DWSS Lalmai TW UK	1988-89	2150	E.(Solarised)		…	Functional
8	DWSS Bughdi UK	1988-89	1980	E.Solar	….		Functional
9	DWSS Nestikot Phase-1 UK	1989-90	1065	E.(Solarised)	…	…	Functional
10	DWSS Angori Uk	1990-91	1895	E.Solar	…	…	Functional
11	DWSS Karakhela & Kachkina (Borki) UK	1990-91	1350	E.Solar		…	Functional
12	DWSS Kunj Alizai UK	1990-91	1975	E.(Solarised)	…	…	Functional
13	DWSS Khomasa UK	1991-92	2488	E.Solar	….	…	Functional
14	DWSS Makhrani UK	1991-92	2562	E.Solar	…		Functional
15	DWSS Nestikot Phase-II UK	1991-92	2420	E.Solar	…..	…	Functional
16	DWSS Zuman Milla UK	1992-93	1825	E.Solar	….	…	Functional
17	DWSS Shnay Plan UK	1994.95	1800	E.Solar	…	…	Functional
18	DWSS Godam College Colony UK	1994-95	2705	E.(Solarised)		…	Functional
19	DWSS Shingak Ero Kali UK	1996-97	1550	E.Solar	…	…	Functional
20	DWSS Nesti Kot Uk	1996-97	1060	E.Solar	….	…	Functional
21	DWSS Badakot UK	2005-06	1520	E.Solar	…	…	Functional
22	DWSS College Colony UK	2006-07	1652	E-Solar		…	Functional
23	DWSS Alamsher Sherkaly And Dangeela UK	2006-07	2233	E-Solar		…	Functional
24	DWSS Sragalah Uk	2006-07	1250	E.Solar	…	…	Functional
25	DWSS Sher Kali Uk	2006-07	1080	E.Solar	…	…	Functional

26	DWSS Hamza Colony UK	2011-12	1524	E.Solar	…..	…	Functional
27	DWSS Turi Qabristan UK	2011-12	1647	E.Soalar	….	…	Functional
28	DWSS Burki Uk	2011-12	1650	E.Solar	…	…	Functional
29	DWSS Turi Market UK	2013-14	2154	Solar Based	…	…	Functional
30	DWSS Hidayatullah Colony UK	2013-14	1600	Solar Based	…	…	Functional
31	DWSS Airport coliny UK	2013-14	1521	Solar Based	…	…	Functional
32	DWSS Liaqatabad PCR UK	2013-14	1258	Solar Based	…	…	Functional
33	DWSS Kachkina UK	2013-14	2100	Solar Based	…	…	Functional
34	DWSS Lalmai UK	2013-14	1540	Solar Based	…	…	Functional
35	DWSS Cantonment Area UK	2013-14	1080	Solar Based	…	…	Functional
36	DWSS Shakh Dolth Khel UK	2014-15	1290	Solar Based	…	…	Functional
37	DWSS Karakhela UK	2014-15	1350	Solar Based	…	…	Functional
38	DWSS Tori Colony Parkho UK	2014-15	1170	Solar Based	…	…	Functional
39	DWSS Kurram Militla UK	2014-15	1800	Solar Based	…	…	Functional
40	DWSS Bughdai UK	2014-15	1600	Solar Based	…	…	Functional
41	DWSS Dander Road UK	2014-15	1142	E.Solar	….	…	Functional
42	DWSS MET Office UK	2016-17	2350	Solar Based	…	…	Functional
43	DWSS Turi Qabristan Lower UK	2016-17	1750	Solar Based	…	…	Functional
44	DWSS Shingak Road Colony UK	2016-17	1680	Solar Based	…	…	Functional
45	DWSS Hazara Mohalla City UK	2016-17	1450	Solar Based	…	…	Functional
46	DWSS Bughdi Upper UK	2016-17	1850	Solar Based	…	…	Functional
47	DWSS Nestikot Sehra UK	2017-18	1080	Solar Based	…	…	Functional
48	DWSS Shingak Sehra UK	2017-18	1150	Solar Based	…	…	Functional

49	DWSS Yaqob Abad UK	2017-18	980	Solar Based	…	…	Functional
50	DWSS Lagy Kot UK	2017-18	1020	E.Solar	…	…	Functional
51	DWSS Mehdi Abad UK	2017-18	1100	E.Solar	…	…	Functional
52	DWSS Eidgah Tbe well UK	2017-18	990	E.Solar	…	…	Functional
53	DWSS Jilandhar UK	2017-18	1050	Solar Based	…	…	Functional
54	DWSS Bisato Ghundi Kali UK	2013-14	1250	Solar Based	…	…	Functional
55	DWSS Bisato Imambargah UK	2017-18	860	Solar Based	…	…	Functional
56	DWSS Parkho UK	2019-20	1400	Solar Based	…	…	Functional
57	DWSS Airport Colony UK	2019-20	1470	Solar Based	…	…	Functional
58	DWSS PA Compound UK	2019-20	770	Solar Based	…	…	Functional
59	DWSS Kurram Militia UK	2019-20	1540	Solar Based	…	…	Functional
60	DWSS Zeran Tajak UK	2021-22	840	Solar Based	…	…	Functional
61	DWSS Shaheed Zafar Ali Colony UK	2021-22	1260	Solar Based	…	…	Functional
62	DWSS Hassan Abad Yardah UK	2021-22	1400	Solar Based	…	…	Functional
63	DWSS Bughdi UK	2021-22	840	Solar Based	…	…	Functional
64	DWSS Army Colony UK	2021-22	1750	Solar Based	…	…	Functional
65	DWSS Sheen Khuwar UK	2021-22	840	Solar Based	…	…	Functional
66	DWSS Krakhela Barkali/Shsho Kali UK	2021-22	1400	Solar Based	…	…	Functional
67	DWSS: Shingak Upper UK	2022-23	1400	Solar Based	…	…	Functional
68	DWSS: Chinar Abad Taprey UK	2022-23	2100	Solar Based	…	…	Functional
69	DWSS: Lower Dandar Sehra UK	2022-23	1400	Solar Based	…	…	Functional
70	DWSS Mouza Musa Khan UK	2023-24	800	solar based	…	…	Functional
71	DWSS: Azi Kali & Adj: Areas UK	2023-24	1300	solar based	…	…	Functional

72	DWSS Shaheed Abad & Bangash Colony Opp: PGC	2023-24	1040	solar based	…	…	Functional
73	DWSS Burki Upper	2024-24	1050	solar based	…	…	Functional
74	Solar Pressure Pump and Storage Tank at Amir Mujtaba Zayrat Burki		450	solar based	…	…	Functional
		TOTAL =	**112910**				
		GRAVITY BASED					
1	DWSS Shakardara Uk	1978-79	1834	…	…	Gravity Based	Functional
2	DWSS Ibraimzai UK	1980-81	2150	…	…	Gravity Based	Functional
3	DWSS Bughdai UK	1983-84	1580	…	…	Gravity Based	Functional
4	DWSS Karakhella-Kachkina UK	1983-84	2958	…	…	Gravity Based	Functional
5	DWSS Agra UK	1984-85	1699	…	…	Gravity Based	Functional
6	DWSS Zerran Dam to Parachinar UK	1985-86	4962	…	…	Gravity Based	Functional
7	DWSS Luqmankhel UK	1985-86	1300	…	…	Gravity Based	Functional
8	DWSS Badakhel UK	1985-86	1750	…	…	Gravity Based	Functional
9	DWSS Pewar UK	1987-87	2640	…	…	Gravity Based	Functional
10	DWSS Dhand UK	1989-90	1150	…	…	Gravity Based	Non Functional
11	DWSS Malana & Sehra UK	1989-90	3550	…	…	Gravity Based	Functional
12	DWSS Mali Khel UK	1990-91	2150	…	…	Gravity Based	Functional
13	DWSS Jalandhar UK	1991-92	1285	…		Gravity Based	Functional
14	DWSS Jilandhar UK	1992-93	1456	…	…	Gravity Based	Functional
15	DWSS Alishari UK	1992-93	1020	…	…	Gravity Based	Functional
16	Dwss Alamsher UK	1994-95	1560	…	…	Gravity Based	Non Functional
17	DWSS Norkai Uk	1964-95	1065	…	…	Gravity Based	Functional

18	DWSS Shalozan UK	1996-97	3142	...	...	Gravity Based	Functional
19	DWSS Sehra Kali UK	1996-97	1250	...	...	Gravity Based	Functional
20	DWSS Luqmankhel UK	1998-99	1350	...	...	Gravity Based	Functional
21	DWSS Mula Bagh UK	1998-99	840	...	...	Gravity Based	Functional
22	DWSS Khewas UK	1998-99	1749	...	...	Gravity Based	Functional
23	DWSS Pewar Sehara UK	1998-99	1103	...	...	Gravity Based	Functional
24	DWSS Malana & Sehra UK	1999-2000	1650	...	...	Gravity Based	Functional
25	DWSS Maqbl Area Uk	2006-07	1420	...	...	Gravity Based	Functional
26	DWSS Khormana UK	2006-07	2500	...	...	Gravity Based	Functional
27	DWSS Jalamzoo Kot Zeran UK	2011-12	1350	...	...	Gravity Based	Functional
28	DWSS Mastyara Zeran UK	2013-14	850	...	...	Gravity Based	Functional
29	DWSS Gaido Uk	2014-15	890	...	...	Gravity Based	Functional
30	DWSS Bijli Ghar Colony Uk	2016-17	1260	...	...	Gravity Based	Functional
31	DWSS Rangeen Khana Shalozan UK	2016-17	900	...	...	Gravity Based	Functional
32	DWSS Lewan Khel UK	2016-17	900	...	...	Gravity Based	Functional
33	DWSS Ghozgarrhi UK	2016-17	5520	...	...	Gravity Based	Functional
34	DWSS Sursurang Uk	2016-17	500	...	...	Gravity Based	Functional
35	DWSS Shahdada Kherawa UK	2017-18	1600	...	...	Gravity Based	Functional
36	DWSS Luqman Khel Sehra UK	2020-2021	850	...	...	Gravity Based	Functional
37	DWSS Pewar Tangai UK	2020-2021	1620	...	...	Gravity Based	Functional
38	DWSS Khomasa Rego UK	2020-2021	800	...	...	Gravity Based	Functional
39	DWSS Agra UK	2020-2021	920	...	...	Gravity Based	Functional
40	DWSS Upper Jilandhar UK	2020-2021	1800	...	...	Gravity Based	Functional

41	DWSS Pasta shaga & AdJ: Area UK	2020-2021	1050	…	…	Gravity Based	Functional
42	DWSS Sultan Kanda UK	2020-2021	1200	…	…	Gravity Based	Functional
43	DWSS Ibrahim Zai UK	2020-2021	850	…	…	Gravity Based	Functional
44	DWSS Hussain Naghare UK	2020-2021	900	…	…	Gravity Based	Functional
45	DWSS Zeran Zoor Kali and Navi Kali UK	2020-2021	2590	….	…..	Gravity Based	Functional
46	DWSS Korrigzai Malana Shamkhel UK	2021-22	980	….	…..	Gravity Based	Functional
47	DWSS Pewar (Gravity) UK	2023-24	980	….	…..	Gravity Based	Functional
		TOTAL =	**77423**				

3.10.3.3 Existing Water Supply System in Lower Kurram

Table 3-104: Existing Water Supply System in Lower Kurram

DETAILS - **EXISTING WATER SUPPLY SYSTEM (LOWER KURRAM)**							
S. No	**Name of Scheme**	**Year of Completion**	**Served Population (Persons)**	**NATURE OF SCHEME**			**Functionalit**
				Pumping Based		**Gravity Based**	
				Solar Based	**Electric Based**		
ELECTRIC BASED							
1	DWSS Sadda Rest House LK	1976-77	2685	...	Electric Based	...	Functional
2	DWSS Buda China LK	1984-85	1470	...	Electric Based	...	Functional
3	DWSS Shaho & Jindari LK	1987-88	3587	...	Electric Based	...	Functional
4	DWSS Colony Sadda(Park) LK	1992-93	1950	...	Electric Based	...	Functional
5	DWSS Wali China LK	1998-99	1458	...	Electric Based	...	Functional
		TOTAL =	11150				
SOLAR BASED							
1	DWSS Alizai LK	1980-81	2951	E.(Solarised)	...	...	Functional
2	DWSS Uchat Kalay LK	1981-82	2800	E.(Solarised)	...	...	Functional
3	DWSS Manduri LK	1982-83	1200	E.Solar		...	Non Functional
4	DWSS Arawalay LK	1984-85	1050	E.Solar	...	...	Functional
5	DWSS Baggan LK	1984-85	2707	E-Solar		...	Functional
6	DWSS Chapri Lk	1985-86	2280	E.Soalar	....	...	Functional
7	DWSS Kochi Kalay LK	1987-88	2100	E.Solar		...	Functional
8	DWSS Pir Qayyum LK	1988-89	4000	E.(Solarised)		...	Functional

9	DWSS Ahmad Shama LK	1988-89	1980	E.Solar		…	Functional
10	DWSS Bagzai Lk	1991-92	2500	E.Solar		…	Functional
11	DWSS Sateen Lk	1993-94	2157	E.Solar	…..	…	Functional
12	DWSS Inter College Sadda Lk	1994-95	4500	E.(Solarised)	…	…	Functional
13	DWSS Warsak to Jamal Kalay LK	1995-96	1400	E-Solar		…	Functional
14	DWSS Bata Kalay Alizai LK	2005-06	1450	E-Solar		…	Functional
15	DWSS Nazari Kalay LK	2007-08	2038	E.Solar	…	…	Functional
16	DWSS Charkhel LK	2010-11	1498	E-Solar		…	Functional
17	DWSS Sateen Lk	2013-14	2900	Solar Based	…	…	Functional
18	DWSS Chardiwal LK	2013-14	1250	Solar Based	…	…	Functional
19	DWSS Manduri LK	2016-17	1943	E.Solar		…	Functional
20	DWSS Khairullah Mela Beggan LK	2016-17	2230	Solar Based	…	…	Functional
21	DWSS Sadda Cant LK	2016-17	1550	Solar Based	…	…	Functional
22	DWSS Makhezai Lk	2016-17	1610	Solar Based	…	…	Functional
23	DWSS Sadda Eidgah LK	2017-18	1750	Solar Based	…	…	Functional
24	DWSS Makhezai Lk	2019-20	1550	Solar Based	…	…	Functional
25	DWSS Tarak Sadda LK	2019-20	1980	Solar Based	…	…	Functional
26	DWSS Alizai LK	2019-20	1330	Solar Based	…	…	Functional
27	DWSS Munda LK	2019-20	1120	Solar Based	…	…	Functional

28	DWSS Kas Sakhi Ahmad Shah LK	2019-20	1260	Solar Based	…	…	Functional
29	DWSS Dadkamar LK	2021-22	2050	Solar Based	…	…	Functional
30	DWSS: Lower Sateen LK	2022-23	2800	Solar Based	…	…	Functional
31	DWSS: Mazida Mila LK.	2022-23	2750	Solar Based	…	…	Functional
32	DWSS Mendanak Sehra LK	2024-24	1200	Solar Based	…	…	Functional
33	DWSS Yaqoobi LK	2023-24	980	Solar Based	…	…	Functional
34	DWSS: Pir Qayum LK.	2023-24	1120	Solar Based	…	…	Functional
35	DWSS: Jindarae Lower Kurram	2023-24	1120	Solar Based	…	…	Functional
		TOTAL =	**69104**				
GRAVITY BASED							
1	DWSS Sultani FR Lk	1986-87	1600	…	…	Garavity Based	Functional
2	DWSS Bilyamin LK	1987-88	1845	…	…	Gravity Based	Functional
3	DWSS Manatoo LK	1990-91	1685	…	…	Gravity Based	Functional
4	DWSS Mauza Bilyamin / Munda LK	2012-13	1775	…	…	Gravity Based	Functional
5	DWSS Makhezai Gidaro LK	2020-2021	750	…	…	Gravity Based	Functional
		TOTAL =	**7655**				

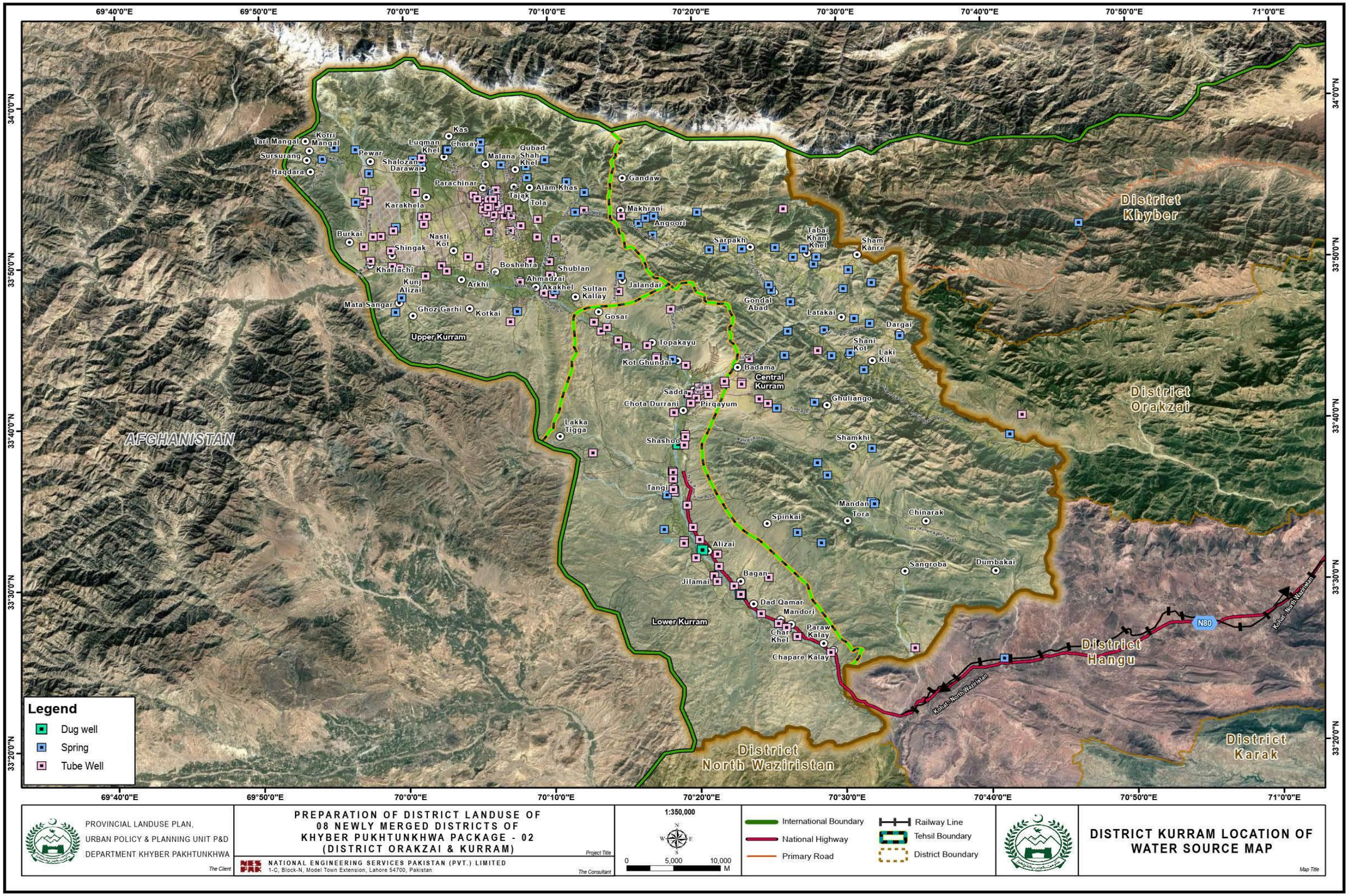
3.10.3.4 Existing Water Supply System in Central Kurram

DETAILS - EXISTING WATER SUPPLY SYSTEM (LOWER KURRAM)							
S. N	**Name of Scheme**	**Year of Completion**	**Served Population (Persons)**	**NATURE OF SCHEME**			**Functionality**
				Pumping Based		**Gravity Based**	
				Solar Based	**Electric Based**		
ELECTRIC BASED							
1	DWSS Mirbagh CK	1992-93	2150	…	Electric Based	…	Functional
2	DWSS Tindo CK	1992-93	1190	…	Electric Based	…	Non Functional
		TOTAL =	**3340**				
SOLAR BASED							
1	DWSS Sra Ghorga CK	1988-89	1220	E.Solar		…	Functional
2	DWSS Tangai CK	2013-14	1320	Solar Based	…	…	Functional
3	DWSS Goggani CK	2016-17	2600	Solar-Gravity	…	…	Non Functional
4	DWSS Gulli Shang CK	2016-17	750	Solar Based	…	…	Functional
5	DWSS Palosen Wazir CK	2019-20	840	Solar Based	…	…	Functional
6	DWSS Mirbagh New Abadi CK	2021-22	1260	Solar Based	…	…	Functional
7	DWSS Qissa Khel CK	2024-25	1290	Solar Based	…	…	Functional
		TOTAL =	**9280**				
GARAVITY BASED							
1	DWSS Mandan CK	1991-92	1883	…	…	Garavity Based	Functional
2	DWSS Dogar CK	1992-93	1602	…	…	Garavity Based	Functional
3	DWSS Dargai CK	1992-93	1019	…	…	Garavity Based	Functional
4	DWSS Taralai CK	1995-96	3560	…	…	Gravity Based	Functional
5	DWSS Gondal CK	1998-99	1560	…	…	Gravity Based	Functional

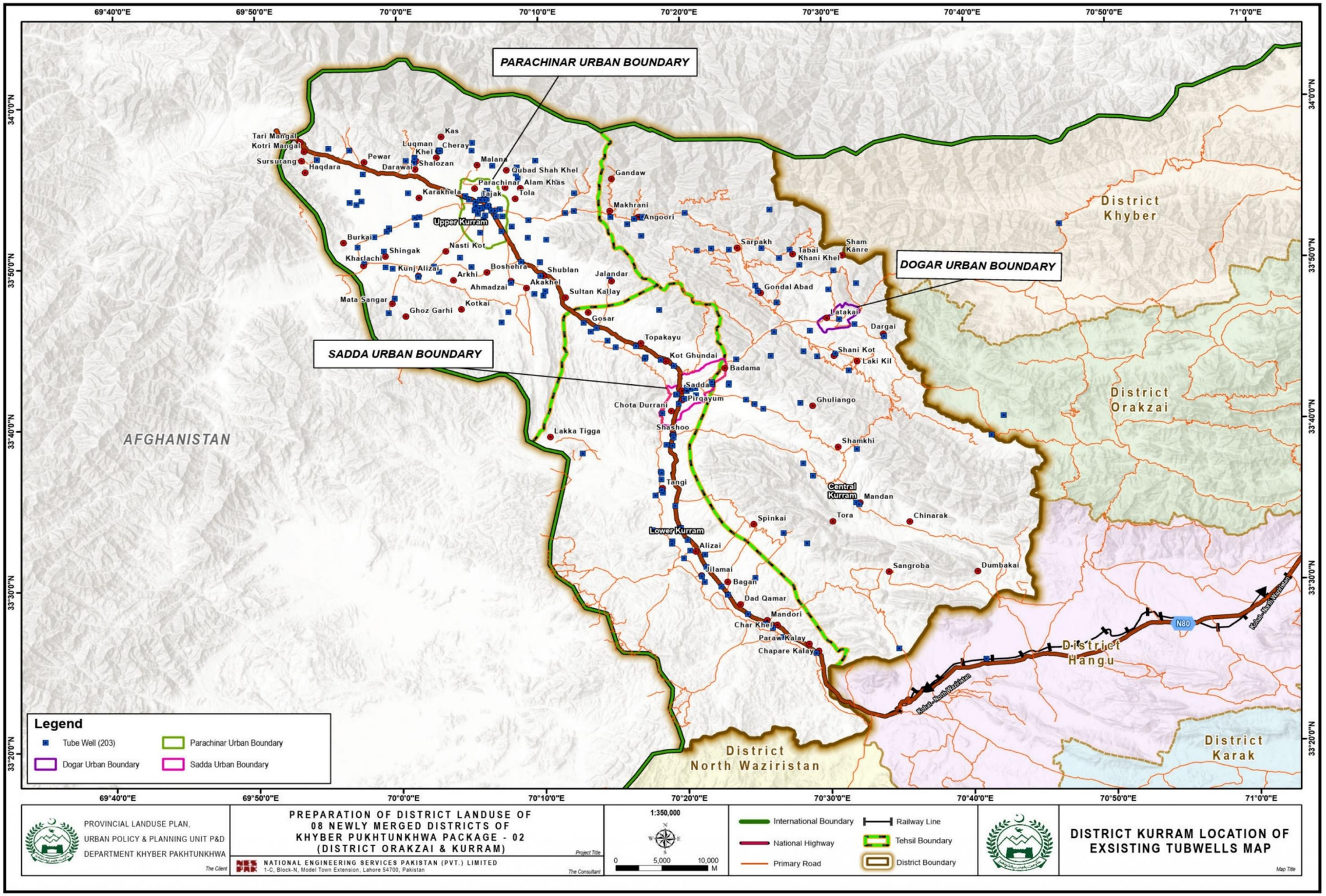
6	DWSS Ohm Mandukhel CK	1998-99	1400	…	…	Gravity Based	Functional
7	DWSS Ziarath Khandaow CK	1998-99	1680	…	…	Gravity Based	Functional
8	DWSS Sarpakh CK	1998-99	1800	…	…	Gravity Based	Functional
9	DWSS Arawaza CK	1998-99	1250	…	…	Gravity Based	Functional
10	DWSS Pastawani CK	1999-2000	1363	…	…	Gravity Based	Functional
11	DWSS Ghuya Gharra CK	2001-02	2176	…	…	Gravity Based	Functional
12	DWSS Jalo CK	2001-02	1607	…	…	Gravity Based	Functional
13	DWSS Nargus CK	2001-02	1900	…	…	Gravity Based	Functional
14	DWSS Samkhkak CK	2001-02	2150	….	….	Gravity Based	Functional
15	DWSS Mirbagh & Sateen CK	2002-03	4500	…	…	Gravity Based	Functional
16	DWSS Tatang CK	2006-07	1100	…	…	Gravity Based	Functional
17	DWSS Sham Kani CK	2011-12	1750	…	…	Gravity Based	Functional
18	DWSS Arkharo & Adjooing CK	2012-13	1800	…	…	Gravity Based	Functional
19	DWSS Owdh CK	2012-13	1520	….	….	Gravity Based	Functional
20	DWSS Dogar and Sara Dara CK	2012-13	2600	….	….	Gravity Based	Functional
21	DWSS Star Kalli CK	2015-16	2250	…	…	Gravity Based	Functional
22	DWSS Tindo Afridi Kalli CK	2015-16	2500	…	…	Gravity Based	Functional
23	DWSS Khaori Khola CK	2016-17	1120	…	…	Gravity Based	Functional
24	DWSS Osai and Manato CK	2016-17	2316	…	…	Gravity Based	Functional
25	DWSS Daray Manaray CK	2016-17	1330	…	…	Gravity Based	Functional
26	DWSS Khansadai Mandathosam CK	2016-17	1786	…	…	Gravity Based	Functional
27	DWSS Angori CK	2016-17	1925	…	…	Gravity Based	Functional
28	DWSS Madrege CK	2016-17	1500	…	…	Gravity Based	Functional

29	DWSS Woghala & Takhtao Chato CK	2016-17	1800	…	…	Gravity Based	Functional
30	DWSS Jaodara CK	2016-17	1652	…	…	Gravity Based	Functional
31	DWSS Madrassa Kalay Baza CK	2016-17	1026	…		Gravity Based	Functional
32	DWSS Amandara CK	2017-18	1250	…	…	Gravity Based	Functional
33	DWSS Sabza Sam CK	2017-18	1158	…	…	Gravity Based	Functional
34	DWSS Javaso Manto CK	2017-18	600	…	…	Gravity Based	Functional
35	DWSS Star Mundan CK	2017-18	880	…	…	Gravity Based	Functional
36	DWSS Laki Kali CK	2017-18	760	…	…	Gravity Based	Functional
37	DWSS Murghan CK	2017-18	2250	…	…	Gravity Based	Functional
38	DWSS Godah CK	2017-18	1050	…	…	Gravity Based	Functional
39	DWSS Ginako Klai CK	2017-18	550	…	…	Gravity Based	Functional
40	DWSS Gardy Ismail Khel CK	2017-18	1400	…	…	Gravity Based	Functional
41	DWSS Dadwas CK	2017-18	1400	…	…	Gravity Based	Non Functional
42	DWSS Gondal CK	2019-020	1300	….	….	Gravity based	Functional
43	DWSS Gawakai CK	2020-2021	1700	…	…	Gravity Based	Functional
44	DWSS Khawaja Barat Sangrobai CK	2020-2021	1650	…	…	Gravity Based	Functional
45	DWSS Wrasta Alisherzai CK	2020-2021	1300	…	…	Gravity Based	Functional
46	DWSS Zarghoney & Jabba CK	2020-2021	980	…	…	Gravity Based	Functional
47	DWSS Mashriqi Sarpakh CK	2020-2021	1750	…	…	Gravity Based	Functional
48	DWSS Baza Lisyanri Area CK	2020-2021	1020	…	…	Gravity Based	Functional
49	DWSS Kalaya Masozai CK	2021-22	2450	…	…	Gravity Based	Functional
50	DWSS Taby Tangai & Shakar Tangai CK	2021-22	1030	…	…	Gravity Based	Functional
51	DWSS Haroon Kali Jaodara CK	2021-22	1200	…	…	Gravity Based	Functional

52	WSS: Zangi Sara Gharra Chamkani CK	2022-23	850	…	…	Gravity Based	Functional
53	DWSS: Dul China CK	2022-23	515	…	…	Gravity Based	Functional
54	DWSS: Sra Jawara Donga Chamkani CK	2022-23	920	…	…	Gravity Based	Functional
55	DWSS: Narae Rogh CK.	2022-23	990	…	…	Gravity Based	Functional
56	DWSS: Drey Khel Kam Mirani CK.	2022-23	780	…	…	Gravity Based	Functional
57	DWSS Tandori Sam CK	2024-25	860	…	…	Gravity Based	Functional
		TOTAL =	**88018**				

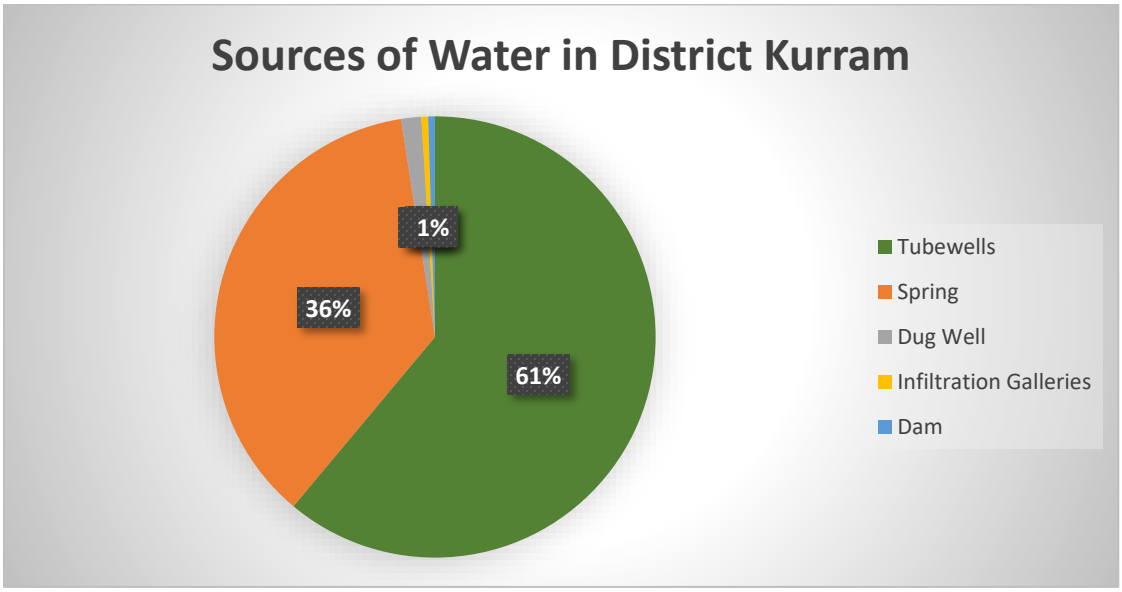


Map 3-23 Existing Water Supply sources in District Kurram



Map 3-24 *Location of* Existing Tube wells in District Kurram

There are various tubewells, springs, dug wells, Dam and infiltration galleries serves as source of water have been established across the district. Most of these are currently operational but, their overall coverage is still limited compared to the district's total population. The reliance on solar-powered tube wells has increased, offering a more sustainable solution in off-grid or electricity-deficient areas. However, electricity-based systems continue to face operational constraints due to irregular power supply and maintenance issues. The graph below shows the different water sources in district.



The existing water supply schemes has tubewell and Spring as their main water source. The distribution is either through direct pumping and through pumping with storage. The following table summarizes the sources of water, their distribution and functionality

Table 3-105: Water Sources and Their Distribution

Sr.no	Source		Distribution		Functionality	
1.	Tubewells	124	Direct Pumping	34	Functional	31
					Non-Functional	3
			Pumping with Storage	90	Functional	80
					Non-Functional	10
2.	Spring	74	Direct Pumping	8	Functional	8
					Non-Functional	0
			Pumping with Storage	66	Functional	60
					Non-Functional	6
3.	Dug Well	3	Pumping with Storage	3	Functional	2
					Non-Functional	1
4.	Infiltration Gallery	1	Direct Pumping	1	Functional	
5.	Dam	1	Pumping with Storage	1	Functional	

The mode of supply in most schemes is through pumping combined with water storage. The condition of storage tanks varies across the district. Some tanks remain well-maintained and function effectively, while others show signs of aging, including leakage, sediment buildup, and structural deterioration, which can compromise water quality and service continuity. In certain cases, storage infrastructure is insufficient or missing altogether, leading to reliance on direct pumping systems with no buffer storage capacity.

Water is distributed through pipe networks made primarily of galvanized iron (GI) and high-density polyethylene (HDPE). The lengths of these networks vary significantly, from a few hundred feet to several kilometers, depending on the terrain and the target population. However, due to limited reach, many households, especially in remote or high-altitude villages, remain unconnected to the piped supply. Furthermore, the absence of trained PHED operators for many systems hampers routine monitoring and maintenance, contributing to intermittent service and delayed repairs.

Despite the presence of this infrastructure, the district faces considerable challenges in ensuring equitable and reliable water access. Many residents still depend on alternative sources such as hand pumps or natural springs, often located far from their homes. The inconsistency in water availability, especially during dry periods, continues to burden rural households. The served and unserved population is shown in Figure 3-7.

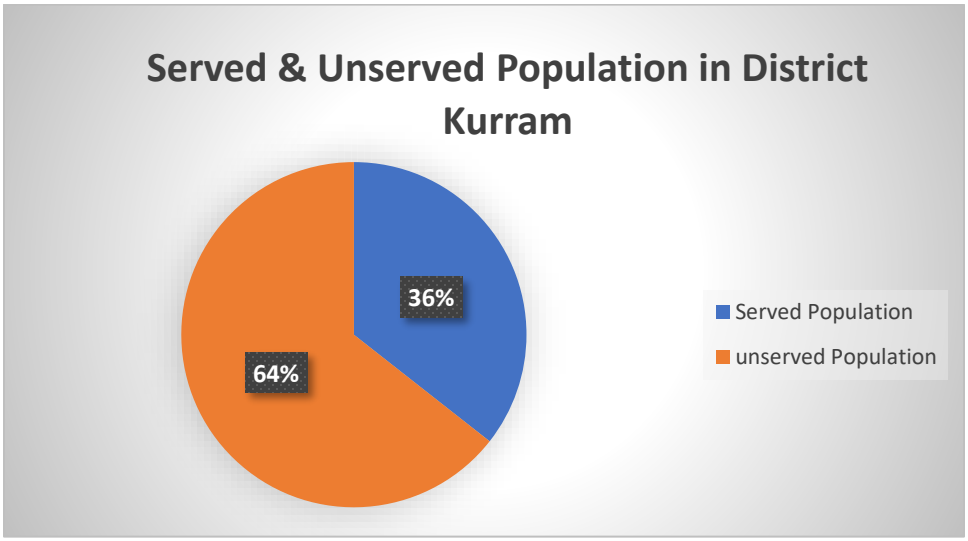


Figure 3-31: Served and Unserved Population in Kurram District

To improve water supply coverage, immediate attention is needed to rehabilitate and expand existing schemes, strengthen storage infrastructure, and assign qualified personnel for system oversight. The integration of decentralized water solutions, such as rainwater harvesting and solar-powered community-based schemes, can further enhance resilience and extend access to underserved areas. A coordinated and community-inclusive approach will be essential to bridging the service gap and ensuring sustainable water supply across Kurram District.

3.10.4 Quality and Quantity of Water

Drinking enough water in suitable quantity and quality is the most basic need of each individual. The following section examines water quantity and quality in accordance with local and international requirements for a consolidated, sustainable, and appropriate supply of water.

3.10.4.1 Water Demand/Quantity

The World Health Organization (WHO) recommends a per capita daily water supply of 50 to 100 liters to meet essential personal and domestic needs. In line with this, the Public Health Engineering Department (PHED) of Khyber Pakhtunkhwa has established design criteria of 30 gallons per capita per day (GPCD) for urban areas and 15 GPCD for rural areas. These standards are widely accepted for planning water supply infrastructure in developing regions.

Based on the population projections for Kurram District, the estimated water demand has been calculated using PHED's per capita water consumption standards. The water demand of the city corresponding to the population variation has been provided below.

Table 3-106: **Per Capita Consumption of Water as per the PHED Criteria**

Design Population	Per Capita Consumption Per Day (Inclusive of Unaccounted for Water)
Up to 5,000	10 Gallons
5,001 – 10,000	15 Gallons
10,001 – 20,000	20 Gallons
20,001 – 50,000	30 Gallons
50,001 – 100,000	40 Gallons
100,001 – 200,000	50 Gallons
200,001 – 300,000	55 Gallons
300,001 – 400,000	60 Gallons
400,001 – 500,000	65 Gallons
500,001 – 600,000	70 Gallons
600,001 – 700,000	75 Gallons
700,001 – 800,000	80 Gallons
More than 800,000	85 Gallons

Kurram District, with its predominantly rural population and scattered settlements, relies heavily on limited surface and groundwater sources. As population growth continues, water demand will increase accordingly. Seasonal rainfall, snowmelt, and the district's mountainous terrain further influence the availability and reliability of water resources.

To ensure long-term water security, future planning must consider these variables along with climate change impacts, which may lead to greater variability in precipitation and water availability. Efficient water resource management, infrastructure development, and

conservation practices will be essential to meet the growing domestic demand and to safeguard the right to water for all residents of Kurram.

3.10.4.2 Water Quality

Water quality in Kurram District is influenced by both natural and anthropogenic factors, with surface water sources such as rivers, streams, and nullahs playing a central role in meeting local water needs. Limited water quality monitoring has been conducted in the district, with available data primarily based on spot sampling at key points along the Kurram River and its tributaries.

According to existing assessments, water from the Kurram River generally falls within acceptable ranges for key chemical parameters. Measurements taken at locations like the Kurram River Dam site and Kurram Garhi Headwork indicate that the pH levels range between 7.8 and 8.0, suggesting slightly alkaline water. Electrical conductivity values (460–570 dS/m) and sodium absorption ratios are within permissible limits for irrigation and domestic use, although chloride levels show minor variation.

Despite this, the lack of a consistent and district-wide water quality monitoring system remains a significant gap. Seasonal runoff, sedimentation, agricultural runoff, and inadequate waste disposal may introduce contaminants, particularly in surface water bodies. These conditions pose potential health risks, especially in areas relying on untreated water sources.

To ensure safe drinking water for the population, it is essential to establish a regular water quality monitoring framework across the district. This should be supported by community awareness, source protection, and the integration of water treatment facilities, particularly in densely populated or vulnerable areas.

Water quality remains a pressing concern, with assessments indicating contamination in several sources. Groundwater in certain areas has been found to have bacteriological contamination, high turbidity, and elevated concentrations of dissolved solids. Without adequate filtration and treatment facilities, communities relying on these sources face significant health risks.

To address these issues, efforts must be directed toward rehabilitating non-functional tube wells, expanding piped water supply networks, and ensuring regular monitoring and treatment of drinking water. Rainwater harvesting could serve as a valuable supplementary water source, especially in remote areas with limited groundwater availability. Strengthening water resource management policies will also be essential in ensuring sustainability and equitable distribution. Bridging the existing supply-demand gap will require a strategic, long-term approach focused on infrastructure development, community engagement, and sustainable water management practices.in securing long-term water accessibility for the district's growing population.

3.10.4.3 Current and Future Water Demands

The current water demand in Kurram District is primarily shaped by its rapidly growing population, predominantly rural settlement pattern, and the reliance on agriculture and livestock as main sources of livelihood. Most households depend on groundwater accessed through tube wells, hand pumps, and gravity-fed springs for their daily needs, as access to piped water remains limited, especially in remote areas. Community wells and seasonal streams (khwars) serve as crucial supplementary sources, particularly where centralized water supply systems are absent. Rural areas, which account for over 94% of the district's population, face additional challenges due to underdeveloped water infrastructure and the seasonal variability of water sources.

As Kurram's population is projected to increase significantly from 2025 to 2045, the overall demand for water is expected to rise sharply. This growth will be driven by natural population increase, gradual urbanization in centers like Parachinar and Sada, and continued expansion of agricultural activities. The need for improved sanitation and hygiene facilities will further contribute to higher water consumption. Livestock farming, a key economic activity, will continue to exert pressure on available water resources, particularly in rural communities where reliance on groundwater is already high.

The anticipated rise in water demand underscores the necessity for strategic and sustainable management of water resources. Rehabilitation of non-functional water supply schemes, expansion of piped water networks, and the adoption of groundwater recharge methods are essential to ensure long-term water security. Alternative sources such as rainwater harvesting and water conservation techniques should be promoted to reduce dependence on groundwater extraction. The introduction of solar-powered tube wells and the development of small-scale water reservoirs could enhance the district's capacity to meet future water needs in an energy-efficient and environmentally sustainable manner. Given the projected demographic trends, investments in infrastructure, water treatment, and conservation practices will be critical to secure reliable and equitable access to water for Kurram's growing population, ensuring that both rural and emerging urban communities are adequately served.

3.10.4.3.1Water Demands

Kurram District is predominantly rural, with a significant proportion of the population relying on localized water sources such as tube wells, hand pumps, gravity-fed springs, and seasonal streams. The absence of a comprehensive, centralized piped water supply system has resulted in dependence on small-scale and scattered schemes, many of which are operated by the Public Health Engineering Department (PHED). Despite these efforts, considerable gaps in service coverage persist, particularly in remote and dispersed rural settlements, placing increasing pressure on the district's limited water resources.

In view of the prevailing water-scarce conditions and to ensure realistic and sustainable system planning, a reduced per capita water demand of 15 gallons per capita per day (GPD) has been adopted for both urban and rural populations. This conservative demand standard reflects resource constraints while meeting essential domestic and non-domestic water requirements.

Of the total demand in 2025, approximately 10.27 MGD is attributed to rural settlements, while 2.24 MGD corresponds to urban centers. Rural water demand is projected to rise to 17.39 MGD by 2045, reflecting the dispersed settlement pattern and increasing coverage of improved water supply schemes. Urban water demand, concentrated in Parachinar, Sadda, Dogar, and Alizai, is also expected to increase steadily due to population growth and densification, with combined demand rising over the planning horizon. The sustained growth in both rural and urban water demand underscores the need for an integrated and sustainable water management approach. Priority interventions include the development of alternative water sources such as rainwater harvesting, construction of small-scale storage facilities, installation of solar-powered tube wells, and protection of existing springs. In parallel, phased expansion of piped distribution networks and measures to enhance groundwater recharge are essential to ensure long-term water security and equitable access to safe drinking water across both rural settlements and urban centers of District Kurram. Tables below presents the projected average daily water demand for Rural Settlements and Urban Centers;

Table 3-107: Water Demand from 2025 to 2045 in Rural Settlement

Rural Settlements	Avg. Daily Demand (MGD) 2025	Avg. Daily Demand (MGD) 2030	Avg. Daily Demand (MGD) 2035	Avg. Daily Demand (MGD) 2040	Avg. Daily Demand (MGD) 2045
Central Kurram F. R	5.57	6.64	7.88	9.31	10.67
Lower Kurram Tehsil	1.30	1.52	1.66	1.82	1.96
Upper Kurram Tehsil	3.40	3.66	3.99	4.34	4.76
Total	**10.27**	**11.82**	**13.53**	**15.48**	**17.39**
				Area Required for WTP	**13 acres**

Table 3-108: Water Demand from 2025 to 2045 in Urban Centers

Urban Settlements	Average Daily Demand (MGD) 2025	Average Daily Demand (MGD) 2030	Average Daily Demand (MGD) 2035	Average Daily Demand (MGD) 2040	Average Daily Demand (MGD) 2045	Total
Parachinar	0.90	1.08	1.22	1.38	1.50	**6.07**
Sadda	0.67	0.76	1.01	1.32	1.71	**5.47**
Dogar	0.23	0.29	0.35	0.41	0.79	**2.07**
Ali Zai	0.44	0.55	0.64	0.74	0.90	**3.27**

3.10.5 Proposed Water Supply system in Urban Centers

The proposed water supply system for urban centers of District Kurram including Sadda, Dogar, Alizai, and Parachinar has been designed to ensure continuous, safe, and reliable water delivery. The system will rely on groundwater abstraction through tube wells, with water conveyed to strategically located overhead reservoirs for flow equalization, pressure regulation, and emergency storage. A network of pressurized pipelines will distribute water efficiently across residential, commercial, and institutional areas, ensuring equitable access throughout each urban center. Solar-powered pumping units are proposed to enhance energy efficiency and operational sustainability, particularly in off-grid or remote urban zones. The design allows for phased capacity augmentation over the planning horizon to accommodate population growth and expansion of service coverage, ensuring long-term reliability of urban water supply. The required number of tubewells and Overhead Reservior is shown in tables below.

Table 3-109:No of Tubewells Required in Urban Centers (2025-2045)

Urban Centers	No of TWs Required (2025)	No of TWs Required (2030)	No of TWs Required (2035)	No of TWs Required (2040)	No of TWs Required (2045)
Parachinar	6	7	8	9	10
Sadda	5	5	7	9	11
Dogar	2	2	3	3	6
Ali Zai	3	4	5	5	6

Table 3-110: No of OHRs Required in Urban Centers (2025-2045)

Urban Centers	No of OHR Required (2025)	No of OHR Required (2030)	No of OHR Required (2035)	No of OHR Required (2040)	No of OHR Required (2045)
Parachinar	8	9	11	12	13
Sadda	6	7	9	11	15
Dogar	2	3	3	4	7
Ali Zai	4	5	6	7	8

3.10.5.1 Proposed Water Supply System in Parachinar

The proposed water supply system including water supply network and location of tubewells and OHRs has been in following Maps At locations where the pipeline alignment intersects natural streams, thrust boring technology will be adopted to safely install the pipeline beneath the stream bed. This method will prevent disturbance to the stream flow and minimize environmental impacts. The pipeline will be installed inside a protective casing pipe using thrust boring to ensure structural stability and long-term protection of the water supply line. This approach will maintain the integrity of the stream channel while ensuring the continuity and safety of the water supply network.

3.10.5.2 Proposed Water Supply System in Sadda

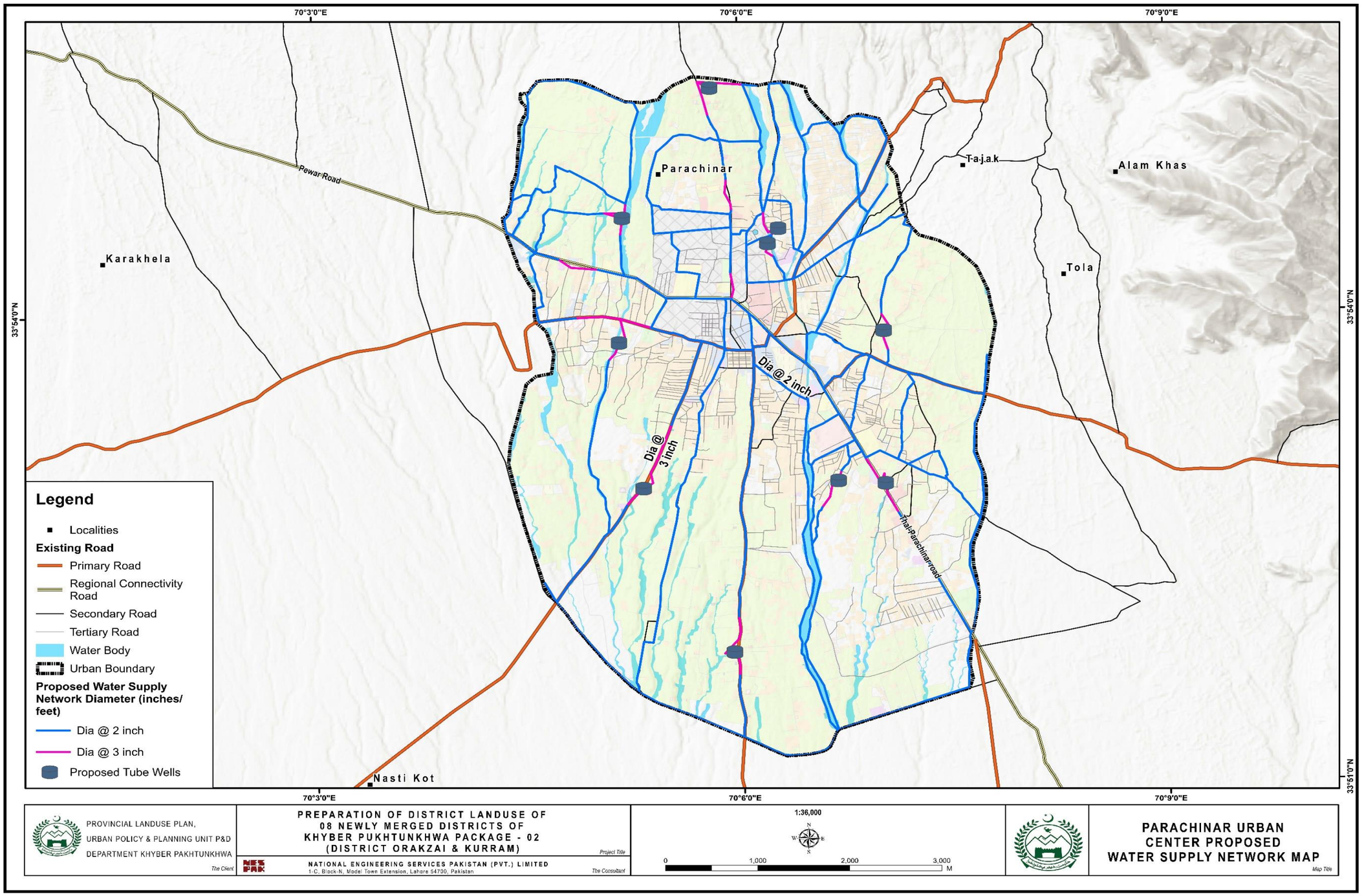
The proposed water supply system including water supply network and location of tubewells and OHRs has been in following Maps.

3.10.5.3 Proposed Water Supply System in Dogar

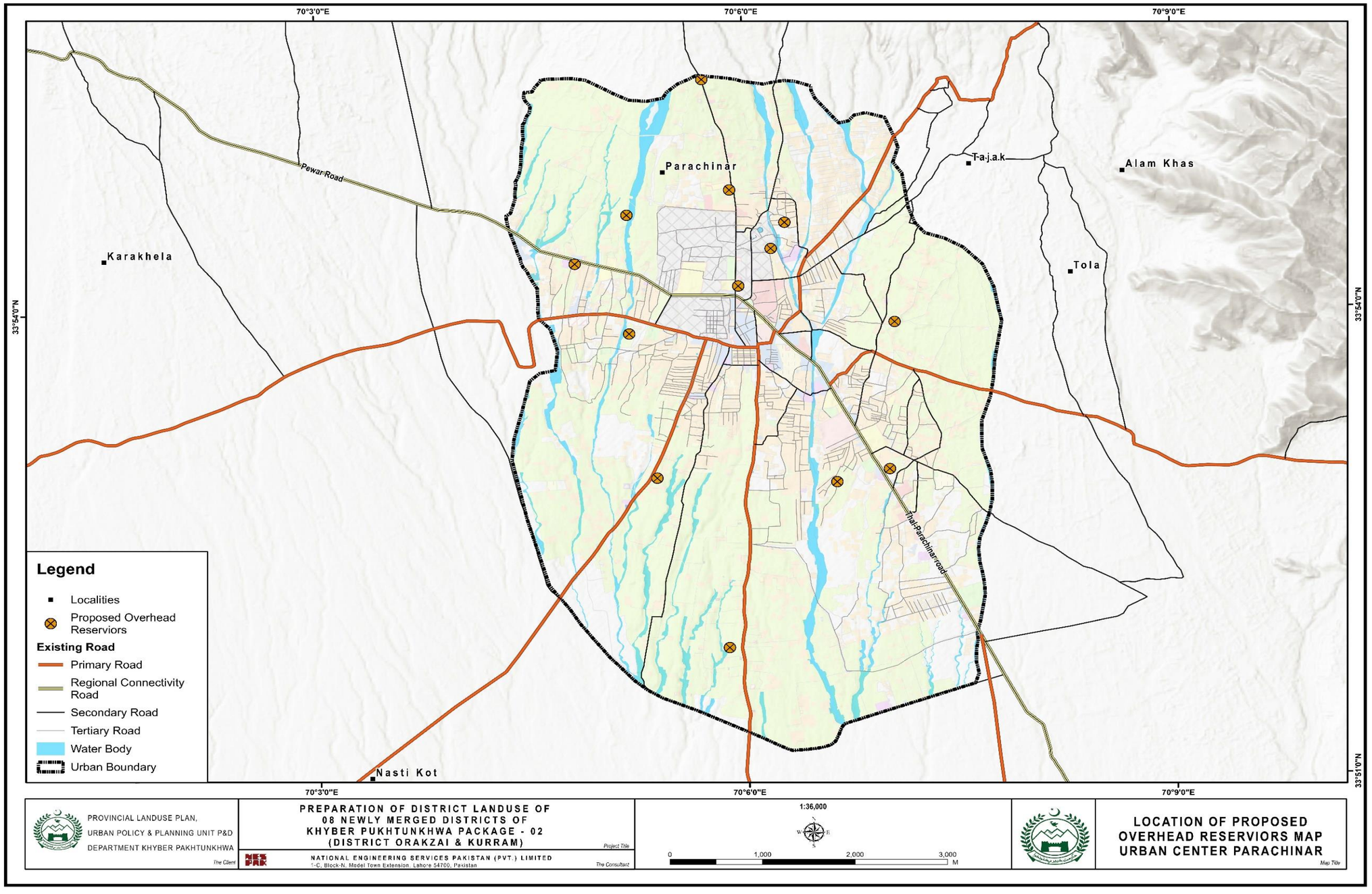
The proposed water supply system including water supply network and location of tubewells and OHRs has been in following Maps.

3.10.5.4 Proposed Water Supply System in Ali Zai

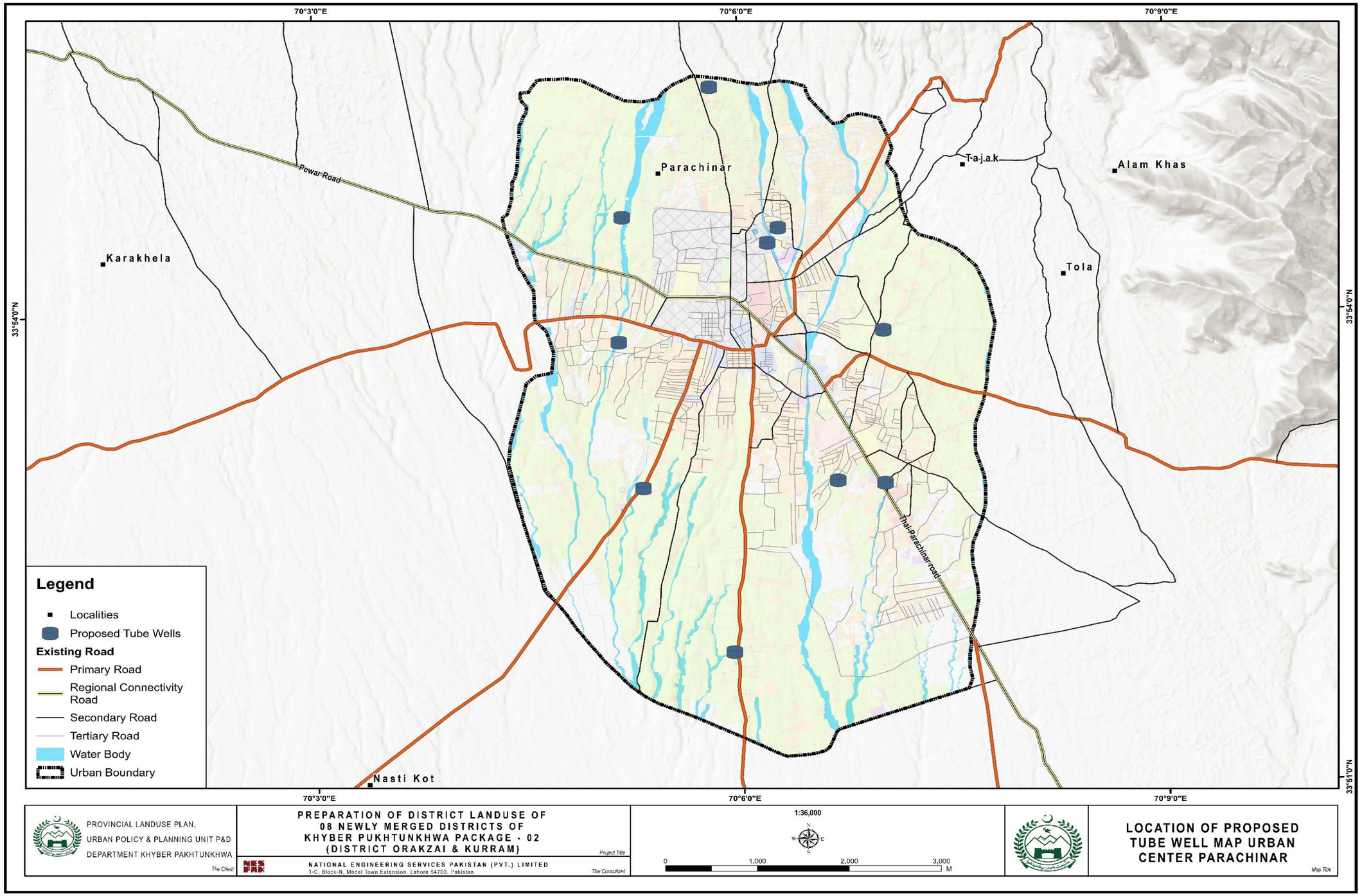
The proposed water supply system including water supply network and location of tubewells and OHRs has been in following Maps.



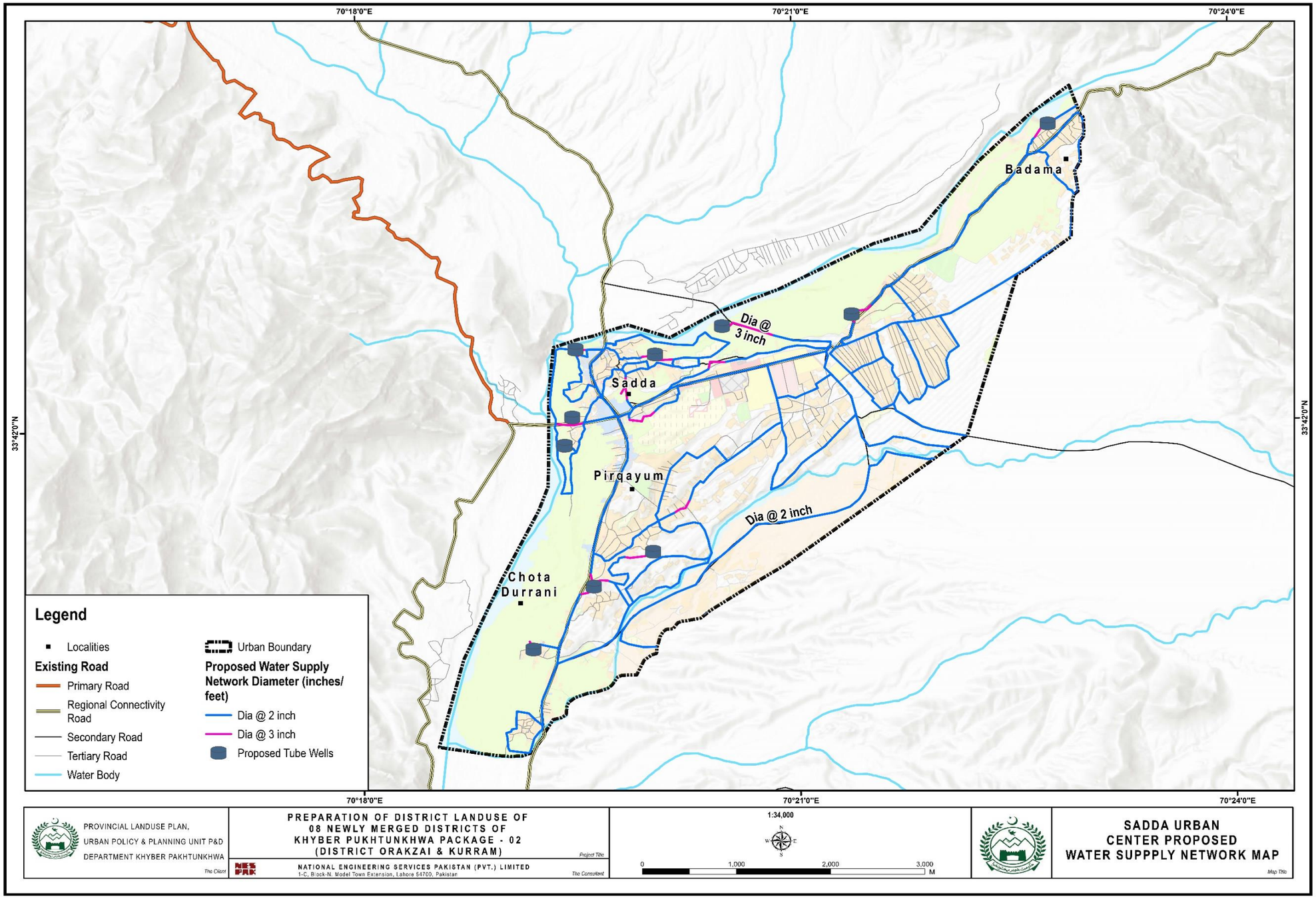
Map 3-25: Proposed Water Supply Network in Parachinar



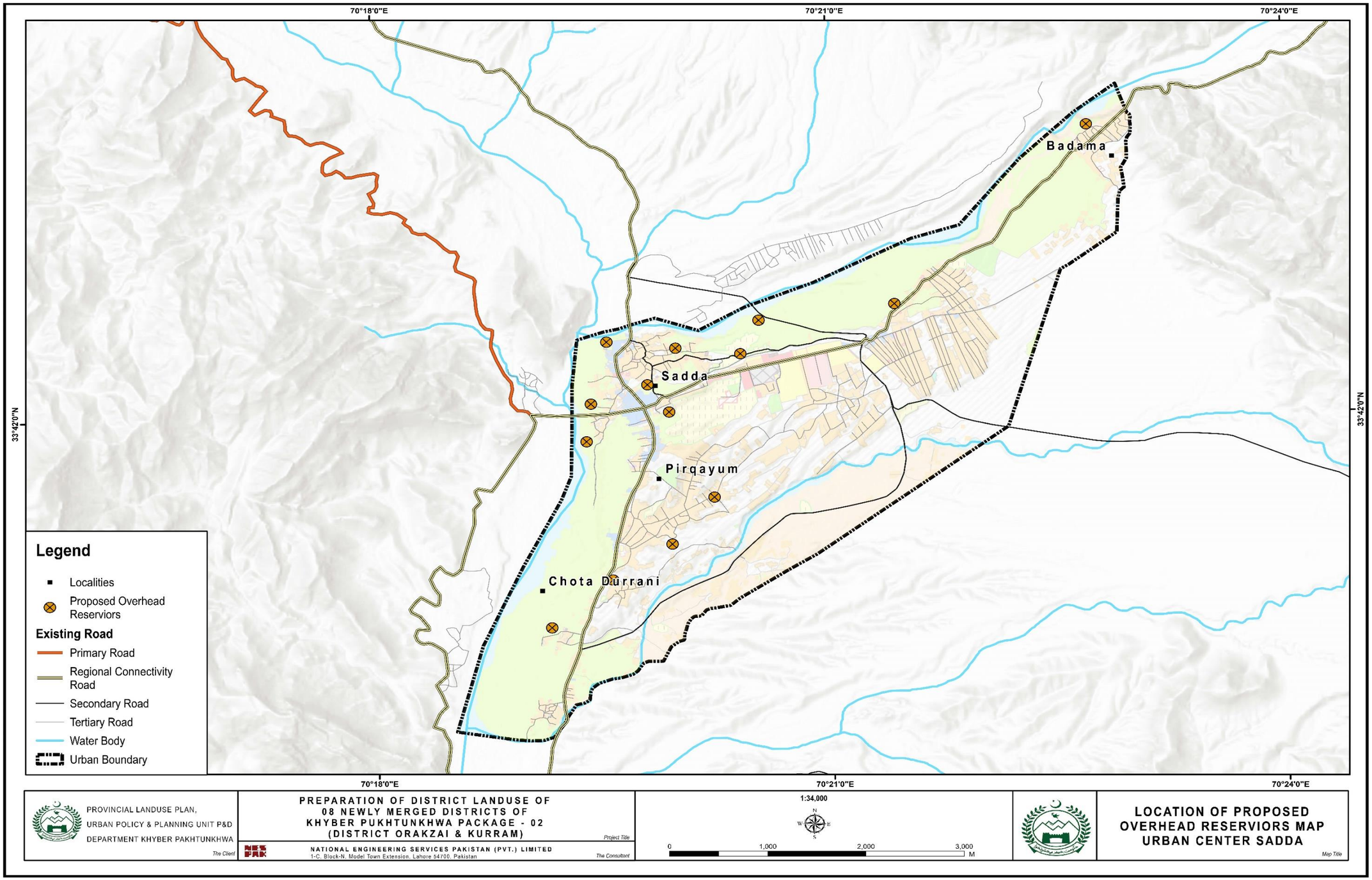
Map 3-26: Location of Proposed OHR in Parachinar



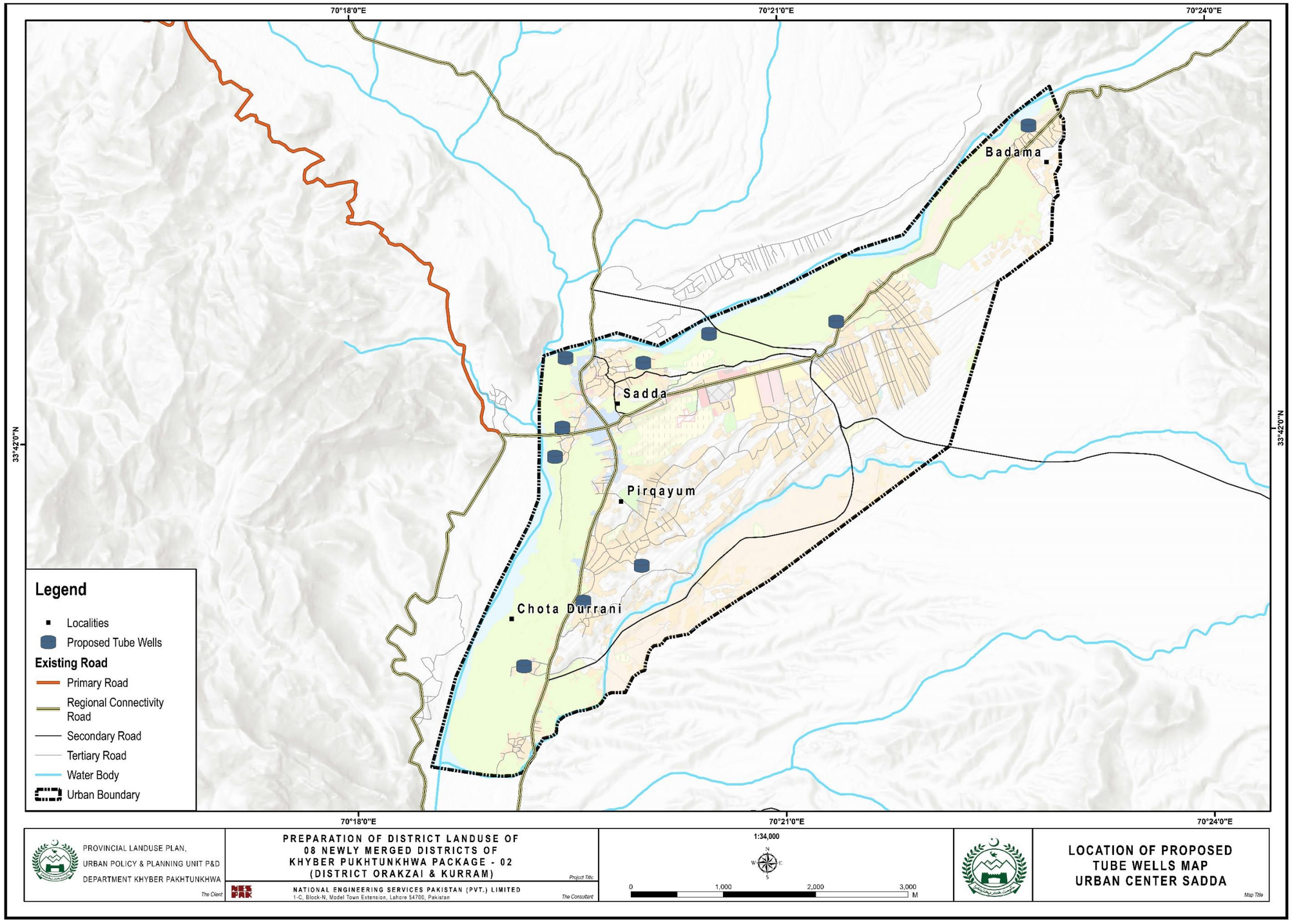
Map 3-27: Location of Proposed tubewells in Parachinar



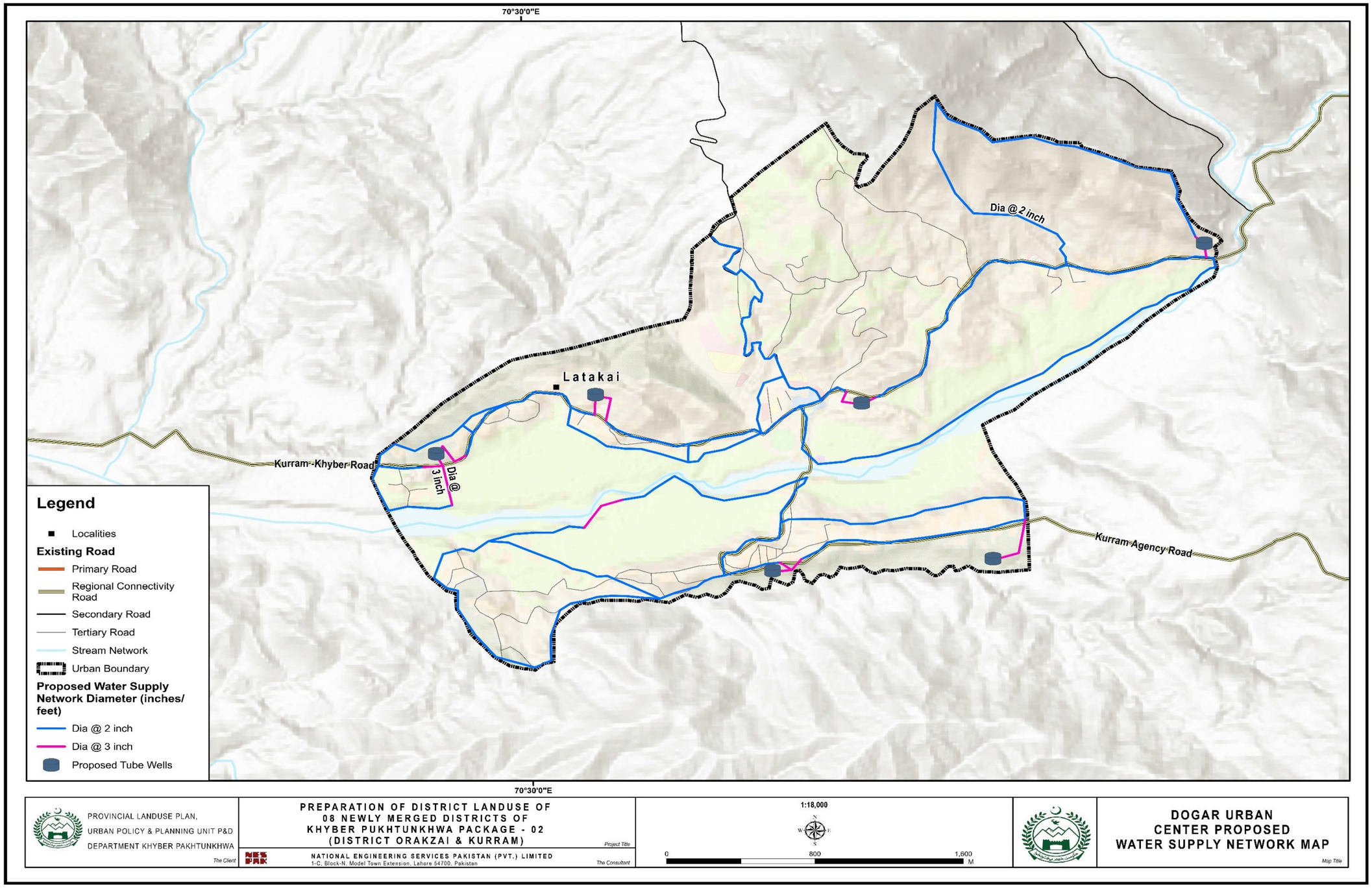
Map 3-28: Proposed Water Supply Network in Sadda



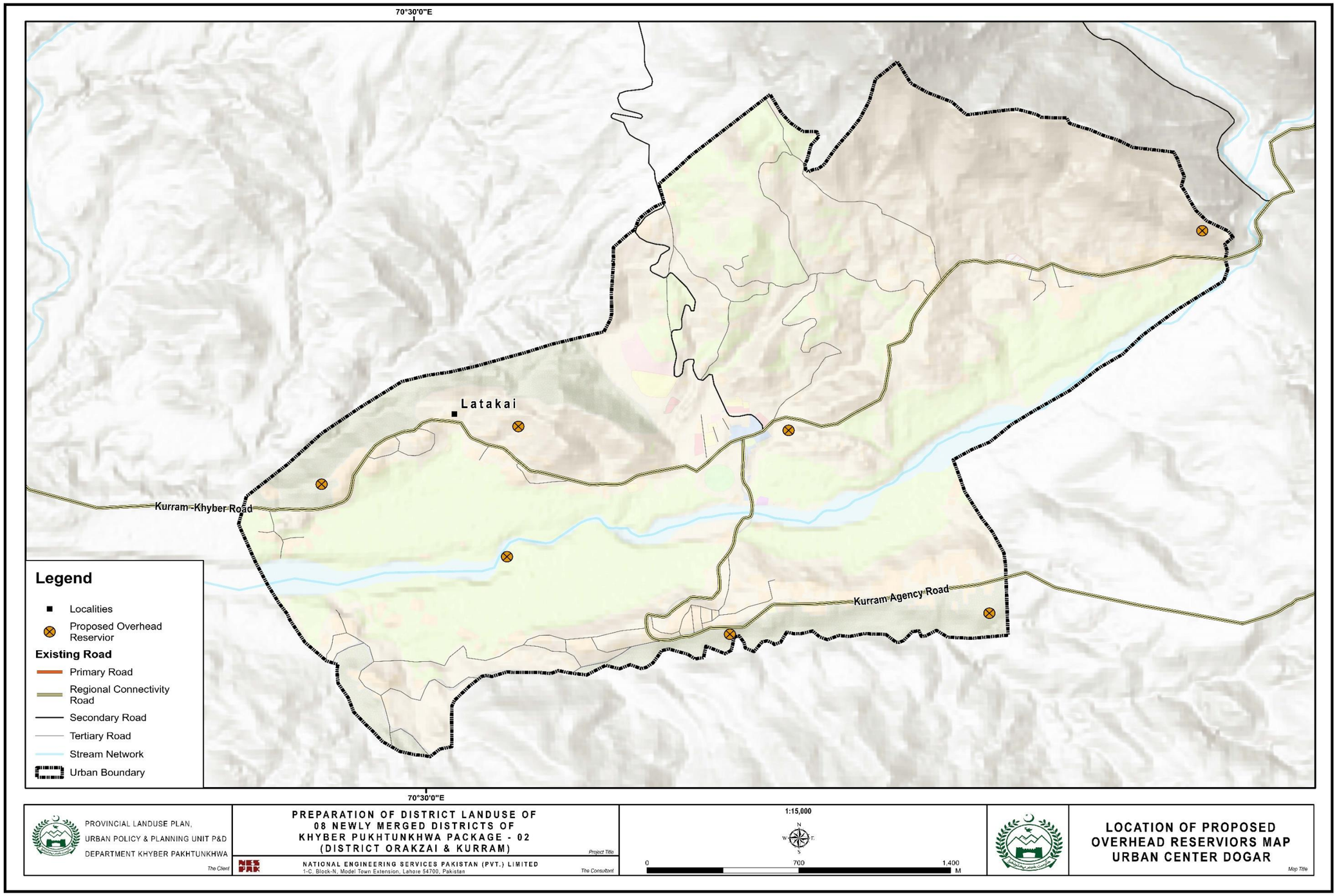
Map 3-29:Proposed OHR Location in Sadda



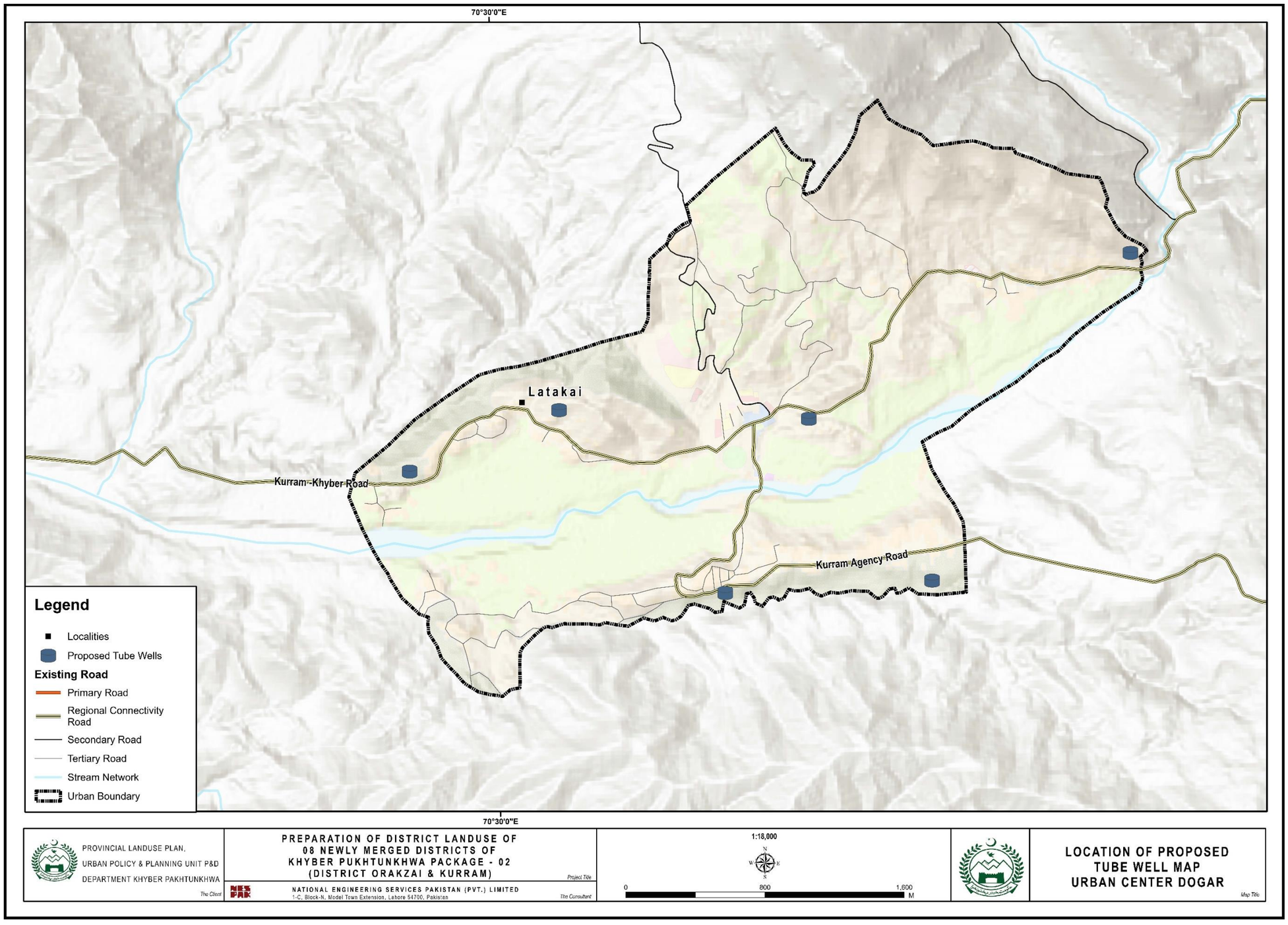
Map 3-30: Proposed Tubewell Location in Sadda



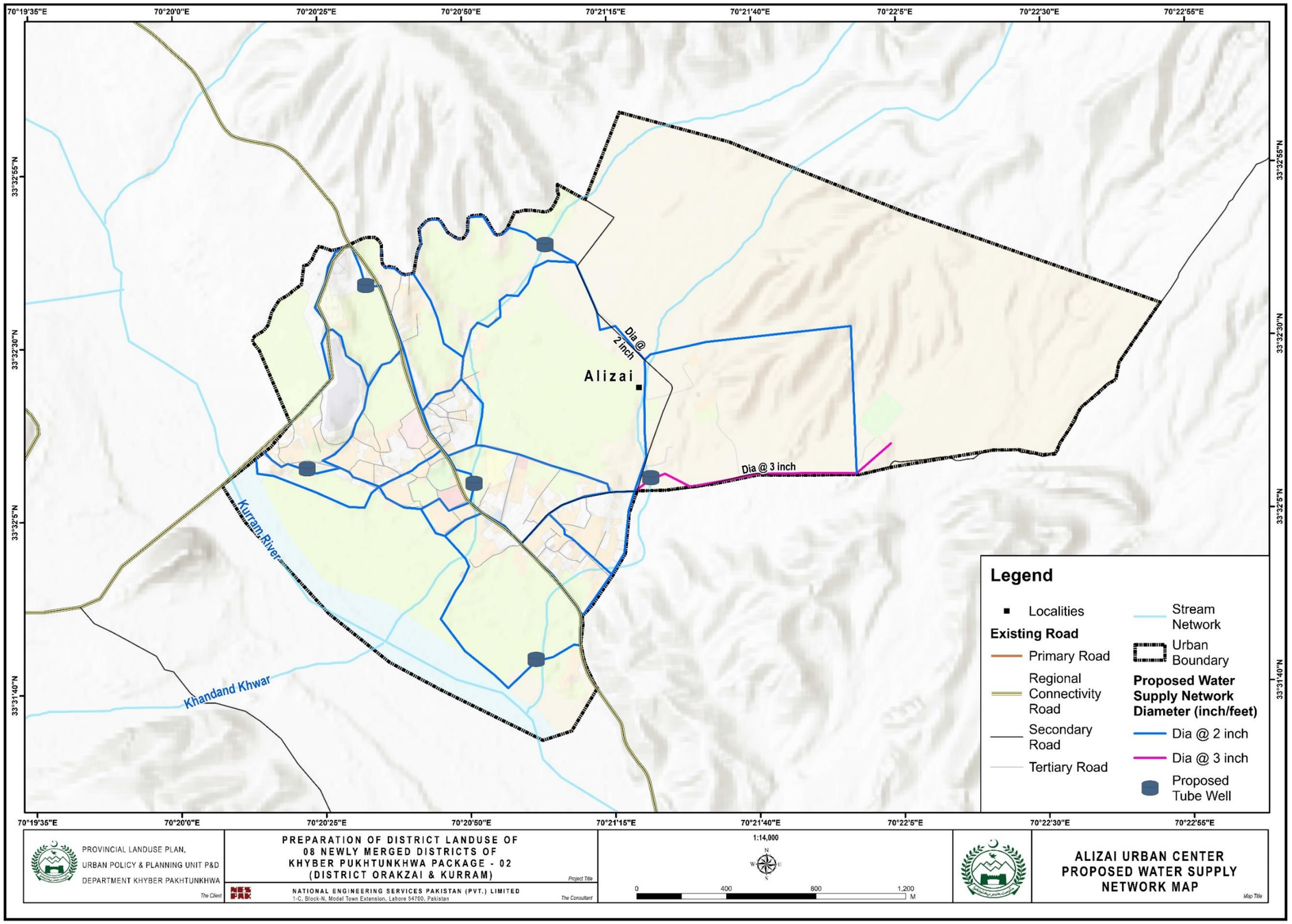
Map 3-31:Proposed Water Supply Network in Dogar



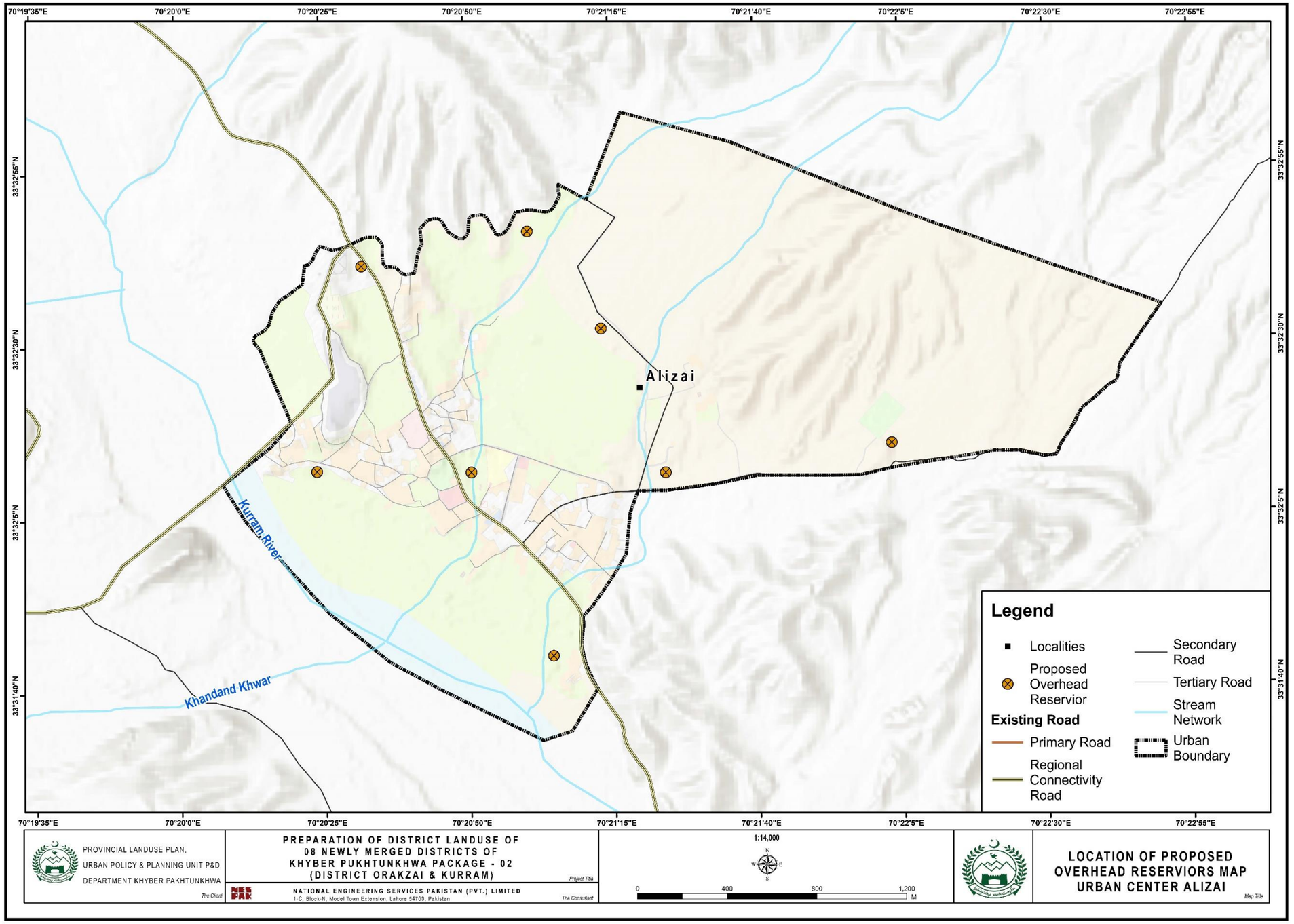
Map 3-32:Proposed OHR Location in Dogar



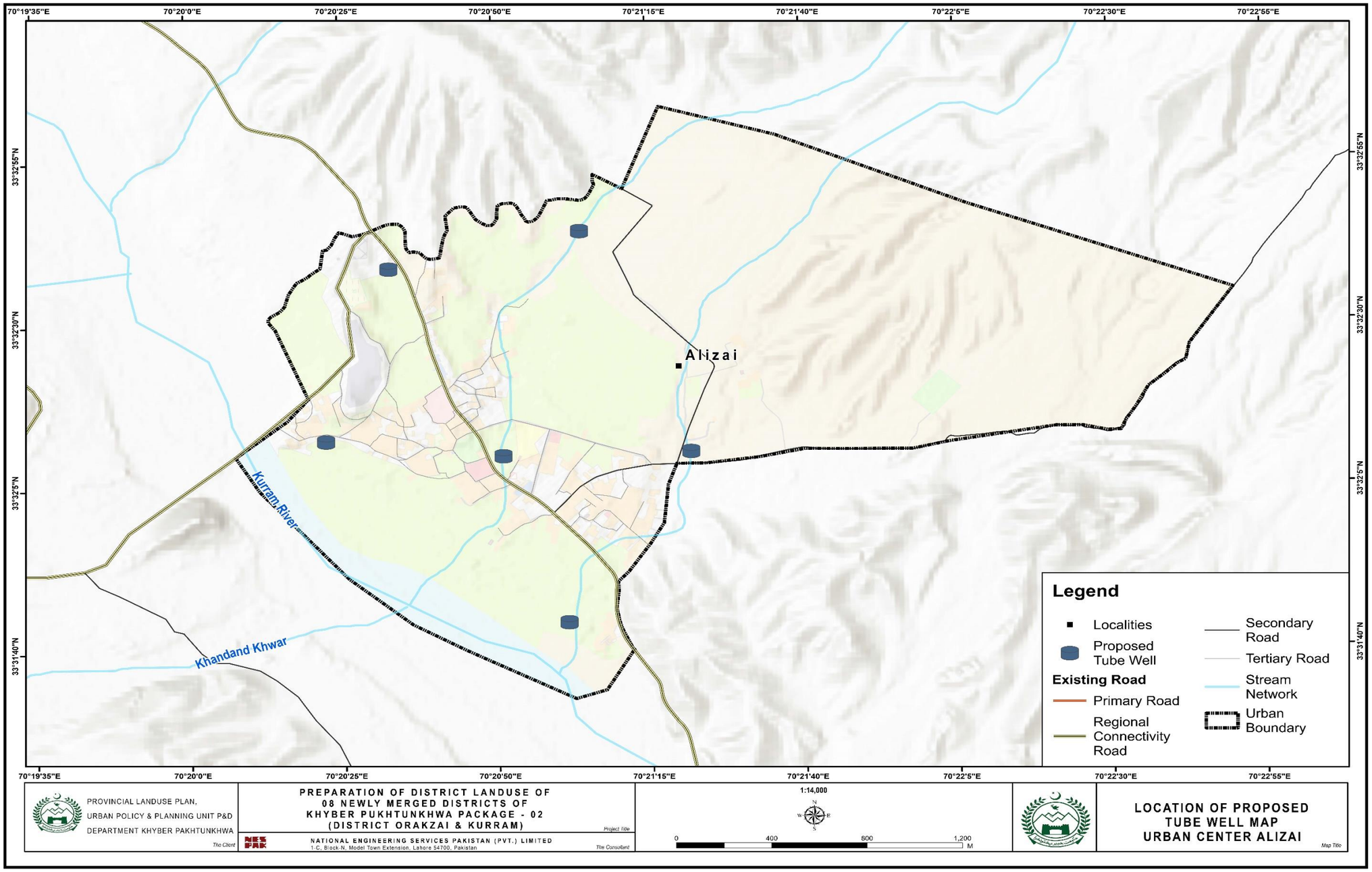
Map 3-33:Proposed Tubewell Location in Dogar



Map 3-34: Proposed Water Supply Network in Ali Zai



Map 3-35:Proposed OHR Location in Ali Zai



Map 3-36:Proposed Tubewell Location in Ali Zai

3.10.6 Proposed Water Supply system in Rural Settlements

For rural settlements in District Kurram, the proposed water supply system focuses on ensuring accessible, reliable, and sustainable provision of safe drinking water. The system will utilize groundwater abstraction through tube wells, with water conveyed to community-level storage structures to facilitate flow regulation, pressure management, and emergency storage. A distribution pipeline network will serve dispersed settlements, ensuring efficient and equitable water delivery. Solar-powered pumping units are proposed in areas with limited or unreliable grid connectivity to enhance energy efficiency and ensure uninterrupted operation. The system is designed with provisions for phased expansion to accommodate future demand, thereby supporting long-term service sustainability across rural communities throughout the planning horizon.

Table 3-111:No of Tubewells Required in Rural Settlements (2025-2045)

Rural Settlements	No of TWs Required (2025)	No of TWs Required (2030)	No of TWs Required (2035)	No of TWs Required (2040)	No of TWs Required (2045)
CENTRAL KURRAM F. R	36.00	43.00	51.00	60.00	68.00
LOWER KURRAM TEHSIL	9.00	10.00	11.00	12.00	13.00
UPPER KURRAM TEHSIL	22.00	24.00	26.00	28.00	31.00

Table 3-112: No of OHRs Required in Rural Settlements (2025-2045)

Rural Settlements	No of OHR Required (2025)	No of OHR Required (2030)	No of OHR Required (2035)	No of OHR Required (2040)	No of OHR Required (2045)
CENTRAL KURRAM F.R	47.00	56.00	66.00	78.00	89.00
LOWER KURRAM TEHSIL	11.00	13.00	14.00	16.00	17.00
UPPER KURRAM TEHSIL	29.00	31.00	34.00	37.00	40.00

3.11Sewerage and Storm water Drainage

Kurram District, characterized by its largely rural landscape and emerging urban centers, faces considerable challenges in sewerage and stormwater drainage due to the lack of a formalized infrastructure network. Most settlements, including Parachinar and Sadda, lack a comprehensive piped sewerage system, resulting in the widespread use of traditional on-site sanitation methods such as pit latrines and septic tanks. In many areas, wastewater is disposed of through open, unlined drains or directly onto open land, leading to significant risks of environmental contamination and public health concerns.

Stormwater drainage infrastructure in Kurram is similarly underdeveloped. The district's hilly terrain means that rainwater naturally flows through valleys and seasonal streams (khwars), but the absence of engineered drainage structures often results in uncontrolled runoff. During periods of heavy rainfall, this can lead to localized flooding, erosion of agricultural land, and damage to roads and settlements. Inadequate drainage also contributes to the deterioration of existing infrastructure and can disrupt daily life in both rural and semi-urban communities.

3.11.1 Existing Situation of Sanitation and Drainage System

The current sanitation and drainage system in Kurram relies heavily on natural channels and informal arrangements. Open drains are commonly used to channel wastewater away from homes, but these are often poorly maintained and insufficient to handle both domestic wastewater and stormwater during peak flows. The lack of a centralized system means that untreated wastewater frequently enters natural watercourses, posing risks to downstream water quality and increasing the potential for waterborne diseases.

Solid waste management is another pressing issue in Kurram. With no organized waste collection system in place, residents often resort to disposing of solid waste in open areas or directly into drainage channels. This practice exacerbates the blockage of drains, increases the risk of flooding, and contributes to environmental degradation and health hazards, especially in densely populated settlements.

Addressing these challenges requires a comprehensive approach to sanitation and drainage management. Key strategies should include the rehabilitation and expansion of existing drainage networks, the development of decentralized wastewater treatment facilities, and the introduction of covered and lined drains in more populated areas. The adoption of waste stabilization ponds or other appropriate treatment technologies should be considered for larger settlements such as Parachinar, Sadda, and other tehsil headquarters, with smaller-scale solutions for rural villages. Effective solid waste management systems must also be established to prevent the clogging of drainage channels and reduce environmental pollution.

Community engagement and awareness campaigns will be essential to promote safe sanitation practices and encourage the proper disposal of waste. Investments in capacity building for local authorities and the provision of technical support for maintenance and operation of new infrastructure are critical to ensuring the long-term sustainability of these interventions.

3.11.1.1 Sewage Flow

As part of the long-term sanitation planning for Kurram District, projected sewage flows have been estimated based on population growth trends and per capita water consumption patterns. Given the predominantly rural character of the district and the absence of centralized sewerage infrastructure, these projections are critical for identifying future service needs and infrastructure investments. Table 3-109 shows average sewage flow in district from 2025-2045.

Table 3-113: Sewage flow in Rural Settlements (2025-2045)

Rural Settlements	Avg. Sewage Flow (MGD) 2025	Avg. Sewage Flow (MGD) 2030	Avg. Sewage Flow (MGD) 2035	Avg. Sewage Flow (MGD) 2040	Avg. Sewage Flow (MGD) 2045
Central Kurram F. R	4.45	5.31	6.30	7.45	8.53
Lower Kurram Tehsil	1.04	1.21	1.33	1.46	1.57
Upper Kurram Tehsil	2.72	2.93	3.19	3.47	3.81
Total	**8.22**	**9.45**	**10.83**	**12.38**	**13.91**
				Area Required for WWTP	**17 acres**

Table 3-114: Sewage flow in Urban Centers (2025-2045)

Urban Settlements	Average Sewage Flow(MGD) 2025	Average Sewage Flow(MGD) 2030	Average Sewage Flow(MGD) 2035	Average Sewage Flow(MGD) 2040	Average Sewage Flow(MGD) 2045	Area Required for WWTP
Parachinar	0.72	0.86	0.98	1.10	1.20	1.79
Sadda	0.54	0.61	0.81	1.05	1.37	2.06
Dogar	0.18	0.23	0.28	0.33	0.63	0.95
Ali Zai	0.35	0.44	0.51	0.59	0.72	1.08

These projections indicate a progressive increase in sewage generation, with total rural flows expected to rise by nearly 80% over the 20-year planning horizon. Central Kurram is projected to contribute the highest share due to its larger population base and faster growth rate.

The growing volume of wastewater necessitates the development of decentralized sewage treatment systems (e.g., stabilization ponds) in rural growth centers, particularly in Central and Upper Kurram. Early-stage interventions will help prevent environmental degradation, reduce public health risks, and align with the broader goals of sustainable and resilient rural development outlined in the district's master planning framework.

3.11.2 Proposed Sewerage and Wastewater Treatment Strategy

Sewerage planning for District Kurram has been undertaken by delineating each urban center as an independent sewerage catchment. Accordingly, separate sewerage networks and dedicated wastewater treatment plants (WWTPs) are proposed for Parachinar, Sadda, Dogar, and Alizai, ensuring self-sustained and efficient sanitation systems for each urban area.

Wastewater generated within the respective urban centers shall be collected through gravity-based sewerage networks and conveyed to their individual WWTPs, which will be sited at technically

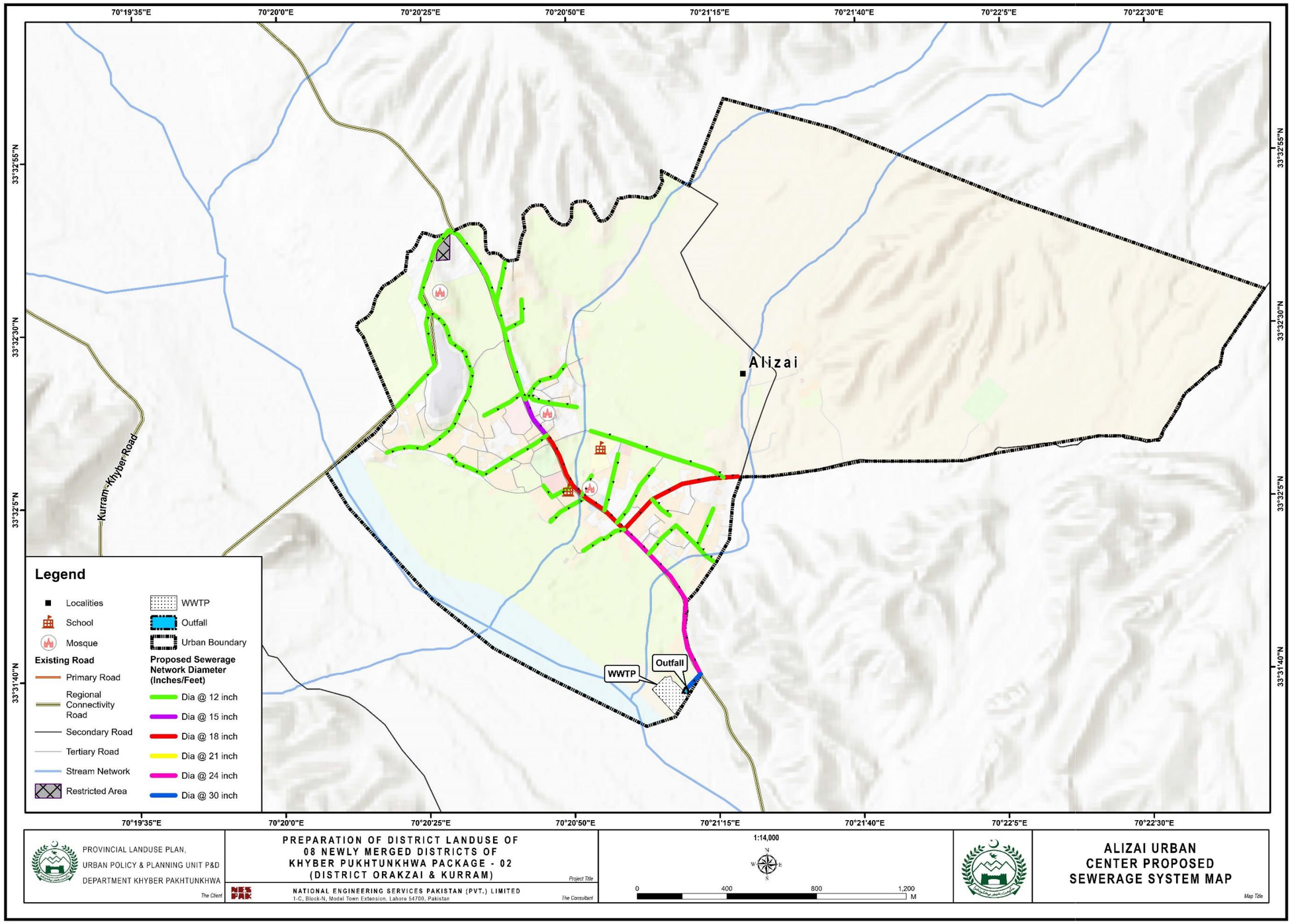
appropriate downstream locations, taking into account topography, environmental sensitivity, land availability, and future expansion requirements.

The proposed decentralized wastewater treatment approach minimizes the need for long trunk sewers, reduces capital investment and operation and maintenance costs, and significantly lowers environmental and public health risks associated with system failures. Treated effluent shall comply with the applicable National Environmental Quality Standards (NEQS), with provisions for safe disposal and, where technically feasible, beneficial reuse.

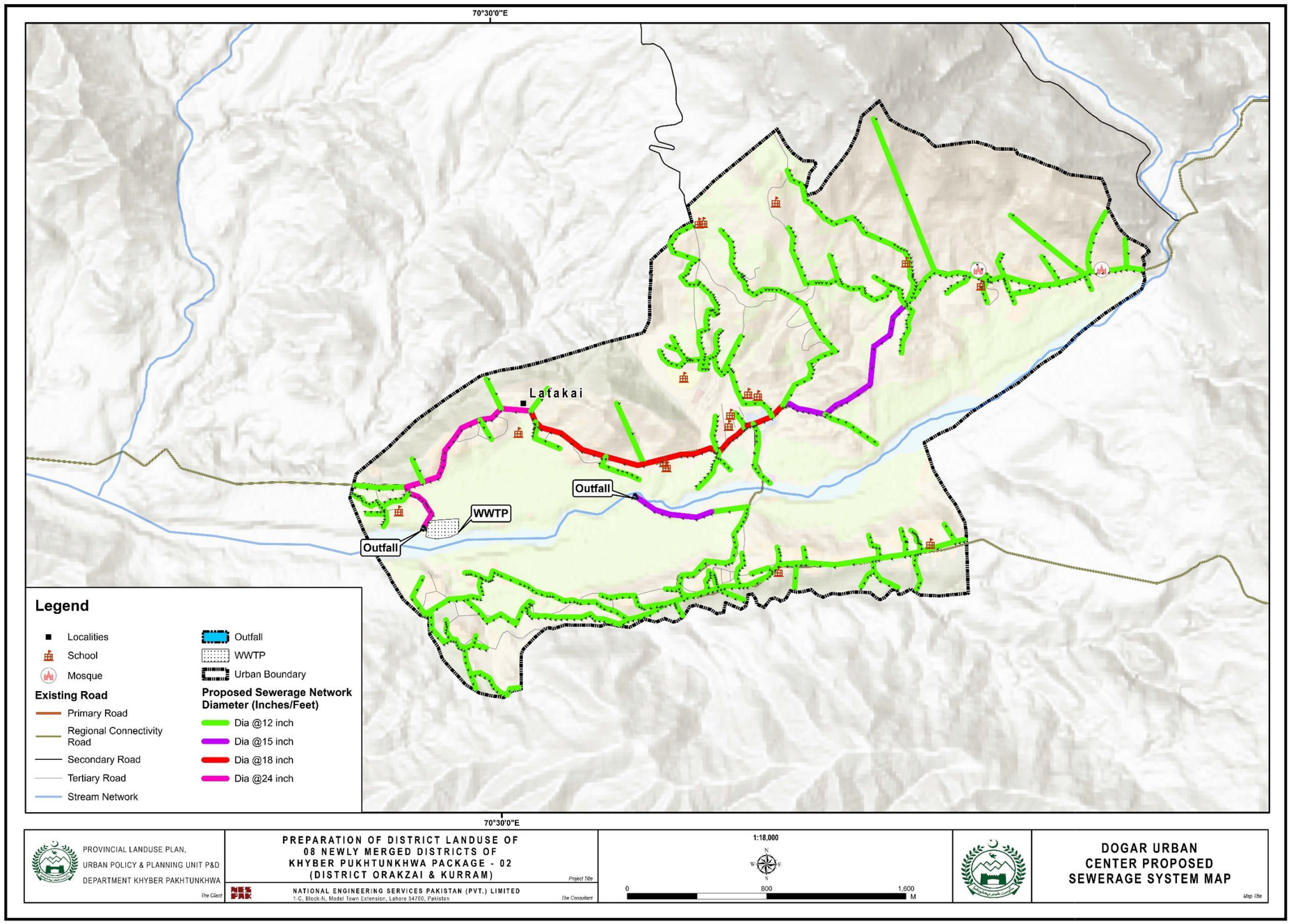
This urban-center-specific planning strategy ensures system scalability, operational reliability, and improved sanitation outcomes, while supporting sustainable urban growth across all four urban centers of District Kurram**. The proposed WWTP site is shown below in** map**,** Figure 3-28 Figure 3-29 **and** Figure 3-30**.**

3.11.2.1 Proposed Sewerage Network in Urban Center

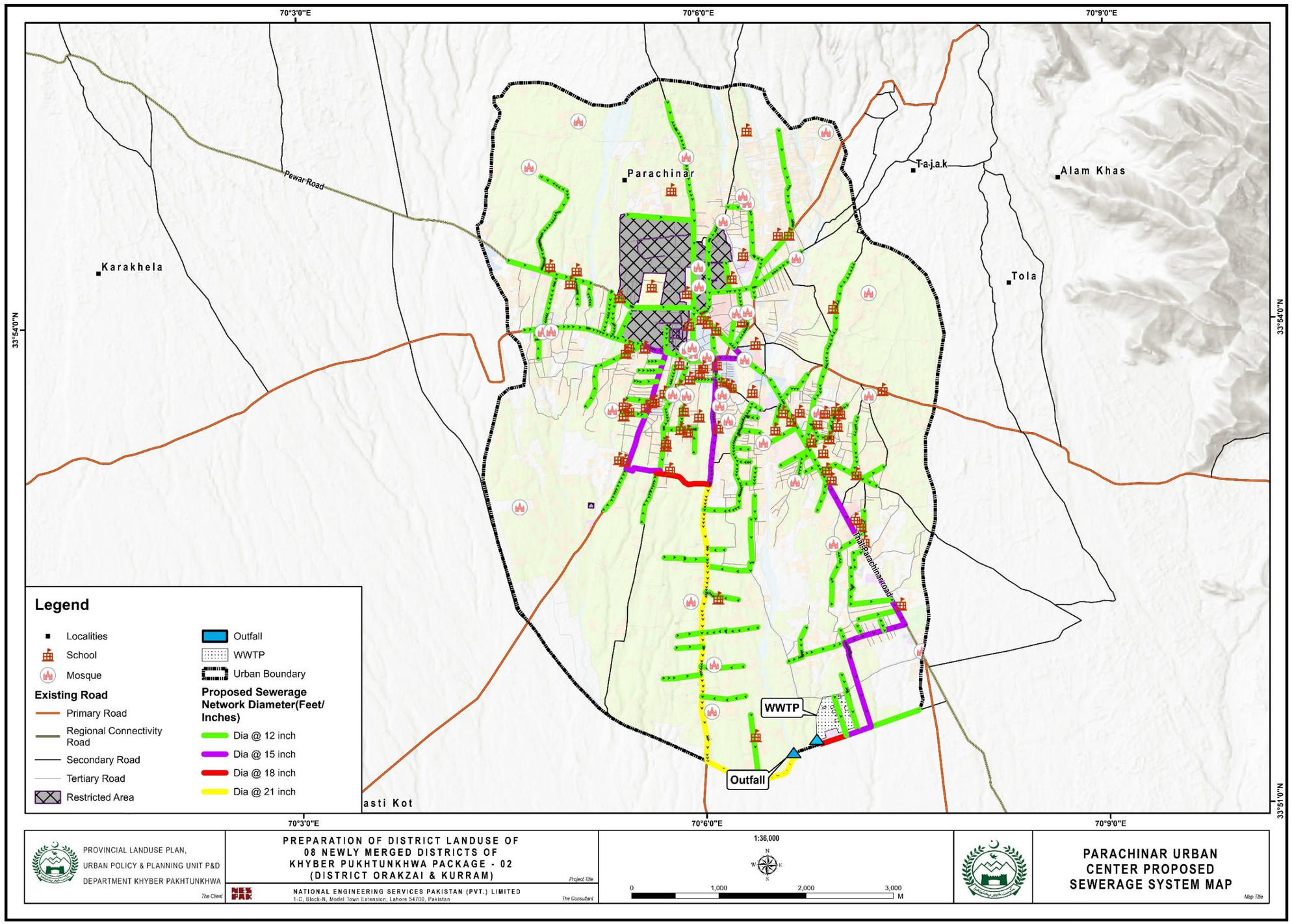
A sewerage network is proposed for the urban center to ensure the proper collection and conveyance of wastewater generated within the area. The design of the sewerage system is based on 80% of the water supply demand, which is considered as the sewage generation rate for the urban population. The proposed sewerage network has been planned to efficiently collect wastewater from different localities of the urban center and convey it to the designated disposal/treatment point. The alignment of the sewer lines has been designed considering topography, existing infrastructure, and accessibility to ensure effective gravity flow wherever feasible. At locations where the proposed sewer lines cross rivers or streams, thrust boring is proposed to safely install the pipeline without disturbing the natural watercourse and surrounding environment. The proposed pipe diameters and the layout of the sewerage network are presented in the maps provided below. These maps illustrate the alignment of the sewer lines and the corresponding pipe sizes for the proposed system.



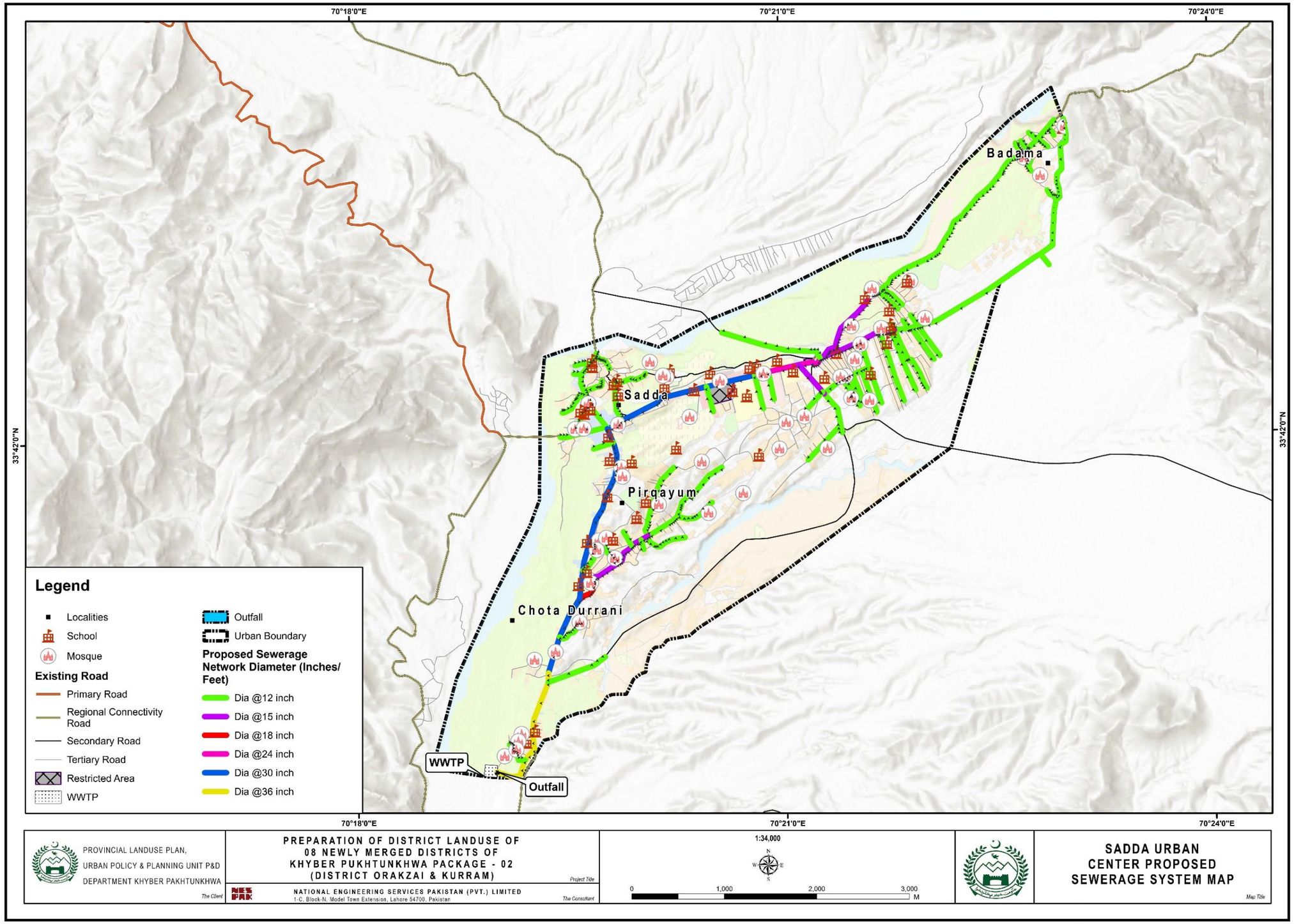
Map 3-37:Proposed Sewerage Network in Ali Zai



Map 3-38:Proposed Sewerage Network in Dogar



Map 3-39:Proposed Sewerage Network in Parachinar



Map 3-40:Proposed Sewerage in Sadda

3.11.2.2 Ongoing Projects

The ongoing drinking water and sanitation-related initiatives in Kurram District focus on improving water availability, irrigation infrastructure, and sustainable resource management. These projects aim to enhance agricultural productivity and provide reliable water access to communities by utilizing renewable energy sources and modern irrigation techniques Table 3-111 summarizes the development schemes in District Kurram.

Table 3-115: Development schemes in District Kurram

Project Name	Expected Completion
Bezot Irrigation Scheme – Development of irrigation infrastructure to ensure a reliable water supply for farmlands	Ongoing
Solarization of New Irrigation Tube Wells – Integration of solar energy into irrigation systems for sustainable water supply	Ongoing

3.12 Environment

3.12.1 Introduction

The study of environmental consideration for the Kurram Land use Plan helps to incorporate principles of sustainability, environmental protection, and climate resilience during initial stages of development. This section outlines key environmental issues along with proposed strategies and intervention.

3.12.2 Environmental Objectives during Planning Stages

- Improve environmental quality through integrated waste, sanitation, and emission control systems.
- Promote renewable energy and climate-resilient urban infrastructure.
- Ensure sustainable development that conserves natural ecosystems, forests, and water bodies.
- Enhance institutional coordination for effective environmental governance.
- Build community capacity and awareness for environmental stewardship.

3.12.3 Environmental Baseline Analysis Outcome

A detailed environmental baseline analysis was conducted during the baseline study stage. Baseline analysis revealed that the city was facing various challenges from environmental perspectives including absence of any system for environmental management in the district. No environmental testing laboratory or air quality monitoring station was working in Kurram. Poor solid waste management, water supply, sewerage and sanitation condition was prevailing in the city. Forest of Kurram was facing threats due to urbanization and other anthropogenic activities.

3.12.4 Key Environmental Issues and Mitigation Strategies

3.12.4.1 Environmental Management and Sustainability

Most critical issue observed during baseline study was absence of environmental consideration. KP Environmental Protection Action, 2014, introduces the Strategic Environmental Assessment as a tool to ensure that principles of sustainable development are integrated during planning stage of each development project. Furthermore, activities of environmental protection agency in Kurram is limited which needs to be enhanced.

To ensure that future growth remains ecologically balanced, there is a pressing need to mainstream environmental considerations in the initial stages of development, supported by strong institutional capacity, real-time monitoring, and evidence-based management tools.

Proposals:

- Establishment of Environmental Monitoring lab in Parachinar
- Implement zoning regulations to control unplanned industrial and residential growth and minimize environmental degradation.
- Develop a database system in Parachinar for continuous data collection and environmental monitoring.

3.12.4.1.1Water and Sanitation

Currently, Kurram is facing water scarcity issues. Water supply in district is limited. People mostly rely on tube wells and springs. Baseline analysis revealed bacteriological contamination of ground water along with elevated level of magnesium and calcium, which necessitates filtration of water. No proper sewerage or drainage system exist in the district, which is not only contaminating water bodies but also posing health risks.

Strategies and Interventions:

Strategy	Interventions	Time Frame
Improvement of Water Supply, Sewerage and storm water drainage System	Design and update of existing water supply system, sewerage and drainage schemes	Medium Term
Provision of safe drinking water and water conservation	Identification of points where water is contaminated through water testing and Installation of solar powered water filtration plants Promoting Rainwater Harvesting to conserve water	Medium Term
Prevention of water bodies from contamination	Design and establish wastewater treatment plants to reduce contamination of natural streams.	Medium Term
Integrated water quality monitoring	Establish district-level monitoring systems for testing drinking water sources and wastewater discharge points.	Short Term
Public awareness campaigns	Conduct awareness drives on water conservation and sanitation practices targeting schools and rural communities.	Short Term

3.12.4.2 Solid Waste Management

Baseline study revealed that district is lacking solid waste management system. No practice of waste collection and disposal exist in the district.

Strategies and Interventions:

Strategy	Intervention	Time Frame
Institutional Strengthening for Solid Waste Management	Establish solid waste wing in TMA for solid waste management to perform all the functions related to solid waste management	Medium Term
Development of Sanitary Landfill Site	Establish a sanitary landfill site for scientific disposal of solid waste	Medium Term
Adopt waste minimization techniques	Promote composting of organic waste by utilizing degradable portion of waste. Encourage people to separate the recyclable waste for reuse	Medium Term

Awareness and behavioral change campaigns	Conduct district-wide awareness drives on segregation, and waste minimization practices in educational institutes and media.	Short Term

3.12.4.3 Forestry, Ecology, and Biodiversity

Issues

Despite its rich ecology, Kurram faces challenges to Forest and Wildlife due to illegal cutting of trees, conversion of forest into urban areas and natural disasters.

Strategies and Interventions:

Strategy / Intervention	Description	Targeted area
Forest protection	• Strengthen fire-breaks, early warning & rapid response units • Awareness campaigns among communities & tourists • Monitoring & enforcement of illegal logging Promote biogas and improved stoves to reduce dependence of fuelwood • Patrols in high fire-risk zones	Medium Term
Forest Rehabilitation	• Identify degraded patches and restore using native species • Nursery expansion for native plants • Use of mixed species to improve resilience • Transplantation in places where trees lost due to landslides or roadworks	Long term
Green		

3.12.4.4 Air and Noise Pollution Control

During baseline study, air and noise level testing showed higher values from the permissible limits along highways, commercial areas and near industries. This requires attention to sustain good air quality in Kurram.

Strategies and Interventions:

Strategy	Intervention	Time Frame
Install air quality monitoring stations	Set up air quality monitoring stations	Short Term

3.12.4.5 Climate Resilience and Disaster Risk

Currently, Pakistan is ranked among one of the most affected countries due to climate change. It is need of the hour to enhance resilience by strengthening the adaptive capacity of the district to tackle climate change impacts and be prepared to deal with disasters.

Strategies and Interventions

Strategy/ Intervention	Description	Time Frame
Climate-smart infrastructure design	Promote resilient road, bridge, and drainage standards that can withstand intense rainfall and erosion.	Long Term
Establish early warning systems (EWS)	Delineating the zones vulnerable to fire, landslide, earthquake etc. Install sensors for early warning Develop emergency response mechanism.	Short Term
Community disaster preparedness programs	Conduct capacity-building workshops, mock drills, and training for communities, schools, and local institutions in disaster response and first aid.	Short Term
Community training for Climate mitigation and Adaptation	Launch awareness campaign, Involve government departments. Promote campaign through social media to engage community	Short Term

3.12.4.6 Renewable Energy and Sustainable Infrastructure

Strategies and Interventions

Strategy / Intervention	Description	Time Frame
Promote solar projects	Use solar powered streetlights along road. Use solar powered water pumps and tubewells. Use solar panels to power buildings	Short Term
Public–Private Partnerships (PPP) for renewable energy	Encourage investment in solar energy through PPPs and incentive-based models.	Medium Term
Green building and energy efficiency guidelines	Introduce incentives for sustainable building materials, passive cooling, and solar-integrated architecture.	Long Term
Awareness and capacity-building programs	Conduct training for local technicians, contractors, and communities on solar energy maintenance and safety.	Ongoing

3.13 Natural Hazard

3.13.1 General

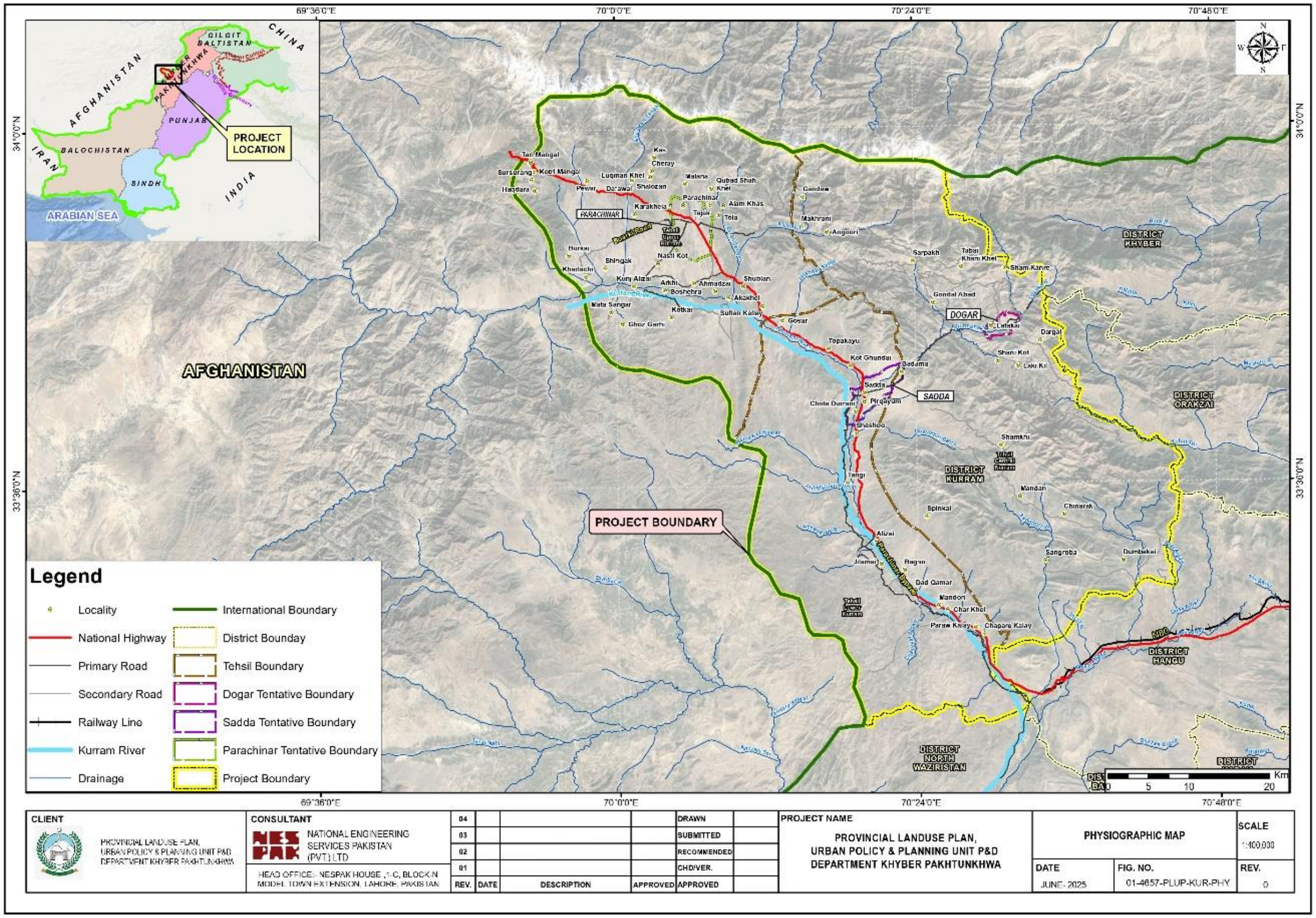
Throughout history, the world has been plagued by natural and man-made disasters that have resulted in the loss of life and damage to property, environment, economy, infrastructure, and other facets of human life. In the recent past, the frequency and impact of the natural hazards have increased manifold because of the ever-increasing development, rapid urbanization and exposure.

Assessment of the geohazards such as landslides, floods, mass movements, earthquakes, land degradation, ground subsidence, rising sea level, cloud bursts and Climate Change Impacts is a challenging task. All of these natural and geohazards in the recent decades have drawn the attention of Planners, Geoscientists and Sustainability Experts to mitigate and /or minimize the impacts, aftermaths, and the risks associated with them.

Economic development, socioeconomic policy, population growth, scientific research, innovative technologies, Disaster Risk Management (DRM) initiatives, public awareness, and natural hazards are the key factors that contribute to sustainability. However, during planning, development, environment management and infrastructure development, the conventional economic and social parameters are usually taken into account and a holistic approach towards mitigation of natural disasters is generally overlooked. Consequently, in vulnerable locations, such as areas presenting steep slopes, geologic faults zones, water courses, flood plains and /or degraded soils, the natural hazards that often occur, such as landslides, earthquakes, and floods can cause extensive damage, disruption of the social and economic network and lead to the loss of human lives and property.

This scenario demands the incorporation of natural hazards into landuse planning for the overall safety of the community and environment against disasters. This involves identifying hazard prone areas such as geologic fault zones, mountain ranges having steep slopes, flood plains and seismic zones etc, and restricting development through geohazard zoning, implementation and enforcement of laws and building codes. Mitigation strategies including the diversion of infrastructure and built-up from more hazard prone areas to a relatively less hazard prone areas, resilient design of infrastructure, residential buildings, industrial and commercial areas and preserving open green spaces should be employed to help reduce the impact of natural disasters. Additionally, emergency preparedness needs to be adequately integrated by Planning evacuation routes, emergency transportation corridors and safe heavens for shelters. Sustainable development practices should be promoted to minimize vulnerability alongwith the protection of natural ecosystems to buffer against geohazards during the disasters. The assessment of anticipated impacts needs to be assessed as these contribute to aggravate the risk associated with the natural disasters.

A thorough knowledge of the underlying geology, geomorphology, geotectonics, climate and seismicity is essential for the sustainability of any planning and development project. In order to avoid the aforementioned disastrous situations and impacts, it is necessary for the planners, geoscientists and engineers to take into account the terrain characteristics and physical parameters of the areas to be developed, during the planning stage so as to assure the disaster resilience to the natural hazards. The geology and the geomorphology of an area are important in the assurance of sustainable planning for landuse management and in the protection of human life and value at risk.



Map 3-41 Physiographic Map of District Kurram

3.13.2 Disaster Resilience

The objective of natural and human induced disaster resilience of development cannot be substantiated by safe engineering designs alone, unless the concept and requirements of Safer Landuse Planning are not hybrid into Master Planning. To materialize the task of sustainable and disaster resilient development, it is imperative, to develop a realistic Disaster Profile of the area under consideration and formulate guidelines for mainstreaming the elements of Disaster Risk Reduction (DRR) not only into the new planning and development but also to the existing built-up fabric of the area. During this noble cause of saving the human lives and environment, it will very soon be realized that there is a dire requirement to divert the existing development from more hazard prone areas towards less hazardous areas. The aforementioned task can be well substantiated by employing the tools of Safer Landuse Planning.

3.13.2.1 Safer Land-use Planning

If during the planning stage of any development project, the considerations for safe, sustainable and secure built environment are ignored, the intended development is considered to be highly vulnerable to natural and human induced disasters. These disasters cannot be best addressed by safe engineering designs of built-up fabric unless the effective implementation of the Safer Landuse Planning has been assured.

In other words, if the planning (and subsequent development) of any area is not compliant to the geohazard considerations and requirements of that area, as identified in the Safer Landuse Planning, the entire development and the built-up fabric will either be unsafe being vulnerable to natural/ human induced hazards or is not economically viable.

The development of Safer Landuse Plans must accord due consideration to pre and post disasters scenarios and, therefore, require the detailed geohazard mapping of the target areas and the vicinity for geohazard risk assessment. In addition to above, it is mandatory to take into account the engineering design codes, construction practice, building by-laws, existing landuse of the area, implications of the intendent landuse, capacity and resources of the Government line departments to a post disaster response, recovery and rehabilitation. It also involves the capacity and efficiency of critical infrastructure such as electricity, health, medical emergency services, water supply, communication, accessibility, transportation, emergency evacuation and mobilization corridors, shelter locations, resettlement, and the general awareness of the population towards natural disasters.

3.13.2.2 Exposure

In addition to the above, one of the primary reasons for the catastrophic natural disasters is the level of the exposure of both built up fabric and lifelines to geohazards. For instance, if an earthquake effects an area of 5000 sq. km or storm or riverine flood inundates the area, we can imagine that the destructiveness of the hazards of the affected area if it is densely populated. Contrary to this, if the same intensity geohazard affects the terrain, which is marked by sparse built up, and lifelines density, the incurred losses will be drastically reduced. Therefore, one of the major reasons that render the densely populated and built-up areas extremely vulnerable to geological hazards are attributed to built-up fabric and population density. In this perspective, the importance of terrain characterization for Safer Landuse Planning and development based on geology, seismicity, geotectonics and geohazards to minimize the exposure to natural hazards cannot be over emphasized.

3.13.2.2.1 Disaster Preparedness and Response

In fact, disaster resilience requires the formulation of Disaster Risk Management (DRM) Strategic Polices and Planning based on the well-integrated realistic approach while focusing on both short

and long-term frameworks for disaster preparedness, prevention and post disaster response and rehabilitation. To substantiate this task, Safer Landuse Planning is of pyramid importance for disaster resilience and sustainable development.

3.13.2.3 Location and Accessibility

District Kurram is located in the Khyber Pakhtunkhwa province of Pakistan, and its capital city is Parachinar. It lies between 33°41'23.42"N latitudes and 70°29'39.71"E longitudes having an area of approximately 3,400 sq. km. The district is named after the Kurram River and traverses through the Kurram Valley.

It is situated approximately 34.57 km West of Kurram District and about 54.66 km South-East of Hangu District. Additionally, it lies roughly 160 to 180 km South-West of Peshawar City and around 220 km West of Islamabad, the capital of Pakistan. Please refer Appendix A for Map Document No. 01-4567-PLUP-KUR-PHY: Physiographic Map.

3.13.2.4 Geomorphological Characterization

3.13.2.4.1 General

Geomorphologic characterization is concerned with the assessment of surface processes, sediment dynamics, and landform evolution, stage of development and geomorphological hazards that have formed or reshaped them. These processes that have shaped the Earth's surface can be dangerous if they occur in inhabited places, and if they exceed a particular threshold, they can produce instability of slopes, land degradation gravity induced flows, floods in river or coastal areas, earthquakes, and volcanic eruptions and other geohazard situations.

District Kurram is surrounded on three sides North, West, and East by mountains ranging in altitude from 726 to 4,561 meters. The lowest point in the district, at 726 meters above mean sea level, is located in the Southern side near areas such as Char Khel, Mandori, Alizai, Tangi, Jilamai, Dad Qamar, and Chapray Kallay. In contrast, the highest elevations, reaching up to 4,561 meters above mean sea level, are found in the northern, northwestern, and northeastern parts of the district, including Tari Mangal, Haqdara, Pewar, Sursurang, Malana, Gandaw etc. **Please refer Appendix A for Map Document No. 02-4567-PLUP-KUR-EL: Elevation Map.**

The landforms in District Kurram are characterized by deep incisions made by major streams and nullahs originating from the surrounding mountains, exhibiting drainage patterns that range from dendritic to rectilinear. As previously mentioned, the district is bordered by medium to high-altitude mountains on the north, west, and east sides. The geological composition includes rocks from the Paleocene, Eocene, Miocene, Cretaceous, and Jurassic periods, along with Quaternary recent deposits. These recent deposits consist mainly of younger alluvial and floodplain deposits, which are found extensively throughout the plain areas.

The primary river that flows in Kurram District wherein the entire drainage of the area is concentrated and it runs through the tehsils of Upper and Lower Kurram. Several tributaries originate from the northern side, including Sahlozan Tangai, Zeran Tangai, and Kirmar Tangai, while other streams such as Jalandar Salga and Khuramana Nullah flow in from the northeastern side. Please refer Appendix A for Map Document No. 04-4567-PLUP-KUR-DR: Drainage Map.

3.13.2.5 Drainage

The project area is well-drained, with a well-developed and interconnected drainage system comprising rills, gullies, tributaries, streams, and rivers. A significant portion of the Kurram region drains toward the north, northeast, and southwest into the Kurram River. The main river in the area, the Kurram River, flows from northwest to southeast through both Upper and Lower Kurram tehsils, serving as the primary drainage for the region.

During heavy rainfall, many smaller seasonal streams, along with the major rivers, experience rapid increase in flows, often becoming turbulent torrents. These streams flow in various directions, including north to south, northeast to southwest, Southwest to Northeast and northwest to southeast. For example, in the Kurram area, streams such as Shalozan Tangai and Zeran Tagai flow north to south and enter the Kurram River. Major streams like Gowakhai Darra flow from the Eastern side and intersect with the Kurram River. Additionally, Nainawar Khwar flows from the southwest and joins the Kurram River near the Tangai area. Other drainage, such as Charo Khal Algad and Sangroba Nullah, also originate from the southwestern side and Northeastern side and joins with the Kurram River **Please refer Appendix A for Map Document No. 04-4567-PLUP-KUR-DR: Drainage Map.**

3.13.2.6 Geomorphological Characterization of District Kurram

The District Kurram studied geomorphologically using Satellite images both at local and regional scale. In order to characterize the terrain geomorphologically, slope and elevation maps were prepared using Shuttle Radar Topography Mission (SRTM) data.**Please refer Appendix A for Map Document No. 02-4567-PLUP-KUR-EL: Elevation Map and Please refer Appendix A for Map Document No. 03-4567-PLUP-KUR-SLP: Slope Map** showing Elevation and Slope Map of the District Kurram. These map documents display slope in degrees that offers a characterization of altitudes and exposure of the terrain and helps in the identification of the areas that are susceptible to geohazards associated with altitude and relief difference. Details of the slope types based on the steepness and their likely impacts on geomorphology are given in Table 1 below:

Table 3-116 Slope Ranges according to Morpho-dynamic Thresholds

Slope (degree)	Slope (%)	Qualitative Name	Geomorphological Threshold
0 – 2	0 – 3.49	Horizontal	Erosion nil to slight, sheet wash
2.1 – 5	3.67 – 8.75	Gentle	Slight, diffused erosion. Sheet wash. Initiation of rills. Cold solifluction.
5.1 – 10	8.92 – 17.63	Moderate	Moderate to intense erosion. Initiation of linear erosion. Rill wash or integrated rill development, iniciation of gully erosion.
10.1 – 20	17.81 – 36.40	Steep	Intense erosion. Frequent linear erosion. Incipient gullies.
20.1 – 30	36.59 – 57.73	Very Steep	Moderately steep, frequent gullies. Mass movements, creeping.
30.1 – 45	57.97 – 100	Bluff	Low to moderate slope instabilities.
> 45	>100	Steep Bluff to Vertical Cliff	Massive slope failures and landslides. Corridors of frequent rock-fall.

As per the details and outcomes of the slope map of District Kurram, 31 % slopes fall in 'horizontal to Gentle' which represent nil to slight erosion and initiation of rills based on the slope steepness are categorized as shown in Table 1, 20 % slopes in the District Kurram are categorized as 'Gentle to Steep' which indicates moderate to intense erosion and Incipient gullies. 18 % slopes in the district are categorized as 'Steep' which indicates Intense linear erosion, Slope comprised of 15 % are categorized as 'Steep to Very Steep' which indicates steep, Intense Erosion, frequent gullies, mass movements and creeping, 11 % and 5% of the Kurram area lies in Very steep to Vertical Cliff which indicates massive landslides and slope failures, corridor of frequent rockfall etc.

3.13.2.7 Regional Geologic Scenario of District Kurram

The project area is covered by Geological Map of Parachinar Quadrangle prepared by United State Department of the Interior Geological Survey and Geological Survey of Pakistan. District Kurram is located in the western part of Khyber Pakhtunkhwa, Pakistan, holds a unique strategic and geographic position due to its location along the Pakistan-Afghanistan border. The district is located within the rugged mountains terrain of the former FATA region and is known as Kurram Valley, a fertile and culturally rich area.

To assess the geological setting of this sub-regional area, a desk-based geological study was conducted using secondary data from various sources. This investigation identified and described the geological conditions, spatial distribution, and characteristics of the rock units and Quaternary deposits exposed in and around the District Kurram. **Please refer Appendix A for Map Document No. 05-4567-PLUP-KUR-SG: Sub-Regional Geological Map.**

The terrain comprises surficial Quaternary deposits and bedrock formations ranging in age from the Paleocene to the Quaternary. The surficial deposits are likely as Quaternary Alluvium. **A detailed Geological Time Scale is provided in Appendix D.**

All the mapped geological units, of the project site are briefly described as follow:

3.13.2.7.1 Geological Formations

A brief description of Quaternary deposits and Geological Formations exposed within the District Kurram is given as under:

a) Quaternary Deposits (Q)
b) Hangu Formation (Th)
c) Lockhart Limestone (Tl)
d) Murree Fomration (Tmm)
e) Darasmand Limestone (Kd)
f) Lumshiwal Formation and Chichali Formation (KlC)
g) Datta Formation (Jd)
h) Samanasuk Formation (Jss)
i) Kurram Formation (KK)

a) Quaternary Deposits (Q)

These deposits are found at various locations throughout the Kurram area and its surroundings. They primarily consist of sediments transported by water, wind, and gravity, including clay, silt, sand, gravel, cobbles, boulders, and angular rock fragments of varying sizes, shapes, and proportions. Unconsolidated sediments are further categorized into colluvial deposits, Fan deposits, Talus Deposits, Slope Wash Deposits and Terrace Deposits.

- **Colluvial Deposits (Qc)**

Unconsolidated and unsorted earth materials being transported or deposited on the slope and a valley fills by mass movement (e.g., direct gravitational action) and by stream deposition and un-concentrated runoff. Depending on the geology of the highlands surrounding the areas, colluvial deposits can range from mixtures of silt, sand, gravel, and cobbles, to accumulations of gravel to boulder sized rock fragments (talus). Most of the mountain slopes in the area contain a thin veneer of fresh colluvial deposits.

- Fan Deposits (Qf)

Fan deposits are unconsolidated sediments that accumulate along stream channels and floodplains. These deposits are comprised predominantly of gravel, clay, and silt. These deposits are present on the western mountain front.

- Talus Deposits (Qt)

Talus Deposits occur in the Western mountain front and hilly terrains in the southern part of Landikotal comprises of loose angular rock fragments with some fines. These deposits contain angular rock fragments moved downslope under the influence of gravity and water formed as result of tectonic compression and physical weathering of the rocks.

- Slope Wash Deposits (Qs)

The slope wash deposits may consist of unconsolidated, unsorted, chaotically mixed soil and/or rock some fine debris and are therefore distinguished from the Colluvial deposits which are relatively more sorted and generally have less voids and moisture. These deposits are presents throughout the Landikotal Area specifically in mountainous of hilly terrain.

- Terrace Deposits (Qt)

Terrace deposits are water run materials and occur along the major streams and rivers and consists of unconsolidated to poorly consolidated mixture of well-sorted clay, silt, sand and rounded gravels, cobbles and occasional boulders deposited by stream. In many areas, Terrace deposits are typically composed of silt-clay and are relatively uniform graded gravely soils above stream channels. For the distribution of various types of surficial Quaternary Deposits. Terrace deposits occur along the Khyber River where there rivers enter in plain areas.

b) Hangu Formation- Paleocene (Th)

In the Kurram region, the Hangu Formation predominantly consists of light grey to reddish-brown, quartz-rich sandstone that is commonly cross-bedded and conglomeratic in nature. The sandstone is typically medium- to coarse-grained, and its composition indicates a high degree of maturity, suggesting prolonged transportation and reworking. The presence of cross-bedding and conglomeratic layers reflects deposition in a high-energy fluvial or shallow marine environment, likely during the Late Paleocene.

c) Lockhart Limestone - Paleocene (Tl)

In the Kurram region, the Lockhart Formation is composed predominantly of dark to dark grey, massive limestone that weathers into a nodular appearance. The limestone is typically fine-grained and fossiliferous, indicating deposition in a shallow marine environment during the Late Paleocene. Its nodular weathering pattern is characteristic and aids in its identification in the field. The Lockhart Formation typically lies conformably above the Patala Shale and is overlain by the Hangu Formation or other Early Eocene units, depending on the local stratigraphy.

d) Murree Formation – Miocene (Tmm)

In the Kurram region, the Murree Formation is primarily composed of clay and silty claystone, interbedded with brick-red sandstone, purple to dark brown siltstone, and occasional conglomerate lenses and grit layers. The formation exhibits a characteristic reddish coloration, indicative of oxidizing conditions during deposition. The sandstone units are typically fine- to medium-grained and often display cross-bedding, while the conglomeratic layers suggest episodic high-energy depositional events, likely in a fluvial to deltaic environment. The Murree Formation is of Miocene age and plays a significant role in the molasse sequence associated with the Himalayan foreland basin.

e) Darasmand Limestone – Cretaceous (Kd)

In the Kurram region, the Drasmand Formation consists of light grey, aphanitic limestone that ranges from thin to thick bedding, interbedded with thin layers of shale. The fine-grained nature of the limestone indicates deposition in a relatively calm marine environment, while the shale interbeds suggest periodic changes in sedimentation, possibly linked to fluctuations in water depth or energy conditions.

f) Chichali and Lumsiwal Formation – Cretaceous (Klc)

In the Kurram region, the Lumshiwal Formation is characterized by dark green to grey, soft, glauconitic sandstone, while the Chichali Formation consists predominantly of dark green to dark grey, glauconitic shale. The presence of glauconite in both formations indicates deposition in a marine setting with relatively slow sedimentation rates, typical of continental shelf environments.

g) Datta Formation – Jurrasic (Klc)

In the Kurram region, the lithology includes grey to dark grey, thin to medium-bedded sequences with interbeds of nodular marl and calcareous shale in some areas. Additionally, quartzose, ferruginous, and calcareous sandstones are present, reflecting a diverse depositional environment with variations in sediment supply and chemical conditions.

h) Samanasuk Formation – Jurrasic (Jss)

In the Kurram region, grey to dark grey, medium to thick bedded limestone is commonly deposited. In the extreme northwest of the district, this limestone has experienced partial metamorphism, transforming it into marble.

i) Kurram Formation- Cretaceous (KK)

In the Kurram region, this formation primarily consists of variegated shale in shades of red, brown, and green, interspersed with light grey limestone that is mottled with pink in some areas. The limestone is very thin-bedded and platy in texture. Additionally, brown or grey sandstone layers are also present, contributing to the formation's diverse lithology.

3.13.3 Disaster Profile of District Kurram

District Kurram is exposed to a wide spectrum of distinct existing and envisaged natural hazards which are primarily attributed to a mountainous terrain, high relief, steep and lofty slopes, deeply incised drainage system, seismicity and climatic conditions of the area. The elevation of Kurram District varies being between 726 to 4561 m with the Northern areas being more elevated than the Southern areas. The climate is cold temperate with mild average annual rainfall ranging between 60 to 260 mm and any prolonged wet weather results in hill torrents and floods in

Kurram River which disrupts the livelihood of the riparian's living along the river banks and low lying terraces.

The disaster profile of any area serves as a basic tool to formulate and configure the specific Disaster Risk Management (DRM) Strategy of the area to build Disaster Resilience by Safer Landuse Planning while ensuring sustainable development.

The disaster profile of the District Kurram was developed based on the available secondary data related to the technical aspects such as geology, seismicity, geomorphology, geohazard, climatic and other terrain conditions of the area. While preparing the disaster profile of District Kurram, the relevant historical data of the natural disasters was also taken into account and the priority order of the disasters is defined as under:

Disaster Profile of Kurram District

- **High Priority**

  a) Earthquake

  - High rising buildings
  - Vertical growth/Increased population density
  - Non-Engineered Structures
  - Increased exposure to earthquake hazard
  - Slumps
  - Poor construction practices
  - Use of prohibited construction materials

  b) Flood Hazard

  - Riverine floods
  - Encroachment of drains
  - Horizontal extension of built-up areas
  - Inadequate Protection Works

  c) Slope Hazard

  - Rockfalls/Slide
  - Landslides

- **Medium Priority**

  a) Climate Change Impacts

  - Unprecedented wet and dry season
  - Cloud Burst
  - Flash floods
  - Hill torrents
  - Storms and cyclones
  - Extreme Temperature (Heat/Cold Waves)
  - Disruptions in Hydrological Cycle
  - Early Warning Systems (EWS)
  - Lack of Awareness

  b) Differential Erosion

  c) Mining and Quarry related hazards

- **Low Priority**
  - d) Land degradation and bank collapse
  - e) Loss of Cultivated and Arable land

The Disaster Profiles are imperative to mitigate the impacts of natural hazards on population through the process of Safer Landuse Planning whereas the exposure to natural hazards can be minimized by diverting development from hazard prone areas towards the relatively safer areas, which are less prone to hazards.

3.13.3.1 Earthquake Hazard

3.13.3.1.1 Preamble

An earthquake is a sudden and rapid shaking of the ground caused by seismic waves traveling through Earth's crust. These waves are generated when energy stored in the crust is suddenly released, typically due to rockmasses straining against one another and then fracturing and slipping. Earthquakes most often occur along the existing geological faults, however major earthquakes results in the development of new geological faults narrow zones where rock masses move relative to each other. The geological faults are the linear zones of variable thickness ranging from a few hundreds to many kilometers in width comprising ground rupture zones. These faults are generally located at the edges of large tectonic plates. The severity of an earthquake is measured using the Richter Magnitude Scale, which ranges from 1 to 9. The impacts of earthquakes can be severe, including ground shaking, landslides, infrastructure collapse, and tsunamis in coastal areas. Moreover, the disastrous impacts of the earthquakes having variable magnitudes can be gauged by using the Modified Mercalli Intensity Scale (MMI) which serves as a direct mean to measure the earthquake impacts at specific variable locations without considering the earthquakes overall strength. It is a subjective scale that determines the seismic ground shaking intensity by considering their effects on built-up objects and lifelines. **Please refer Figure-1 below which presents the most widely adopted MMI Scale.**

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest,especially on upper floors of buildings.
III	Weak	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Figure 1 The Modified Mercalli (MMI) Scale

The District Kurram is primarily covered by a mountainous terrain comprising North-west and South-east oriented linear mountain ranges with intermontane areas filled with variable

thickness of diversified quaternary deposits. The rocks belonging to Paleocene and Jurassic age forms the skylines of the ridges while the middle and lower slopes exhibit restricted development of terraces utilized for cultivation and construction of houses.

The overwhelming North-West and South-East structural fabric of Kurram District holds a signature of intense compressional / collision tectonics which is well elucidated by multiple, North-West and South-East striking, parallel to sub-parallel geological faults, indicative of intensely folded and faulted strata. Out of these multiple North dipping thrust faults include Main Mantle Thrust (MMT), which is north of Kurram District and the other active geological faults that ripped through the terrain of Kurram District include Hissartang Fault, Main Boundary Thrust (MBT) and its associated faults, Punjal (Khairabad) Fault and Khair-e-Murat Fault which runs South of the District Kurram. Kurram thrust is dipping towards Northwest and trending North-east and Southwest Direction. North of MBT is the Himalayan Crystalline zone whereas south of MBT is the Parachinar-Kala Chitta Fold Belt.

Kurram District is bounded by the Peshawar Basin and Khyber Mountains to the north, the Attock-Cherat Range to the east, the Kalachitta Range and Kohat Plateau to the south, and the Safed Koh Range to the west. Across these mountain ranges, a gradual variation in the structural trend is observed from east to west. The orientation of sedimentary strata generally follows the prevailing tectonic trends of the surrounding mountain ranges, reflecting the region's complex fold-and-thrust belt geology.

The geologic faults within the proximity of the District Kurram and its sub-regional vicinity were initially identified using secondary data and relevant literature. However, later on, some field surveys were conducted for ground truthing in a few critical areas due to security and law and order constraints. Major regional geotectonic features within and around the sub-regional vicinity of District Kurram that are capable of generating hazardous earthquakes are briefly described as in the proceedings sub sections:

3.13.3.1.2 Regional Geologic Faults

A. Main Mantle Thrust (MMT)

Main Mantle Thrust is major regional zone of collision between the Indo-Pakistan Plate in the South and the Kohistan- Ladakh Island Arc in the North. MMT is passing in the far Northern region from District Kurram and is aligned in East-West direction. The MMT, which is aligned with the Nanga Parbat-Haramosh on East, span an area of about 400 km through Diamir, Kohistan, Swat, Dir and Bajaur, before entering Afghanistan. The general trend of MMT is NE-SW. It is a seismically active fault and is capable of generating disastrous earthquakes. Please refer Figure-2 showing Regional Geotectonic Map of Northern Pakistan and **Map Document No. 07-4657-PULP-ORK-GT for Geotectonic Map of District Kurram.**

B. Main Boundary Thrust (MBT)

Main Boundary Thrust (MBT) is passing through the Central terrain of District Kurram having Northwest-Southeast direction and varying dip in the North. MBT comprises a set of North-dipping thrust faults and forms the boundary between the Sub Himalayas and the Lesser Himalayas (Wadia 1931). A hairpin-shaped system of faults truncates the Murree Formation on the East, North and West. It abuts the Mesozoic and earlier rocks against the Murree Formation. West and North of this geological fault, within the short distance of 1 to 5 km, there is a parallel thrust fault along which Precambrian sequence has been pushed over the Paleozoic and Mesozoic rocks.

From near Balakot (Hazara Kashmir Syntaxis), it extends Southwestwards through the Margalla Hills, Attock-Cherat and Kalachitta ranges to the Sufaid Koh Range on Afghanistan boarder, a distance of about 350 km. It is an intensely deformed and tectonised belt with isoclinal folds and several South-verging thrust sheets (Treloar et al. 1989a, Treloaret al. 1990, Greco 1991). The estimated Maximum Credible Earthquake for this segment of MBT is assessed to be between Magnitudes (Mw) 8.0 to 8.5. Please refer Figure-2 showing Regional Geotectonic Map of Northern Pakistan and Please refer Appendix A for Map Document No. 07-4567-PLUP-KUR-GT: Geotectonic Map.

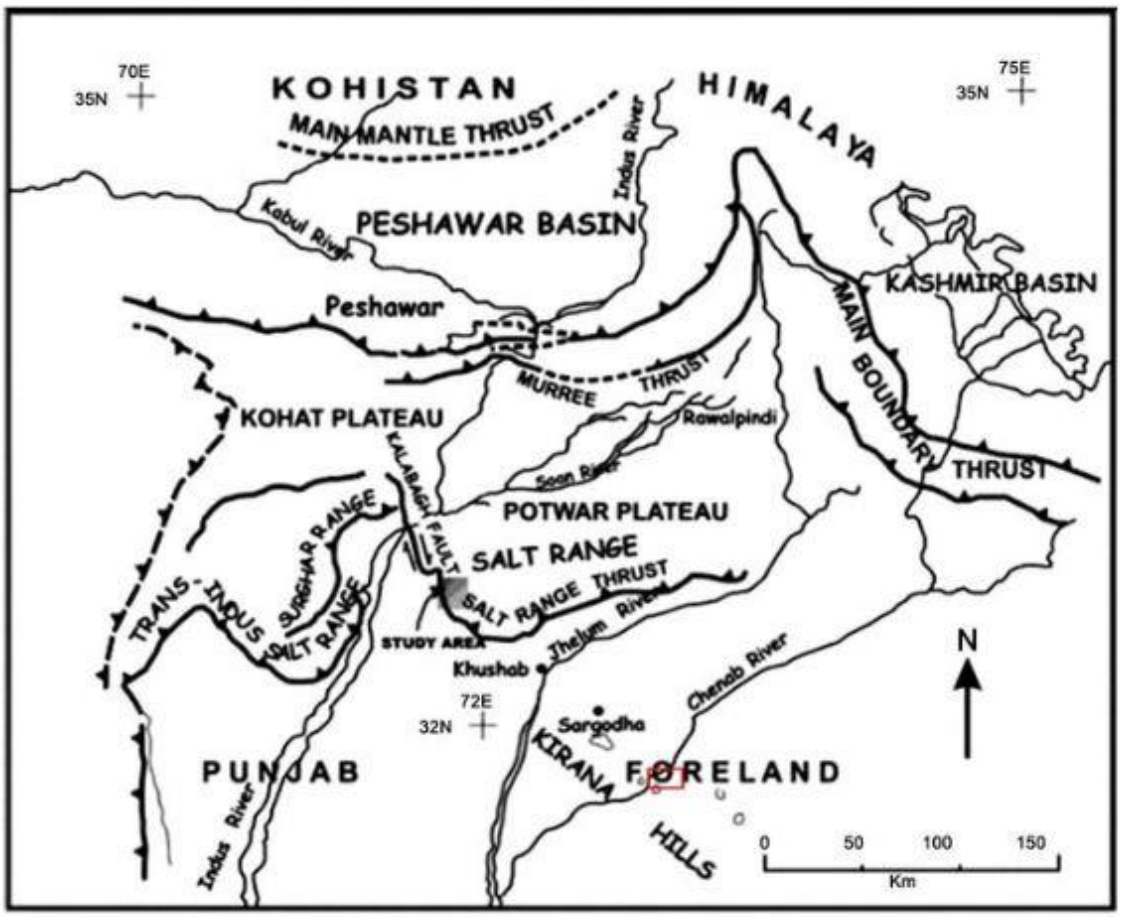


Figure 3-32: Generalized Geotectonic Map of Northern Pakistan showing Major geologic faults and features.(After Ahmad et al., Pakistan Journal of Hydrocarbon Research, 2005.)

In Pakistan, the Lesser Himalayas, which include the Attock-Cherat, Kalachitta and Margalla Hill ranges, lying to the North of MBT, are very young tectonic features. They are characterized by thrusting along MBT as late as 2.1-1.8 Ma, and movement on the Khairabad fault being as late as 0.5 to 0.1 Ma (Burbank and Beek 1989). Therefore, this region reflects moderate to high seismicity having a number of active geologic faults. According to Nakata et al. (1989) in Pakistan, active faults are rather densely distributed on and in the vicinity of the MBT.

C. Hissartang Fault (HtF):

Hissartang Fault is passing near the Dara Adam Khel area in the northward's region of District Kurram in East-West direction where it is believed to merge in shallow crust within the imbricate zone of MBT. Yeats and Hussain (1989) explained it as a lineament, South facing scarps occur throughout the Attock-Cherat Range, and Jurassic limestone is faulted over gravels at the

Western end of the Nizampur basin. Earlier, Kazmi (1979a, 1979b) had mapped two East-West trending parallel active fault lineaments, the Attock and Campbellpur Faults, extending from the Attock-Cherat Range up to the Haripur Basin. These two faults correspond to the Khairabad and Hissartang Faults of Yeats and Hussain (1989). These faults are considered seismically active and a number of teleseismic events are cited along these fault zones. Please refer Figure-2 showing Regional Geotectonic Map of Northern Pakistan and Please refer Appendix A for Map Document No. 06-4567-PLUP-KUR-GT: Regional Tectonic Map.

D. Punjal (Khairabad) Fault (KhF):

Khairabad Fault / Panjal Thrust is passing in the northward's proximity of District Kurram East-West direction. The Khairabad fault is a thrust fault and forms a loop around the Hazara Kashmir Syntaxis. It follows the trend of MBT with a dip in North (Wadia 1931. Calkins et al. 1975). The analysis of satellite imagery and digital elevation model shows that the fault is still active as evidenced by deformed Quaternary deposits. However, the recorded instrumental seismic data indicate moderate to moderately high seismic activity for the last few decades. The vertical extent of the fault appears to reach up to the Indian Basement (Bossart et al. 1984, Greco 1991. Trcloaretal. 1989). Figure-2 showing Regional Geotectonic Map of Northern Pakistan and Please refer Appendix A for Map Document No. 07-4567-PLUP-KUR-GT: Geotectonic Map.

3.13.3.1.3 Earthquake Vulnerability

Pakistan is located in a region with significant seismic activity and has experienced several notable earthquakes throughout its history. The 1935 Quetta earthquake, with a magnitude of 7.5, caused over 30,000 deaths and extensive damage in Balochistan. The 2005 Kashmir earthquake, measuring 7.6 on the Richter Scale, resulted in more than 80,000 deaths and widespread destruction in Balakot, Khyber Pakhtunkhwa, and the State of Azad Jammu and Kashmir (AJ&K). The 2013 Awaran earthquake, with a magnitude of 7.7, led to around 800 deaths and considerable damage in Balochistan. In 2015, the Malakand earthquake, measuring 7.5, caused about 300 deaths and affected the Malakand region in Khyber Pakhtunkhwa.

The District Kurram falls in seismically active zone due to its proximity to the collisional zone between the two tectonic plates. The region wherein District Kurram is located has been subjected to severe seismic shaking in the past due to earthquakes. The historical record mentioned a damaging earthquake which damaged Taxila in 25 A. D. Maximum intensity at Taxila was estimated as IX on modified Mercalli intensity scale. Another damaging earthquake occurred on June 04, 1669 which was strongly felt at Mandra just north of Gujjar Khan with maximum intensity of VI-X on modified Mercalli intensity scale. The recorded seismicity during the past century shows a large to small number of moderate earthquake originating in the area between Kohat-Attock and Islamabad which could be associated with Main Boundary Thrust, however it currently relatively less active in the area covering Kurram and Kurram Agencies. However, MBT and its associated faults has the potential to produce hazardous earthquakes.

Pakistan is highly vulnerable to earthquakes due to its location at the convergence of several major tectonic plates, including the Indian, Eurasian, and Arabian plates. This seismic activity results in frequent earthquakes, some of these are rated to be moderate to large with a few rated as hazardous earthquakes. Seismicity, the study of earthquake frequency, type, and size in a region, shows that Pakistan is highly susceptible to seismic activity. Earthquake magnitude, which ranges from micro earthquakes (0 to 3) to Great earthquakes (8 and 9), depends on factors like fault rupture and energy release. The Modified Mercalli Scale measures earthquake intensity, ranging from I (not felt) to X (extreme damage), assessing impacts on people, buildings, and the ground surface. Intensity maps are crucial for understanding impact and planning responses.

Pakistan's seismic activity is influenced by its location at the boundary of major tectonic plates, notably the Indian Subcontinent Plate and the Eurasian Plate. The collision of these plates has formed the Hindukush-Karakorum-Himalayan ranges and continues to cause seismic activity. Other plates, such as the Arabian, Tibetan, and Iranian Plates, also contribute. The Makran Subduction Zone, where the Arabian Plate slides beneath the Indian Plate, poses a risk for large earthquakes and tsunamis. Major fault zones like the Main Boundary Thrust, Main Mantle Thrust, Main Karakoram Thrust, Chaman-Ornach-Nal Fault and Chitral-Hunza Faults are key to Pakistan's seismicity, causing significant ground displacement. Seismic zonation helps identify areas of varying risk, guiding building codes and emergency planning to enhance resilience against earthquakes.

3.13.3.1.4 Earthquake Preparedness and Response

District Kurram is situated in a seismically active region with complex tectonic interactions. The district lies near the western edge of the Indian Plate, which converges with the Eurasian Plate. This tectonic boundary significantly contributes to the area's seismic vulnerability. Main Boundary Thrust is passing through the center of the District Kurram, a major geological feature known for its seismic activity.

The seismic risk in District Kurram is reflected in the magnitude of past earthquakes, which have typically ranged between 3 and 5 on the Richter scale. According to the Seismic Zones of Pakistan, District Kurram falls within Seismic Zone 2B (moderate hazard). This zone is characterized by a Peak Horizontal Ground Acceleration (PHGA) of 0.16 to 0.24g, where 'g' denotes the acceleration due to gravity. This level of acceleration indicates a moderate seismic risk, necessitating appropriate building codes and preparedness measures to mitigate potential earthquake impacts. Please refer figure-4 showing Seismic Hazard Zonation Map of KP, BCP, SP 2007 and Please refer Appendix A for Map Document No. 08-4567-PLUP-KUR-SZ: Seismic Zoning Map.

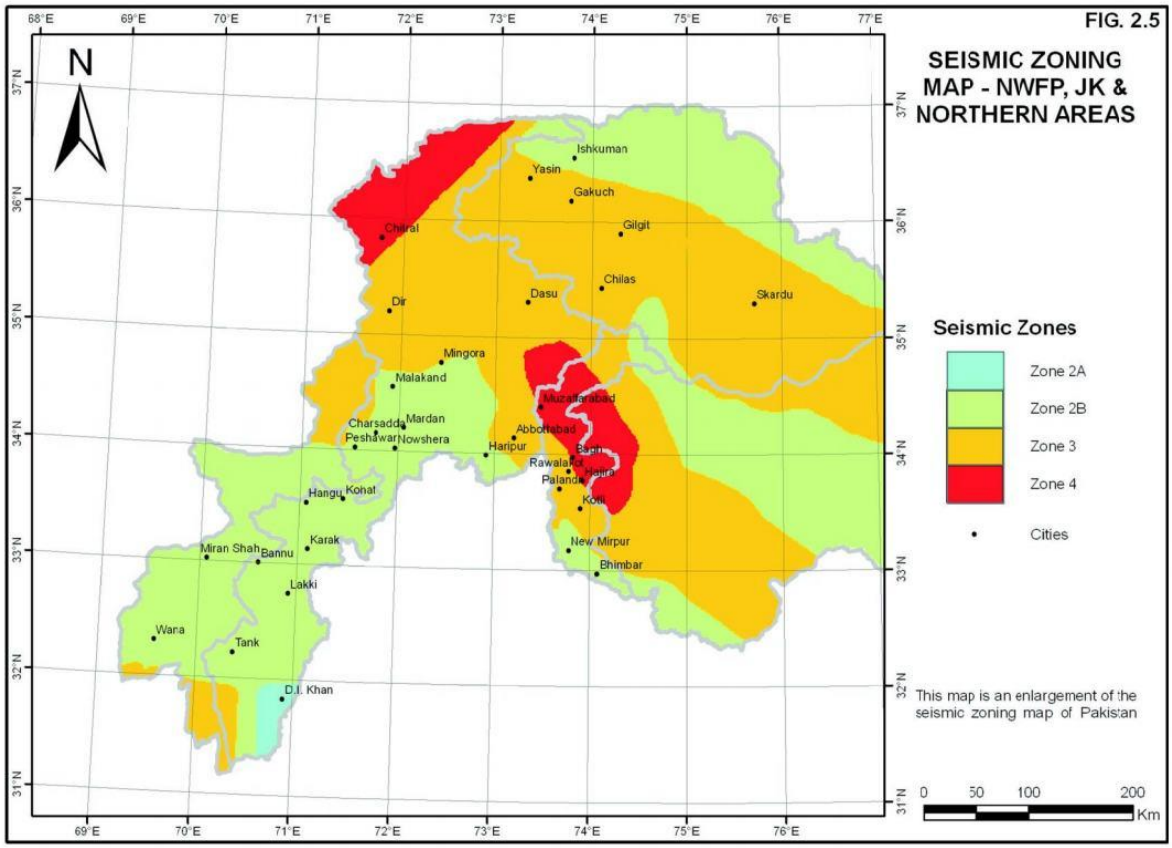


Figure 3 Showing Seismic Hazard Zoning of KP, BCP, SP 2007

For Seismic Sustainability of buildings, detachments and other civil engineering structures, the terrain of Pakistan has been identified under five distinct zones of seismic hazards. These zones are based on the peak ground acceleration with 10% probability of exceedance in 50 years. The peak ground acceleration (g) ranges are summarized in the Table 1. District Kurram situates in Seismic Hazard Zone 2B having PGA values ranging from 0.16 g to 0.24 g for soil profile type S_B.

Table 3-117 Showing Seismic Hazard Zones of KP alongwith Peak Horizontal Ground Acceleration BCP, SP 2007.

Seismic Zones	Peak Horizontal Ground Acceleration
1	0.05 to 0.08g
2A	0.08 to 0.16g
2B	0.16 to 0.24g
3	0.24 to 0.32g
4	> 0.32g

3.13.3.1.5 Historical Preview of Instrumental Seismic Data of District Kurram

Instrumental Seismic data within two hundred (200 km) radial distance of District Kurram has been collected from variable and reliable national and international sources and earthquake monitoring agencies. The acquired seismic data was processed and synthesized with respect to the aerial distribution of regional and sub-regional active geological faults such as Main Mantle Thrust (MMT), Main Boundary Thrust (MBT), Hissartang Fault (HtF) and Punjal (Khairabad) Fault (KhF). This data pertains to a time window starting from 1985 to 2024 which reveals an alarming situation that the seismic activity is relatively much more pronounced in the region of District

Kurram. In addition, most of the seismicity is of surficial thin-skin nature having focal depths ranging from 10 to 70 km.

In this context, a detailed Earthquake Catalogue of Instrumental Seismic Data of all the seismic events ranging from Mw 1.0 to a maximum magnitude of Mw 8.5 has been compiled and analyzed by employing geospatial techniques.

The instrumental Seismic Data revealed that since 1985 to 2024, a total number 19,750 earthquakes have occurred in District Kurram and its Vicinity which implies a highly pronounced strike rate of 475 earthquakes per annum. Out of these, 19,750 seismic events, 18,967 events were feeble having magnitudes Mw 3.0 and above. The seismic tremors having Mw less than 3.0 are generally too small to be felt by people but contribute to the cumulative seismic record of the area.

Please refer Table-2 which exhibits moderate earthquakes having magnitudes Mw ranging from 6.0 to 6.9 which includes one hundred and eleven (111) number of seismic events that occurred during the last forty (40) years which implies almost three moderate earthquakes per annum. Out of these one hundred and eleven (111) earthquakes, two (02) earthquakes Mw 6.9 and Mw 6.7 occurred in the years 1965 and 1974 respectively.

Table 3-118 Composite Earthquake Catalogue Showing Instrumental Seismic Events Magnitudes (Mw) Ranging from (6.0 to 6.9) of District Kurram, KP

Sr. No.	Date			Time	Location		Depth (Km)	Magnitude Type					Converted	Source
	Year	Month	Day		Latitude	Longitude		mb	Ms	ML	Mw	Md	Mw	
1	1925	6	20	13:04:15	36.50	71.50	230.0		6.5				6.5	ISC
2	1925	12	18	18:10:25	36.50	71.00	230.0		6.0				6.1	ISC
3	1928	11	14	04:33:09	35.00	72.50	110.0		6.0				6.1	ISC
4	1929	3	3	03:11:02	36.50	71.00	250.0		6.2				6.2	ISC
5	1931	1	20	09:27:22	36.50	71.50	220.0		6.5				6.5	ISC
6	1935	7	28	05:23:58	36.00	71.00	150.0		6.0				6.1	ISC
7	1936	6	29	14:30:10	36.50	71.00	230.0		6.8				6.8	ISC
8	1937	11	7	19:07:40	35.00	73.00	100.0		5.8				6.0	ISC
9	1940	1	26	15:20:45	36.50	72.00	200.0		5.8				6.0	ISC
10	1941	3	11	21:48:55	36.50	71.00	210.0		6.0				6.1	ISC
11	1943	9	24	11:31:37	36.50	74.00	120.0		6.8				6.8	ISC
12	1950	9	12	61612	36.20	73.00		6.0					6.1	USGS
13	1955	08	23	14:09:21	31.00	71.00	64.0	6.5					6.6	ISC
14	1956	09	16	-	34.00	69.50				6.0			6.3	PMD
15	1956	10	13	-	36.50	71.00				6.1			6.5	PMD
16	1957	06	11	-	36.50	71.00	200.0			5.8			6.1	PMD
17	1957	08	20	-	36.50	71.00	200.0			5.9			6.2	PMD
18	1957	09	02	-	36.50	71.00	200.0			6.4			6.9	PMD
19	1958	03	28	-	36.50	71.00	200.0			6.1			6.5	PMD
20	1958	04	03	-	36.50	71.00	100.0			6.0			6.3	PMD
21	1958	04	08	-	33.00	67.50				5.8			6.1	PMD
22	1958	09	18	-	36.50	71.00				6.1			6.5	PMD
23	1959	05	19	-	32.80	68.30				5.8			6.1	PMD
24	1959	09	12	-	36.00	71.00	200.0			6.4			6.9	PMD
25	1960	01	29	-	36.00	71.00	200.0			6.1			6.5	PMD
26	1960	07	14	-	36.00	70.00	100.0			6.0			6.3	PMD
27	1961	03	20	-	36.60	71.10	121.0			6.0			6.3	PMD
28	1961	09	28	-	36.50	70.70	223.0			6.1			6.5	PMD
29	1965	03	14		36.40	70.70	219.0			6.4			6.9	PMD
30	1966	6	6	07:46:15	36.43	71.12	214.0	6.1					6.2	ISC
31	1969	08	08		36.40	70.90	193.0			5.8			6.1	PMD
32	1972	01	20		36.40	70.70	214.0			5.8			6.1	PMD
33	1972	9	3	16:48:29.50	35.94	73.33	45.2	6.2		6.3			6.3	ISC
34	1974	07	30		36.40	70.80	209.0			6.3			6.7	PMD
35	1974	12	28	12:11:46.60	35.06	72.91	45.2	5.9		6.2			6.0	ISC
36	1976	10	12		36.50	70.60	196.0			5.8			6.1	PMD
37	1976	11	27	21:42:12.13	36.52	71.05	190.2	6.2					6.3	ISC
38	1981	5	2	16:04:54.56	36.40	71.15	217.4	5.9					6.0	ISC
39	1981	9	12	07:15:53.80	35.68	73.60	29.7	6.1	6.0				6.1	ISC
40	1982	12	16		36.10	69.00	34.0			6.1			6.5	PMD
41	1983	9	12	15:42:08.28	36.52	71.10	204.7	5.9					6.0	ISC
42	1984	1	27	13:01:39.63	36.48	71.05	164.1	5.8					6.0	ISC
43	1984	02	01	14:22:09	34.57	70.48	44.5	5.9	5.9				6.0	ISC
44	1984	02	16		36.40	70.80	207.0			5.8			6.1	PMD
45	1984	07	01		36.50	70.90	204.0			5.8			6.1	PMD
46	1986	9	15	21:42:30.18	36.75	71.11	96.2	5.8					6.0	ISC
47	1987	05	05		36.50	70.70	202.0			5.8			6.1	PMD
48	1987	10	3	11:00:05.09	36.51	71.49	93.2	5.9					6.0	ISC
49	1988	8	6	09:03:21.86	36.52	71.07	192.6	5.9					6.0	ISC
50	1989	7	24	03:27:48.80	36.10	71.10	95.0	5.8					6.0	ISC
51	1990	02	05		36.70	71.20	223.0			6.1			6.5	PMD
52	1991	7	14	09:09:12.75	36.42	71.15	218.9	6.2					6.3	ISC
53	1992	05	20	12:20:32	33.35	71.33	16.3	5.9	6.0				6.1	ISC
54	1993	9	18	05:02:27.61	36.45	71.60	117.0	5.9					6.0	ISC
55	1994	6	30	09:23:22.22	36.41	71.16	232.1	6.0		6.5			6.1	ISC
56	1995	09	18		36.40	70.40	222.0			5.9			6.2	PMD
57	1997	5	13	14:13:46.25	36.48	71.00	198.1	5.9					6.0	ISC
58	1997	12	17	55129	36.55	72.09	110.0			5.9			6.2	MSSP
59	1998	03	21		36.50	70.30	228.0			5.9			6.2	PMD
60	1998	3	21	182242	36.55	71.65	110.0			6.4			6.9	MSSP
61	1998	12	11	201630	36.40	73.03	110.0			5.8			6.1	MSSP
62	1999	02	11	14:08:54	34.31	69.24	45.6	5.3	5.8	6.0			6.0	ISC
63	1999	6	29	23:18:04.59	36.66	71.39	179.5	5.8		5.6			6.0	ISC
64	1999	11	8	16:45:41.80	36.52	71.23	214.5	6.1		6.5			6.2	ISC
65	2000	01	19		36.30	70.30	207.0			6.0			6.3	PMD
66	2000	5	12	231028	36.05	72.63	110.0			6.3			6.7	MSSP
67	2000	07	17		36.20	70.90	141.0			6.0			6.3	PMD
68	2000	11	08		36.50	71.20				6.2			6.2	PMD
69	2001	11	23	20:43:03.61	36.40	71.48	-	5.8		6.1			6.0	ISC
70	2002	01	03		36.10	70.70	129.0			5.8			6.1	PMD
71	2002	1	3	7521	36.35	72.84	110.0			6.2			6.6	MSSP
72	2002	03	25		36.00	69.20	8.0			6.0			6.3	PMD
73	2002	11	20	21:32:27.43	35.35	74.59	13.0	5.7	6.4	6.0			6.4	ISC
74	2004	4	5	21:24:00.40	36.56	71.03	159.0	6.6	5.8				6.0	ISC
75	2005	02	26		36.50	71.50				5.9			6.2	PMD
76	2005	10	08	10:46:30	34.90	73.15	23.0	6.3	6.3				6.3	ISC
77	2005	10	08	04:26:12	34.76	73.16	25.0	6.0					6.1	ISC

Sr. No.	Date			Time	Location		Depth (Km)	Magnitude Type					Converted	Source
	Year	Month	Day		Latitude	Longitude		mb	M_s	M_L	M_w	M_d	Mw	
78	2005	10	08	04:02:27	34.62	73.37	33.0	5.9					6.0	ISC
79	2005	10	08	03:57:24	34.43	73.68	33.0	5.9					6.0	ISC
80	2008	10	5	22:56:28	33.88	69.47	10	5.7	6.0				6.1	USGS
81	2008	12	29	3:37:17	33.87	73.33	150	6.0					6.1	BGS
82	2009	1	3	20:23:18	36.62	70.61	206	6.0					6.1	BJI
83	2009	10	22	19:51:27.6	36.52	71.01	188.6	6.1					6.2	ISC
84	2009	10	29	17:44:32.1	36.38	70.77	213.9	5.8					6.0	ISC
85	2009	10	29	23:44:32	36.44	70.80	205			6.1			6.4	PMD
86	2010	2	28	4:21:11	35.90	70.11	68			6.2			6.6	PMD
87	2010	9	17	19:21:12.5	36.61	70.91		6.1			6.3		6.3	CSEM
88	2011	5	14	21:07:22.2	36.41	70.75	207.3	5.8					6.0	NEIC
89	2012	6	11	5:29:14	36.08	69.32	31.3	6.0					6.1	NNC
90	2012	7	12	14:00:34	36.50	70.88	190.2	6.0					6.1	CSEM
91	2012	7	12	19:00:33	36.52	70.98	169			6.1			6.5	PMD
92	2012	12	29	22:50:52	35.72	70.67	93			5.8			6.1	PMD
93	2013	4	4	11:31:32	36.48	71.18	227			5.9			6.2	PMD
94	2013	4	24	14:25:30	34.5	70.18	71			6.2			6.6	PMD
95	2013	6	20	2:29:01	32.61	70.56	10			5.8			6.1	PMD
96	2014	4	11	6:08:03	34.17	73.84	10			5.9			6.2	PMD
97	2014	6	14	8:58:41	36.42	70.25	10			6.0			6.3	PMD
98	2015	8	10	10:05:25.75	36.5326	71.2147	224	5.8		5.9	5.7		6.0	ISC
99	2015	11	22	18:16:04.71	36.4344	71.4233	102	5.8	4.7		5.8		6.0	ISC
100	2015	12	25	19:14:47.19	36.4935	71.1263	206	6.5	5.7	6.2	6.3		6.6	ISC
101	2017	4	25	21:38:34	32.78	70.45	10			6.3			6.7	PMD
102	2017	4	28	16:06:12	33.36	71.21	32			5.8			6.1	PMD
103	2017	4	28	15:30:07	33.31	71.86	10			5.9			6.2	PMD
104	2018	1	14	9:19:30 AM	36.4525	70.7313	199.5	5.8		2.0		2.1	6.0	ISC
105	2018	1	31	7:07:00 AM	36.5261	70.8507	193.7	5.9	5.5	5.8	6.1		6.1	ISC
106	2018	4	10	10:19:28 AM	30.91	71.57	75			6.2			6.6	PMD
107	2019	12	20	11:39:53 AM	36.54	70.46	212	6.1		6.0	6.2		6.2	ISC
108	2023	1	5	02:25:54 PM	36.396	70.856	203.9	5.6	5		6		6.0	ISC
109	2023	3	21	04:47:27 PM	36.3384	70.8833	207.4				6.5		6.5	ISC
110	2023	3	21	04:47:25 PM	36.46	71.001	198.7	6.3	5.9	6.9	6.6		6.6	ISC
111	2024	1	11	9:20:26 AM	36.46	70.69	201	5.9		6.4	6.5		6.5	ISC

Apart from the moderate earthquakes, there are still seventeen (17) number of major earthquakes having magnitude Mw ≥ 7 that occurred in District Kurram and its vicinity during the past Forty (40) years starting from 1985. Please refer Table 3 which elaborates the necessary details of the aforementioned seismic events alongwith the reference of the source of information. This table indicates that out of these seventeen (17) seismic events, three (03) events have focal depths less than 70 km which implies that disastrous impacts of such events may create a havoc depending upon the level exposure of the built-up fabric, environment and lifelines. Please refer Appendix A for Map Document No. 09-4567-PLUP-KUR-ST: Seismotectonic Map and Please refer Appendix A for Map Document No. 10-4567-PLUP-KUR-SZ: Focal Depth Map.

Table 3-119 Composite Earthquake Catalogue Showing Instrumental Seismic Events Magnitudes (Mw) Ranging from (7.0 to 8.5) of District Kurram, KP

Sr. No.	Date			Time	Location		Depth (Km)	Magnitude Type					Converted	Source
	Year	Month	Day		Latitude	Longitude		mb	M_s	M_L	M_w	M_d	Mw	
1	1885	5	30		34.60	74.38			7.0				7.0	USGS
2	1956	06	09	-	35.00	67.50				7.5			8.4	PMD
3	1956	6	9		34.30	69.10	60.0		7.6				7.6	USGS
4	1956	07	03	-	36.50	71.20	200.0			6.5			7.0	PMD
5	1956	11	14	-	36.00	71.00	200.0			6.5			7.0	PMD
6	1960	01	09	-	36.00	69.00	150.0			6.6			7.2	PMD
7	1960	02	19	-	36.00	70.50	200.0			6.8			7.4	PMD
8	1960	05	19	-	36.00	71.00	200.0			6.5			7.0	PMD
9	1962	09	12	-	36.50	69.20	50.0			6.8			7.4	PMD
10	1983	12	30		36.40	70.70	215.0			6.5			7.0	PMD
11	1991	02	01		36.40	70.80	-			6.8			7.4	PMD
12	1993	08	09		36.30	70.80	215.0			6.6			7.2	PMD
13	2002	03	03		36.50	70.40	225.0			6.7			7.3	PMD
14	2005	10	08	03:50:38	34.42	73.52	13.0	6.8	7.7	7.0	7.6		7.6	MSSP
15	2005	12	12	214746.07	36.36	71.09	224.0	6.5		6.8			7.4	USGS
16	2015	10	26	09:09:30.50	36.446	70.824	207	6.9		7.5	7.6		7.6	ISC
17	2016	4	10	10:28:59	36.52	71.27		7.0	5.9		6.6		7.0	ISC

3.13.3.1.6 Earthquake 2015

On October 26, 2015, a massive earthquake with a magnitude of 7.5 struck North-West Pakistan, originating from the Hindu Kush Range in Afghanistan at a focal depth of 212

kilometers. The earthquake had a disastrous impact, resulting in at least 280 deaths and over 1,773 injuries. The tremor was felt across neighboring countries, highlighting its widespread zone of impact.

The earthquake caused extensive damage in the Khyber Pakhtunkhwa province and the Federally Administered Tribal Areas (FATA) and at that time. Nine districts in Khyber Pakhtunkhwa, including Malakand, Chitral, Shangla, Upper Dir, Lower Dir, Torghar, Swat, and Buner, as well as Bajaur and Mohmand Agencies in FATA, were among the worst affected areas. The Earthquake damaged over 109,070 houses and 497 schools, with varying degrees of severity. In general, the damage was moderate, though some houses with ordinary construction were buckled and fissured, while those without bricks and iron were collapsed.

In the light of this disaster, several key considerations emerged for improving future preparedness and response. Strengthening building standards, Design Codes and construction practices, upgrading infrastructure to withstand seismic events, enhancing emergency preparedness and /or contingency plans and increasing community awareness about earthquake safety are crucial steps for better resilience in vulnerable regions.

3.13.3.1.7 Earthquake Preparedness and Mitigation

a) **Preparedness and Mitigation**

Mitigation and preparedness for earthquakes involve a blend of strategies to reduce damage and enhance safety. Mitigation includes developing earthquake-resistant buildings, adhering to modern building codes, and retrofitting existing structures. For exsiting Built-up fabric and infrastructure, it is imperative to opt for a rigorous mainstreaming of Disaster Risk Reduction (DRR). Community-based programs aim to increase awareness and readiness. Preparedness focuses on conducting evacuation drills, securing homes and workplaces with emergency supplies. By combining these efforts, communities can better withstand seismic events and minimize their impact.

b) **Preparedness**

Preparedness involves proactive measures to ensure safety and an effective response during and after an earthquake. General preparedness includes conducting regular evacuation drills to improve community readiness. Individuals should secure their homes, maintain emergency supply kits, and plan evacuation routes to be better equipped for an earthquake. In schools, educating students and staff about earthquake safety, conducting regular drills, and developing comprehensive evacuation plans are crucial. Schools should also secure heavy furniture, maintain emergency supplies, and establish communication plans with parents. For offices, implementing emergency response plans, securing office equipment, and providing employee training are key factors to enhance resilience. Maintaining emergency kits and establishing communication systems for updates are also important. Developing a family emergency plan and addressing structural safety through regular inspections and retrofitting are also vital. In high-rise buildings, conducting seismic retrofitting, developing tailored emergency response plans, and establishing phased evacuation procedures are essential. Installing communication systems, stocking emergency supplies, and conducting regular drills ensure occupant preparedness and safety.

c) **Mitigation**

Mitigation strategies focus on reducing earthquake damage and enhancing safety through several key approaches. One crucial measure is developing earthquake-resilient areas by integrating Safer Landuse Planning and re-development efforts. This includes constructing buildings designed to withstand seismic activity, establishing clear evacuation routes, and

preserving open spaces. Adhering to upgraded building codes and seismic standards is essential for minimizing damage, with new construction incorporating seismic design principles. Retrofitting existing structures and strengthening vital lifeline facilities, such as water, power, and communication systems, also play a significant role in enhancing resilience. Additionally, Community-Based Disaster Risk Reduction (CBDRM) programs contribute by raising public awareness, providing education and training, and developing local risk reduction strategies to bolster community preparedness and mitigate the impacts of earthquakes.

3.13.3.2 Flood Hazard

3.13.3.2.1 Preamble

District Kurram is predominantly mountainous and is bounded by a series of sub-parallel, northwest–southeast oriented linear valleys, through which the Kurram River flows. The river has shaped the landscape, forming the Kurram Valley, which also extends in a northwest to southeast direction. Along this valley, several significant mountain passes are located, with elevations ranging from 726 to 4,651 meters.

There is mostly very limited development of terraced land along these rivers which are fairly inhabited by both dispersed and clustered population and or the primary source of agriculture based livelihood and other related commercial activities. However, during heavy rains in the monsoon, and also in perspective of the climate change impacts, the local communities and their livelihoods have persistently suffered from heavy loses to property and livelihood.

A flood occurs when streams and rivers overflow beyond adjoining flood plains and inundates onto land that is usually dry. This can happen during heavy rains, when water bodies like rivers, lakes, or oceans overflow their banks. Floods are often triggered by intense rainfall or rapid snowmelt and can lead to widespread destruction. The 2010 floods in Khyber Pakhtunkhwa were a significant climatic event that devastated many lives. According to data from the Federal Flood Commission of Pakistan, the combined flow of the Swat and Kabul rivers reached a record 400,000 cusecs, surpassing the previous peak of 250,000 cusecs recorded in 1929. In the 2022 floods, 309 people lost their lives, and 600,000 others were displaced. The flood water flows in Kurram river and its tributaries were also unprecedented and resulted in extensive damage to property and liveliness. These floods affected several districts of KP, including District Kurram, Kurram, Karak, Lakki Marwat, Tank, Dera Ismail Khan, Malakand, Swat, Shangla, Dir Lower, Dir Upper, Chitral Lower, Chitral Upper, Kohistan Lower, Kohistan Upper, Swabi, Mardan, Nowshera, Charsadda, and Peshawar.

3.13.3.2.2 Surface Drainage System District Kurram

The project area is well-drained, with a well-developed and interconnected drainage system comprising rills, gullies, tributaries, streams, and rivers. A significant portion of the Kurram region drains toward the north, northeast, and southwest into the Kurram River. The main river in the area, the Kurram River, flows from northwest to southeast through both Upper and Lower Kurram tehsils, serving as the primary drainage for the region.

During heavy rainfall, many smaller seasonal streams, along with the major rivers, experience rapid increase in flows, often becoming turbulent torrents. These streams flow in various directions, including north to south, northeast to southwest, Southwest to Northeast and northwest to southeast. For example, in the Kurram area, streams such as Shalozan Tangai and Zeran Tagai flow north to south and enter the Kurram River. Major streams like Gowakhai Darra flow from the Eastern side and intersect with the Kurram River. Additionally, Nainawar Khwar flows from the southwest and joins the Kurram River near the Tangai area. Other drainage, such as Charo Khal Algad and Sangroba Nullah, also originate from the southwestern side and

Northeastern side and joins with the Kurram River Please refer Appendix A for Map Document No. 04-4567-PLUP-KUR-DR: Drainage Map.

3.13.3.2.3 Flood Hazard Vulnerability

District Kurram is susceptible to two main types of floods: the riverine floods and flash floods/hill torrents that may occur due to huge influx of water.

Riverine floods occur when rivers overflow their banks, inundating surrounding areas. Although riverine flooding is primarily caused by heavy rainfall, it can also result from snowmelt during the heat wave or cloud burst that may occur during the late monsoon months i.e., August and September. In District Kurram, the widening of river spans and increased erosion, following the catastrophic 2010 and 2022 floods, have made the district more vulnerable. Population living near river banks and terraces face heightened risks during the monsoon season, with protective measures often compromised. Riverine floods can persist for days or even weeks depending on the terrain and the duration of the wet weather conditions.

Flash floods in District Kurram are predominantly triggered by intense and short bursts of rainfall, particularly during the monsoon season. The mountainous and rugged terrain, coupled with seasonal streams increases the vulnerability to riverine floods.

3.13.3.2.4 Riverine Flood Hazard Susceptibility Zones of District Kurram

The landscape of District Kurram is fundamentally shaped by the powerful interplay of its mountainous topography and its Kurram River drainage system. This fluvial system and its tributaries create a complex hydrological network that directly determines the district's flood hazard patterns. The demarcation of Flood Hazard Susceptibility Zones classifies the terrain into High to Medium Flood Hazard (HMFH) zone, providing a critical spatial understanding of flood hazard risks. Please refer Map Document No. 11-4657-PULP-KUR-FH for Flood Hazard Zoning Map of District Kurram.

These zone reveal how the distinct characteristics of river system influence flood behavior, where deep, incised valleys act as primary conduits for floodwaters, while the surrounding higher ground offers relative safety. However, this risk profile is not static; the accelerating impacts of climate change are projected to intensify the region's hydrological cycle, acting as a threat multiplier that exacerbates existing vulnerabilities across all three drainage basins and introduces new challenges to both high and low-risk areas.

A – High to Medium Flood Hazard Zone

The High to Medium Flood Hazard (HFH) zone represent areas of greatest vulnerability to flood hazards, characterized by distinct linear patterns that precisely follow the active channels and floodplains of the district's major river system. These zone form a dense, dendritic network that mirrors the drainage patterns of the Kurram River and its tributaries.

Along the Kurram River, the MHFH zone exhibits particularly high risk due to the river's central position and large catchment area. The river's course through constricted gorges creates natural bottlenecks that amplify flood velocities and cause dangerous backwater effects during high discharge events. The convergence of multiple tributaries in this basin significantly increases the volume of floodwaters, posing substantial threats to settlements along its banks, including Kharlachi, Shingak, Kanj Alizai, Arkhi, Boshehra, Ahmadzai, Akakhel, Shublan, Gosar, Topakayu, Kot Ghundai, Sadda, Pirqayum, Chota Durrani, Badama, Shahshoo, Tangi, Alizai, Jilamai, Dad Qamar, Mandori, Char Khel, Paraw Kalay, Chapare Kalay, Sangroba, Shalzone, Pewar other settelments near to the Kurram River and its tributaries.

Climate change is expected to intensify risks in all these river corridors significantly. The anticipated increase in frequency and intensity of extreme precipitation events will lead to more powerful and frequent flood hazards. Changes in snowmelt patterns, including earlier melts and rain-on-snow events, will contribute to higher baseline river levels and sudden pulses of discharge, overwhelming these channels more frequently. Consequently, infrastructure, agriculture, or settlements within any of these river-specific MHFH zone face escalating threats, demanding stringent development restrictions and robust protective measures tailored to each river's unique flood characteristics.

3.13.3.2.5 Flood Hazard Management

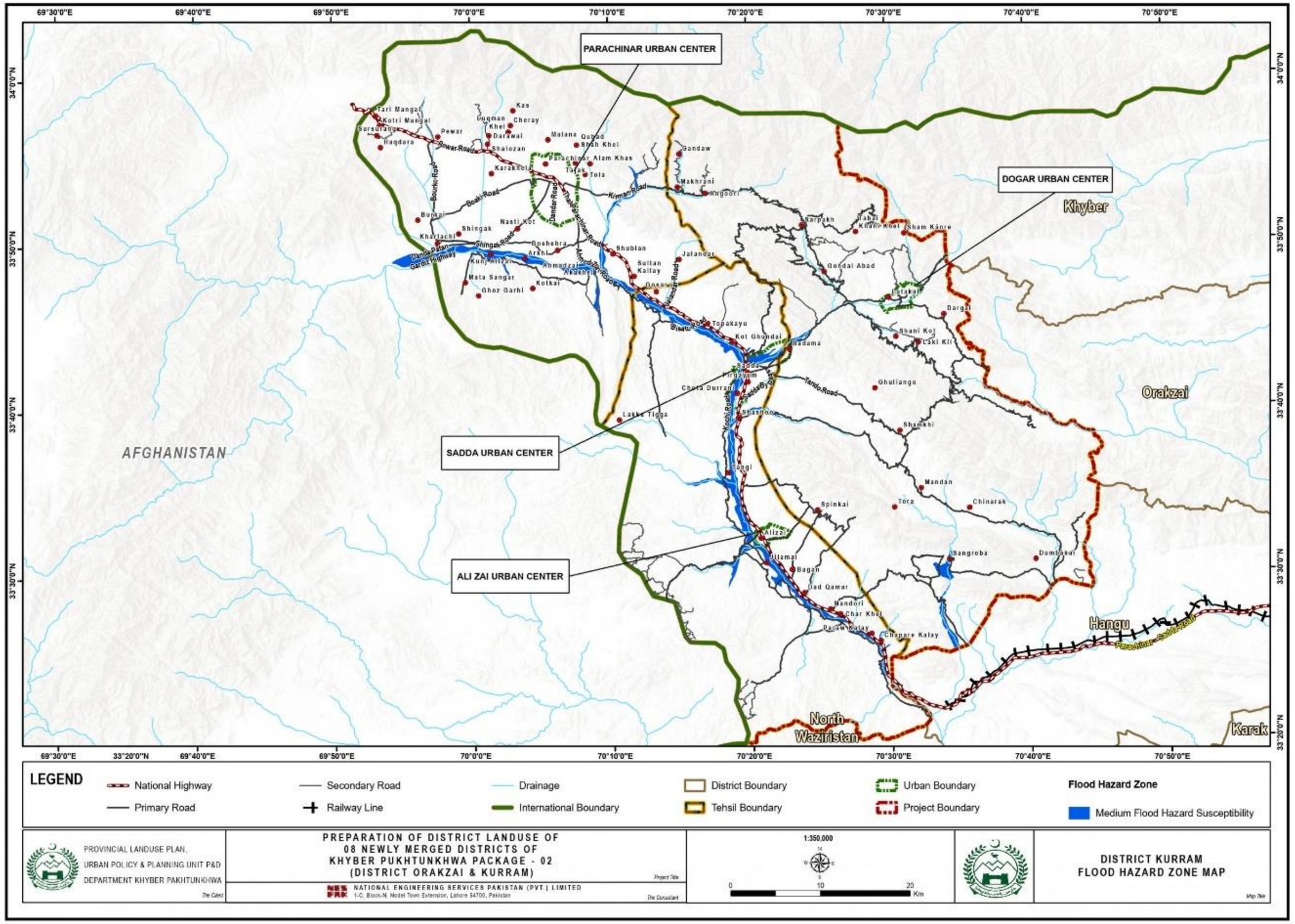
Anticipatory actions are critical in reducing the impact of floods on vulnerable households by prioritizing which are most at risk. Recognizing the challenges posed by monsoon seasons, the Government of Khyber Pakhtunkhwa is actively utilizing available resources to mitigate disaster risks and enhance preparedness to minimize losses to lives and property. While the provincial government is committed to improving flood management systems, several constraints hinder progress. These include insufficient water storage facilities, ineffective regulations, and inadequate early warning systems.

Currently, the early warning and flood forecasting system in the province relies on telemetry equipment installed by the Provincial Disaster Management Authority (PDMA), WAPDA, and the Irrigation Department. However, the response times provided by this system are limited 24-48 hours for the Swat River, 5-7 hours for the Kabul River, and 36-48 hours for the Indus River at Dera Ismail Khan. These response times are insufficient for effective evacuation of vulnerable communities in flood-prone areas.

Drawing from past experiences and global best practices, anticipatory response actions are expected to save lives, protect assets, and reduce costs. These actions should focus on five key areas for success:

1. Implementing robust forecasting systems integrated with a clear decision-making process based on triggers.
2. Securing financial commitments from the government for contingency funding.
3. Ensuring broad geographic reach to maximize the number of beneficiaries.
4. Developing a collective, inter-agency action plan that includes cash compensation and other necessary interventions.
5. Learning from previous experiences to improve future responses.

In addition, flash floods in the province's mountainous regions remain a significant concern due to the lack of early warning systems. The province has seen minimal investment in water storage capacity, which could significantly reduce flood vulnerability. Existing storage facilities are further compromised by silting, a common issue that reduces their effectiveness in flood mitigation.



Map 3-42 District Kurram Flood Hazards Zones Map

3.13.3.3 Landslides

3.13.3.3.1Preamble

A landslide is the movement of a mass of rock, debris, or earth down a slope, driven either by gravity or during by a seismic activity. Landslide is one of the typical phenomenon of "mass wasting," which encompasses all types of down-slope movements of soil and rock. Landslide is a generic term which involves so many types of manifestations that result in the downslope movement of rock and /or soil mass such as rockfalls, rockslide, shallow or deep-seated slope failures, earth slumps, mudflows and debris flows. These natural hazards frequently occur in hilly terrains in conjunction with earthquakes, wet weather floods, and volcanic activity.

As regards, Khyber Pakhtunkhwa province, landslides have had significant impacts in recent years. On January 20, 2022, heavy rains caused severe landslides near Alpuri, the capital of District Shangla. This event resulted in the deaths of at least eight people, with five bodies recovered and one person reported missing. Six individuals were rescued, but the landslide blocked a major road and destroyed a family house.

Another major landslide occurred on April 18, 2023, near the Torkham border in District Khyber, which lies at the crossing between Pakistan and Afghanistan. This landslide caused at least three deaths, trapped several people, and buried 20 vehicles, including large trucks. The scale of this disaster was significant that required a massive operation for many weeks to reinstate the area and clearing of the rubble to make the road operational.

3.13.3.3.2 Landslide Hazard Vulnerability

Identifying regions vulnerable to landslides involves analyzing geological, environmental, climatic, and human factors. Geologically, areas with loose soils, such as clay or sand, or fractured rock formations, are more prone to landslides. Steep slopes, especially near geological fault zones, increase the risk, particularly in earthquake-prone regions.

Vegetation plays a key role in stabilizing soil, so areas with little vegetation face higher risks. Poor drainage or excessive water saturation from heavy rainfall, flooding, or snowmelt can destabilize slopes, leading to landslides, as wet soils lose strength. The climate also contributes to landslide vulnerability, with regions experiencing heavy rainfall or rapid snowmelt being particularly susceptible. Human activities like construction, deforestation, and mining can further destabilize slopes, increasing the likelihood of landslides.

Historical data and landslide hazard maps are crucial for identifying at-risk regions, while technological tools like remote sensing and Geographic Information Systems (GIS) enhance monitoring and risk assessment. By combining these factors, it becomes possible to identify landslide-prone regions and implement preventive measures.

A landslide triggered by a blast at a coal mine, buried about 33 miners under mud in March 2018. Rescue teams and local tribesmen worked with shovels due to the lack of machinery, successfully pulling out 18 miners alive, though eight were critically injured and hospitalized. Officials estimated that 25 to 33 miners remained trapped, while locals reported over 40 people were inside the mine when the blast occurred.

Steep slopes are more prone to landslides, especially when they exceed a certain angle threshold, usually, it is around 20-30 degrees. District Kurram has mainly hilly terrain which reach up to an elevation of more than 4500 meters. Due to this hilly terrain, the slope of some areas is greater than 60-65 degrees. Please refer to Map Document No. 03-4657-PULP-ORK-SLP for Slope Map of District Kurram.

3.13.3.3.3 Landslide Susceptibility Zoning

As part of the Master Planning for District Kurram, a spatial assessment of landslide susceptibility has been carried out to guide sustainable Landuse and minimize disaster risks. District Kurram lies within a dissected landscape, characterized by steep escarpments, narrow valleys, fragile lithologies, and active drainage networks, which together create conditions favorable for slope instability. Seasonal heavy rainfall, seismic activity due to proximity to tectonic zones, and unplanned human interventions such as road cuts and deforestation further amplify the risk of landslides in the region. The accelerating impacts of climate change, particularly through altered precipitation regimes, are a critical factor that is likely to increase landslide frequency and expand susceptible areas in the future.

Based on geomorphological interpretation, GIS-based delineation, and terrain analysis, the district area has been divided into four susceptibility zones:

A – High Landslide Susceptibility Zone (HLS)

B – Low to Moderate Landslide Susceptibility Zone (LMLS)

C – No Landslide Susceptibility Zone (NLS)

This classification provides a crucial planning layer to ensure that future development activities are aligned with the stability of the terrain. However, this static assessment must be viewed in light of the dynamic changes expected from a warming climate, which could push slopes in Moderate and even Low susceptibility zones toward failure. Please refer Map Document No. 12-4657-PULP-KUR-LSH Landslide Hazard Susceptibility Zones Map of District Kurram.

A – High Landslide Susceptibility Zone (HLS)

High susceptibility zone (HLS) represent the most hazard-prone areas within District Kurram. These are primarily located along steep valley sides, road corridors that cut across unstable slopes, and areas subjected to toe erosion from rivers and streams. The combination of steep gradients, fractured rock masses, and intense rainfall makes these areas highly prone to rockfalls, debris flows, and shallow to deep-seated slope failures.

Any settlements or infrastructure falling within HLS zones face direct and immediate hazard risk, often requiring continuous maintenance or emergency interventions. Such areas should be recognized as the most unstable parts of the district, with slope instability processes shaping both Landuse and natural resource patterns. Climate change will disproportionately affect these zones. More frequent and intense rainfall events will increase pore-water pressure, saturate soils more thoroughly, and enhance erosion, leading to a higher frequency of slope failures and potentially expanding the spatial extent of HLS areas over time. High Landslide Susceptible areas in District Kurram are:

B – Low to Moderate Landslide Susceptibility Zone (LMLS)

The Low to Moderate Landslide Susceptibility Zone (LMLS) form transition belts between highly unstable and relatively stable terrain. These slopes are generally stable under normal conditions, failure are rare but are susceptible to failure during intense rainfall events, earthquakes, or unregulated anthropogenic activities. Activities such as road construction without slope reinforcement, deforestation, poor irrigation management, and quarrying can accelerate the shift from moderate to high hazard conditions.

In these areas, slope failures are often seasonal or event-driven. Slope failures may not be visible throughout the year but can be triggered rapidly when environmental or human-induced stress exceeds the slope's natural stability. Their presence highlights the need for careful consideration of natural thresholds in the district's land-use framework. The impact of climate change is particularly significant in LMLS zones. These areas host a large number of "threshold slopes" that are currently marginally stable. Increased rainfall intensity and duration can be the decisive factor that pushes these slopes past their stability limit, effectively converting large LMLS areas into High Susceptibility zones during extreme weather events.

Localized landslides in these areas are usually shallow and small-scale, often associated with soil saturation, minor undercutting, or surface erosion. They pose limited widespread threat but still require awareness in order to maintain their current stability. Under climate change, the stability of LMLS areas cannot be taken for granted. Prolonged wet periods can lead to progressive soil saturation, increasing the likelihood of shallow translational slides and soil erosion even on gentler slopes, thereby elevating the localized risk. Low to Modertae Landslide Susceptible areas in District Kurram are: Tari Mangal, Kotri Mangal, Sursurang, Haddara, Burkai, Mata Sangar, Ghoz Garhi, Kotkai, Sangroba, Spinkai, Luqman Khel, Cheray, Kas, Malana, Qubad Shah Khel, Alam Khas, Makhrani, Angoori, Sarpakh, Gondal Abad, Latakai, Laki Kil, Shani Kot, Dargai and other areas in vicinity of low to moderately elevated hillslopes.

C – No Landslide Susceptibility Zone (NLS)

The No Landslide Susceptibility zone (NLS), comprising flat valleys, terraces, and stable ridges, are considered safe ground for intensive land-use activities. These areas present minimal risk of slope instability and therefore form the most favorable locations for settlement expansion, agricultural intensification, and major infrastructure projects.

These landscapes remain stable due to their low relief and favorable drainage conditions, with minimal geomorphic processes acting to destabilize slopes. As a result, they provide the most reliable terrain within District Kurram for sustaining long-term development and population growth. While climate change is unlikely to directly induce slope failures in these truly flat areas, its indirect effects are crucial. These NLS zones often coincide with floodplains, which are themselves projected to face increased inundation risks due to climate-driven hydrological changes. Therefore, the safety of NLS zones from landslides does not imply immunity from other climate-aggravated hazards like floods. No Landslide Susceptible areas (NLS) in District Kurram are: Paraw Kalay, Char Khel, Mandori, Dad Qamar, Bagan, Jilamai, Alizai, Tangi, Shashoo, Chota Durrani, Pirqayum, Sadda, Kot Ghundai, Topakayu, Gosar, Sultan Kalay, Shubian, Akakhel, Ahmadzai, Arkhi, Kunj Alizai, Nasti Kot, Tajak, Parachinar, Kharlachi, Shingak, Shalzoan and other flat areas.

3.13.3.3.4 Landslide Safety Guidelines

When planning a trip to hilly regions, ensure your tour aligns with weather forecasts and advisories from the weather department or news channels. In case of a landslide, move quickly away from the landslide path or downstream valleys without wasting time. Keeping drains clear is essential; inspect them regularly for blockages such as litter, leaves, plastic bags, or rubble, and ensure that weep holes remain open. Planting more trees can help stabilize the soil, as tree roots provide natural reinforcement. Be vigilant for signs of landslides, such as rockfalls, subsidence of buildings, or cracks in the ground. Muddy river waters can also indicate landslides upstream. If you notice any of these warning signals, immediately contact the nearest Tehsil or District Headquarters.

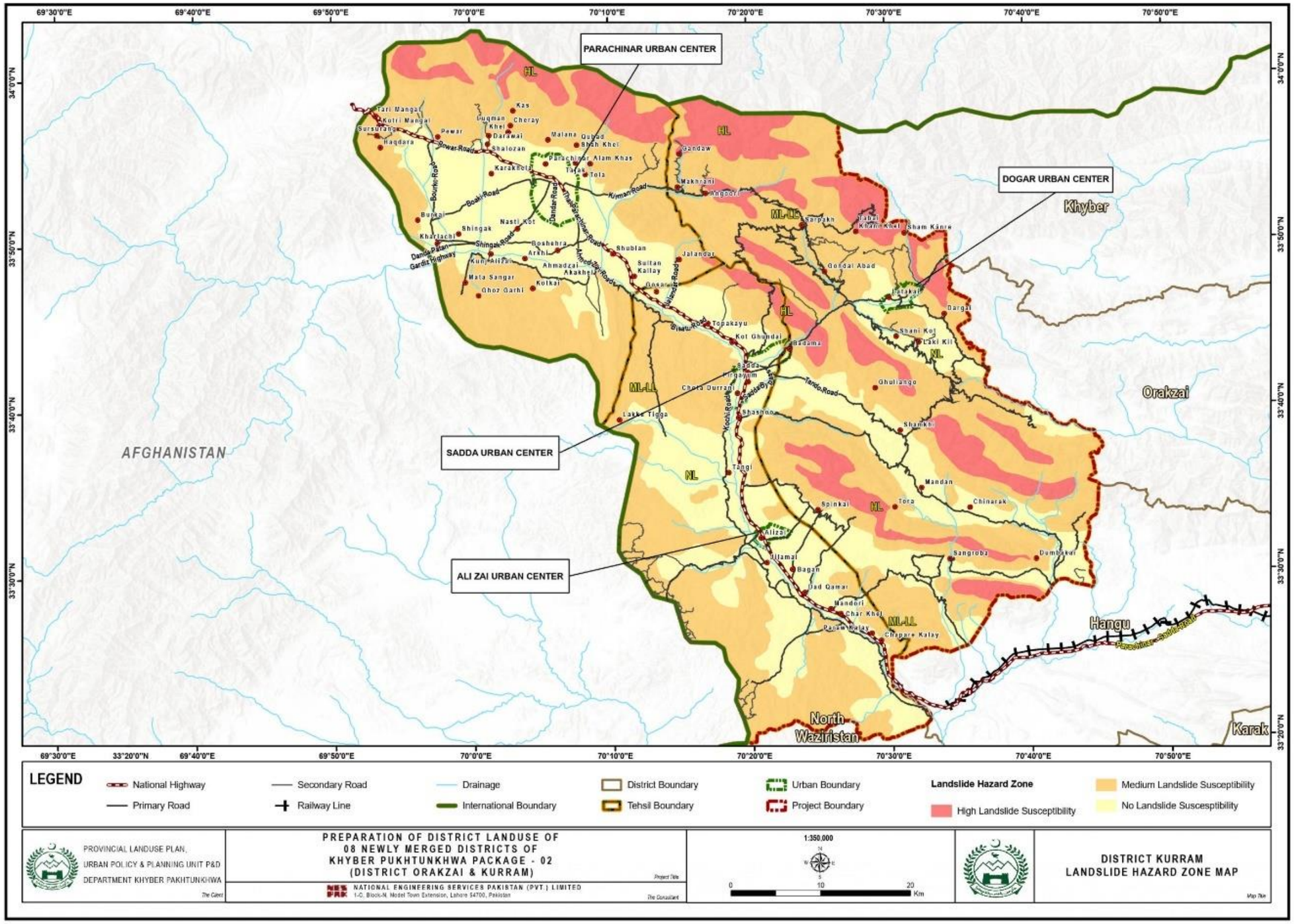
Protect slopes by ensuring the toe of the slope is not cut and remains intact, and avoid uprooting trees unless re-vegetation is planned. Stay alert for unusual sounds, such as cracking trees or

boulders colliding, as these can indicate an impending landslide. Follow the "3A's" rule: stay alert, awake, and active during the impact or when there's a likelihood of a landslide. Locate and go to designated shelters, and try to stay with your family and companions. After the danger has passed, check for injured or trapped persons. When trekking, mark your path to avoid getting lost, and familiarize yourself with emergency communication methods to signal helicopters or rescue teams.

To minimize risk, avoid constructing buildings or staying in vulnerable areas prone to landslides. Stay calm and conserve your energy instead of panicking. Avoid walking on loose materials or near damaged electrical wiring and poles. Building houses near steep slopes or drainage paths increases the risk of disaster. Refrain from drinking potentially contaminated water from rivers, springs, or wells; rainwater, if directly collected, is usually safer. Only move an injured person after administering first aid unless they are in immediate danger.

3.13.3.3.5 Conclusions

The landslide susceptibility assessment of District Kurram highlights the strong influence of topography, geology, and human activity on slope stability. By distinguishing areas into high, low to moderate and no susceptibility zones, the study provides a clear understanding of the district's landslide hazard distribution. The identification of these categories underscores the varying degrees of exposure and stability across the landscape, ranging from hazardous escarpments and active slopes to safe valley bottoms and terraces. Recognizing and mapping these conditions forms an essential foundation for informed decision-making, ensuring that geohazards are adequately considered in the future growth and development of the district.



Map 3-43 District Kurram land Slide Zones Map

3.13.3.4 Hill Torrents

Flash floods and Hill Torrents can develop rapidly, often within minutes or hours after heavy rainfall, causing sudden surges of water and debris through riverbeds, valleys, and low-lying areas. The region's rapid climate changes, combined with the limited absorption capacity of the soil, further exacerbate the situation. Flash floods often overwhelm natural and man-made drainage systems, leading to severe impacts on communities, including damage to homes, infrastructure, and agricultural lands.

As Hill torrents are unpredictable and /or erratic in nature which usually occurs in Monsoon. Prolonged torrential rain during late summer monsoon (August to September) and steep gradient streams after a heavy and sudden downpour or a cloud burst often cause unprecedented hill torrents in the major and minor streams. The steep gradient and gorgeous incoming tributaries of Kurram River are susceptible to generate hill torrents. Furthermore, the low lying drainage basin areas of Kurram River may face hill torrents affecting the localities of Alizai, Shalozan Jilamai, Pewar, Bagan, Dad Qamar, Mandarin Char Khel, Paraw Kalay, Chapare Kalay etc are highly vulnerable.

3.13.3.5 Loss of Cultivated and Arable Land

In a mountainous areas where the slopes are steeply inclined and have bedrock is exposed, very limited lands are available which can sustain development such as hillslope forming, construction of houses, and other infrastructures elements. In this perspective, when the developed land parcels are sparse, the less of such lands is very critical as it drastically affects the built-up areas, hillslope farming and cultivated riverine terraces.

The loss of cultivated and arable land is the result of land de-gradational processes which are primarily attributed to surface runoff, flood flows in streams/ rivers and differential erosion.

Land de-gradation caused by floods and erosion is a major natural hazards that reduces the productivity of the land and affects agriculture, livelihoods, human settlements and environment. In a broader sense, loss of sustainable and developable land is the result of land degradation processes and agencies which result in either decline in land quality or the physical loss of the land parcels by erosion resulting from floods.

- **Floods**: Floods can degrade land parcels through a number of processes such as erosion, water logging, deposition of debris and gully erosion.
- **Soil erosion:** Fast-moving flood waters in huge influx wash away the top soil cover saturates the top soil layer, which is the most fertile layer of soil.
- **Water logging:** excess water saturates the top soil layer which perish the crops and orchards resulting in the depletion or oxygen. The salt content in the soil is increased to enormous amounts and the land is ultimately redundant.
- **Deposition of Debris:** when flood water over run the lands developed for agriculture and when the flood water drains off, the land is covered by deleterious materials, wooden logs, debris and other waste materials. Therefore, a considerable effort is required to make the land suitable for cultivation.

3.13.3.5.1 Mitigation and Prevention

Protection works to prevent the loss cultivable and arable lands which requires certain measures a few of them are listed as under:

a) Design of Engineering Solutions comprising protection works such as retaining walls, slope protection, runoff control, channelization of drainage, water diversion works etc.

b) Soil conservation techniques such as contour plowing, terrace forming, tree plantation and vetiver grasses etc.
c) A-Forestation and Re-Forestation: Tree Plantation of specific species whose roots hold soils at place and reduce runoff.
d) Flood Control Measures: Construction of run of Dams, water storage ponds, leeves and check dams with appropriate drainage system.
e) Sustainable Farming Practices: it requires indigenous species of crops, reduced tillage and mulching.

Community Awareness Campaigns: Education of local community through workshops, seminars and short training courses to learn land conservation techniques.

3.13.3.6 Bank Collapse

Bank collapse along with land degradation is a very common and natural phenomenon where the natural streams traverse through a terrain covered by unconsolidated colluvial soils and terrace deposits. Assessment of bank collapse has been made using satellite image. The low lying terraced lands along the banks of Kurram River such as Kunj Alizai, Arkhi, Jalandar, Akakhel, Kotkai, Gosar, Kot Ghundai, Tangai, Alizai etc. or highly susceptible to bank collapse which progressively spoils and consumes the cultivable lands.

3.14 District Economy

3.14.1 Overview

Kurram District has a diverse economy, with agriculture serving as the backbone of its economic activities. The main crops cultivated in the district include wheat, maize, rice, and pulses, while orchards contribute significantly with fruits like apples, apricots, and plums. Agriculture not only supports the livelihoods of a large portion of the population but also plays a critical role in ensuring food security and sustaining local markets. The district is also endowed with rich mineral resources, including soapstone, coal, marble, magnesite, iron ore, and lead, which present substantial opportunities for mining and related industrial development. Forested areas, spanning approximately 13,120 hectares, provide timber, non-timber products, and environmental benefits such as potential carbon credit earnings. The Kurram River, along with small dams like Malana, Zeran, and Kot Ragha, offers notable hydropower potential, which, if properly developed, could supply local energy needs and support overall economic growth in the district.

Despite these natural advantages, Kurram District faces significant challenges in industrial development. There are only a few small and medium-scale industrial units operating, focusing on products such as sporting and light hunting arms, plastic goods, candles, bricks, flour, electrical equipment, furniture, handicrafts, gem cutting, gypsum products, and marble processing. The district lacks formal industrial estates, modern infrastructure, and services necessary for larger-scale industrial growth. Trade and logistics are also constrained, though the Karlachi border crossing with Afghanistan serves as a vital trade link, facilitating bilateral and transit trade. The region's connectivity and economic activities are further hampered by heavy snowfall, sectarian conflicts, and prolonged route blockages, affecting the uninterrupted flow of goods and services. Addressing these challenges by investing in infrastructure, improving security, and enhancing trade connectivity could stimulate investment, strengthen local markets, improve access to education, healthcare, and social services, and create a sustainable cycle of economic and social development in Kurram District.

3.14.2 Poverty and Livelihood

The distribution of household members' MPI poverty is shown in **Table 3-120** which shows that in the Kurram District, there is 55 % of MPI poor people and are vulnerable to MPI poverty are 18.4%, and in severe MPI poverty 26.7%.[81]

Table 3-120: Poverty and Livelihood

Districts	Percentage of MPI-poor People	Vulnerable to MPI poverty	In severe MPI poverty
Kurram	55	18.4	26.7

Depicts the indicators of MPI poverty and intensity of MPI poverty in districts Kurram and Peshawar, the percentage of the population deprived in each indicator such as education, health, and living standards, in Kurram district is 67.6% of school attendance ratio. The child mortality rate is 9.5%, nutrition deprivation is 62.8%, housing indicator is 93.2% and assets is 42.4%, etc.[82]

[81] MICS Report KP 2019
[82] MICS Report KP 2019

Table 3-121: indicators of MPI poverty and intensity of MPI

	Education		Health		Living Standards					
District	Years of Schooling	School Attendance	Child Mortality	Nutrition	Electricity	Sanitation	Drinking Water	Housing	Cooking fuel	Assets
Kurram	38.9	67.6	9.5	62.8	4.4	63.5	30.01	93.2	87.1	42.4

3.14.3 Agriculture Sector

3.14.3.1 GDP

Agriculture is a pivotal sector in the economy of Khyber Pakhtunkhwa, contributing 24.7% to the regional GDP and employing 31.8% (LFS 2020-21) of the workforce.

Table 3-122: GDP Estimates of Khyber Pakhtunkhwa (2015-22 - Rs. Million) [83]

S. No.	Description	Average (2015-2022)	% Share	CAGR
A	Agriculture Sector	899,973	24%	2.30%
B	Industries	1,044,300	27%	5.06%
C	Services Sector	1,866,199	49%	3.69%
GDP of Khyber Pakhtunkhwa		3,810,472	100%	3.72%

Despite its importance, the sector faces several challenges, including low productivity, outdated technology, and sustainability issues. These problems are compounded by inadequate research facilities and limited community capacity to manage agricultural calamities. The insufficient allocation of resources in the Khyber Pakhtunkhwa Annual Development Program (ADP) has hindered progress in addressing issues related to productivity, food security, and rural livelihoods. In District Kurram, agriculture remains a crucial industry, employing 27% of the local workforce, underscoring its significant role in the local economy.

3.14.3.2 Land Utilization

The agricultural land utilization in District Kurram reveals of the district's total reported area of 338,061 hectares.[84], only 26,631 hectares are actively cultivated. A substantial portion of the land remains uncultivated, with 3,275 hectares classified as culturable waste, 295,014 hectares unavailable for cultivation, and 13,139 hectares designated as forest.

[83] Development Statistics of KP 2023-24

[84] Development Statistics of KP 2023-24

Table 3-123: Land Utilization in District Kurram

District	Reported Area (3+8)	Cultivated Area			Cropped Area		Un-Cultivated Area			
		Total (4+5)	Net Sown	Current Fallow	Total (4+7)	Area sown more than once	Total (9+10+11)	Culturable Waste	Forest	N.A for Cultivation
1	2	3	4	5	6	7	8	9	10	11
Kurram	338,061	26,631	26,324	307	41,308	14,984	311,430	3,275	13,139	295,014

This indicates that while a considerable amount of land remains unused for agricultural purposes, there is potential for expanding farming activities. Enhancing irrigation infrastructure and implementing better land management practices could significantly increase the area available for cultivation and improve overall agricultural productivity.

3.14.3.2.1 Crop Production Profile

The production profile of crops in District Kurrami highlights both potential and challenges. Major crops in the district include wheat, Maize, Rice and Barley. However, crop yields have experienced fluctuations over the years, influenced by factors such as climate change, water availability, and soil fertility. There is also cultivation of fruits and vegetables in the district as shown in. **Table 3-124** however these are in very low numbers:

Table 3-124: Crops, Area, Production and Yield in District Kurram[85]

Commodity	Wheat			Maize			Rice			Barley		
District	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)
Kurram	27,130	54,317	2,002	3,016	4,505	1,494	5,996	17,454	2,911	486	356	733

These figures highlight the key crops in the district, with wheat and rice being the dominant crops in terms of both area and production.

Kurram district is known for its variety of fruits i.e Apples, Peaches, Apricot, and Cherries etc. These fruits contribute to the local economy and provide a source of livelihood for many farmers in the district. The fertile valleys and streams in Kurram support the growth of these fruits, making agriculture an important economic activity in the region.

[85] Development Statistics of KP 2023-24

Table 3-125 : Vegetable and Fruits Cultivation in District Kurram

	Rabi Vegetables			Rabi Fruits			Kharif Vegetables			Kharif Fruits		
District	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)	Area (Ha)	Production (Tonnes)	Yield per Ha (Kg)
Kurram	666	6.299	9,458	120	684	5,700	905	6,143	6,788	370	4,324	11,686

In Kurram District, the area devoted to Kharif fruits (370 hectares) produced the highest yield per hectare (11,686 kg), followed by Rabi vegetables with a yield of 9,548 kg per hectare. Kharif vegetables and Rabi fruits also had respectable yields, with Kharif vegetables producing 6,143 kg per hectare and Rabi fruits producing 5,700 kg per hectare.

3.14.3.2.2 Challenges and Potential

District Kurram's remote, mountainous location limits farmers' access to larger markets, resulting in low returns. The agriculture sector faces challenges like low productivity, outdated technology, limited irrigation, and poor transportation, which hinder economic potential. Enhancing irrigation, adopting modern practices, and investing in research and development are essential for sustainable growth. Expanding cultivated areas and improving crop yields can boost the local economy, especially in rural communities where agriculture is the primary livelihood.

Despite these challenges, Kurram has strong agricultural potential due to fertile valleys, favorable climate, and diverse cropping opportunities. Lower and Central Kurram support cereals, fruits, and vegetables, while apple, apricot, plum, cherry, pomegranate, and walnut cultivation shows promise for commercialization and export. Investments in modern infrastructure and technology can further increase productivity and agricultural output across the district.

3.14.3.2.3 Livestock Population and Opportunities for Growth

District Kurram livestock population is not very high. The district is home to a total of 975,649 animals, which constitutes 2.04% of Khyber Pakhtunkhwa's. Table reveals that overall livestock population. Key livestock includes 194,253 cows, 106,086 sheep, and 155,532 goats, alongside smaller populations of buffaloes, camels, and other animals. Poultry makes about 50% (485,741) of total population of livestock of the district. While these numbers represent a relatively small percentage of the provincial totals, they highlight the district's potential for growth. With strategic investments in livestock farming, particularly in breeding and nutrition, Kurram could expand its livestock production and enhance its contribution to the provincial economy.

Table 3-126: Livestock Population in District Kurram

District	Total	Cattle	Buffaloes	Sheep	Goats	Poultry	Camel	Horse	Donkey	Mules	Other
Khyber Pakhtunkhwa	47,911,692	8,837,227	3,402,135	4,219,238	10,041,678	19,100,442	124,663	268,953	502,821	302,210	1,112,325
Kurram	975,649	194,253	4,522	106,086	155,532	485,741	6,527	1,203	6,863	927	13,995

The livestock population in Kurram District is significantly smaller compared to Khyber Pakhtunkhwa as a whole. Cattles and poultry represent the majority of livestock in the district, with buffaloes having much smaller population. The district's livestock sector is an important part of its economy but operates on a smaller scale than the broader provincial figures.

3.14.3.2.4 Livestock Infrastructure

The district has established a solid infrastructure to support its livestock sector.

Table 3-127 Number of Hospital, Veterinary, Dispensaries, and centers[86]

District	2020-21				2021-22				2022-23			
	Total	Hospitals	Dispensaries	Centres	Total	Hospitals	Dispensaries	Centres	Total	Hospitals	Dispensaries	Centres
Kurram	53	4	24	25	53	4	24	25	52	4	23	25

District Kurram boasts 52 veterinary facilities, including hospitals and dispensaries, which are essential for maintaining animal health and productivity. Mobile veterinary clinics complement these facilities by providing disease prevention, treatment, and vaccination services, ensuring that livestock remains healthy and productive.

Additionally, the presence of two slaughterhouses within the district highlights the importance of livestock in meat processing and food safety. These facilities contribute to the local meat industry, ensuring compliance with health standards and catering to both local and external markets.

[86] Directorate General (Extention) Livestock & Dairy Development Khyber Pakhtunkhwa

District	Number of Slaughter Houses		
	2020-21	2021-22	2022-23
Kurram	-	2	2

3.14.3.2.5 Challenges and Potential

The livestock sector in District Kurram has significant economic potential, driven by rising demand for halal food products. Livestock farming provides meat, milk, hides, wool, and bones, offering daily income and employment while buffering against crop failures. Kurram's hilly and semi-mountainous terrain, ample grazing areas, and temperate climate support rearing of sheep, goats, cattle, and poultry. Tribal communities possess strong local knowledge of animal husbandry, while growing local demand and cross-border trade with Afghanistan present opportunities to supply nearby markets in Peshawar, Kohat, and beyond.

3.14.4 Industries

District Kurram is characterized by hilly terrain, has untapped potential within its industrial sector. Labor in Kurram is cheap and is easily available to producers which affects the production cost to produce goods at low cost. In Kurram there is no such industrial sector and has no economic zone. The current landscape comprises 9 small-scale industrial units, all within the primary sector, emphasizing the district's reliance on natural resources and agriculture. These industries, while modest in scale, provide an essential economic foundation, offering a pathway for future industrial growth and diversification.

Table 3-128 Number of Industries in Kurram District[87]

District	2020-21			2021-22			2022-23		
	Total	Running Unit	Closed Unit	Total	Running Unit	Closed Unit	Total	Running Unit	Closed Unit
Kurram	5	5	-	9	8	1	9	8	1

3.14.4.1 Type of Industries

The existing industries in District is only connected stone crushing plant. Currently there are four stone crushing plants in the district. Other than small scale industrial units. Cottage industrial units like handicraft, card and box also present in the Kurram.

Table 3-129: Type of Industries in District Kurram

Type	Type of Industries
Flour Mills	1
Ice Cream Factory	1
Ice Factory	1
Stone Crusher/ Crush Plant	5
Type	No of Godowns
Flour Sugar	2
Sweets/Biscuits	2

[87] Development Statistics of KP 2023-24

There are six godowns in the district details of which is shown below in Table 3-130[88]:

Table 3-130: Godowns in Kurram

Type	Godowns
Food Items	4
Fertilizer	1
Ghee	1

3.14.4.2 Trade and Commerce

Trade and commerce in Kurram is influenced by its border with Afghanistan making Kurram pivotal for Pakistan Afghanistan trade. Khurlachi Border is primary legal trade route in Kurram, facilitating the exchange of goods, especially fruits and vegetables, between Pakistan and Afghanistan.

3.14.4.3 Mining

District Kurram has considerable deposits of minerals especially coal[89]. Coal is crucial for local energy production and various industrial processes, yet its extraction has been irregular, with notable peaks in production occurring sporadically. There is also some mining of Soap stone and Copper in the district but with limited quantity.

Table 3-131: Mining in District Kurram (Tonnes)

Type of Minerals	Kurram		
	2020-21	2021-22	2022-23
Coal	16,852	16,650	38,390
Copper			71
Soap Stone		38,812	4,149

3.14.4.4 Tourism

Kurram District is a region with significant untapped tourism potential and is a scenic and culturally diverse region with immense tourism potential. It is known for its lush green valleys, fruit orchards, mountainous landscape, and unique tribal culture. Kurram is surrounded by picturesque mountains, lush green valleys, and flowing rivers. The region's natural beauty is comparable to other popular tourist destinations in northern Pakistan, such as Swat and Chitral. Despite its beauty, tourism remains underdeveloped due to security issues in the past and limited infrastructure.

3.14.4.5 Major Tourist Attraction in Kurram

A) **Parachinar**

District Headquarters and the most developed area in Kurram. Famous for pleasant summer weather and beautiful views of snow-capped mountains. Lush greenery and pine forests surround the town, offering natural beauty and picnic spots.

[88] Directorate General of Industries and Commerce KP
[89] Development Statistics of KP 2023-24

B) **Shalozan Valley**

It is Famous for Orchards: Known for apple, apricot, walnut orchards and Spring Blossom Season: The valley is especially attractive in spring when fruit trees are in full bloom. Ideal for Photography & Nature Lovers: Offers stunning landscapes and a peaceful environment.

C) **Tari Mangal (Teri Mangal)**

It is near the Afghan border with scenic views of the surrounding mountains. and offers a glimpse into the tribal lifestyle and Pak-Afghan border culture.

D) **Zeran Valley**

It Known for its fertile lands and cultivation of fruits and vegetables and Offers nature trails and peaceful rural scenery.

E) **Pewar (Pewar Tangi)**

Famous for its pine forests and mountainous terrain. It is near the Pak-Afghan border and used as a traditional trade route. it suitable for hiking and camping activities.it Known for its pine forests and mountainous terrain.

3.14.4.6 Challenges and Potential

Despite its huge tourist potential Kurram has suffered due to past militancy and sectarian tensions. There is poor road connectivity to mainland Khyber and Pakistan. In addition to its lack of hotels and tourist facilities in the region does not help in promoting tourism. In recent there have been no effort to promote tourism in the region. Kurram District has immense potential to become a major tourist destination in Pakistan, offering a mix of natural beauty, cultural heritage, and adventure opportunities. With proper infrastructure development, security improvements, and strategic promotion, Kurram could emerge as a key player in Pakistan's tourism industry like Swat and Chitral.

3.14.5 Key Economic Drivers

Key economic drivers are fundamental sectors, activities, or factors that significantly influence and sustain the economic performance and growth of a region, country, or industry. These drivers are crucial because they directly impact overall economic stability, development, and prosperity. They can be broadly categorized into primary and secondary drivers.

District Kurram economy is supported by a combination of primary drivers such as agriculture, mining, with secondary drivers including cattle farming, and tourism.

3.14.5.1 Primary Economic Drivers

Primary economic drivers are the core sectors or activities that form the foundation of an economy. They typically include natural resources such as agriculture, mining, and energy production, as well as manufacturing and industry, which involve the production and processing of goods. These primary drivers provide the essential resources and outputs that fuel economic activities and growth.

3.14.5.1.1Trade and Commerce and Industry

Trade and commerce is the primary economic driver in Kurram district. It has significant trade potential due to its strategic location, natural resources, and proximity to Afghanistan. Kurram already sees informal cross-border trade with Afghanistan, including the exchange of goods like fruits, vegetables, spices, and textiles. Formalizing and expanding this trade could boost the local economy. By establishing proper trade mechanisms, such as customs facilities and trade agreements, could enhance the volume and efficiency of cross-border trade. Establishing SEZs, logistic hub and trade center in Kurram could attract investment and promote industrial growth, particularly in sectors like agriculture processing, mining, and manufacturing.

3.14.5.1.2Agriculture

Agriculture is the backbone of District Kurram economy, supporting the livelihoods of a significant portion of the population. Key crops include wheat, Maze and various fruits and vegetables. The district's agricultural productivity is influenced by factors such as climate, soil quality, and irrigation practices. The sector contributes substantially to local employment and food security.

3.14.5.1.3 Livestock

Livestock farming is primary livelihood in the district due to district population being mostly rural. This contribute significantly to local livelihood and is the primary main economic driver in District

3.14.5.1.4 Mining

The mining sector plays a crucial role in Kurram district economy, with significant mineral resources such as coal and Laterite. These resources are essential for local industries, including energy production and construction. Mining activities also create job opportunities and contribute to regional development.

3.14.5.2 Secondary Economic Drivers

Secondary economic drivers are supportive sectors that enhance and complement the primary drivers. These include various services such as retail, healthcare, education, and tourism, as well as infrastructure like transportation, construction, and utilities. While not the primary sources of economic output, these secondary drivers play a crucial role in supporting and expanding the economic framework established by the primary sectors.

3.14.5.2.1 Tourism

While not as developed as other sectors, tourism has potential as a secondary economic driver in District Kurram. Attractions such as local bazaars, cultural events like melas, and natural landscapes offer opportunities for tourism-related activities. Expanding tourism infrastructure and promoting local attractions can enhance economic growth and diversify revenue sources.

3.14.5.2.2 Construction

The construction sector benefits from both the demand for residential and commercial buildings and the availability of local resources such as limestone and gypsum. Infrastructure projects, including roads and public buildings, contribute to economic development and improve connectivity within the district.

To finance, and logistical challenges, which could hinder the sector's growth if not properly addressed.

By addressing these challenges and leveraging its existing resources, District Kurram has the potential to transform its industrial sector, fostering economic growth, job creation, and regional development.

3.14.5.2.3 Manufacturing

Small-scale manufacturing units that process agricultural products, such as flour mills and food processing plants, add value to raw materials and create job opportunities. Traditional crafts and manufacturing, including products made from Mazari (a local palm), contribute to the local economy and can attract tourism.

3.14.6 Current and Projected Employment Generation

The district economy significantly contributes to employment generation across various sectors, enhancing residents' livelihoods and driving local economic growth. The primary sector, which includes agriculture and mining, provides a substantial portion of jobs in many districts. In agricultural regions, activities such as farming, animal husbandry, and crop production not only offer numerous employment opportunities but also support ancillary businesses and services.

3.14.8 Employment

The Labor Force Survey (LFS) for 2020-2021[90]provides critical insights into the current employment landscape in District Kurram, reflecting broader national trends in labor distribution across various sectors. The survey reveals that Kurram labor market is characterized by a strong rural presence, with the majority of the working-age population residing in rural areas. Employment in Kurram District is primarily concentrated in the services sector, mirroring the national shift towards tertiary activities. However, agriculture remains a vital source of employment in the district's rural areas, while industrial employment also plays a significant role. The data underscores the gender disparities in labor force participation, with women being significantly underrepresented across all sector.

[90] Labour Force Survey 2020-21

Table 3-132 : Labour Force Data Kurram District

The Labour Force Survey (LFS) 2020-21 data provide an overview of employment and labor force

S.No	Indicator	LFS 2020-21			
			Total	**Male**	Female
1	Working Age Population (000)	**All Areas**	432	206	226
		Rural	422	201	220
		Urban	11	5	6
2	Labour Force (000)	**All Areas**	175.1	125.6	49.6
		Rural	171.0	122.0	49.0
		Urban	4.1	3.5	0.6
3	Employed (000)	**All Areas**	162.4	116.9	45.5
		Rural	158.7	113.5	45.2
		Urban	3.7	3.3	0.4
4	Unemployed (000)	**All Areas**	12.7	8.7	4.0
		Rural	12.3	8.5	3.8
		Urban	0.4	0.2	0.2
5	Refined Participation Rate	**All Areas**	40.5	60.9	21.9
		Rural	40.6	60.7	22.2
		Urban	38.0	70.1	9.9
6	Unemployment Rate	**All Areas**	7.3	6.9	8.1
		Rural	7.2	7.0	7.8
		Urban	9.9	5.6	36.3
7	Employment to Population Ratio	**All Areas**	37.6	56.7	20.1
		Rural	37.6	56.4	20.5
		Urban	34.2	66.2	6.3
8	Employment by Sector (%)	**Agriculture**	**31.6**	**32.4**	29.7
		Rural	32.3	33.3	29.9
		Urban	1.8	2.0	-
		Industry	**26.6**	**29.4**	19.3
		Rural	26.8	29.9	19.2
		Urban	16.2	13.8	37.8
		Services	**41.8**	**38.2**	51.0
		Rural	40.8	36.8	50.9
		Urban	**82.0**	**84.1**	**62.2**

indicators for a specific region, broken down by gender and sector.

- **Labour Force and Employment**: A total of 41% of the working-age population is in the labor force, with a slightly higher participation from men (60.9%) than women (21.5%).

- **Sectors of Employment**: The largest share of employment is in the **services sector** (41.8%), followe d by **agriculture** (31.6%) and **industry** (26.6%). Women are predominantly employed in the services sector, while men are more equally distributed between agriculture, industry, and services.
- **Unemployment**: The unemployment rate stands at 7.3% overall, with a higher rate for woman (8.1%) than for men (6.9%).
- **Gender Disparities**: There are notable gender disparities, with men having a significantly higher share of employment in agriculture and industry, while women dominate the services sector.

These figures reflect key aspects of the labor market, highlighting both employment opportunities and gender-based differences in labor force participation.

3.14.8.1 Future Employment Generation

District Kurram employment prospects are set to evolve significantly due to various factors driving economic development. The future employment landscape in District Kurram will be shaped by economic diversification, infrastructure development, and sectoral growth. By leveraging these opportunities, the district can expect enhanced employment prospects and continued economic advancement.

3.14.8.2 Commerce, Trade and industry

Despite being second busiest border crossing after Torkham, Trade sector is underdeveloped, has significant growth potential due to the region's natural resources and the possibility of regional trade potential and developing small-scale industries. Future growth is projected to be robust if there are investments in infrastructure, such as roads, energy, and industrial zones. Expansion in mining, construction, and manufacturing could drive employment and diversify the economy. Implementing skill development programs tailored to these industries will be crucial for supporting this anticipated growth.

3.14.8.3 Agriculture Sector

Currently, agriculture dominates the rural areas of the district, driven by a reliance on traditional farming and livestock. Future employment in this sector is expected to rise moderately with the introduction of modern farming practices, improved irrigation systems, and crop diversification. The integration of technology and enhanced market access are likely to boost productivity. Additionally, initiatives such as community-based forestry and agroforestry could further increase employment opportunities and income within the agricultural sector.

3.14.8.4 Services Sector

The services sector is presently the leading contributor to employment, especially in urban areas, encompassing retail, healthcare, education, and government services. Anticipated growth in this sector will likely continue, fueled by urbanization, population growth, and increasing demand for services. The expansion of digital services, tourism, and transportation is expected to further bolster this growth. Investment in education and vocational training will be essential to meet the demand for skilled labor in the services sector.

3.14.9 Constraints

- Trade in Kurram has been hindered by security issues and frequent border closure

- Despite being border district, it lacks proper trade facilities like modern trade centers
- There is lack of storage availability in the district hindering any progress in relation to regional trade an d logistics hub
- The industrial sector's underdevelopment is due to insufficient infrastructure, such as roads, energy, and industrial zones, hindering potential growth.
- The mining sector's growth is constrained by the need for modernization, advanced mining technologies, and better infrastructure to ensure safety and efficiency.
- The lack of heavy industries in the district, despite the proximity to raw materials, limits large-scale industrial development and associated employment opportunities
- Lack of tourist infrastructure especially road connectivity and hotels limiting tourism in the district
- Gender disparities in labor force participation, particularly in agriculture and industry, limit economic opportunities for women.
- Limited access to modern farming techniques and irrigation infrastructure hampers agricultural productivity and diversification efforts in rural areas.
- Inadequate road networks, parking facilities, and public transportation within commercial areas reduce accessibility and hinder economic activity.
- Insufficient investment in modern irrigation technologies, such as drip and sprinkler systems, prevents optimization of water use and crop yields.
- The services sector, though dominant, faces challenges in meeting the growing demand for skilled labor due to inadequate vocational training and education facilities.

3.14.10 Recommendation

- Establishing trade and logistic hub in the region can provide better economic opportunities to local
- Establishing cross border facilitation center to boost regional trade
- Promote balanced trade and commerce by upgrading infrastructure and transitioning from traditional markets to modern commercial practices.
- Develop modern logistics and warehousing facilities to attract businesses and stimulate economic growth in the district.
- Develop infrastructure, such as roads, energy supply, and industrial zones, to support the growth of the industrial sector and attract investment.
- Establishing Special Economic Zones (SEZs) can attract foreign direct investment and stimulate industrial growth. SEZs offer fiscal incentives, simplified regulatory procedures, and necessary infrastructure to support industrial activities
- Improving security situation in the district is pivotal to district economy
- Promote the establishment of heavy industries by leveraging the proximity to raw materials, facilitating large-scale industrial development, and creating employment opportunities.
- Kurram has untapped mineral resources. Setting up mineral processing and value addition facilities can create jobs and add value to the local economy
- Investing in modern agricultural techniques and providing farmers with access to better resources can increase productivity. Promoting cash crops and high-value agricultural products can also boost the local economy
- Establish an agro-industrial zone to enable value addition to agricultural products, stimulate job creation, and enhance the local economy.
- Address the gaps in the services sector by investing in vocational training and education facilities to meet the growing demand for skilled labor.

- Improve road networks, parking facilities, and public transportation within commercial areas to increase accessibility and support economic activity.

3.14.11 Future Proposed Intervention

Below is a comprehensive table of Proposed Future Interventions for the Overall District Economy of Kurram, structured in a sector-wise format, covering Agriculture, Industry, Trade, Infrastructure, Human Capital, Tourism, Women & Youth Employment, and Services.

The proposed economic interventions for Kurram District present a comprehensive and inclusive roadmap to transition the region from a subsistence-based and informal economy into a dynamic, diversified, and formalized economic zone. By targeting key sectors such as agriculture, livestock, trade, industry, infrastructure, tourism, women and youth empowerment, and digital commerce, these initiatives aim to unlock the district's natural, geographic, and human capital potential.

Table 3-133 Major Interventions for the District Economy

Sector	Proposed Intervention	Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Agriculture & Livestock	1. High-Value Crop Diversification (Beans, Chilli, Apricot, Medicinal Herbs)	Shift from subsistence to commercial farming	Introduce certified seeds, drip irrigation, farmer cooperatives	Increase in farm income	Agriculture Dept, FAO, NGOs
	2. Livestock Healthcare & Artificial Insemination Program	Improve animal productivity	Mobile vet units, breed improvement, fodder banks	Higher milk & meat output	Livestock Dept, PPAF, BRSP
	3. Community-Based Cold Storage & Solar Drying Units	Reduce post-harvest losses	Solar tunnels, small-scale chillers in villages	Reduction in losses	SMEDA, NGOs, KP Agriculture
Industry & SMEs	4. Small Industrial & Processing Estate (SIP)	Formalize cottage industries	Estate with plots, power, water, lab	Employment Generation	KP Industries Dept, BOIT, ADB
	5. Equipment Leasing & SME Credit Fund	Enable mechanization & scaling	Islamic leasing for tractors, crushers, dryers	Access to capital for SMEs	ADB, NRSP, Akhuwat
Trade & Commerce	6. Border Trade Facilitation Hub (Kharlachi)	Legalize and scale cross-border trade	Customs unit, warehouse, cold chain	Reduction in smuggling, higher revenue	Customs, TDAP, KP Govt
	7. Digital Buyer-Seller Matchmaking & Export Platform	Expand market reach	Online trade portal, monthly fairs	Increased exports to Afghanistan & GCC	Chamber, SMEDA, UNDP
Infrastructure & Connectivity	8. Upgradation of Feeder & Link Roads to Markets & Border	Reduce logistics time	Paving rural roads, truck lay-bys, signage	Lower transport cost by 30%	C&W Dept, NHA
	9. Community Solar Electrification for Markets & Clusters	Improve energy reliability	Off-grid solar systems for processing hubs	Improved uptime for SMEs	Energy Dept, NGOs
Women Economic Empowerment	10. Women Enterprise Clusters & Cooperative Business Units	Shift home labor to income-based work	Shared machines, branding, market stalls	women engaged in formal economy	Women Dev Dept, NGOs
Youth Employment & Skills	11. Vocational & Freight Logistics Training	Employ youth in logistics & trade	Training in customs, loading, packaging	Skilled workforce & reduced migration	TEVTA, NAVTTC
Tourism & Cultural Economy	12. Development of Heritage & Eco-Tourism Trail (Parachinar–Shalozan–Maidan)	Promote rural tourism	Trekking sites, homestay certification	New income for mountain villages	Tourism Dept, NGOs
Public Services & Governance	13. Mobile Governance Units (Registration, Licensing, Dispute Resolution)	Improve state presence & ease of doing business	One-window teams visiting villages	Increased trust & documentation	Local Govt, SMEDA
Digital Economy & E-Commerce	14. Kurram E-Marketplace for Local Products	Brand Kurram as a product identity	Packages, certification, Amazon/Daraz listing	National & global digital reach	KP IT Board, TDAP

Collectively, the interventions will improve agricultural productivity, enhance livestock outputs, and reduce post-harvest losses through value chain support. The formalization of small industries and cottage enterprises, especially through infrastructure and access to credit, will generate employment and foster local manufacturing. Strategic development of the Kharlachi border trade hub and digital trade platforms will legalize cross-border commerce, expand market access, and increase government revenue.

Investments in road connectivity and off-grid solar energy will reduce operational costs for businesses and improve access to markets. Simultaneously, women-led enterprise clusters and youth logistics training will enable inclusive economic participation and reduce outmigration. The development of an eco-tourism trail and digital branding of local products will create new income streams while preserving cultural heritage.

Ultimately, these interventions are designed to create jobs, raise household incomes, strengthen governance, and position Kurram as a strategic trade and economic corridor linking Pakistan with Afghanistan and Central Asia. If implemented effectively, they will foster long-term, sustainable development and economic resilience in the region.

3.15 LAND MANAGEMENT SYSTEM

3.15.1 Land Management

Land serves as the foundation for human decisions, both social and economic, manifesting physically through land use. It is a primary source of human satisfaction, providing financial security, pleasure, and stability. Effective land management requires the organization of various activities in a structured and planned manner. The history of land management in the subcontinent dates back centuries, reflecting its significance in societal development.

Land management encompasses a regulatory framework, institutional arrangements, systems, and processes that govern the determination, allocation, administration, and documentation of land. This includes defining approved land uses, adjudicating rights, registering titles, recording transactions, and assessing land value and taxes. The three core components of land administration are:

- Land Rights Registration and Management
- Land Use Allocation and Management
- Land Valuation and Taxation

3.15.2 Land Management in Khyber Pakhtunkhwa

3.15.2.1 Administrative Setup

The Chief Land Commissioner oversees the recovery of government dues, including agricultural income tax, land revenue, water rates, ushr (religious tax), mutation fees, stamp duty, registration fees, copying fees, and arrears related to banks and cooperative societies.

The Director of Land Records (DLR), under the Chief Land Commissioner's supervision, manages land records across all districts in Khyber Pakhtunkhwa (KP). At the district level, the DLR is supported by a team comprising the Chief Settlement Officer, Settlement Officer, Tehsildar, Naib Tehsildar, Kanungo, and Patwari. The DLR supervises these agencies and inspects compiled records of rights and statistical data.

The Kanungo acts as a liaison between the Tehsil Officer and Patwari, overseeing their work. Each Tehsildar is assisted by an Office Kanungo who consolidates information on Patwari performance. The Patwari is responsible for maintaining land records at the grassroots level.

3.15.2.2 Legislative Framework

Several laws govern land management in KP that address landlord-tenant relationships, mortgages, tax assessments, agricultural income tax, local rates, and public land acquisition. Key legislation includes:

- Land Revenue Act 1967
- NWFP Tenancy Act 1887
- Pre-Emption Act
- Land Acquisition Act
- Registration Act 1908
- Land Consolidation Act 1960
- Transfer of Property Act 1982
- Land Reforms Act

Supporting rules and manuals include:

- Land Revenue Rules
- Settlement Manual Rules
- Land Record Manual
- Land Administration Manual

3.15.2.3 Land Administration Processes

The Board of Revenue (BOR) oversees various land administration processes at provincial and local levels (Patwar Circle). Common processes include:

- Fard Malkiyat (Ownership Document) Process
- Register Haqdaran Zamin (Land Registration) Process
- Fard Badar (Error Correction) Process
- Gardawari (Inspection) Process
- Mutation Process

3.15.2.3.1Types of Land Records

Land records are maintained at Tehsil offices with records established during settlement periods. The Patwari maintains various maps and registers including:

- Field Map
- Field Book
- Shajra Kishtwar
- Register Haqdaran-e-Zamin (Jammabandi)
- Register of Mutations
- Register Khasra Girdawari
- Lal Kitab (Village Notebook)
- Fard Bach
- Roznamcha Waqiati

3.15.3 Challenges in the Land Management System

3.15.3.1 Institutional Issues

The current Land Administration System (LAS) primarily focuses on fiscal aspects like tax collection rather than securing land rights. While land records identify taxpayers and tax values, they fail to clearly define ownership rights, leading to legal insecurity. The system's heavy reliance on Patwaris for transactions creates inefficiencies due to multi-level approvals involving Kanungos, Naib Tehsildars, and Tehsildars.

3.15.3.2 Technical Issues

Land records are maintained in outdated paper formats lacking updated geographical information. Cadastral maps do not include latitude/longitude data, creating discrepancies between maps and ground realities. Records of rights are updated only every 25–35 years—insufficient for modern development needs—and many registers are in poor condition.

3.15.4 Kurram Land Management

3.15.4.1 Land Ownership

In Kurram District, land ownership is deeply rooted in tribal traditions where land (zmaka) is considered a valuable asset tied to identity and power. Communal land (shamilat) is collectively owned by tribes with income shared among members. Historically, land distribution has followed clan (khel), lineage (tappa), and household (kor) structures overseen by tribal elders (Mashar).

Urban areas predominantly feature communal land occupied by various lineages within the Kurram tribe both Shia lineages such as Parachinar area and Sunni-populated areas like Sadda area.

3.15.4.2 Land Transfer

Land transfer practices in Kurram are distinct from other regions due to sectarian boundaries; Shia and Sunni communities rarely transact across sect lines. Transactions occur within clans with agreements documented on plain or stamped paper verified by tribal elders through Jirgas (tribal councils). The Political Administration oversees these processes to ensure transparency.

3.15.4.3 Land Entitlement

Acquiring land entitlement requires permission or a No Objection Certificate (NOC) from relevant authorities before any development work can proceed; however, the lack of formal ownership records complicates this process.

3.15.4.4 Government Land Entitlement

In former tribal areas like Kurram District, cultural norms discourage outright sales of communal lands; instead, these lands are often leased to the government for development projects with compensation negotiated through Jirgas.

3.15.4.5 Compensation Mechanisms

The government employs various methods for compensating landowners when acquiring land for public purposes:

- Purchasing land at market value for projects.
- Compensating with jobs or cash payments.
- Ensuring fair compensation through negotiated agreements with tribal elders.

3.15.5 Range Land Future Proposed Intervention

Rangelands in Kurram District are vital for local livestock grazing, ecosystem services, and rural livelihoods, particularly in areas with limited cultivated land. However, overgrazing, deforestation, and land degradation have severely reduced the productivity and sustainability of these rangelands.

To restore and sustainably manage rangelands in Kurram, the following future interventions are proposed:

3.15.5.1 Rangeland Rehabilitation and Reseeding

This intervention aims to restore degraded grazing lands by reseeding native grasses and improving soil conditions. Techniques like erosion control and moisture conservation will be used to enhance vegetation cover, which increases fodder availability and prevents further land degradation.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Restore degraded pastures for livestock grazing	- Mapping degraded areas	- Improved fodder supply	Livestock Dept, Forest Dept, FAO, NGOs
	- Reseeding with native grasses	- Reduced erosion	
	- Erosion control & soil moisture techniques	- Regenerated vegetation	

3.15.5.2 Community-Based Rangeland Management Committees (CRMCs)

Locally formed committees will manage grazing activities, develop seasonal grazing plans, and promote rotational use of pastures. This encourages community ownership, reduces overgrazing, and ensures sustainable rangeland use.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Local stewardship of communal grazing lands	- Form grazing committees	- Reduced overgrazing	Local Govt, Livestock Dept, BRSP, PPAF
	- Create seasonal grazing plans	- Increased local ownership	
	- Local monitoring and enforcement	- Sustainable land use	

3.15.5.3 Silvo-Pastoral System Development

This approach integrates trees with pasture and livestock systems. Fodder trees will be planted alongside grasslands to provide additional feed, shade, and fuelwood, while improving biodiversity and soil fertility.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Integrate trees, fodder crops & livestock grazing	- Plant fodder trees (e.g., Acacia)	- Multi-purpose land use	Forest Dept, Livestock Dept, UNDP, GIZ
	- Mix pasture with legumes	- Resilience to climate shocks	
	- Promote agroforestry techniques	- Increased biodiversity	

3.15.5.4 Community Fodder Banks and Drought Resilience Zones

To ensure year-round fodder availability, fodder reserves will be established and preserved using silage and haymaking. This will help communities withstand dry seasons and reduce livestock losses during droughts.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Ensure year-round fodder availability	- Establish fodder reserves	- Reduced livestock loss in drought	Livestock Dept, Agriculture Dept, FAO
	- Grow drought-tolerant fodder crops	- Improved animal health	
	- Train in fodder preservation (silage, hay)	- Increased resilience	

3.15.5.5 Capacity Building and Awareness Programs

Training programs will educate herders on sustainable grazing practices, pasture maintenance, and animal health. These sessions will improve rangeland use efficiency and long-term productivity.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Educate herders on sustainable practices	- Field schools and mobile training	- Improved grazing practices	Livestock Dept, NGOs, TEVTA
	- Vet camps with pasture awareness	- Knowledge transfer	
	- Distribute grazing calendars	- Long-term range sustainability	

3.15.5.6 GIS-Based Rangeland Mapping and Monitoring

Advanced tools like satellite imagery and GIS will be used to map rangelands, track degradation, and support data-driven decision-making. This ensures better planning and timely interventions.

Objective	Key Actions / Components	Expected Impact	Lead / Supporting Agencies
Enable data-driven planning & monitoring	- Satellite & drone mapping	- Evidence-based decisions	KP Forest Dept, SUPARCO, Livestock Research Institute
	- Develop rangeland atlas	- Prevention of overuse	
	- Set up local monitoring teams	- Informed policy-making	

The proposed interventions collectively aim to restore degraded rangelands, promote sustainable grazing, and ensure year-round fodder availability for livestock-dependent communities in Kurram District. By combining ecological restoration, community-based management, and modern monitoring tools, these measures will enhance livestock productivity, protect the environment, and build resilience against climate shocks. With proper implementation, they will transform rangelands into a sustainable resource base, supporting both rural livelihoods and long-term economic stability in the district.

3.16 Potential Tourism Strategies

3.16.1 Vision Statement

"A peaceful, prosperous, and inclusive Kurram District, committed to upholding the rule of law, fostering education, and ensuring the provision of essential services for the well-being of its residents. Vision is to transform Kurram into a vibrant hub of economic prosperity, social harmony, and environmental stewardship, where all stakeholders collaborate to cultivate a thriving community by 2045"

3.16.2 Strategic Objectives

- Develop eco-tourism, adventure, and cultural tourism in line with the KITE/NESPAK tourism vision.
- Promote Chapri Bangla, Shalozan–Bagh-e-Laila, and Peiwar Pass as flagship destinations.
- Strengthen infrastructure, access roads, and tourist facilities in key clusters.
- Introduce community-based and PPP models to ensure local ownership.
- Protect natural biodiversity, forests, and heritage sites through regulated zoning.
- Enhance Parachinar's role as the tourism gateway for the district.

3.16.3 Potential Tourist Sites in Kurram

1. Parachinar

As the capital of Kurram District, Parachinar is renowned for its lush greenery, cool climate, and scenic landscapes. The town is adorned with Chinar trees, after which it is named. Visitors can explore the local markets, enjoy the serene environment, and experience the hospitality of the local tribes. The town's proximity to Afghanistan adds to its unique cultural blend.

2. Mount Sikaram

Standing at 4,755 meters, Mount Sikaram is the highest peak in the Spīn Ghar (Safed Koh) mountain range. Located on the Afghanistan–Pakistan border, it offers challenging treks and panoramic views of the surrounding valleys. The mountain holds historical significance, having been a site of military importance during the British colonial era.

3. Peiwar Pass

Peiwar Pass, also known as Kurram Pass, is a mountain pass that connects Paktia Province in Afghanistan to Kurram District in Pakistan. It has historical importance, having been the site of a significant battle during the Second Anglo-Afghan War. The pass offers stunning views and serves as a gateway between the two countries.

4. Tari Mangal

Tari Mangal is a town located near the Durand Line, the border between Pakistan and Afghanistan. It is known for its moderate climate, making it a popular destination during the summer months. The town has historical significance, having served as a Mujahideen camp during the Soviet-Afghan War. Visitors can explore the local culture and enjoy the scenic beauty of the area.

5. Chapri

Chapri is a historical site in Kurram District, known for its ancient fortifications and strategic location. The site offers insights into the region's military history and provides opportunities for exploration and photography. Its elevated position offers commanding views of the surrounding landscapes.

6. Shalozan

Shalozan is a picturesque area in Kurram District, known for its lush green fields and tranquil environment. The region is ideal for nature walks, picnics, and experiencing the rural lifestyle of the local tribes. Its serene atmosphere makes it a perfect getaway for those seeking peace and natural beauty.

7. Zairan

Zairan is a village in Kurram District, offering a glimpse into the traditional lifestyle of the local communities. The area is surrounded by natural beauty, including forests and rivers, providing opportunities for eco-tourism and cultural experiences. Visitors can engage with the local tribes and learn about their customs and traditions.

8. Khar Lachi Fort

Khar Lachi Fort is an ancient fortification located in Kurram District. The fort holds historical significance and offers insights into the region's past. Its strategic location provides panoramic views of the surrounding areas, making it a worthwhile visit for history enthusiasts and photographers.

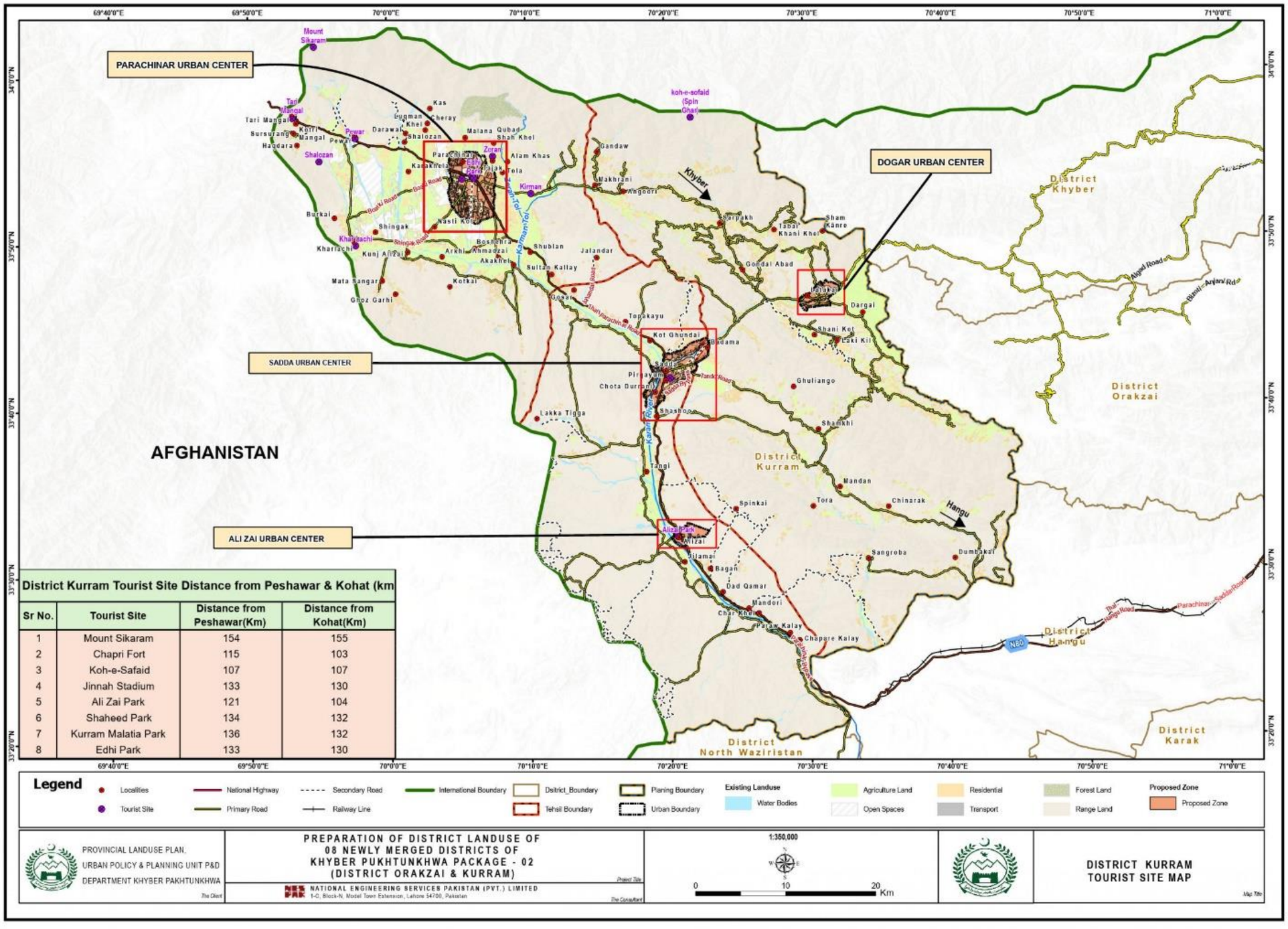
9. Kirman

Kirman is a village in Kurram District, known for its agricultural activities and traditional lifestyle. The area offers a peaceful environment, with opportunities to experience rural life and engage with local communities. Visitors can enjoy the simplicity and tranquility of village life in Kirman.

10. Koh-e-Sufaid

Koh-e-Sufaid, meaning 'White Mountain,' is a mountain range in Kurram District. The range is known for its snow-capped peaks and rugged terrain, offering challenging trekking opportunities. The area is less frequented by tourists, providing a pristine environment for adventure seekers and nature lovers

These attractions highlight the diverse offerings of District Kurram, from historical sites to natural wonders. As tourism infrastructure develops, these sites have the potential to become significant destinations for travelers seeking unique experiences in Pakistan.



District Kurram Tourist Site Distance from Peshawar & Kohat (km

Sr No.	Tourist Site	Distance from Peshawar(Km)	Distance from Kohat(Km)
1	Mount Sikaram	154	155
2	Chapri Fort	115	103
3	Koh-e-Safaid	107	107
4	Jinnah Stadium	133	130
5	Ali Zai Park	121	104
6	Shaheed Park	134	132
7	Kurram Malatia Park	136	132
8	Edhi Park	133	130

Map 3-44: Protentional Tourism Sites in District Kurram

3.16.4 Tourism Clusters and Key Sites

Cluster	Major Attractions	Tourism Type
Chapri–Shalozan–Bagh-e-Laila Cluster	Chapri Rest House, Bagh-e-Laila, Robert Garden, Malana Dam	Eco-Tourism, Adventure, Resort Tourism
Mountain & Border Cluster	Mount Sikaram, Koh-e-Sufaid, Peiwar Pass	Mountain, Hiking, Border Eco-Tourism
Cultural & Heritage Cluster	Khar Lachi Fort, Tari Mangal, Parachinar Bazaar	Heritage, Cultural & Religious Tourism
Valley & Nature Cluster	Zairan, Kirman, Shalozan	Eco-Recreation & Agri-Tourism
Urban Tourism Cluster	Parachinar City, Circuit House Park	Urban, Recreational, Hospitality Tourism

3.16.5 Key Challenges

- Limited access roads (e.g., only partial road to Chapri Bangla and Bagh-e-Laila).
- No reliable water, electricity, sanitation, or waste management systems.
- Poor or nonexistent tourist accommodation.
- Lack of trained tourism and hospitality staff.
- Environmental degradation risks (deforestation, littering, wildlife disturbance).
- Weak branding and marketing of Parachinar's tourism potential.
- Lack of signage, rest areas, and tourist information services.

3.16.6 Policy Framework and Zoning Guidelines

3.16.6.1 Policy 1: Sustainable & Eco-Friendly Tourism

- Apply Environmental Impact Assessments (EIA) and Eco-RAM criteria for all sites.
- Establish protected eco-tourism zones around Bagh-e-Laila, Chapri, and Koh-e-Sufaid.
- Prohibit uncontrolled construction and deforestation.
- Introduce renewable energy systems (solar, wind, hydro micro-turbines) in resorts.

3.16.6.2 Policy 2: Infrastructure & Accessibility

- Upgrade Tall–Parachinar–Chapri–Shalozan road corridor.
- Pave internal access roads to Bagh-e-Laila and Chapri (2–2.5 km new blacktop).
- Install signage, rest points, parking, and emergency services at all major sites.
- Revive Parachinar Airport (PIA flights) for tourism and business access.

3.16.6.3 Policy 3: Cultural Heritage & Community-Based Tourism

- Restore Khar Lachi Fort and Chapri Rest House with adaptive reuse for tourism.
- Encourage homestays, local guiding, handicrafts, and cultural events.
- Establish Village Tourism Committees (VTCs) in Shalozan, Zairan, and Kirman.

3.16.6.4 Policy 4: Investment and PPP Promotion

- Adopt PPP development model under KPK PPP Act 2020.
- Offer land concessions, tax rebates, and viability gap funding for private investors.
- Encourage resort and cable car investment at Bagh-e-Laila and Chapri.

3.16.6.5 Policy 5: Environmental & Safety Safeguards

- Strictly regulate waste disposal; build a solid and liquid waste management system.
- Enforce a ban on illegal hunting and tree cutting.
- Deploy Tourist Police and Rescue Services.

3.16.6.6 Policy 6: Tourism Marketing and Branding

- Launch a “Discover Kurram” branding campaign under KP Tourism Corporation.
- Promote destinations through social media, digital maps, and travel bloggers.
- Organize annual “Kurram Mountain & Culture Festival” in Parachinar.

3.16.7 6. Proposed Action Plan (2025–2045)

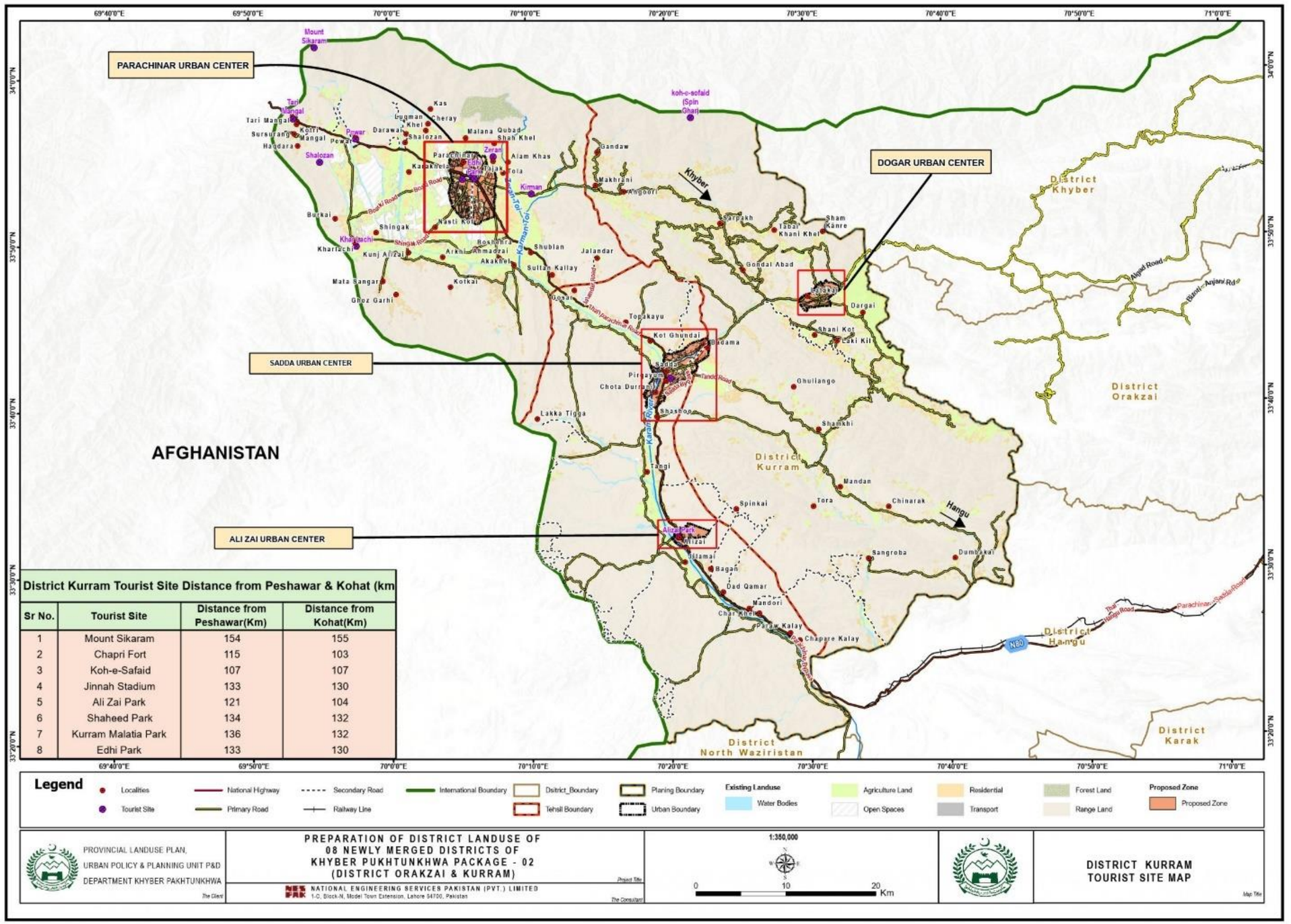
Phase	Timeframe	Key Interventions	Lead Agency
Phase I – Foundation	2025–2030	- Establish Kurram Tourism Development Cell (KTDC). - Upgrade Chapri–Shalozan access road (2.5 km) and Bagh-e-Laila road (2.0 km). - Rehabilitate Chapri Rest House & Circuit House. - Develop Parachinar Tourist Information Centre. - Introduce waste management and water supply systems.	LUBCA, TCKP, C&W Dept., PPP Cell
Phase II – Infrastructure & Facilities	2030–2035	- Construct Eco Lodges at Bagh-e-Laila & Chapri. - Install Zip Line, Chairlift, and Rope Course. - Build parking, restrooms, medical center, and mosque. - Develop Robert Garden Recreational Park. - Launch Homestay Program in Shalozan & Zairan.	TCKP, Local Govt., Private Partners
Phase III – Adventure & Branding	2035–2040	- Develop Adventure Tourism Park (paragliding, snow sports). - Establish Tourist Police & Rescue Services. - Host Kurram Mountain & Culture Festival. - Promote cross-border cultural exchanges (Peiwar Pass, Tari Mangal).	KP Tourism Dept., DPDC, Home Dept.
Phase IV – Expansion & Integration	2040–2045	- Establish Kurram Heritage Museum. - Integrate into KP Tourism Corridor. - Encourage foreign investment in resorts. - Implement Smart Tourism Management System with digital ticketing & GIS monitoring.	KP Govt., TCKP, PPP Partners

3.16.8 Expected Outcomes by 2045

- Tourist arrivals increased by 70% (domestic & foreign).
- Over 8,000 local jobs in hospitality, crafts, and transport.
- Sustainable eco-resorts and adventure parks fully operational.
- Reforestation and conservation programs restoring local biodiversity.
- Tourism contributes 10–12% to the district economy.
- Parachinar recognized as KP's "Mountain Gateway."

3.16.9 Development Guidelines

- Maintain 100–200m ecological buffer around forest and heritage zones.
- Encourage low-rise, local-material architecture (wood, stone, slate).
- Mandatory EIA/IEE for all tourism facilities.
- Introduce visitor caps during peak seasons to protect ecology.
- Develop digital visitor registry and data management via EMIS.



District Kurram Tourist Site Distance from Peshawar & Kohat (km

Sr No.	Tourist Site	Distance from Peshawar(Km)	Distance from Kohat(Km)
1	Mount Sikaram	154	155
2	Chapri Fort	115	103
3	Koh-e-Safaid	107	107
4	Jinnah Stadium	133	130
5	Ali Zai Park	121	104
6	Shaheed Park	134	132
7	Kurram Malatia Park	136	132
8	Edhi Park	133	130

Map 3-45 Potential Reactional sites Map

4 Proposed Land Use Planning and Zoning

Land use planning serves as a foundational pillar of sustainable urban and regional development, providing a structured approach to the spatial organization and management of land resources. It defines how land is allocated for various complementary and competing functions such as residential, commercial, industrial, institutional, recreational, agricultural, and ecological purposes within an integrated planning framework. Through this process, land use planning establishes the conceptual and regulatory basis for zoning mechanisms, ensuring that development occurs in a rational, efficient, and context-sensitive manner aligned with long-term policy objectives.

A well-formulated land use plan minimizes conflicts between incompatible land uses by clearly delineating functional zones, promotes efficient utilization of available land and resources, and mitigates adverse environmental impacts. Moreover, it enhances social well-being by creating equitable, accessible, and livable environments that support sustainable livelihoods. Effective land use planning also underpins the coordination of infrastructure networks, transportation systems, and public utilities, thereby reinforcing the interconnections between spatial form, economic activity, and environmental sustainability.

Zoning, as a critical regulatory instrument derived from land use planning, operationalizes the spatial vision by legally defining the permissible uses, intensity, density, and built form within each designated zone. It is a key governance mechanism for managing growth, ensuring orderly urban expansion, and protecting public interests such as safety, health, and environmental integrity. By setting out clear and enforceable land-use parameters, zoning aligns individual development initiatives with collective planning objectives such as environmental conservation, economic vitality, and social inclusion.

The proposed land use plan and zoning framework have been formulated to respond proactively to projected demographic trends, spatial growth patterns, and evolving socio-economic needs over the next two decades. The plan adopts a balanced and adaptive approach, encouraging compact and sustainable urban growth where appropriate while conserving ecologically sensitive and agriculturally productive areas. This spatial strategy seeks to harmonize development with environmental stewardship, ensuring that urban expansion does not come at the expense of natural habitats or rural livelihoods.

Ultimately, the proposed framework aims to promote a resilient and inclusive spatial structure one that supports sustainable economic development, efficient service delivery, and environmental balance. By integrating land use planning and zoning into a coherent policy and implementation system, the plan aspires to shape a future built environment that is equitable, resource-efficient, and resilient to both demographic pressures and environmental change.

4.1 Proposed Zoning in Urban Area

The proposed zoning framework encompasses a comprehensive range of land use categories designed to accommodate future spatial requirements and foster balanced regional development. While zoning serves as the principal legal and regulatory instrument for guiding and controlling land development, land use planning provides the overarching strategic vision that integrates spatial, socio-economic, and environmental dimensions into a unified and forward-looking framework. Together, these mechanisms form the cornerstone of effective urban governance ensuring that future growth is not only technically feasible but also desirable in terms of livability, functionality, and long-term resilience.

The framework delineates a series of designated zones that collectively structure urban and rural development patterns. These include Residential, Mixed Use, Commercial, Institutional (encompassing Educational, Health, and Public Buildings/Amenities), Agricultural, Industrial, and Recreational zones. Each category is defined by specific objectives, intensity parameters, and development controls that correspond to its intended function within the spatial hierarchy.

This zoning typology establishes the institutional foundation for integrated and regulated land development, enabling the district to transition toward a more sustainable, inclusive, and economically dynamic spatial structure. By coordinating land allocation, infrastructure provision, and environmental management within these designated zones, the proposed framework seeks to optimize land use efficiency, minimize conflicts, and enhance overall spatial harmony.

The following section outlines the methodological approach and planning criteria adopted for each land use zone within the urban areas, detailing their purpose, regulatory provisions, and intended role in achieving the district's broader development vision.

4.1.1 Residential Zone

With the current estimated population living in proposed urban centers, the consultant analyzed household size trends from the earlier available census to propose a realistic household size for 2025 so as to obtain the approximate number of housing units available within the urban boundary. These housing units were then divided by the residential area within proposed urban boundary to get the current housing density.

Now for the plan period requirement, the additional population between 2025 and 2045 was divided by the proposed household size of 2045 to calculate the housing units needed to accommodate the additional population. The additional housing units required till 2045 were then divided by proposed housing density 2045 to get the area required for residential purposes. The housing density proposed for 2045 by the consultant was increased then that of 2025 with the objective to densify the urban growth and optimize land usage.

In the last step to ensure that the proposed residential area is equipped with adequate infrastructure and services, the consultant proposed half of the proposed amount of proposed residential amount (additional 50%) of land for utilities/amenities including but not only limited to basic level private education and health facilities, Mohalla level recreational spaces, water supply network, road infrastructure, community places such as religious buildings, libraries, sewerage and solid waste infrastructure etc. as estimated of the residential zone.

The allocation of residential zones across various urban centers of District Kurram is based on criteria, including accessibility, land availability, existing land use, proximity to employment centers, and access to basic utilities, amenities, and public services. Each proposed zone has been identified through careful analysis of urban growth trends, current development patterns, and future infrastructural expansion with maximum effort to preserve agricultural land wherever possible.

Table 4-1 Urban Area Housing Area Requirements

Area	Current urban area Population 2025	Projected Population 2045	Household Size	Current Estimated Housing Unit 2025	Housing Unit 2045	Required Housing Units	Additional Population 2045	Required Low Income Housing Units (3-5 Mrlas)	Required Middle Income Housing Units (5-10 Mrlas)	Required High Income Housing Units (10-20 Mrlas)	Required Residential Area
Parachinar	60010	99682	8.3	7230	12010	4780	39672	3529	898	352	244.95
Sadda	44935	140901	8.3	5414	16976	11562	95966	8536	2173	851	592.53
Dogar	15150	52884	8.3	1825	6372	4546	37734	3356	854	335	232.99
Ali Zai	29337	60270	8.3	3535	7261	3727	30933	2752	675	274	189.21

4.1.2 Commercial Zone

In formulating the proposal for the establishment of commercial zones within both the existing and proposed urban areas, the consultant has undertaken a comprehensive review of relevant national planning standards, with particular reference to the National Reference Manual of Planning and Infrastructure Standards. The assessment indicates that the existing commercial areas possess sufficient capacity, with a current surplus projected to adequately accommodate commercial needs up to the plan period of up to 2045 and where required by the NRM standard, the necessary requirements shall be fulfilled. This conclusion is derived from the prescribed planning standard of one acre of commercial land per 1,000 population, as stipulated in the aforementioned national manual.

Building on this finding, the consultant has explored alternative strategies for future commercial development, incorporating lessons from international best practices regarding the proportional allocation and spatial distribution of commercial areas. These practices emphasize scaling commercial zones in accordance with existing infrastructure capacity, while simultaneously responding to population growth trajectories, market dynamics, and evolving consumer behaviors. Such a data-informed and adaptive approach ensures that commercial expansion remains balanced, efficient, and sustainable, optimizing both land use and economic outcomes.[91],[92].

The proposed strategy prioritizes long-term sustainability and operational efficiency, aligning the expansion of commercial areas with projected demand patterns and demographic shifts. By integrating internationally recognized planning methodologies, the proposal seeks to maximize accessibility, economic viability, and spatial coherence within the proposed urban framework. This ensures that commercial developments not only serve as economic anchors but also enhance urban livability through well-distributed, accessible retail and service centers.

In addition, the consultant has aligned the proposal with local policy directives, specifically the Khyber Pakhtunkhwa (KP) Urban Policy 2030. In accordance with this policy framework, a portion of the proposed commercial land has been strategically incorporated within the mixed-use zones, promoting integrated, multifunctional development that supports compact urban form and reduces travel demand. The remaining portion of the commercial allocation has been designated for flexible, need-based development, allowing for the emergence of scattered commercial nodes within residential sectors to meet localized retail and service needs.

This hybrid commercial zoning approach combining integrated and decentralized commercial typologies ensures that the urban area evolves into a resilient, accessible, and economically vibrant environment. It facilitates the creation of well-distributed commercial opportunities that are responsive to both macro-level growth projections and micro-level community demands, thereby reinforcing the overarching objectives of balanced urban development and sustainable land use management.

This approach ensures that commercial expansion remains both adaptable and aligned with the broader strategic objectives articulated in the local urban policy framework, thereby fostering a balanced, resilient, and responsive urban environment. By harmonizing spatial development with economic functionality, the proposed strategy supports efficient land utilization while promoting accessibility and economic inclusivity.

[91] Transformation of Residential Land Use, Concomitant Changes and Impacts on Neighborhood Quality in Port Harcourt Municipality

[92] Study on the Application of Crime Zoning Methods Based on Population and Land Use

For urban centers where mixed-use zones have not been proposed, the consultant has recommended the establishment of Central Business Districts (CBDs) as focal points for concentrated commercial activity. These CBDs are envisioned as compact commercial hubs, strategically positioned to enhance urban functionality and ensure efficient service delivery. Their siting has been guided by a set of key locational criteria, including:

- Accessibility from major transportation corridors and arterial roads, facilitating ease of movement for both goods and people.
- Central positioning within the urban fabric, ensuring equitable access for surrounding residential and institutional areas.
- Availability of suitable and appropriately sized land parcels, prioritizing non-agricultural and underutilized areas to prevent encroachment on productive lands.

This targeted approach to commercial zoning and CBD development is intended to strengthen urban structure, encourage compact growth, and enhance the overall economic vitality of the district. By concentrating commercial activity within well-connected and strategically located areas, the proposal ensures efficient land use, reduces travel demand, and contributes to the creation of vibrant, economically sustainable urban centers that align with the long-term vision for regional development.

Table 4-2 District Kurram Commercial Requirements

Year	Population	Existing Commercial (Acres)	Commercial Demand (Acres)	District Commercial Requirements 2045	Proposed Urban Commercial	Additional District Requirements
2025	834,090	280	834.09	554		
2045	1,486,194	-	1486.194	1,206	726	480

Table 4-3 District Kurram Proposed Urban Commercial Requirements

Urban Area	Year	Population	Existing Commercial (Acres)	Commercial Demand (Acres)	Additional Commercial Demand	Proposed Commercial Area
Parachinar	2025	60010	148.10	60.01	-88	
	2045	99,682	148.10	99.68	-48	548.3
Sadda	2025	44935	66.00	44.94	-21	
	2045	140,901	66.00	140.90	75	67.0
Dogar	2025	15,150	4.40	15.15	11	
	2045	52,884	4.40	52.88	48	49.0
Alizai	2025	29,337	1.29	29.34	28	
	2045	60,270	1.29	60.27	59	62.0
Total	2025	149432	219.79	149	-70	0
	2045	353736	219.79	354	134	726

4.1.3 Industrial Zone

The proposed industrial zones have been delineated based on the projection that approximately 5% of the district's total population will be engaged in industrial activities by the planning horizon year 2045. Recognizing the district's abundant mineral resources and its significant potential for future industrial expansion, the consultant has emphasized the strategic role of the industrial sector as a key driver of economic growth and employment generation. In view of this potential, the proposal envisions a strengthened industrial base capable of accommodating the anticipated increase in the industrial workforce while contributing to regional competitiveness and self-sufficiency.

To support this projection, the consultant has adopted the planning standard of 1 acre of industrial land per 50 persons, in accordance with the National Reference Manual of Planning and Infrastructure Standards (NRM).[93] This ratio ensures adequate land provision for industrial operations, associated facilities, and future expansion needs. The allocation is designed to create an industrial environment that is spatially efficient, environmentally responsible, and economically viable, reinforcing the district's capacity to attract both investment and skilled labor.

The proposed industrial land use strategy integrates economic development objectives with sustainability principles, ensuring that industrial growth complements the broader spatial and environmental goals of the district. By aligning industrial zoning with long-term planning horizons, the framework seeks to promote diversified economic activity, employment generation, and balanced urban–rural linkages, contributing to the district's overall prosperity.

The spatial distribution of industrial zones has been guided by a series of key locational criteria, including:

- Accessibility to major transportation corridors and road networks, ensuring efficient movement of raw materials and finished goods.
- Proximity to existing industrial clusters, allowing for synergies and shared infrastructure.
- Availability of suitable, non-agricultural land to prevent displacement of productive farmland.
- Consideration of prevailing wind direction, minimizing potential environmental and health impacts on adjacent residential or institutional areas.

Through this carefully structured approach, the proposed industrial zoning aims to facilitate the development of a sustainable, well-connected, and economically vibrant industrial ecosystem that strengthens the district's role as a regional hub for production, trade, and innovation.

Table 4-4 District Kurram Required & Proposed Industrial Areas

District Population 2045	Total Industrial Requirements	Existing Industrial Area	Proposed Urban LMZ	Additional Requirements for District	Proposed Industrial Zone	Proposed SIDE Site
1,132,457	566	20.8	211	334	**351**	**111**

[93] Ministry of Housing and Works, Environment & Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Section 5.3.1.2, Page 89. The Manual `recommends 50 industrial workers per acre.

Table 4-5 District Kuram Urban Areas Required & Proposed Industrial Areas

Urban Area	Year	Population	Existing & Proposed Industrial (Acres)
Parachinar	2025	60010	20
	2045	99,682	181.0 (As per PAMP)
Sadda	2025	44935	0
	2045	140,901	0.0
Dogar	2025	15,150	1
	2045	52,884	30.0
Alizai	2025	29,337	0
	2045	60,270	0.0
Total	2025	149432	21
	2045	353736	211

4.1.4 Institutional Zone

The institutional zone has been systematically planned to accommodate essential public functions and social infrastructure that support the district's long-term development objectives. To ensure effective spatial organization and functional clarity, the institutional zone is subdivided into three distinct categories; Public Buildings, Health Facilities, and Educational Institutions. Each sub-zone serves a specialized role in promoting community welfare, accessibility to services, and equitable urban development.

This subdivision enables a more targeted allocation of land and resources, ensuring that institutional uses are optimally distributed in relation to population density, accessibility, and future growth patterns. The following sections discuss each of these institutional sub-zones in detail, outlining their planning rationale, locational criteria, and development objectives.

4.1.4.1 Educational Zone

Following a comprehensive assessment of the future demand for educational infrastructure, the consultant has proposed the establishment of a dedicated Educational Zone to facilitate the systematic expansion of learning facilities across the district. This zone is envisioned to accommodate higher-level educational institutions, including those offering post-matriculation and tertiary programs, as well as large-scale private sector educational establishments. The creation of this specialized zone ensures that the district remains well-prepared to meet the increasing demand for advanced education driven by demographic growth and socio-economic development.

In parallel, primary to matriculation-level educational facilities are proposed to be integrated within the residential zones, utilizing specifically allocated land parcels to ensure convenient access to schooling for local communities. This integrated approach supports the development of a comprehensive, inclusive, and decentralized educational system, catering to the diverse learning needs of all age groups while promoting equitable access to quality education across urban and peri-urban areas.

By strategically locating educational institutions within proximity to population centers, the proposal enhances educational accessibility, community cohesion, and social mobility. This spatial distribution also minimizes travel distances for students, reduces pressure on urban transport systems, and contributes to the creation of child-friendly and education-oriented neighborhoods. The strategy aligns with both national educational objectives and the regional development vision, fostering a well-rounded educational infrastructure capable of supporting the district's long-term human capital development goals.

The allocation of the Educational Zone has been guided by a set of key locational criteria, including:

- Proximity to residential developments, ensuring accessibility for students and staff.
- Adjacency to existing educational clusters or open/green spaces, providing opportunities for campus expansion and shared amenities.
- Connectivity to major and secondary road networks, facilitating safe and efficient access.
- Availability of suitable, non-constrained land parcels, enabling future growth while minimizing environmental and spatial conflicts.

Through this balanced and forward-looking approach, the proposed educational zoning framework aims to create a robust, accessible, and future-ready educational landscape that supports the district's broader objectives of sustainability, inclusivity, and socio-economic advancement.

4.1.4.2 Health Zone

Following a comprehensive assessment of the future healthcare demand across the district, the consultant has proposed the establishment of dedicated Health Zones to ensure the systematic development of medical infrastructure capable of meeting both current and long-term population needs. These zones are strategically designated to accommodate large-scale healthcare facilities, including district-level hospitals, specialized medical centers, and major private healthcare institutions. The intent is to create health service hubs that can provide advanced medical care, specialized treatments, and emergency response facilities, forming a critical component of the district's social infrastructure.

In parallel, smaller-scale and primary healthcare facilities are proposed to be integrated within residential zones, utilizing available and appropriately located land parcels to support community-based healthcare services. This decentralized approach ensures that all segments of the population have equitable and convenient access to essential medical care, reducing travel distances and alleviating pressure on tertiary healthcare centers. By distributing health services across different spatial tiers, the proposal encourages a hierarchical healthcare system linking local clinics and basic health units to larger, specialized hospitals within the designated Health Zones.

This framework aligns with the district's broader objectives of sustainable urban development, social equity, and improved public health outcomes. It is designed to deliver a balanced and resilient healthcare network that supports population well-being and enhances the overall quality of life.

The site selection and allocation of Health Zones are guided by a series of key locational criteria, including:

- Accessibility from major and secondary road networks, ensuring efficient patient and emergency access.
- Proximity to existing healthcare facilities, enabling service clustering and resource sharing.
- Availability of suitable, unconstrained land parcels, allowing for future expansion of healthcare infrastructure.
- Adjacency to open or green spaces, promoting a healthy environment and providing opportunities for medical and wellness-related activities.
- Proximity to residential areas, ensuring that healthcare services remain easily accessible to local populations.

Through this structured and evidence-based approach, the proposed Health Facilities Zoning Framework seeks to establish a comprehensive, inclusive, and sustainable healthcare infrastructure that effectively meets the district's evolving medical and social needs while reinforcing its long-term urban development vision.

4.1.4.3 Institutional Zone/Public Buildings

The proposed Institutional Zones, as guided by the standards outlined in the National Reference Manual of Planning and Infrastructure Standards (NRM), have been strategically designated in close proximity to existing public infrastructure and institutional nodes. This spatial strategy is intended to enhance accessibility, operational efficiency, and inter-agency coordination by clustering essential administrative and civic functions within well-connected areas that already possess supporting utilities and services.

By situating these zones near established public and governmental facilities, the proposal aims to optimize land utilization, reduce travel distances for users, and promote functional integration among complementary public services such as administrative offices, community centers, emergency response facilities, and civic institutions. This clustering approach not only strengthens institutional synergy but also contributes to the creation of vibrant civic hubs that serve as focal points for governance and community engagement.

The strategy aligns with the overarching principles of sustainable and inclusive urban development, ensuring that public amenities are well-integrated into the urban fabric and equitably distributed across the district. Such spatial coherence supports effective service delivery, minimizes redundancy in infrastructure investments, and enhances the overall quality of urban life.

The allocation and siting of Public Buildings Zones have been guided by a set of key locational criteria, including:

- Adjacency to existing public buildings or institutional clusters, enabling continuity and collaboration among government and civic services.
- Accessibility to major and secondary road networks, ensuring efficient public access and connectivity.
- Availability of suitable, serviced land parcels, providing adequate space for current needs and future expansion.

Through this carefully structured and context-sensitive approach, the proposed Public Buildings Zoning Framework supports the creation of an efficient, accessible, and well-coordinated

network of civic institutions, reinforcing the district's capacity for effective governance, community service delivery, and sustainable urban management.

4.1.5 Recreational Zone

In formulating the recreational zoning strategy, the consultant has undertaken a comprehensive assessment of the existing recreational land use, encompassing public parks, playgrounds, and sports complexes. Utilizing Geographic Information System (GIS) analysis, the consultant evaluated the spatial distribution and total land area currently allocated for recreational purposes. This data formed the basis for calculating the existing proportion of recreational land relative to the total urban area. The findings were then compared with projected population growth over the plan period to assess future demand and ensure that the proposed recreational provisions remain adequate and equitable.

Through this analytical process, the consultant identified gaps and deficiencies in the current recreational infrastructure, particularly in terms of accessibility, spatial coverage, and diversity of recreational options. The assessment revealed a shortfall in facilities such as parks, playgrounds, and sports complexes, which will become increasingly significant given the district's growing population and urban expansion.

To address these deficiencies, the consultant has proposed the development of additional recreational zones that include both active and passive recreational facilities, in accordance with the recommended percentage ranges outlined in the National Reference Manual of Planning and Infrastructure Standards (NRM). This proposal ensures that future recreational spaces are adequately sized, equitably distributed, and functionally diverse, catering to the varied needs and preferences of different user groups. The approach emphasizes sustainability, inclusivity, and public well-being, recognizing recreational spaces as vital components of a livable and healthy urban environment.

The allocation and distribution of recreational zones across the urban centers of District have been guided by a set of key locational criteria, including:

- Accessibility for nearby residents, ensuring convenient public use.
- Connectivity through major and secondary road networks, enhancing overall accessibility and integration with other land uses.
- Availability of suitable and unconstrained land parcels, providing space for both current needs and future expansion.
- Strategic positioning central or peripheral within the urban structure, depending on the scale and intended function of the facility.

Furthermore, the recreational zones have been subdivided into three primary categories Public Parks, Playgrounds, and Sports Complexes each serving a distinct role within the broader recreational framework. Public parks primarily cater to passive recreation and environmental enhancement; playgrounds provide community-level spaces for children and families; while sports complexes accommodate larger-scale, organized recreational and athletic activities.

This integrated and evidence-based approach ensures that recreational planning not only supports physical activity and community interaction but also contributes to the district's overarching objectives of urban sustainability, livability, and environmental resilience.

4.1.6 Forestation Zone

Forestation refers to the strategic planning, development, and management of trees and green spaces within urban environments to promote ecological balance and enhance urban livability. This concept encompasses a diverse array of green infrastructure elements such as street trees,

public parks, green corridors, gardens, and buffer plantations that collectively contribute to the formation of a sustainable urban forest ecosystem.

Urban forests are integral to sustainable city development, offering a multitude of environmental, social, and economic benefits. Environmentally, they improve air quality by filtering pollutants, reduce urban heat island effects through shading and evapotranspiration, and mitigate flooding by intercepting rainfall and enhancing stormwater infiltration. They also play a crucial role in biodiversity conservation, providing habitats for urban fauna and promoting ecological connectivity.

Socially, green spaces enhance community well-being and public health by offering recreational areas that foster physical activity, relaxation, and social interaction. Numerous studies have linked the presence of trees and greenery in cities to reduced stress levels, lower incidences of mental health issues, and greater community cohesion. Economically, urban forests contribute to increased property values, lower energy consumption through natural cooling, and reduced infrastructure maintenance costs by stabilizing microclimatic conditions.

As cities expand and densify, integrating and maintaining urban forests becomes essential for ensuring urban resilience, environmental sustainability, and climate change adaptation.

In the context of project area, a detailed spatial analysis was conducted using digitized rangeland data to identify potential areas suitable for urban forestation. This analytical approach focused on optimizing the use of underutilized or degraded rangelands, proposing their conversion into functional green assets that contribute to the district's ecological stability. By targeting dilated and unproductive portions of rangeland, the proposed initiative aims to restore environmental integrity, enhance microclimatic conditions, and strengthen the natural landscape within both urban and peri-urban areas.

The proposed Urban Forestation Framework for project area seeks to:

- Rehabilitate degraded lands and improve soil stability through vegetation cover.
- Increase biodiversity and ecological connectivity within urban zones.
- Reduce environmental risks, including soil erosion and flash flooding.
- Provide social and recreational benefits to residents through accessible green spaces.

Through this proactive and data-driven strategy, the urban forestation initiative is envisioned as a key environmental intervention, fostering long-term sustainability, resilience, and quality of life for the communities of the district.

4.1.7 Agricultural Zone

Within the broader context of proposed land use planning and zoning, the delineation of urban and rural agricultural zones plays a pivotal role in achieving sustainable and balanced spatial development. These zones serve as essential components of the district's environmental and economic fabric, contributing directly to food security, ecosystem stability, and community resilience. Both urban and rural agricultural zones perform distinct yet complementary functions, together forming an integrated system that supports the district's sustainable growth and long-term prosperity.

Urban agricultural zones, typically located within urban, suburban, and peri-urban areas, represent a strategic effort to integrate agricultural practices into the city's spatial and functional framework. By utilizing available spaces such as rooftops, vacant plots, and green belts these zones adapt to urban pressures while promoting localized food production, waste recycling, and

green space preservation. In addition to providing fresh produce for nearby communities, urban agriculture contributes to microclimate regulation, carbon sequestration, and urban biodiversity enhancement. It also supports agri-tourism and educational initiatives, creating recreational and learning opportunities for residents while strengthening the cultural connection between people and food production systems.

In contrast, rural agricultural zones encompass large tracts of farmland and rangeland that sustain traditional and mechanized crop and livestock production. These zones underpin rural livelihoods, food supply chains, and agro-based industries, forming the backbone of regional food security. They also play a crucial role in maintaining ecological integrity, supporting watershed functions, and conserving biodiversity. However, both urban and rural agricultural systems face mounting challenges urban zones confront land scarcity and competing development demands, whereas rural areas are increasingly vulnerable to land degradation, water scarcity, and unplanned urban sprawl.

In response to these challenges, the proposed land use and zoning plan for district emphasizes a strategic and sustainable approach to agricultural land management. Acknowledging that a significant portion of the district is already urbanized, the plan prioritizes the preservation of productive agricultural land while accommodating urban growth through efficient spatial allocation. To mitigate the loss of arable land, future development is directed toward non-productive and underutilized areas, including vacant land, barren tracts, and rangelands, rather than encroaching upon fertile agricultural zones.

Agricultural land is considered for development only in exceptional circumstances, where no feasible alternatives exist or where existing agricultural value has already been compromised. This policy ensures that urban expansion remains compatible with long-term agricultural sustainability and that critical food-producing areas are protected for future generations.

Furthermore, the proposed framework advocates for climate-resilient agricultural practices, modern irrigation systems, and soil conservation measures to enhance productivity and environmental performance. It also encourages the establishment of agro-industrial linkages and farm-to-market connectivity to strengthen the district's local economy and reduce post-harvest losses.

Ultimately, the Agricultural Zoning Framework for district seeks to achieve a balanced coexistence between development and conservation, reinforcing the district's commitment to sustainable land use, food security, and environmental stewardship. By integrating agricultural preservation into the core of spatial planning and zoning policy, the plan ensures that growth remains inclusive, resource-efficient, and ecologically sound.

4.2 Recommended Zoning for Urban Area

The proposed urban boundaries have been strategically delineated and divided into a series of functional zones, each designated for a specific land use purpose in accordance with established planning principles and regulatory standards. This spatial division provides a clear framework for guiding urban development, ensuring that future growth within the defined boundaries aligns with the district's planning vision, regulatory guidelines, and sustainable development objectives. The zoning framework serves as a core instrument for managing land use distribution, promoting efficient urban form, and ensuring compatibility among diverse land uses.

Each designated zone whether residential, commercial, industrial, institutional, recreational, or agricultural has been carefully identified based on its suitability, accessibility, and functional interrelationships with surrounding areas. The intent is to promote orderly, inclusive, and sustainable urban growth that balances economic vitality with environmental protection and

social well-being. In line with contemporary urban design and planning principles, the proposed framework ensures equitable access to green and public spaces, encourages economic productivity through mixed and commercial zones, and integrates essential public services and infrastructure in a manner that enhances livability, resilience, and urban efficiency.

The zoning regulations and implementation guidelines associated with each zone will serve as the primary tools for controlling land development, regulating density, and ensuring design consistency across the urban landscape. These controls are aimed at fostering a cohesive urban structure that optimizes land use efficiency while preserving community values, environmental integrity, and public welfare.

In the zoning delineation process, all existing built-up areas have been excluded from new zoning designations to prevent conflicts with established land uses and ensure continuity in existing settlements. The remaining vacant and developable land has been systematically allocated to the most appropriate zoning categories, guided by an in-depth evaluation of topography, infrastructure capacity, land suitability, and development potential.

This allocation methodology takes into account projected population growth, anticipated infrastructure expansion, and future demand for housing, public amenities, and economic facilities through the planning horizon year 2045. The resulting framework provides a comprehensive and adaptable foundation for managing urban expansion, facilitating investment, and guiding public and private sector decision-making.

Ultimately, the proposed urban boundary and zoning framework aim to create a well-balanced, functional, and resilient urban system, where growth is strategically directed, resources are efficiently utilized, and development contributes to the socio-economic advancement and environmental sustainability of the district.

Table 4-6 Urban Areas Projected Populations

Urban Center	Population 2025	Projected Population 2030	Projected Population 2035	Projected Population 2040	Projected Population 2045
Parachinar	60010	71848	81293	91697	99682
Sadda	44935	50621	67139	87866	114286
Dogar	15150	19514	23172	27386	52884
Ali Zai	29337	36632	42619	49383	60270

4.2.1 Parachinar Urban Center

The Parachinar Proposed Urban Center land use framework presents a carefully structured and environmentally responsive urban development model aligned with the National Reference Manual (NRM) standards. Covering a total planning area of approximately 8,373.80 acres, the framework integrates existing and proposed land allocations to guide future growth in a balanced, sustainable, and spatially efficient manner. The plan emphasizes controlled urban expansion, preservation of agricultural land, strengthening of institutional services, and protection of natural systems, in line with Parachinar's socio-economic role as the district headquarters and its environmentally sensitive context.

4.2.3.1 Residential

Residential land use in Parachinar Urban Center comprises a total of 1,554.61 acres (19%), which remains below the NRM benchmark range of 24–50%. The proposed residential growth includes infill development (207.50 acres) and a new town expansion (139.00 acres),

supplementing the existing residential footprint of 1,208.11 acres. This approach prioritizes compact urban form and densification of underutilized areas rather than outward sprawl. Residential areas are strategically located near transport corridors, institutional facilities, and commercial zones to enhance accessibility, reduce travel distances, and promote cohesive neighborhood development. The restrained residential allocation reflects Parachinar's topographical constraints and the policy emphasis on agricultural preservation.

4.2.3.2 Commercial

Commercial land use increases from 148.10 acres to a total of 239.67 acres (3%), remaining well within the NRM guideline range of 0.5–5%. The proposed commercial structure includes mixed-use commercial areas (6.67 acres), an economic corridor (64.50 acres), and a weekly bazar with fruit and vegetable market (20.40 acres). This diversified commercial strategy supports localized economic activity, strengthens Parachinar's role as a regional service center, and promotes inclusive economic growth. The emphasis on mixed-use and corridor-based development enhances land-use efficiency while encouraging pedestrian-friendly and economically vibrant urban spaces.

4.2.3.3 Institutional and Public Buildings

Institutional land use expands significantly to 514.79 acres (6%), aligning with the NRM benchmark range of 2–21%. This category includes education, health, government, and civic amenities. Proposed additions include educational facilities (100 acres), health facilities (70 acres), and public buildings and civic amenities (116.50 acres), supplementing existing institutional uses. This expansion addresses current service deficiencies and anticipates future population growth. Institutional facilities are spatially distributed to ensure equitable access across the urban area, reinforcing Parachinar's administrative, educational, and healthcare functions at the district level.

4.2.3.4 Industrial

Industrial land use is rationalized through the transition from scattered industrial activity (19.83 acres) to a designated light manufacturing and industrial zone (89.50 acres), bringing the total industrial land to 109.33 acres (1%). While this remains below the NRM recommended range of 2–20%, the conservative allocation reflects environmental sensitivity, limited industrial demand, and the city's service-oriented economy. The planned industrial zone supports small-scale manufacturing, agro-processing, and local enterprises, while minimizing environmental impacts through zoning control and appropriate buffering.

4.2.3.5 Recreational and Open Space

Recreational and open space land use totals 89.11 acres (1%), which falls within the NRM guideline range of 0.5–7%. The proposed allocation includes playgrounds (15 acres), public parks (11 acres), and a sports complex (18.50 acres), complementing existing parks and playgrounds. These spaces enhance urban livability, promote public health, and provide community interaction opportunities. The recreational network also contributes to environmental benefits such as urban cooling, stormwater management, and improved microclimatic conditions.

4.2.3.6 Arterial Circulation and Transport Terminals

Transportation and circulation infrastructure occupies 312.86 acres (4%), aligning with the NRM benchmark range of 2–29%. The plan includes an upgraded parking lot and bus terminal (5 acres) alongside existing transportation corridors. This allocation supports efficient traffic flow, improved public transport facilities, and enhanced regional connectivity. The circulation

framework promotes a hierarchical road network that integrates residential, commercial, and institutional areas, ensuring safe, accessible, and efficient mobility throughout the urban center.

4.2.3.7 Other Uses

The Other Uses category constitutes the largest share of land, totaling 5,553.43 acres (66%), underscoring the plan's strong emphasis on environmental conservation, agricultural preservation, and natural resource management. Major components include:

- **Preserved Agriculture (5,226 acres)** to ensure long-term food security and protect fertile land from unplanned urban encroachment.
- **Water Bodies (230.11 acres)** supporting hydrological balance and ecological stability.
- **Open Spaces and Natural Areas** contributing to landscape continuity and environmental resilience.
- **Wastewater Treatment Plant (4.70 acres)**, **landfill site (8 acres)**, and **slaughterhouse (2.65 acres)** to address essential urban environmental management needs.
- **Restricted areas and utilities** ensuring safety, service provision, and regulatory compliance.

This dominant allocation reflects a deliberate planning choice to prioritize sustainability, disaster resilience, and ecological integrity in a geographically sensitive region.

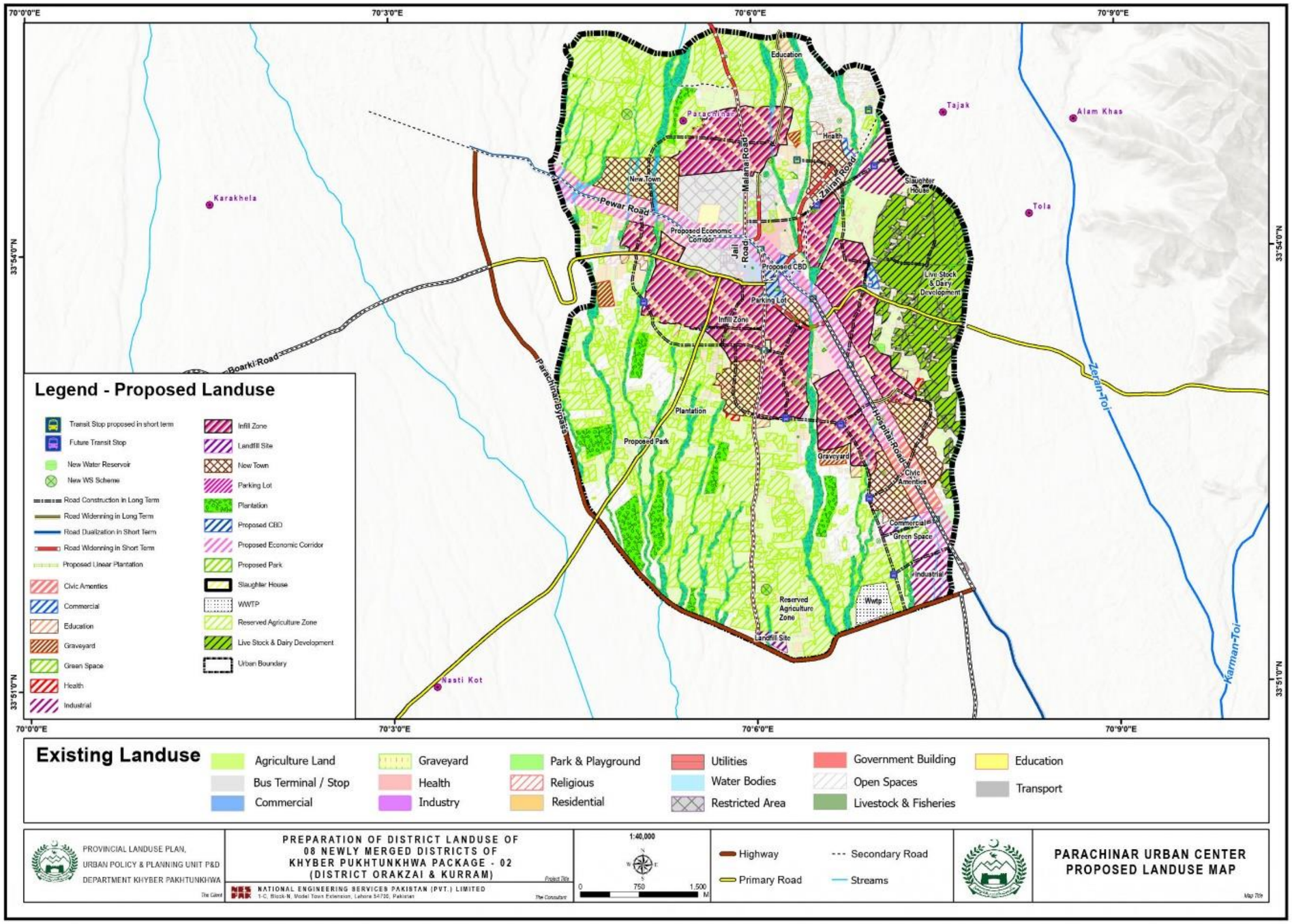
The proposed land-use framework for Parachinar Urban Center demonstrates a controlled, conservation-oriented urban growth model. While residential and industrial allocations remain below ideal NRM thresholds, the strategy appropriately reflects Parachinar's terrain, environmental constraints, and socio-economic profile. The framework successfully strengthens institutional and commercial functions, improves mobility and services, and preserves agriculture and natural systems, ensuring that future urban development remains sustainable, resilient, and context-sensitive.

.

.

Table 4-7 Parachinar Urban Center Existing and Proposed Land use Stats

Parachinar Urban Center Existing and Proposed land Use Stats							
Land use Class	**Existing**	**Area (Acres)**	**Proposed**	**Area (Acres)**	**Sum of existing and proposed**	**Land use Percentages**	**NRM Percentages**
Residential	Residential	1208.11	Infill Zone	1240.77	2448.88	**34.75%**	**24 - 50%**
			New Town	462.76			
	Total	**1208.11**	**Total**	**1703.53**	**2911.64**		
Commercial	Commercial	148.10	Mix Use (Commercial)	26.40	**696.42**	**8.31%**	**0.5 - 5%**
			CBD	33.21			
			Economic Corridor	488.71			
	Total	**148.10**	**Total**	**548.32**			
Institutional	Education	104.59	Educational	57.08	**381.40**	**4.55%**	**2-21%**
	Health Facility	46.19	Health	20.00			
	Government Building	63.13	Public Buildings/Civic Amenities	76.03			
	Religious Building	14.38					
	Total	**228.29**	**Total**	**153.11**			
Industrial	Scattered Industry	19.83	Industries/Light Manufacturing Zone	181.02	**200.85**	**2.40%**	**2-20%**
	Total	**19.83**	**Total**	**181.02**			
Recreational/ Open Space	Park & Playground	44.61	Playground	0.00	**52.16**	**0.62%**	**0.5-7 %**
			Public Park	7.55			
	Total	**44.61**	**Total**	**7.55**			
Arterial Circulation/Terminals	Bus terminal	3.39	**Parking Lot/Bus Terminal**	**0.96**	**308.82**	**3.69%**	**2-29%**
	Transportation	304.47					
Other Uses	**Total**	**307.86**	Slaughterhouse	3.20	**3839.77**	**45.83%**	**-**
	Agriculture	4219.36	Live Stock & Dairy Development	549.09			
	Forest Land	0.00	Riparian Plantation	880.80			
	Graveyard	81.97	Preserve Agriculture	1973.00			
	Open Spaces	1570.86	WWTP	45.72			
	Range Land	0.00	Graveyard	37.52			
	Vacant Area	0.00	Landfill Site	15.95			
	Livestock & Fisheries	0.06	Green Space	22.41			
	Restricted Area	317.61					
	Utilities	2.29					
	Water Bodies	230.11					
	Total	**6422.26**	**Total**	**3527.69**			
	Grand Total	**8379.06**	**Grand Total**	**6122**	**8391.06**	**100.14%**	



Map 4-1 Parachinar Urban Center Proposed Zonings

4.2.2 Sadda Urban Center

The Proposed Urban Center Sadda land-use framework presents a structured, balanced, and sustainability-oriented urban development strategy in line with the National Reference Manual (NRM) standards. Covering a total planning area of approximately 4,582.35 acres, the framework integrates existing land uses with proposed allocations to guide future growth in a compact, efficient, and environmentally responsible manner. The plan emphasizes controlled residential expansion, strengthening of institutional and commercial functions, improved mobility, and strong protection of agricultural and ecological assets, reflecting Sadda role as an emerging urban node within District Kurram.

4.2.4.1 Residential

Residential land use constitutes 1,350.35 acres (29%) of the total planning area, which falls well within the NRM benchmark range of 24–50%. The proposed residential growth comprises 340 acres of new residential development and 255 acres of infill development, supplementing the existing 755.35 acres of residential land. This approach prioritizes densification and efficient use of already serviced areas while minimizing urban sprawl. Residential zones are strategically aligned with transport corridors and institutional areas, promoting accessibility, compact urban form, and balanced neighborhood development.

4.2.4.2 Commercial

Commercial land use accounts for 132.96 acres (3%), remaining within the NRM guideline range of 0.5–5%. The proposed commercial expansion includes a Mixed-Use Central Business District (57 acres), along with a fruit and vegetable market (5 acres) and a weekly bazar (5 acres). These allocations strengthen Sadda role as a local commercial and service hub, encourage small-scale trade and informal economic activity, and promote mixed-use development patterns that enhance land-use efficiency and urban vitality.

4.2.4.3 Institutional and Public Buildings

Institutional land use totals 229.10 acres (5%), conforming to the NRM benchmark range of 2–21%. This category includes existing and proposed educational facilities (33 acres), health facilities (30 acres), and a dedicated institutional/government zone (41.50 acres). The planned expansion addresses current service gaps and supports future population growth by ensuring equitable access to education, healthcare, and administrative services. Institutional facilities are spatially distributed to enhance accessibility and reinforce Sadda role as a civic and service center.

4.2.4.4 Industrial

Industrial land use remains minimal at 0.43 acres (0%), which is below the NRM recommended range of 2–20%. While no new industrial land is proposed, this reflects Sadda limited industrial demand, environmental sensitivity, and service-oriented urban character. The planning framework intentionally avoids large-scale industrial development, prioritizing environmental protection and compatibility with residential and agricultural land uses.

4.2.4.5 Recreational and Open Space

Recreational and open space land use amounts to 85.46 acres (2%), which lies within the NRM guideline range of 0.5–7%. Proposed facilities include playgrounds (9.20 acres), public parks (21.50 acres), and a sports complex (15 acres), in addition to existing parks and playgrounds. These spaces enhance urban livability, promote public health and social interaction, and contribute to environmental quality through urban cooling and stormwater management.

4.2.4.6 Arterial Circulation and Transport Terminals

Transportation and circulation functions occupy 169.73 acres (4%), aligning with the NRM benchmark range of 2–29%. The plan includes an upgraded bus terminal (5.15 acres) alongside existing road infrastructure. This allocation supports efficient movement of people and goods, improves public transport accessibility, and strengthens internal and regional connectivity through a hierarchical road network.

4.2.4.7 Other Uses

The 'Other Uses' category constitutes the largest share of land, totaling 2,614.32 acres (57%), highlighting a strong emphasis on environmental conservation and sustainable land management. Major components include:

- Preserved Agriculture (1,891.50 acres) to safeguard fertile land and ensure long-term food security.
- Riparian Plantation (321.15 acres) to enhance biodiversity, reduce erosion, and protect watercourses.
- Water Bodies (332.54 acres) supporting hydrological balance and flood management.
- Wastewater Treatment System (4.30 acres) and landfill site (7 acres) to ensure environmentally sound urban sanitation and waste management.
- Graveyards, restricted areas, utilities, and livestock-related uses supporting essential community and safety functions.

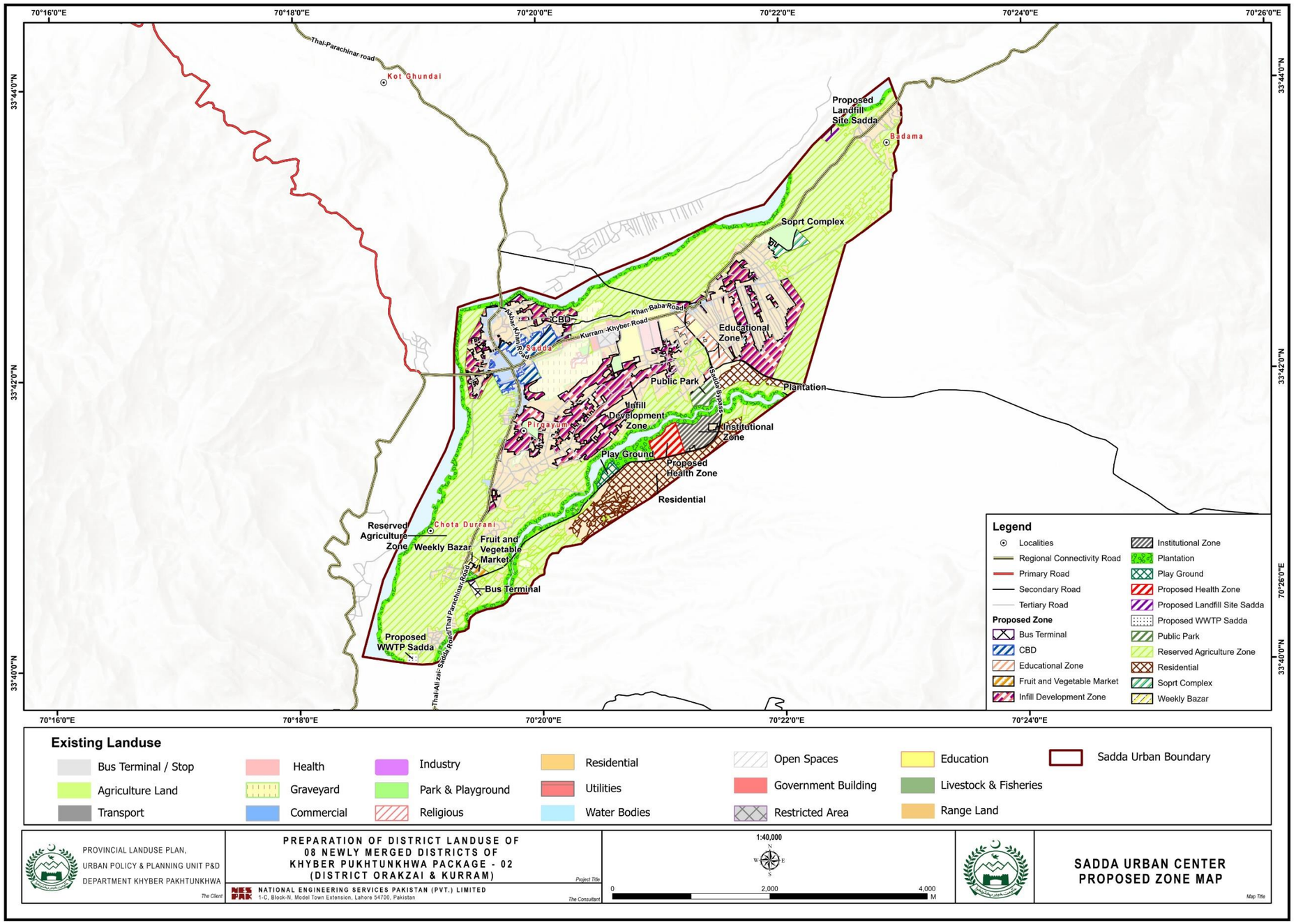
This dominant allocation reflects a deliberate planning choice to integrate green infrastructure and protect natural systems while accommodating urban growth.

The Proposed Urban Center Sadda land-use framework demonstrates a balanced, compact, and environmentally sensitive urban development model. Residential, commercial, institutional, recreational, and transport allocations align well with NRM benchmarks, while the strong emphasis on agricultural preservation and ecological assets ensures long-term sustainability. The restrained industrial allocation is appropriate given local context and environmental considerations. Overall, the framework provides a resilient and context-responsive roadmap for Sadda future urban growth.

.

Table 4-8 Sadda Proposed Urban Center Existing and Proposed Land use Stats

Land use **Class**	**Existing**	**Area (Acres)**	**Proposed**	**Area (Acres)**	**Sum of existing and proposed**	**Land use Percentages**	**NRM Percentages**
Residential	Residential	755.35	Proposed Residential	340.00	1095.35	**29%**	**24 - 50%**
			Infill Development	255.00			
	Total	**755.35**	**Total**	**595.00**	**1350.35**		
Commercial	Commercial	65.96	Mix Use (CBD)	57.00	**132.96**	**3%**	**0.5 - 5%**
			Fruit and Vegetable Market	5.00			
			Weekly Bazar	5.00			
	Total	**65.96**	**Total**	**67.00**			
Institutional	Education	67.69	Educational	33.00	**229.10**	**5%**	**2-21%**
	Health Facility	25.66	Health	30.00			
	Government Building	16.75	Institutional Zone	41.50			
	Religious Building	14.50					
	Total	**124.60**	**Total**	**104.50**			
Industrial	Scattered Industry	0.43	Light Manufacturing Zone	0.00	**0.43**	**0%**	**2-20%**
	Total	**0.43**	**Total**	**0.00**			
Recreational/ Open Space	Park & Playground	39.76	Playground	9.20	**85.46**	**2%**	**0.5-7 %**
			Public Park	21.50			
			Sport Complex	15.00			
	Total	**39.76**	**Total**	**45.70**			
Arterial Circulation/Terminals	Bus terminal	2.79	**Bus Terminal**	**5.20**	**169.78**	**4%**	**2-29%**
	Transportation	161.79					
Other Uses	**Total**	**164.58**	Preserve Agriculture	1916.00	**2637.67**	**57%**	**-**
	Agriculture	1333.79	WWTS	4.30			
	Forest Land	0.00	Landfill Site	7.00			
	Graveyard	45.42	Riparian Plantation	320.00			
	Open Spaces	1257.89					
	Range Land	469.39					
	Livestock & Fisheries	0.75					
	Restricted Area	12.41					
	Utilities	2.17					
	Water Bodies	332.54					
	Total	**3454.36**	**Total**	**2247.30**			
	Grand Total	**4605.04**	**Grand Total**	**3060**	**4605.75**	**100%**	



Map 4-2 Sadda Urban Center Proposed Zonings

4.2.3 Dogar Proposed Urban

The Dogar Proposed Urban Center land-use framework presents a compact, environmentally sensitive, and functionally balanced urban growth model in accordance with the National Reference Manual (NRM) standards. With a total planning area of approximately 1,959.49 acres, the framework integrates existing land uses with proposed allocations to guide future development in a controlled and sustainable manner. The plan emphasizes consolidation of residential areas, strengthening of commercial and institutional functions, promotion of light industrial activity, and strong protection of agricultural and ecological assets, reflecting Dogar's role as a small but strategically important urban node.

4.2.3.1 Residential

Residential land use in Dogar Urban Center totals 356.18 acres (18%), which remains below the NRM benchmark range of 24–50%. The proposed residential expansion includes 237.45 acres of new residential development, supplementing the existing 118.73 acres. The relatively lower residential share reflects Dogar's compact settlement pattern, limited population pressure, and the planning intent to avoid excessive land conversion. Residential growth is designed to remain contained, ensuring efficient service delivery, reduced infrastructure costs, and protection of surrounding agricultural and natural lands.

4.2.3.2 4.2.2 Commercial

Commercial land use increases from 4.41 acres to 53.26 acres (3%), which lies well within the NRM guideline range of 0.5–5%. The proposed commercial structure includes a Mixed-Use Central Business District (38.85 acres), a fruit and vegetable market (5 acres), and a weekly bazar (5 acres). This allocation strengthens Dogar's local economic base, supports small-scale trade and informal markets, and enhances service availability for surrounding rural areas. The mixed-use approach encourages efficient land utilization and creates opportunities for walkable and economically vibrant urban spaces.

4.2.3.3 4.2.X.3 Institutional and Public Buildings

Institutional land use expands from 20.40 acres to a total of 60.40 acres (3.08%), remaining within the NRM benchmark range of 2–21%. Proposed allocations include educational facilities (10 acres), health facilities (10 acres), and public/government buildings (20 acres). This expansion addresses existing deficiencies in social infrastructure and ensures adequate provision of education, healthcare, and civic services. Institutional facilities are strategically located to improve accessibility and reinforce Dogar's function as a local service center.

4.2.3.4 4.2.X.4 Industrial

Industrial land use increases significantly from 0.52 acres to 54.68 acres (3%), aligning with the NRM recommended range of 2–20%. The establishment of a Light Manufacturing Zone (54.16 acres) marks a transition from scattered industrial activity to a planned and regulated industrial area. This allocation supports small-scale manufacturing, agro-processing, and local enterprises, while minimizing environmental impacts through controlled zoning. The proposed industrial development is expected to generate employment and diversify the local economy without compromising environmental sustainability.

4.2.3.5 Recreational and Open Space

Recreational and open space land use totals 24.63 acres (1%), which falls within the NRM guideline range of 0.5–7%. Proposed facilities include playgrounds (5 acres), public parks (5 acres), and a sports complex (11 acres), in addition to existing parks and playgrounds. These spaces enhance urban livability, promote physical activity, and provide community interaction

areas. The recreational network also contributes to environmental benefits such as urban cooling and improved micro-climatic conditions.

4.2.3.6 Arterial Circulation and Transport Terminals

Transportation and circulation functions occupy 12.87 acres (1%), which is below the NRM benchmark range of 2–29%. While no additional bus terminal area is proposed, the existing transportation network is considered adequate for Dogar's scale and projected growth. Compact urban form reduces travel distances and limits the need for extensive transport infrastructure, supporting cost-effective and efficient mobility.

4.2.3.7 Other Uses

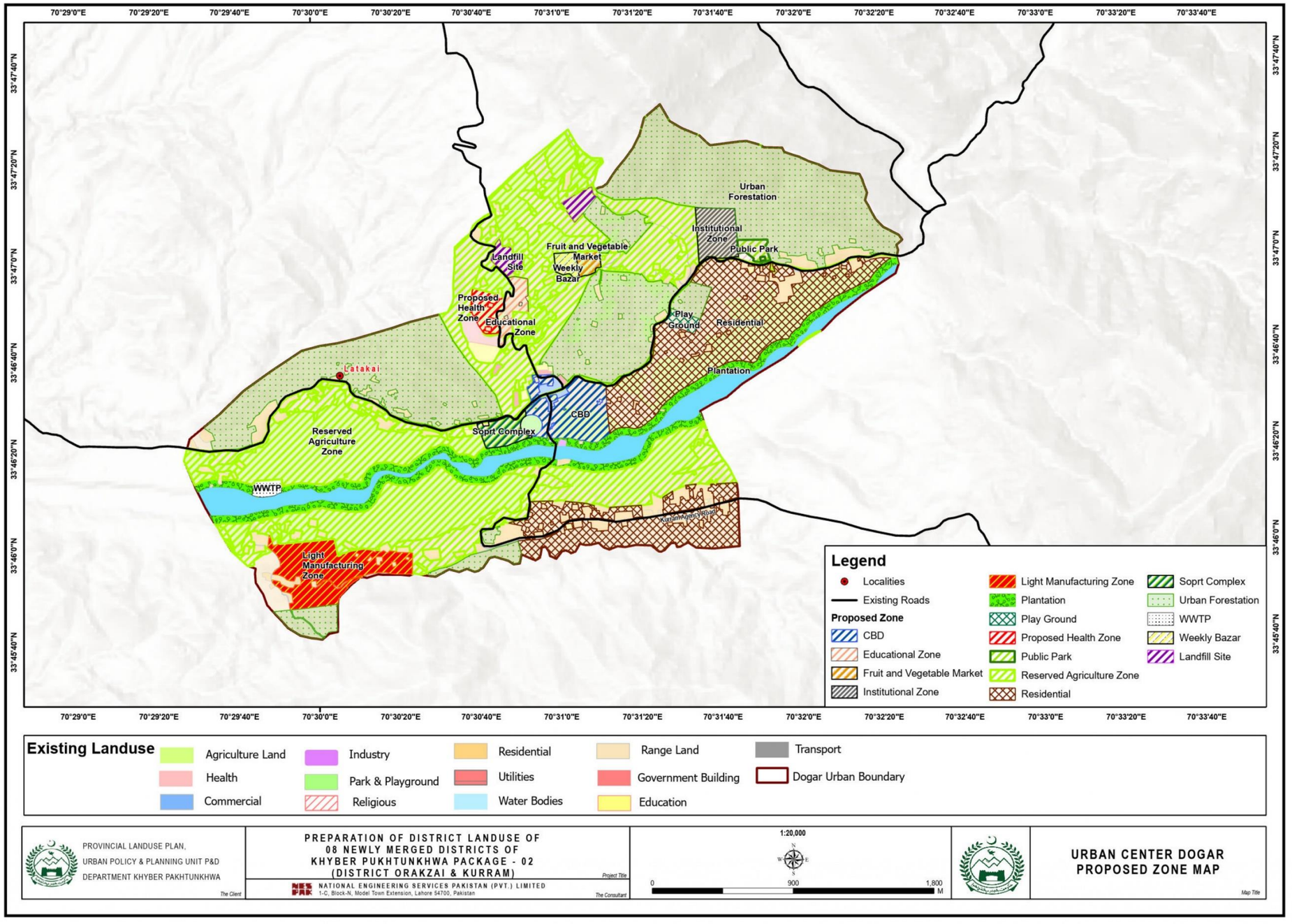
- The **'Other Uses' category** dominates the land allocation with 1,397.47 acres (71%), reflecting a strong emphasis on environmental conservation, agriculture, and natural resource management. Key components include:
- **Preserved Agriculture (657 acres)** ensuring long-term food security and protection of fertile land.
- **Urban Forestation (532.91 acres)** to enhance biodiversity, improve air quality, and regulate micro-climate.
- **Riparian Plantation (97.80 acres)** supporting erosion control and watercourse protection.
- **Water Bodies (93.01 acres)** contributing to hydrological balance and flood management.
- **Wastewater Treatment Plant (4.25 acres)** and **landfill site (12.50 acres)** to ensure environmentally sound sanitation and waste management.

  This dominant allocation highlights the planning priority of safeguarding ecological systems while accommodating essential urban development. The Dogar Proposed Urban Center land-use framework presents a compact, environmentally responsible, and context-sensitive urban development model. While residential and transport allocations remain below ideal NRM thresholds, this is appropriate given Dogar's limited population growth, compact urban form, and strong emphasis on environmental preservation. The framework successfully strengthens commercial, institutional, and industrial functions while protecting agriculture and natural systems, ensuring sustainable and resilient urban growth.

.

Table 4-9 Dogar Urban Center Existing and Proposed Land use Stats

Land use Class	Existing	Area (Acres)	Proposed	Area (Acres)	Sum of existing and proposed	Landuse Percentages	NRM Percentages
Residential	Residential	118.73	Residential	237.45	356.18	**18%**	**24 - 50%**
					0.00		
	Total	**118.73**	**Total**	**237.45**	**356.18**		
Commercial	Commercial	4.41	Mix Use (CBD)	38.85	**53.26**	**3%**	**0.5 - 5%**
			Fruit and Vegetable Market	5.00			
			Weekly Bazar	5.00			
	Total	**4.41**	**Total**	**48.85**			
Institutional	Education	10.15	Educational	10.00	**60.40**	**3.08%**	**2-21%**
	Health Facility	6.62	Health	10.00			
	Government Building	2.40	Public Buildings	20.00			
	Religious Building	1.23					
	Total	**20.40**	**Total**	**40.00**			
Industrial	Scattered Industry	0.52	Light Manufacturing Zone	54.16	**54.68**	**3%**	**2-20%**
	Total	**0.52**	**Total**	**54.16**			
Recreational/ Open Space	Park & Playground	3.63	Playground	5.00	**24.63**	**1%**	**0.5-7 %**
			Public Park	5.00			
			Sport Complex	11.00			
	Total	**3.63**	**Total**	**21.00**			
Arterial Circulation/Terminals	Bus terminal	0.00	**Bus Terminal**	**0.00**	**12.87**	**1%**	**2-29%**
	Transportation	12.87					
Other Uses	**Total**	**12.87**	Agriculture	657.00	**1397.47**	**71%**	**-**
	Agriculture	602.24	WWTP	4.25			
	Forest Land	179.05	Landfill Site	12.50			
	Graveyard	0.00	Riparian Plantation	97.80			
	Open Spaces	0.00	Graveyard	0.00			
	Range Land	924.41	Urban Forestation	532.91			
	Vacant Area	0.00					
	Tourism -Historical Building	0.07					
	Restricted Area	0.00					
	Utilities	0.82					
	Water Bodies	93.01					
	Total	**1799.60**	**Total**	**1304.46**			
	Grand Total	**1960.16**	**Grand Total**	**1706**	**1959.49**	**100%**	



Map 4-3 Dogar Urban Center Proposed Zonings

4.2.4 Ali Zai Proposed Urban

The proposed land use framework for the Ali Zai proposed urban center delineates a comprehensive spatial reorganization designed to achieve a sustainable balance between urban expansion, ecological preservation, and socio-economic growth. Covering a total area of approximately 1,404.86acres, the plan integrates both existing and proposed allocations, responding to projected demographic trends, environmental considerations, and the principles of Natural Reference Manual (NRM).

4.2.4.1 Residential

Residential land use occupies 256.65 acres (18%), which falls below the NRM benchmark range of 24–50%, indicating a moderate and controlled urban expansion approach. The residential category comprises new housing development (126.5 acres) and infill development (62.67 acres) aimed at optimizing existing settlement footprints and improving urban density. The focus is on compact, efficient neighborhood design that ensures access to public services, transportation corridors, and green infrastructure. The restrained residential allocation reflects a commitment to preserving surrounding agricultural and natural areas, consistent with sustainable land management principles.

4.2.4.2 Commercial

The commercial sector spans 62.79 acres (4%), aligning precisely with the NRM guideline range of 0.5–5%. The proposed configuration introduces a Mixed-Use Central Business District (CBD – 51.5 acres), a Fruit and Vegetable Market (5 acres), and a Weekly Bazar (5 acres), collectively promoting local trade and economic self-reliance. The mixed-use commercial design fosters walkable, multi-functional urban spaces, integrating retail, service, and administrative uses. This distribution strengthens Alizai's role as a local commercial hub, reducing dependency on regional centers and encouraging balanced intra-district

4.2.4.3 Institutional and Public Facility

Institutional land use totals 45.75 acres (3.26%), aligning with the NRM benchmark range of 2–21%. This allocation includes educational facilities (10 acres), health services (10 acres), and public/government buildings (15 acres) to ensure adequate social infrastructure for the existing and projected population. The institutional land has been strategically sited to maximize accessibility and promote service equity across the settlement. This emphasis on social infrastructure supports the district's goals of improved education, health, and governance, ensuring Alizai functions as a community service nucleus within the regional urban network.

4.2.4.4 Industrial

No new industrial development is proposed in Alizai, maintaining 0 acres (0%) of land in this category. While this is below the NRM benchmark range of 2–20%, the absence of industrial allocation is a deliberate policy decision to preserve the center's rural and agrarian character. Industrial activity for the area is expected to be supported by nearby larger urban centers such as Kalaya and Dogar, preventing environmental degradation and ensuring compatible land use within Alizai's primarily residential and agricultural setting.

4.2.4.5 Recreational and Open Space

Recreational and open space areas occupy 31.74 acres (2%), well within the NRM guideline range of 0.5–7%. This category includes public parks (8 acres), sports complexes (10 acres), and playgrounds (5 acres), integrated to provide accessible recreational amenities for residents. These facilities improve the quality of life, promote community engagement, and contribute to the ecological performance of the urban landscape. The inclusion of green and open spaces also

enhances microclimatic stability and urban aesthetics, supporting the principles of climate-sensitive urban planning.

4.2.4.6 Arterial Circulation and Transport Terminals

Land use for circulation and terminals covers 42.07 acres (3%), aligning with the NRM benchmark range of 2–29%. The proposed bus terminal (5 acres) and road infrastructure ensure efficient mobility and connectivity across the urban center. The transportation framework is designed to accommodate current and future mobility demands, with emphasis on public transit integration, pedestrian safety, and sustainable transport linkages to regional centers. The hierarchical road system ensures smooth intra-urban flow while supporting future commercial and residential expansion.

4.2.4.7 Other Uses

The "Other Uses" category dominates the land allocation, totaling 964.28 acres (69%), underscoring Alizai's strong focus on environmental sustainability and agricultural preservation. Key components include:

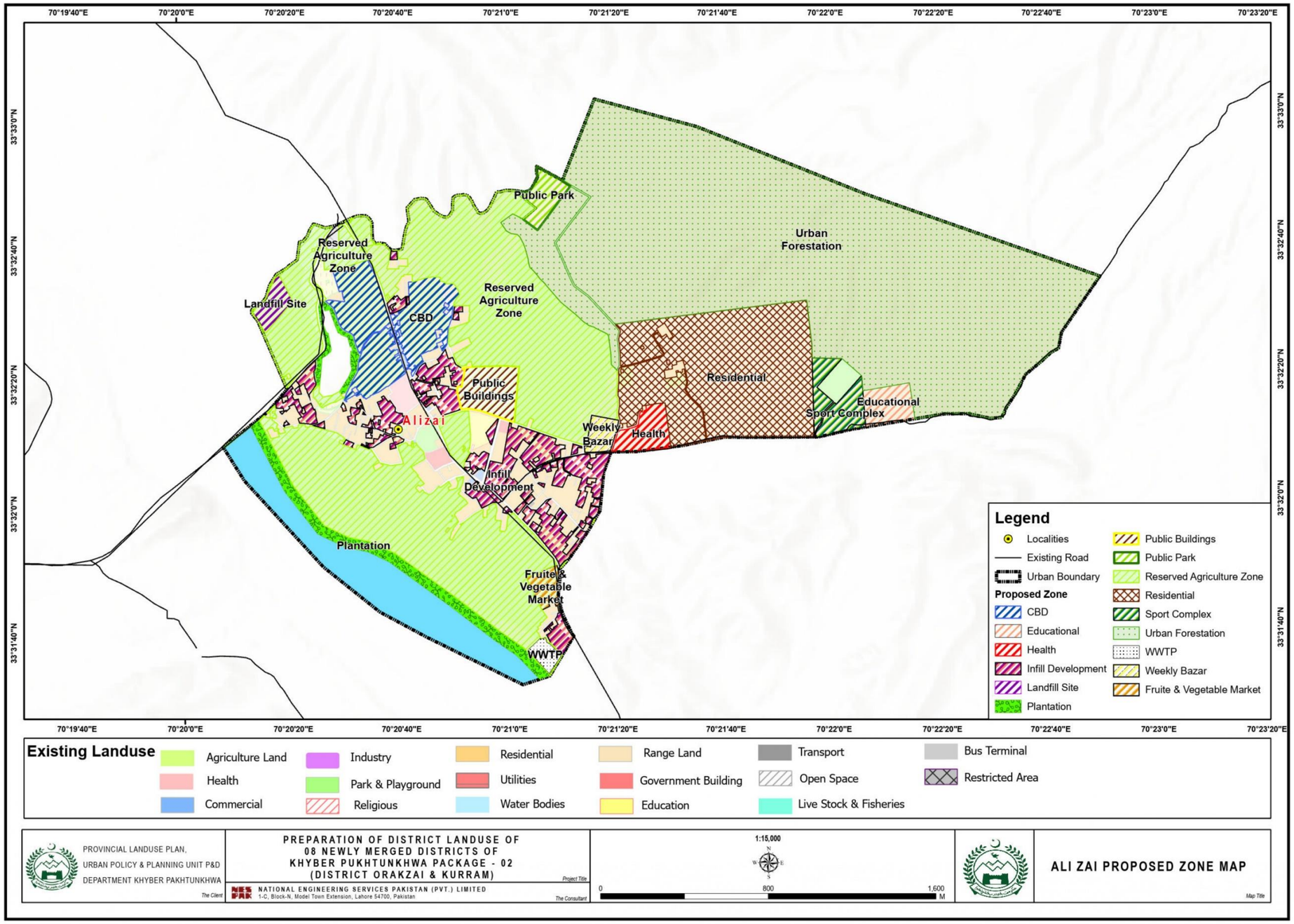
- Agricultural Land (293 acres) — ensuring food security and protecting productive soil resources.
- Urban Forestation (534.25 acres) and Riparian Plantation (25.7 acres) — strengthening biodiversity, reducing erosion, and enhancing carbon sequestration.
- Water Bodies (67.59 acres) and Wastewater Treatment Plant (10 acres) — ensuring ecological balance and clean water management.
- Landfill Site (5 acres) and Graveyards (24.39 acres) — accommodating essential civic and environmental infrastructure.

This extensive allocation aligns with the NRM's sustainability objectives, integrating green infrastructure and natural systems as vital components of the urban environment.

.

Table 4-10 Ali Zai Urban Center Existing and Proposed Land use Stats

Land use Class	Existing	Area (Acres)	Proposed	Area (Acres)	Sum of existing and proposed	Landuse Percentages	NRM Percentages
Residential	Residential	67.48	Residential	128.60	196.08	**18%**	**24 - 50%**
			Infill Development	62.67	62.67		
	Total	**67.48**	**Total**	**191.27**	**258.75**		
Commercial	Commercial	1.29	Mix Use (CBD)	52.00	**63.29**	**5%**	**0.5 - 5%**
			Fruit and Vegetable Market	5.00			
			Weekly Bazar	5.00			
	Total	**1.29**	**Total**	**62.00**			
Institutional	Education	3.94	Educational	10.00	**45.75**	**3.26%**	**2-21%**
	Health Facility	3.64	Health	10.00			
	Government Building	2.90	Public Buildings	15.00			
	Religious Building	0.27					
	Total	**10.75**	**Total**	**35.00**			
Industrial	Scattered Industry	0.00	Light Manufacturing Zone	0.00	**0.00**	**0%**	**2-20%**
	Total	**0.00**	**Total**	**0.00**			
Recreational/ Open Space	Park & Playground	8.74	Playground	5.00	**35.94**	**3%**	**0.5-7 %**
			Public Park	8.20			
			Sport Complex	14.00			
	Total	**8.74**	**Total**	**27.20**			
Arterial Circulation/Terminals	Bus terminal	0.00	**Bus Terminal**	**0.00**	**37.07**	**3%**	**2-29%**
	Transportation	37.07					
Other Uses	**Total**	**37.07**	Agriculture	336.00	**963.14**	**69%**	**-**
	Agriculture	399.13	WWTP	3.40			
	Forest Land	0.00	Landfill Site	6.00			
	Graveyard	4.35	Riparian Plantation	28.90			
	Open Spaces	76.40	Graveyard	0.00			
	Range Land	730.47	Urban Forestation	516.90			
	Vacant Area	0.00					
	Tourism -Historical Building	0.07					
	Restricted Area	1.34					
	Utilities	0.18					
	Water Bodies	67.59					
	Total	**1279.53**	**Total**	**891.20**			
	Grand Total	**1404.86**	**Grand Total**	**1207**	**1403.94**	**100%**	



Map 4-4 Dogar Urban Center Proposed Zonings

4.3 Comparative Review of Parachinar City Master Plan (2024–2042) and District Land Use Plan

4.3.1 Parachinar urban center

The project area of Parachinar comprises seven Neighborhood Councils, encompassing a total planning jurisdiction of approximately 34.03 square kilometers. Within this area, the existing urban core presently occupies about 8.10 square kilometers of built-up land, accommodating a population of 52,729 persons, as recorded in the Population and Housing Census 2017.

Based on projected demographic trends, spatial growth patterns, and urban service demand, the Parachinar Master Plan (Horizon Year 2042) estimates that the urban population will increase to approximately 76,481 residents. To effectively manage this anticipated growth in a sustainable and orderly manner, the plan proposes the strategic allocation and zoning of an additional 14.13 square kilometers (3491.599) of land for future urban expansion.

This proposed expansion area is intended to support planned residential development, along with complementary land uses such as commercial centers, public facilities, transport infrastructure, open spaces, and utilities. The land-use and zoning framework aims to optimize land consumption, prevent unplanned sprawl, and ensure balanced urban density, while safeguarding environmentally sensitive areas and promoting efficient service delivery.

The spatial distribution of future growth has been aligned with accessibility, infrastructure capacity, and socio-economic needs, ensuring that urban expansion contributes to a compact, resilient, and well-integrated urban structure for Parachinar up to the year 2042.

Table 1-4: Land Use Classification[3]

Land Use		Area (Sq. Km.)	Percentage %	NRM Standards	
Residential		4.24	12.46	Residential	27%-43%
Commercial		0.38	1.12	Commercial	1%-5%
Industrial		0.03	0.09	Industrial	2%-20%
Public Buildings	Education	0.39	1.15	Institutional	3%-11%
	Health	0.21	1.59		
	Religious	0.03	0.09		
	Security	0.34	0.03		
	Others	0.47	1.38		
Recreational Facilities	Parks	0.34	1.00	Recreational	1%-6%
	Sports Complex	0.10	0.29		
Agricultural		13.41	39.42		
Barren/Vacant Land		9.08	26.67	Vacant Land	8%-26%
Range Land/Forest		1.10	3.23		
Mining Area		0.00	0.00		
Restricted Area		0.00	0.00		
Graveyard		0.05	0.15	Graveyard	0.5%-6%
Water Bodies		2.00	5.88		
Transportation		1.86	5.47	Transportation	3%-27%
Total		**34.03**	**100**		

Table 6-1: Land Allocation for Proposed Land Uses in Parachinar City

Proposed Land Use (Recommended area is based on multiplying percentages with the total area which is 34.0 sqkm.)	NRM Standard % for 50000-99000 population range	Recommended Area – min (sq. km.)	Recommended Area – max (sq. km.)	Required (Recommended Area (min) – Existing Land Use) (Sq. km.)	Required (Recommended Area (max) – Existing Land Use) (sq.km)	Existing Land Use Area (sq. km.) (2021)	Proposed Area (sq. km.)
Residential Zone	27 to 43	9.18	14.62	4.94	10.38	4.24	**3.96**
Commercial Zone	1 to 5	0.34	1.7	-0.04	1.32	0.38	**0.09**
Industry Zone	2 to 20	0.68	6.8	0.65	6.77	0.03	**0.7**
Civic Amenities (Institutional)	3 to 11	1.02	3.74	-0.42	2.30	1.44	**0.2**
Economic Corridor/Mixed Use Zone							**1.25**
Graveyard	0.5 to 6	0.17	2.04	0.12	1.99	0.05	**0.14**
Reserved Agriculture	-	-	-	-	-	-	**7.79**

4.3.2 Master Plan Review

4.3.2.1 Residential

The existing residential footprint of Parachinar covers approximately 4.24 sq. km, accommodating 5,239 housing units with an average household size of 6.97 persons. According to NRM planning standards, residential land should typically constitute 27% to 43% of the total urban area, depending on settlement size, density, and socio-economic composition.

For the planning horizon of 2042, the approved master plan proposes 3.96 sq. km (978.53 acres) of additional residential land, based on a projected household size of 5.30 persons and the provision of 14,428 new housing units. However, a critical review of these figures reveals a major inconsistency. The implied average land consumption per housing unit is approximately 1.84 kanals, which is not aligned with realistic urban plot sizes, particularly when compared with the plan's proposed plot categories of 9, 17, and 30 marlas for low-, middle-, and high-income groups.

Furthermore, findings from the HIS Survey indicate that 60% of Parachinar's population belongs to the low-income group, 28% to the middle-income group, and only 12% to the high-income group. This socio-economic distribution necessitates a stronger focus on compact, affordable, and appropriately sized residential development. The over-allocation of residential land in the approved master plan does not reflect this reality and risks inefficient land consumption and urban sprawl.

4.3.2.2 Commercial

The existing commercial land in Parachinar covers 93.90 acres, while the current demand, based on population and activity levels, is only 57.16 acres, indicating a surplus of commercial land even under present conditions. Projections up to 2042 suggest that the existing commercial area remains largely sufficient.

Despite this, the approved master plan proposes an additional 22.23 acres for commercial use and introduces a mixed-use commercial corridor spanning 308 acres. When commercial land demand is recalculated strictly for the incremental population growth, the requirement as per NRM standards is only 19.31 acres.

4.3.2.3 Industry

Parachinar currently has only 7.41 acres of industrial land, which is significantly below the existing estimated requirement of 57.16 acres. To address this gap, the approved master plan proposes a substantial increase, allocating 172.97 acres for industrial use.

However, a reassessment using NRM standards shows that for the projected 2042 population, the total industrial land requirement is approximately 76.48 acres. This indicates that while some expansion is necessary, the industrial land proposed in the approved master plan is excessive and not demand-driven.

4.3.2.4 Green Space/Recreational

The existing land-use survey highlights a severe shortage of green and recreational spaces in Parachinar. Currently, parks cover only 0.34 sq. km (84 acres), while the sports complex occupies 0.10 sq. km (24.7 acres).

The approved master plan proposes 1,450.50 acres of green and open spaces, citing WHO standards. However, WHO recommends 9 square meters of open space per capita. When applied to the projected 2042 population, the actual requirement amounts to approximately 170.08 acres.

4.3.2.5 Education:

Parachinar currently has 17 educational institutions, including 12 primary schools, 1 middle school, and 4 high schools. The HIS Survey 2021 identified gaps of 4 primary schools and 1 middle school, with no deficit at the high-school level.

A parallel reassessment by the DLUP consultant identified a slightly different gap: 3 primary schools and 3 middle schools, again with no shortage of high schools. For the year 2042, the approved master plan projects the need for 10 primary, 20 middle, 4 high, and 3 higher secondary schools.

In contrast, the DLUP consultant's projections estimate the requirement of 22 primary schools, 9 middle schools, and 6 high schools, reflecting different demographic assumptions and service thresholds. The discrepancy is further compounded by the use of different standards. While the master plan applies NRM standards in hectares, the DLUP assessment uses NRM standards of 2 acres per facility.

Alternatively, when applying Elementary & Secondary Education Department standards, land requirements are calculated as:

- Primary school: 2 kanals
- Secondary / Higher secondary school: 4 kanals

Based on these standards, the total educational land requirement for 2042 is approximately 104 kanals (13 acres). The DLUP revision adopts these need-based and department-aligned standards to avoid exaggerated land allocation.

Table 6-21: Government education institutes in urban center of Parachinar

Schools	Boys	Girls	Total	Gap
Primary	8	4	12	4
Middle	1	-	1	1
High	2	2	4	0
Higher Secondary	-	-	-	0
Total	11	6	17	5

Source: Household Information Survey, 2021

Table 6-23: NRM standards for Schools

Population (2017)	Projected Population (2040)	School level	Criteria for 1 school @ per Population[12]	Criteria for Required area @ per School[13] (Hectares)	Schools required by 2040	Required area in Hectare
52,729	76,481	Primary	7,500	1	10	10
		Middle	3,900	1.5	20	30
		High	23,000	2.1	04	8.4
		Higher Secondary	30,000	5	03	15

Source: National Reference Manual, 1985

4.3.2.6 Health

The health sector analysis in the approved master plan identifies existing facilities and accessibility gaps; however, it lacks future-oriented planning rigor. At present, Parachinar has only three government health facilities, which are inadequate even for the 2017 population of 52,729.

While the master plan includes maps and descriptive assessments, it does not project health facility requirements for 2040, nor does it calculate land demand for BHUs, CHCs, hospitals, or MCHCs based on NRM or population-based standards. As a result, proposed health interventions are not supported by quantified justification, limiting their planning validity.

Table 4-11 Comparative Review of PAMP

Sectors	Approved Master Plan (PAMP)	Issues Identified in PAMP
Residential	• Large areas proposed for residential infill and new towns • No realistic density or plot-size alignment • Residential zones located on prime agricultural land	• Overestimation of residential land • Inconsistent calculations vs housing units • Illogical land suitability (agriculture vs barren land)
Commercial	• Additional commercial areas proposed • Extensive commercial corridor introduced	• Existing commercial land already surplus till 2045 • Over-zoning without demand and rationale justification
Industrial	• Existing: 7.41 acres • Proposed: 72.97 acres	• Proposed industrial land far exceeds NRM requirement • Risk of underutilization
Green Space / Recreation	• Approx. 1,450 acres proposed based on WHO standards	• WHO standards misapplied • Proposed area disproportionate to projected population
Education	• Large number of institutions proposed • Land calculated using inconsistent standards	• Overestimation of facilities & land • Lack of alignment with departmental standards

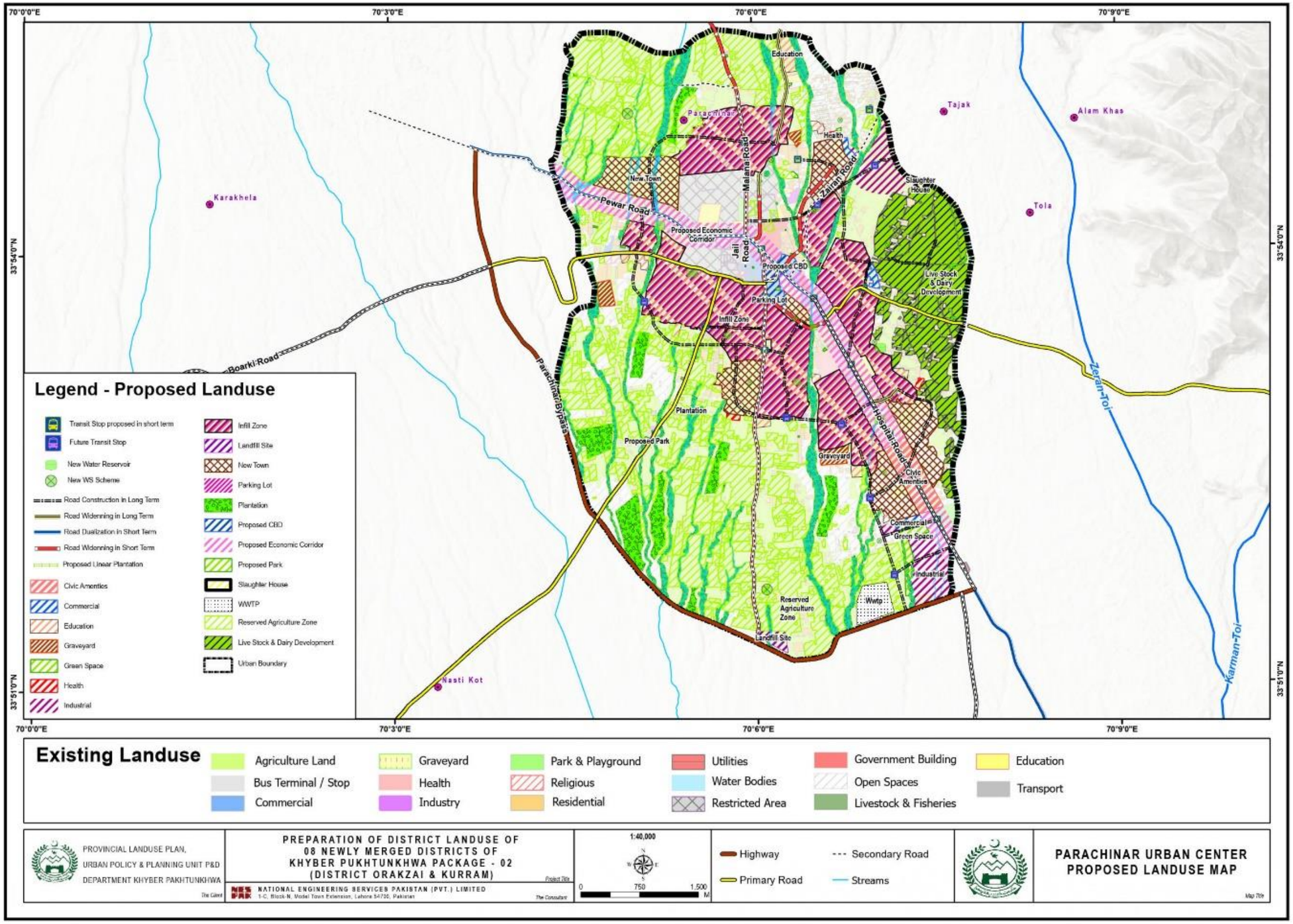
4.3.3 Executive Summary

A comprehensive review of the Parachinar Approved Master Plan (PAMP) was conducted to evaluate the adequacy, realism, and sustainability of proposed land-use allocations. The assessment revealed significant discrepancies in population-based calculations, sectoral land requirements, and zoning logic, resulting in widespread over-allocation of urban land, particularly for residential, commercial, industrial, and recreational uses.

The approved master plan proposed extensive residential infill and new town development without aligning land allocation with realistic densities, plot sizes, or the socio-economic profile of the population. Moreover, residential expansion was proposed on prime agricultural land, while barren and rangelands were reserved for agriculture, contradicting fundamental land suitability principles.

Similarly, the commercial and industrial sectors were found to be over-zoned, despite existing surplus land and modest projected demand. Green and recreational spaces were also significantly over-proposed due to the misapplication of WHO standards, leading to allocations disproportionate to the projected population.

In response, the District Land Use Plan (DLUP) revision adopted a demand-driven, standards-based, and land-suitability-focused approach. Using a revised population projection of 99,682 for the year 2045, sectoral land requirements were recalculated in accordance with NRM standards and relevant departmental guidelines. Residential land demand was rationalized to 245 acres, commercial and industrial zoning was adjusted to match actual economic needs, and green, educational, and recreational facilities were proposed strictly on a need basis.



Map 4-5 Parachinar Approved Master Plan Map

4.4 District Land Use Zoning Plan

The areas situated beyond the proposed urban boundaries, categorized as rural zones, have been delineated and zoned on a broader spatial scale to reflect the distinct functional and environmental characteristics of the district's rural landscape. The zoning process for these areas was informed by a comprehensive analysis of the existing land use patterns, as extracted from the district's current land use map, with additional consideration given to potential areas suitable for inclusion within each land use category.

Based on this assessment, the predominant land uses in the rural landscape were designated as independent zones, each representing a specific functional category consistent with the district's natural and socio-economic characteristics. Rural settlements were identified and classified as Rural Residential Zones, providing for the housing and communal needs of dispersed rural populations. Meanwhile, existing industrial sites located outside urban limits were designated as Rural Industrial Zones, allowing for small to medium-scale industrial and processing activities, particularly those related to resource extraction, agro-industries, and cottage-based enterprises.

The resulting rural zoning framework reflects a balanced approach acknowledging the district's limited industrial base, significant agricultural activity, and abundance of natural resources. This spatial strategy aims to harmonize rural development with the district's natural endowments, ensuring that urban expansion does not undermine the ecological and economic vitality of rural areas. The framework promotes functional linkages between urban centers and their surrounding hinterlands, enabling the district to evolve as a cohesive and interdependent regional system.

However, the rural areas of the district face notable environmental and socio-economic challenges, including a semi-arid climate, limited water availability, and restricted economic diversification. These constraints highlight the pressing need for sustainable land use practices, efficient resource management, and climate-resilient rural planning. Strengthening water conservation systems, supporting agricultural innovation, and encouraging sustainable livelihood opportunities are vital to ensuring that the district continues to grow economically while preserving its natural resources and environmental integrity for future generations.

The proposed zoning framework for the rural areas thus provides a foundation for integrated rural development, balancing economic advancement with ecological stewardship. The statistical summary of proposed land use zoning for the entire district is presented in the table below, accompanied by a map visualizing the spatial distribution of the proposed zones. Together, these components offer a comprehensive overview of how the district land has been planned to accommodate growth while maintaining environmental sustainability and spatial balance.

The proposed land use plan for District Kurram covers a total planning area of 839,470.13 acres and establishes a comprehensive spatial framework for sustainable regional development. The proposed zoning structure reflects the predominantly rural and mountainous character of the district while accommodating future urban growth, economic development, and environmental protection. The plan emphasizes the conservation of natural landscapes, protection of agricultural resources, and the planned development of urban settlements and economic infrastructure.

A large proportion of the district is allocated to natural and resource-based land uses, highlighting the ecological importance of the region. Rangelands constitute the largest share, covering 455,511.49 acres, which indicates the dominance of pastoral landscapes and the importance of livestock grazing in the local economy. Forest areas cover 186,704.80 acres, playing a crucial role in watershed protection, biodiversity conservation, and slope stabilization in the mountainous terrain. In addition, plantation areas covering 10,407.09 acres, along with urban forestation areas of 1,049.81 acres, are proposed to strengthen environmental sustainability and improve

ecological resilience. Riparian plantations covering 810.85 acres are also designated along river corridors to protect water bodies, reduce erosion, and maintain ecological buffers.

Agricultural protection is another key component of the proposed zoning strategy. The plan allocates 140,351.99 acres as reserved agricultural zones to safeguard productive farmland from uncontrolled urban expansion and ensure long-term food security. In addition, 7,747.29 acres are designated as general agricultural areas for cultivation and farming activities. These allocations highlight the importance of agriculture as a fundamental economic activity in the district and reinforce the need to maintain fertile land for crop production.

Urban development within the district is concentrated around existing settlements and emerging urban centers. Existing built-up areas cover 34,024.78 acres, representing established settlements across District Kurram. To accommodate future population growth, 1,369.45 acres are designated for residential development, ensuring planned housing expansion and improved urban structure. Commercial and mixed-use areas, including central business districts, cover 154.52 acres, which will function as commercial and service hubs within urban centers.

The proposed plan also emphasizes the development of public and institutional infrastructure to enhance social services and community welfare. Educational facilities are allocated 153 acres, while health facilities cover 70 acres, ensuring improved access to essential services. In addition, public buildings occupy 146.50 acres, and civic amenities cover 46.50 acres, strengthening administrative, cultural, and community functions within the district.

Economic development is supported through the designation of industrial and manufacturing zones. Industries and light manufacturing areas cover 143.66 acres, while a proposed industrial estate covering 351.19 acres and a Small Industrial Development Board (SIBD) industrial estate covering 110.95 acres are planned to encourage industrial growth, attract investment, and generate employment opportunities. Furthermore, an economic corridor covering 64.50 acres is proposed to facilitate trade, transportation connectivity, and regional economic integration.

The land use plan also incorporates facilities that support agricultural trade and local markets. Fruit and vegetable markets covering 25.40 acres and weekly bazaars covering 25 acres are proposed to strengthen local commerce and provide marketing opportunities for agricultural producers. These facilities are expected to improve market access for farmers and enhance rural economic activity.

Recreational and open space provisions are also included in the plan to improve urban livability and community well-being. Public parks covering 45.70 acres, playgrounds covering 34.20 acres, and sports complexes covering 58.50 acres are designated to provide recreational opportunities and encourage healthy lifestyles. These facilities will contribute to creating balanced and livable urban environments.

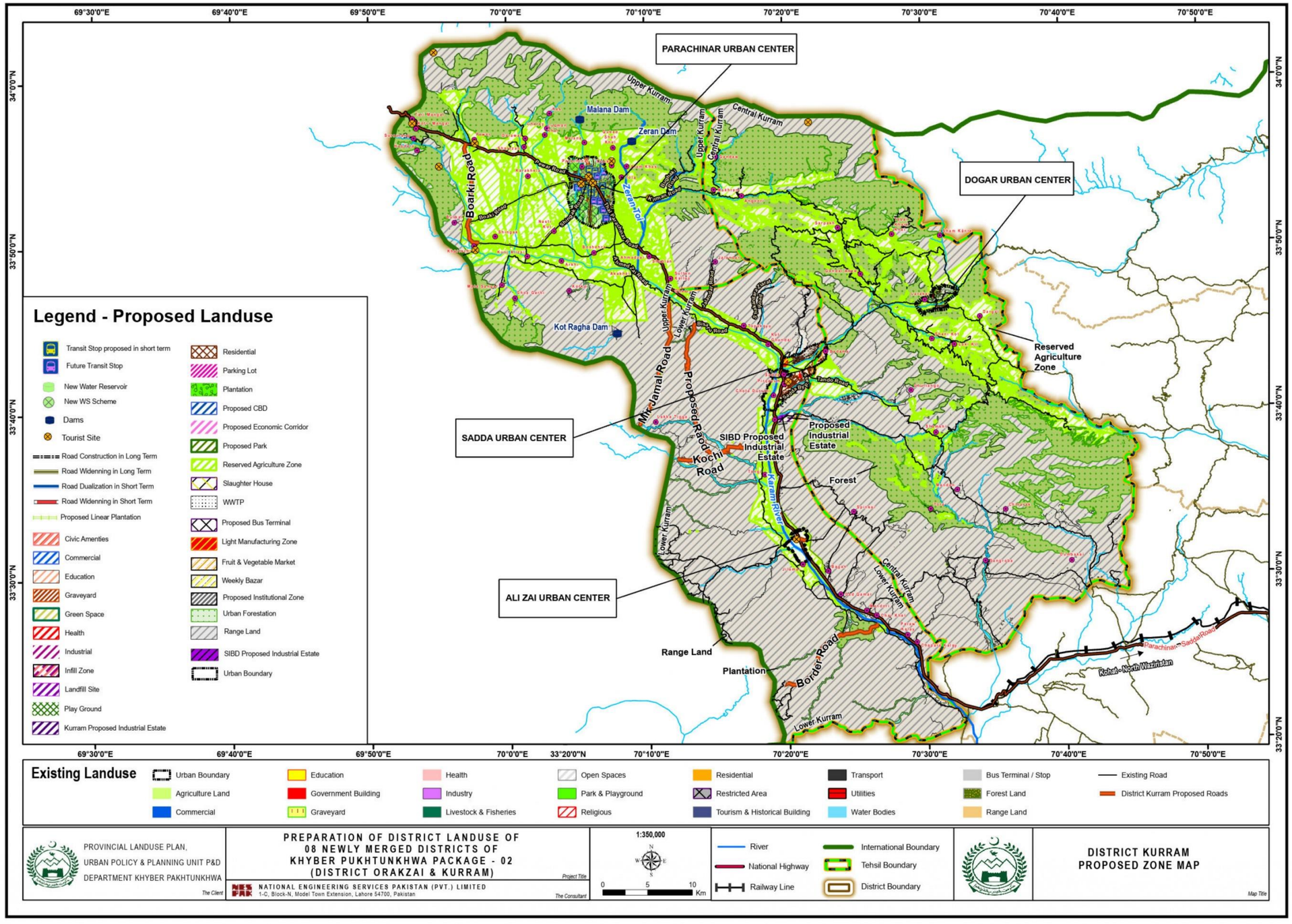
The plan further incorporates essential urban infrastructure and environmental management facilities. Wastewater treatment plants covering 16.65 acres and landfill sites covering 33.50 acres are proposed to improve waste management and environmental sanitation. In addition, slaughterhouse facilities covering 2.65 acres are designated to regulate livestock processing activities and minimize environmental impacts. Transportation infrastructure is also supported through bus terminals and parking areas covering 10.15 acres, which will enhance mobility and connectivity within urban areas.

Overall, the proposed land use distribution for District Kurram reflects a balanced and sustainable planning approach that prioritizes environmental conservation while enabling structured urban and economic development. By allocating substantial areas for forests, rangelands, and agriculture, the plan preserves the ecological integrity and rural character of the district. At the

same time, the provision of residential, commercial, industrial, and public service zones ensures that urban centers can grow in a planned and sustainable manner, supporting long-term socio-economic development and improved quality of life for the population.

Table 4-12 District Proposed Zones Stats

Proposed Zone	Area in Acres
Agriculture	7747.29
Bus Terminal/Parking Lot	10.15
Educational	153.00
Fruit and Vegetable Market	25.40
Health	70.00
Industries/Light Manufacturing Zone	143.66
Commercial/Mixed use/ CBD	154.52
Playground	34.20
Public Buildings	146.50
Public Park	45.70
Residential	1369.45
Riparian Plantation	810.85
Sport Complex	58.50
Slaughterhouse	2.65
WWTP	16.65
Landfill Site	33.50
Economic Corridor	64.50
Civic Amenities	46.50
Weekly Bazar	25.00
Urban Forestation	1049.81
Forest	186704.80
Plantation	10407.09
Proposed Industrial Estate	351.19
Range Land	455511.49
Reserved Agriculture Zone	140351.99
SIBD Proposed Industrial Estate	110.95
Existing Buildup	34024.78
Grand Total	**839470.13**



Map 4-6 District Kurram Proposed Zones Map

4.4.1 Agriculture Zone

For the delineation of the Agricultural Zone, the consultant conducted a comprehensive assessment of existing agricultural land use patterns across the district. This process involved detailed field surveys, land use mapping, and consultations with local stakeholders and agricultural experts to identify areas where crop cultivation and livestock farming represent the predominant land uses. Based on this multi-layered analysis, the agricultural zone was strategically delineated to encompass areas exhibiting high agricultural productivity and long-term potential for sustainable cultivation.

The designation of this zone seeks to safeguard prime agricultural lands from non-agricultural encroachment, promote sustainable and climate-resilient farming practices, and ensure the continued viability of the district's agricultural economy. By aligning the zone boundaries with existing land use patterns and agronomic suitability, the proposed plan facilitates targeted interventions to improve crop yields, livestock productivity, resource optimization, and rural livelihood resilience.

The proposed Agricultural Zone covers approximately 44,243 acres, underscoring its critical role in district economy and food security. Agriculture in the district is primarily concentrated in fertile valleys and lower-lying areas, where soil conditions and access to groundwater-based irrigation systems mainly through tube wells support the cultivation of both food and cash crops. These areas represent the agricultural backbone of the district, contributing significantly to local employment and subsistence.

The district's agricultural profile is characterized by the cultivation of wheat, maize, potato, and cannabis, along with extensive livestock farming. Among these, cannabis is the most widely cultivated crop, followed by wheat and maize, which are grown in alternating seasons maize during warmer months and wheat during cooler periods. Livestock rearing, including goats, sheep, and cattle, remains a major economic activity, particularly in the hilly and semi-arid regions where conditions are favorable for grazing. Goats and sheep dominate due to their adaptability to the district's rugged topography and limited vegetation cover, providing valuable outputs such as meat, milk, and wool.

However, the agricultural sector in district faces a range of environmental and structural challenges. The semi-arid climate, coupled with the limited availability of surface water, constrains agricultural productivity and heightens dependence on groundwater extraction for irrigation. Over-reliance on tube wells has resulted in declining groundwater tables, while soil erosion, nutrient depletion, and loss of fertility remain pressing concerns due to erratic rainfall and insufficient soil management practices. Furthermore, climate variability including unpredictable rainfall patterns and prolonged dry spells poses significant risks to crop yields, livestock health, and overall food security.

In the context of land use planning, integrating environmental conservation and climate adaptation measures within the agricultural zone is vital to mitigate these vulnerabilities. Establishing buffer zones along watercourses and steep slopes can help reduce soil erosion, prevent sedimentation, and protect water quality. Similarly, land use regulations must discourage the conversion of agricultural lands for non-agricultural purposes such as urban expansion, industrial development, or infrastructure projects that threaten the sustainability of farming activities.

To address these challenges and strengthen the district's agricultural base, the consultant recommends the adoption of sustainable and resource-efficient agricultural practices. These include:

- Enhancing irrigation efficiency through drip irrigation, sprinkler systems, and solar-powered pumps to conserve water and improve yields.
- Implementing soil conservation techniques such as contour plowing, terracing, and agroforestry to minimize erosion and maintain soil fertility.
- Promoting climate-resilient and drought-tolerant crop varieties suited to the semi-arid environment.
- Encouraging diversification of livelihoods through agro-based industries, value-added processing, and market linkages.

The delineation of the Agricultural Zone thus represents a strategic intervention within the district's broader land use planning and zoning framework. It ensures that agricultural productivity is preserved and enhanced while maintaining a balance between economic growth, environmental sustainability, and social equity. By protecting fertile lands, promoting innovation, and integrating environmental safeguards, the proposed framework aims to secure the long-term sustainability, resilience, and prosperity of the agricultural sector in District Karak.

Land use planning should also promote diversification of agricultural activities and support infrastructure development such as rural roads, storage facilities, and market access to strengthen the agricultural value chain. Engaging local communities and stakeholders in participatory planning processes ensures that agricultural zoning reflects local knowledge and addresses farmers' needs, thus improving compliance and effectiveness.

Despite these challenges, the agriculture zone in district remains a vital part of the district's economy, supporting the livelihoods of many rural households and providing essential resources for the local community. Proper zoning and planning combined with sustainable practices will enhance the resilience and productivity of agriculture in the district for future generations.

4.4.2 Forest Zone

For the proposed Forest Zone, the consultant conducted a comprehensive preliminary assessment of both designated and observed forested areas as part of the district's overall land use analysis. This assessment incorporated field observations, spatial mapping, and land use classification data to identify areas of significant ecological value and natural vegetation cover. The proposed Forest Zone has been delineated to include these identified forested areas along with their immediate surrounding buffer zones, thereby ensuring the preservation of environmental integrity, ecological connectivity, and biodiversity across the district.

This zoning approach demonstrates a strong commitment to environmental stewardship by prioritizing the protection of natural habitats and ecological resources that are vital for maintaining soil stability, water regulation, carbon sequestration, and wildlife conservation. By incorporating both officially designated forest lands and additional adjoining areas of ecological sensitivity, the proposal establishes a comprehensive conservation buffer. This buffer is intended to mitigate the adverse impacts of human activities such as deforestation, overgrazing, and unsustainable mining, thereby strengthening the district's capacity for sustainable resource management and climate resilience.

The proposed Forest Zone covers approximately 114,114.66 acres, making it one of the most extensive land use categories in district. The forested areas are predominantly concentrated in the northwestern and southwestern regions of the district, where mountainous terrain and rugged topography naturally limit intensive agricultural or industrial development. The forest landscape primarily consists of scrubland, woodland patches, and semi-dense vegetation, with surrounding mountain ranges forming natural ecological boundaries. These forests are crucial in maintaining the district's ecological balance supporting biodiversity, conserving soil, and regulating hydrological cycles.

The northern and western parts of the district, characterized by higher elevations and steeper slopes, contain some of the most extensive and ecologically rich forest tracts. These zones play a critical role in mitigating soil erosion, preventing land degradation, and buffering against seasonal floods and droughts. Smaller, more fragmented forest patches are interspersed within western agricultural and grazing lands, serving as secondary habitats and ecological corridors that enhance overall landscape connectivity.

Despite their ecological importance, the forested areas of District face significant and ongoing threats from deforestation, agricultural encroachment, unregulated grazing, illegal logging, and mining activities, particularly in mountainous regions. These pressures jeopardize the forest ecosystem's ability to sustain local wildlife populations, including various bird species, small mammals, and native flora, while undermining the forests' role in soil conservation, groundwater recharge, and climate regulation.

The fact that a substantial portion of the district's land area is classified as forest highlights its environmental and economic significance. To ensure the long-term sustainability of these forest resources, the proposed zoning framework calls for the implementation of comprehensive conservation and management measures, including:

- Reforestation and afforestation programs to restore degraded forestlands.
- Sustainable timber harvesting practices that balance resource use with regeneration.
- Designation of protected forest reserves to preserve biodiversity and ecological functions; and
- Community-based Forest management initiatives that involve local populations in conservation and monitoring activities.

Additionally, promoting alternative livelihood opportunities such as eco-tourism, non-timber forest products (NTFPs), and small-scale sustainable agriculture can reduce dependency on forest exploitation while enhancing local economic resilience.

Through these measures, the proposed Forest Zoning Framework aims to safeguard District natural heritage, maintain ecological stability, and ensure that forest ecosystems continue to provide environmental, social, and economic benefits for both present and future generations.

4.4.3 Range Zone

The Rangeland Zone in District covers an extensive area of approximately 144,735 acres, representing one of the most significant land use categories in the district's spatial framework. These lands are primarily utilized for grazing and pastoral activities, forming a critical component of the district's rural economy and supporting the livelihoods of numerous households engaged in livestock rearing. Characterized by open, uncultivated terrain with sparse natural vegetation, rangelands provide ideal grazing grounds for livestock such as goats, sheep, and cattle, which are well adapted to the region's semi-arid climate and rugged landscape.

The district's rangelands are predominantly concentrated in the southern and southwestern parts of district, where the topography is composed of hills, plateaus, and arid valleys. These areas, though unsuitable for intensive crop cultivation due to limited water availability and poor soil fertility, are well-suited for extensive grazing systems. The natural vegetation cover, consisting mainly of grass, shrubs, and drought-resistant plant species, sustains the district's pastoral economy by providing forage for livestock, especially in regions where terrain and climatic constraints limit other forms of land use.

Rangelands play a vital role in the district's agricultural and economic landscape, underpinning food security, local trade, and livelihood diversification. Livestock farming particularly the rearing of goats, sheep, and cattle remains a cornerstone of rural subsistence and income generation. These animals supply meat, milk, and wool, while also serving as trade commodities in local and regional markets, thereby contributing substantially to household economies and the district's GDP.

However, the rangeland ecosystem faces a series of environmental and management challenges. Overgrazing has emerged as a critical concern, leading to land degradation, loss of vegetation cover, and soil erosion. Increasing population pressures and expanding herds have intensified grazing demands, further stressing the fragile semi-arid ecosystem. Additionally, climate change manifested through prolonged droughts and irregular rainfall has exacerbated the depletion of natural forage and water resources, reducing the productivity and resilience of rangeland areas.

To safeguard these vital ecosystems and ensure their long-term sustainability, the proposed zoning framework emphasizes the need for sustainable rangeland management and conservation practices. Key recommended measures include:

- Rotational grazing systems to allow vegetation recovery and prevent overexploitation of grasslands.
- Development of water harvesting and storage systems, including ponds and check dams, to improve water availability during dry seasons.

- Establishment of fodder cultivation areas to supplement natural forage and reduce pressure on grazing lands.
- Rehabilitation of degraded rangeland areas through reseeding and controlled grazing; and
- Community-based rangeland management programs to engage local pastoral groups in monitoring, awareness, and conservation efforts.

These strategies aim to balance economic necessity with ecological sustainability, ensuring that livestock production continues to thrive without compromising the natural regenerative capacity of the land.

In conclusion, the Rangeland Zone of District constitutes an indispensable natural and economic asset, sustaining both livelihoods and ecological functions. Its prudent management through zoning, sustainable grazing practices, and community participation is essential to prevent further degradation and to secure the environmental resilience and economic stability of the district for future generations.

4.5 Tehsil Wise land Use Zoning

4.5.1 Tehsil Upper Kurram

The Proposed Land Use Zoning Plan for Tehsil Upper Kurram (District Kurram) covers a total planning area of 227,753.74 acres and establishes a spatial framework aimed at environmental conservation, agricultural sustainability, rangeland management, and controlled urban expansion around Parachinar, the principal urban center of the tehsil. The zoning distribution reflects the predominantly rural and mountainous character of Upper Kurram while strategically allocating land for future urban growth and essential public services.

A. Dominant Natural and Rural Land Uses

A significant proportion of the planning area is allocated to natural and primary production landscapes.

- Rangeland constitutes the largest share, covering 81,984.70 acres (35.99%), reflecting the pastoral character of the region and supporting traditional livestock grazing activities. These areas are critical for maintaining the ecological balance of upland ecosystems and sustaining local livelihoods dependent on grazing resources.
- Agricultural land occupies 77,737.41 acres (34.13%), demonstrating the continued importance of farming in the regional economy. The plan safeguards productive farmland to ensure food security and prevent unplanned conversion of agricultural land into urban uses.
- Forest areas account for 59,277.75 acres (26.03%), emphasizing environmental protection, watershed management, and biodiversity conservation. These forests play an essential role in slope stabilization, climate regulation, and preservation of natural habitats.
- Additionally, plantation zones covering 2,963.66 acres (1.30%) are proposed to enhance afforestation, strengthen ecological resilience, and improve environmental quality.

Together, these natural and productive land uses comprise over 97% of the total planning area, highlighting the environmentally sensitive and rural nature of Upper Kurram.

B. Urban Development and Functional Zones in Parachinar

Urban-related land uses are primarily concentrated in **Parachinar**, which functions as the administrative and economic hub of the tehsil. The plan introduces a series of specialized zones to support organized urban growth and service provision.

Public and institutional uses include:

- Educational zones (48.77 acres), health facilities (6.69 acres), and civic amenities (46.42 acres) to enhance social infrastructure and improve access to public services.

- Graveyards (33.06 acres) and green spaces (20.92 acres) are also designated to meet community needs and maintain environmental quality within the urban area.

Economic and commercial development is facilitated through:

- Commercial areas (15.46 acres) and a proposed Central Business District (CBD) that will strengthen Parachinar's role as a regional service center.
- An industrial zone (150.12 acres) and livestock-related facilities (428.63 acres) to support agro-based industries, value addition, and employment generation.
- A proposed economic corridor (118.68 acres) intended to stimulate trade and connectivity along key transportation routes.

C. Planned Urban Expansion and Infrastructure

To accommodate future population growth, the plan proposes planned residential expansion and redevelopment areas, including:

- New Town development (313.92 acres) to guide future housing growth in a structured manner.
- Infill development zones (530.08 acres) aimed at optimizing existing urban land and reducing urban sprawl.

The plan also incorporates **urban infrastructure and environmental management facilities**, such as:

- Landfill sites (14.42 acres) and wastewater treatment plants (39.90 acres) for improved waste management.
- Slaughterhouse facilities (2.62 acres) to regulate livestock processing activities and minimize environmental impacts.

D. Environmental Protection and Recreational Spaces

Environmental sustainability is further strengthened through:

- Riparian buffer zones covering 500.11 acres (0.22%), protecting river corridors and reducing flood risks.
- Reserved agricultural zones (3,099.30 acres) to safeguard high-value farmland near urban areas from uncontrolled development.
- Urban plantations (387.96 acres) and public parks (21.34 acres) to enhance green infrastructure.

To promote sustainable mobility and public space development, the plan also proposes cycling tracks (7.99 acres) and parking facilities (3.71 acres) within Parachinar.

Overall, the proposed zoning structure reflects a balanced land use strategy that prioritizes environmental conservation and agricultural protection while enabling controlled urban growth centered on Parachinar. By allocating the majority of land to forests, rangelands, and agriculture, the plan preserves the ecological integrity and rural character of Upper Kurram. At the same time, targeted urban zones and infrastructure investments aim to improve service delivery, economic development, and the overall quality of life for residents.

Table 4-13 Tehsil Upper Kurram Proposed Zones Stats

Sr No	Proposed Zone	Area Acre	Percentages
1	Forest	59277.75	26.0271%
2	Plantation	2963.66	1.3013%
4	Range Land	81984.70	35.9971%
5	Agriculture Zone	77737.41	34.1322%
1	Civic Amenities	46.42	0.0204%
2	Commercial	15.46	0.0068%
3	Educational Zone	48.77	0.0214%
4	Graveyard	33.06	0.0145%
5	Green Space	20.92	0.0092%
6	Health	6.69	0.0029%
7	Industrial	150.12	0.0659%
8	Infill Zone	530.08	0.2327%
9	Landfill Site	14.42	0.0063%
10	Livestock	428.63	0.1882%
11	New Town	313.92	0.1378%
12	Proposed Economic Corridor	118.68	0.0521%
13	Proposed CBD	0.12	0.0001%
14	Proposed Cycling Track	7.99	0.0035%
15	Proposed Parking Lot	3.71	0.0016%
16	Proposed Parks	21.34	0.0094%
17	Proposed Plantation	387.96	0.1703%
18	Reserved Agriculture Zone	3099.30	1.3608%
19	Slaughterhouse	2.62	0.0011%
20	WWTP	39.90	0.0175%
21	Riparian Buffer Zone	500.11	0.2196%
Total		**227753.74**	**100.0000%**

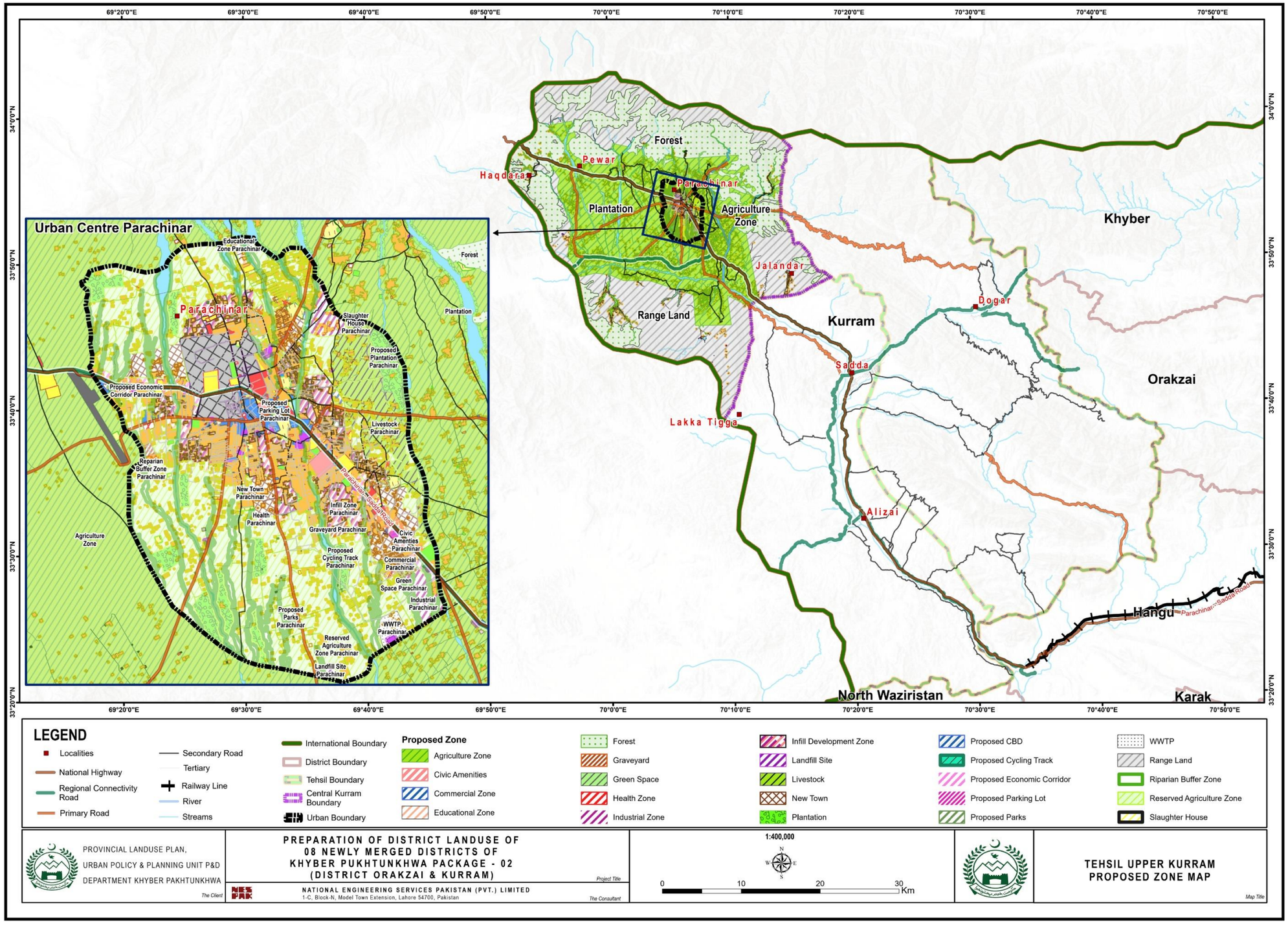


Table 4-14 Tehsil Upper Kurram Proposed Zones Map

4.5.2 Tehsil Central Kurram

The Proposed Land Use Zoning Plan for Tehsil Central Kurram (District Kurram) covers a total planning area of 354,894.98 acres. The zoning framework reflects the predominantly rural and mountainous landscape of the tehsil while providing a structured spatial strategy for urban growth in Sadda and Dogar, which function as important local service and commercial centers. The plan emphasizes environmental conservation, rangeland management, agricultural protection, and limited but organized urban development.

A. Dominant Natural and Resource-Based Land Uses

A substantial proportion of the planning area is allocated to natural landscapes and productive rural land uses, reflecting the ecological and socio-economic character of Central Kurram.

- Rangeland constitutes the largest land use category, covering 177,107.65 acres (49.90%) of the total area. These lands support pastoral livelihoods and livestock grazing activities that form a critical component of the local economy.
- Forest areas occupy 124,347.08 acres (35.04%), highlighting the importance of forest ecosystems in watershed protection, biodiversity conservation, and slope stabilization in the mountainous terrain of the region.
- Agricultural land accounts for 48,289.58 acres (13.61%), ensuring the continued protection of productive farmland and sustaining food production for the local population.
- Plantation areas, totaling 3,210.83 acres (0.90%), are proposed to enhance afforestation efforts, improve environmental resilience, and strengthen ecological buffers.

Together, these land uses constitute over 98% of the total planning area, demonstrating that the spatial structure of Central Kurram remains predominantly rural and environmentally sensitive.

B. Urban Development in Sadda

Sadda is recognized as an emerging urban node within the tehsil. The zoning plan introduces targeted land allocations to guide planned urban growth and service provision. These include:

- Infill development zones (23.43 acres) aimed at optimizing underutilized urban land and promoting compact development.
- Reserved agricultural zones (449.92 acres) around the urban fringe to protect high-value agricultural land from uncontrolled expansion.
- Residential areas (8.15 acres) and plantation areas (18.75 acres) that contribute to balanced urban development and environmental enhancement.
- A sports complex (7.90 acres) designated to provide recreational and community facilities for the local population.

C. Planned Urban and Economic Functions in Dogar

Dogar is designated as a secondary service and economic center within Central Kurram, with a variety of functional zones to support local commerce, services, and small-scale industrial activities.

Key economic and commercial facilities include:

- Central Business District (CBD) covering 38.76 acres, intended to function as the commercial and administrative core of Dogar.
- Fruit and Vegetable Market (5.10 acres) to support agricultural trade and improve market accessibility for farmers.

- Light manufacturing zone (53.78 acres) to encourage small-scale industries and local employment generation.

Public and institutional land uses include:

- Educational zones (10.01 acres), institutional areas (19.95 acres), and health facilities (10.10 acres) to strengthen service delivery.
- Residential areas (247.17 acres) designed to accommodate future population growth in a planned manner.

D. Urban Infrastructure and Community Facilities

The plan also incorporates key infrastructure and public facilities to support sustainable urban development, including:

- Landfill site (6.41 acres) and wastewater treatment plant (4.52 acres) to improve waste management and environmental sanitation.
- Public parks (5.17 acres), playgrounds (5.06 acres), and sports complexes (11.03 acres) to enhance recreational opportunities and urban livability.
- Urban forestation areas (531.40 acres) aimed at strengthening green infrastructure and improving the urban ecological environment.
- Weekly bazaar (5.01 acres) designated to facilitate traditional market activities and support local commerce.

Overall, the zoning distribution for Tehsil Central Kurram reflects a balanced spatial planning approach that prioritizes environmental conservation and sustainable resource management while enabling controlled urban growth in Sadda and Dogar. The predominance of rangelands, forests, and agricultural lands preserves the ecological integrity and rural economy of the region, while the introduction of commercial, residential, institutional, and infrastructure zones ensures that emerging urban centers develop in an organized and sustainable manner. This framework supports regional economic development, improved service delivery, and enhanced quality of life for residents while maintaining the natural and productive landscapes of Central Kurram.

Table 4-15 Tehsil Central Kurram Proposed Zones Stats

Sr No	Proposed Zone	Area Acre	Percentages
0	Infill Development Zone	23.430	0.006602%
1	Plantation	18.746	0.005282%
2	Reserved Agriculture Zone	449.915	0.126774%
3	Residential	8.149	0.002296%
4	Sport Complex Sadda	7.904	0.002227%
5	Forest	124347.083	35.037713%
6	Plantation	3210.832	0.904727%
7	Proposed Industrial Estate	0.004	0.000001%
8	Range Land	177107.653	49.904243%
9	Agriculture Zone	48289.576	13.606723%
10	CBD Dogar	38.764	0.010923%
11	Educational Zone	10.006	0.002819%
12	Fruit and Vegetable Market	5.103	0.001438%
13	Institutional Zone	19.953	0.005622%
14	Light Manufacturing Zone	53.782	0.015154%
15	Plantation	101.428	0.028580%
16	Playground	5.059	0.001425%
17	Proposed Health Zone	10.095	0.002845%
18	Landfill Site	6.414	0.001807%
19	WWTP Dogar	4.520	0.001274%
20	Public Park Dogar	5.165	0.001455%
21	Reserved Agriculture Zone Dogar	376.783	0.106167%
22	Residential Dogar	247.174	0.069647%
23	Sport Complex Dogar	11.034	0.003109%
24	Urban Forestation	531.396	0.149733%
25	Weekly Bazar	5.012	0.001412%
Total		**354894.979**	**100.000000%**

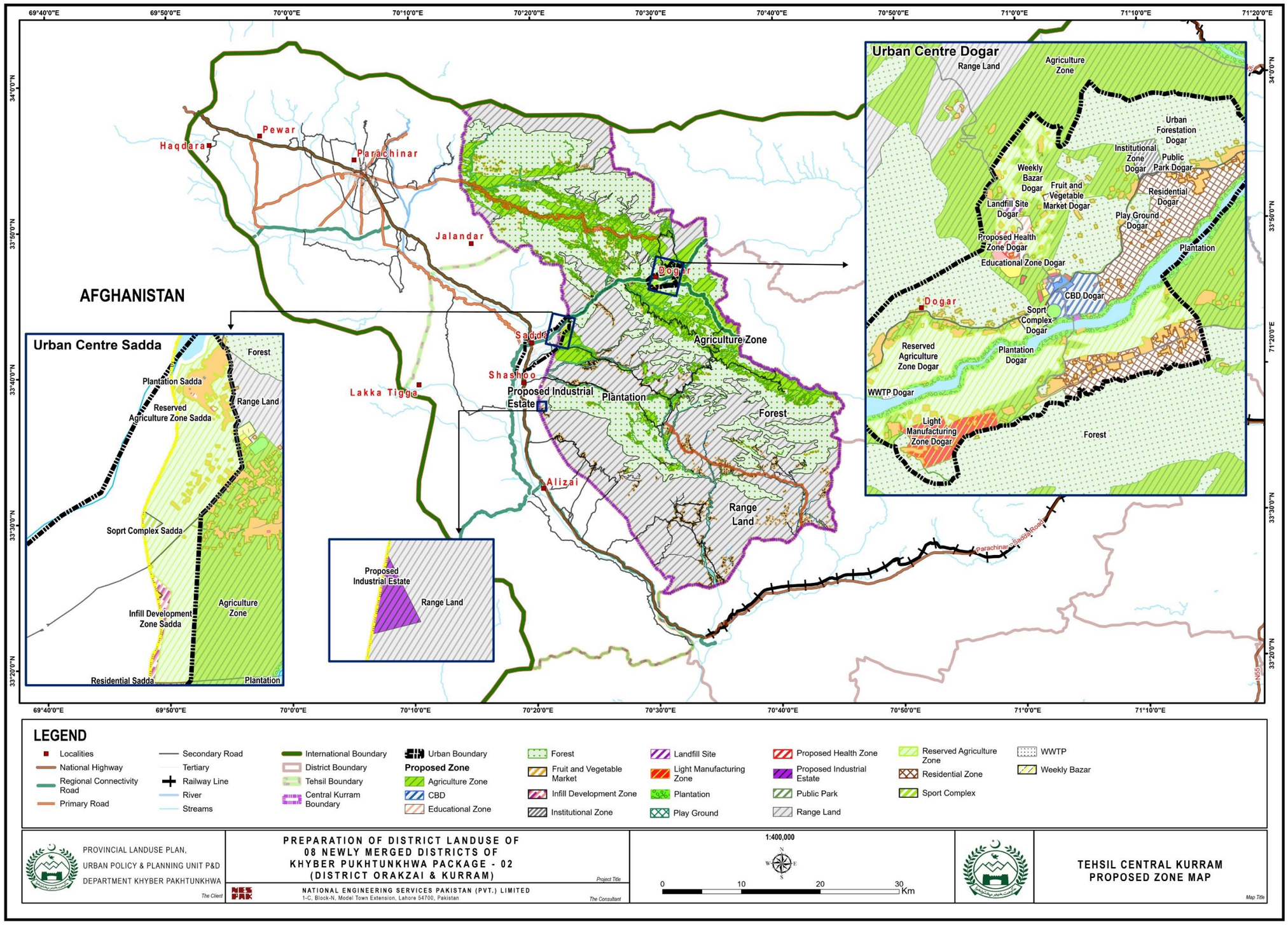


Table 4-16 Tehsil Central Kurram Proposed Zones Map

4.5.3 Tehsil Lower Kurram

The Proposed Land Use Zoning Plan for Tehsil Lower Kurram (District Kurram) covers a total planning area of 222,400.13 acres and establishes a spatial framework that prioritizes rangeland conservation, agricultural productivity, and structured urban development around the key settlements of Sadda and Ali Zai. The zoning distribution reflects the predominantly rural landscape of the tehsil while accommodating future economic growth, infrastructure development, and service provision.

A. Dominant Natural and Resource-Based Land Uses

The spatial structure of Lower Kurram is largely characterized by extensive rangelands and agricultural landscapes, which together form the backbone of the local rural economy.

- Rangeland is the most dominant land use category, covering 194,508.57 acres (87.46%) of the total area. These lands are vital for pastoral activities and livestock grazing, which remain central to local livelihoods and traditional land use practices.
- Agricultural land occupies 16,528.45 acres (7.43%), representing the primary cultivated areas that support crop production and contribute to regional food security.
- Plantation areas account for 4,199.95 acres (1.89%), proposed to enhance vegetation cover, improve ecological stability, and support afforestation initiatives.
- Forest areas cover 2,913.84 acres (1.31%), serving important environmental functions such as soil conservation, watershed protection, and biodiversity preservation.

Collectively, these natural and productive land uses account for **over 98% of the total planning area**, indicating that Lower Kurram remains predominantly rural with a strong emphasis on natural resource management.

B. Industrial and Economic Development

To promote economic diversification and employment generation, the plan designates areas for **industrial development.**

- A Proposed Industrial Estate covering 351.18 acres and a Small Industrial Development Estate (SIDE) of 110.95 acres are allocated to encourage small and medium-scale industrial activities. These zones are intended to stimulate local economic growth, support agro-based industries, and provide employment opportunities while maintaining compatibility with surrounding land uses.

C. Urban Development in Sadda

Sadda, the principal urban center of Lower Kurram, is planned as a major service and administrative hub. The zoning plan introduces several functional zones to support organized urban growth and infrastructure development.

Key land allocations include:

- Central Business District (57.11 acres) to strengthen commercial and administrative activities.
- Residential areas (193.47 acres) and infill development zones (423.81 acres) to accommodate population growth while promoting compact urban development.
- Reserved agricultural zones (1,432.53 acres) surrounding the urban area to protect productive farmland from uncontrolled urban expansion.

Public and community facilities include:

- Educational zones (33.10 acres), institutional areas (41.49 acres), and health facilities (30.13 acres) to enhance social infrastructure and public services.

- Recreational facilities, such as playgrounds (9.18 acres), public parks (21.62 acres), and a sports complex (7.20 acres), to improve urban livability.

Supporting infrastructure includes a bus terminal (5.34 acres), landfill site (7.08 acres), and wastewater treatment plant (4.30 acres), ensuring improved urban management and environmental sustainability.

D. Planned Development in Ali Zai

Ali Zai is identified as a secondary urban node with designated zones to support local economic activities and community services.

Key allocations include:

- Central Business District (51.86 acres) to function as the commercial core of the town.
- Residential areas (128.24 acres) and infill development zones (63.24 acres) for planned housing expansion.
- Reserved agricultural zones (343.24 acres) to protect surrounding farmland.

Community and public facilities include:

- Educational facilities (9.91 acres), health facilities (10.21 acres), and public buildings (15.02 acres) to strengthen institutional infrastructure.
- Fruit and vegetable markets (5.06 acres) and weekly bazaars (4.99 acres) to support agricultural trade and traditional commerce.

Environmental and recreational spaces are also incorporated through urban forestation areas (516.89 acres), sports complexes (14.09 acres), and public parks (8.11 acres).

The zoning framework for Tehsil Lower Kurram reflects a strategic balance between rural resource management and controlled urban development. The predominance of rangelands, agriculture, and plantation areas ensures the preservation of traditional land uses and ecological systems. At the same time, the allocation of urban, industrial, and service-related zones in Sadda and Ali Zai provides the foundation for sustainable economic development, improved infrastructure, and enhanced service delivery. This integrated land use strategy supports long-term regional growth while maintaining the environmental and socio-economic stability of Lower Kurram.

Table 4-17 Tehsil Lower Kurram Proposed Zones Stats

Sr No	Proposed Zone	Area Acre	Percentages
1	Forest	2913.84	1.310%
2	Plantation	4199.95	1.888%
3	Proposed Industrial Estate	351.18	0.158%
4	Range Land	194508.57	87.459%
5	Agriculture Zone	16528.45	7.432%
6	SIDE Proposed Industrial Estate	110.95	0.050%
7	Bus Terminal Sadda	5.34	0.002%
8	CBD Sadda	57.11	0.026%
9	Educational Zone Sadda	33.10	0.015%
10	Fruit and Vegetable Market Sadda	5.01	0.002%
11	Infill Development Zone Sadda	423.81	0.191%
12	Institutional Zone Sadda	41.49	0.019%
13	Plantation Sadda	301.58	0.136%
14	Playground Sadda	9.18	0.004%
15	Proposed Health Zone Sadda	30.13	0.014%
16	Proposed Landfill Site Sadda	7.08	0.003%
17	Proposed WWTP Sadda	4.30	0.002%
18	Public Park Sadda	21.62	0.010%
19	Reserved Agriculture Zone Sadda	1432.53	0.644%
20	Residential Sadda	193.47	0.087%
21	Sport Complex Sadda	7.20	0.003%
22	Weekly Bazar Sadda	5.08	0.002%
23	CBD Ali Zai	51.86	0.023%
24	Educational Ali Zai	9.91	0.004%
25	Fruit & Vegetable Market Ali Zai	5.06	0.002%
26	Health Ali Zai	10.21	0.005%
27	Infill Development Ali Zai	63.24	0.028%
28	Landfill Site Ali Zai	6.01	0.003%
29	Plantation Ali Zai	28.91	0.013%
30	Public Buildings Ali Zai	15.02	0.007%
31	Reserved Agriculture Zone Ali Zai	343.24	0.154%
32	Residential Ali Zai	128.24	0.058%
33	Sport Complex Ali Zai	14.09	0.006%
34	Urban Forestation Ali Zai	516.89	0.232%
35	Weekly Bazar Ali Zai	4.99	0.002%
36	WWTP Ali Zai	3.38	0.002%
37	Public Park Ali Zai	8.11	0.004%
Total		**222400.13**	**100.000%**

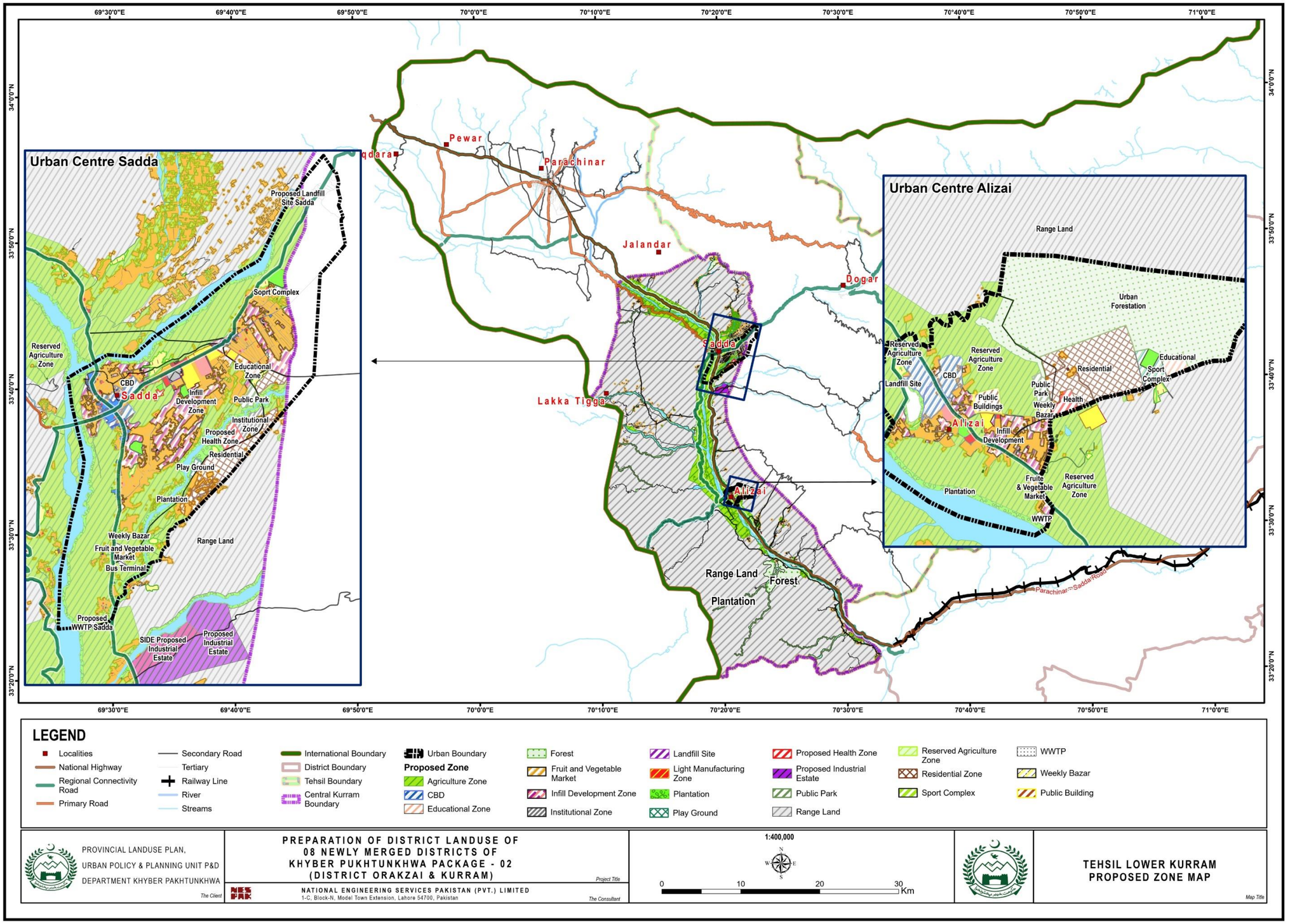


Table 4-18 Tehsil Lower Kurram Proposed Zones Map

4.6 Rural Development Framework

4.6.1 Introduction and Planning Rationale

This Rural Development Framework has been formulated to provide a structured, service-oriented, and population-responsive approach to rural development in Kurram Districts. The framework recognizes that rural areas are not static conservation spaces but living socio-economic systems where development must be carefully guided to support livelihoods, protect natural resources, and ensure equitable access to basic services.

In contrast to urban development models, rural development in the districts is predominantly shaped by agriculture, forestry, rangelands, tribal land tenure systems, and dispersed settlement patterns. Accordingly, this framework adopts a differentiated planning approach based on settlement population size, level of service provision, and functional role within the district hierarchy.

The key objectives are to:

- Guide rural growth toward settlements with existing or planned service capacity
- Safeguard agricultural land, forests, and rangelands from unplanned conversion
- Enable controlled, livelihood-linked rural housing
- Prevent ribbon development and speculative land subdivision
- Align rural development with infrastructure investment and service delivery capacity

4.6.2 Rural Settlement Hierarchy and Functional Classification

Rural settlements are categorized into a hierarchy to guide land-use intensity, infrastructure provision, and housing typologies.

4.6.2.1 Rural Growth Centers (RGCs)

Indicative Population Range: above 10,000

Functional Characteristics:

- Concentration of higher-order services such as secondary schools, colleges, BHUs/RHCs
- Organized bazaars, storage facilities, and transport linkages
- Administrative and service delivery functions for surrounding rural areas

Planning Role:
Rural Growth Centers shall act as focal points for future rural population absorption, economic diversification, and infrastructure investment, thereby reducing development pressure on urban areas.

Land-Use and Development Direction:

- Compact and clustered residential development patterns
- Mixed-use commercial spines along primary streets
- Small-scale agro-processing, storage, and workshops compatible with rural character

4.6.2.2 Rural Service Villages (RSVs)

Indicative Population Range: –2,000- 10,000

Functional Characteristics:

- Provision of basic social services such as primary/middle schools and dispensaries
- Local markets serving surrounding villages and hamlets

Planning Role:
Rural Service Villages shall function as intermediate service nodes, supporting agricultural and livestock-based economies of their hinterlands.

Land-Use and Development Direction:

- Low- to medium-density residential development
- Community facilities and local commercial activities
- Limited expansion subject to service capacity

4.6.2.3 Villages and Hamlets

Indicative Population Range: Below 2,000

Functional Characteristics:

- Limited formal services
- Dispersed and organic settlement form

Planning Role:
Villages and hamlets shall primarily support agriculture, forestry, and rangeland-based livelihoods, with development strictly regulated to maintain rural character.

Land-Use and Development Direction:

- Single-family residential dwellings only
- Prohibition of speculative subdivision and urban-style housing schemes
- Development restricted to household and livelihood-related needs.

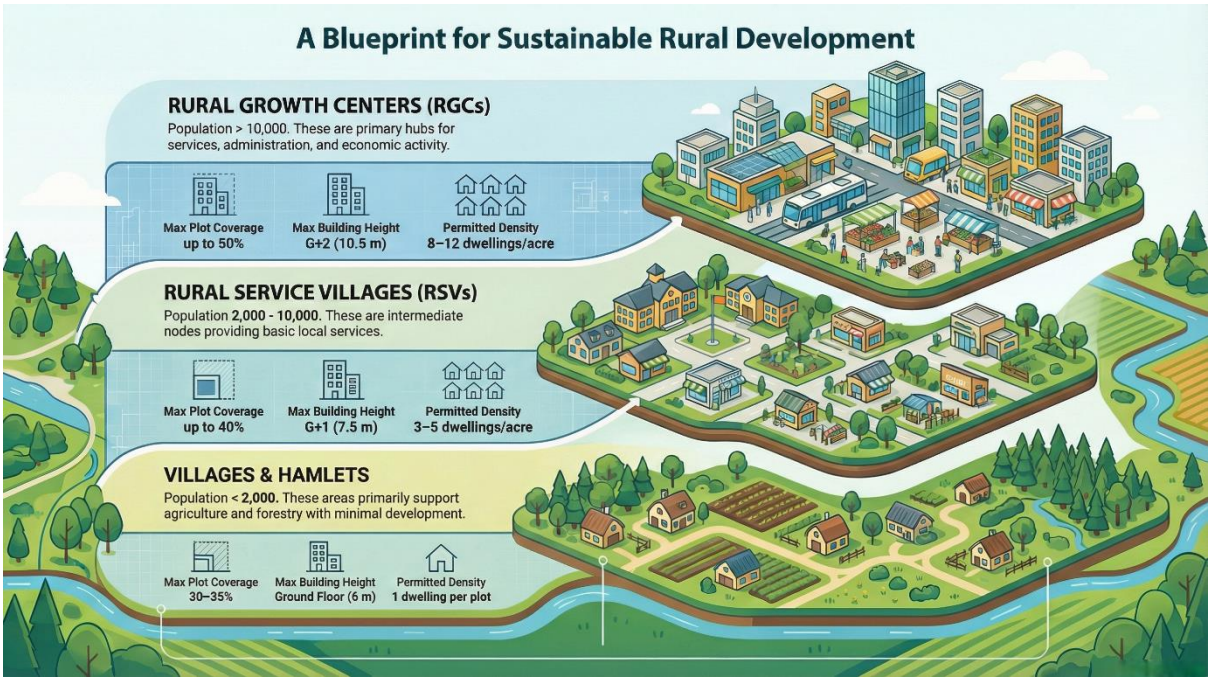


Figure 4-1: Suggested Settlement Hierarchy

4.6.3 Rural Land-Use Zoning Framework

4.6.3.1 Agriculture Zone (AZ)

Planning Intent:
To preserve agricultural productivity while enabling necessary rural habitation and agri-based economic activities.

Permitted Uses:

- Crop cultivation, orchards, and allied agricultural activities
- Single-family farm dwellings directly associated with landholdings
- Farm worker housing, storage facilities, barns, and small-scale agri-processing.

Regulatory Controls:

- Maximum of one residential dwelling per landholding
- Minimum plot sizes as prescribed under district regulations
- Prohibition of land subdivision for speculative residential development
- Mandatory linkage of residential use with agricultural activity

4.6.3.2 Forest Zone (FZ)

Planning Intent:
To conserve forest resources while accommodating traditional forest-dependent livelihoods.

Conditional Uses:

- Single caretaker or landowner dwelling
- Forest management and protection infrastructure

- Low-impact eco-tourism facilities subject to environmental clearance

Regulatory Controls:

- Very low site coverage and development footprint
- Absolute prohibition of commercial housing schemes
- Compliance with environmental protection requirements

4.6.3.3 Range Zone (RZ)

Planning Intent:
To protect grazing lands and sustain livestock-based livelihoods.

Permitted Uses:

- Livestock grazing and associated activities
- Single-family dwellings for herders or landowners
- Livestock shelters, water points, and ancillary structures

Regulatory Controls:

- Minimal development intensity
- Prohibition of land subdivision and urban conversion.

4.6.4 Rural Housing Policy

Rural housing development shall be governed by settlement hierarchy and service availability. In settlements with limited infrastructure, residential development shall be restricted to single-family dwellings to avoid overburdening services and to preserve rural character. Higher-density housing typologies shall only be permitted within designated Rural Growth Centers and Rural Service Villages, subject to infrastructure capacity.

4.6.5 Rural Development Design and Infrastructure Standards

4.6.5.1 Road and Street Network

- Primary rural access roads: ROW 18 m; carriageway 6–7.3 m
- Secondary rural roads: ROW 12 m
- Internal village streets: ROW 6–9 m
- Pedestrian paths and tracks: minimum width 1.5–2.0 m

Road alignments shall respect natural drainage, topography, and existing settlement morphology, particularly in hilly terrain.

4.6.5.2 Setbacks, Plot Coverage, and Built Form

Minimum Setbacks:

- Front: 3.0–4.5 m
- Side: 1.5–2.0 m (where applicable)
- Rear: 2.0–3.0 m

Maximum Plot Coverage:

- Villages & Hamlets: 30–35%

- Rural Service Villages: up to 40%
- Rural Growth Centers: up to 50%

4.6.5.3 Essential Rural Services

- Water supply: 45–70 liters per capita per day through protected or piped sources
- Sanitation: on-site systems with septic tanks or improved pits; clustered systems in growth centers
- Energy: grid extension supplemented by solar/off-grid solutions
- Solid waste: community collection points and controlled disposal/composting

4.6.5.4 Community Facilities and Open Spaces

- Villages & Hamlets: primary school, mosque/community space, basic water point
- Rural Service Villages: primary and middle schools, dispensary, market space, minimum 5% open space
- Rural Growth Centers: secondary education facilities, BHU/RHC, organized markets, minimum 10% public open space.

4.6.5.5 Development Control Regulations (DCR) – Rural Areas

Plot Sizes and Density:

- Villages & Hamlets: minimum 1 kanal; one dwelling per plot
- Rural Service Villages: minimum 0.75 kanal; 3–5 DU/acre
- Rural Growth Centers: minimum 10 marla; 8–12 DU/acre

Building Heights:

- Villages & Hamlets: Ground floor (5 m)
- Rural Service Villages: G+1 (7.5 m)
- Rural Growth Centers: G+2 (10.5 m)

Land-Use Restrictions:

- No subdivision below minimum standards
- No conversion of AZ, FZ, or RZ to urban residential use without plan revision
- Commercial housing schemes restricted to designated growth centers.

4.6.6 Commercial Regularization and Roadside Services Control in Rural Areas

4.6.6.1 Policy Rationale

Rural settlements in the district have experienced gradual emergence of commercial activities such as shops, workshops, fuel stations, storage facilities, and roadside tuckshops. While these activities are essential for livelihood diversification, mobility support, and local service provision, unregulated expansion can result in ribbon development, traffic hazards, environmental risks, and loss of agricultural land.

This section establishes an integrated framework to:

- Regularize existing commercial activities
- Prevent uncontrolled roadside commercialization
- Regulate petrol pump approvals and spacing
- Control tuckshop proliferation along rural corridors
- Align commercial growth with settlement hierarchy and infrastructure capacity
- Protect agricultural, forest, and range zones

4.6.6.2 Settlement-Based Commercial Permissions

Commercial uses shall be permitted based on settlement hierarchy.

A. Rural Growth Centers (RGCs)

Permitted Uses:

- Organized bazaars and market streets
- Retail shops and service establishments
- Small-scale agro-processing
- Warehousing (non-polluting)
- Fuel stations (subject to spacing and safety compliance)

Commercial development shall be concentrated within designated service cores and shall not extend beyond approved settlement boundaries.

B. Rural Service Villages (RSVs)

Permitted Uses:

- Small retail shops
- Local agricultural markets
- Repair workshops (low impact)
- Limited roadside services

Commercial uses shall be restricted to designated main streets or clusters. Strip commercialization along approach roads shall not be permitted.

C. Villages and Hamlets

Permitted Uses (Limited):

- Single small daily-needs shop
- Home-based enterprises
- Livelihood-linked micro-businesses

Standalone commercial plazas, fuel stations, and market strips shall not be permitted in villages and hamlets.

4.6.6.3 Regularization of Existing Commercial Uses

Existing commercial activities operating prior to adoption of this framework may be regularized subject to:

- No encroachment on public right-of-way
- Compliance with minimum road safety standards
- Provision of sanitation and waste management
- Structural safety compliance
- Environmental screening (where applicable)

Unauthorized commercial uses within Agriculture (AZ), Forest (FZ), or Range (RZ) Zones shall not be regularized unless directly linked to agricultural or livestock activity.

4.6.6.4 Petrol Pump (Fuel Station) Approval Standards

Fuel stations require strict regulation due to traffic, environmental, and safety implications.

A. Location Criteria

Fuel stations may be permitted:

- Within or on the periphery (300m) of Rural Growth Centers
- Along designated primary district roads (subject to spacing rules)

Fuel stations shall not be permitted:

- Within Forest or Range Zones
- In flood-prone or environmentally sensitive areas
- Within compact village cores
- On road curves, blind spots, or unsafe gradients

B. Minimum Spacing Requirements

To prevent clustering and traffic congestion:

- Primary Roads: Minimum 3 km between petrol pumps
- Secondary Roads: Minimum 5 km between petrol pumps
- Within Rural Growth Centers: Minimum 1 km between pumps

Spacing shall be measured center-to-center along the road alignment.

C. Plot and Design Standards

- Minimum plot size: 1 kanal
- Minimum frontage:
    - 30 meters on primary roads
    - 24 meters on secondary roads
- Minimum setback from ROW: 12–15 meters
- Minimum distance from:
    - Residential structures: 30 meters
    - Schools, mosques, health facilities: 50 meters

- Water bodies or wells: 60 meters

Dedicated entry and exit points, internal circulation, deceleration lanes (where required), oil traps, drainage systems, and fire safety compliance shall be mandatory.

4.6.6.5 Roadside Tuck-shop and Small Commercial Control

To prevent ribbon development along rural corridors, small tuck-shops shall be regulated as follows:

A. Location Permissions

Tuck-shops may be permitted:

- Within settlement boundaries
- At designated transport nodes
- Along long rural corridors subject to spacing controls

They shall not be permitted within Agriculture, Forest, or Range Zones outside settlement limits.

B. Minimum Spacing Standards

- Primary Roads: Minimum 1 kilometer between tuck-shops
- Secondary Roads: Minimum 1.5 kilometer between tuck-shops
- Outside settlement boundary: Maximum one tuck-shop per 2 km stretch

Spacing shall be measured along the road alignment.

C. Plot and Building Standards

- Maximum plot size (outside settlements): 5 marla
- Maximum coverage: 40%
- Height limit: Single storey (maximum 4.5 meters)
- Minimum front setback: 6 meters from ROW
- No encroachment on road shoulder or drainage

Consecutive roadside commercial plots shall not be approved to avoid strip commercialization.

4.6.6.6 Corridor-Based Commercial Management

Along major rural access corridors:

- Commercial uses shall be clustered rather than dispersed
- Infrastructure (parking, waste disposal, lighting) shall be planned collectively
- Agricultural frontage shall be protected from speculative subdivision

No approval shall be granted that leads to linear, urban-style commercial ribbon development.

4.6.6.7 Environmental and Infrastructure Compliance

All commercial and roadside service uses shall comply with:

- Safe water supply and sanitation provisions
- Solid waste management systems
- Drainage and stormwater management

- Fire safety regulations
- Environmental screening where required

Polluting industries, heavy mechanical workshops, fuel depots (bulk), and hazardous storage facilities shall not be permitted in rural settlements.

Policy Outcome

This integrated commercial regulation framework ensures that:

- Rural economic activity is supported and formalized
- Road safety and mobility are protected
- Environmental risks are minimized
- Agricultural and protected lands are preserved
- Ribbon commercialization is prevented
- Commercial growth aligns with settlement hierarchy and service capacity

Enforcement Clause

Failure to comply with these Development Control Regulations shall result in:

- Suspension of approval
- Monetary penalties
- Sealing of premises
- Demolition of unauthorized structures
- Blacklisting from future approvals

4.6.7 Phased Wise Service Provision and Implementation Strategy

- **Phase I (Basic Services):** safe water, access tracks, primary schools, sanitation
- **Phase II (Intermediate Services):** piped water, dispensaries, improved streets, markets
- **Phase III (Advanced Services):** secondary education, upgraded health facilities, drainage, public open spaces

Implementation shall be coordinated through district authorities, line departments, and community institutions, with periodic review every five years.

4.6.8 Layout Framework for Rural Development (Indicative Planning Structure)

The rural development framework shall be spatially implemented through a hierarchical layout structure, ensuring that population growth, services, and infrastructure are logically aligned.

4.6.8.1 District-Level Structure

At the district scale, the layout framework shall:

- Identify and designate Rural Growth Centers and Rural Service Villages
- Protect continuous tracts of agricultural land, forests, and rangelands
- Define primary rural access corridors connecting settlements to markets and urban centers

4.6.8.2 Settlement-Level Layout (Growth Centers and Service Villages)

At the settlement scale, Rural Growth Centers and Rural Service Villages shall be planned as compact, efficient, and service-oriented settlements. The objective is to ensure that residential development is directly supported by infrastructure and public services, while preventing unplanned outward expansion into agricultural and environmentally sensitive areas.

Key Layout Principles:

- A clearly defined settlement boundary shall be established to control sprawl and ribbon development along access roads.
- A central service core shall be designated, accommodating key facilities such as bazaars, schools, health units, mosques, local administration, and community spaces.
- Residential areas shall be organized in compact clusters around the service core to ensure walkable access to daily services and to reduce infrastructure costs.
- Higher residential densities shall be located closer to the service core, with densities gradually decreasing toward the settlement edge.
- Expansion of the settlement shall be incremental and contiguous to existing built-up areas, subject to service capacity and infrastructure availability.

Street and Circulation Structure:

- A hierarchical road network shall be followed, comprising primary access roads, secondary internal streets, and pedestrian pathways.
- Streets within the service core shall prioritize pedestrian movement and local access, with traffic-calming measures where appropriate.
- All new development shall maintain adequate right-of-way reservations for future service upgrades.

Open Spaces and Community Facilities:

- Public open spaces and playgrounds shall be distributed within walking distance of residential clusters.
- Community facilities shall be centrally located to maximize accessibility for the surrounding population.

This settlement-level layout approach ensures efficient service delivery, strengthens rural service functions, and supports sustainable population growth in accordance with service availability and planning capacity.

4.6.8.2.1 Population Thresholds and Service Triggers

To ensure that development intensity remains aligned with service capacity, the following indicative population thresholds and service triggers shall guide settlement expansion:

- **Up to 2,000 population:** Basic services only (primary school, water points, access roads); residential development restricted to low-density clustered housing.
- **2,000–10,000 population:** Intermediate services permitted (dispensary/BHU, piped water, local market); moderate residential densification allowed within settlement boundary.

- **Above 10,000 population:** Higher-order services required (secondary education, upgraded health facilities, drainage systems); higher-density residential and mixed-use development permitted within designated areas.

Expansion beyond existing settlement boundaries shall only be allowed once the minimum service requirements for the relevant population threshold are met.

4.6.8.2.2 Residential Density and Housing Typology

Residential density within Growth Centers and Service Villages shall be regulated to reflect proximity to services:

- **Core Area (within walking distance of service core):** Compact housing, small plots, and mixed residential-commercial use where appropriate.
- **Intermediate Area:** Low- to medium-density residential plots suitable for extended family housing.
- **Peripheral Area:** Low-density housing transitioning toward agricultural or open land, with no further outward expansion without plan review.

Apartment-style or high-rise residential development shall not be permitted in rural settlements.

4.6.8.2.3 Infrastructure Coordination and Phasing

All residential expansion shall be synchronized with infrastructure provision:

- Roads, water supply, sanitation, and drainage shall be provided prior to or concurrently with new development.
- Incremental upgrading of infrastructure shall be prioritized over outward spatial expansion.
- Temporary service deficits shall not justify unplanned settlement growth.

4.6.8.2.4 Environmental and Agricultural Safeguards

- Settlement expansion shall avoid prime agricultural land, flood-prone areas, steep slopes, and environmentally sensitive zones.
- A minimum buffer shall be maintained between settlement boundaries and agricultural, forest, or range zones.
- Natural drainage channels and vegetation shall be preserved within and around settlements.

4.6.8.2.5 Implementation and Control Measures

- Settlement boundaries and service cores shall be delineated on planning maps.
- All new development proposals shall be evaluated against population thresholds and service availability.
- Any deviation from the approved layout framework shall require formal planning approval and justification.

4.6.8.3 Village and Hamlet Layout

For villages and hamlets with limited services:

- Organic settlement patterns shall be respected
- Development shall occur as infill or incremental expansion adjacent to existing built-up areas
- Individual residential plots shall remain large enough to support household-level livelihood activities.

4.6.9 Conceptual Rural Development Layout

The rural development framework follows a nodal settlement model in which Rural Growth Centers function as primary service and employment hubs, supported by Rural Service Villages acting as secondary service nodes. Smaller villages and hamlets remain dispersed within agriculture, forest, and range zones. Infrastructure and services radiate outward from primary and secondary nodes, enabling efficient service delivery, controlled land consumption, and long-term sustainable rural development.

The conceptual rural development layout follows a nodal model:

- **Primary Node:** Rural Growth Center acting as the main service and employment hub
- **Secondary Nodes:** Rural Service Villages supporting surrounding villages
- **Support Areas:** Villages and hamlets embedded within agriculture, forest, and range zones

Infrastructure and services radiate outward from primary and secondary nodes, while low-density residential development remains dispersed and livelihood-oriented. This structure ensures efficient service delivery, controlled land consumption, and long-term sustainability.

4.6.10 Rural Livelihood Diversification and Local Economic Development

Rural development shall not be limited to primary agriculture alone. The framework promotes diversification of rural livelihoods to improve income resilience, reduce out-migration, and strengthen local economies.

Policy Directions:

- Promotion of cottage and home-based industries such as handicrafts, food processing, carpentry, and tailoring
- Support for agri-value chains including storage, grading, packaging, and local markets
- Allowance of small-scale, non-polluting enterprises within Rural Growth Centers and Rural Service Villages
- Integration of women-led and youth-led economic activities within settlement layouts

Livelihood-related development shall remain compatible with rural character and environmental capacity.

4.6.11 Gender, Social Inclusion, and Vulnerable Groups

The rural development framework recognizes the need for inclusive and equitable access to services and spaces.

Key Considerations:

- Safe and convenient access to water points, schools, health facilities, and markets
- Provision of community spaces usable by women, children, elderly, and persons with disabilities
- Walkable settlement layouts reducing travel burden for daily needs
- Integration of social facilities within settlement cores to enhance safety and accessibility

4.6.12 Disaster Risk Reduction and Climate Resilience

Given the exposure of rural areas to floods, landslides, droughts, and climate variability, resilience measures are integral to rural planning.

Planning Measures:

- Prohibition of settlement expansion within flood plains, unstable slopes, and erosion-prone areas
- Maintenance of buffers along watercourses and natural drainage channels
- Promotion of drought-resilient water supply systems and rainwater harvesting where feasible
- Preservation and enhancement of tree cover and natural vegetation around settlements.

4.6.13 Rural Mobility, Accessibility, and Connectivity

Efficient and inclusive rural mobility is essential for service access and economic activity.

Framework Provisions:

- Priority to all-weather access roads connecting settlements to service centers and markets
- Consideration of walking distances in settlement layout design
- Recognition and protection of traditional movement paths, including livestock routes
- Integration of public transport stops within Growth Centers and Service Villages

4.6.14 Governance, Community Participation, and Ex Tribal Context

Effective rural development requires alignment with local governance structures and customary practices.

Implementation Principles:

- Engagement of community representatives, jirgas, and local leadership in planning and implementation
- Respect for communal and customary land tenure systems
- Preference for incremental upgrading and regularization of existing settlements rather than forced restructuring
- Capacity-building of local institutions for long-term management

4.6.15 Flexibility and Context-Sensitive Application

Recognizing the diversity of terrain, settlement forms, and socio-cultural conditions, the framework shall be applied with contextual flexibility.

- Standards may be adapted to hilly terrain and dispersed settlements where justified
- Existing village cores may be accommodated through pragmatic adjustments to setbacks and layouts
- Flexibility shall not compromise environmental protection or long-term sustainability

4.6.16 Monitoring, Review, and Performance Indicators

The effectiveness of the Rural Development Framework shall be periodically assessed using measurable indicators.

Indicative Indicators:

- Population growth trends by settlement category
- Access to basic and intermediate services
- Rate of agricultural and environmental land conversion

- Infrastructure coverage and service quality

A formal review of the framework shall be undertaken every five years to reflect changing population dynamics, service levels, and development priorities.

4.6.17 Integration with District and Sectoral Planning

The Rural Development Framework shall be integrated with district development plans, sectoral investment programs, and infrastructure strategies.

- Alignment with education, health, water, and transport sector plans
- Use of the framework to guide public investment prioritization
- Coordination among planning, line departments, and local governments

This integrated approach ensures coherence between land-use planning, service delivery, and long-term rural development objectives.

4.7 Conclusion and Policy Recommendations

The proposed Land Use Planning and Zoning Framework for District Kurram represents a strategic and data-driven approach to guiding the district's future spatial development in a sustainable, inclusive, and environmentally responsible manner. It serves as a blueprint for balancing urban expansion, agricultural productivity, industrial growth, and environmental conservation, ensuring that development initiatives align with both local aspirations and regional policy objectives such as those outlined in the Khyber Pakhtunkhwa Urban Policy 2030.

Through the delineation of distinct zoning categories including Residential, Commercial, Industrial, Institutional, Recreational, Agricultural, Forest, and Rangeland Zones, the framework establishes a clear spatial structure that supports orderly development, efficient resource allocation, and sustainable land management. Each zone has been identified and planned based on its functional suitability, locational context, and long-term development potential, providing a robust foundation for both urban governance and rural land management.

4.7.1 Summary of Key Findings

The assessment revealed that District Kurram's land composition is characterized by a diverse mix of urbanizing settlements, agricultural plains, forested hills, and extensive rangelands, each playing a unique role in the district's socio-economic and ecological system:

- Urban and Peri-Urban Areas: Rapid population growth and emerging commercial activities necessitate the adoption of compact and sustainable urban forms. The zoning plan promotes high-density development within designated urban boundaries, ensuring efficient use of land and infrastructure.
- Agricultural Land: Approximately 44,243 acres of highly productive agricultural land have been safeguarded to maintain the district's food security and rural economy, with strong emphasis on sustainable irrigation, soil conservation, and climate-resilient farming practices.
- Industrial Zones: Industrial development is planned in strategic locations with access to transportation networks and non-agricultural land, promoting economic diversification while minimizing environmental conflicts.
- Forest and Rangeland Areas: Together covering a substantial portion of Kurram's landmass, these zones are vital for biodiversity conservation, carbon sequestration, and soil stabilization. The proposed framework supports sustainable forest management, community-based conservation, and regulated grazing systems to prevent degradation and maintain ecological balance.

- Recreational and Green Infrastructure: Parks, open spaces, and proposed urban forestation zones enhance livability, climate resilience, and public health, integrating nature into the built environment and improving overall urban quality of life.

4.7.2 Policy Recommendations

To implement the proposed zoning plan and ensure its long-term effectiveness, the following policy directions are recommended:

1. **Institutional Strengthening and Governance**

    - Establish a District Land Use Planning and Management Authority (DLUPMA) for Kurram to oversee implementation, monitoring, and periodic review of the zoning plan. or fully operationalized the established Land use and Building Control Authority (LUBCA)

2. **Sustainable Land and Resource Management**

    - Enforce policies that discourage the conversion of prime agricultural land for non-agricultural purposes.
    - Introduce integrated watershed and soil conservation programs to address erosion, desertification, and water scarcity, particularly in the rangeland and forest zones.
    - Promote water-efficient irrigation systems and encourage the adoption of solar-powered technologies to reduce dependency on groundwater extraction.

3. **Climate Resilience and Environmental Protection**

    - Implement reforestation and afforestation programs in degraded forest areas and along riparian corridors to enhance vegetation cover.
    - Strengthen rangeland management through rotational grazing, fodder cultivation, and water harvesting systems.
    - Integrate climate-adaptive design principles into all future development to reduce vulnerability to droughts, floods, and temperature extremes.

4. **Infrastructure and Economic Development**

    - Prioritize infrastructure investments including transport, energy, and communication networks within designated urban and industrial zones to stimulate economic growth.
    - Encourage public-private partnerships (PPPs) to attract investment in housing, tourism, and agro-industrial ventures compatible with the zoning framework.
    - Promote local employment and skills development programs, particularly in sustainable construction, agriculture, and forest management sectors.

5. **Community Participation and Awareness**

    - Foster community engagement in land use decision-making, especially among farmers, pastoralists, and forest-dependent communities.
    - Develop awareness programs on the importance of land conservation, sustainable agriculture, and environmental stewardship.
    - Support community-based monitoring systems for forest and rangeland management to ensure long-term ownership and accountability.

4.7.3 Conclusion

The Land Use Planning and Zoning Framework for District Kurram provides a holistic and forward-looking foundation for guiding development up to the planning horizon year 2045. By integrating spatial

planning with environmental management, the framework ensures that growth remains balanced, resources are utilized responsibly, and future generations inherit a resilient and sustainable landscape.

Ultimately, the proposed plan seeks to transform Kurram into a model district for integrated rural–urban development, where economic opportunity, environmental protection, and community well-being coexist in harmony. Through consistent policy enforcement, stakeholder collaboration, and adaptive governance, District Kurram can achieve sustainable growth that honors its cultural heritage, ecological richness, and developmental potential.

4.8 Land Use Regulations and Guidelines

Land use regulations constitute the legal and procedural backbone of spatial governance, enabling the orderly transformation of land while safeguarding public interest, environmental assets, and urban form. As part of the zoning framework, these regulations establish the functional character of each land parcel by defining what activities are allowable, conditionally approvable, or strictly restricted within designated zones.

The following Land Use Zoning Regulations have been formulated to guide the spatial development of Kurram District in accordance with sustainable urban planning principles, environmental protection standards, and socio-economic needs. These zoning categories delineate the allowable land uses, conditional activities, and prohibited developments to ensure orderly growth, public safety, and the protection of natural resources.

Central to this framework are three key categories:

- **Permitted Uses** refer to those land use activities that are inherently aligned with the primary intent and planning objectives of a specific zone. These uses are allowed by-right and do not require discretionary approval, provided they comply with applicable building codes, design guidelines, floor area ratios (FAR), setbacks, and height restrictions. Permitted uses facilitate predictable development outcomes and ensure efficient processing of building permits and planning approvals.
- **Permissible Uses** represent a secondary tier of land use activities that may be allowed within a zone subject to certain conditions. These uses are not automatically permitted but may be approved through a special review process—often involving impact assessment, stakeholder consultation, and compliance with supplementary criteria. The intent is to provide flexibility while maintaining compatibility with surrounding uses and minimizing potential land use conflicts.
- **Prohibited Uses** encompass activities that are fundamentally incompatible with the intended function of a zone due to their adverse environmental impacts, socio-spatial externalities, or infrastructure demands. These uses are categorically disallowed to preserve the integrity of zoning objectives, protect public health and safety, and maintain functional coherence in urban and rural areas.

These regulatory distinctions are essential to preserving urban form, promoting functional integration, managing growth, and facilitating context-sensitive development. They also empower local planning authorities to enforce zoning compliance, monitor land use change, and guide investment in alignment with strategic spatial frameworks.

The zoning regulations apply uniformly across the district and are tailored to the land use character and development intensity of each zone. The regulatory structure covers the following major land use categories:

- Residential Zones
- Commercial Zone (CBD)
- Industrial Zones
- Agricultural Zones

- Mining Zones
- Forest Zones
- Institutional Zones (including Education, Health, and Governmental uses)
- Recreation Zone

Each of these zones is governed by a specific matrix of permitted, permissible, and prohibited uses, as detailed in the following subsections. This structured approach ensures the development of an inclusive, sustainable, and resilient urban-rural fabric while balancing socio-economic development with environmental stewardships.

Each zone defines a distinct functional character residential, commercial, industrial, institutional, agricultural, recreational, forest, mining, and mixed-use designed to accommodate the district's current and projected land use requirements.
All land development activities within these zones shall be subject to the approval of the Land use and Building Control Authority(LUBCA) and must comply with the provisions of the Khyber Pakhtunkhwa Local Government (Planning) Rules, Environmental Protection Act, and other relevant regulations.

The purpose of this matrix is to:

- Provide clear guidance on land use compatibility.
- Prevent environmental degradation and land use conflicts.
- Promote efficient infrastructure provision and balanced growth.
- Support the vision of an environmentally sustainable and economically vibrant Kurram District.

4.8.1 Residential Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Detached/semi-detached dwellings • place of worship or prayer • Social/cultural institutions • Parks and playgrounds • Residential Apartment • Graveyard or place of burial horticultural nursery, • Small health units/dispensaries • Neighborhood grocery or corner shop • Rainwater harvesting structures • Home-based small-scale cottage industries (non-polluting). • Urban farm, • Old age home or orphanage, • Urban forest,	• Commercial offices and service, • Shops of local character, • Raising of poultry for non-commercial purposes, • Private community center or club • Day-care center or Pre-schools, • primary school; • secondary school; • Rehabilitation centers, • Small scale Taxi/rickshaw stand. • Guest houses • Offices of professionals with adequate parking facilities, • Local shopping areas/retail shops, • Clinics/dispensaries • Private schools (primary/secondary.	• Local government shall not allow person to use land or building commercial area for any purpose which is neither permitted nor permissible.

4.8.2 Commercial Zone (CBD)

Permitted Uses	Permissible Uses	Prohibited Uses
• Commercial buildings, • Markets, shopping mall departmental stores and Outlets, • Shops except dealing in hazardous dangerous substances • Taxi/rickshaw stand. • Public Squares and Parks • Memorial and monument, • Hotel or motel, • Hostel • Car showroom, • Police station, post office and fire station, • Restaurant, • Social welfare institutions such as community centre, art gallery and museum, • Parking plaza or Parking site.	• Pedestrian friendly streetscape, • Mixed- use buildings,(As per KP Urban Policy 2023) • Seasonal commercial fare site, • Fuel Stations, • Coal, wood or Timber yard. • Marriage or banquet hall, concert hall • petrol pump or gas or LPG or LNG station; • auto workshop; • indoor sport facility • place of worship or prayer,	• Local government shall not allow person to use land or building commercial area for any purpose which is neither permitted nor permissible.

4.8.3 Industrial Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Small and Medium Scale Industries and associated activities and facilities • vertical green industry; • construction equipment, building material store; • Industrial park or estate • Police station, fire station and post office; • Bank or automated teller machine (ATM); • Industrial research institute; • Treatment or recycling plant • Vocational Training Institute • Renewable energy manufacturing (solar panels, wind components).	• Showrooms (only for industrial products, not retail) • Mixed- used buildings(industrial + service use only) • Residence for workers • Fuel stations and Oil depot; • Restaurant; • Power plant • Grid Station • Place of Worship • commercial, health and educational facility for workers or employees • Auto workshop, service garage and service station • Petro chemicals, petroleum and gas products • Cannabis Processing Industry • Weighing stations • Shooting Range	• Local government shall not allow person to use land or property in an industrial area for any purpose which is neither permitted nor permissible.

Note: Industries in this zone shall adopt green practices including renewable energy integration, rainwater harvesting, effluent treatment, and tree belts as per EPA and district planning standards.

4.8.4 Agriculture Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Crop, • Orchard, • Pastureland • livestock such as dairy or poultry farm • Forest, • Nursery or a green house, horticulture, • Tube well, • Existing rural settlement or village, • Place of worship or prayer. • Agro-based industry: limited to small or cottage-scale (e.g., flour, oil pressing, fruit processing) • Storage activities of agricultural goods which are non-hazardous in nature. • Water harvesting ponds and irrigation structures • Farm-to-market storage sheds	• Milk Chilling and Pasteurization • Animal husbandry clinic, veterinary dispensary or hospital. • Agricultural machinery workshop • Basic health unit • clinic or hospital. • Zoological garden, • Farmhouse (max 2 kanal, owner-linked) • Detached/semi-detached dwellings. • Slaughterhouses, • Dairy production, • Botanical garden, • recreational club or resort or country club. • Bird sanctuary, • Zoo or wildlife park, • Grain market • Cattle farm • Poultry Farm, • Cattle market • Fruit and vegetable market, • Agriculture, Livestock research institute • Park, monument, playground, gymnasium or sports complex • public or private recreational or theme park; • Vegetable, fruit and grain market • water filtration plant; • wastewater treatment plant; • Power plant • Petrol pump or gas station or LPG or LNG storage and filling station. • Base trans-receiver station • Or communication tower. • shooting range	Other than permitted and permissible

	• swimming pool • library • Public slaughterhouse •	

Note: Conversion of fertile agricultural land to non-agricultural use shall be subject to prior environmental clearance and approval by the District Planning & Development Committee (DPDC) or Land Use and Building Control Authority (LUBCA) Priority shall be given to preserving prime agricultural land for food security.

4.8.5 Mining Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Extraction of minerals (e.g., coal, sand, gravel, stone), quarrying, and other resource mining activities. • Temporary storage and crushing units • Rehabilitation Areas • weighbridges, safety offices, and security check-posts	• Housing or colony for workers (including schools and corner shops, health facility) • Processing plants for mined materials, • storage facilities for mined goods, Industrial parks related to mining activities (Processing plants, Storage facilities • Workshops and manufacturing units, Logistics infrastructure), Transportation infrastructure. • Utilities for mining operations (water treatment plants, power plants for mining operations), • Vocational training centers for workers in the mining sector.	• Residential developments, • Commercial buildings, • Agricultural uses (crop farming, livestock farming), • Any land use that interferes with mining operations or is incompatible with mining activities. • Any non-essential developments such as recreational areas, large-scale residential, or commercial zones within mining areas

4.8.6 Forest Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Forestry activities such as timber extraction (sustainable logging), reforestation, agroforestry, controlled ecotourism (e.g., hiking, camping), conservation efforts. • Wildlife conservation and habitat restoration, national parks, nature reserves.	• Forestry research institutes, sustainable wood processing industries (e.g., paper mills), eco-tourism facilities (lodges, visitor centers), and community-based forest management activities. • Educational and training centers focused on environmental conservation and sustainable forestry practices	• Urban development (residential, commercial, industrial), large-scale agriculture (e.g., crop farming), mining activities, infrastructure projects (e.g., roads, buildings), land clearing for non-forest related uses. • Any activities that lead to deforestation, illegal logging, or degradation of forest ecosystems. • hunting, poaching, and wildlife trafficking • waste disposal, solid waste dumps, or quarrying.

Note: Any tree felling, land clearance, or construction activity without prior approval from the Forest Department shall be strictly prohibited

4.8.7 Institutional Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Large Scale education zone • General education universities • IT and Media institutes • City Level libraries, book banks, data and information centers • Large Scale Health Institutions; Hospitals, • Scientific research institutes • Clinics • Clinical Laboratory, • BHUs and RHCs • Maternity Care Centers • Government or semi- government offices (District Secretariat, Town Hall etc. • Social welfare institution such as community center, art gallery, museum and auditorium • Local and zonal municipal office • Police station, fire station or post office • Shelter home	• Staff residences (teaching and non-teaching, health workers, employees) • Separate hostels for Boys and Girls • Auditoriums, seminar halls, workshop spaces • Athletic club, gymnasium, Sports facilities, fitness center or indoor sport facility • Banks or Automated Teller • Machine (ATM) • Departmental Store • Taxi or bus stand. • Hotel or Motel • Guest house	• Other than permitted and permissible

• Pannahgahh • Convention Centre • Religious Seminaries (Madaris) • NGO/INGO offices		

4.8.8 Mixed Land Use Zone

Permitted Uses	Permissible Uses	Prohibited Uses
• Detached/semi-detached homes • Residential apartments • Social institutions (schools, places of worship) • Retail shops, cafes, local businesses, offices for professionals (doctors, lawyers) • Schools, • Clinics, • Community centers, • Public parks, • Transportation hubs (bus stations and public transport terminals) • Small workshops, • Artisan businesses, • Local food production, local manufacturing units • Libraries, post offices • Restaurants, Cafés, and Small Eateries • small offices, co-working spaces, and financial institutions (banks, ATMs).	• Additional housing developments, Housing Schemes, housing societies and residential apartments • Hotels, motels, restaurants, specialized retail outlets. • Day-care centers, health centers, cultural centers. • Cottage industries, home-based businesses, small- scale production units. • Public sports complexes, recreation centers.	• Large-scale housing projects incompatible with zoning. • Hazardous goods stores, large malls, or heavy industry shops. • Large hospitals, forensic labs, military facilities. • Large factories producing hazardous materials, heavy industrial operations. • Sewage plants, waste disposal sites, power plants. • Wholesale Markets • Truck Terminals • Fuel Depots •

4.8.9 Recreation Zone

Permitted Uses	Permissible (Conditional) Uses	Prohibited Uses
• Public parks, playgrounds, green spaces • Sports facilities (fields, courts, pools) • Community/recreation centers • Nature preserves • Accessory uses (parking, restrooms) • Educational facilities (nature centers) • Walking and cycling trails • Children's activity zones and cultural performance areas	• Commercial amenities (e.g., cafés) • Event venues (festivals, concerts) • Campgrounds/RV parks • Private recreational facilities (marinas) • Small-scale lodging (eco-lodges) • Temporary uses (farmers' markets)	• Industrial activities (factories) • Heavy commercial (malls) • Residential housing (high density) • High-impact infrastructure (highways) • Polluting uses (landfills) • Intensive agriculture (livestock farming) • Waste disposal facilities • Transport depots/terminals • fuel stations, parking depots, • Scale Food Courts • Quarrying or Sand Extraction • long-term camping • Other than permitted and permissible

4.9 Implementation and Regulatory Framework

4.9.1 Institutional Responsibility

The implementation of the zoning regulations shall be the responsibility of the Land use and Building Control Authority (LUBCA), which will serve as the principal coordinating body for overseeing, enforcing, and periodically reviewing land use and zoning activities within District. The LUBCA shall work in close coordination with the Tehsil Municipal Administrations (TMAs), the Environmental Protection Agency (EPA), and other relevant line departments to ensure that zoning provisions are implemented in a transparent, efficient, and accountable manner.

Each agency shall perform a defined role:

- LUBCA; policy oversight, zoning enforcement, and inter-departmental coordination.
- TMAs; Implementation at the tehsil level, including building control and land use monitoring.
- EPA; Environmental clearance, impact assessment, and compliance monitoring.
- Line Departments; Technical support in infrastructure, housing, agriculture, industry, and public utilities.

4.9.2 Approval and Monitoring

All development proposals that fall under permissible (conditional) land uses shall undergo a formal review and written approval process administered by LUBCA before the commencement of construction or activity. This process shall include technical evaluation, environmental assessment, and verification of conformity with zoning regulations and design guidelines.

Regular compliance monitoring shall be conducted by the relevant authorities to ensure that developments adhere to approved plans, environmental safeguards, and safety standards. Violations or deviations shall be subject to corrective actions and penalties as stipulated in the enforcement provisions.

4.9.3 Environmental and Safety Compliance

All industrial, mining, or major infrastructure activities within the district shall be subject to environmental clearance in accordance with the Khyber Pakhtunkhwa Environmental Protection Agency (EPA) Regulations. Environmental Impact Assessments (EIA) and Initial Environmental Examinations (IEE) shall be mandatory for all projects with potential environmental or social impacts.

Activities that pose a risk to public health, water sources, natural ecosystems, or cultural heritage shall not be permitted. The EPA, in coordination with the LUBCA, shall have the authority to suspend or revoke approvals for non-compliance with environmental and safety standards.

4.9.4 Zoning Amendments

Future zoning amendments or revisions may be considered in response to population growth, economic transitions, infrastructure expansion, or environmental considerations. Any such amendments shall follow a structured review and approval process, including:

- Technical assessment by the LUBCA and relevant departments.
- Stakeholder consultation, ensuring representation from local communities, private sector entities, and civil society.
- Formal endorsement through the LUBCA and notification by the competent district authority.

This process ensures that zoning regulations remain dynamic, adaptable, and aligned with evolving development priorities and sustainability objectives.

4.9.5 Enforcement and Penalties

Strict enforcement mechanisms shall be instituted to preserve the integrity of zoning boundaries and uphold planning standards. Unauthorized land use changes, encroachments, or developments inconsistent with the approved zoning regulations shall be subject to:

- Fines and penalties as prescribed by the LUBCA.
- Cessation orders or demolition of unauthorized structures.
- Land restoration requirements to rehabilitate affected areas.

The LUBCA, TMAs and relevant enforcement agencies, shall ensure that violations are addressed promptly and transparently.

4.9.6 Policy Statement

The District Land Use Zoning Regulations seek to establish a coherent and enforceable framework that balances development with conservation. The overarching policy objective is to ensure efficient land utilization, sustainable livelihoods, and environmental stewardship that safeguard the interests of both present and future generations.

This regulatory framework reinforces the district's commitment to planned development, equitable resource distribution, and ecological resilience, thereby supporting the realization of Kurram's long-term vision for sustainable spatial growth and community well-being

5 LEGAL & INSTITUTIONAL FRAMEWORK

5.1 Legal Framework for Implementation of District Land Use Plans

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, the implementation of District Land-Use Plans involves a structured process. Initially, the Planning Control Authority or designated unit formulates the plan, which is then reviewed and approved by the Provincial Land-Use and Building Control Council. Once approved, the plan is officially notified, and public consultations may be conducted to raise awareness. The plan is integrated with broader urban and infrastructure plans to ensure alignment with development goals and service provision. Landowners and developers must ensure their activities comply with the plan, with the Planning Control Authority monitoring compliance and enforcing regulations through inspections and notices. Applications for land-use and development permissions must align with the plan. The plan is subject to periodic reviews and updates, with significant changes leading to amendments. The Planning Control Authority monitors implementation, prepares regular reports, and resolves disputes through the Appellate Tribunal, ensuring effective and organized land development across Khyber Pakhtunkhwa.

5.1.1 Constitution and Functions of the Council

The Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021 establishes the Provincial Land-Use and Building Control Council, a key body responsible for overseeing land-use and building regulations. The Council is chaired by the Chief Minister of Khyber Pakhtunkhwa, with the Minister for Local Government, Elections, and Rural Development serving as the Vice Chairperson. The Council's membership includes various provincial ministers such as those for Agriculture, Industries, and Environment as well as senior officials from the Planning and Development Department, the Board of Revenue, and other government departments. Additionally, the Council features five experts, with at least three from the private sector, who are nominated by the Chairperson. The Director General of the Authority acts as the Member-cum-Secretary. While co-opted members with specific expertise may be invited for discussions, they do not possess voting rights. Members are expected to attend all meetings and may receive honoraria, particularly those from the private sector. Terms for members from clause (q) are three years, renewable, and vacant seats must be filled within one month.

The Council's functions are multifaceted. It is responsible for approving policies and guidelines related to the Authority's operations, reviewing and endorsing urban policies, physical planning standards, and land- use regulations proposed by the Authority. The Council oversees the creation and modification of strategic and master plans, including district land-use plans, and approves the Authority's annual budgets. Additionally, the Council manages financial provisions for private sector expert members and oversees the preparation and implementation of various plans, providing directives as needed.

Meetings of the Council are chaired by the Chief Minister or, in their absence, by the Vice Chairperson. The Council is required to meet at least bi-annually, though additional meetings may be convened at the Chairperson's discretion. A quorum for meetings is two-thirds of the total members, and the Council determines its own procedural rules.

5.1.2 Provincial Land-Use and Building Control Authority

The Act also establishes the Provincial Land-Use and Building Control Authority as a corporate entity with perpetual succession, capable of managing property, entering into agreements, and engaging in legal actions. The Council serves as the Board of Directors for the Authority, which is headquartered in Peshawar with the option to open sub-offices across the province. The

Authority's actions are authenticated by the Director General, who is supported by the Urban Planning Policy Unit of the Planning and Development Department.

The Director General leads the Directorate General, overseeing the Authority's operational aspects. Responsibilities include proposing and recommending planning standards, land-use guidance, and regulatory amendments to the Council, and supervising the development and implementation of master plans, strategic development plans, and district land-use plans. The Director General conducts research, publishes reports, and advises the Council on land conservation, classification, and development, and supervises the District Land-Use Planning and Management Committees. The Director General may be appointed from a panel of recommended candidates or through direct recruitment. This role involves administrative and financial management of the Authority, preparation of meeting agendas, implementation of Council decisions, progress monitoring, and compliance management, including recommending inquiries into non-performance.

This comprehensive framework under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, aims to ensure organized development and regulatory compliance across the province, fostering effective land-use planning and building control.

5.1.3 District Local Enforcement Unit

The planning regulation outlines the establishment of a Local Planning and Enforcement Unit in each district to ensure effective land-use management. This Unit comprises a Chief Planning Control Officer, Planning Control Officers, Inspectors, and additional staff appointed by the government in consultation with the relevant authority. The Chief Planning Control Officer is responsible for the administration and operational functions of the Unit and reports directly to the District Land-Use Planning and Management Committee. Moreover, the Chief Officer is required to maintain coordination with local governance bodies, including the Chairperson of the Tehsil Council, City Mayor, Tehsil Municipal Officer, Director of the Urban Area Development Authority, as well as Deputy and Assistant Commissioners. This inter-agency coordination ensures transparency and accountability, particularly in identifying and reporting deviations from approved land-use and master plans.

The Unit's primary responsibilities include supporting the District Land-Use Planning and Management Committee in conducting surveys and preparing district land-use and master plans. It is also tasked with ensuring the implementation of relevant legislative provisions within its jurisdiction. Furthermore, the regulation empowers the government to appoint Planning Control Officers and Inspectors as required, and to authorize other agencies or designated officials to perform these roles during the enforcement period of the Act. Overall, this chapter emphasizes a structured, collaborative, and compliance-driven approach to land-use governance at the district level.

5.1.4 District Land-Use Planning and Management Committee

The District Land-Use Planning and Management Committees are constituted as institutional mechanisms to oversee and guide land-use governance at the district level in accordance with statutory provisions. Each committee is chaired by the Deputy Commissioner and comprises key departmental heads and representatives from local councils, with the Additional Deputy Commissioner (Finance and Planning) serving as both a member and the Secretary. The committees are mandated to convene on a monthly basis or as required, with a two-thirds quorum necessary for proceedings. Their core functions include the facilitation and supervision of land-use surveys, zoning activities, strategic and master planning, and coordination with local government bodies. They are also responsible for reviewing no-objection certificates (NOCs), development permissions, and recommending land-use plans to the relevant Authority for

approval. Additionally, the committees are empowered to take enforcement action against unauthorized developments and violations of approved land-use plans. The inclusion of co-opted members with technical expertise further strengthens the committee's capacity for informed decision-making. These provisions collectively promote a structured, accountable, and efficient approach to district-level land-use planning and management.

5.1.5 Planning Control Permissions

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, certain permissions are required for land and building developments. These include both land-use and development permissions. Land-use permission is necessary for any land or building unless specifically exempted by the Act, while development permission is required for any land development or building construction. It is important to note that land- use permissions granted before the commencement of this Act will still be subject to its provisions.

5.1.6 Land Use Permission

To obtain land-use or master planning permissions, applications must be submitted to the Planning Control Officers. These applications need to be in the prescribed format and include all necessary documents, along with any additional documentation that the Planning Control Officer may request. Only the landowner or their authorized representative is eligible to apply for land-use permission.

When a land or building use does not comply with the district land-use plan, the owner must submit a land- use conversion plan within three months of the notification of the plan. If the owner fails to submit a plan, the Planning Control Officer will issue a notice requiring submission within 30 days. Should the plan still not be provided, the Planning Control Officer will create and issue a conversion plan on behalf of the owner. Owners must align their land or building use with the issued conversion plan.

5.1.7 Development Permissions

The Act defines three types of development permissions: land development permissions, road remodeling permissions, and building permissions. Applications for these permissions must be accompanied by the prescribed fee.

Applications for development permissions should be submitted to the Planning Control Officer, following the prescribed format and including all necessary documents. Additional documentation may be requested by the Planning Control Officer. Land development and building permissions can only be requested by the property owner or their authorized representative, whereas road remodeling permissions can be requested by relevant authorities or entities.

Certain exemptions apply to building permissions. Specifically, no building permission is required for constructions based on standard designs notified by the Authority. Similarly, repairs, rehabilitation, or renovation of historic buildings, provided they have the approval of the relevant authority, are exempt from building permission requirements.

Owners of buildings that do not comply with the district land-use plan must submit a building conversion plan within three months of the notification of the plan. If no plan is submitted, the Planning Control Officer will issue a notice requiring submission within 30 days. Should the plan still be lacking after this notice, the Planning Control Officer will create and issue a conversion plan. Compliance with the issued conversion plan is mandatory for all building owners.

This framework provides clear procedures for obtaining and managing planning and development permissions, ensuring adherence to land-use and building regulations, while also allowing for necessary modifications and exemptions.

5.1.8 Certificates and Renewal of Building Stock

Under the Khyber Pakhtunkhwa Land-Use and Building Control Act, 2021, a compliance certificate is mandatory for anyone who has obtained development permission. This certificate must be submitted within the time specified in the development permission and must confirm that the development has been executed in accordance with the granted permissions and applicable regulations. The compliance certificate should adhere to the form and include the documents specified by the Authority or any additional documents requested by the Planning Control Officer. If the Planning Control Officer determines that the development aligns with the permissions and regulations, they will issue the compliance certificate.

Buildings may be subject to renewal regulations, and owners are required to renew their buildings in accordance with these regulations.

5.1.9 Improvement of Urban Design

Improvement proposals are necessary if an area's urban design is deemed poor or if directed by the Government. These proposals must include a land use change plan (if required), a redevelopment plan, a building stock renewal program (if necessary), cost estimates for the redevelopment and renewal programs, any required changes in development and ownership, and steps to ensure a smooth transition to the planned development. Land use change plans will follow the procedures outlined in Section 18 of the Act.

When land use changes occur, an infrastructure change proposal must be formulated within 60 days. This proposal will include directives for utilities and agencies to plan for the municipal services required to support the new land use. The Unit has the authority to prepare and execute schemes, direct government agencies, standardize building plans, acquire land, enter into public-private partnerships, reallocate land and building rights with Government approval, and support the establishment of Real Estate Investment Trusts (REITs).

A betterment fee may be charged to cover the costs of improvement or infrastructure proposals, with prior Government approval. This fee is based on the ownership of physical assets and may be recovered as arrears of land revenue. It can cover all or part of the costs associated with improvements.

If the full cost of improvements is not covered by the betterment fee, a development charge may be imposed on the owners of physical assets who have benefited from the development. This charge is payable upon the sale or lease of the asset exceeding 11 months. It correlates with the development costs and may be recovered as arrears of land revenue, subject to Government approval.

5.1.10 Enforcement and Penalties

Planning Control Officers are responsible for assessing and evaluating planning permissions, while Planning Control Inspectors handle unauthorized land use and development and prepare contravention reports.

Authorized officers have the power to seal buildings or structures for violations of the Act, rules, or regulations. They may also attach areas or open spaces for such violations.

Penalties for offenses are specified in the First Schedule of the Act. These offenses are cognizable and non-bailable. No court can take cognizance of these offenses except on a complaint by an authorized officer or the District Land-Use Planning and Management Committee. The Code of Criminal Procedure, 1898 applies to offenses under this Act.

The Government will establish an Appellate Tribunal to hear appeals against decisions or orders issued by the Authority or its officers. The Tribunal will consist of a chairperson and two expert members. Appeals must be filed within 15 days of receiving the decision. The Tribunal's decisions are final, and its members will serve a three-year term. Directors and officers of corporate bodies are responsible for offenses under this Act unless they can prove otherwise.

5.1.11 Inspection

The Government may establish an external Land Use Inspectorate to monitor enforcement of the Act. This Inspectorate will include a Chief Inspector and Deputy Chief Inspectors and will be funded by the Government.

The Chief Inspector and Deputy Chief Inspectors have the authority to inspect records, enter premises, and obtain court records related to the enforcement of the Act.

Inspections will follow an annual schedule prepared in consultation with the Authority. Unannounced inspections may only occur on the Department's directions. Draft findings from inspections will be shared with enforcement officials for feedback, and final reports will be provided to the relevant authorities.

5.1.12 Inclusion of Technical Experts in District Planning framework

In order to ensure a robust and effective decision-making in district land-use planning, the framework requires the active participation of technical experts, a provision made possible through the co-option of members in the District Land-Use Planning and Management Committee, in collaboration with the newly established Local Planning and Enforcement Unit. Some strong alternatives include:

- Inclusion of local enforcement unit in District Land-Use Planning
- Engagement of Urban Planners, GIS Experts for District-Level Planning
- Integration of specialized workforce for effective Land-Use Planning
- Integration of Sectoral Expertise in District Committees
- Appointment of Technical Consultants for Planning Oversight
- Expert Advisory Mechanism for District Planning Committees
- Involving Technical Experts in District Land-Use Planning.

5.2 Institutional Gaps and Implementation Strategy

Despite the presence of a legislative and administrative framework for land use planning at the provincial and district levels, effective implementation remains hindered by several institutional shortcomings. Key challenges include limited technical and human resource capacity, poor inter-agency coordination, weak monitoring and enforcement mechanisms, and minimal stakeholder engagement. Local planning units often operate without qualified professionals such as urban planners and GIS experts, leading to delays in plan preparation, poor compliance, and ineffective development control. Fragmented mandates, cumbersome regulatory processes, and lack of data-sharing protocols further exacerbate inefficiencies and duplication of efforts.

5.2.1 Institutional Gap Analysis and Actionable Mechanisms

To address these issues, a set of targeted, actionable mechanisms has been developed to strengthen institutional performance and bridge the gap between planning and implementation. These include establishing formal coordination bodies, implementing training programs, introducing GIS-based monitoring tools, reforming regulatory procedures, and creating participatory platforms for community engagement. The following table outlines the key

institutional gaps and corresponding strategies designed to enhance accountability, coordination, and responsiveness in the planning system.

Identified Gap	Detailed Description	Proposed Mechanism / Action Plan	Responsible Institutions
Fragmented Inter- Agency Coordination	Agencies at provincial, district, and tehsil levels often operate in silos with unclear communication and reporting lines. This leads to duplication of work and conflicting decisions in planning and enforcement.	• Establish formal coordination committees at each level. • Conduct quarterly inter- departmental coordination meetings. • Develop shared digital dashboards for real-time data sharing.	District Planning Committees
Inadequate Institutional Capacity	District and tehsil-level units often lack adequately trained urban planners, GIS experts, data analysts, and enforcement officers, limiting the quality and timeliness of plan implementation.	• Launch mandatory training & certification programs for planning staff. • Hire technical staff through P&D-led recruitment. • Allocate dedicated funds for technical equipment and planning software.	Planning Control Authority, P&D Department
Weak Monitoring and Enforcement System	Lack of real-time monitoring tools and irregular site inspections lead to unauthorized developments going unchecked.	• Integrate GIS-based monitoring systems. • Schedule routine and surprise inspections. • Publish quarterly compliance and enforcement reports. • Establish citizen complaint response mechanisms.	Inspectorate Wing, District Enforcement Units, Planning Control Officers
Obsolete Land Use Data and Delayed Updates	Land use plans are often based on outdated or incomplete data, and there is no structured timeline for their periodic review.	• Make five-year plan revision mandatory by regulation. • Institutionalize data collection using satellite imagery and public surveys. • Create a rolling update mechanism at the district level.	DG of Authority, District Committees, Urban Planning Policy Unit

Limited Community Engagement and Public Awareness	Citizens remain unaware of land-use regulations, their responsibilities, or the grievance re dressal mechanisms available to them.	• Launch public education campaigns (radio, TV, social media, town halls). • Establish digital portals for plan access and feedback. • Form citizen advisory groups for plan reviews.	District Committees, LG Department, Communication & Outreach Unit

5.2.2 Strengthened District Institutional Framework and Human Resource Structure (Proposed for District Kurram)

While the Act provides the statutory basis for land-use governance, effective implementation at the district level requires institutional strengthening, particularly in District Kurram where technical capacity and coordination mechanisms require formal consolidation.

Accordingly, the following enhanced institutional structure is proposed.

5.2.2.1 Establishment of District Technical Planning Sub-Committee

A District Technical Planning Sub-Committee shall be constituted under the District Land-Use Planning and Management Committee.

C. Composition:

- Senior Urban Planner – Convener
- GIS Specialist
- Environmental Planner
- Transport/Infrastructure Planner
- Revenue Survey Officer
- Legal Officer

D. Functions:

1. Technical vetting of development proposals prior to Committee approval.
2. GIS-based spatial analysis and zoning verification.
3. Review of land-use conversion applications.
4. Preparation of five-year plan revision documentation.
5. Maintenance of district land-use spatial database.

No major land-use conversion shall be placed before the Committee without prior technical review.

5.2.2.2 Strengthening of Local Planning and Enforcement Unit

The Local Planning and Enforcement Unit shall be strengthened through structured human resource deployment as follows:

A. Core Technical Positions

Position	Minimum Qualification	Function
Chief Planning Control Officer	BS/MS Urban & Regional Planning (PCATP Registered)	Overall supervision
Urban Planners (02)	BS/MS Planning (PCATP Registered)	Zoning & proposal review
GIS Specialist (01)	GIS/Geomatics	Spatial monitoring
Environmental Planner (01)	Environmental Science	Impact review
Data Analyst (01)	Statistics/Planning	Monitoring & evaluation
Legal Officer (01)	LLB	Enforcement & prosecution

B. Enforcement Staff

Position	Responsibility
Planning Control Officers (02–03)	Permission processing
Planning Inspectors (04–06)	Field inspections
Surveyor (02)	Boundary verification
Clerical Staff	Record management

5.2.2.3 Digital Monitoring and Data Systems

To address monitoring gaps identified earlier, the following systems shall be introduced:

1. District GIS Laboratory
2. Digital Building Permission Portal
3. Mobile-based Inspection Reporting System
4. Quarterly Compliance Dashboard
5. Public Complaint and Tracking Portal

5.2.2.4 Institutional Coordination Mechanism

To overcome inter-agency fragmentation:

1. Quarterly District Coordination Meetings shall be mandatory.
2. Shared digital dashboards shall be maintained.
3. Joint inspection protocols shall be established.
4. Annual institutional performance review shall be conducted.

5.2.2.5 Organizational Hierarchy

The operational hierarchy shall function as follows: