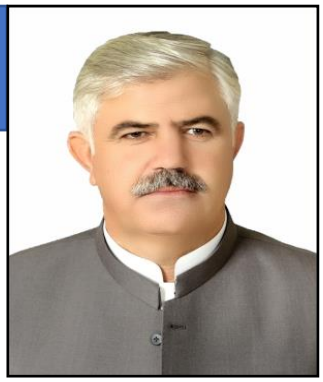
Provincial Land Use Plan (PLUP) Urban Policy and Planning Unit –
Planning and Development Department
Government of Khyber Pakhtunkhwa

Final Land Use Plan of District Charsadda

MESSAGE FROM CHIEF MINISTER KHYBER PAKHTUNKHWA



The process of allocating land among competing and frequently conflicting land uses is referred to as land use planning. This process aims to promote the rational and orderly use of land in an environmentally friendly manner to enable the sustained growth of human settlements.

Cities and towns would be in disarray without an appropriate land-use plan, and the traffic movement would not be effective. Industrial facilities would contaminate streams, residential areas, and the air. Urban sprawl would hinder the cities from functioning as they ought to, thus the economy would stagnate, causing future generations to be unable to benefit from the land due to resource wastage and environmental harm. There is a rising consciousness of human impact on the environment in today's society, reminding us that every change we make has an environmental impact. We are becoming more cognizant of how we live, work, and interact to maintain a sustainably able environment.

Land use planning is not a stand-alone idea. Visualizing land-use planning as a vital element in the process of promoting national development is important. Given the existing economic, financial, and technical resources and expertise, this approach aims to take these into account as well as identify and satisfy the population's fundamental social and human needs.

There are requirements that must be addressed for everyone such as housing, employment, education, leisure activities, transportation, and access to essential amenities like clean water, power, and healthcare. The goal of social planning and policy is to meet the population's fundamental social requirements. Economic planning and strategies aim to guarantee that the nation has a strong economic foundation, which generates income to fund government operations and pay for the delivery of services to the general public while also guaranteeing that there are jobs available for the labor force of the nation.

Within a conceptual and physical framework, land-use planning aims to meet the needs of housing for the population, but it cannot be constructed in a swamp, an area that is hazardous to the health and safety of the residents or other citizens, or an area which is ill suited for housing development due to its terrain, vulnerability to natural disasters or other hazards, or its incapability to physically endorse the building.

The master plans of cities and towns in Khyber Pakhtunkhwa were made independently from their respective rural areas in a disjointed and fragmented endeavor. Recognizing the circumstances, the present administration chose to implement development using an integrated and comprehensive district-level planning method across the province. The six districts of Peshawar, Nowshera, Charsadda, Mardan, Swabi, and Abbottabad have land use plans prepared, and work is ongoing on the province's remaining districts.

The Provincial Land Use and Building Control Act 2021, passed by the provincial government to standardize the approval and implementation systems for land use plans, which had previously been inadequate. For the purpose of reviewing and authorizing future infrastructure projects, the Provincial Land Use and Building Control Act established the Provincial Land Use and Building Control Council. Additionally, district-level land use plans provide explicit methods for their implementation. Land use plans of the districts of Peshawar, Nowshera, Charsadda, Mardan, Swabi, and Abbottabad were granted approval by the Provincial Land Use and Building Control Council.

I appreciate and acknowledge all stakeholders who provided their input during the preparation of these district land use plans. I would also like to extend my gratitude to the concerned team of the provincial land use plan, UPPU, P&D Department for their dedicated efforts to complete these six land use plans.

Mahmood Khan
CHIEF MINISTER

MESSAGE FROM ADDITIONAL CHIEF SECRETARY KHYBER PAKHTUNKHWA

In order to relieve pressure on mega cities, the Provincial Land Use Plan is intended to serve as a policy document for the integrated, coordinated, and systematic planning and even deployment of development programs and employment opportunities to rural and suburban communities close to their residences. As potential touchstones to benefit rural areas and small towns, it aims to build a hierarchy of settlements and developments made up of satellite, intermediate, secondary, and industrial towns. The plan will aim to maximize provincial revenue, raise overall activity, balance the distribution of infrastructure and services, and enhance per capita income while simultaneously maximizing the utilization of human and physical resources. Furthermore, it will serve as a guideline to the nation-building departments and agencies, including local government entities and TMAs, for carrying out integrated and coherent development projects through systematic and structured techniques.

Khyber Pakhtunkhwa has led the way in creating comprehensive land-use strategies. Based on the findings of studies and consultations with key stakeholders, this document serves as a roadmap for the sector plans that will be carried out with careful integration among sectors. District land use planning involves a variety of stakeholders at various stages of the planning process, including the Planning and Development Department, Local Government, Elections and Rural Development Department, and other key stakeholders. District land use planning is optimistic, based on the anticipated variations in the decades ahead, producing later ledgers in the plan at appropriate stages, and engaging stakeholders to identify their timely needs.

The proposed District Land Use Plan will serve as a major planning document for the allocation of land for future development initiatives. This will help fulfill human needs in a more effective manner and also ensure protection of the natural environment.

I wish to record my appreciation for the initiative of preparing the district land use plans of District Peshawar, Charsadda, Mardan, Nowshera, Swabi and Abbottabad and am optimistic for its implementation.

Shahab Ali Shah
ACS. P&DD

Acknowledgments

Provincial Land Use Plan is extremely thankful to the planning & Development Department, Government of KP for assigning this important and prestigious study. The Land Use Plan of District Charsadda is a component plan of Provincial Land Use Strategy for Khyber Pakhtunkhwa. The plan at work is an in-depth study encapsulating all sectors of physical, socio-cultural, environment and economy in spatial context. The plan also takes into account issues and constraints related to land use planning in the district and accordingly suggests a more harmonized, balanced and sustainable use of land and other natural resources.

The project team of the Provincial Land Use Plan is greatly indebted to the Additional Chief Secretary P & D Department, Secretary P & D Department and Executive Director of the Urban Policy & Planning Unit for spearheading the project. Without their continuous support, it wasn't possible at all to continue and successfully complete this District Land Use Plan. They have been the Project's sole custodian during project upheavals, and the project team is highly indebted to his patronage of the project.

It is worth, mentioning here that Khyber-Pakhtunkhwa is the first province in Pakistan taking this initiative of preparing District Land Use Plans of the 36 districts of Khyber Pakhtunkhwa including merged districts. We also deeply acknowledge the continuous support, cooperation, and omnipresence of sectoral experts of the Urban Policy and Planning Unit and the technical section of the Provincial Land Use Plan of their valuable inputs during the conceptualization, data collection, analysis, planning and review stages, which are truly praiseworthy.

Special thanks are due to the officials of the district line departments and all other stakeholders for their active involvement, cooperation and coordination during the preparation of this District Land Use Plan. we are also extremely thankful to those who help and facilitated various surveys by providing the required information.

Finally, but certainly not least, the dedicated efforts that the Project Manager, Mr. Naseer Ahmad, has put forth are commendable. He works around the clock to get the plans to the point where they were approved, leaving no stone unturned in the process.

Hope that these dedicated efforts of the whole team will bring prosperity and peace to the District Charsadda. Despite of our best efforts, if any error or omissions are detected or if there are suggestions for further improvements of this Plan, the same would be forwarded to the District Land Use Planning and Management Committee at District level for their inclusions in the updated versions of the Plan.

Project Manager
Provincial Land Use Plan

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF MAPS

ABBREVIATIONS AND ACRONYMS

Term	Description
ADB	Asian Development Bank
ADP	Annual Development Program
BHU	Basic Health Unit
Cantt	Cantonment
CIDA	Canadian International Development Agency
dB	Decibels (Unit of Sound)
EPA	Environmental Protection Agency
GIS	Geographical Information System
GT Road	Grand Trunk Road
HHs	Households
Kms	Kilometers
KP	Khyber Pakhtunkhwa
DLUP	District Land Use Plan
M1	Motorway Islamabad-Peshawar Section
MC	Municipal Corporation/Committee
NRM	National Reference Manual
MCC	Manual Classified Count
O-D Survey	Origin-Destination Survey
OFWM	On-Going Water Management
PCU	Passenger Car Unit
PEPA	Pakistan Environmental Protection Agency
PHA	Provincial Housing Authority
ppm	Particles per Million
R^2	Coefficient of Determination used in Regression Analysis
ROW	Right of Way
SME	Small and Medium Enterprises
SMEIDA	Small and Medium Industrial Development Authority
UC	Union Council
WHO	World Health Organization

1 INTRODUCTION

1.1 BACKGROUND

In the past, Master Plans of Cities/Towns in Khyber Pakhtunkhwa were prepared in isolation from their hinterland, which was a piecemeal and isolated effort, and thus did not achieve the desired results. The Provincial Government, taking cognizance of the situation, decided to develop all areas of the province by adopting an integrated and holistic planning approach.

According to Section 4, Sub-Section 2 (xv) of the NWFP (now Khyber Pakhtunkhwa) Housing Authority Act 2005, the Provincial Housing Authority (PHA) is required to formulate a Provincial Land Use Plan/Policy of the Province. During the PDWP meeting held in March 2010, the PC-I of PMU for preparing Land Use Plans of Khyber Pakhtunkhwa was presented for approval, where the chair decided that the project shall be completed in phases proposed in the PC-I. Phase-1 of the Project pertains to Land Use Planning of the five Districts, namely Peshawar, Nowshera, Charsadda, Mardan, and Swabi.

Land Use Plan is envisaged as a policy document for an integrated, coordinated, systematic planning and uniform spread of development activities. It also aims at generating employment for the rural and sub-urban population, reducing rural-urban migration. It would help establish a hierarchy of settlements and development of satellite, intermediate, secondary, and industrial towns as focal points for the future to cater to rural and small towns.

The Land Use Plan will help induce sustainable development, optimize land and physical resources exploitation, enhance provincial income, increase overall activity, and balance the distribution of infrastructure and services. The Land Use Plan will be a tool to guide Provincial Government, Urban Policy Unit, District Governments, and TMAs in undertaking integrated and coherent development programs.

1.2 PLUP INTRODUCTION

i. To provide a broad framework for District Spatial Plans and resolve inter-District planning issues.
ii. To establish a planned hierarchy of settlements and integrated and systematic growth of trunk infrastructure and services in the Province.
iii. To provide guidelines for the emerging development corridors.
iv. To suggest parameters for reducing migration to big urban centres.
v. To determine a need for new towns at a feasible location.
vi. To provide guidelines for the proper development of rural areas.
vii. To provide a broad guideline to the nation-building departments/ agencies for undertaking integrated and coherent development programs at the provincial level.

1.3 SCOPE AND ROLE OF DISTRICT LAND USE PLAN

Land-use planning has different levels: national, provincial, regional, district, and local. These are not necessarily sequential but correspond to the levels of government at which decisions about Land Use are taken. Planning at the national level is more economical, but spatial aspects become more prominent at lower levels, urban or local.

Different kinds of decisions are taken at each level, where the planning methods and kinds of the plan also differ. The greater the interaction between the different levels of planning, the better. The flow of information should be in both directions. The degree of detail needed increases at each successive level of planning increases, and so should the local people's direct participation. Planning at different levels needs information at different scales and levels of generalization.

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.

At the national level, planning is concerned with national goals and the allocation of resources. In many cases, national land-use planning does not involve the actual allocation of land for different uses but the establishment of priorities for projects at the national level.

Regional planning deals with the efficient placement of land-use activities, infrastructure, and settlement growth across a larger land area than an individual city or town. Under Regional Planning, areas covered and specific administrative setups vary widely from country to country. Thus, regional planning may encompass an entire District or more than one District. Regional Plan and District Plan both, however, are equally "regional" in nature. A ‘region’ in planning terms can be administrative or partially functional and will likely include a network of settlements, rural areas and other uses.

Urban Planning deals with the specific issues of city planning, and urban plans (or structure plans) are prepared within the broad realm provided by District Land Use Plan. It is concerned with the use of land and the design of cities to guide and ensure their orderly development. In the lowest rung of Land Use Planning are local plans or action plans prepared within urban

plans, just as urban plans or rural plans are prepared within the framework of District/Regional Plans.

1.4 PLANNING PARADIGM

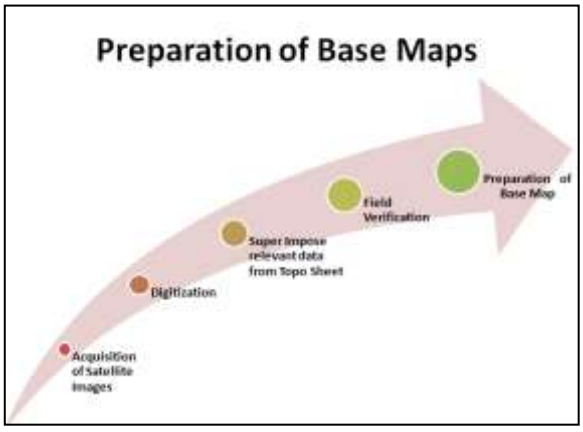


Figure 1-1: Preparation of Base Map

In the traditional planning paradigm, separate spatial plans are usually prepared for urban and rural areas. At the same time, the District Land Use Plan of Charsadda is a shift from the traditional planning paradigm where spatial plans for urban and rural areas are prepared simultaneously. The Land Use Plan principally emphasizes two primary planning techniques: projections according to existing scenarios encompassing the sectors of housing, infrastructure, transportation, commercial, industry, and recreational activities and the analysis & proposals for such sectors to improve the living standards of the populace of Charsadda. The Land Use Plan provides both long-term broad policy guidelines and short-term specific project proposals for cohesive development of the area. The plan's implementation will reduce regional disparities and ensure the balanced development of both urban and rural areas in the District.

1.5 SECTORAL COVERAGE

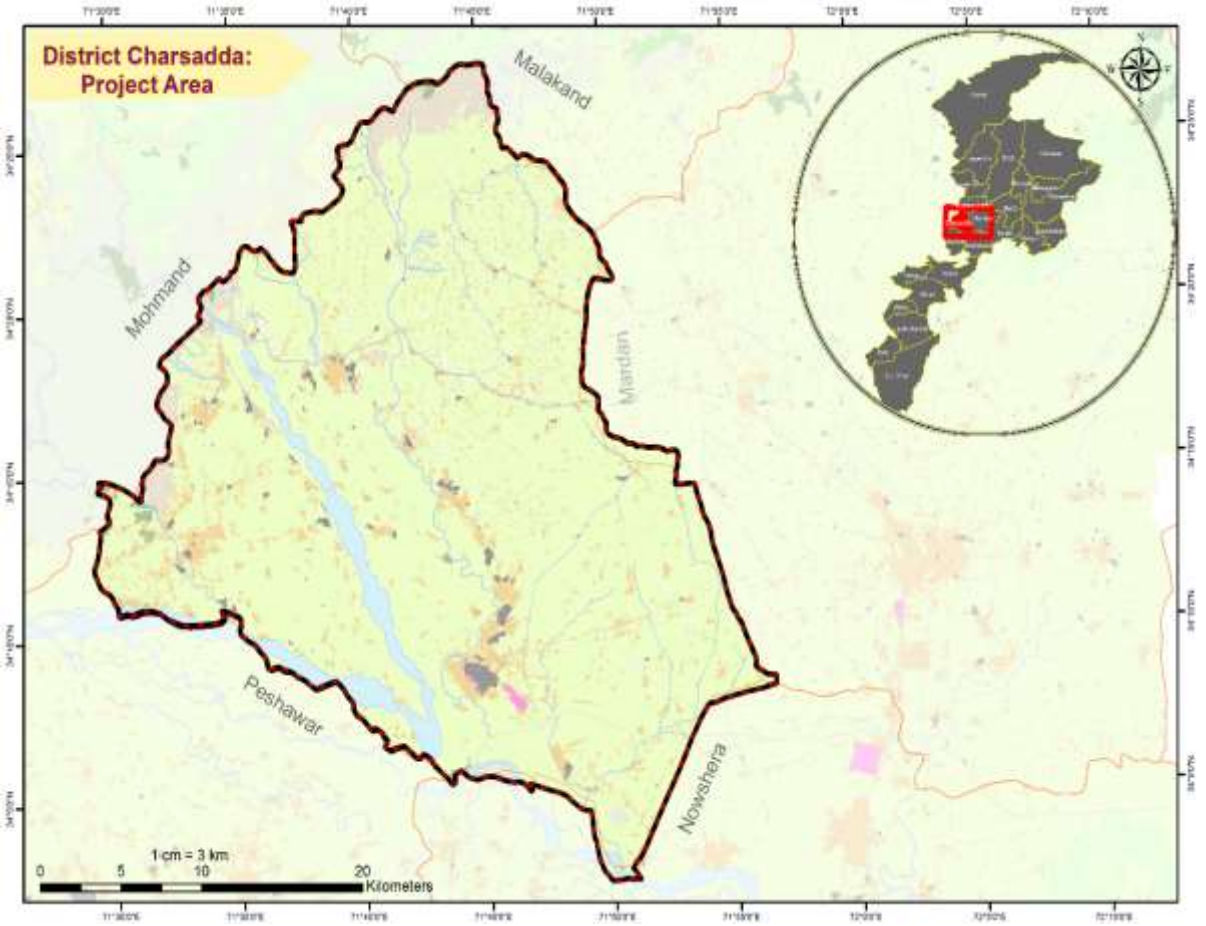
The sectors covered in the Land Use Plan of Charsadda are listed as under:

Urbanization and hierarchy of human settlement, Demography, Agriculture and livestock, Trade, Commerce and Industries, Mines, Minerals and Energy, Communication (Road, Rail, and airways, postal services and Telegraphs), Health and Education, Tourism, Sports and Entertainment, including historical and religious places, libraries, museum, zoo, and open spaces, security, graveyards, Housing, Water (surface and ground water resources), District economy. To prepare the District Land Use Plan of Charsadda (2021-39), all these sectors are thoroughly analyzed and mapped using modern GIS and Remote Sensing techniques.

1.6 THE PROJECT AREA

The District lies between 34-03' and 34-38' North latitudes and 71-28' and 71-53' East longitudes. Charsadda is located in the West of the Khyber Pakhtunkhwa and is bounded by Malakand District in the North, District Mardan in the East, District Nowshera and Peshawar in the South, and District Mohmand in the West. District Charsadda covers an area of 996 $Km^{2,}$ comprising Tehsil Tangi, Charsadda, and Shabqadar. The area's major crops are Sugarcane, Tobacco wheat, rice, maize, vegetable, and orchards. The common orchards are peaches &

persimmon. As District Charsadda has been arable for many centuries, the inhabitants have killed wild animals long ago, so only domestic animals are considerably found in the area.



Map 1-1: Geological Map of District Charsadda

1.7 CLIMATE

The local steppe climate influences district Charsadda. In Charsadda, there is little rainfall throughout the year. The Köppen-Geiger climate classification is BSh[1]. The temperature here averages 22.5 °C. The average annual rainfall is 460 mm. The driest month is June, with 11 mm of rainfall. With an average of 82 mm, the most precipitation falls in August. The warmest month is June, with an average temperature of 33.3 °C. January has the lowest average temperature of the year. It is 10.4 °C. The difference in precipitation between the driest month and the wettest month is 71 mm. During the year, the average temperature varies by 22.9 °C.[2]

Generally, four seasons prevail in the area, which may climatologically be divided as follows;

[1] Hot semi-arid climates

[2] https://en.climate-data.org/location/1241/

- Winter: December-March
- Pre-monsoon: April-June
- Monsoon: July-September
- Post-monsoon: October-November

1.7.1 Mean Relative Humidity Profile

The relative humidity in District Charsadda varies from 36% in May to 65% in August. Humidity is a calculated value and varies significantly throughout the day concerning the changes in the air temperature. The amount of water vapour in the air at any given time is usually less than that required to saturate the air. The relative humidity is the percent of saturation humidity.

The average humidity is not high over the region. Under the influence of western disturbances and monsoon rainfall, it rises locally. The mean relative humidity ranges from 42 to 69 percent during the year.

Table 1-1: Climatological Normal for District Charsadda

Parameters/ Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Temperature (°C)	10.4	12.6	17.4	22.9	28.5	33.3	32.6	31.2	28.9	23.4	16.7	11.7	22
Min. Temperature (°C)	3.1	6	10.9	15.8	20.9	25.6	26.7	25.8	22.6	15.5	8.3	3.8	15
Max. Temperature (°C)	17.7	19.3	24	30.1	36.2	41	38.5	36.6	35.3	31.4	25.2	19.6	30
Precipitation / Rainfall (mm)	39	48	69	48	22	11	58	82	30	12	14	27	38
Mean R/H %[3]	58.6	57.5	58.4	51.7	37.3	36.2	55	64.6	58.7	54.9	60.1	63.7	55
Mean wind speed (knots)	1.9	3.1	3.5	4	2.4	5.9	5.8	5.2	4.1	2.1	1.2	1.3	3.3
Wind Direction	variable											SW	varies

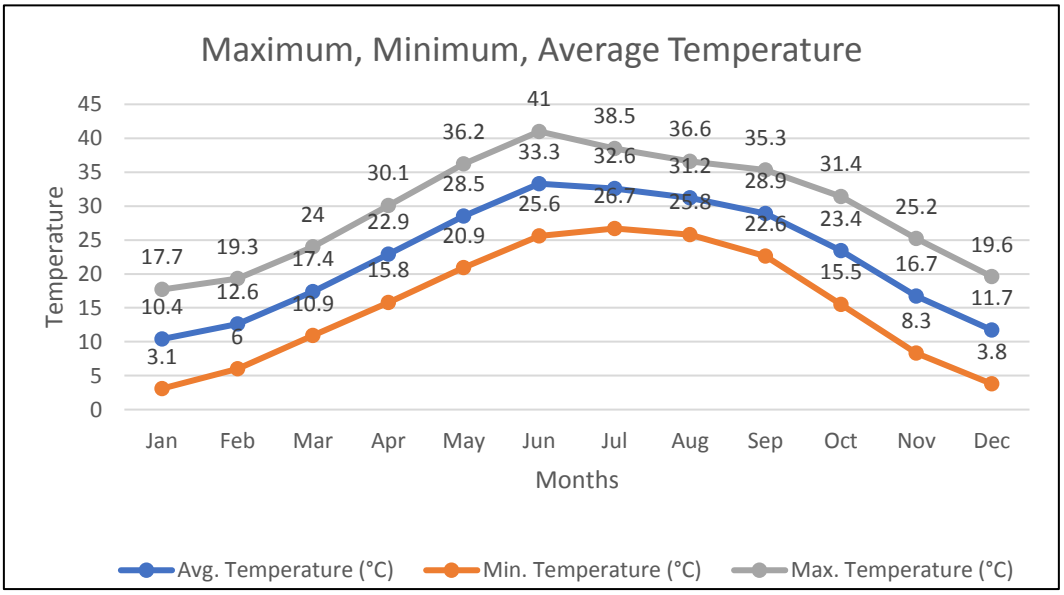


Figure 1-2: Maximum, Minimum, Average Temperature

[3] District Studies Report Charsadda

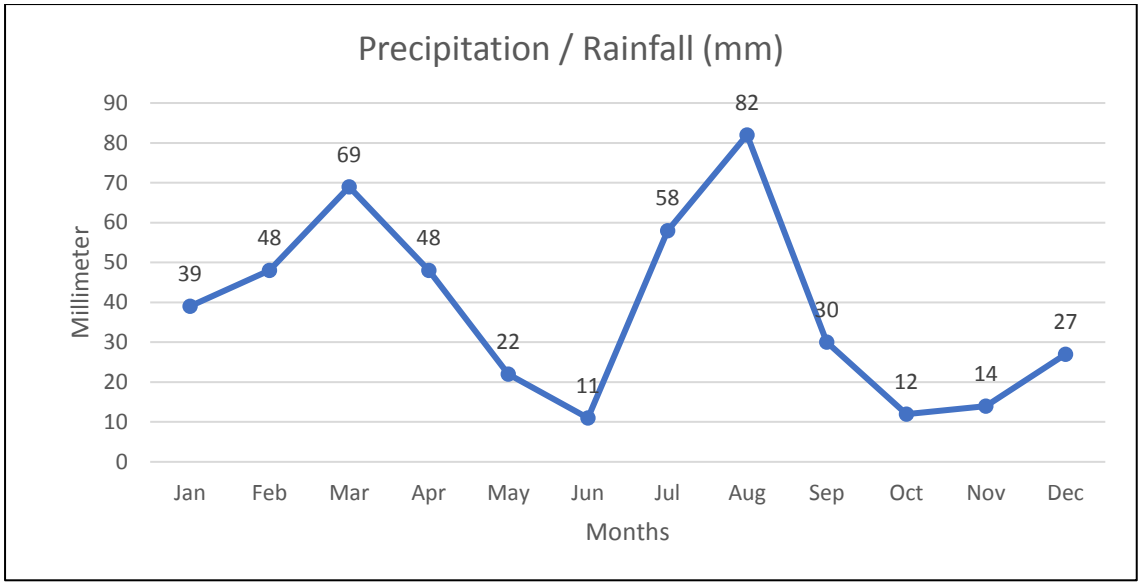


Figure 1-3: Precipitation/ Rainfall (mm)

1.8 GEOLOGY

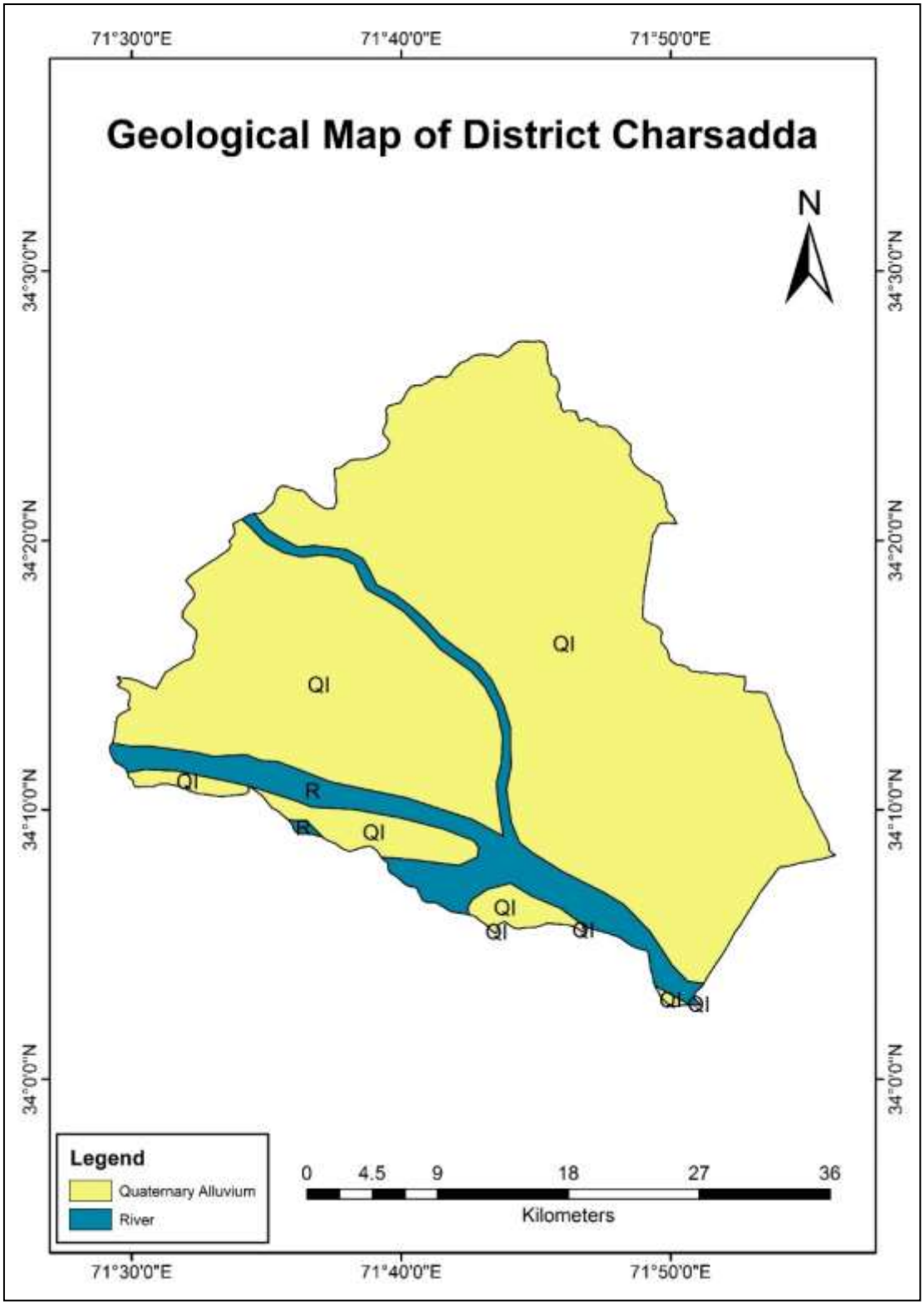
1.8.1 General

Geological Survey of Pakistan is an attached Department of the Federal Ministry of Petroleum and Natural Resources is responsible for studying the country's geology in all pertinent details and assessing its geological resource potential. It undertakes:

- Geological mapping and other geo-scientific surveys,
- Basic and applied research in earth sciences,
- Scientific investigations for an accurate understanding of the country's geological resources and their prudent management,
- Environmental geology and hydro-geological studies

The Geological Survey of Pakistan's role Under the National Mineral Policy is as below:

i. To expedite the publication of geological, geophysical, and geochemical data and maps.
ii. To produce Geological maps of the entire country on a 1:250,000 scale. Priority areas to be mapped on a 1:50,000 scale.
iii. To operate an open file system for the potential investors.
iv. To undertake collaborative projects with the constituting Provinces and the private sector.
v. To establish the Geo Data Center of Pakistan for collecting, disseminating, storing, and updating the country's data and making it available in print and electronic formats.



Map 1-2: Geological Map of District Charsadda

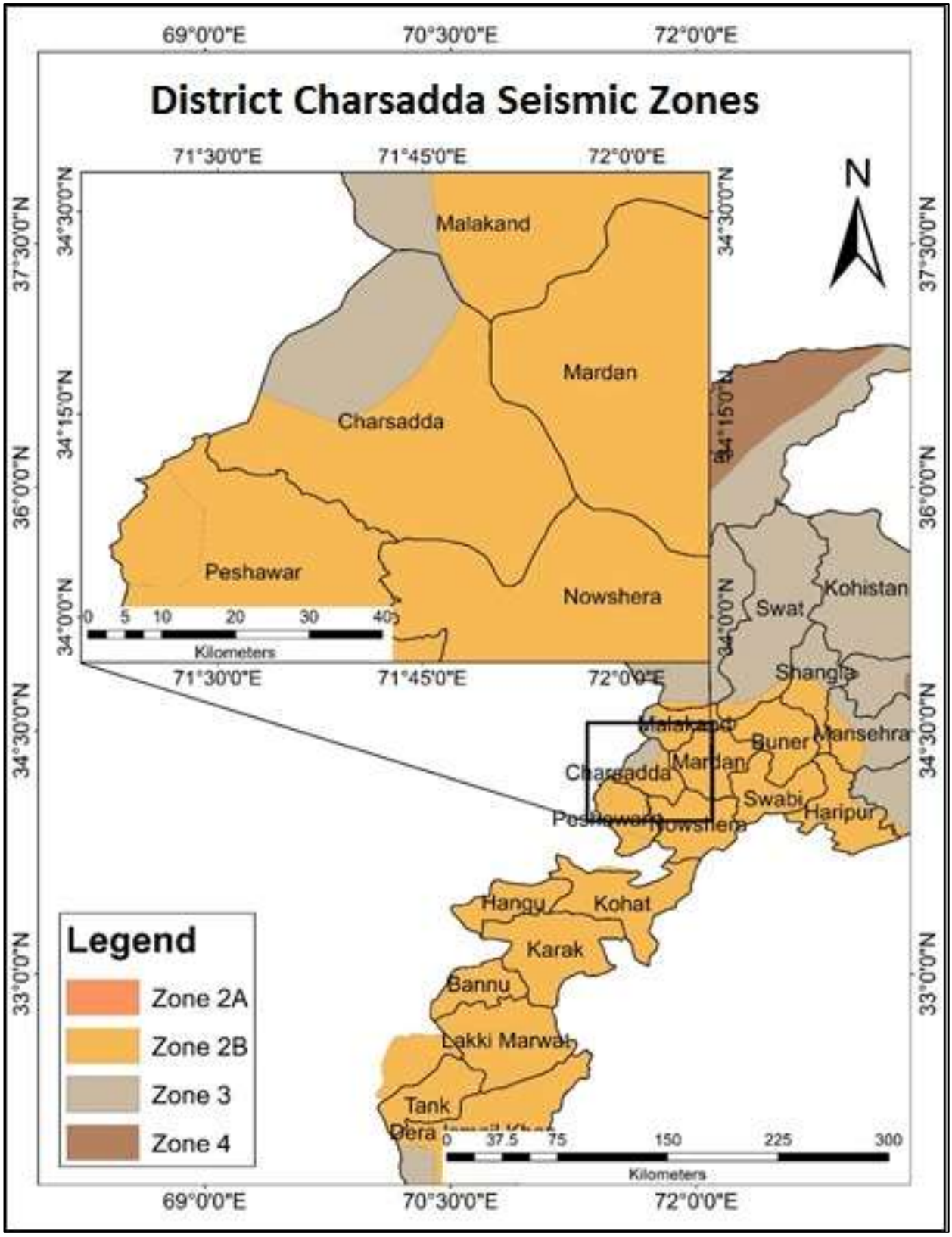
About 80% of the District Charsadda is underlain by recent alluvium. These include recent river, stream, flood plain, and lake deposits belonging to the Pleistocene age group. These are classed into the following three types: i.e., Stream beds, Fan deposits, and Alluvium. Apart from these, about 20% of the area of the District Charsadda is covered by other rock types. These rocks are typically revealed in the outcrops that stretch in a belt that bounds the District from North West and its entire Western territory of the District.

Configuration is deduced from the geological cross-sections. The outcrops in the District are all located along its Western boundary with more or less North-Easterly directed dip directions. The rocks in these outcrops that would possibly underlie the District Charsadda (at least its Western half) would be Paleozoic assemblage.

The outcrops exposed within the District dip at 45 to 50 degrees towards North-East. Thus, the same lithologies will be encountered by extension along the dip direction, albeit at greater depth as one reaches the middle of the District.

1.8.2 Seismic Conditions of District Charsadda

Regarding seismicity in the District, Charsadda lies in zone 2b of the minor damage, corresponding to PGA (Peak Ground Acceleration) value of 0.0667g to 0.1g. The only active faulting in District Charsadda is near Uch Khattak ridge, which passes from Piran to Ghari Chandan near-fault, above the Panjal Khairabad Thrust (PKT) in Attock Cherat range. Therefore, this active fault could be a future seismic risk for District Charsadda.



Map 1-3: Seismic Zones in Charsadda

1.8.3 Review of Geology Sector Policies

A lot of geological work has been conducted since the independence of Pakistan in 1947. The government has completed the major works, with the Geological Survey of Pakistan producing several geological maps of various regions in Pakistan. It has covered almost the entire area of Pakistan, including the geological map of Khyber Pakhtunkhwa. The maps made this way are used as the base maps for geological information by many groups.

Besides, organisations such as the Geology Department and Center of Excellence of Peshawar University have generated a lot of geological academic and research data for KP and northern areas. Pakistan Mineral Development Corporation (PMDC), Sarhad Development Authority (SDA), Punjab Mineral Development Corporation, and the Geology Department of Punjab University have all made maps and collected a lot of information about the exploration of different metallic and nonmetallic minerals in Pakistan.

The Oil and Gas Development Corporation (OGDC) and foreign oil companies granted licences to explore oil and gas in different parts of Pakistan. KP has generated detailed exploration and geological data. Still, this data is not available to the public or research organizations.

1.8.4 Recommendations for Geology Sector

With the collaboration of the Geological Survey of Pakistan, the government of Khyber Pakhtunkhwa shall prepare separate District wise Geological maps with all the relevant information. These maps should be available to the public on payment of nominal charges.

The government of Khyber Pakhtunkhwa and the Geological Survey of Pakistan should jointly conduct hazardous site mapping of landslides/slopes and vulnerability assessment for all Districts of the Province through a possible mechanism. The information gathered through this exercise will be vital for constructing roads, canals, dams, hydroelectric power plants, industrial plants, etc.

It is recommended that the Directorate of Mines and Minerals, Government of Khyber Pakhtunkhwa should prepare an accurate mineral map of the Province along with separate District-wise maps with all the vital information such as name, reserve, location, quality, the chemical composition of the mineral deposit, lease areas and the number of leases, etc. This information must be as per international standards.

The Government of Khyber Pakhtunkhwa needs to generate accurate seismic event maps, identify active fault lines, and impose a ban on construction over such areas.

1.9 ENVIRONMENT

There are several environmental issues such as water pollution and air and noise pollution. Water pollution refers to harmful and objectionable materials obtained from sewers, industrial wastes, and rainwater run-off in sufficient concentrations to make water unfit for use. The term “water pollution” generally refers to human-induced (anthropogenic) changes to water quality. Thus, the discharge of toxic chemicals from a pipe or the release of livestock waste into a nearby water body is considered pollution.

The increase in the global concentrations of greenhouse gases CO_2, CH_4, and N_2O can be called air pollution. Air pollution occurs when the air contains gases, dust, fumes, or odour in harmful amounts. That is amounts that could be harmful to the health or comfort of humans and animals or which could cause damage to plants and materials.

Air pollution can threaten the health of human beings, trees, lakes, crops, and animals and damage the ozone layer. It can also cause haze, reducing visibility in national parks and wilderness areas. Pollution also has a negative impact on the weather and climate. One of the reasons for the increase in air pollution is the low quantity of rains that caused the increase in smog and carbon dioxide, which contributed to global warming.

Noise from vehicles and other powered mechanical equipment is intermittent. Vehicles are the worst offenders, with aircraft, railroad stock, trucks, buses, automobiles, and motorcycles producing excessive noise. Construction equipment, e.g., jackhammers and bulldozers, also produce substantial noise pollution. Besides the growing level of air and water pollution, noise pollution has been recognized as rising as a new threat to the inhabitants of cities. Mitigating road traffic noise is a big challenge for urban planners and environmental engineers. The volume of a sound above the permissible level of 65 decibels (dB) unit is called noise

The effects of Noise are both physical and behavioural. This unwanted sound (noise) can damage physiological and psychological health. Noise pollution can cause annoyance, aggression, hypertension, high stress, hearing loss, sleep disturbances, and other harmful effects.

This section describes the environmental pollution, particularly parameters of water, air, and noise pollution in District Charsadda[4]. To make relative measurements of these parameters, the spot values of pollution indicators have been considered and compared with the acceptable standards.

[4] Source: The Land Use Consultants obtained the values for air, water and noise level under a contract with ‘Pakistan Council of Scientific and Industrial Research’ PCSIR Laboratories Complex, Jamrud Road, Peshawar, in June 2017. The tests were done specifically for Land Use Project.

1.9.1 AIR QUALITY

Air samples were tested at Old Bazar, Tangi-Mardan Chowk, and the Sugar Mill area of District Charsadda. (Table 1-2) below are values of air parameters for the air samples for Charsadda. Comparisons with Standards for Pak EPA for ambient air are also shown in Table 1-3

Table 1-2: Air Quality

Parameters	Unit	Old Bazar	Tangi Mardan Chowk	Sugar Mill Area	Standard Pak EPA
Nitric Oxides (NO)	µg/m3	11.07	17.22	20.91	40 µg/m3 for 24 hours
Carbon Monoxide (CO)	mg/m3	N. D	N. D	N. D	10 mg/m3 for 1 hour
Nitrogen Dioxide (NO2)	µg/m3	N. D	N. D	N. D	80.00 µg/m3 for 24 hours
Hydrogen Sulfide (H2S)	mg/m3	N. D	N. D	N. D	--
Carbon Dioxide (CO2)	ppm	490.00	556.00	473.00	--
Ammonia (NH3)	ppm	N. D	N. D	N. D	--

Table 1-3: Air Pollution

Parameters	Result				Standards Pak EPA
	Unit	Old Bazar	Tangi Mardan Chowk	Sugar Mill Area	35.00
Particulate matter (PM2.5)	µg/m^3	185.00	235.00	501.00	

Effects on Environment

i. Nitric Oxide (NO)

- The value of samples of Charsadda is within Pak EPA standards. Generally, the NO level exceeds the standards due to high vehicular traffic, traffic jams, and the idling of vehicles.

Possible impacts of high NO levels

- This can cause lung irritation and weaken the body's defence against respiratory infections.
- It assists in the formation of Photochemical smog.

ii. Carbon Monoxide (CO)

In Charsadda, the CO level for all sampling locations was not detected.

Possible impacts of high CO levels

- If CO increases from the NEQs, it enters the bloodstream and reduces oxygen delivery to the body's organs and tissues.
- It can develop vision problems
- At a very high level, CO is poisonous and can cause death

iii. Nitrogen Dioxide ($N0_2$)

NO_2 was within limits at all the three sampled sites of Charsadda.

Possible impacts of high levels of $N0_2$

- Same as that of NO

1.9.2 Noise Level

The Noise level in Charsadda is higher than Pak-EPA standards at all the sampling locations. The maximum noise level is in the sugar mill area. (Table 1-4).

Table 1-4: Noise Level

Parameters	Result			
	Old Bazar	Tangi Mardan Chowk	Sugar Mill Area	Sound level Meter Model: TES 1350A, Range 30-130dB
Noise	76.40	85.48	100.20	
Standards Pak EPA	65 dB	65 dB	65 dB	

Impacts of higher noise levels

- Higher noise levels can increase blood pressure and cause other cardiac issues even if the person is not particularly consciously disturbed.
- Noise pollution can also cause gastric problems. Noise leads to emotional and behavioural stress. A person may feel disturbed in the presence of loud noise produced by beating drums.
- Noise increases the chances of occurrence of diseases such as headache, blood pressure, heart failure, etc.
- Exposure to loud noise over long periods can also lead to partial deafness.
- Noise disturbs some animals' feeding and breeding patterns and has been identified as a contributing factor to the extinction of some species.

Sources of Noise Pollution

Sound is essential to our daily lives, but noise is not. Noise is generally used as an unwanted sound that produces unpleasant effects and discomfort on the ears. Noise can create from many sources, including household sources, industries, generators, transportation, etc.

Transportation is a big source of noise pollution in the urban area. Increasing traffic has given rise to traffic jams in congested areas where the repeated hooting of horns by impatient drivers pierces the ears of road users.

Remedies/Control Measures

Following remedies must be applied:

- Proper legislation on roads to use EPA approved vehicles
- Avoid horns, especially near schools, colleges, hospitals, etc.
- The construction of sound-proof rooms for noisy machines in industrial and manufacturing installations must be encouraged.
- Noise-producing industries, airports, bus and transport terminals, and railway stations are situated far from where living places are. Vegetation (trees) along roads and in residential areas is a good way to reduce noise pollution as they absorb sound.

1.9.3 Drinking Water

Water samples were collected from Old Bazar, Tangi-Mardan Chowk, and the Sugar Mill area of District Charsadda. For each sample, different quality parameters were tested. The results of drinking water samples and their statistical analysis are also shown in the (Table1-5).

Table 1-5: Chemical Analysis

Parameters	Method No.	Units	Old Bazar	Tangi Mardan Chowk	Sugar Mill Area	Expanded Uncertainty (±)	WHO limits Drinking water
pH	4500-H+. B	-	7.47	7.64	7.65	0.18	6.50 - 8.50
Sodium as Na	3500-Na	mg/L	145.87	177.84	23.50	1.7	200
Potassium as K	3500-K	mg/L	8.33	7.37	1.93	0.64	75
Total Hardness as $CaC0^3$	2340.C	mg/L	338.67	237.33	299.33	3.33	500
Calcium as $CaC0^3$	3500-Ca. B	mg/L	158.67	128.67	198.67	2.47	250
Magnesium as $CaC0^3$	3500-Mg. B	mg/L	180.00	108.67	100.66	-	150
Total Alkalinity as CaC03	2320. B	mg/L	264.22	316.42	29.23	3.27	500
P-alkalinity as $CaC0^3$	2320. B	mg/L	Nil	Nil	Nil	-	30
Chloride as Cl	4500-Cl. B	mg/L	104.54	69.81	40.03	-	250
Conductivity	2510. B	µS/cm	916.66	793.33	530.00		-
Total l Dissolved Solids (TDS)	2540. C	mg/L	677.33	623.00	420.00	-	1000
Total Suspended Solids (TSS)	2540. D	mg/L	3.66	3.33	3.67	-	5
Sulphate as SO^4	4500-S04. E	mg/L	37.44	24.11	17.67	-	250

Effects on Environment:

Table 1-6: Physicochemical & Heavy Metals Analysis of Drinking Water

Parameters	Method No.	Units	Old Bazar	Tangi Mardan Chowk	Sugar Mill Area	WHO limits Drinking water
Colour	2120. B	-	Colorless	Colorless	Colorless	Colorless
Temp	2550.B	OC	28.00	28.00	28.20	-
Turbidity	2130.B	NTU	0.41	0.36	0.48	5
Taste	2160. A	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Nitrate as NO3	4500-NO3B	mg/L	14.15	16.25	13.96	50
Ammonia as NH$	4500-NH3F	mg/L	0.18	0.11	0.12	-
Iron as Fe	3500-Fe	mg/L	0.19	0.10	0.20	-
Magnesium as Mn	3500-Mn	mg/L	0.14	0.15	0.05	0.5

The pH of all samples is within the NEQS limits

Total Dissolved Solid (TDS)

- The TDS of all samples is within limits. Total Dissolved Solid (TDS) measures inorganic salts, organic matter, and other dissolved materials in water. The TDS amount helps us classify the water, i.e., fresh water, brackish water, saline water, or hyper saline water. There are no health impacts of high TDS. However, due to its bitter taste, it is difficult to drink.

Turbidity

- The turbidity level for all samples of Charsadda is within the NEQS limit.

Impacts

- High turbidity can significantly reduce the aesthetic quality of water. It has no health impacts.

Nitrate (NO_3)

- The value of NO_3 samples is within the NEQS.

Calcium as $CaCO_3$

- The value of calcium as $CaCo_3$ in Charsadda is within the NEQS Limits.

Chlorides as Cl

- The concentration of chlorides is within the NEQs limit at all sampling locations of Charsadda.

1.9.4 Review of Environment Sector Policies

Before the Eighteenth Amendment was enacted, the subject of "Environmental Pollution and Ecology" appeared in the Concurrent List, allowing both Federal and Provincial Assemblies to frame laws governing natural resources and environmental management. With the enactment of the Eighteenth Amendment, the Concurrent Legislative List has been abolished. As a result, the Provinces now have exclusive jurisdiction to frame environmental pollution and ecology laws.

One immediate consequence of this new amendment is that the federal PEPA 1997 now applies only to the Islamabad Capital Territory and those areas not included in any Province. It is understood that PEPA 1997 will remain in force in the Provinces, but only until it is repealed or amended by them. This process is underway, and provincial governments are preparing to enact environmental legislation.

Following the Eighteenth Amendment, the Khyber Pakhtunkhwa EPA noted that proper procedures are required for implementing the environmental policy and pollution control protocols. The KP Government has started working on its Comprehensive Environmental Policy, including levying the pollution charge, developing forests & addressing deforestation, range lands, limiting pollution due to agriculture, housing development, urban development, transportation, noise, water, industrial, health, hazardous and non-hazardous waste handling, and all other types of environmental issues.

One of the major issues is to adopt a carrot and stick policy to educate people and investors. Institutions to reduce waste and pollution, and at the same time charge fines on those who violate environmental regulations and pollute the environment. The KP EPA takes this one step further, recommending that all fines and fees relating to IEE, EIA, environmental reports, and laboratory analysis are deposited in the fund for use in environmental rehabilitation pilot projects by the Province.

The KP EPA recommends that specific rules are framed to regulate vehicle emissions, which are currently being handled under traffic rules. It also raises the issue that "the present form of NEQS is either "stringent or relaxed," and suggests that "standardized form" of 'Environment Quality Standards' based on research shall be formulated to ensure its effective and uniform enforcement." It is further pointed out that rates for pollution charges have not been specified and that such rates should be determined annually.

Regarding issuing no-objection certificates for IEE and EIA, the KP EPA suggests that the Director-General of the EPA should have the power to issue a stay order, halt all project activities (temporarily or permanently), and impose spot fines. The KP EPA recommends that

the Director-General of the EPA should have the power to charge spot fines on those violating EPO. EPA has expressed concerns that PEPA 1997 in its current form fails to address certain issues or that some of the issues have been duplicated.

A close analysis of the PEPA 1997 reveals that it does not address the following subjects:

- Solid waste disposal
- Radiation and radioactive waste
- Vibrations
- Pollution or environmental damage from commercial activities
- Littering and damage to the physical environment.

It is recommended that at the provincial level, the municipal services, such as sanitation, solid waste management, and the provision of safe drinking water, which at present are not covered under PEPA 1997; shall be brought under the Directorate General of EPA, and qualified inspectors shall be appointed at the municipalities and even Public Health Departments to regulate the environmental protocols.

Though most of these matters were covered in detail under the provincial LGOs of 2001; however, since the LGO 2001 is no longer in force, thus these matters need to be resolved. It may be time that the Province will enact new or amended local government legislation. Rather than duplicating provisions on municipal services, those broad powers should be provided under provincial environment law to manage such services at the local level. That specific provisions in this regard are dealt with in local government laws.

It may further be argued that the environmental issues are best dealt with at the local level; thus, each TMA and the rural local government shall be empowered, and qualified environmental inspectors shall be included in the TMA staff to create awareness amongst the public and report any polluting activities, as well as issue licenses to the local industries. The pollution charges may be collected at the local level by the TMA.

It may be added here that several important issues will need to be considered before any provincial legislative action can begin. The provincial and federal governments will require the following measures for the environmental protection legislation:

- Under PEPA, rules and regulations must be adapted and re-issued along with the provincial environmental law.
- Draft rules under preparation need to be finalized.
- Coordination amongst Provinces: Guidelines issued by respective Provincial EPA for specific sectors should be assessed, amended if necessary, and adopted as uniform standard policy.
- Requirements for the implementation of multilateral environmental agreements must be included in the provincial environmental laws, and a mechanism for reporting developed

- Funding by donors shall be transferred directly to the provincial governments. In the Amendment, certain key terms have been omitted (for example, marine pollution and biological waste); some definitions are inconsistent or outdated (for example, pesticides and agricultural waste).
- Lack of clarity in certain provisions (for example, environmental laboratories, pollution charge, functioning and jurisdiction of environmental tribunals and environmental magistrates).
- Procedures need to be simplified, clarified or refined (for example, procedures related to environmental protection orders (EPO), environmental impact assessment (EIA), and Environmental Protection Agencies (EPA).
- Role of the police, enforcement responsibility of EPA officers.
- Penalties need to be re-assessed and revised based on the environmental impact of offences rather than the type of offence. Administrative penalties need to be clarified and delegated solely to the Provinces.
- Environmental quality and emissions standards must be uniform, and no variations should be permitted with respect to the geographical area unless it is to strengthen the standards. The relevant provisions must be amended.
- Forests and National Parks, such as Galiyat and Chitral National Park in KP, and the development of Eco tourist resorts, shall be completely transferred to the Province
- Managing the refugees, especially Afghan refugees, is a federal subject; however, there are over a million living in camps in KP., and the environmental pollution due to these camps has become the responsibility of the Province while the administrative decision stays with the Federal Government, thus creating a major financial and environment conflict.

The PEPA 1997 (Federal) review highlights many areas not covered by the law. These include the following subjects:

- Public participation must be an integral part of all procedures; thus, the focus shall be community and not the institutions
- Strategic environmental assessment (SEA), the standard best practice in many countries, shall also be introduced in the provincial Acts.
- Environmental Audits (EA) covering all types of industrial and commercial operations with a potential impact on the environment shall be conducted regardless of scale or when they began operations.
- The polluter pays for the damages shall be properly integrated into the law, with provisions for follow-up inspections to ensure that mitigating is done at the polluter's expense.
- Cross-border or transboundary issues need to be considered with respect to the country's participation in international environmental programs (Pollution of River

Kabul, to be taken up with Afghanistan) and concerning cross-boundary pollution issues between Provinces.

- Discharges and emissions, environmental quality standards: certain types of discharges have not been included. EPAs shall be empowered to regulate vehicle emissions; pollution charges should be specified and determined annually.
- Environmental impact assessment: the IEE/EIA Regulations 2000 should be revised. Even small-scale projects should also be required to submit an environmental report to the Director-General of EPA, who should have the power to halt all project activity (temporarily or permanently) and impose spot fines.
- Hazardous substances and waste: licensing provisions should be developed for hazardous substances and regulated under the law.
- Environmental tribunals and environmental magistrates shall be empowered to levy fines and set up an account into which fines imposed by the tribunal can be paid;
- The role of environmental magistrates shall be the same as the High Court judge so that his orders have legal value and are obeyed.
- Environmental protection orders: procedures and mechanisms for penalties to be collected by the Director-General of the EPA shall be developed and enacted as a law.
- Offences and penalties need to be rationalized according to inflation; pollution charges should be revised annually; procedures for determining pollution charges shall be very clear and publicized.
- It may be made mandatory for the financial institutions to issue loans only to those investors who have a clearance certificate front the EPA
- The Provincial EPA shall also be given powers to regulate
    - Solid waste disposal
    - Radiation and radioactive waste
    - Vibrations
    - Pollution or environmental damage from commercial activities
    - Littering and damage to the physical environment
    - Municipal services, sanitation, and safe drinking water.

1.9.5 Constraints, Potentials and Recommendations

i. The problems caused by the untreated waste discharge from the existing major industrial concerns ask for an efficient waste collection system and a common waste treatment plant for the industrial estate.

ii. Land Use legislation and fiscal policy are the main tools to address industrial and residential sources of air pollution.

iii. Segregation of building zones for different purposes is essential to consider air pollution when building plans for an area or a city. The first requirement is to protect residential

areas against trade, industry, and traffic fumes. In principle, industrial zones should be located on the downwind side of the community. As possible, industrial zones should be separated from other areas by green belts. Establishing zoning should incorporate consultations with all the affected communities and stakeholders as the otherwise may likely have serious social and economic constraints.

Distance apart the distance that must separate industrial zones and major traffic roads depend on the following factors:

- The extent of the emissions of fumes and smoke
- Meteorological factors affecting their distribution
- The limits of allowable pollution laid down for the residential areas

i. Keeping in view the wind direction, every major source of air pollution ought to be sited as far as possible in the wind shadow of residential areas, but this principle is valid only where there is distinct prevailing wind and then only if there are no other meteorological factors more influential than the wind direction

ii. Open spaces have the following effects on air pollution; therefore, they need to be provided properly:

- They encourage the mixing of air masses and help to dilute the impurities.
- They act as settling places for solid particles and directly cleansing.

iii. Small and medium-size industries that rely on urban locations illegally maintain profitability, making it more difficult to control them to maintain labour safety and environmental standards.

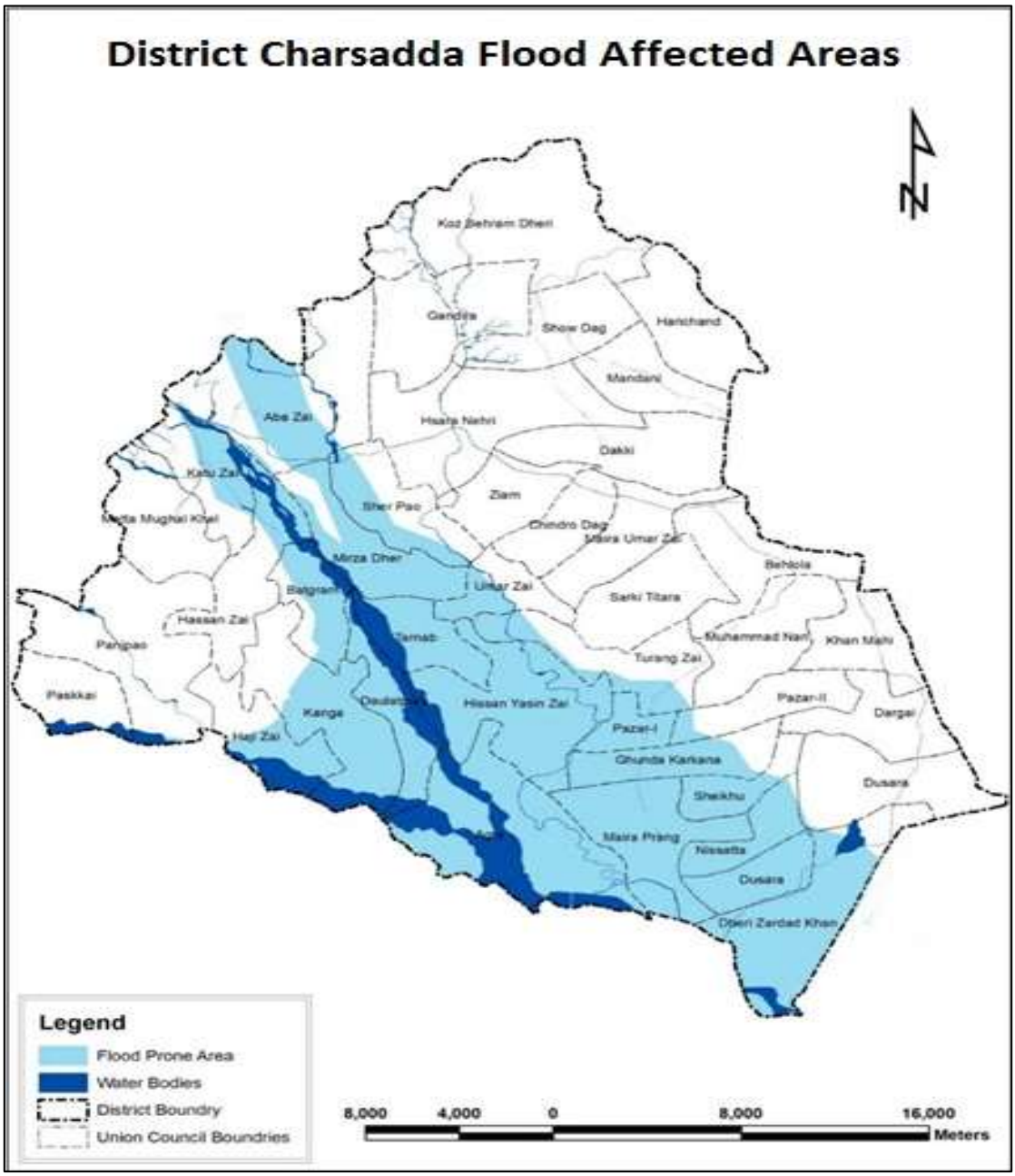
iv. In the interest of environmental improvement, there is a drive to earmark zones for all industries away from major urban centres. While strict enforcement of such zoning would improve air quality, this policy points to conflicts between different sector objectives.

v. Banning new industries in major urban areas exacerbates an increasing number of under or unemployed workers forced into the informal sector.

vi. Urban based workers have to be transported to and from their homes to far-flung industrial sites; therefore, to eliminate the potential automobile pollution, the industrial zones need to be provided with the residential blocks for the workers.

1.10 FLOODS

Charsadda experiences regular flooding from River Kabul. In 2006, approx. 15,300 families were displaced owing to the sudden onset of floods in River Kabul. In 2010, the floods affected more than 70,000 households. The area also remains vulnerable to flash flooding in river Swat, which tends to meander across the District, emerging from mountains in the Tangi area in the upper part of the District. The area is vulnerable to flash floods along Jindi Nullah and Shuban Nullah.



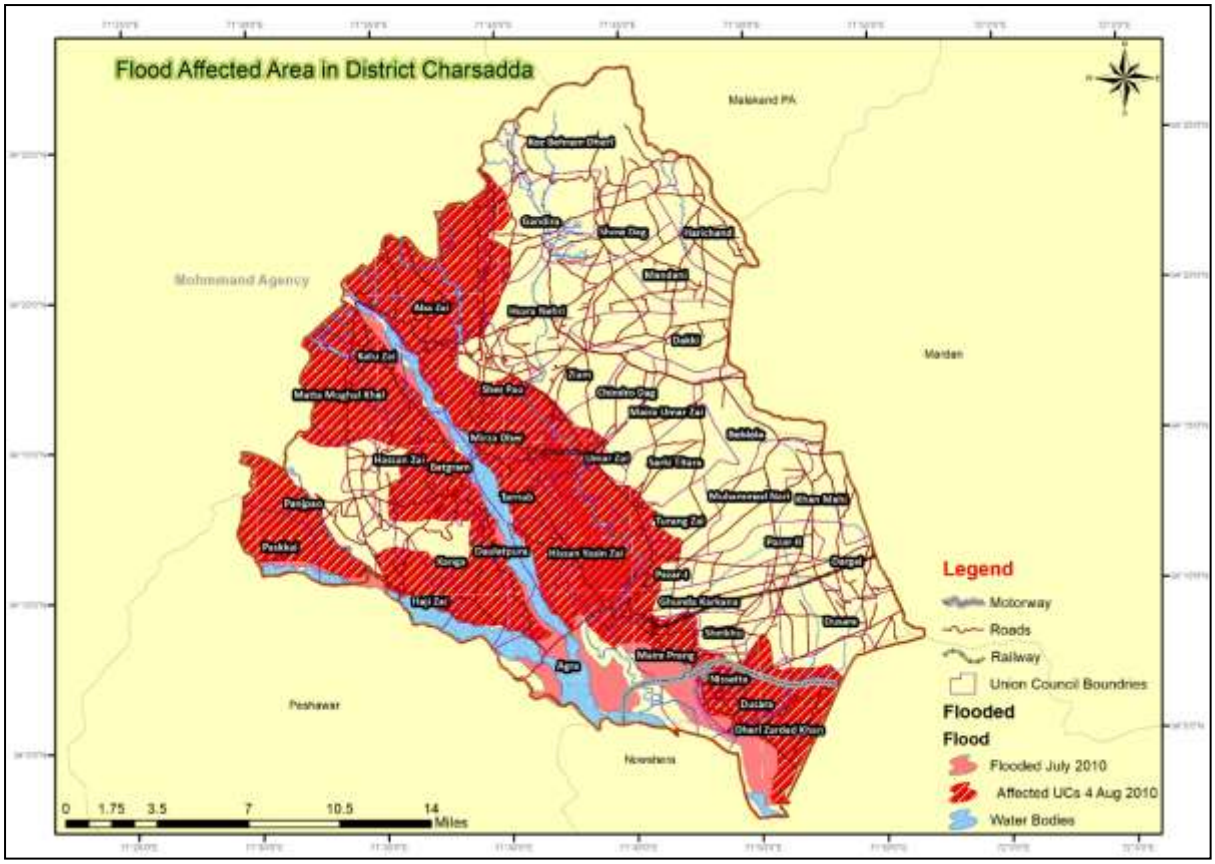
Map 1-4: District Charsadda Flood Affected Areas

1.10.1 Affected Population

As per the initial assessment conducted by Global Peace Pioneers, 2025 households were affected in two Tehsils of the District. Out of the estimated total population of 32,400, 50% of the population is severely affected by the monsoon rain. A total of 12 villages are devastated due to the continuous rain. Precious lives were lost by the flooding, where 09 people were reported dead and more than 760 were injured. Most of the people fleeing the area were settling with their relatives and friends at different schools. Village wise affected population is given below (Table 1-7).

Table 1- 1: Village Wise detail of affected Population in District Charsadda

Sr. No	Name of Village	Tehsil	Total Population	Effected Populations	Effected House Holds	Causalities or Injuries	
						Death	Injured
1	Abazai	Tangi	6000	200	25	2	30
2	Munnada	Charsadda	2000	250	30	0	45
3	Mirzadar	Charsadda	5000	3000	320	1	150
4	Dildar ghali	Charsadda	7000	7000	1000	3	400
5	Oaagi	Charsadda	2000	2000	300	0	18
6	Sangar	Charsadda	1200	1200	120	0	10
7	Miangari	Charsadda	500	500	60	0	04
8	Sherpao	Charsadda	6000	2000	270	03	100
9	Kotazai	Tangi	1500	300	30	0	03
10	Kulaabad	Tangi	600	200	20	0	0
11	Bacha qila	Tangi	300	100	12	0	0
12	Sadaraqrh	Tangi	300	150	18	0	0
Total			32400	16900	2205	09	760



Map 1-5: Flood Affected Area in District Charsadda

1.10.2 Affected Agricultural Land and Livestock

The land of Charsadda is very fertile and beautiful. Three rivers flow in Charsadda. The River Jindi, the Kabul River, and the Swat River; are the main source of irrigation for Charsadda. These three rivers then merge and join the Indus River. The main crops of Charsadda are; Tobacco, Sugarcane, Sugar beet, Wheat and Maize. Vegetables include Potato, Tomato, Cabbage, Brinjals, Okra and Spinach. Apricot, Citrus, Plum, Strawberry and pear are famous among orchards. Strawberry, Sugarcane and Tobacco are cultivated vary abundantly in this area. Among these, Strawberries are sold in deferent areas of the Province due to their good quality and taste. Cattle, buffalo, sheep, and goats are common livestock in the District. Other livestock is camels, horses and poultry. (Table 1-8).

Table 1-7: Village Wise Affected Agriculture and Livestock

Sr. No	Name of Village	Tehsil	Total Population	Effected Agricultural Land / Crops	Livestock		
					Goats	Sheep	Cow
1	Abazai	Tangi	6000	Above 40 Acers	0	0	0
2	Munnda	Charsadda	2000	Above 10 Acers	0	0	0
3	Mirzadar	Charsadda	5000	Above 600 Acers	20	35	65
4	Dildar ghali	Charsadda	7000	Above 300 Acers	165	200	40
5	Oaagi	Charsadda	2000	Above 200 Acer	20	40	0
6	Sangar	Charsadda	1200	Above 75 Acer	0	10	03
7	Miangari	Charsadda	500	Above 40 Acers	0	02	0
8	Sherpao	Charsadda	6000	Above 400 Acers	25	30	0
9	Kotazai	Tangi	1500	Above 50 Acers	0	0	0
10	Kulaabad	Tangi	600	Above 20 Acers	0	0	0
11	Bacha qila	Tangi	300	0	0	0	0
12	Sadaraqrh	Tangi	300	0	0	0	0
Total			32,400	1,735 Acres	230	317	108

1.10.3 Roads and Communication

The floods of 2010 had also disrupted the roads as 33 roads in District Charsadda had been damaged and blocked due to the flowing waters. Electricity and cell phone service, along with PTCL services, were affected. 03 bridges in the areas had been washed away by the flood, leaving many people trapped in the affected areas. The intensity of floods and areas affected are shown in (Table 1-9).

Table 1-8: Areas Affected/ Liable to Flooding

Sr. No	Flood Type	Name of Union Council	Name of Settlements
1	High	Agra	Agra Kuz, Agramilana, Agro Bala, Akhund Zadgan, Dogar, Gulabad, Hasan Khel, Kudai Kalie, Manzurai, Nawan Shaikh Kalie, Sardaryab, Shahbro
2		Daulatpura	Bara Koruna, Bero Sukor, Daulat zai, Faridabad, Goggar, Jamhat, Khandar Daulatpur, Kharkai, Nikkar, Sukar
3		Kanga	Bakiona, Bamozai, Dheri Ati Muhammad, Dheri Saiyidan, Dheri Sikandar Khan, Gharambak, Hariara, Jarhan Pur, Karhani, Khawaja zai, Muhammad Khan Qila, Nahkaj, Sandasar, Tawanai, Yaghiband Bola, Yaghiband Rayan
4		Haji Zai	Adezai, Hajizai, Mahzara, Tarkha
5		Hassan Zai	Katozai, Mulla Khel, Sarsong, Turlandai, Walai
6		Batgram	Adad Khel, Khandar, Marazai, Mathra Nawan, Mathra Purana, Mian Dezaim Sarikh
7		KatuZai	DherajKalle, Garibabad, Khebare, SadarGarhi
8	High/Low	DheriZardad Khan	KaptanKalle, Hindu Kalle, BubakKalle, BubakQalyas, Sultanabad, Bangladesh, Tulandi, ShujaKhel, Zakir Khan Kalle, Khan Sahib
9		Dusara	SharBahadurKalle, Gul Rahim Karuna, Shah Pasand Koruna, Laundo
10		Maira Prang	Prang, Majoki, Faizabad, Fazalabad, GarhiAminian, Faqirabad, FazalGafoorKalle, Najimabad, Abdul RahmanKaruna
11		HissanYasinZai	Adadakra, Gharaj Koruna, Giadar, NaweKalle, Palo Dheri, Sarki, Shahaj, Shekhan, QaziKhel, KhaKalan, Faqirabad, Andarai, Spinawarai, Shaikan, Kudai, Tarapuna, LalmaDher, Tarkhar, AlianDheri, Utmanzai, Kot, Gushte, Shagawati, Numare Baba, Shed Koruna, Hamid MianDherai, Jalu Banda
12		Tamab	Chatta, Dagai Mukarram Khan, Kalashai Ucha, Mina, Shambar, Tarnab, Guli Bagh, Gangu, Spalmai, Ucha Malmalai, DagaiGhulamQadar Khan, Dagai Khalid Khan
13		MirzaDher	GarhiDildaj, Isogal, Mian Sahib Garhi, Turlandi, China, GhazoDheri, Dher, MirzaDher, Totakal, Tangiwala Karuna, Duba, Dong Qila, Nama, Station Kalle, Dheral Kalle

Sr. No	Flood Type	Name of Union Council	Name of Settlements
14	Low	Aba Zai	ZiaratKalle, Kas Koruna, MarghuzKalle, GhulamMehmoodKalle, KirrooKaruna, Dheri
15		SherPao	GumtaiKalle, Sramkha, PanraJranda
16		Umar Zai	SandaSar, Umarzai
17		TurangZai	Deputy Kalle, QilaKaruna, JarhaKrouna, Kaka KhelDheraj
18		Pazar – I	Mirabad, Rajjer, AngarKalle
19		GhundaKarkana	BazMianKalle, HameshMianKalle, BabraKouruna, Garhi Hamid, Gul, Kula Dheri, Chatral, Amirabad, Ghondal Khan, malkaDheri, Sardarabad, Safdar Khan
20		Sheikhu	Banda, Suimaia, DheriKalle, Zarinabadm Sultanabad, Sui Khatti, Sur Khatti
21		Nisatta	SapartiDheri, Palosa

1.10.4 Short-Term and Long-Term Plans

Reasons and Justifications

The shortfalls in the 2010 Flood Response were the following:

- Inadequate flood protection arrangements
- Inadequate flood warning arrangements
- Encroachments
- Lack of preparations and Coordination (Provincial Departments and Districts)
- Non-observance of Early Warning by General Public
- Reduced Water Storage and Regulatory Capacity.

To overcome or minimize the damages caused by floods, the following short term and long-term measures are suggested[5]**:**

Short-Term Plans

i. Early warning system through WAPDA and Irrigation Department regarding flooding/overtopping of Warsak Dam.
ii. Early warning through existing mechanisms.
iii. Pakistan Metrological Department flood forecasts/warnings and weather forecasts.
iv. Flood warnings by the Local Administration and community-based mechanisms
v. Removal of Encroachments and an imposing ban on construction (Residential/Commercial)

[5] Source: Monsoon Contingency Plan – 2011, Provincial Disaster Management Authority, KP, June, 2011, Page 17.

vi. Re-construction of irrigation channels.
vii. Repair and maintenance of Drainage System.
viii. Restoration of Damage flood protection works
ix. Improvements in flood mitigation measures over River Kabul and its tributaries

Long-Term Plans

i. To receive real-time information about water levels, a network of community-level organizations and community volunteers be organized in the catchment areas.
ii. Arrangements for quick dissemination of flood warnings by the Revenue and Irrigation departments.
iii. Establishment of observation posts by the Irrigation Department in the likely flood areas.
iv. Civil Defense Staff and volunteers should be made fully functional.
v. Evacuation centres should be earmarked with the assistance of the education department.
vi. Each Department should prepare its own Standard Operating Procedures for sensitive buildings and records.
vii. Health Department should formulate comprehensive health response plans.
viii. Works and Services Department should keep strict vigilance on the roads and bridges and initiate necessary measures.
ix. The encroached areas, particularly along waterways and flood-prone areas, should be identified, and requisite measures are taken for their removal.

1.10.5 Integrated Approach to Flood Management[6]

Flood management plays an important role in protecting people and their socio-economic activities in flood plains from flooding. The development of the river basins has been closely linked with the successful implementation of flood control projects. In the past, exposure to flood risks has been handled largely through structural measures. However, strategies that rely largely on structural solutions, unfortunately, alter the natural environment of the river, which may result in loss of habitats, biological diversity and ecosystem productivity.

Further, structural approaches are bound to fail when an extraordinary or unforeseen event occurs. These traditional approaches, where the risks are merely transferred spatially, will likely generate conflicts and inequities. Environmental degradation can threaten human security, including life and livelihoods and food and health security. This realization has recently led to calls for a paradigm shift from traditional flood management to Integrated Flood Management.

Integrated Flood Management (IFM) is a concept that addresses human security issues against flood risks and sustainable development within the framework of Integrated Water

[6]ANNUAL FLOOD REPORT 2016, Federal Flood Commission, Ministry of Water & Power

Resources Management (IWRM). Such an integrated approach to flood management can play an important role in sustainable development and poverty reduction. Integrated Flood Management aims to minimize loss of life from flooding while maximizing the net benefits derived from flood plains.

1.10.6 Floods and the Development Process

Historically, flood plains have been the preferred places for socio-economic activity, as evident from the very high densities of human settlement. Floods are a natural phenomenon with both negative and positive impacts and, generally, should not be considered a hindrance to economic development. Floods play a major role in replenishing wetlands, recharging groundwater and supporting agriculture and fisheries systems, making flood plains preferred areas for human settlements and economic activities. Extreme demands on natural resources due to population growth have forced people and their property to move closer to rivers in many parts of the world. Further, flood control and protection measures have encouraged people to utilize newly protected areas extensively, thereby increasing flood risks and consequent losses.

However, recurrent and extreme flooding poses grave risks to development and negatively impacts lives, livelihoods and economic activity and can cause occasional disasters. Flood disasters result from the interaction between extreme hydrological events and environmental, social and economic processes. These disasters can put development back by five to ten years, particularly in developing countries. The spiralling economic losses in developed countries also have grave concerns.

The balancing of development needs and risks is essential. The evidence worldwide is that people will not, and in certain circumstances, cannot abandon flood-prone areas. Therefore, there is a need to find ways of making life sustainable in floodplains. The best approach is to manage floods in an integrated manner.

1.10.7 Traditional Flood Management Options

The traditional management response to severe floods was typically an ad-hoc reaction – quick implementation of a project that considered both the problem and its solution to be self-evident and gave no thought to the consequences of flood risks for upstream and downstream areas. Thus, flood management practices have largely focused on mitigating flood intensity and reducing localised damage to private and public property. Besides physical and institutional interventions, traditional flood management has employed both structural and non-structural interventions. These interventions were employed before, during and after flooding and have often overlapped. The traditional flood management interventions are listed below;

i. Source control to reduce runoff:
    - Permeable pavements, an artificial forestation recharge;

ii. Storage of runoff:
    - Detention Basins, reservoirs etc.;
iii. Capacity enhancement of Headwork/Barrages across rivers:
    - Remodelling of Barrages/Headworks, provision of Bypass/Escape channels etc.;
iv. Separation of rivers and populations:
    - Land-use control, flood plan mapping & zoning, removal of illegal encroachments, and construction of flood protection infrastructure.
v. Emergency management during floods:
    - Flood forecasting & warnings, flood fighting works, i.e. raising/strengthening flood embankments, evacuation of flood affectees from the dangerous zone and their temporary settlement at safe places; and
vi. Flood recovery:
    - Compensation of flood affectees and restoration of damaged public infrastructure.

Surface water storage (large, medium & small dams), flood embankments, and flood flow retention basins are traditional approaches to attenuating flood peaks. Water storage attenuates floods by slowing the rate of rising waters, enhancing the time it takes for the waters to attain a high level and evading the synchronization of flood peaks, hence, lowering the peak level in the downstream areas. Such storage reservoirs serve multiple purposes, i.e. storage of water mainly for irrigation water supplies, hydropower generation, and flood management. Storage Reservoirs have to be used appropriately with other structural and non-structural measures.

Seemingly self-evident but regularly overlooked in practice is the need to make flood management a part of the planning, design, and operation of reservoirs. Releases of surplus water from reservoirs at the time when rivers in the downstream areas are experiencing high flood flows can create risks. Therefore, the careful operation of reservoirs can minimize the loss of human life and property damage due to properly managed releases. In this context, transboundary cooperation is indispensable.

Flood embankments are most likely appropriate for floodplains that are already intensely used in urbanization or where the residual risks of intense floodplain use may be easier to handle than the risks in other areas, i.e. (Landslides or other disturbances).

Land-use control is generally adopted where intensive development on a particular floodplain is undesirable. Providing incentives for development to be undertaken elsewhere may be more effective than simply trying to stop development on the floodplain. However, land-use control is less likely to be effective where land is under development pressure, especially from informal development. Flood protection or construction of houses at high elevations is most appropriate where development intensities are low, properties are scattered, or the warnings times are short. In areas prone to frequent flooding, protection of the infrastructure and the communication links from floods can reduce the debilitating impacts of the flood on the economy.

Flood Forecasting & issuance of timely warnings complement all forms of intervention. A combination of timely, clear & accurate warning messages with a high level of community awareness gives the best preparedness for self-reliant action during floods. Public education program/awareness campaign is crucial to the success of warnings intended to preclude a hazard from turning into a disaster. Evacuation is an essential constituent of emergency planning, and evacuation routes may be upward into a flood refuge at a higher elevation or outward, depending on local circumstances. Outward evacuations are generally necessary where the water depths are significant, where flood velocities are high and where the buildings are vulnerable. Successful evacuations require planning and awareness among the population of what to do in a flood emergency. Active community participation in the planning stage and regular exercises to assess the viability of the system help ensure that evacuations are effective. Providing basic amenities such as water supply, sanitation and security in areas where affectees gather is particularly important in establishing a viable evacuation system.

1.10.8 The Challenges of Flood Management

Besides many other challenges, climate change is emerging as perhaps the greatest environmental challenge for Pakistan, causing floods, droughts, increasing hunger, poverty, displacement, soil degradation, desertification, and deforestation. Rising number of extreme climate events, the shift of monsoon rainfall zone from North-East to North-West. Intense, concentrated monsoon rains in the short time interval, inconsistent behaviour of monsoon and erratic flash flood events are the major future challenges. There is a strong need to educate people about these natural disasters and their frequent occurrence in the region, including Pakistan.

There is a growing recognition that current approaches regarding flood management are not as sustainable as they might be. Hence, it is imperative to cope with the increasing risks of flooding and the uncertainties of climate change more effectively. Increased population pressure and enhanced economic activities in floodplains, such as the construction of buildings and infrastructure, further increase the risk of flooding. Food security is synonymous with livelihood security in developing countries with primarily agricultural economies. Floodplains contribute substantially to the food production that provides nutrition for the people of these countries. The Asia-Pacific region is under frequent and severe impacts of floods because of its geographical composition. The majority of the region's major cities are riverine or coastal, which have the concentration of population, assets, economical & industrial development and infrastructures. Flooding can be caused by torrential rains in urban areas, flash floods in semi-mountainous regions, riverine flooding in main rivers in plain areas, or storm surge. In this respect, rapid urban growth brings us prosperity and a series of challenges, in which the water-related issues, including the escalation of urban floods, have become essential problems in connection with sustainable development. The increasing

urban flood risk has pushed all nations and international organizations to take measures to confront the threats caused by floods and to build flood resilient cities.

Pakistan is a resource-constrained country with a fast-growing population, low natural resource development, unfavourable local socio-cultural conditions, and climate change is additional stress. Educating the masses about natural disasters and building up their preparedness at educational institutions can help minimize the damages of disasters. Media can play its due role in this regard as, without its support, awareness cannot be boosted. Areas vulnerable to climate change-induced natural disasters must have adequate flood protection facilities, besides reliable medium and long-range weather & flood forecasting & warning systems in place. (Table 1-10).

Table 1-9: Department-wise Flood Management Measures

Departments	Flood Management Measures Required
Revenue Department	A major stakeholder in managing floods & other disastrous events. Demarcation of encroachments nominating affectees for compensation through its staff & revenue records.
Irrigation Department	Establishment of Flood Emergency Cell Encroachments are to be removed with the assistance of DCO, TMA, and the C&W Department.
Communication and Works Department.	Establishment of Flood Emergency Cell When required, available machinery should be pre-positioned in vulnerable areas.
Transport Department	When needed, Transport Department should coordinate for evacuation of the affected population in an orderly manner. The Regional Transport Authorities should coordinate with respective DCOs for needful arrangements.
Health Department	The Department should establish a Health Emergency Preparedness and Response Cell when required. The Department should carry out detailed planning with District officials, and District level health plans should be in place well before the monsoon season.
Food Department	The Department should keep a stock of wheat for the population that may be affected by floods.
Information Department	FM radio stations should be established for warnings and sensitize the public as soon as flood warnings are received. These stations should guide the public about nearby safer places, foodstuff, health care facilities, health tips and other precautionary measures. The Department should also arrange press briefings/press conferences.

The measures to manage floods in national, provincial and local/Districts may include the following.

National/Provincial Level Flood Management		
National Level	**Provincial Level**	**District/Local Level**
Early warning system through WAPDA and Irrigation Department regarding flooding/overtopping of Warsak Dam.	The Provincial Emergency Operation Center has been established at PDMA-Khyber Pakhtunkhwa, fully equipped with Modern Communication System. Provincial Emergency Operation Center is the Command and Control Center pre, during, and post-disaster situations.	District Charsadda experiences regular flooding from River Kabul and remains vulnerable to flash flooding in River Swat, which tends to meander across the District emerging from mountains in the Tangi area in the upper part of the District. Besides, flash floods also occur along Jindi Nullah and Shuban Nullah. The list of waterways which tend to spill over is as under: • River Kabul • L/bank of Adezai River • Subhan Khwar • Khiyali river • Jindi River, • Soor Khatkai Drain, • Gilgichi Khwar, • Hisarar Drain, • Dab Drain & Musa Killi drain, • lower Swat canal section of Disty No.5,6 • Nisatta Branch and Nisatta Minor • Adezai River • Swat River (Khiyali) • Jindi River The following measures need to be taken: The encroached areas along the above waterways and flood-prone areas should be removed. Irrigation channels in the vicinity of these waterways should be re-constructed Drainage System should be repaired/maintained.

National Level	Provincial Level	District/Local Level
Early warning through existing mechanisms.	Pakistan Metrological Department flood forecasts/warnings and weather forecasts.	Flood warnings by the Local Administration and community-based mechanisms
	Restoration of Damage flood protection works	Real-time information about water levels, a network of community-level organizations and community volunteers be organized in the catchment areas.
	Improvements in flood mitigation measures over River Kabul and its tributaries.	Civil Defense Staff and volunteers should be made fully functional.
	Arrangements for quick dissemination of flood warnings by the Revenue and Irrigation departments.	
	Establishment of observation posts by the Irrigation Department in the likely flood areas.	
	Evacuation centres should be earmarked with the assistance of the education department.	
	Each Department should prepare its own Standard Operating Procedures for sensitive buildings and records.	
	Health Department should formulate comprehensive health response plans.	
	Works and Services Department should keep strict vigilance on the roads and bridges and initiate necessary measures.	

1.10.9 Recommendation

Flood management in Pakistan is a task that requires both vast resources and a comprehensive understanding of the flood problem. The nature of floods varies drastically throughout the country due to contrasting physiographic, climatic, hydrologic, demographic, and socio-economic factors. The present approach for flood management incorporates both structural and non-structural measures, yet their inter-linkage and combined efficiency still

need to be improved. The efficiency of any proposed measure should be evaluated for its integration into existing measures to achieve efficient and economically viable solutions. The 2010 flood in the upper Indus was due to exceptional intensive rainfall in the catchments of the Kabul and Swat rivers which were not covered by Doppler Weather Surveillance Radar units. Expansion of structural and non-structural measures is extremely important to enhance the efficiency of the flood management system. Flood zoning and flood mapping projects must be completed on a priority basis. Necessary legal and institutional support must be provided for flood mapping and flood zoning. New dams are necessary for improvement in water management in general and effective flood management in particular. Unfortunately, the maintenance and functioning of flood measures have been neglected. High priorities must be assigned for the proper functioning of measures. Flood Early Warning System is a state-of-the-art model. Its proper functioning and full utilization must be assured. Comprehensive flood management plans must be prepared and executed without waiting for another devastating flood. Concluding, a risk-based pro-active approach is required to achieve sustainable flood management.

1.11 WATERLOGGING AND SALINITY

The Government of NWFP (now **Khyber Pakhtunkhwa**) initiated the Salinity Control and Rehabilitation Project (SCARP) in 1994-2002 in four Districts known as the Swab SCARP project. The 7 -year long SCARP project concluded in September 2002. In KP Province (former NWFP), the major SCARP Projects were only two, namely the Peshawar SCARP project, which included a Canadian International Development Agency (CIDA) Nowshera and Peshawar and SCARP project, which spread over Mardan, Charsadda, Swabi and adjoining areas in the catchment. The projects were intended to upgrade and strengthen the upper and lower Swat Canal System. The World Bank, Canadian International Development Agency (CIDA), Asian Development Bank (ADB) and the Swiss Agency for Development & Cooperation (SDC) provided technical and financial assistance. The Project area covered the Districts of Mardan (31,781 hectares/40%), Charsadda (26,923 hectares /34%), Swabi (15,871 hectares/20%) and Malakand Agency (4,777 hectares/6%). The Project focused on those areas that draw water from the Upper Swat Canal system.

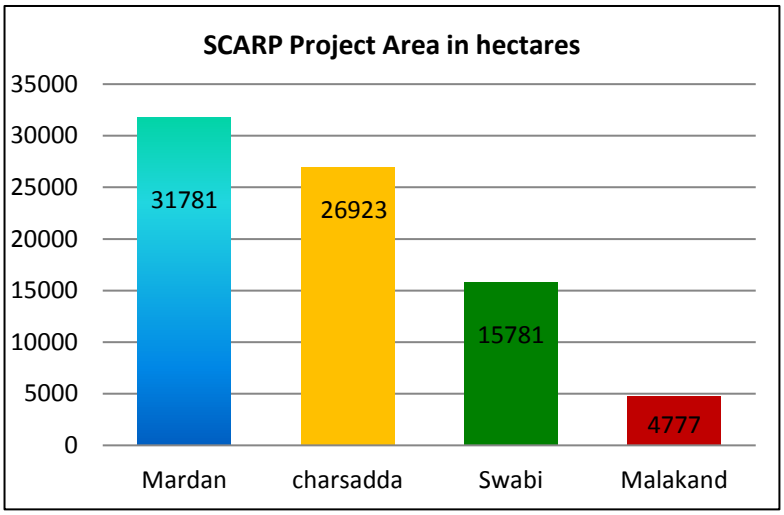


Figure 1-4: SCARP Project Area in Hectares

The project's engineering purpose was to establish a drainage system for all three types of waterlogged areas, i.e. high intensity of waterlogging with the water table at 3 meters and above, moderate with 1.5 meters to 3 meters depth and low levels up to 1.5 meters depth. The project's main objective was to improve water availability to farmers by providing additional water and controlling water losses.

Two major engineering initiatives were required for the SCARP:

i. Conversion (i.e. upgrading) of watercourses into Minors.
ii. Watercourse renovation.

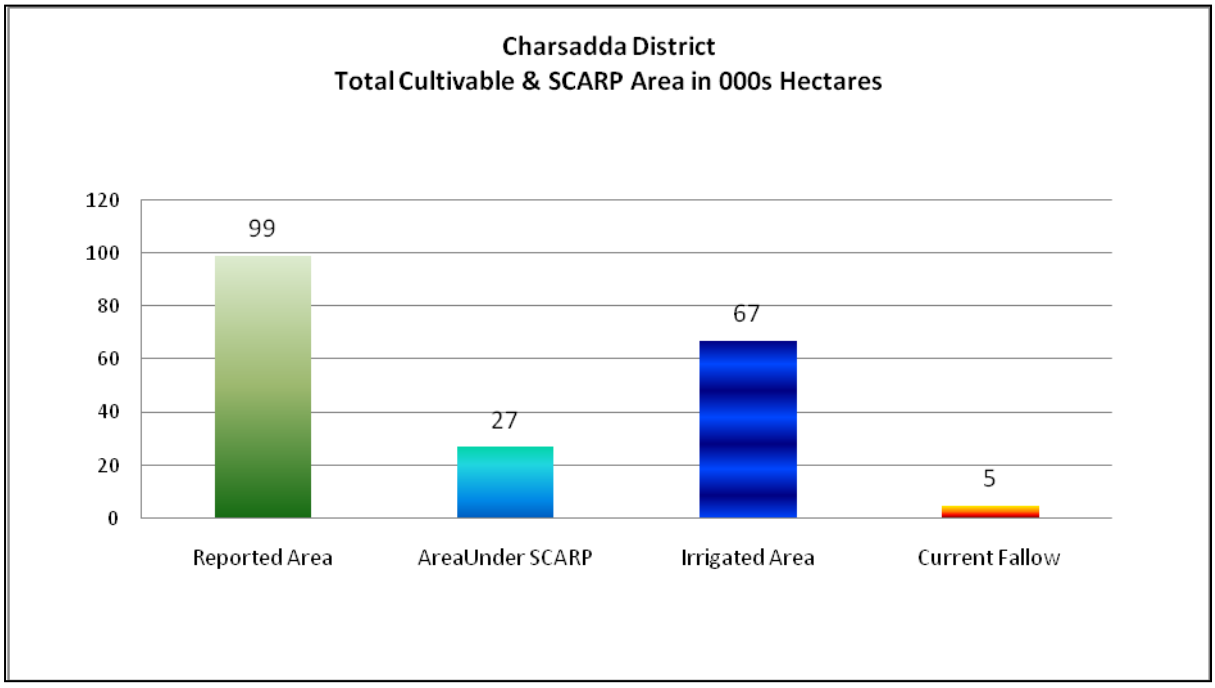


Figure 1-5: District Charsadda Total Cultivable and SCARP Area in Thousands of Hectares

At the start of the SCARP project, watercourses with a Cultivatable Command Area of 268 acres or more would be converted (i.e. upgraded) into Minors. Each existing watercourse was to be divided into two or more watercourses, with the area fed by

each watercourse, and the route and length of the Minor, depending on four factors: the discharge of the resultant watercourse, geographical constraints, farmer's preferences and the availability of funds. In all, a total of 95 watercourses were converted to Minors.

The SCARP project also included a component of ADP to renovate 1,188 watercourses according to their remodelled discharge. Many Agencies executed the SCARP; including On-Farm Water Management (OFWM), which was responsible for reducing watercourse operational losses by lining critical sections, improving earthen watercourses, and installing water-control structures. As a civil-society organization, NRSP was mandated to ensure that its social mobilization methods of community participation and women were integrated into all of the community-focused activities of the Project.

Water Users Associations (WUAs) were formed to be involved in watercourse remodelling and renovation activities, including survey-design preparation and implementation of civil works with technical guidance from OFWM. The role of the Agriculture Extension Department was to improve farming and water use practices through demonstrations, communications and facilitating activities. New techniques and technologies were introduced to improve agricultural production in relation to the increased water supply.

Although community participation was a lengthy process, it had the advantage of long-term sustainability and community 'ownership' of the work. The community members signed partnership agreements for watercourse remodelling, i.e. local farmers and 903 watercourse renovation schemes were completed in the allotted seven years.

1.11.1 Programs to Alleviate Waterlogging and Salinity

SCARP Program 1980 -1997

WAPDA installed tube wells and a number of dug wells in 1980 under the SCARP program. However, this strategy had little success, and the water table did not recede. In many areas, the continuous pumping by the tube wells has not proved efficient in lowering the water table, and the salts reappear on the surface in the early winter season.

According to a study[7] by the Pakistan Institute of Nuclear Science & Technology Nilore, Pakistan, the chemical quality of the shallow groundwater is quite poor.

The SCARP Swabi projects were initiated, which covered Swabi, Charsadda, Malakand and Mardan Districts with the basic objectives as given below:

i. To eradicate waterlogging and Salinity in the Peshawar valley.
ii. To bring the areas thus rescued under crops through supplemental irrigation supplies.
iii. Improve the agricultural productivity through better farm management and increased inputs, thereby raising the intensity of agriculture and yields.
iv. To lower the water table in the water-logged areas of Peshawar valley.
v. To control and remove salinity in the identified SCARP area.

These objectives were to be achieved by vertical and horizontal drainage provided by the tube wells surface or tile drains. The served area of Kabul River and many Khawars around Peshawar city has clayey aquifers that contribute to the problem of waterlogging and salinity. This problem can be overcome by lining irrigation canals and water channels properly. Additionally, this problem can be reduced greatly by readjusting the delta for farm irrigation practice to reduce the recharge and by abandoning the pumping wells penetrating the artesian aquifer.

The SCARP program was established to address areas where salinity and alkalinity problems developed because of the poor drainage. World Bank/CIDA supported initiatives through

[7] Study of ISOTOPES in Peshawar Valley by R. M. QURESHI and others

projects to provide drainage, reclaim land, increase irrigation efficiencies, and improve on-farm water management practices. In SCARP Peshawar, the projects positively impacted and met 95 % of the designed targets.

The cropped area in Charsadda has not registered any changes under the SCARP Program, and the cultivated and cultivable area has remained unchanged during this period. Though there may have been some achievements, the gains and loss of area to water logging and salinity have balanced it to show no change. The major gain has been that the area under crops has remained constant, and there has been no deterioration of land due to waterlogging and salinity.

SCARP was aimed to increase crop production through (a) lowering and controlling groundwater levels; (b) provision of increased irrigation deliveries to leach salts, meet optimum crop water requirements and increase cropping intensities; (c) reclamation of marginally productive and abandoned land; and (d) increasing on-farm water use efficiency. These objectives were to be attained through investments in subsurface drainage using perforated PVC pipes and waste disposal systems comprising open drains; canal remodelling works to handle increased deliveries; watercourse modifications to improve on-farm water use, gypsum application, rural roads", and improved agricultural extension services. Floods, the situation has again worsened. Under the National Drainage Program (NDP) Project, the drainage around Kabul river system was improved to achieve equitable distribution of irrigation supplies.

The area at the junction of Indus and Kabul is heavily water logged and tube wells were sunk to decrease the water logging. However, the deficiencies of the existing irrigation system pertaining to the seepage losses, sedimentation in canals were visible. Thus, it was proposed by the Govt. of KP to avert the inadequacy to meet with the demand of crop; which can be achieved by remodeling the existing system.

The activities under the Project included the following:

- Installation of subsurface (tile) drains in areas with a water table depth of less than 5 *ft.*
- Remodeling existing surface drains to carry storm water and provide a gravity outlet for the tile drainage waste during Monsoons
- Construction of small Check Dams
- Remodeling of the Warsak Dam and allied system to provide increased capacity and improve canal operating efficiencies.
- Additional water from the Kabul river to be directed through the enlarged and improved system to provide full irrigation.
- Reclamation requirements of the Warsak Canal command area; reclamation of about 20,000 ac of abandoned and/or marginally productive saline-alkaline land.

National Drainage Program - NDP 1998 -2004

The SCARP project was aborted due to the problem that it was draining vertically and there was no provision for horizontal drainage which could have reduced the problem of water logging. Thus, in order to address the problems of increasing water logging and salinity the National Drainage Project was initiated. The Government of Pakistan launched the National Drainage Program (NDP) in January 1998 which was undertaken to address the problems of Irrigation and Drainage infrastructure. The overall NDP Umbrella Project (Phase-1) was approved by ECNEC on May 26, 1997 for Rs. 31,400 million (equivalent to US$ 785 million). The project envisaged foreign assistance of US$ 525 million (IDA US$ 285 million, ADB US$ 140 million and JBIC US$ 100 million).

In Khyber Pakhtunkhwa NDP was financed both by the Asian Development Bank and the World Bank. NDP was launched in 1998, to continue for 25 years. The major activities envisaged include

- Remodeling/ extension of existing surface and new drains,
- Rehabilitation/ replacement of saline groundwater (sgw) tube wells,
- Installation of pipe drains in new areas,
- Lining of watercourses in sewage areas,
- Capacity building of the irrigation and other related departments by bringing in institutional reforms;

The institutional and training components of the NDP had delayed in the Province for some reasons and it required more time and funds to complete the leftover work. Owing to slow progress the project was however abandoned by the World Bank and the ADB.

In its progress report, the NDP's coordination cell says 721 kilometers existing surface drains in the KP Province have been rehabilitated against the target of 1,540 kilometers. Similarly, of 133 kilometers lining of canals, 31 kilometers were completed till July 2006. Under the institutional component, according to the report, the provincial irrigation department was proposed to be decentralized and establish a provincial irrigation drainage authority, which will work as an autonomous body.

1.11.2 Existing and Future Programs

The government of KP initiated partnership and participatory programs for reclaiming waterlogged area and land affected by sodicity and salinity. To this end several programs were launched by the government and the NGOs. At present following two programs are working successfully.

On Farm Water Management (OFWM) Program

There are number of on-going OFWM projects like the Federal Government Financed OFWM projects; NWFP OFWM Project (World Bank Assisted), PHLC (ADB Funded) and MRDP with OFWM component (ADB Funded).

The project is designed to cover the entire Province and has two participants the government as technical advisors and facilitators, the user i.e. the farmer who acts through the Water User Association (WUA), which is formed by the local farmers who participate in the program as partners and provide their share in cash or kind i.e., labor, maintenance and some of the materials. Watercourses would be maintained by the WUAs. They will, therefore be responsible for any O&M expenditure after completion of the project gestation period.

Provincial Rural Support Program (RSP)

The RSP has replicated OWFM and provided technical advice to the community groups for lining of water courses. The financing is made on partnership basis, the farmers or community association has to mobilize seed money and their share in cash or kind while design and major portion of the funds is provided by the RSP, from the Poverty Alleviation fund of the World Bank. After completion of the project the farmers' association is responsible for maintenance and upkeep of the project.

Billion tree Tsunami Project

The Billion Tree Tsunami Project is driven by current Government's vision of Green Growth which ties in the needs for sustainable forestry development in Khyber Pakhtunkhwa generating Green jobs, Gender empowerment, and Preserving Pakistan's natural capital while also addressing the global issue of Climate Change. That project has several objectives two of these have direct impact on Water logging areas.

- Reclamation of 1000 hectare saline and water-logged areas
- Planning and rehabilitation of 10 degraded Watersheds

1.11.3 Benefits of the Current Programs

The OWFM and the RSP have shown remarkable success in terms of reducing waterlogging and salinity and increasing agricultural incomes for farmers on partnership basis. Some of the main features of the programs include:

- **Social Mobilization and Support Program;** Forming over ten thousand effective WUAs Associations, registering new WUAs under 1981 WUAs Ordinance and providing them training and initial management support.
- **Improvement of Irrigation Facilities;** Rehabilitation and lining of watercourse in the canal and non-canal commanded (barani, riverian, tubewell) areas, in Peshawar and other Districts of Khyber Pakhtunkhwa
- **Training and Capacity Building,** Imparting training to professionals and sub professionals and farmers in O&M of watercourse. Creating awareness amongst farmers for efficient/optimal use of irrigation water as per crop water requirements; further the farmers are also trained and educated to go for sowing high value crops in order to increase their farm income per unit area and water.

1.11.4 Benefits of Ongoing Programs

From the previous discussion it can be noticed that during the past few years the government of KP has adopted an integrated approach of resolving the problems of water logging and salinity. These programs have a number of benefits, some of which are not directly related with the problem of water logging and salinity, but indirectly resulted in increased cooperation and collective participation in the public-sector projects. Some of the benefits include:

- Increased coordination amongst farmers i.e., Organization of farmers in the form of Associations/ Community Groups at watercourse level;
- Renovation/Rehabilitation of watercourses to reduce water logging;
- Promotion of Irrigation Agronomy activities i.e. LASER technology, Furrow-Bed Irrigation system, Zero Tillage technology etc.; to combat salinity and water logging
- Installation of Community Tube Well Watercourses outside the canal command areas;
- Construction of Water Storage Tanks in low discharge areas;
- Development of Rain Water Harvesting units in rain-fed tracts;
- Installation of Micro Irrigation Schemes I.e. Sprinklers, Drip, Lift Irrigation;
- Pilot Projects for Participatory Irrigation Management (PIM) at Distributary level;
- Training of Manpower in Water Management.
- Coordination with Research, Extension and Field wings of Agriculture Department for transfer of technology regarding irrigation water management.

1.11.5 Constraints

One of the major bottlenecks in the successful operation of drainage projects for salt management has been the safe disposal of saline drainage waste. Only a small amount of drain discharge rates used for different drainage projects in Pakistan. The salt management issues are very complex and no single straight forward solution applies. To sustain and improve the productivity of irrigated agriculture, the integration of irrigation and drainage is absolutely necessary because irrigation management and drainage problems are closely interlinked through: (i) over or inefficient irrigation as a cause of water logging and (ii) the relationship between irrigation management and waste disposal.

Regarding the mobilization of farmers through formation of water user association (WUA) to manage the drainage projects locally; the process could not continue and ended drastically with the completion of SCARP project.

The discontinuation of WUA was another major constraint of SSP, as the stakeholder's participation completely vanished.

Upon completion of the SCARP project in 2002, the government and the project offices rolled back, due to external factors and this initiative could not be sustained by the local farmers.

1.11.6 Potential Loss of Agriculture Sector Due to Water Logging and Salinity

Water logging and salinity are major impediment to the sustainability of irrigated lands and livelihoods of the farmers, especially the smallholders. These problems are the result of a multitude of factors, including seepage from unlined earthen canals system, inadequate provision of surface and subsurface drainage, poor water management practices, insufficient water supplies and use of poor-quality groundwater for irrigation. About 6.3 million hectares are affected by different levels and types of salinity, out of which nearly half are under irrigated agriculture.

However, in spite of huge investments, the results have in general been disappointing and the problems of water logging and salinity persist. Water use efficiencies within the irrigated areas are generally low, with much of the diverted surface water recharging the underlying aquifers. These losses in the upstream of the system have serious consequences for the delivery of surface water to the farmers located at the end of the canal system.

The estimated 26923 hectares in District Charsadda are affected by water logging and salinity. It has been observed that in areas where the salt content in water is 835 parts of salt per million is suitable for agriculture. While in the water-logged areas, the pumped water can be reused for irrigation purposes. However new crops need to be introduced in this regard. The local farmers have used some other techniques as well, like altering the crop patters, the area under sugar cane cultivation has thus been increased as the effect of Water logging and salinity is not significant. On the other hand, area under vegetables and fruits has been reduced as these are delicate crops and give low yield in water logged areas.

The Government of KP needs to evolve:

- Method of public private partnership to check and manage the water table and salt content regularly. The consultant's study reveals that almost 50 % of the area affected by water logging and salinity still gives good yields and has been classified as Class II.
- Increase budget on Research and development and provide some incentive to local farmers for higher yields and adopting local solutions.
- Line the canals and water distributaries on priority on public private partnership basis.

1.11.7 Measures Taken by the Government

To increase production of irrigated areas, some of which were waterlogged and affected by salinity, the Government of Pakistan initiated the Salinity Control and Reclamation Program (SCARP) in 1959.The SCARP received a push from the Government under the Fifth 5-Year Plan (1978–1983). The SCARP in the command areas of the Upper Swat Canal (USC) and Lower-Swat Canal (LSC) systems was planned for a period of seven years - 1994-95 to 2002.

Irrigation improvements and drainage relief for the irrigation system were carried out in the early 1980s, under the SCARP assisted by ADB and SDC in 1994-95, the Government requested donors for financing for project preparatory technical assistance for a similar project in the USC system under the Seventh 5-Year Plan (1988–1993)

The Project aimed to realize the full agricultural potential of the Project's cultivable command area (CCA), thereby improving farm income, increasing employment opportunities, and boosting economic activity in the Project's area, comprising part of the LSC and USC systems in Khyber Pakhtunkhwa.

Since the early 1990s, numerous efforts have been made to cope with the problems of water logging and salinity. These included lining of watercourses to control seepage losses, adaptation of improved irrigation practices, increased farmers participation in the initiative and the installation of surface and subsurface drainage systems. Most of these projects were funded by government and only minor investments were made by farmers associations, which was limited to labor and other inputs in kind. Over the last three decades, considerable work has also been done on the reclamation of saline soils through physical, chemical and biological strategies. These efforts however, remained confined to support on-farm research on salinity and sodicity management. On the other hand, farmers continue their efforts to reclaim salt affected lands through improved water management, crop choices and cultural practices.

Upon the completion of the SCARP donor-government financed project both the monitoring and management teams withdrew from the project. Consequently, there was no follow up both by the public and private sector, bringing all efforts to a marginal level. However, these efforts were limited to field scale level and have generally not been taken up by the wider farming community. Despite huge investment, the success has been limited in-solving land degradation issues.

1.11.8 Scarp Projects

In areas where salinity and alkalinity problems developed because of the poor drainage, SCARP program was established to address these problems. Donors supported initiatives through projects aimed at providing drainage, reclaiming land, increasing irrigation efficiencies, and improving on-farm water management practices.

SCARP Project aimed to realize the full agricultural potential of the Project's cultivable Command area (CCA), thereby improving farm income, increasing employment opportunities, and boosting economic activity in the Project's area, comprising part of the Swat Canal System in Khyber Pakhtunkhwa. The existing irrigation system, developed about a century ago, was designed for much lower cropping intensities and had limited provision for drainage, resulting in arise in-ground water and the occurrence of salinity.

The objectives of the Project were to alleviate the major constraints facing irrigated agriculture in the Project's area, including inadequate irrigation supplies, waterlogged ground, and salinity, thereby raising agricultural production, employment, and farm income. These objectives were achieved.

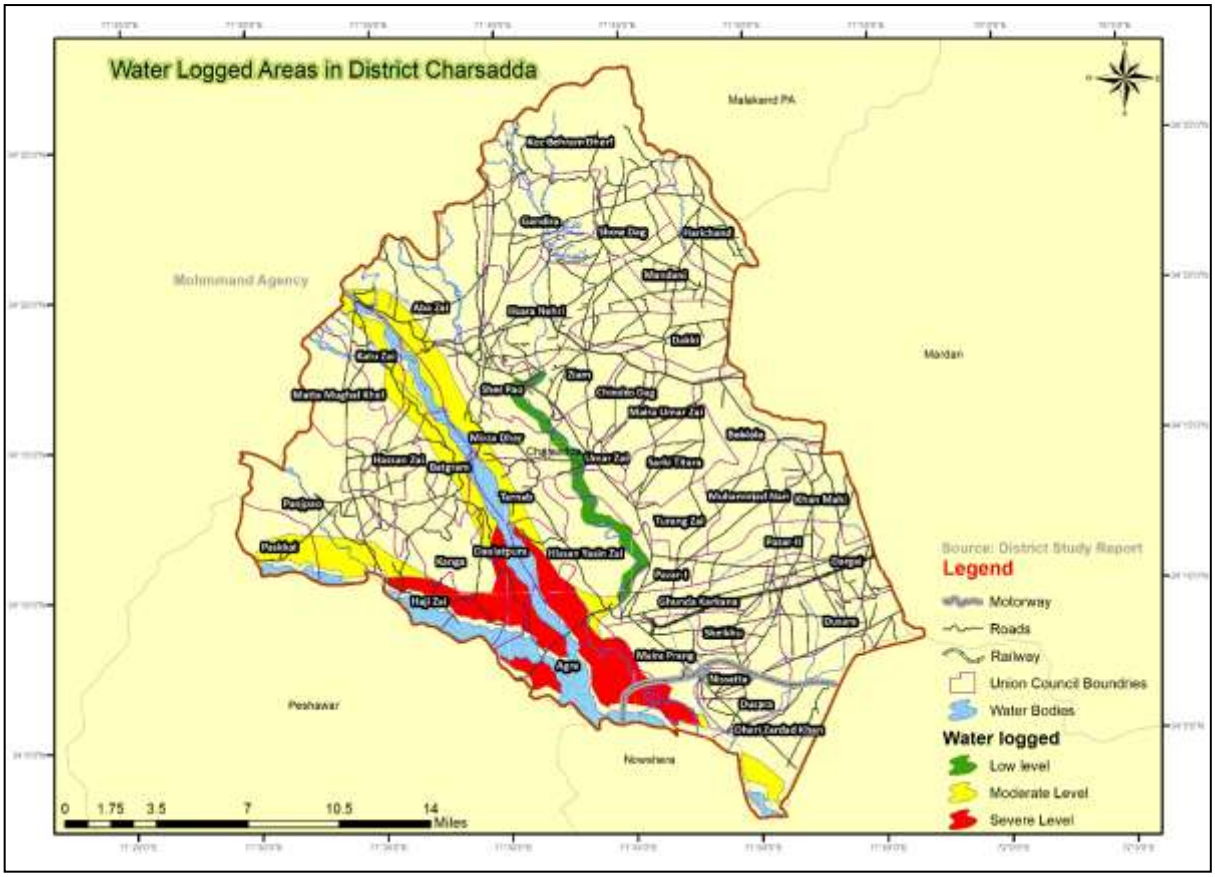
i. Increasing irrigation supplies through remodeling the irrigation system serving about 89,000 hectares,

ii. controlling the spread of water-logging through the provision of subsurface drainage through improvements of surface drainage and water courses
iii. Reducing water loss at the farm level by improving about 1,070 water courses out of a total of 1188 water courses

SCARP was the first irrigated agricultural development project financed by different donors including ADB and SDC in the North-West Frontier Province (Khyber Pakhtunkhwa). The SSP objectives were to increase agricultural production through extensive improvements in the on-farm water management system such as; (i) drainage of waterlogged lands; (ii) provision of additional irrigation water to meet crop water requirements adequately; (iii) reclamation of marginally productive and/or abandoned land; (iv) increasing on-farm water management efficiency; and (v) improved agricultural extension services.

The project was to cover most of the irrigated land in the Swabi, Charsadda, and Mardan area, including the entire LSC command (134,500 ac) and part of the USC command (75,500 ac). The project was designed to increase crop production through

i. Lowering and controlling groundwater levels;
ii. Provision of increased irrigation deliveries to leach salts meet optimum crop water requirements and increase cropping intensities;
iii. Reclamation of marginally productive and/or abandoned land; and
iv. Increasing on-farm water use efficiency. These objectives were to be attained through investments in subsurface drainage



Map 1-6: Water Logged Areas in District Charsadda

v. Canal remodeling works to handle increased deliveries, watercourse modifications to improve on-farm water use, gypsum application, rural roads", and improved agricultural extension services.

The areas under water logged lands in the five Districts are given in the Table below 1-12. shows Around 206 square kilometers of area in District Charsadda is water logged, which is about 21% of total District area.

Table 1-10: Water Logged Areas in the Districts

District	Total District Area (Sq. Km)	Water logged area in the District (Sq. Km)	Water Logged area as % of District area
Peshawar	1216.78	245.00	20.14
Nowshera	1712.00	522.63	30.53
Charsadda	996.06	206.42	20.72
Mardan	1633.70	439.83	26.92
Swabi	1478.78	540.98	36.58
Total	7037.32	1954.86	27.78

The following measures may be adopted to address water logging & salinity in District Charsadda:

i. The problem needs to be addressed at the provincial level and not the District level as the water resources jointly irrigate many Districts, from Swat Malakand to DI Khan. The amount of sediments and salts carried by the rivers from upstream can be managed by adopting holistic approach by the provincial Irrigation and Drainage Authority.
ii. There are a number of programs/initiatives adopted by the federal and provincial governments, which include on-farm water management program, RSPs program, and Drainage project.
iii. In case of District Charsadda, lining of canals, distributaries and water courses and adoption of new and improved means of irrigation that include drip irrigation and rain water harvesting may be considered.
iv. Crops in the water-logged areas of Charsadda may be replaced by hardy crops such as sugar cane and tobacco production.
v. The areas towards West of District Charsadda, near the two rivers and their two tributaries should be forested by appropriate trees in the affected zones.
vi. Around urban areas of District Charsadda, the concept of Urban Forests that include shady trees which grow on waste and waterlogged land may be grown.
vii. Introduce and adapt participatory initiative of drainage and managing water courses
viii. Managing the use of fertilizer upstream as well within the Districts so that the wastewater does not increase the salt content in the water bodies.

The proposals to reduce or manage water logging and salinity should be approached as an integrated solution to managing land, which can be adopted holistically by coordinating with other Districts at the provincial level; at the same time personal participation through the water user's association, community groups or other platforms should be encouraged.

1.11.9 Recommendations

As a result of SCARP project and the OFWM project the community was organized and irrigation for the medium and small farmers improved. However, with the retirement of the

OFWM initiative and completion of NRSP projects the activities gradually reduced to a minimum. It is recommended that the irrigation department shall initiate Community Participation and Farmers collective water usage at District Level.

The institutional arrangements regarding drainage and irrigation management need to be developed to remove the constraints at the farm, provincial and local level. Efforts shall be made to ensure that the various interventions and components of the system are integrated as much as practicable. Presently farmers pay for some of the operation and maintenance costs of the surface irrigation costs but have so far been unwilling to pay for the drainage systems as they view it a government responsibility. One of the major reasons for this behavior of farmers is that the drainage costs are considerably higher, because unlike canals, surface drains are not self-maintaining and sub-surface drainage involves huge pumping costs. It is recommended that the water courses and drains where ever possible shall be lined through public and private partnership initiative, i.e., KP government's irrigation department and farmers associations.

The consultants recommend that the problems of low agricultural production which is mainly due to water logging and salinity shall be resolved through an integrated action plan that may include:

i. Developing a comprehensive Salinity and Water Logging reduction plan which is feasible and doable at the local level.
ii. Encouraging and including community and farmers in developing the action plan.
iii. Upgrading and maintaining data base on cropping patterns, agricultural production, water inputs and agro-economic activities
iv. Enhancing technical capability at the local and District level
v. Initiating research and development for alternate crops and increasing yields and input substitution.
vi. Timely release of funds and availability of extended inputs for smooth project implementation.
vii. Budgetary provision be made for On Farm Water Management & Drainage (OFWM)
viii. Training of locals in Management skills and procedures for the implementation improved, and decentralized decision-making
ix. Local right-of-way acquisition should be carried out in time to meet design requirements;
x. Availability of finances on easy terms to farmers associations for drainage improvement projects
xi. Ability of contractors (both financial and technical) should be analyzed prior to determining contract packages;

xii. Staff deputed or involved in a new project should not be transferred until the completion of the project and should have minimum involvement with other administrative activities.

xiii. Large-scale awareness, training and participation of the stakeholders about the new concepts and activities should be an integral part of the project plan of activities.

xiv. The design of modernized projects should recognize the limitations of staff availability and capacity, and as far as possible design around them, and in consultation with both users and operators.

xv. CBIO procedures should be introduced in Pakistan to other irrigation systems such as Chashma Right Bank Canal where higher water allowance has been made in order to save water and to control groundwater recharge.

1.12 WATER RESOURCES

1.12.1 Water Resources Charsadda

Charsadda has a very unique feature of water resources comprising Canals, tube wells, dug wells, shallow pumps and three main rivers flowing through its terrain Kabul and Swat River pass through the District. River Kabul forms the boundaries between Peshawar. The second major River is Khiali, which is a branch of river Swat which enters near Munda, later bifurcates into Khialai and Jindi Rivers. The two main Canals of River Swat Namely Lower Swat Canal constructed in 1895 and Upper Swat Canal System constructed in 1914 that includes recognizable Benton tunnel to irrigate lands of Malakand Agency and four Districts of KP including Charsadda, Mardan, Swabi and Nowshera.

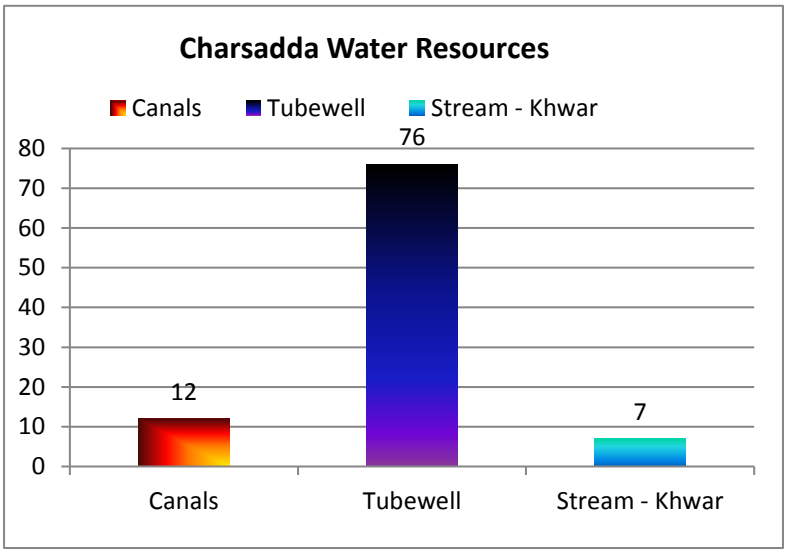
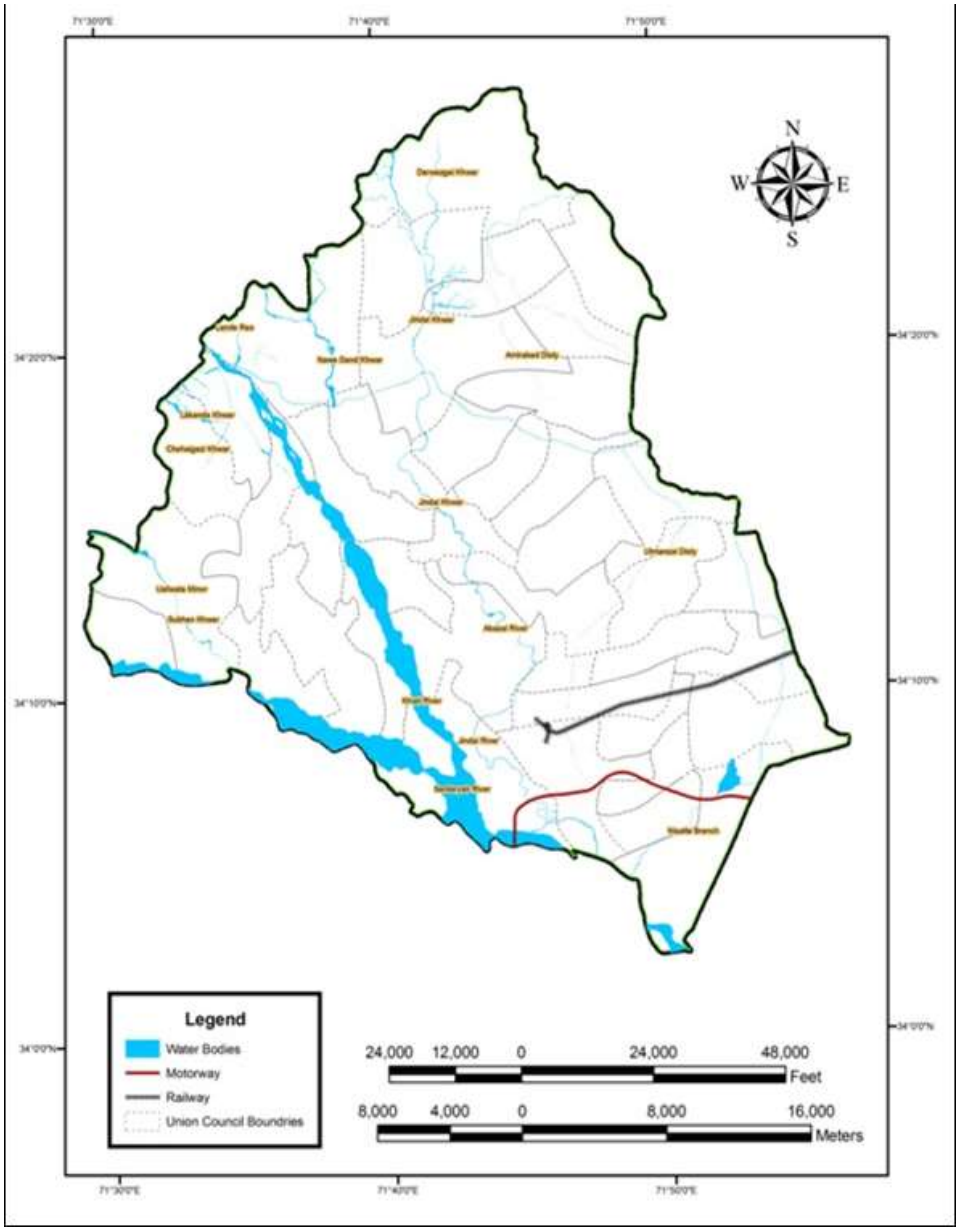


Figure 1-6: Water Logged Areas in the Districts

Table 1-11: District Charsadda- Area Irrigated by Source 2005-06 to 2007-08

Year	Total	Canals		Tube-wells	Wells	Lift Pump	Others
		Govt.	Private				
2005-06	66650	49343	14784	201	932	25	1365
2006-07	66650	49343	14784	201	932	25	1365
2007-08	66650	49343	14784	201	932	25	1365

Charsadda can truly be called the land of rivers. River Swat, River Kabul along with the upper & Lower Swat canal, Michini Dalazak Canal and Doaba feeder Canal are the main sources of irrigation. The three rivers flowing in Charsadda: The River Jindi (also known as Nullah Jindi), the Kabul River, and the Swat River; these are the main source of irrigation for Charsadda. There are a number of Nullahs and small tributaries in the District Charsadda including Jindi and Shobla nullah. The three rivers then merge and join the Indus River. The area surrounded by River Swat and River Kabul is called Doaba and has a great importance in the district.



Map 1-7: Water Resources of District Charsadda

In addition to the surface constant water resources the farmers and the city also use dug wells, shallow pumps and tube wells for irrigation and general water supply. The quality of ground water according to a WAPDA study is quite good, and the deep well (Tube wells) water is potable.

Charsadda has 66,650 hectares of cultivable land of this almost 96 % of the area is irrigated by canal water.

Sediment Load and its Effect on Agriculture

The aquifers of the Peshawar basin are generally categorized as alkaline earth fresh water with high contents of alkalis but in certain areas small input of alkaline freshwater has also been noticed. Among the physical parameters, pH of the waters of this basin varies from acidic (pH = 4.5) to alkaline (pH = 10.1) while the EC and TDS are generally within the permissible limit with elevation in certain areas of the basin. In most parts of the basin both surface and ground waters have “cations” (Ca, Mg, Na, K) and “anions” (i.e., SO4, Cl, HCO3) within the permissible limit. However, in certain areas of the basin these cations and anions have high concentrations and could be considered hazardous.

The high concentration of these cations and anions can be attributed to the percolation of these waters through the limestone, dolomite, gypsum and seams of sulfides, salts and coals within the Quaternary sediments. The heavy and trace elements (i.e., Fe, Cu, Pb, Cr, Ni, Cd, Co) in the waters of most of the areas of the basin are within the permissible limit but in certain areas of the basin the concentrations of Fe, Pb, Cr and Ni are too high and may pose a threat to the health of the people. Both anthropogenic and geogenic sources could be responsible for this contamination. The anthropogenic sources include the waste from the industrial Estates and many tannery industries in the Peshawar city and the corrosion of underground pipes while the geogenic sources include the sulfide seams and the mafic and ultramafic rocks in the northwest and northeast of the Peshawar basin.

The physio-chemical studies of the surface and ground waters of the basin further suggest that there is no significant change in the chemical concentration in these waters with the passage of time. The geogenic sources such as the weathering of limestone, dolomite, mafic and ultramafic rocks and K-bearing clays in the surrounding mountains and water logging and salinity are considered to be the main cause of enrichment of Al, Na, Ca and Mg in certain areas of the basin. The high concentration of these elements in the soils of the basin can be attributed to the weathering and erosion of the sulfides, and mafic and ultramafic rocks in the surrounding mountainous regions with greater input from the rocks of the Kohistan island arc in northern regions of the basin.

The earlier studies suggest that the aquifers in the basin are generally replenished both by rain water and water from Kabul and Swat rivers. This suggests that the contamination in these rivers may have direct effect on the underground water, especially the shallow water (dug wells). If the disposal of municipal and industrial waste is continuously falling in the Kabul

and Swat rivers, which are irrigating most of the basin, there are greater chances that in future with the establishment of industrial zones, as proposed, the aquifer system of the basin would be adversely affected.

Quality of Ground Water

The water quality in District Charsadda is very similar to Peshawar District, and varies with the seasons during summers i.e., May to July the concentration of light elements and turbidity increases due to low precipitation, similarly in winters during November – February the concentration is relatively high, however during monsoons (July 15- September) and March rains the dissolved elements get diluted.

In the District Charsadda all the industries and the urban settlements drain the wastewater in the adjoining water bodies. Thus, the COD and BOD of the canal and other water bodies has been found to be relatively high. The tests conducted by the University of Peshawar for a research program indicate that both the ground water and the surface water contained high levels of Lead, Nitrates, Sulphates, as well as E. coli and Fecal forms. Some of the waters samples from dug wells were also found to contain high values of Totally Dissolved Solids (TDS). The provincial EPA department has conducted some tests in the post 2010 floods and concluded that water is highly contaminated.

1.12.2 Groundwater

The groundwater is available mostly at the optimum depth for economic exploitation for various uses by the local inhabitants. The shape of groundwater table generally follows the surface topography. The discharge from the groundwater reservoir in the District Charsadda occurs mainly through existing water wells and outflow to rivers and evapo-transpiration water table is near to the ground surface particularly in areas adjacent to the rivers. The depth to groundwater along the Kabul and Swat rivers and in canal irrigated areas in western part is generally less than 10 m while it is more than 30 m for areas at higher elevations. The water table in the District rises during rainy season (January – March and July and August) and declines during dry season (October to December) when the groundwater abstraction is higher (WAPDA, 2008b).

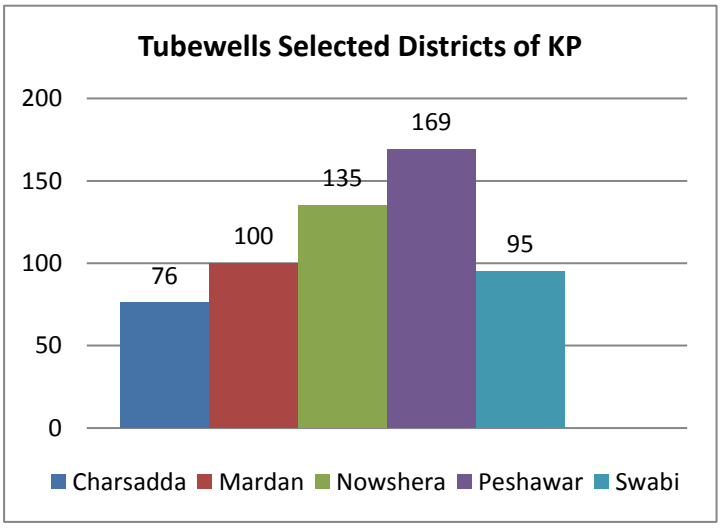


Figure 1-7: Tube well Selected Districts of KP

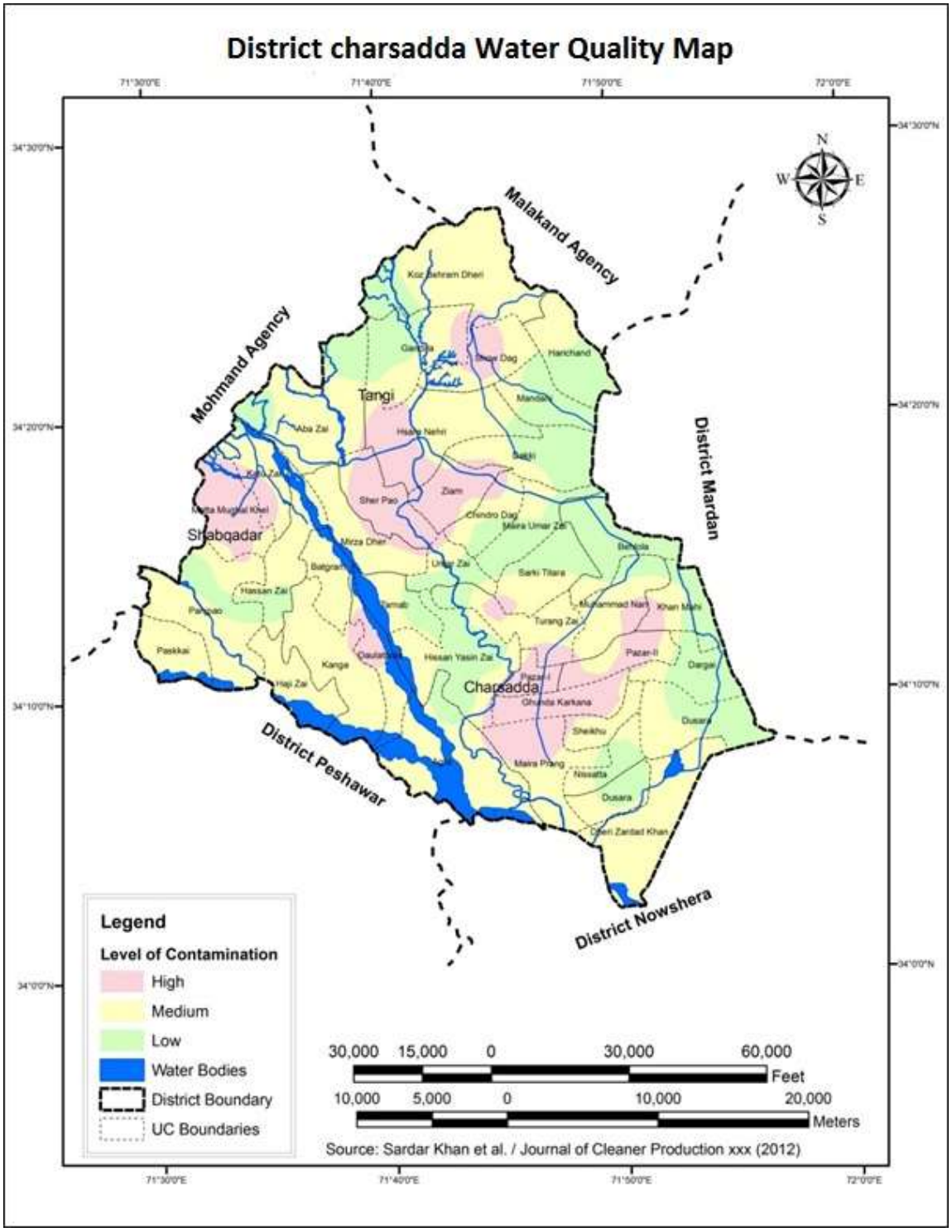
Recently study was conducted by PCRWR, to check the quality of water, it was established that the water from old tube wells with rusted and relatively outlived pipes is contaminated

by the waste in the surface water sources. According to several studies conducted by leading professionals, the water quality in Charsadda is relatively good however concentration of Nitrates & Sulphates to some extent was found in the ground water which can be attributed to the washout of fertilizer. Some lead concentration has been traced in Tangi and Charsadda town, this may be due to use of pipes in which lead has been used.

According to several studies conducted by leading professionals the water quality in Charsadda is relatively good; however, concentration of Nitrates & Sulphates to some extent was found in the ground water which can be attributed to the washout of fertilizer. Some lead concentration has been traced in Tangi and Charsadda town, this may be due to use of pipes in which lead has been used. The quality of water in Charsadda has been assessed as High (containing metals and contaminants higher than the WHO permissible values), medium is close to the normal range and low concentration is within permissible limits, is given below:

- High: values 30 % or higher contamination than the WHO standards
- Moderate: 10 % higher than the WHO standards
- Low: Within 5 % range of WHO standards.

The deep ground water from tube wells was tested and found to be of relatively good quality.



Map 1-8: Water Quality Map of District Charsadda

1.12.3 River Supplies

Charsadda has River Kabul and River Swat which merge near Charsadda town and there engulfed by the two rivers near the junction is called “Doabba” is very fertile and suitable for high valued crops.

Kabul River

Originates in Chitral and via Kabul flows down to Charsadda onwards to Attock where it joins River Indus. The flow in the river varies, and a monthly variation exists, and during July - September it’s relatively high.

Swat River

The Swat River emerges as from the joining of the Gabriāl and Ushu rivers at Kālām. The Swat River is fed by melting snow and glaciers and receiving the drainage of the entire Swāt River valley, the river flows southward, then westward, until joined by the Panjkora River. The united stream then flows southwestward into the District Charsadda and joins the Kābul River at Nisatta after a 200-mile (320-kilometre) course.

Table 1-12: Charsadda Monsoons Discharge

Year	Discharge Cusecs
2001-02	80.42
2002-03	87.55
2003-04	121.5
2004-05	77.78
2005-06	204.01
2006-07	126.44
2007-08	130.27
2008-09	195
2009-10	249.1

Existing Groundwater Pumping

A substantial amount of groundwater is being abstracted for different uses in the area through water wells. The total amount of abstraction from the area through water wells varies as during a dry spell it increases while in summers when the rivers are full the dependence on the well water reduces.

Rainfall

The average monthly monsoon discharge for Charsadda during 2001-2010 indicates that it varies from a low of 77.760,000 cusecs to high of 247,000 cusecs in 2010. The area receives maximum rainfall i.e. about 60% in the months of February, March, with highest in March varying between 3 to 4 inches, while in July and August the rainfall is recorded as 1.67 and 2.66 respectively. It is thought that winter rains contribute relatively more to groundwater recharge than monsoon rains which are in the form of thunder storms and have more runoff (WAPDA, 2008).

According to leading experts in climatology, the catastrophic flooding during the monsoons of 2010 indicates the climatic shift in the region due to global warming and the magnitude of flooding is expected to increase in the coming years.

1.12.4 Agricultural Water - Canal Supplies

There are eleven canals in the District the canal irrigated land is served through water courses. An appreciable amount of water is percolating to groundwater from irrigation application and channel loses. The main canals in the District have a number of distributaries and minors the canal irrigated land is served through water courses. An appreciable amount of water is percolating to groundwater from irrigation application and channel loses.

Swat Canal

The Swat canals irrigate about 160,000 acres (65,000 hectares) in which sugarcane and wheat are grown as main crops.

There are three major aquifer systems:

i. Phreatic (water table) aquifer system;
ii. Confined (artesian) aquifer system,
iii. Flood plains, streams aquifer.

Water table in the aquifer is found to a depth of 30-60 meters below ground surface and is mainly composed of coarse sand and gravels.) Hydraulic conductivity in the basin ranges from 30-60 m/day and average specific yield is 12%. Water table elevation varies considerably in the area. It ranges from less than 100 m in the southern portion to more than 1500 m in the mountainous north (in relation to the mean sea level).

The main sources of recharge to the aquifer are precipitation, seepage from rivers, surface storage reservoirs, and irrigation networks. The drilled wells and dug wells are commonly used for irrigation, industrial and domestic purposes. Drilled wells range in depth from 50 to 150 m whereas dug wells are up to 20 m in maximum depth.

There is appreciable amount of ground water available in form of storage in pore spaces of the sediments. Transitivity values of the aquifer vary depending upon the lithology and storing between 500 to 2000 m^2/day. This suggests that sufficiently porous and permeable strata lie beneath the ground surface. The water-depth in Charsadda area is recorded to be around 15 to 45 meters near the hills and quite shallow (less than 5 Meters) near Kabul River in the Doabba.

Industrial Water

There are sugar mills and other major industries in Charsadda located along Charsadda and other main roads. These were established almost three to four decades back; were located along the suburbs outside the main urban area, however now these are engulfed by housing.

The water supply to the industry is the responsibility of the owner of the industry himself; and the Government is not responsible to supply the water to the industrial estate. In the light of this backdrop each industry has its own water supply system, which consists of shallow pumps used for drawing ground water from the aquifer. Each industry extracts water from its own tube well. Due to this phenomenon there is no data, or information about the usage of water by each industrial unit. The only way to know approximately how much water is being used by the industrial estate/s is to monitor the wastewater.

The gravel aquifer is interspersed with clay and its total depth from water is about 40-50 meters. While the water table depth of the city close to the rivers and in Doaba between 2-3 meters.

1.12.5 Water Productivity Potential - Program and Policies

The government of KP under the existing irrigation and agricultural system is committed to increasing productivity of for poverty alleviation and greater economic benefits. To this end the government plans to initiate programs for increasing yield and value of crops and reducing farm inputs especially water. By increasing the productivity of water, the Govt. of KP will on one hand achieve higher agricultural income as a means of intensifying agricultural production, while on the other hand this program will result in reducing environmental degradation.

In District Charsadda there is ample scope for higher physical water productivity; for getting more produce per unit of water in low-yielding farm areas and in poorly performing irrigation systems. This is important for increasing crop output per drop of water. This strategy will include:

- Initiating Good Agricultural Practices
- Managing Soil Fertility And
- Reducing Land Degradation

It may not be out of place to mention here that the integrated approaches are more effective than single technologies. Water productivity gains are often difficult to realize, and there are misperceptions about the scope for increasing physical water productivity. Waste in irrigation is less than commonly perceived, especially because of reuse of water locally or downstream—farmers thirsty for water do not let it flow easily down the drain. Thus, a water productivity gain by one user may be a loss to another, upstream gain may be offset by a loss in fisheries, or the gain may put more agrochemicals into the environment.

For achieving higher productivity of water, the government needs to revise its policies by including more reliable and precise distribution and application such as:

- Drip Irrigation Water,
- Supplemental and Deficit Irrigation,
- Improved Soil Fertility, and
- Soil Conservation Practices.

Switching to higher value agricultural uses

Alternatively, the Govt. of KP can achieve higher water productivity by switching to higher value agricultural uses; or by reducing costs of production. Integrated approaches—agriculture-aquaculture systems, better integrating livestock in irrigated and rain-fed systems, using irrigation water for household and small industries—all are important for increasing the value and job per drop. For example: better veterinary services can improve water productivity because healthier animals provide more benefits per unit of water.

1.12.6 Review of Existing and Future Programs & Policies

Integrated Water Resource Development: The National Water Vision and MDGs

The government of KP has proposed that by 2025, KP should have adequate water available, through proper conservation and development. To this end it is proposed that the water supplies should be of good quality, equitably distributed and meet the needs of all users through an efficient management, institutional and legal system that would ensure the sustainable utilization of the water resources and support economic and social development with due consideration to the environment, quality of life, economic value of resources, ability to pay and participation of all stakeholders.

The water resource development will:

- Provide sufficient water for all sub sectors based on Integrated Water Resources Management (IWRM).
- Promote water conservation.
- Ensure effective planning and decision making.
- Regulate and systematic groundwater abstraction where feasible.
- Improve water quality.
- Develop information base.
- Develop public awareness and understanding of the issues.
- In order to achieve the IWRM goals the Govt. of KP has recommended improving and justifying the use of water for the agriculture sector; this includes:
- Increase irrigation efficiency from 40% to 45% to conserve water.
- Achieve equity in water distribution at all levels.
- Increase irrigated area for agriculture production and poverty alleviation, by construction of new schemes.

- Achieve sustainability including financial sustainability.
- Promote stakeholder participation, through PIDAs, AWBs and FOs.
- Reduce water logging.
- Capacity building PID for the changing technology.
- Commit to financial sustainability of the irrigation & drainage infrastructure and prepare a plan for this.

KP Govt. has proposed to initiate actions to increase irrigation efficiency to 45% to include addressing improved water management, farmer participation and cost recovery. Under the IWRM the District Charsadda will continue implementation of Institutional Reforms initiated under NDP, and prepare plan for expansion of irrigated area.

It is proposed that the existing irrigation and water supply systems in the peri-urban areas of the cities and towns in the District shall be improved and institutionalized by upgrading the system. To this end; technical study, feasibility studies shall be carried out for small schemes.

Monitoring of Water Quality

In the District Charsadda, it has been observed that for qualitative monitoring, the system of regular sampling, testing and recording does not exist. This is done randomly on need basis. It is proposed that a comprehensive water quality management program be established and implemented.

1.12.7 Main Issues

Flooding in the Doaba area and land erosion has created serious problems for irrigation infrastructure development. Floods during heavy rains not only pose a risk to human life and property but also cause severe damage to irrigation and drainage works. High operation costs, low electricity voltage and a depleted water table have rendered tube wells inoperable in many areas. Farmers lack the resources, both technical and financial, to operate and maintain irrigation superstructure such as headworks, diversion heads and cross-drainage works.

The existing water resource delivery system is inequitable and unpredictable, and many schemes demonstrate a marked absence of proper planning. In many areas, tube wells have been installed without assessing the underground water situation. Similarly, there is no inter-sectoral coordination or consensus in the construction of small dams. Although farmers constantly battle water scarcity, drought mitigation strategies have not been developed.

Decision making and resource distribution at the government level are carried out on the basis of resource availability rather than technical requirements, resulting in partial services with minimal or no benefits to users. There is limited capacity, in terms of personnel and skills, at the directorate and its field-level offices.

Departmental level Technical Coordination and Stakeholder Participation

During 2010 floods the analysis of the Disaster Management Authority and that of various technical committees indicated that the Motorway Bridge built by the National Highway Authority created a bottle neck by restricting the width of the river to 500feet. This obstacle of restricted width was one of the reasons for backlog off water creating heavy floods, which resulted in loss of life property and assets.

It is recommended that the technical coordination committee and other stakeholders like universities, and engineering institutions shall be invited to discuss and approve designs of all projects so that such damages are mitigated.

River and Water Body Pollution

In District Charsadda the Municipal Wastewater is indiscriminately discharged in the rivers and stream. The wastewater system in District Charsadda is a combined traditional system, where municipal and industrial commercial and hospital wastewater us carried by open drains, and sewers, which dispose their wastes directly into surface water and the seepage taking from the wastes as well as other anthropogenic activities impair the quality of surface and ground water and making them unfit for irrigation and drinking purposes. Especially the water quality in the shallow wells in some areas has shown contamination. So, the treatment of the wastes before disposal into surface drains should be practiced in all industrial premises of the country to safeguard better water

1.12.8 Proposals for future Policies

The government of KP shall introduce policies to increase the productivity of water and to reduce environmental degradation due to mixing of municipal and industrial wastewater in the water bodies. Accordingly following Policy Actions may be adopted by the Govt. of KP:

- Provide sufficient water for all sub sectors based on Integrated Water Resources Management (IWRM).
- Increase irrigation efficiency from 40% to 45% to increase water productivity.
- Achieve equity in water distribution at all levels.
- Increase irrigated area for agriculture production by construction of new schemes.
- Achieve sustainability including financial sustainability.
- Promote stakeholder participation.
- Reduce water logging.
- Introduce Assets Management for irrigation infrastructure.
- Promote water conservation.
- Create awareness and include user groups to initiate water conservation.
- Introduce programs and action plans to reduce floods and to use flood water for productive agriculture.
- Harness unused flood water and runoff from hill torrents.

- Conservation of rain water. Watershed Management.
- Ensure effective planning and decision making.
- Include all stakeholders for project prioritization and planning.
- Use participatory approach for water management and decision making.
- Regulate and introduce systematic groundwater abstraction where feasible.
- The present policy of abstraction of ground water indiscriminately shall be resisted to introduce pumping from designated areas of approved size.
- Based on the ground water testing, climatic and other data related with recharge of aquifer from rain fall the ground water information shall be updated periodically.
- Improve water quality.
- The issue of contamination of water bodies both by chemicals from industries and municipal waste is one of the major issues, this needs to be addressed by introducing the policy of

  a) wastewater treatment by industries;

  b) municipal water shall be treated before discharging in the water bodies;

  c) hazardous waste water from hospitals and other identified establishments shall be treated before disposal;

  d) water quality shall be tested regularly by the irrigation department, in addition to the PCRWR, municipal agencies and EPA.
- Develop information base.
- Data about water bodies, flow of water and other information shall be made available both electronically and in the form of hard copies published by the Govt. of KP.
- Develop public awareness and understanding of the issues.
- Both at the rural and urban level water consumer associations shall be formed as CBOs who shall conduct: a) Training of trainers to create awareness amongst the community; b) hold regular sessions and workshops at public and private universities and colleges.

1.12.9 Programs

There are two departments responsible for the water resources in Peshawar District. The Irrigation department of the government of KP is responsible for the upkeep, monitoring and maintenance of surface water in the entire Province, and for the ground water in the rural areas. While the municipal and the local government looks after the urban water supply which is mostly derived from the ground sources.

Since the water bodies including rivers, canals and streams flow through the entire Province and some of this flow through the whole country, thus the water from these sources is shared by all the regions and Provinces. According to the water accord of 1991, KP has been allocated 8.78 MAF of the perennial flows for surface water under para-2 of the accord which is 7.5% of the total allocation under this para. Similarly, under flood water KP has been allocated 14%

share. Presently the withdrawal situation is far below the allocation averaging at 5.97 MAF. The existing system is very old and not responsive to the changing environment and needs of growing population. The Govt. of KP has initiated long term, medium term and immediate programs for sustaining ground and surface water. It is proposed that by 2025, KP will have adequate water available, through proper conservation and development, Water supplies should be of good quality, equitably distributed and meet the needs of all users through an efficient management, institutional and legal system that would ensure the sustainable utilization of the water resources and support economic and social development with due consideration to the environment, quality of life, economic value of resources, ability to pay and participation of all stakeholders.

Existing/On-Going

The Govt. of KP introduced a Short-Term program in 2008 for three years i.e., 2009 to 2011 shown in table below the program suffered due to financial limitations and devastating floods of 2010. However, the KP Govt. is still marginally following the short-term development programs.

New/In-Process and future Programs

The medium-term development programs of the KP Govt. spread over five years 2012 – 2016. This program was delayed and could not be implemented as planned thus the program has been extended to 2025.

Due to a number of reasons the program could not take off as envisaged. Some of the constraints include:

- Limitations of time, due to the backlog of previous program;
- Slow growth in water sector development;
- Project implementation difficulties;
- Limitations of finances;
- Capacity constraints. The government of KP had to divert its funds towards flood mitigation and terrorist activities and these two sectors were accorded top priority. Additionally, it can be observed that the KP Govt. also ignored the environmental and quality factors thus:
- Low priority accorded to water quality.
- Inadequate institutional capacity to implement effective pollution control.

The programs that have been approved by the cabinet which are in process and will be implemented in future as well are presented below.

Short Term Programs Existing				
Water Resources Development	**Irrigation and Drainage**	**Environment**	**Flood Protection**	**Rain Water Harvesting & Small Dams**
• Upgrade PMC for integrated water resources planning and project monitoring. • Promote and support water sector conservation. • Commit to develop large and medium storages • Prepare water resources master plan • Undertake feasibility study on public awareness • Study and develop a water sector management information system (MIS) • Develop water quality monitoring program. • Update feasibility study on ground water potential and prepare regulatory mechanism.	• Commit to financial sustainability of the irrigation & drainage infrastructure and prepare a plan for this. • Initiate actions to increase irrigation efficiency to 45% to include addressing improved water management, farmer participation and cost recovery. • Continue implementation of Institutional Reforms initiated under NDP. • Prepare plan for expansion of irrigated area. • Prepare/upgrade feasibility studies for small schemes. • Rehabilitate/improve existing irrigation systems. • Feasibility Study for establishment of Asset Management System	• Plan a comprehensive water quality management program • Develop a major campaign to raise public awareness of the environment. • Support the studies to determine the volume of flows required downstream Ghazi Barrage. • Assess the need for incentives to industries to comply with EPA effluent disposal regulations. • Determine the needs for legislation for regulation of industrial development, enforcement of standards and water abstraction licensing.	Following the Second Flood Sector Project, implement the proposed Third Flood Sector Project. Implementation of the Ten-Year Comprehensive Flood Protection Plan for NWFP.	Conduct Feasibility Study for Small dams & rain water harvesting ponds. Implementation of 20 Nos Small Dams Program. Prepare plan to harness hill torrent flows.

Water Resources Development	Irrigation and Drainage	Environment	Flood Protection	Rain Water Harvesting & Small Dams
Promote and support water conservation Implement water resources master plan and begin implementation of storage development. Implement public awareness program. Develop MIS Implement Water Quality Improvement Program. Implement regulatory frame work on ground water potential for its systematic exploitation. Integrate water resources development.	Undertake training/capacity building to strengthen PIDAs and AWBs. Initiate pilot projects to evaluate modern irrigation technologies Implement modernization of barrages Plan increased cropping intensity as new storage comes on line. Implementation of Asset Management	Implement the national water quality monitoring program. Execute the public awareness campaign on the environment Support municipal and industrial waste water control measures. Enact new legislation where required.	Continue Implementation of Ten-Year Comprehensive Flood Protection Plan. Plan Flood Sector Four Program.	Expand the on-farm water management programs (OFWM) to Small Dams.

1.12.10 Recommendations

The locals both industrialists and the domestic and commercial users of water are completely ignorant of the quality and quantity issues. It was noticed in an informal discussion that the popular thought is that the water is a natural commodity like air and every user as a right to use it as and as much required. The wastage of water resources and unnecessary exploitation of ground water is indiscriminately popular.

The KP Govt. shall develop a major campaign to raise public awareness of the environment and include following:

- Support the studies to determine the volume of flows in the rivers and tributaries
- Introduce a system of providing water to the industries through a collective system
- Assess the need for incentives to industries to comply with EPA effluent disposal regulations.
- Determine the needs for legislation for regulation of industrial development, enforcement of standards and water abstraction licensing.

- Implement the national water quality monitoring program.
- Execute the public awareness campaign on the environment
- Support municipal and industrial waste water control measures.

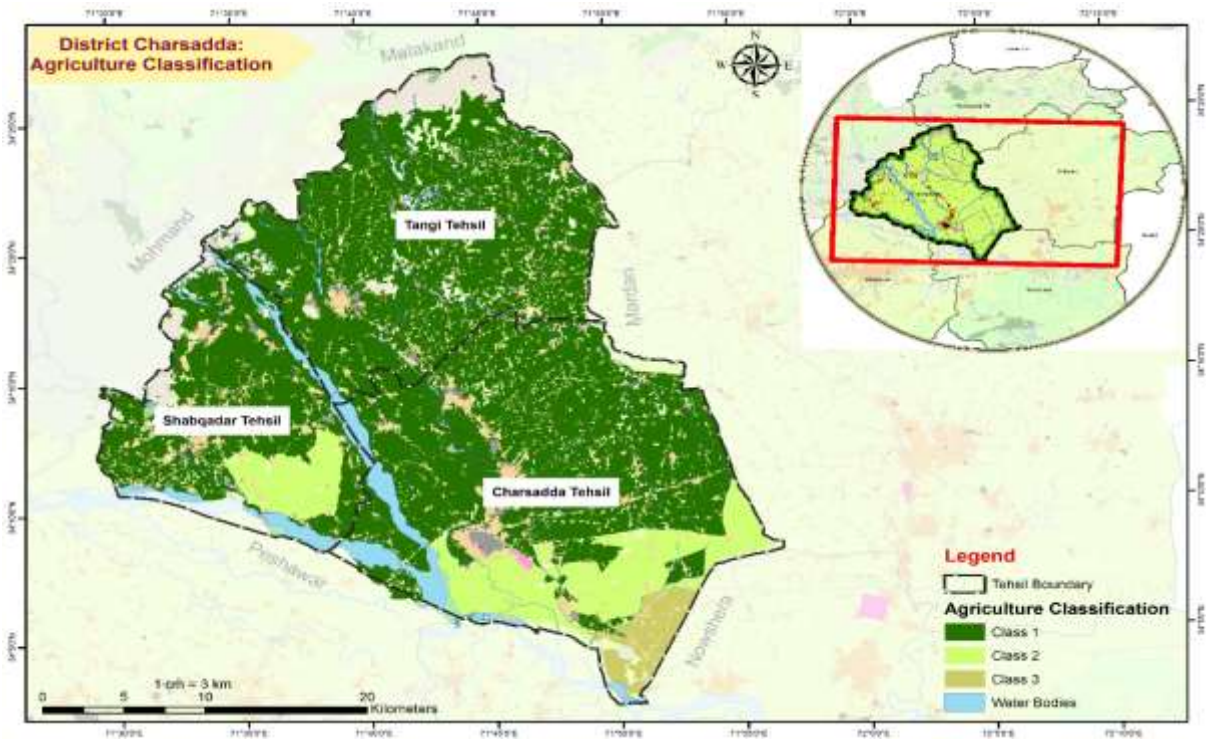
1.13 AGRICULTURE

The land of Charsadda is known to be the most fertile land of Khyber Pakhtunkhwa and the most common grown is. There are three rivers flowing in Charsadda: The River Jindi, the Kabul River, and the Swat River; these are the main source of irrigation for Charsadda. The three rivers then merge and join the Indus River. The main crops of Charsadda are; Tobacco, Sugarcane, Sugar beet, Wheat and Maize. Vegetables include Potato, Tomato, Cabbage, Brinjals, Okra and Spinach. Major fruits in Charsadda are Water Mellon, Musk Mellon, Apricots, Banana, Apple, Dates, Guava, Mango, Pear, Peaches, Plums, Persimmons and Strawberry.

Table 1-17 shows the year wise total reported area, total cultivated area and uncultivated area in hectares. Total cultivated area is that land sown at least during a year or the preceding year. Total cultivated area is the sum of net area sown and current fallow which is 74.3% of the total reported area according to the development statistics Khyber Pakhtunkhwa, 2016. Net area sown means that cultivated area which is actually sown at least once during the year (Kharif and Rabi) regardless of the number of crops raised. Current Fallow means that cultivated area which is not cropped during the year, but was cropped during the preceding year. Cropped area is that area which is sown once or two times in a single year. About 25.7% of the total reported area is uncultivated. Area not available for cultivation means barren or mountainous land, area under roads, Canals, Rivers and all such areas which are not utilized for agriculture purpose in the Table 1-17 Column 2 shows total reported area, Column 3,4,5 shows Cultivated area, Column 6,7 shows total cropped area, and Column 8,9,10,11 shows Un-Cultivated area. In District Charsadda the main threat to agriculture is waterlogging otherwise the soil is very fertile and feasible for agriculture.

Table 1-13: Land Utilization for Agriculture in District Charsadda

Year	Reported Area	Cultivated Area total area	Cropped Area Net Sown	Un-Cultivated Area Current fallow	Total	Area Sown More than Once	Total	Culturable waste	Forest	Non-Available for Cultivation
2013-2014	98641	73319	55232	18087	96618	41386	25322	6174	0	19148
2014-2015	98641	73319	56781	16538	91273	34492	25322	6174	0	19148
2015-2016	98641	73319	60331	12988	96648	38512	25322	6174	0	19148



Map 1-9: Land Utilization for Agriculture in District Charsadda

1.13.1 Distribution of Area by Crops

Crops

Table 1-18 gives a comparative statement of distribution of area by crops in District Charsadda. According to the development statistic 2017 total areas occupied by maize crop in 2015-2016 were 16,319 hectares respectively. Wheat ranks first in acreage and production among all food crops. In 2015-2016 total area occupied by wheat were 40446 hectares with a production of 107690 tons respectively. In the same years, total area occupied by sugarcane crop was 31,115 hectares. Rice is the second major staple food of the most people of Pakistan. In District Charsadda the rice was sown on an area of 121 hectares in the 2015-2016 respectively.

Table 1-14: Distribution of Area by Crops in District Charsadda (Hectare)

Type	2013-2014			2014-2015			2015-2016		
	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG
Wheat	33123	85508	2582	27488	70567	2567	40446	107690	2663
Maize	16406	37752	2301	16578	37779	2279	16319	38330	2349
Rice	114	273	2395	108	257	2380	121	276	2281

Sugarcane	32615	1451177	44494	30012	1368221	45589	31115	1442903	46373
Rape seed & Mustard	9	8	889	0	0	0	0	0	0
Tobacco	3524	10734	3046	4194	12410	2959	4194	12410	2959
Barley	19	23	1211	19	24	1263	0	0	0

Vegetables

Total area under Rabi vegetables is 786 hectares while total area under kharif vegetable is 9537 hectares with the production of 7521 and 33157 ton in the year 2014-15. Area of Rabi and Kharif vegetables increased to 1234 and 2278 hectare with 11613-ton and 33157-ton production. Table 1-19 give the total area, production and yield per hectare in KG of Rabi and Kharif vegetables in the year 2013-2014, 2014-2015 and 2015-2016.

Table 1-15: Distribution of Area by Vegetables in District Charsadda (Hectare)

Vegetables	**2013-2014**			**2014-2015**			**2015-2016**		
	Area	**Production**	**Yield per Hectare in KG**	**Area**	**Production**	**Yield per Hectare in KG**	**Area**	**Production**	**Yield per Hectare in KG**
Rabi Vegetables	1036	9133	8816	786	7521	9569	1234	11613	9411
Kharif Vegetables	6619	23096	3489	9537	33157	3477	2278	33157	14555
Total	7655	32229	12305	10323	40678	13046	3512	44770	23966

Fruits

The total area occupied by fruits in 2015-2016 is 1358 hectare with the production of 15173 tons. In total area 30% is covered with Rabi fruits and 70% with kharif vegetables. Table 1-20 show the area and production of Rabi and kharif vegetables in the year 2013-2014, 2014-2015 and 2015-2016.

Table 1-16: Distribution of Area by Fruits in District Charsadda (hectare)

Fruits	2013-2014			2014-2015			2015-2016		
	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG
Rabi Fruits	424	4871	11488	451	4860	10776	413	4740	11477
Kharif Fruits	916	10096	11022	922	10187	11049	945	10433	11040
Total	1340	14967	22510	1373	15047	21825	1358	15173	22517

1.13.2 Water Management

Table 1-21 shows percentage wise of the total cultivated area, total cropped area and total uncultivated area the total irrigated area of the District is 66539 hectares constitute 68% of the total reported area. Thus, a reasonable part of the District is irrigated only a little portion is rainfed.

Table 1-17:Type of Irrigation use for Agriculture in District Charsadda

Year	Total	Canals		Tanks	Tube wells	wells	Left pump	Other
		Govt.	Private					
2013-2014	66539	60692	3324	0	206	928	25	1364
2014-2015	66539	60692	3324	0	206	928	25	1364
2015-2016	66539	60692	3324	0	206	928	25	1364

1.13.3 Influence of Urbanization on Agriculture

Table 1-19 gives the total cultivated area in District Charsadda in the years 1997-98 and 2015-16. Cultivable area is the farm area which was sown at least once during the census year. It is the sum of area Net Sown and Current Follow. The total cultivable area during 1997-98 was 74,265 hectares, which dropped to 73,319 hectares in 2015-2016. Comparing cultivable area in 1997-98 with that in 2015-16, the reduction over the period of 19 years is 946 hectares (2,337.62 acres), or an average of about 123 acres per year.

The conversion is not significant, and can be attributed to urbanization and other non-agricultural uses such as industries and a number of other factors. Most of the conversion of
agricultural land in District Charsadda has taken place around urban areas like Charsadda city, Shabqadar and Tangi.

Table 1-18: Change in Cultivation Area: 1997-98 and 2015-16

Year	Cultivable area		
	Total	Net Sown	Current Fallow
1997-98	74265	70597	3668
2015-16	73319	60331	12988

1.13.4 Constraints

Constraints and recommendations were made according to the field survey visits from the farmers in the District. The detail of which is given as:

- The total reported area of the District is about 98641 hectares, out of which 73319 hectares (74%) area is used for agricultural purposes. Still more hectare's area is idle and un-utilized.
- Water logging and salinity are twin major problems which are adversely affecting the performance of agriculture in District Charsadda. Water logging has affected the major portion of the District which is not only waste of land but also reduction in productivity.
- Erosion is one of the big problems in the District which can eroded away the fertile soil by surface run-off and leaving nothing behind by cuttings of lands near the rivers.
- Strawberry is one of the rising cash crops of the locality but the farmers are not fully aware about that crop, so they need proper trainings for fruits preservation and marketing.
- The locality of the District Charsadda is very feasible for Orchards like peach, pear, apricot, plum etc. but still very little portion of the District contain orchards.
- Plastic tunnel is one of the best technologies for producing off season vegetables. But most of the farmers are unaware from that technology.
- The flood has remained most of the cultivated lands barren which needs leveling, but the farmers are unable to make their lands due to high cost.
- The infrastructure is inadequate because the total length of farm-to-market road is not only shorter but their condition is also poor. Many villages have no metal-led road at all.
- Like other parts of the Districts the division of landholdings by generations is common. Due to which majority of the farmers has less than 2 hectares. Moreover, holdings are scattered. Therefore, it is difficult to use modern machinery on such small pieces of land.

- Maximum ratio of the farmers still unaware to used quality seeds, fertilizers and pesticides, and are using traditionally old methods of farming.
- The District is covered by rivers which can enhance erosion especially in the form of flood which drastically damage fertile lands through surface runoff and cutting of lands.
- The supply of modern inputs like high yielding variety seeds, chemical fertilizers, pesticides, mechanized machinery etc. are not only costly but inadequate also in the locality.
- Defective land tenure system is also one of the low yield productions because most Landlords live in urban areas while tenants and peasants have no or less incentive for their hard work.
- Due to the lack of awareness the fertility of the soil is decreasing due to improper crop rotation and soil management. The constant cultivation of one crop or two; exhausts the fertility of the soil. Proper rotation of crops is necessary in order to restore the fertility.
- Joint family system is also a big problem in District Charsadda for agriculture. The farmer is poor the major portion of the income are utilized to support his big family. It creates deficiency in saving and investment. A huge part of farmer's productivity is consumed at his own house.
- The market price of agricultural goods generally remains unstable in the District like other parts of the country. The price of one commodity remains much higher in this year and much low in the next year and vice versa. So, the farmers, do not get due reward from the sale of their productions and remain unsatisfied.

1.13.5 Agricultural Reforms

Agriculture is the major component of provincial economy on which more than 75% of rural population depends for their survival. However, the plight of the people engaged in agricultural occupation has aggravated over time as poverty incidence has increased in rural areas. One of the reasons for this pathetic situation of agriculture is because successive governments have paid little attention to this vital sector of economic importance. The real investment remained squeezed during the 1990s and operational budget was as low as 10% of the establishment budget, which actually made the transfer of technology process ineffective. Similar was the position of research and development. Less attention of the policy makers and little investment in agriculture sector coupled with associated factors; the following serious problems encounter growth and development in agriculture making the sector unprofitable for farming community especially the small farmers, which needed an immediate policy response to ameliorate the situation in the interest of farming community as well as the provincial economy:

- Fragmented and un-economical land holdings
- In-efficient Utilization of Water Resources.

- Quality Seed
- High Cost and low quality of Fertilizers and Pesticides.
- Weak coordination amongst various tiers of the department
- Inadequate Technical Capacity in Agriculture Sector
- Lack of Agriculture/Livestock Marketing Infrastructure
- Absence of Gender mainstreaming
- Absence of rural agro-based processing units
- Low productivity of livestock
- Weak organizational trends amongst farming community
- Burden of multiple taxes on farming community
- Absence of an enabling environment for private sector investment.

1.13.6 Recommendations

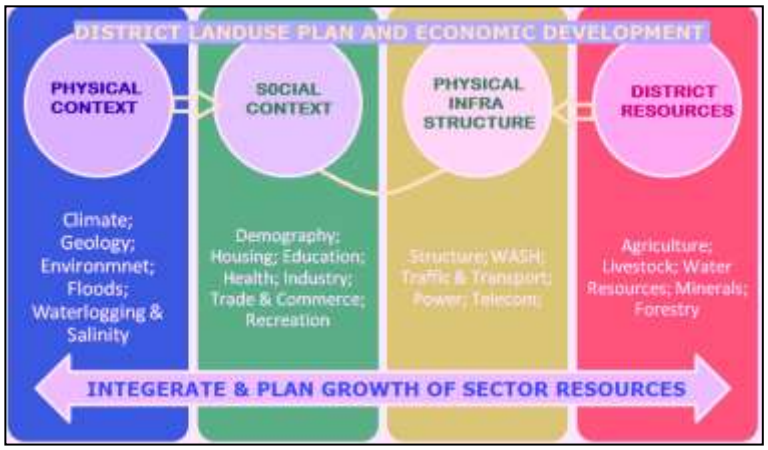
- The main problem of the District Charsadda is waterlogging, as a part of the area has been reclaimed through SCARP but still most of the area is water logged. Tube-wells should be installed in the affected areas to decrease the salinity by reducing water table.
- The extension staff should visit the farmer community regularly as there is a huge communication gap between farmers and the extension workers, the farmers even didn't know about the extension workers.
- Erosion is the one of the major issues of the District so protection bunds should be made to reduce the erosion.
- Due to extreme flood in 2010 a lot of the cultivated area has eroded away which have drastically decrease the cropped area. So, farmers are encouraged to provide seeds, fertilizers etc. on reasonable prices.
- Strawberry is one of the rising fruits of the locality so the farmers should be encouraged through trainings and field visits by the extension staff.
- The soil of the District is also very feasible for Orchards, so more and more orchards should be established.
- Plastic tunnel is one of the best technologies of producing off season vegetables. So, extension workers should do help in that technology with the farmers.
- The flood has remained most of the cultivated lands barren which needs leveling, so the Govt. should provide land leveling implements to the farmers on reasonable prices
- Plantation of Eucalyptus and poplar trees should be enhanced in those parts of the District which are left uncultivated due to waterlogging.
- The Chemical fertilizers should be provided on low prices so that the farmers can be encouraged to buy them. Also, organic sources of fertilizers should be introduced in the locality which can enhance soil fertility.

- The use of pesticides and modern implements is not possible without adequate credit facilities for the farmers. The government has extended the existing credit facilities to a large extent.
- The farmers should be provided better quality seeds at the lowest price and at the right time. Better seeds will ultimately give better yield.
- Various plant diseases are damaging the crops. Farmers have no effective control over them. Therefore, preventive and narrative measures should be taken.
- The most areas of the District are located on a distant from the main markets, so the transportation system should be improved through reasonable charges and roads.

1.14 ECONOMIC DEVELOPMENT

Land is a finite physical entity in terms of its topography and spatial nature; a broader integrative view also includes natural resources: the minerals, water, geology and the soils biota that the land comprises. The Land Use spatially occurs horizontally and can change only in terms of location, area, zoning and type of use; while the resources which have been studied under 21 different sectors and grouped into four broad categories are liable to change with technology, time, demand and exploitation of resources. The resources and investment in infrastructure can vary, resulting in a vertical growth.

The District Land Use Plan for Charsadda is based on exhaustive data collection, situation analysis, and extensive stakeholder discussions, for drawing inferences of more than twenty different sectors that have been grouped under four categories (refer figure 1-5). For



economic development the District land resources are used in ways that take advantage of all these sectors; more over by examining all uses of land in an integrated manner, it makes it possible to minimize conflicts, to make the most efficient trade-offs and to link social and economic development with spatial Land Use and land resources, thus helping to achieve the objectives of sustainable economic development. The essence of the integrated approach finds expression in the coordination of varied sectors planning and management activities concerned with the various aspects of Land Use and land resources.

More specifically the economic development of the District needs a holistic approach by different levels of governments and departments and a coordinated informed effort for adapting and adopting the agreed objectives of economic growth and development. This will include but not limited to the following:

1.14.1 Economic Development in the Physical Context

Climate in the District is discussed in details in District Studies Report; climate in general has an impact on economy of a region as it influences the decision making for location and type of industries and agriculture and other Land Uses. As explained earlier since the climate is not harsh, its impact on Land Use and economic development will be minimal.

The geological study District Charsadda indicates that 80% of the area is underlain by recent river, stream and flood plain deposits and belong to the Pleistocene age group. These are classed into three types i.e. Stream beds, Fan deposits and Alluvium. Apart from these, about 20% of the area of the District is covered by other rock types. These rocks are typically revealed in the outcrops that stretch in a belt which bounds the District along its entire Western territory.

The environmental problems both in the urban area and the peri-urban area are quite pronounced pollution of surface and subsurface water, air and noise pollution that emerge from lack of implementing EPA Act and siting of non-compatible Land Uses, non-availability of proper sanitation system, burning of waste, improper disposal of hazardous waste and haphazard traffic. It is recommended that the environmental management shall be recognized as a high priority sector and propose to establish environmental accountability. It is also recommended that the department responsible for industrial and municipal wastewater and waste disposal shall be encouraged and mandated to recognize their responsibility for environmental management. Environment is a cross cutting theme and indirectly and directly impacts economic and social sectors, investment in this sector by adopting proper Land Use and mitigating hazards will have a multiplier effect on the economy**.**

Floods have direct impact on economy of a region as it results in damage to property, life and assets. District Charsadda experiences regular flooding from River Kabul. The area also remains vulnerable to flash flooding in River Swat which tends to meander across the District emerging from mountains in Tangi area in upper part of the District. The area is vulnerable to flash floods along Jindi Nullah and Shuban Nullah. During the floods of 2010 vast areas of the District were affected by the floods. In the Land Use Plan, developments that may result in loss of life and property during floods have been considered, and area liable to flooding has not been proposed for habitation purposes. This will result in minimizing the adverse effect on economy, thus contributing to economic growth.

The Government of KP initiated partnership and participatory programs for reclaiming waterlogged area and land affected by solidity and salinity. Since the impact of water logging and salinity is a direct reduction in agricultural activity and thus income; a two prong approach

has been recommended i.e. participatory approach where through the extension program farmers shall be educated in adopting proper drainage and alternative cropping to increase their income; also the programs like OWFM and the RSP which have shown remarkable success in terms of reducing water logging and salinity and increasing agricultural incomes for farmers on partnership basis shall be encouraged, so that the farming income increases and the contributes to economic development.

1.14.2 Economic Development – The Social Context

Demographic sector i.e., the population its composition by age and gender and its spatial spread along a time series is one of the basic factors affecting both the Land Use and economic growth. The two sectors of demographic growth and economic growth are inversely interlinked; the higher the population growth the lower the economic growth. Additionally, education, training level of skills, labor force, and the proportion of dependent population are some of the factors that affect Land Use and economy. For advocacy of the Land Use Plan, proper demographic projections for District Charsadda for the next 20

Years using different forecasting model such as regression analysis, extrapolation and cohort-survival Method were carried out. Current population (2021) of District Charsadda is 1.7 million, likely to increase into 3.15 million up to 2039. The proposals for economic development in context of housing, education health and industry are presented in the following paragraphs:

One of the vital factors of the social context is housing; as it impacts both the Land Use, and employment, generating in construction industry and service industry. Holistic approach has been used for locating residential areas in the Land Use Plans. All factors that affect housing demand and supply such as income, land values, proximity to urban services, availability of transportation linkages, employment opportunities, cost of infrastructure, availability of construction materials and technology; health and education faculties have been considered. Prime agricultural land has been reserved for farming only and conversion of prime agricultural land to housing and other urban uses has been prohibited. The housing demand during

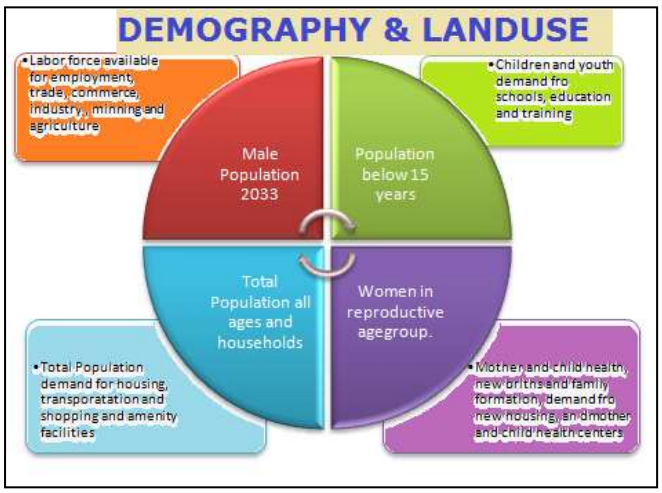


Figure 1-8: Demography and Land Use

-2029 and 2029-2039 will be 606942 and 835540 respectively, while the current housing backlog is 50537. The total housing required for the next 20 years, including the existing backlog, is estimated to be 290951 housing units. This will generate economic activity both during land development and construction as well as employment in education, health,

commerce and transportation. The Land Use Plan and Education sector is vital to the continued evolution of the community. Access to quality educational opportunities within convenient access boosts the chances for success of a Land Use Plan. The educational opportunities in Charsadda will reduce migration towards larger urban centers, and will also attract many new residents and businesses in the district. The Land Use Plan encourages education sector to establish new institutions that provide people with the skills they need for the changing job market.

The educational facilities serve both the local and District population and even wider area for higher and special education. The accompanied economic activities are direct employment for teaching and other jobs and indirect economic activities for serving large segments of population in and around the universities, technical colleges, medical colleges and training institutes. Additionally, it also generates economic activities in the field of transportation, and small business of stationers, computers and other accessories. Finally, the trained and skilled youth in the District Charsadda will ultimately serve the province and the nation, thereby generating higher household, regional and national income.

The Land Use for health is spatially spread at two tiers, the local or micro level health centers which are located close to the residential areas, and in the rural areas, and the hospitals which work at District, regional and even provincial level for in-door and out-door facilities. There is a strong linkage between health and economic sustainability; healthier population is productive and contributes substantially towards the economy of a region. This will also result in providing jobs for educated youth as well as generate small business activities for the health sector such as medical shops, labs and small private clinics etc.

District Charsadda has 37 operational industrial units. Small industries are spread throughout the district, particularly along inter-city roads. Under the District Land Use Plan, a new industrial area for Charsadda is proposed between railway line and Mardan Road towards East of Charsadda City. It lies south of the future residential area proposed in the Plan, and has access to Mardan, Peshawar and also to Motorway through Charsadda-Nowshera Road. The Industrial sector has a direct linkage with economic development, income and employment. Industries create direct jobs; and as such this Land Use is income generating both through direct job creation, movement of goods and services and related imports/exports and trading. The location and area of land under this use thus directly contributes to the economy.

Trade and Commerce focuses on its role in prioritizing the future commercial development efforts, as it is the major income and employment-generating sector, and a large proportion of population of all ages directly or indirectly depends on small scale commerce and trade. The Land Use under trade and commerce at present is widely spread intermixed with residential areas and spreads along roads and streets. A new trade zone has been proposed along Takht Bhai Road, East of Charsadda & Utmanzai. The proposed site is well connected to other areas through existing roads such as Charsadda-Takht Bhai Road, Utmanzai-Mardan

Road, and link road connecting Takht Bhai Road with Mardan Road. Thus, by virtue of its location and linkages, the proposed site for Trade/Commercial center will become the future hub of commercial activities in District Charsadda. It will generate employment and income directly and indirectly thus contributing to the economic development of the region and the province.

Recreational facilities and open spaces contribute to the health and environment of a community; which in turn indirectly impacts economic development. The decreasing recreational facilities and open spaces are a cause of concern. The pressure on land is increasing because of competing Land Uses. The main recreational places in District Charsadda include Sardaryab, Charsadda Park, and Hazrat Baba-ul-Din Nimoun Forest between the Tangi and Tarnab Road, towards North of Charsadda Urban Area.

Although not exactly in District Charsadda, Munda headwork and under-construction dam provide water to District Charsadda. Near this area, there are mango farms along which River Swat flows. It is a lush green and serene area with number of canals for irrigation purposes; and is a good picnic spot. In this area, Abazo Recreational Park is proposed in the Land Use Plan District/Regional level recreation.

1.14.3 Physical Infrastructure and Economic Development

Infrastructure is a key ingredient for productivity and growth. Conceptually, physical infrastructure may affect aggregate output in two main ways: first, directly because infrastructure services enter production as an additional input, and second, because they raise total factor productivity by reducing transaction and other costs thus allowing a more efficient use of conventional productive inputs. Four sectors i.e. Water Supply, Sewerage & Drainage; Traffic and Transport, Power and Telecommunications have been grouped under physical infrastructure.

Most of District Charsadda has piped water supply systems, which is underground and does not show as a zone in the Land Use, however the waterworks and OHRs and surface reservoirs take up some land, but that too is so negligible when considered at the District level. The major Land Use in this sector is the open drains and the treatment works for sewage and disposal stations. The condition and efficiency of the WASH system directly has a direct linkage to the economic development. Enhancing the quality and quantity of water, and collection and treatment of municipal and industrial waste water in accordance with the PEPA Act 1997 has been recommended by the consultants. The improved infrastructure of WASH will have direct impact on the economy of the region, as good quality water will contribute to health of the citizens and be available for businesses and industries. Adequate disposal of the wastewater will on one hand result in reduction in pollution and contamination of surface and subsurface water, while on the other it will impact health by reduction in water borne diseases.

Transportation network in an area influences Land Use and development trends and thus the obvious need of integrating transportation and Land Use proposals. The main transport infrastructure in District Charsadda is provided by several links to various highways including the Motorway (M-1), the Grand Trunk Road (N-5), the Karakoram Highway (N-35), Nowshera - Dir - Chitral Highway (N-45) and Nowshera - Charsadda - Shergarh Highway (S-9), and a railway station.

Effective road network and proper management of transport system play major role in the efficient functioning of a habitat. One of the main objectives of Land Use Plan at District level is to increase the capacity of existing roads, opening up new area for development, and decentralization and traffic management in the inner city.

A major problem being faced by Charsadda is that all main inter-city roads such as Peshawar Road, Nowshera Road and Mardan Road converge in the urban area of Charsadda causing immense traffic problems, as inter-city traffic mingles with the local traffic. Thus, a Ring Road is proposed round Charsadda City, in order to ease the traffic flow on arterial roads, by facilitating the inter-city traffic to bypass the city, without disturbing the down town activities and facilitate the efficient movement of intra- city traffic. The Land Use Plan also proposes widening if inter-city roads, mesh of new roads in the area proposed for future urbanization towards North-East, and gradual

The Land Use Plan also proposes that the major traffic generating activities in the inner-city areas, such as transport terminals, wholesale commercial activities, administrative areas, and higher-level educational institutions etc. may be gradually shifted to suitable locations as proposed in the Plan to streamline traffic.

The impact of the proposed roads and creation of a planned extension of Charsadda towards North-East will result in efficient movement of goods and passengers providing intercity and intra city linkages, which will directly contribute to the economy of the region and result in enhanced regional income. This strategy will also generate income by creating employment during construction and later in the transport sector as drivers, cleaners, managers, maintenance workers, gas stations repair shops and a host of other activities.

Power sector is an important part of District Land Use Plan Charsadda, to provide systematic planning and to coordinate development activities for next 20 years for rural and urban population. Electric power sector in Charsadda such as transmission and distribution are managed by PESCO (Peshawar Electric Supply Company).

Power generation capacity in District Charsadda is around 36 MW, whereas average demand is 48 MW and peak demand is 56 MW. Based on average demand, the shortfall is 12MW or 25%. There is a need to launch a large-scale expansion program to use the renewable Hydro Electric Potential for power generation.

At present due to shortage of electricity power outages are frequent and sometimes last more than 12 hours in day. This affects both the productivity at the personal and District level. The

government or the public sector needs to augment power on priority. It is suggested that small scale coal gasification plants can be installed to add to existing power generation. There is a need to encourage and popularize the solar power plants at District and local level. The available infrastructure of transmission lines and grid stations should be repaired and upgraded to reduce technical losses. The power has a direct linkage with economic development and once improved and made sustainable the economy of the area will grow.

The process for planning and developing telecom services have to be in line with Land Use Planning strategies, so that regulations related to radio frequency engineering standards can be used as illustrative planning tool that coincides with the underlying zoning. Co-relating Land Use Planning with telecom infrastructure protects aesthetics and property values by helping in controlling the number of future sites that are located in an area. There is a total of 24 telephone exchanges in District Charsadda with 17,951 connections. The installed capacity of broadband connections is 4,496 whereas working connections are 2,779. Other telecom services in Charsadda include PTCL V Phone (Wireless) and DSL. Telecom assets are a special class of IT assets that require an accurate inventory for effective financial management

1.14.4 Economic Development – District Resources

Urbanization is often considered to have negative impacts on agriculture; for instance, from the loss of agricultural land to urban expansion and an urban bias in public funding for infrastructure, services and subsidies. However due consideration has been given to this aspect in the District Land Use Plan and prime agricultural land in the District, wherever possible has been retained for agricultural Land Use, with recommendations to prohibit any urbanization related activity in that area. Considering that the District Charsadda is famous for producing both food and cash crops it is recommended that:

- Those farmers who have made their own tube wells their water channels should be lined by concrete to decrease the water loses and fuel consumption and increase their profitability.
- The area which is still cultural waste should be enabled for cultivation through land reclamation, leveling, irrigation etc.
- Modern methods of irrigation such as drip, sprinklers or tickle irrigation systems should be incorporated or additional water reservoirs should be started.
- Farm to market transportation system should be improved so that the farmers are able to bring their goods to the market easily.

These interventions will result in higher farm income and economic growth of the District and the Province.

The District has a potential of increasing the value of livestock, and a zone has been reserved for pastures and rangeland. Livestock in the District comprise cattle (40%), followed by goat (29%), buffaloes (19%) and sheep (8%); While 4% of the livestock is camels, horses, mules and

donkeys. Additionally, there are 305 poultry farms 14 fish farms in District Charsadda. The livestock sector in Khyber Pakhtunkhwa, despite having great potential for poverty alleviation, has not developed on commercial lines because of paucity of funds, capacity and technology constraints. Another important benefit of livestock is the best utilization of the passive woman labor force which makes more than 50% of national population. Besides the above some Non-Governmental Organizations are also working for improvement of the socio-economic status of the livestock farmers. The product of livestock especially goats both slaughtered and live are mostly exported to Afghanistan and Middle East, this potential shall be exploited to increase the provincial income and economic development of the region.

The rivers in the District are the Kabul, Swat and Bara River. Swat River flows from Swat and feeds upper Swat Canal and Lower Swat Canal. Kabul River joins River Indus at Attock whereas Bara River merges with River Kabul. The depth to groundwater is generally less than 10 m while it is more than 30 m for areas at higher elevations. For economic development and increase in rural income the government of KP under the existing irrigation and agricultural system is committed to increasing productivity for poverty alleviation and greater economic benefits. To this end programs are being initiated for increasing yield and value of crops and reducing farm inputs especially water. By increasing the productivity of water, the Govt. of KP will on one hand achieve higher agricultural income as a means of intensifying agricultural production, while on the other hand this program will result in reducing environmental degradation. The existing water resource delivery system is inequitable and unpredictable, and many schemes demonstrate a marked absence of proper planning. In many areas, tube wells have been installed without assessing the underground water situation. Similarly, there is no inter-sectoral coordination or consensus in the construction of small dams.

Four types of industrial minerals are extracted in District Charsadda and include Chromite, Dolomite, Lime Stone and Red Oxide. Minor minerals in the District are sand, gravel and bajri which are extracted from small streams and river banks. The economic contribution of the mining sector in District Charsadda can be significant and needs to be institutionalized and enhanced in terms of trained manpower and extraction.

Though the Province is very rich in the forest resources, but in District Charsadda there are hardly any, except for some scatters towards East of the District. A tangible step to slow the speed of environmental degradation and minimize the negative effects of climatic changes is massive plantation. Plants play a vital role in protection of environment and have multiple advantages beside beautification. Spring and monsoon are two suitable seasons for the plantation of saplings. Monsoon is favorable season for plantation. It is suggested that highway forestry should be encouraged by planting trees along the highways and roads, this will have a two-prong effect, and reducing pollution and increasing forest cover in the District. These economic benefits of such an approach will be direct as well as indirect by reducing diseases related to air and noise pollution, and minimizing adverse effects of floods.

2 Existing Land Use Distribution

2.1 GENERAL

General misuse and mismanagement of our agricultural land resources, i.e. soil and water, is the single most important factor responsible for continued land degradation and stagnation of yields. Present use of the land resources is not adapted to the potential of the land and its conservation requirements. It is rather determined by the owner's needs and local trends.

There is thus a dire need that an unbiased and sound plan be prepared at District level that can guide the implementing agency in rationalization of all Land Uses and objective planning and formulation of based on the potential and requirements of the land resource. Preparation of District Land Use Plan will satisfy this need and promote a potential-based use of the land for maximum land resource conservation.

It will provide a scientific base for resource-based Land Use Planning to rationalize agriculture Land Use and maximize agriculture production through adoption of appropriate management technology and systematic development/improvement of the agriculture land resources. This will also ensure conservation of the resources for use for the coming generation. The optimum utilization of land is, in fact, the main objective of the Land Use Plan.

More specifically, objectives of the Project are:

1 Preparation District Land Use Plan for scientific utilization of land resources based on District land resource inventory and quantitative land evaluation through field research.
2 Proposing necessary changes in the current Land Use system to promote conservation of the land resources.
3 Identifying tracts of degraded farmland and suggesting economically viable and practical measures for their rehabilitation.

2.1.1 Justification for Land Use Distribution

The purpose of Land Use distribution is to compare the existing distribution with the desired distribution in an area, to identify the shortcoming/dearth of a particular Land Use/s or its excess, and accordingly take corrective measures where ever needed or possible. However, it needs to be considered that unlike housing scheme or industrial estate, at District or City level, there is no 'standardized' distribution of Land Uses. The proportions of Land Uses at city level are the resultants of past and present socio-economic forces. But in many cases, in urban areas of similar population sizes, market/institutional forces throw up common and widely recognized patterns of land distribution. Despite this, it is important to be aware of the pervasive power of market processes, so that limitations to the scope of planned interventions are understood.

The proportions of land under various uses vary according to the scale under consideration. Obviously, a small residential scheme will be predominantly occupied by dwelling units, an industrial estate by various types of factories, while at urban level; both will be reflected in a certain mix. Recommended Land Use distribution for the above categories is given below:

Table 2-1: Land Use Distribution in Housing Scheme

Sr. No.	Land Uses	Percentage
1	Residential	24-32
2	Industrial	2-15
3	Commercial	1-2
4	Institutional	3-8
5	Arterial Circulation/Terminals	13-20
6	Recreational Open Spaces	2-5
7	Graveyards	0.5-3.5
8	Vacant	9-45

Table 2-2: Land Use Distribution in Industrial Estates

Sr. No.	Land Uses	Percentage
1	Factory Plots	60-65
2	Roads	Up to 20
3	Open Spaces	Up to 20
4	Administrative and Other Buildings	5-10

Table 2-3: Land Use Distribution at Town/City Level (500,000+ Population)

Sr. No.	Land Uses	Percentage
1	Residential	45-52
2	Commercial	2-3
3	Education, Health & Other Community Facilities	7.5-10
4	Roads/Streets	25-30
5	Open Spaces	5-7.5
6	Others	2-5

2.2 EXISTING LAND USE DISTRIBUTION – DISTRICT CHARSADDA

Total area of District Charsadda is 996.06 square km, comprising of the following three Tehsils:

1 Charsadda Tehsil
2 Shabqadar Tehsil
3 Tangi Tehsil

Of the above, Charsadda Tehsil is 426.69 square kilometers, or about 45% of the total District area, Shabqadar Tehsil is 213.81 square km or 22% of the total District area, while Tangi Tehsil is around 331.16 sq. km or 33% of the total area. Land Use Distribution in the District is described below.

2.2.1 Land Use Distribution in Overall District

The maximum area in District Charsadda is under Agriculture category (80%), followed by the small towns/villages (6%), water bodies (5%), range land (3.4%), vacant land (1.7%), roads/railway/terminals (1.06%), graveyards (1.03%), urban residentiary (1%) and others.

The area and their percentages are given in Table 2-4 The distribution is graphically illustrated in Figure 2-1

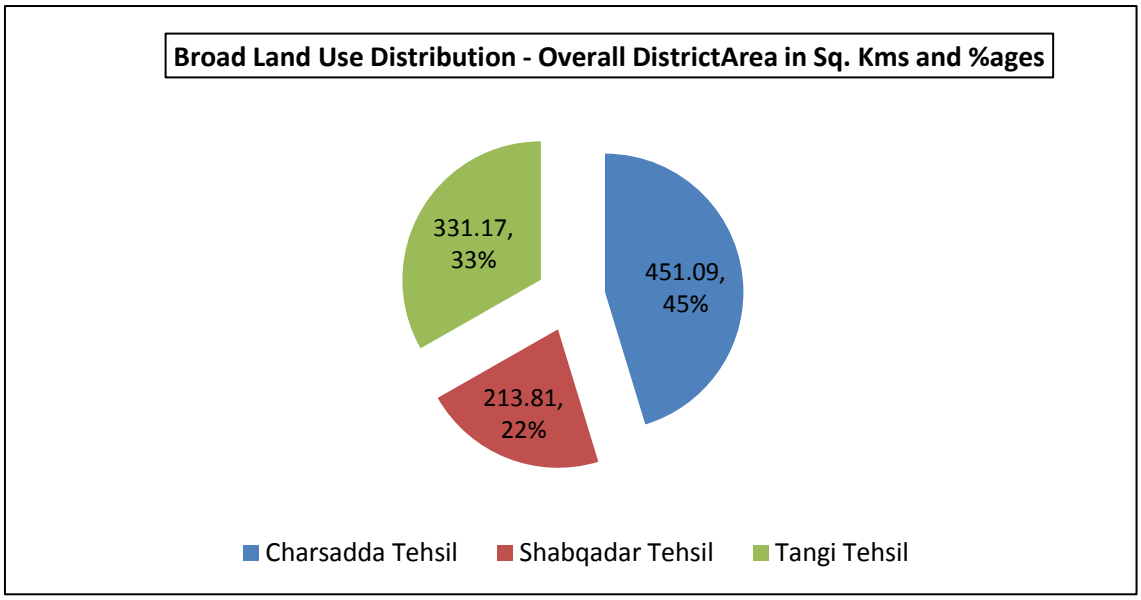


Figure 2-1: Broad Land Use Distribution of Overall District

Table 2-4: Existing Land Use Areas- Overall District

Sr. No.	Land Use	Area (Sq. Km)	%age
1	Agriculture	751.23	75.4
2	Forest	4.51	0.5
3	Graveyards	10.89	1.1
4	Industries	1.09	0.1
5	Orchards	32.38	3.3
6	Railways	0.29	0
7	Rang Land	4.19	0.4
8	Residential	103.53	10.4
9	Roads	11.13	1.1
10	Vacant	1.06	0.1
11	Water Bodies	45.22	4.5
12	Barren/Hills	30.47	3.1
Total		996	100

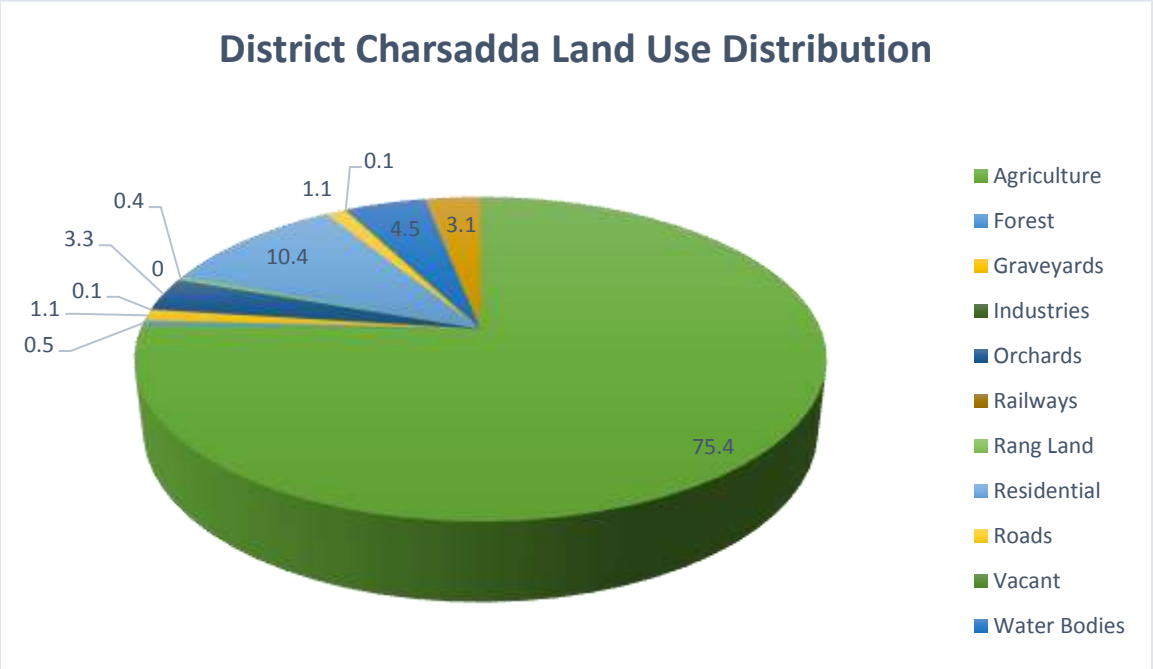
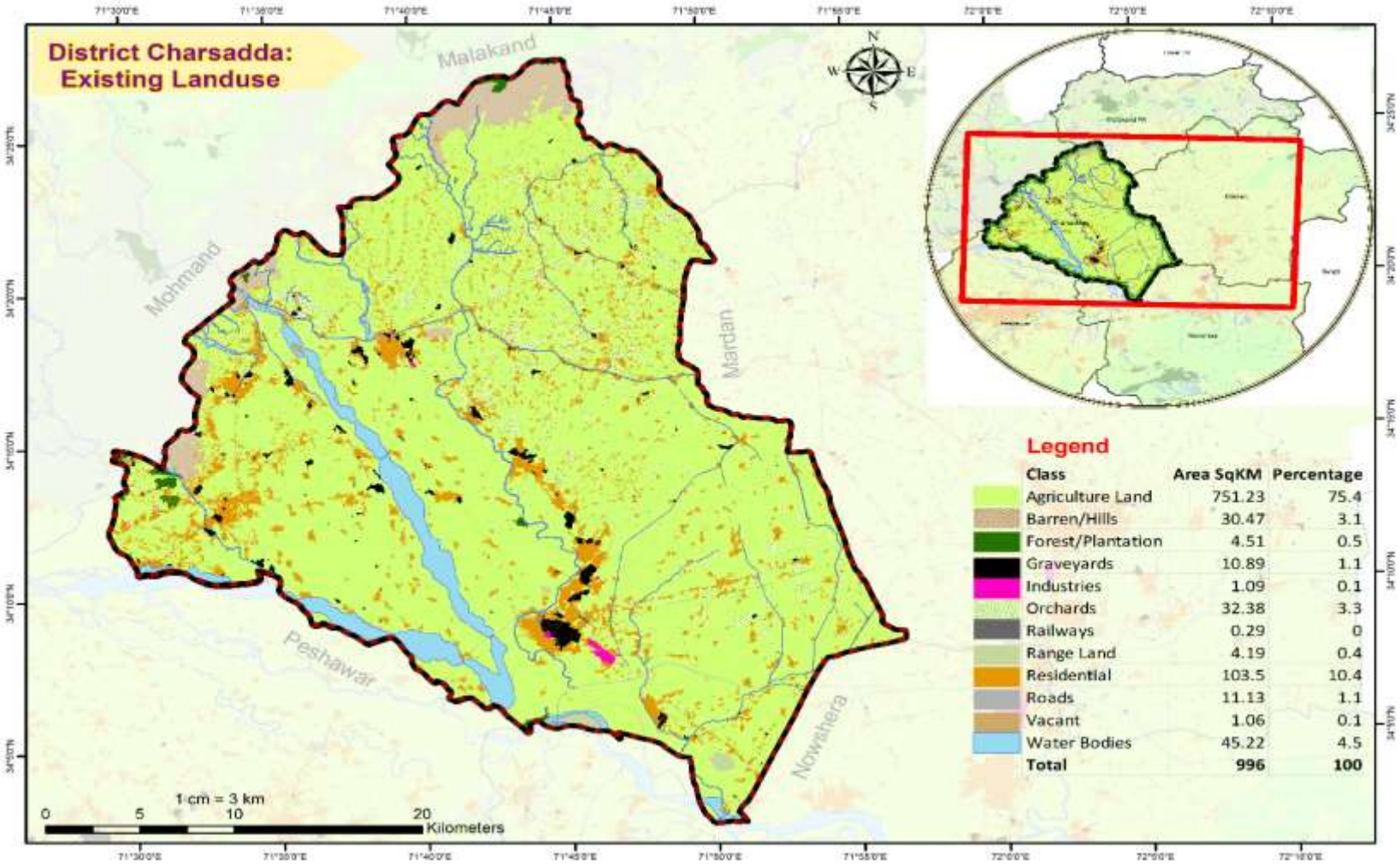


Figure 2-2: Land Use Distribution of Overall District



Map 2-1: District Charsadda Existing Land Use

2.2.2 Land Use Distribution in Charsadda Urban Area

Current urban area of Charsadda is obviously different from that reported in 1998, as substantial sprawl has taken place over the last 15 years. The following methodology has used to assess the current urban area of Charsadda.

1 The current urban area was determined by closely studying the base map/satellite image, and determining the current urban sprawl. The boundary of urban area was thus marked, and its area calculated.
2 The urban area was marked considering the Physical feature i.e. water bodies, in which the substantially urbanized/urbanizing area fell (even though such area is not entirely urbanized).

Total urban area thus delineated works out in Charsadda to be 30.12 square km, of which Urban Residentiary area is 11.4 square kilometers or about 37.9 % of the total urban area. As already stated, Urban Residentiary area is pre-dominantly residential area and also includes the local level facilities i.e. education, health, religious, local roads, shops etc.

Following is a comparison of Land Use distribution in urban area of Charsadda with Land Use distribution in other urban areas of similar class category, i.e. urban areas of 100,000 - 499,000 populations.

- Urban residential area is within the range but closer to lower end of the range.
- Charsadda is short of industrial area as compared to other urban areas.
- Commercial area is within the range but closer to lower end of the range.
- Charsadda is short of institutional area as compared to other urban areas.
- The percentage of area under arterial circulation/terminals is slightly lesser than even the lower end of range in other urban areas.
- Charsadda is woefully short of recreational areas, i.e. 0.77% as compared to 2-5% in other urban areas.

  Statistics about Land Uses in urban area are given in Table 2-5 and demonstrated graphically in Figure 2-3

Table 2-5: Land Use Distribution- Charsadda Urban Area

Sr. No.	Land Use	Area (Sq. Km)	%age
1	Residential	11.4	37.9
2	Roads	0.69	2.3
3	Agriculture Land	13.2	43.83
4	Graveyards	3.2	10.63
5	Industries	1.12	3.72
6	Railways	0.11	0.37
7	Orchards	0.1	0.34
8	Water Bodies	0.13	0.44
9	Vacant	0.17	0.56
Total		**30.12**	**100**

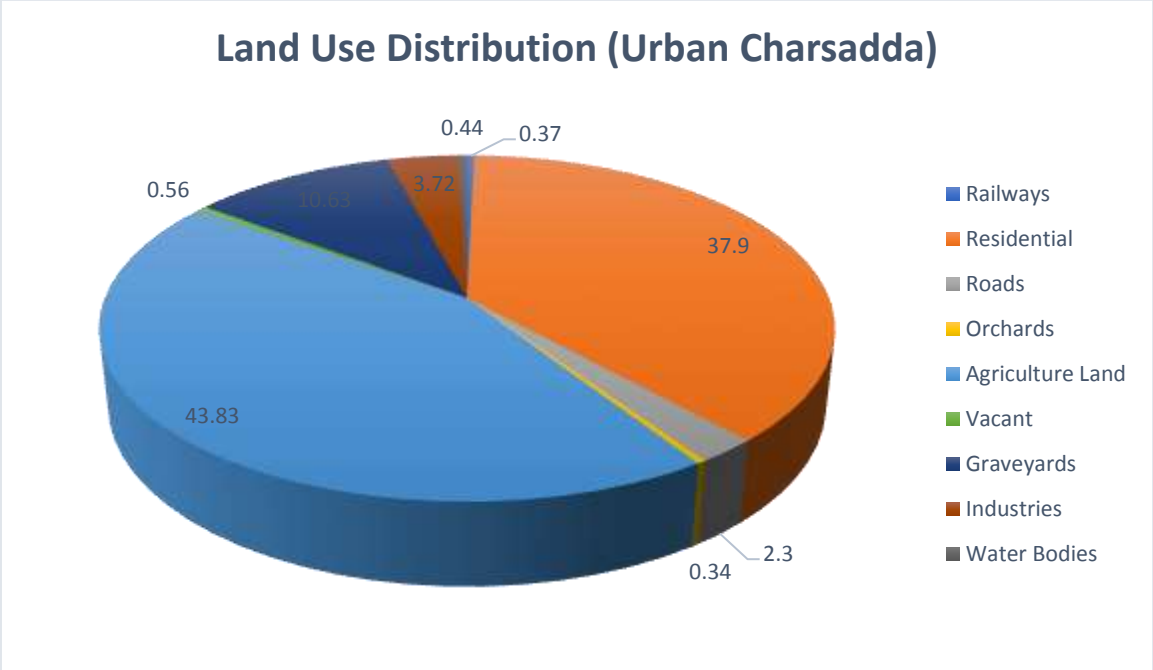


Figure 2-3: Land Use Distribution Urban Charsadda

2.2.3 Land Use Distribution in Charsadda Tehsil[8]

Charsadda Tehsil comprises the area of 451.09 square kilometer. The maximum area in this Tehsil consist of agriculture land which is 366.48 square kilometer or 81.1% followed by the

[8] Includes Charsadda urban area

water bodies (5.3%), Urban Residentiary (7.9%), graveyards (1.3%), roads (1.3%), railway (0.1%).

Table 2-6: Existing Land Use Areas- Charsadda Tehsil

Sr. No.	Land Use	Area (Sq. Km)	%age
1	Agriculture	366.48	81.1
2	Forest	0.68	0.2
3	Graveyards	5.67	1.3
4	Industries	1.09	0.2
5	Orchards	8.1	1.8
6	Railways	0.29	0.1
7	Rang Land	3.58	0.8
8	Residential	35.7	7.9
9	Roads	5.73	1.3
10	Vacant	0.03	0
11	Water Bodies	23.74	5.3
Total		451.09	100

Statistics about Land Uses in Charsadda Tehsil are given in Table 2-6 and illustrated graphically in Figure 2-4.

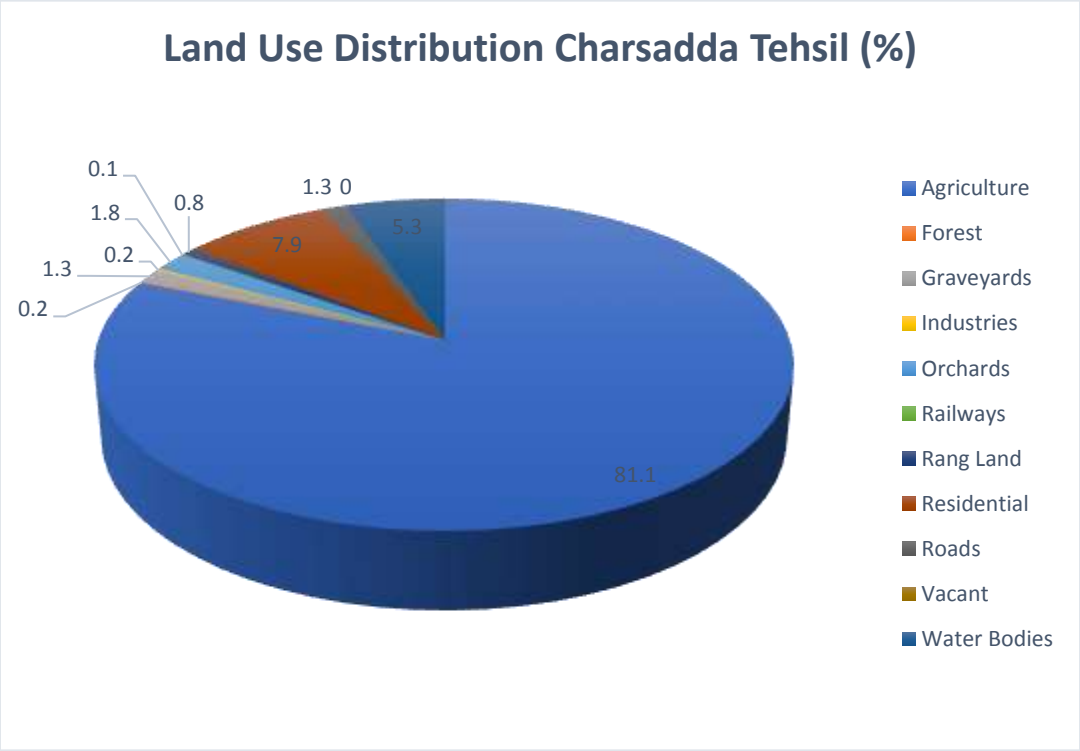
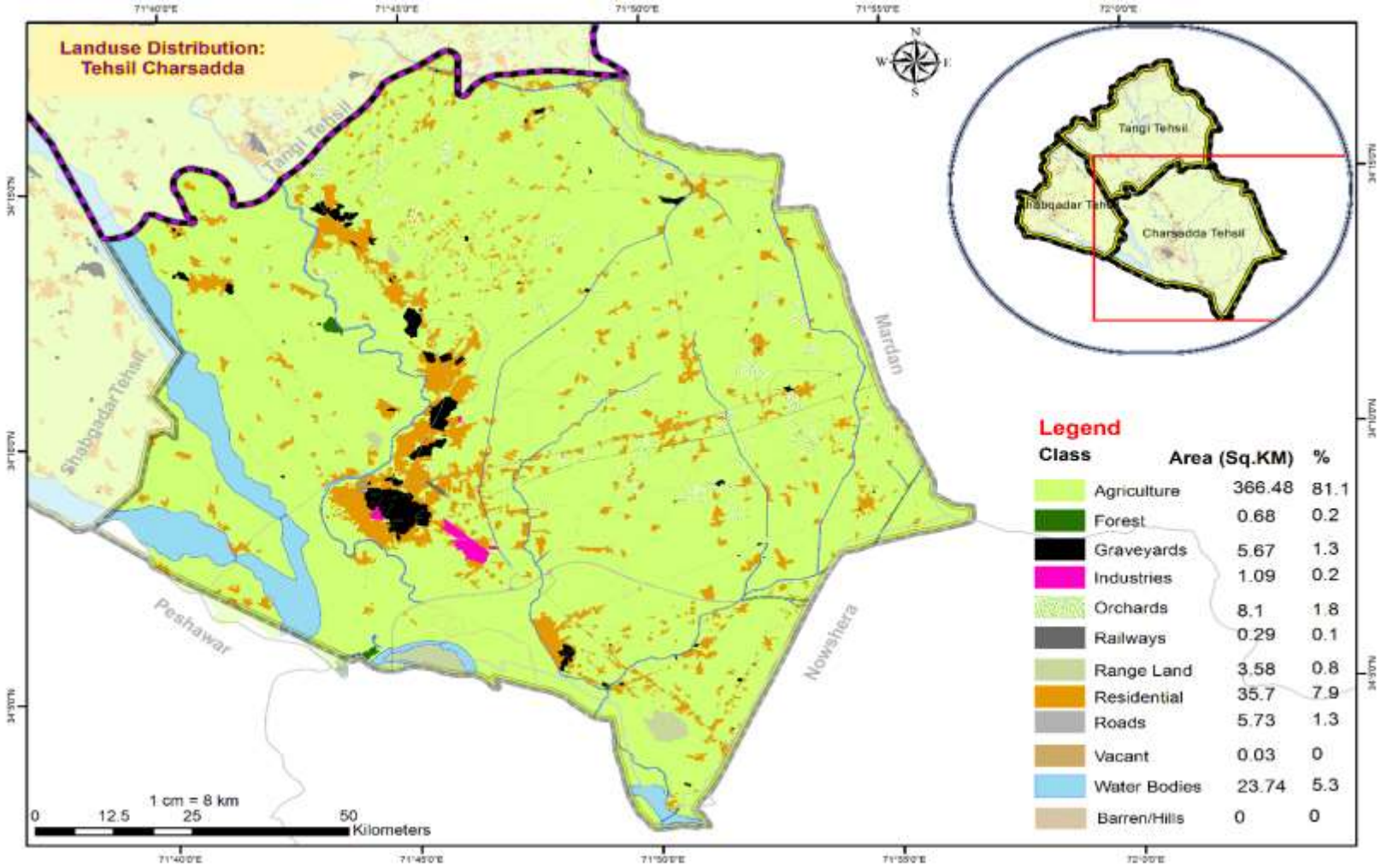


Figure 2-4: Land Use Distribution of Charsadda Tehsil



Map 2-2: Land Use Distribution Tehsil Charsadda

2.2.4 Land Use Distribution in Shabqadar Tehsil

The Shabqadar Tehsil comprises the area of 213.81 square kilometer. The maximum area in this Tehsil consist of agriculture land which is 143.71 square kilometer or 67.2% followed by the water bodies (7%), graveyards (1.3%), vacant land (0.3%) transportation i.e. roads (0.8%),

Table 2-7: Existing Land Use Areas- Shabqadar Tehsil

Sr. No.	Land Use	Area (Sq. Km)	%age
1	Agriculture	143.71	67.2
2	Vacant	0.54	0.3
3	Orchards	1.78	0.8
4	Forest	2.15	1
5	Graveyards	2.76	1.3
6	Barren/Hills	7.76	3.6
7	Roads	1.65	0.8
8	Rang Land	0.29	0.1
9	Water Bodies	14.9	7
10	Residential	38.27	17.9
11	Railway	0	0
Total		213.81	100

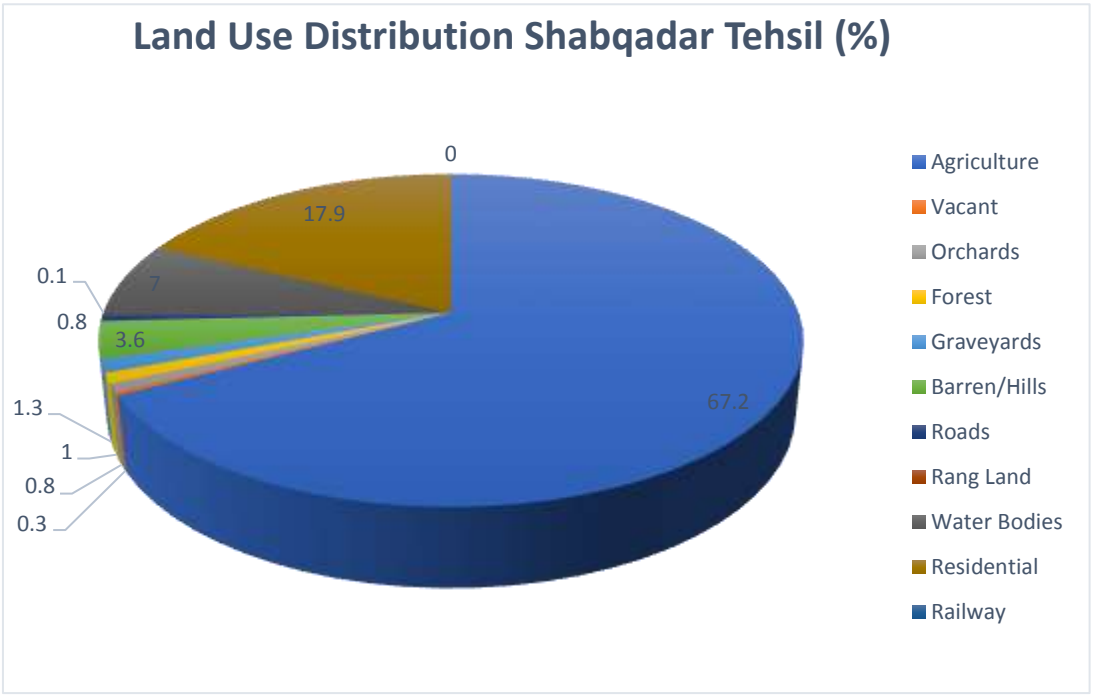
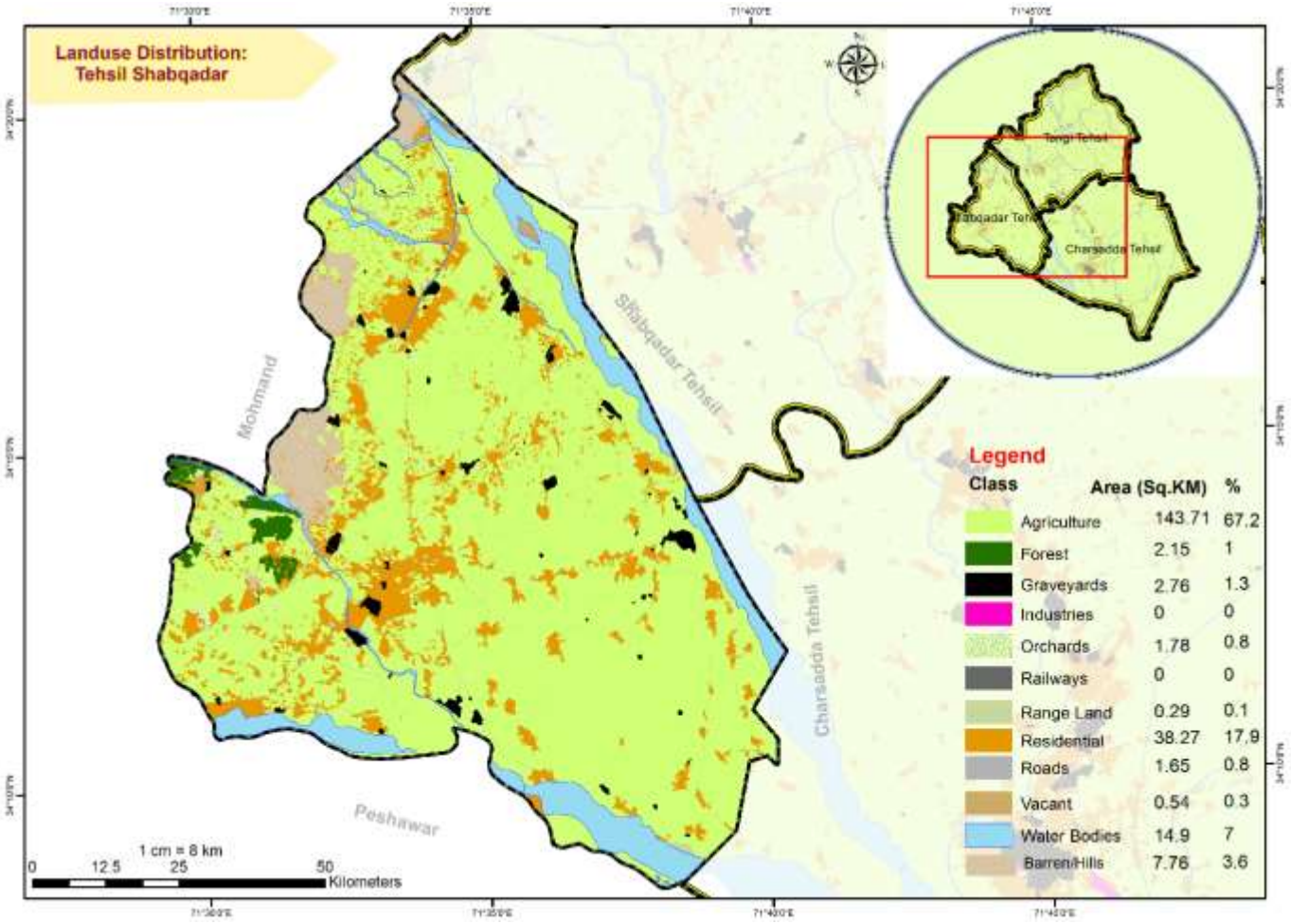


Figure 2- 1: Land Use Distribution of Shabqadar Tehsil

The area and their percentages are given in Table 2-7. The distribution is graphically illustrated in Figure 2-5



Map 2-3: Land Use Distribution Tehsil Shabqadar

2.2.5 Land Use Distribution in Tangi Tehsil

The Tangi Tehsil comprises the area of 331.17 square kilometer. The most area in this tehsil consists of agriculture land which is 241.04 square kilometer or 72.8% followed by the range land (0.1%), vacant land (0.1%), water bodies (2%), roads (1.1%).

Statistics about Land Uses in Tehsil Tangi are given in Table 2-8 and illustrated graphically in Figure 2-6

Table 2-8: Existing Land Use Areas- Tangi Tehsil

Sr. No.	Land Use	Area (Sq. Km)	%age
1	Agriculture	241.04	72.8
2	Vacant	0.49	0.1
3	Orchards	22.5	6.8
4	Forest	1.68	0.5
5	Graveyards	2.46	0.7
6	Barren/Hills	22.71	6.9
7	Roads	3.75	1.1
8	Range Land	0.32	0.1
9	Water Bodies	6.58	2
10	Residential	29.56	8.9
11	Industries	0.08	0
Total		331.17	100

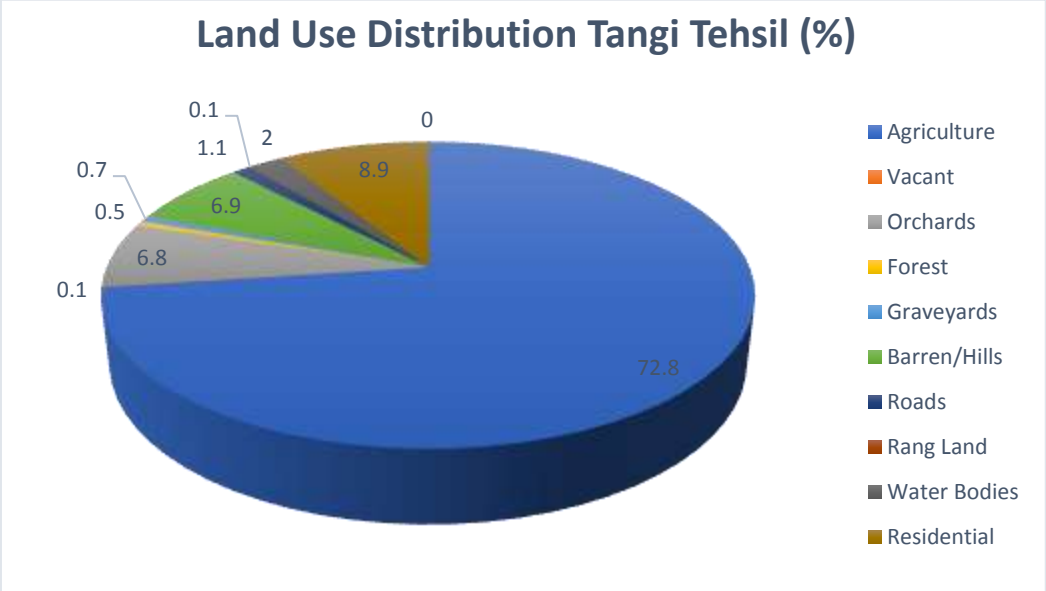
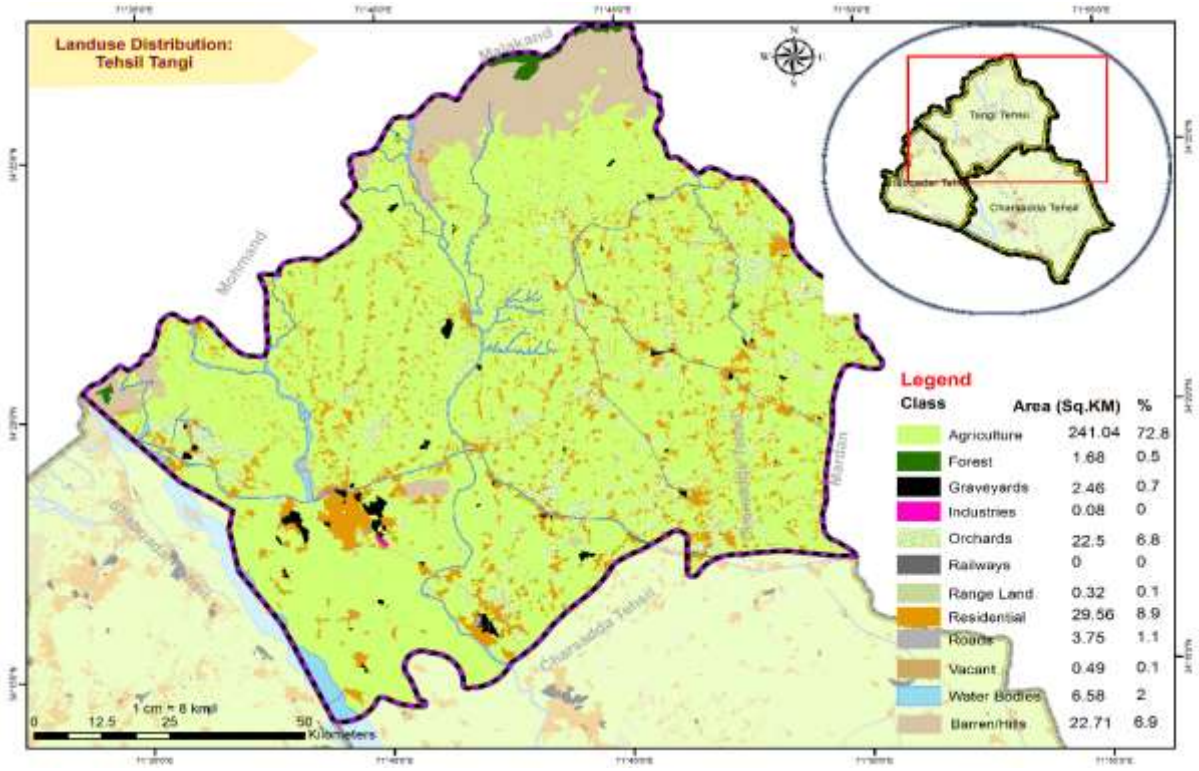


Figure 2-5: Land Use Distribution Tangi Tehsil



Map 2-4: Land Use Distribution Tangi Tehsil

3 Population-Current and Forecasts

3.1 PAST GROWTH TRENDS: PROVINCE VS DISTRICT CHARSADDA

Inter-census growth rates of the Province and District Charsadda (from 1951 to 2017) are given in Table 3-1. It is clear from the Table that from 1951-61 the growth rate was 2.3%. It was 3.6% during the period 1961-72, It reduced to 3.3% during 1972-81, and further declined to 2.8% during 1981-1998 while a slight increase of 0.1 occur between 1998-2017.

In (Table 3-1) it is shown that in case of District Charsadda, the growth rate has been highest during 1961-72 i.e. 3.17%, but declined to 2.32% during 1972-81, and raised slightly to 2.88% during 1981-1998 while in 1998-2017 the growth rate is 2.44%. The District growth rates in general have been lower than the provincial growth rates in the corresponding time periods and the comparison of growth rates in Urban, Rural and the District is also shown in Table 3-2 below.

Table 3-1: Past Growth Trends

InterCensus Period	Average Annual Growth Rate (%)	
	Provincial[9]	District[10]
1951-1961	2.3%	2.57%
1961-1972	3.6%	3.17%
1972-1981	3.3%	2.32%
1981-1998	2.8%	2.88%
1998-2017	2.9%	2.44%

[9] Source: Pakistan Bureau of Statistics, Govt. of Pakistan, Hand Book of Population and Housing Census, 1998 Census, Pakistan, Page 1, Table 1.

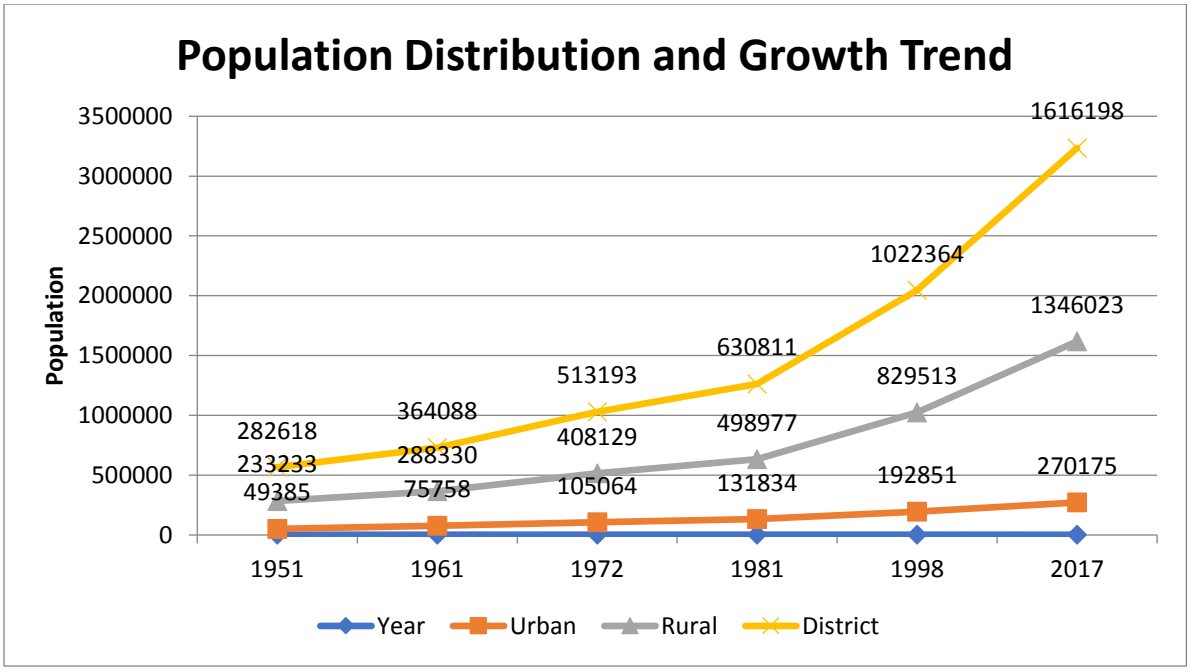


Figure 3-1: Population Distribution and Growth Trends

Table 3-2: District Charsadda Urban/Rural Populations with Growth Rates

Year	Urban		Rural		District	
	Population	Urban %	Population	Rural %	Growth Rate	Population
1951	49385	17.47	233233	82.53	---------	282618
1961	75758	20.81	288330	79.19	2.57%	364088
1972	105064	20.47	408129	79.53	3.17%	513193
1981	131834	20.90	498977	79.10	2.32%	630811
1998	192851	18.86	829513	81.14	2.88%	1022364
2017	270175	16.72	1346023	83.28	2.44%	1616198

3.2 MIGRATION

There are two main causes of population growth:

- Natural Increase
- Migration
    - Conventional Migration
    - Transient Migration

3.2.1 Conventional Migration

Estimates of the magnitude of migration during 1998-2017 of District Charsadda have been made by the following method.

National rate of growth during 1998-2017 was used to estimate expected population in the District Charsadda in 2017, assuming uniform natural increase. When these figures are compared with actual population as recorded in 2017 census, the difference is the contribution of net migration. Migration is never unidirectional, but there is no way to assess inward and outward movements separately. But the net migration figure is a fairly robust assumption.

The overall national growth rate during the period 1998-2017 was 2.40%. Using this growth rate, the population of District Charsadda in 2017 is calculated to be 1604371.

Table 3-3: District--Migration Vs Natural Increase		
2017 Census	1616198	(I)
2017 (using National G.R@2.4% during 1998-2017)	1604371	(ii)
1998Census	1022364	(iii)
Additional Population (2017-1998)	593834	(I)-(iii)=(iv)
Net Migration	11827	(I)-(ii)=(v)
Natural Increase	582007	(iv)-(v)

The actual 2017 census population of the District Charsadda was 1616198, implying a net in-migration of 11827. The additional population during 2017-1998 was 593834, of which, as already stated, migration component was 11827 (about 2%) and 582007 (98%) was caused by na

tural increase. The basis and calculations for this are given in Table 3-3.

3.2.2 Transient Migration

Transient migration in context of District Charsadda refers to analysis of mobility due to a number of factors which are shaped due to natural disasters and disturbances resulting from armed conflicts. These are described in the sections below:

Afghan Refugees

UNCHR conducted census of Afghan refugees in May 2011, and reported that there are 39,325 families (204,589 persons) living in Peshawar-II, including District Nowshera and Charsadda. There are no separate figures available for District Charsadda.

IDPs due to Border Disturbances

There are no camp-based IDPs in District Charsadda. However, IDPs living outside camps are about 100 families, constituting 750 persons[12].

Flood Affectees/Earthquake Impact

At present there are no displaced persons living in Charsadda due to flood effect of 2010 or earthquake of 2005.

Table 3-4: Transient Population

Transient Population	Number of Persons	Number of Families
Afghan Refugees	204,589[11]	27,279
Internally Displaced Persons	750	100
Affectees of Flood/Earthquake	--	--
Total	205,339	27,379

3.3 POPULATION FORECASTS

An estimate number of future populations has been derived for the next 20 years using different forecasting models. These include:

- Regression Analysis
- Extrapolation
- Cohort-Survival Method

The estimates under the three forecasting models have been averaged to avoid uncertainty with growth rate and achieve more accuracy. The estimates under the three forecasting models and the recommended population for different years are presented in Table 3-5. These forecasts are radically illustrated below in figure no 3-2.

[11] Includes those living in Peshawar-II, including District Nowshera and Charsadda. There are no separate figures available for District Charsadda.

[12] Source: Chief Coordinating Officer, Provincial Disaster Management Authority, Peshawar.

Table 3-5: Population Forecasts for the plan period (2021-2040)

Projected Population			
Period	**Urban**	**Rural**	**District**
2017	270175	1346023	1616198
2021	290045	1488659	1778704
2025	311377	1646409	1957786
2030	340261	1867309	2207570
2035	371824	2117846	2489670
2040	406315	2401999	2808314

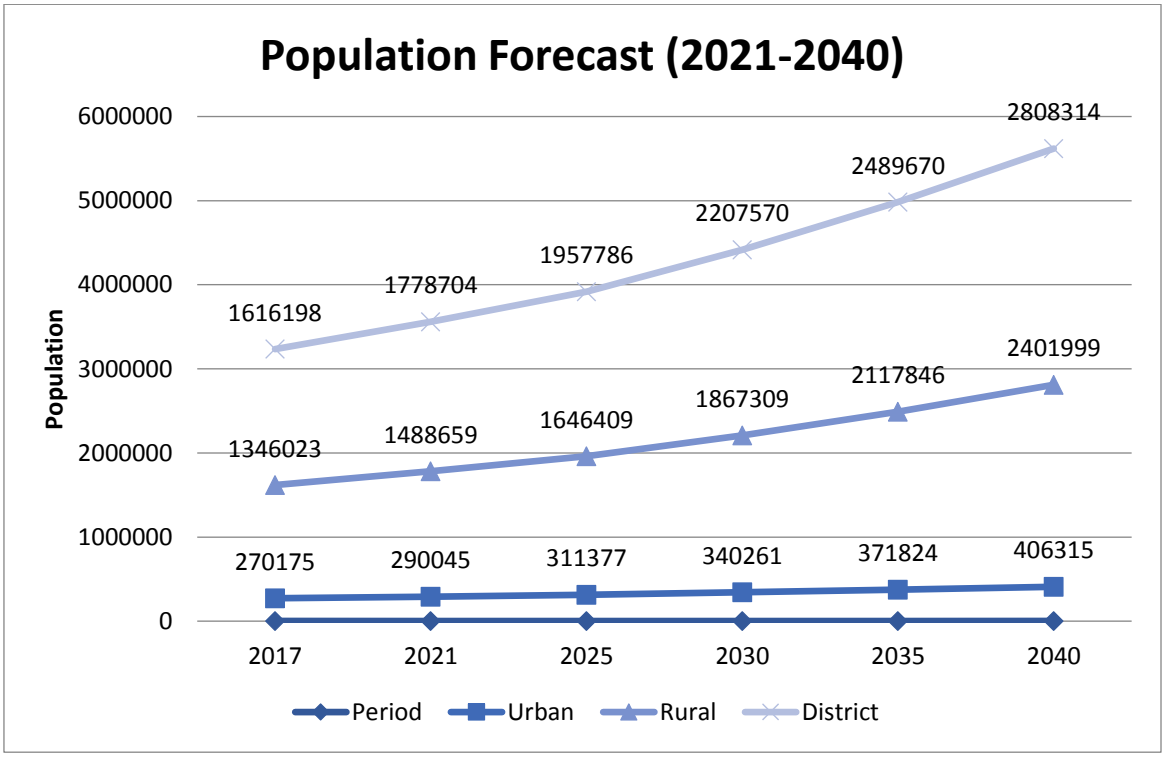


Figure 3-2: Plan Period Population Forecasts (2021-2040)

3.4 Population Density

Even more alarming than the population growth trends in District Charsadda is its spiraling population density figures, which highlight the demographic dilemma that confronts the district. As of Census-2017, the population density in Charsadda was at 1623 persons/ sq. km, compared to 300 persons/sq. km in the province. The current population density of District Charsadda is 1786 persons/sq. km, it is estimated to increase up-to 2820 persons/sq. km at the end of the plan period. The detail is represented in Table 3-6.

Table 3-6: Population Density of District Charsadda and Khyber Pakhtunkhwa

YEAR	POPULATION DENSITY (PERSON/SQ KM)	
	PROVINCE	DISITRICT
2017	300	1623
2021	330	1786
2025	363	1966
2030	408	2216
2035	460	2500
2040	518	2820

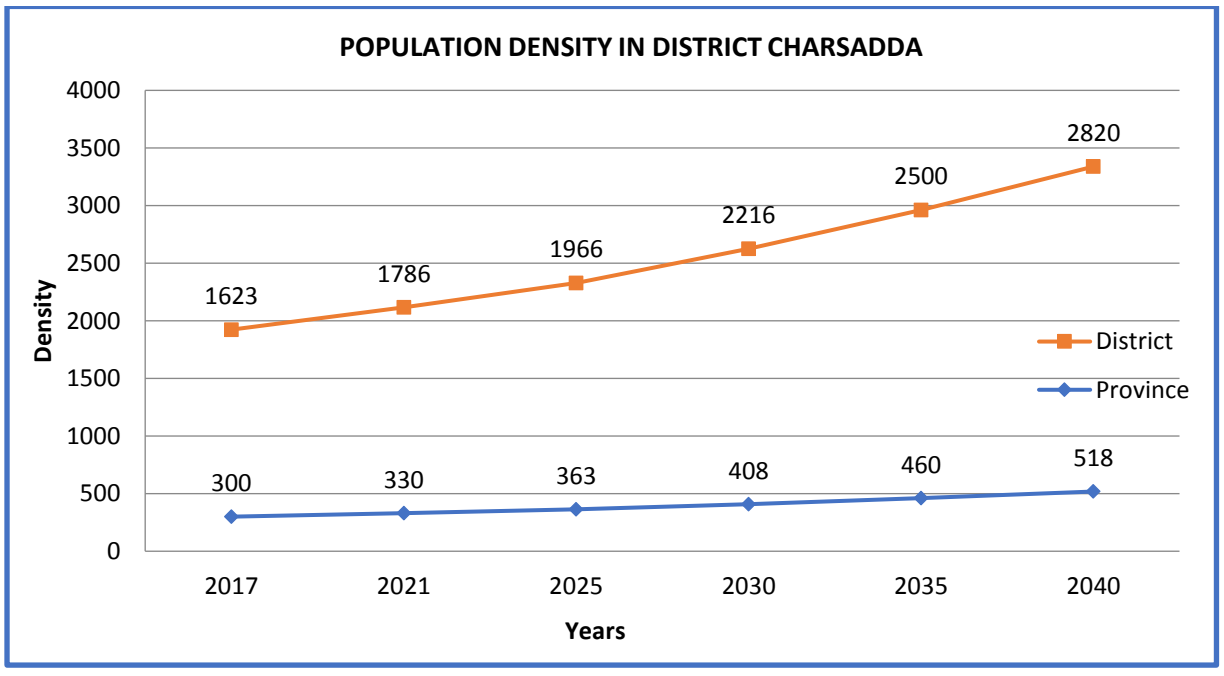


Figure 3-3: Population density of KPK vs District Charsadda

4 Regional Planning Context

4.1 Regional Planning Context

Regional planning deals with the efficient placement of land-use activities, infrastructure, and settlement growth across a larger area of land than an individual city or town as against urban planning which deals with the specific issues of city planning. A 'region' in planning terms can be administrative or at least partially functional, and is likely to include a network of settlements and character areas. In the context of this Project, Regional Plan encompasses the entire Peshawar Valley comprising of five Districts i.e. Peshawar, Mardan, Nowshera, Charsadda and Swabi.

Regions require various Land Uses; protection of farm land, cities, industrial space, transportation hubs and infrastructure. Regional planning is the science of efficient placement of infrastructure and zoning for the sustainable growth of a region. Regional planning can address region-wide environmental, social, and economic issues which may necessarily require a regional focus.

Regional Plans direct certain levels of development to specific cities and towns in order to support and manage the region depending on specific needs.

The essential components of regional planning include the following:

- Hierarchy of Settlements
- Growth Trends and Areas of Influence of urban settlements falling in the Region.
- Parameters for reducing migration to urban areas.
- Emerging development corridors, new towns, and planning for rural areas.

All these aspects in the context of Peshawar Region are discussed below:

4.2 Hierarchy Of Settlements

4.2.1 Objectives of Settlement Hierarchy

The overall objective of establishing settlements is to describe and understand the existing structure of the network of settlements (cities and towns) in Peshawar Valley as a key consideration in the formulation of development strategies and projects. Structure is determined by the functions and roles of the settlements.

Major objectives of the Settlement Hierarchy are as below:

- Accommodate and promote the development of linkages and infrastructure servicing of these Towns.
- Accommodate and promote proper planning and sustainable development in their environs
- Promote the role of these towns as economic, social and cultural centers for the surrounding areas

- Promote growth in smaller towns to allow for balanced and coordinated development throughout Peshawar Valley.
- Promote linkages between larger and smaller towns in order to distribute the resulting influence throughout the region.
- Promote the strengthening of towns as employment and service centers and as attractive residential centers.

4.2.2 Hierarchy of Settlements and Land Use Planning

For Land Use Planning, it is important to determine the hierarchy of settlements. It helps to achieve objectives of the Project in order to set out a clear order of preference for the location of different developments. The larger cities having higher threshold population will need higher order services to serve their own as well as their threshold populations; and vice versa. Peshawar for example, being the provincial headquarter and the most populous city of the Province, has or needs higher order facilities than Charsadda. In District Charsadda, Charsadda town needs higher order facilities than its smaller urban centers such as Utmanzai or Tangi; and such smaller urban centers need more facilities than the surrounding villages.

The hierarchy of settlements in case of Peshawar Valley has been determined on basis of following criteria:

- Population
- Location (e.g. lying within Peshawar Valley Development Corridor or not)
- Number of beds per thousand population
- Number of universities
- Availability of airport
- Administrative status of settlement (i.e. District or Tehsil headquarter).

Scoring for each of the above was done shown in Table 4-1.

Table 4-1: Criteria for Hierarchy of Settlements

Sr. No.	Criteria	Score
1	Settlement Population	1 for every 100,000 population
2	Location with respect to Peshawar Valley Development Corridor	Inside: 2 Outside: 0
3	Number of hospital beds per thousand population	< 0.3 beds/1000 population: 1 0.3 to 1 bed/thousand population: 3 > 1 bed/1000 population: 5.
4	Number of universities	One score per university. If the number of universities exceeds 10, they get a maximum score of 10.
5	Availability of airport	Airport available: 3 Airport not available: 0
6	Administrative status of settlement (i.e. District or Tehsil headquarter).	District Headquarter: 2 Tehsil Headquarter: 1

The score for each District was then added, and based on aggregate score, ranking was done, as shown in Table 4-1.

Table 4-2: Score-Wise Settlement Ranking

Settlements	Population Score		Location (inside/Outside PVDC)	Number of Hospital Beds/1000 Population	Number of Universities	Airport	Administrative Status (DHQ/THQ)	Total Score	Hierarchy Ranking (1-19)
	Population (2019)	Score							
Peshawar	1,928,475	19.28	2	2.83	15	1	2	42.11	1
Mardan	457,049	4.57	2	1.02	4	0	2	13.59	2
Swabi	155,185	1.55	2	2.09	3	0	2	10.64	3
Takht Bhai	155,538	1.56	2	0.86	0	0	1	5.42	8
Charsadda	132,737	1.33	2	1.66	1	0	2	7.99	5
Nowshera	122,070	1.22	2	1.01	3	0	2	9.23	4
Shabqadar	111,759	1.12	2	1.03	0	0	1	5.15	10
Pabbi	84,357	0.84	2	1.37	0	0	1	5.21	9
Jahangira	59,907	0.6	2	0	0	0	1	3.6	12
Topi	56,002	0.56	2	0.94	1	0	1	5.5	7
Risalpur Cantt	53,449	0.53	2	0	0	0	0	2.53	14
Aman Garh Industrial Area	57,630	0.58	2	0	0	0	0	2.58	13
Tordher TC	51,227	0.51	0	0	0	0	0	0.51	17
Zaida MC	41,657	0.42	0	0	0	0	0	0.42	18
Tangi	35,665	0.36	2	2.35	0	0	1	5.71	6
Utmanzai	35,293	0.35	2	0	0	0	0	2.35	15
Akora Khattak	30,225	0.3	2	1.73	0	0	0	4.03	11
Nawan Killi	30,087	0.3	2	0	0	0	0	2.3	16
Cherat Cantt	5,875	0.06	0	0	0	0	0	0.06	19

4.2.3 Conclusions

Peshawar is a primate city of the Province. In other words, it is disproportionately larger than any other settlements in the urban hierarchy. The sheer size and activities of Peshawar becomes a strong pull factor, bringing additional residents to the city and causing the primate city to become even larger and more disproportional to smaller cities in the Province. Being a primate City, Peshawar is different from Mardan in terms of area of influence, services provided and population.

Figure 4-1: Hierarchy of Urban Settlements in Peshawar Valley

The above analysis indicates that Peshawar (the primate City) and Mardan (Category 1 settlement) have greater area of influence than settlements lower in hierarchy. Similarly, Category 2 settlements (Swabi, Takht Bhai, Charsadda, and Nowshera) have wider catchment area than Category 3 settlements, and so on.

4.3 Growth Trend of Urban Settlements

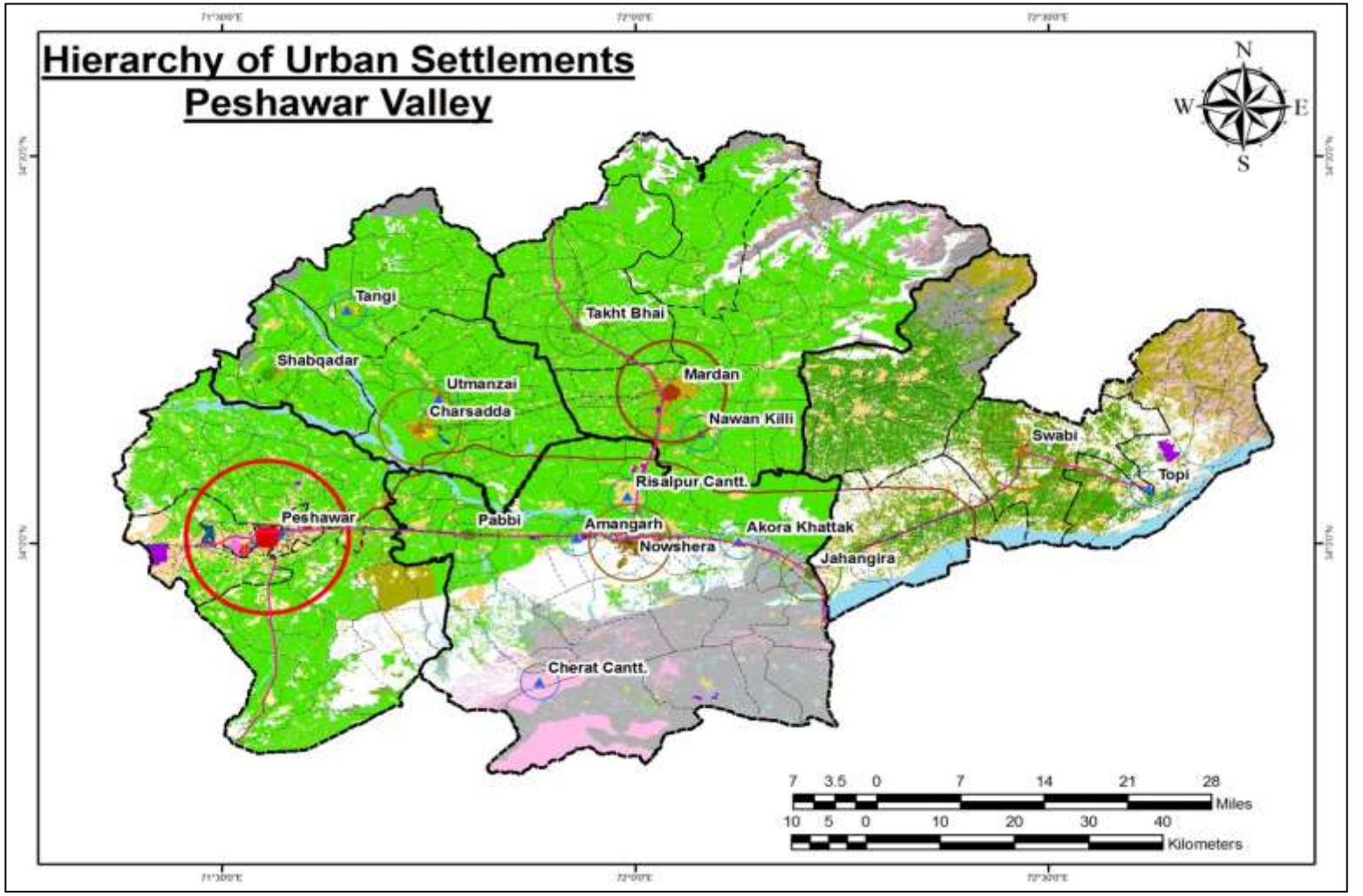
As per population Census of 1998, there were 21 urban settlements in the five Districts of Peshawar Valley. In 1981 however, there were 17 urban settlements in the valley, as four settlements in that year did not have urban status. These included University Town in District Peshawar, and Topi MC, Zaida MC and Tordher MC in District Swabi. Since 1981, significant urbanization has taken place; existing urban settlements have grown and new urban settlements have sprung up. For example, in the context of Peshawar, newly urbanized (or to be urbanized) areas include Hayatabad Township, Regi Model Town and a number of private developments. However, these are relatively new developments and their populations cannot be compared in time-series context.

Table 4-3: Urban Settlements Growth Rates

Districts	Tehsil	Urban Settlements	Population (Census Year)		Growth Rate
			1998	2017	(1998-2017)
Peshawar	Town-I	Peshawar MC	910,807	1893361	3.93
		Peshawar Cantt	68,740	70741	0.15
	Town-II	--	--	--	--
	Town-III	Peshawar Univ. TC	3,269	5940	3.19
	Town-IV	--	--	--	--
Mardan	Mardan	Mardan MC	238,629	351733	2.06
		Mardan Cantt	7,297	6871	-0.32
	Takht Bhai	Takht Bhai MC	49,202	80721	2.64
Nowshera	Nowshera	Nowshera MC	56,576	83567	2.07
		Nowshera Cantt	33,237	36564	0.5
		Aman Garh Industrial Area TC	21,476	38624	3.14
		Risalpur Cantt	31,416	36653	0.81
	Pabbi	Cherat Cantt	2,527	2265	-0.57
		Pabbi MC	31,153	55255	3.06
	Jahangira	Jahangira MC	31,115	52839	2.83
		Akora Khattak MC	19,530	32883	2.78
Swabi	Swabi	Swabi MC	80,157	123412	2.3
		Zaida MC	22,656	31949	1.83
	Topi	Topi MC	30,458	52983	2.96
	Razzar	Nawan Killi TC	18,082	26161	1.96
	Lahor	Tordher TC	27,861	41420	2.11
Charsadda	Charsadda	Charsadda MC	87,218	114565	1.45
	Shabqadar	Shabqadar MC	55,439	91857	2.69
	Tangi	Utmanzai MC	24,848	30747	1.13
		Tangi MC	25,346	33012	1.4

Table 4-4: Growth Pattern of Urban Settlements in Peshawar Valley

Urban Settlements	Growth Rate (1998-2017)	Settlements with Growth Rate Differences
Peshawar MC	3.93	Above 3 and Below 4
Peshawar Univ. TC	3.19	
Aman Garh Industrial Area TC	3.14	
Pabbi MC	3.06	
Mardan MC	2.06	Above 2 and Below 3
Takht Bhai MC	2.64	
Nowshera MC	2.07	
Jahangira MC	2.83	
Akora Khattak MC	2.78	
Topi MC	2.96	
Tordher MC	2.11	
Shabqadar MC	2.69	
Swabi MC	2.3	
Peshawar Cantt	0.15	Below 2 and Above -1
Mardan Cantt	-0.32	
Nowshera Cantt	0.5	
Risalpur Cantt	0.18	
Cherat Cantt	-0.57	
Zaida MC	1.83	
Nawan Killi TC	1.96	
Charsadda MC	1.45	
Utmanzai MC	1.13	
Tangi MC	1.4	



Map 4-1: Hierarchy of Urban Settlements of Peshawar Valley

4.4 SPHERES OF INFLUENCE OF URBAN SETTLEMENTS

The sphere of influence of a settlement describes the area that is served by a settlement, for a particular function. Its sphere of influence for different functions may cover vastly different areas. For instance, a supermarket may attract people from a 20-mile radius, whilst a leisure activity, such as going to the city park may attract them from far further away.

The larger a settlement, greater its sphere of influence as it has a wider range of services and functions to attract people to go there. This is shown in the diagram below. A small village may only have a village store selling the daily newspaper and food such as bread and milk. People will only travel the shortest distance they need to buy these products. They are described as being convenience goods. In other words, something that can be bought easily and for the same price all over the place.

A larger town would have a wider sphere of influence because it would have shops and services that are more specialized, and so people would be willing to travel further to use them. The range of service describes the maximum distance that someone would be willing to travel to obtain that good or service. The threshold population of a good or service is the minimum number of people needed to allow that shop or service to be successful. The more specialist a shop is the larger its threshold population is. The same applies to settlements as given in the diagram below.

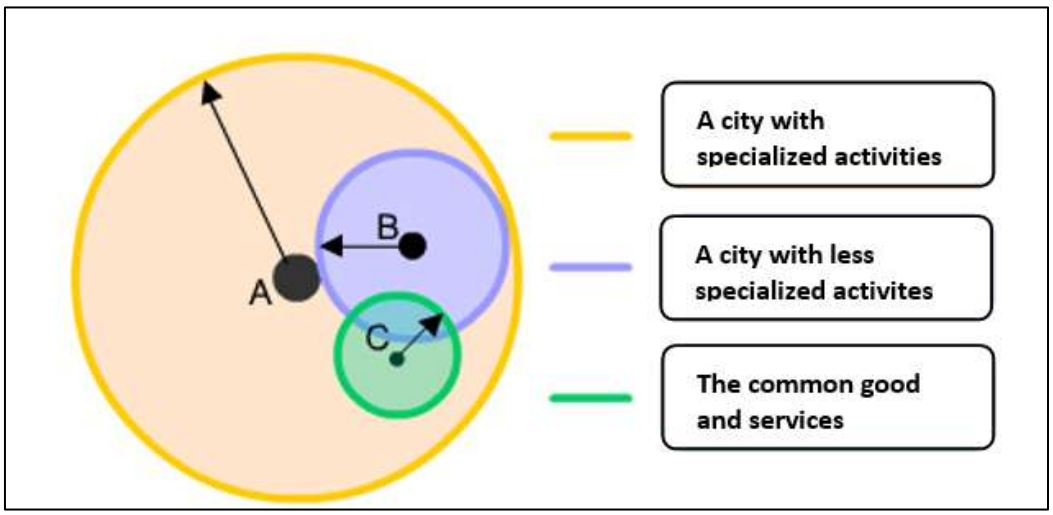


Figure 4-2: Sphere of Influence of Different Settlements

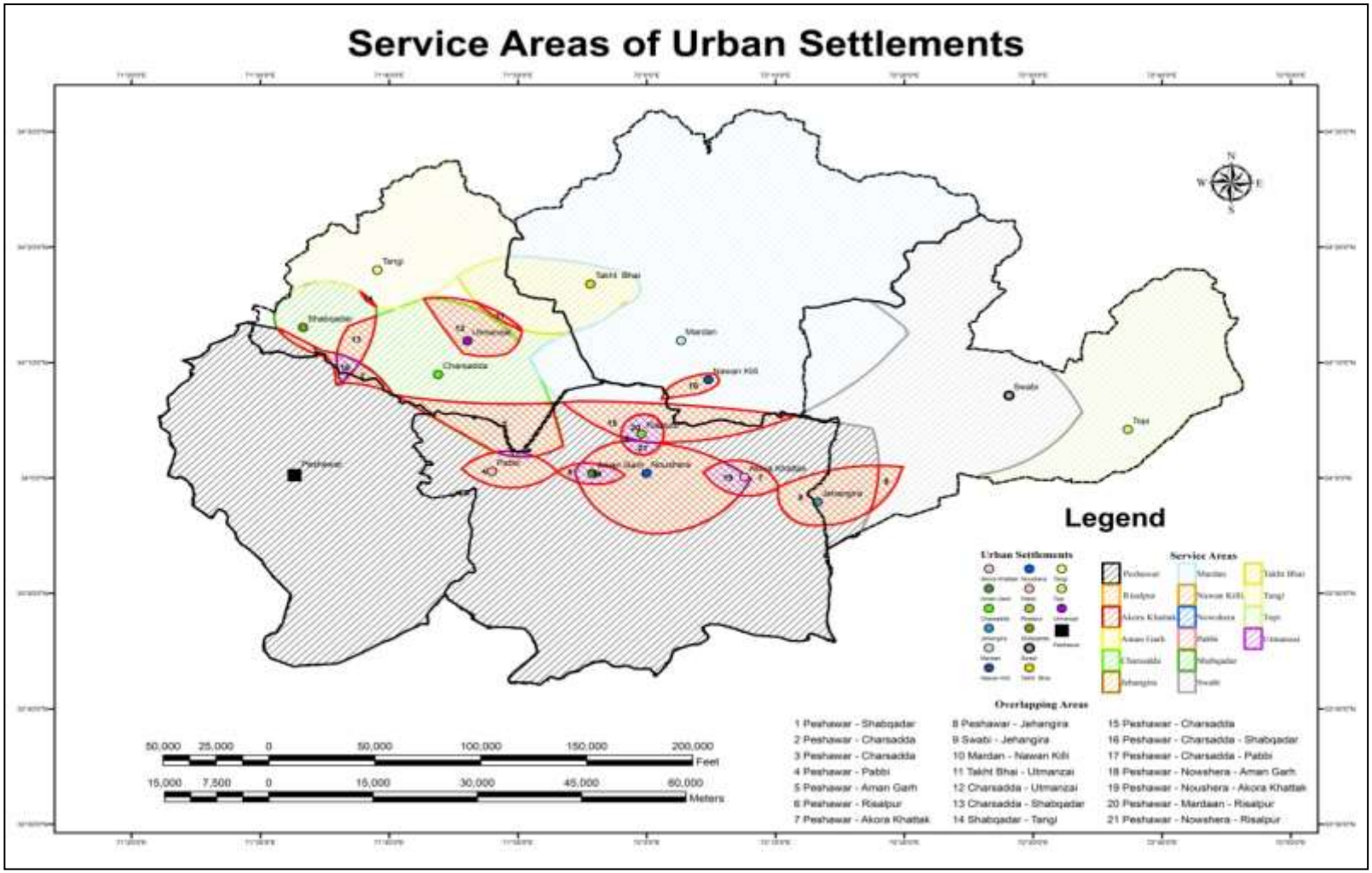
Gravity models measure the pulling power of competing locations, whether cities, shopping centers or towns and the influence this has on the customers that reside within the boundaries. Models identify a boundary line, called the breaking point, at which customers that reside within the boundaries, either one side or the other of the line. Calculations can specify a particular breaking point or point of maximum pull between two settlements.

Breaking point between two urban settlements can be calculated by the formula:

$$\text{The breakpoint from A} = \frac{\text{Distance from center A to center B}}{1 + \sqrt{(\text{population B}/\text{population A})}}$$

Boundary line of area of influence an urban settlement can then be drawn by a smooth line joining all the breaking points.

The sphere of influence or service areas of urban settlements in Peshawar Valley, using the above methodology has been calculated and shown in the figure below.



Map 4-2: Service Areas of Urban Settlement

Map 4-2 is indicating the service areas of Urban Settlements in Peshawar Valley

4.5 PARAMETERS FOR REDUCING MIGRATION TO BIG URBAN CENTERS

Development is a two-pronged strategy, based on the classical debate of efficiency Vs. equity. Focusing on efficiency, there is a need to identify 'development corridors' in the region where returns against investments made would be maximum; and in these corridors private sector would also be interested to invest. These corridors are thus 'investment zones', encompassing cities as well rural areas. Thus, these will benefit not only urban areas, but also rural settlements which lie in it; resulting in better rural development and hence help to retard migration flows to urban areas. In fact, these development corridors will also have a spill-over effect even outside these corridors.

Second parameter to reduce migration to bigger urban centers is development of new towns at feasible locations. This will however not help unless these are coupled with adequate employment opportunities and other necessary facilities, which make them attractive for the people to live in, and can restrain them to move towards bigger urban centers.

The third factor to reduce migration is sustainable rural development, in which each District should be divided into a number of 'Rural Growth Zones', each zone to comprise of few union councils, and within each zone a centrally located village would act as 'Rural Growth Center', which will have better inter-village road connectivity as well as access to the nearest main road, provision of basic facilities such as good healthcare, quality education, provision of adequate infrastructure and physical improvement of villages including village streets and houses.

To sum up, the parameters for reducing migration to bigger urban centers are as below:

- Identification of Development Corridors
- Establishment of New towns at appropriate locations with employment opportunities
- Sustainable rural development.

These are elaborated in subsequent sections.

4.6 VALLEY DEVELOPMENT CORRIDOR (PVDC)

Valley Development Corridor (PVDC) is a major project of Peshawar Valley being proposed under the KP Land Use Project. Development corridors are described as transport (or trade) corridors with under-utilized economic potential in their environs, the development of which would be explored through spatial planning and development projects. They are therefore seen as a means of prioritizing and promoting inter-related infrastructure and large-scale economic sectoral investments in defined geographic areas and optimize the use of infrastructure. PVDC can become the framework and platform for comprehensive and integrated development in the five Districts. PVDC needs to be given great importance as well as active promotion.

PVDC will be of great significance to the development of Peshawar Valley which will provide new opportunities, new vision as well as new impetus to the developmental activities. It will effectively promote the economic and social development of the valley. The construction of PVDC will enhance connectivity and integration of developmental efforts of the five Districts, which is in the fundamental interests of the people.

As a large and systematic project, which covers 2021-2040, PVDC needs joint and unremitting efforts by the provincial government, companies and all social sectors of KP. In the process of its construction, there is a need for scientific planning, step by step implementation, consensus among Districts through consultation, mutual benefit and win-win results, as well as ensuring quality and safety. All five Districts of the Valley should agree to make a list of prioritized or early harvest projects as well as the long-term plan for PVDC. The prioritized or early harvest projects mean the projects which will be completed before 2024, and others by 2039. PVDC is a vision with the long-term planning up to 2039.

The central role of the PVDC would include establishment of new towns, special economic zones including industrial estates, and transportation infrastructure. Besides, there can be projects in the fields of financial services, science and technology, tourism, education, poverty elimination and city planning, etc.

To promote the construction of PVDC, the provincial Government needs to set up a PVDC Committee, under which there would be a number of working groups for projects till 2024, long-term planning, transportation infrastructure, new townships and special economic zones.

Efforts are to be made to improve the livelihood of the local people, particularly the construction of educational and medical projects, and vocational institutes. Although hydro-electric projects will be located outside PVDC framework, feasibility studies will have to be conducted for Solar and wind Power Projects in the proposed corridor.

Efficient and fast transportation network is of vital importance to the economic development. The existing road network in Peshawar Valley shall be used in the beginning, developing the missing connections first, with easiest one on priority, through scientific planning. At the same time, feasibility study needs to be conducted for upgrading railway network in the valley.

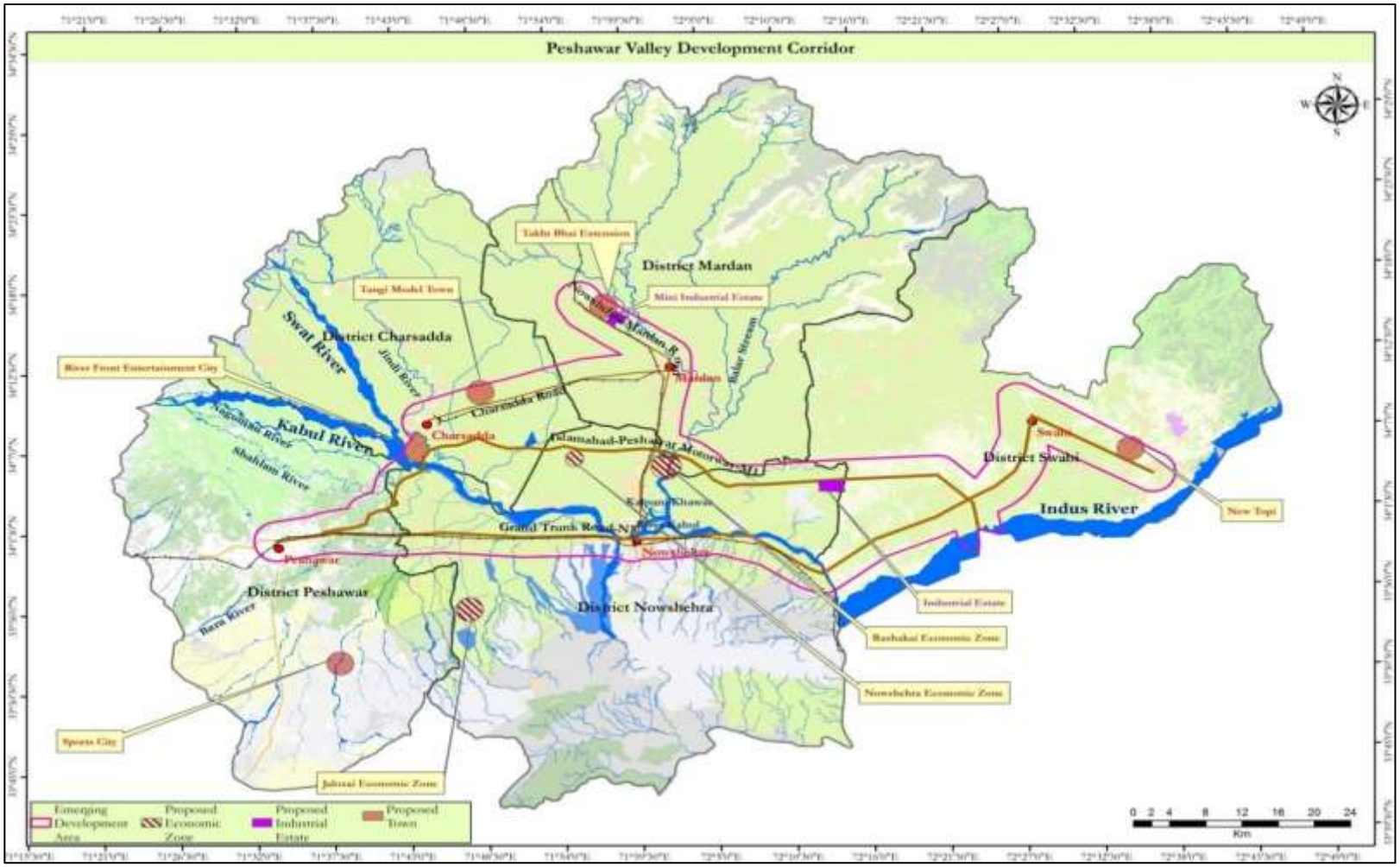
The PVDC aims to benefit the economic and social development of all regions in Khyber Pakhtunkhwa and provide effective inter-District connectivity. With the implementation of various projects, PVDC will play an increasingly important role in promoting the economic development and uplifting living standard across different parts of the Province. These projects will help boost employment and tax collection, strengthen the provincial road connectivity, promote economic development as well as improve people's living standard.

The proposed development corridor encompasses the area between GT Road and Motorway, and well beyond it to cover Mardan-Charsadda Road.

It is important that the identified corridors should be able to generate densification activities, and efforts to stimulate SMEs in the proposed corridors. It is also important to establish an appropriate legal and institutional framework before the project gets rolling.

It needs to be ensured that no hype is generated around the corridor with unrealistic expectations for the communities involved which may not be fulfilled in terms of anticipated investments in certain areas of the corridor. The proposed corridors may generate notable successes in private sector investments into regional infrastructure development, industrial development and natural resources exploitation.

The corridor approach represents an understandable and reasonably objective way to prioritize regional infrastructure projects, stimulate investments into productive capacity and achieve economic densification.



Map 4-3: Peshawar Valley Development Corridor

4.7 ESTABLISHMENT OF SATTELLITE, INTERMEDIATE, SECONDARY, AND INDUSTRIAL TOWNS – THE EMERGING SCENARIO

There are many classical theories developed over last two centuries to explain the reasons behind the distribution patterns, size, and number of cities and towns in a region. These theories such as central place theory or rank size rule etc. are based on various assumptions which are not applicable in real life.

However, the analysis and inferences drawn in earlier section regarding hierarchy of settlements provides sound basis to establish satellite, intermediate, secondary and industrial towns as focal points for future to cater for the rural and small towns. Before doing so however, it seems appropriate to provide a brief description of different kinds of towns, as given below:

Satellite Towns

A satellite town or satellite city is a concept in urban planning that refers essentially to smaller metropolitan which are located somewhat near to, but are mostly independent of larger metropolitan areas.

Intermediate Towns

Intermediate towns perform social and economic functions that are important for regional development, functioning quite reasonably. Therefore, the intermediate towns are important not merely because of their size, but because of the services they render to the rural areas. As services centers, these towns can provide public, social, commercial and personal service not only to its own population but also to the surrounding rural hinterlands

In fact, Intermediate towns can also offer better facilities in social services i.e., health and education, than large and small cities. They become stopping-off points for migrants who might otherwise go directly to the big cities, but the big cities have no more carrying capacity to accommodate more population.

Secondary Towns

Secondary towns serve as trading centers for agricultural and other primary goods. They also serve as centers for providing economic and social services to the rural populations, particularly the rural poor. Secondary towns play important role in reducing poverty in both rural and urban areas and in redirecting rural-urban migration from mega-cities. Rural-urban migration is not only inevitable but also desirable as it allows labor to move to sectors of the economy where it can be more productive. However, rural-urban migration to mega-cities may be undesirable as it may contribute to the diseconomies of scale of these cities. Hence the role of secondary towns is important to control the above.

Industrial Towns

An industrial town is described as the one with predominant industrial economic base and where workers live within walking-distance of their places of work. The term also implies the ways in which economic specialization arises through clustering in a particular industry-zoned urban area. Firms in industrial towns battle to internationalize production, and they have only limited resources to invest in research and development

The Economic zones/Industrial Towns that have been approved by the Provincial Government are described below:

4.8 ECONOMIC ZONES

Three Economic Zones have been approved by the Government, the details of which are as below:

4.8.1 Rashakai Economic Zone

Rashakai Economic Zone is spread over an area of about 1,000 acres of land and is located on M1 motorway at Mardan interchange and links to CPEC through Burhan interchange. Due to its central position in the province, it is envisaged to be an imminent trade hub. The Economic Zone will also host an IT Park of 100 acres in collaboration with the Board of ITKP. The strength of this zone is its strategic location by being connected to Districts and a resource pool which has a predominant investment favorability for industries in fruit & food packaging, textile and auto manufacturing. Further expansion of around 5,000 acres is also under consideration.

4.8.2 Jalozai Economic Zone

This economic zone is spread over an area of 257 acres. It will be a strategic location for small and medium enterprises. The economic zone connects to GT Road through a link road of about 15 KMs from Pabbi. The industrialists of Jalozai Economic Zone will have readily available trained human resource due to its location in the center of a settled area, which also has a long-established industrial tradition. It will have access to plenty of natural resources and agricultural products.

4.8.3 Nowshera Economic Zone

It spreads over an area of 100 acres and is situated on GT Road. The zone is located at a distance of about 50 Kms from Peshawar near Mardan interchange on Islamabad-Peshawar motorway section.

4.9 NEW TOWNS

New towns can be used as economic 'Growth Poles' for regional level Land Use Plans such as the five Districts of Peshawar Valley. New towns in Peshawar Region will exert a positive impact on the economy and lead to a sustained increase of production and of incomes of the region. However, for a new town to be functional and act as a growth pole, it must have some basic industry, education, health and physical concentration of activities with strong backward and lateral linkages. New towns located in older urbanized regions like Peshawar, will also help to revitalize blighted or decaying areas and may infuse life in the area by the creation of dynamic new types of employment and up to date amenities.

New towns are also needed in the region for the purpose of 'Decongestion' of large cities like Peshawar and Mardan. These will help to ease pressure on such bigger urban centers and achieve a more sub-regional distribution of jobs, homes, amenities and transport. This can be a successful strategy for controlling growth in the fringe areas of larger cities. Although in KP and rest of the Country, new housing schemes and townships within urban areas primarily cater for the needs of upper strata of society, but the trend needs to be rationalized. New towns in Peshawar Valley in particular and in KP as a whole, can be built primarily to resettle the urban poor from overcrowded central areas of larger urban centers to permit the renewal of central city areas.

New towns are also planned for rural population to prevent further encroachment on limited prime agricultural land by urban extensions. It is thus important that new towns should be built on land which is unsuitable or poor for agricultural production. Another rationale for creation of such towns can be deliberate concentration of the population of scattered hamlets or villages to facilitate/economize the provision of adequate amenities and services.

New towns are a form of urban planning designed to relocate populations away from large cities by grouping homes, hospitals, industry and cultural, recreational, and shopping centers to form entirely new.

A typological distinction can be made between new towns with a 'predetermined location' and new towns where the optimal location can be chosen among several potential sites. In the first category, the site is fixed by the need for proximity to location bound resources such as mines, sources of energy, or land suitable for specific agricultural development. The second category would include towns built as service centers of development regions and new towns created for the decongestion of existing cities or the reorganization of metropolitan areas.

Industrial towns in 'Isolated Locations' are created to exploit such natural resources as iron, coal, oil, etc. In developing countries most, new towns belong to this type since economic development is given priority over social development objectives such as the decongestion of overcrowded urban centers. Isolated new towns can also serve as foci of scattered settlements.

4.10 ENTERTAINMENT CITY

There a huge potential of developing an 'Entertainment City' near Charsadda Interchange on M1. Spread over around 5,000 kanals, it has ideal location, being located between River Kabul and River Jindi. The site is mostly barren and thus agricultural land will not be affected. Entertainment City will be a hub of recreational facilities at regional level.

4.11 NEW TOWNSHIPS/LARGE SCHEMES IN PIPELINE

New Townships that are already being planned/considered by Provincial Government include Mega City and Jalozai Scheme in District Nowshera and a Sports City in District Peshawar.

Mega City spread over 50,000 kanal is a project of Provincial Housing Authority. The site is located near Kernel Sher Khan Interchange on Peshawar - Islamabad Motorway. Preliminary feasibility study of the project has been completed and approved.

The Jalozai site is also located in District Nowshera on main Cherat Road, approximately 8 km from main GT Road near Jalozai industrial estate. Total area of scheme is 8905 kanals, while the number of plots is 8,044.

4.12 OTHER FEASIBLE LOCATIONS FOR NEW TOWNS

Feasible location for a new town requires detailed studies.

The following three new Towns are proposed in Peshawar Valley at the indicated locations:

- Tangi Model Town, District Charsadda
- Takht Bhai Extension Town in District Mardan
- New Topi in District Swabi.

The existing Tangi settlement is located at about 22 kilometers from Charsadda; while Charsadda is about 28 Kms from Peshawar located in the West of KP and is bounded by District Malakand on the North, District Mardan towards East, Districts Nowshera and Peshawar towards South and the Mohmand Agency of the Federally Administered Tribal Areas on the West. Charsadda has one of the most fertile lands in KP. There are three rivers flowing in Charsadda: The River Jindi, the Kabul River, and the Swat River; these rivers are the main sources of irrigation for Charsadda. The three rivers then merge and join the Indus River.

The main crops of Charsadda are; Tobacco, Sugarcane, Sugar beet, Wheat and Maize. Vegetables include Potato, Tomato, Cabbage, Brinjals, Okra and Spinach. Among orchards; Apricot, Citrus, Plum, Strawberry and Pears are famous. Strawberry, Sugarcane and Tobacco are cultivated abundantly.

Foot Wearing, Cloth Wear and Fishery contribute a lot towards economy of the District. Hundreds of people are involved in making Foot Wear. There are more than 500 footwear manufacturing units that have also started making handmade shoes, bags, belts and small leather accessories but the most popular and highly produced item is footwear (Peshawari

Chappal). As already stated, cloth wear manufacturing is also an attractive business for the people of Charsadda.

Being close to Peshawar metropolis and hence under its shadow effect, Charsadda has not developed industrially as it should have, particularly for agro-based industry. Besides, being close to Peshawar has its advantages as well as disadvantages. The disadvantage is that most people commute daily from Charsadda to Peshawar and back increasing traffic load. Besides, people who can afford, tend to build houses in Peshawar causing its sprawl and related issues. A decent well-planned town near Tangi in District Charsadda will help to control this trend and also provide impetus to the District (and hence regional) economy.

Takht Bhai Extension Town

As the name suggests, is a planned extension of the existing Takht Bhai Settlement in District Mardan. The existing urban settlement of Takht Bhai is the fastest growing urban settlement in Peshawar Region; its growth rate was 5.98% during the period 1981-1998. It is the highest rate among all urban settlements of the region. It is also the second largest settlement of District Mardan, after Mardan City. Takht Bhai is situated 15 km from Mardan on Swat-Malakand Road. In 1908/9 the ancient Buddhist history was discovered in the mountains.

Some of the possessions of the Buddhist houses and buildings have been taken away illegally. The population is expanding and new houses are being built in and around Takht Bhai. If ignored for a few more years, the tourist and historic attractions will disappear. The authorities need to draw a boundary line, so stop further encroachments. There is a need for a new township at an appropriately located site near Takht Bhai, along with appropriate living environment, along with tourist rest houses and restaurants where people can relax before and after they embark for the on-wards mountain journey. This will reduce pressure on Mardan City, and will also help to develop Northern part of Mardan District, as Takht Bhai will become a growth pole for this part of the region.

New Topi in District Swabi

Topi Town lies in the Eastern part of District Swabi. It is located to the West of Tarbela Dam, the world's largest earth filled dam, which is also the largest hydroelectric generation project in Pakistan.

Topi is home to Ghulam Ishaq Khan Institute of Engineering Sciences and Technology (GIKI), one of the premier technical universities of Pakistan. Gadoon Amazai Industrial Estate, is also a few kms North-East of Topi. All these key Land Uses i.e. Tarbela dam, GIKI, Gadoon Amazai Industrial Estate and the geographic location of existing Topi settlement justify a well-planned New Town (New Topi) adjacent to existing Topi settlement.

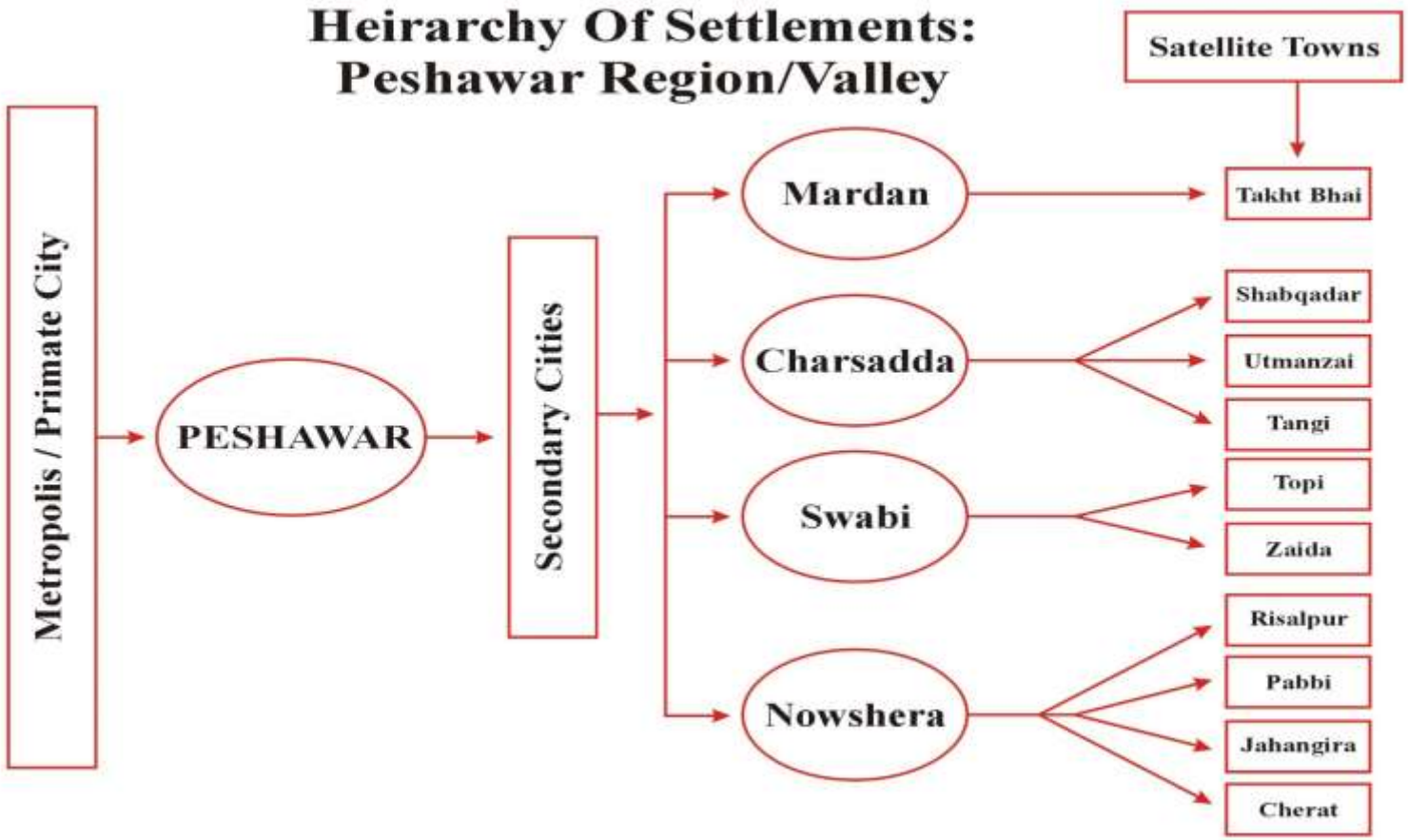
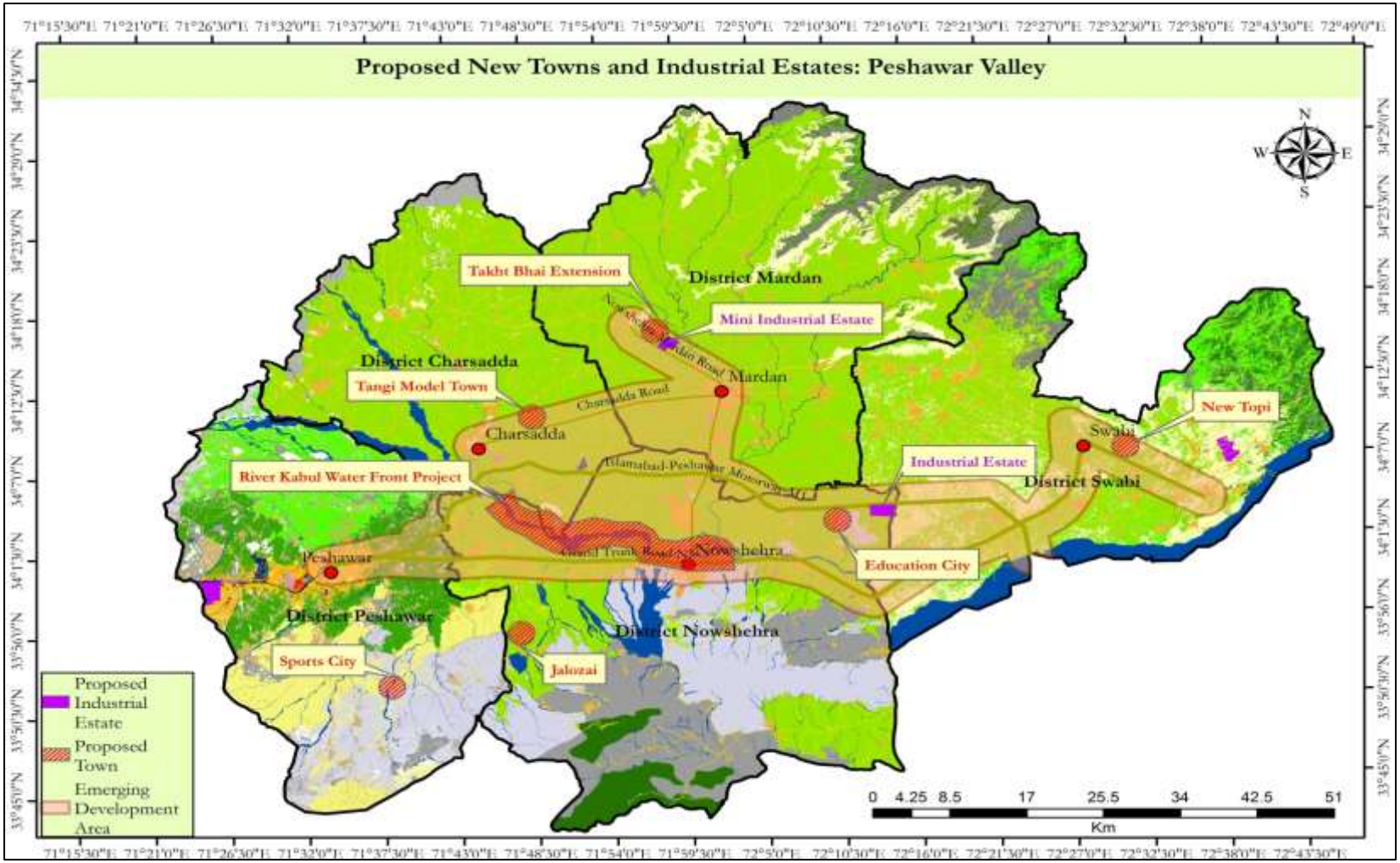


Figure 4-3: Hierarchy of Settlements in Peshawar Valley



Map 4-4: New Town and Industrial Estate in Peshawar Valley

5 THE LAND USE PLAN

5.1 OVERVIEW

There was always a need for Provincial Land Use policy for Land Use Planning and optimum utilization of land resources. The Land Use Plans for the five Districts are building blocks towards that end.

At present there is no framework of policy relating to Land Use and therefore, in the matters of location and acquisition ad-hocism prevails. Government in one department takes certain decisions, which is negated by another department, behind most of which the confrontationist situation is the question of land. There being no Land Use policy within the framework of which, different departments can decide their projects, contradictory views are taken by different departments, at the root of which is the question of Land Use.

Locating non-agricultural activity on land best suited for agriculture would not be permitted within the framework of the District Land Use Policy. To decide about location, therefore, Land Use policy is of vital importance. Under the policy, appropriate land resources would always be available where necessary for development, and the logic of appropriate Land Use would apply.

Land is required for roads, railway tracks, airports, city expansion, industrial location, mining, afforestation, etc. The District Land Use Policy, and ultimately a Provincial Land Use Strategy would zealously guard the land for the Land Use which has been designated under the Plan, and their conversion to other use would be prohibited. As policy is based on logic, it would draw public support. Land is required for grazing, but unfortunately many of grazing areas have been eliminated.

The Consultants have taken a holistic view of land as a resource and then assigned to it an appropriate use, resulting in a logical location policy and a framework within which agricultural growth for example, would accelerate without compromising urban development and industrialization, with the latter not competing with agriculture and moving forward at the cost of agriculture. All this is the rationale behind a properly thought out Land Use policy.

Provincial Land Use Plan is envisaged as a policy document for an integrated, coordinated and systematic planning and uniform spread of development activities and employment to the rural and sub-urban population close to home and reduce pressure on Districts like Charsadda. It aims at establishing hierarchy of settlements and developments of satellite, Intermediate, Secondary and Industrial Towns as focal points of future to cater the rural areas and small towns. It will also provide guidance to nation building departments/agencies, Urban Policy Unit, District Governments/TMAs for undertaking integrated and coherent development programs through holistic planning.

The Consultants have conducted surveys of twenty-one different sectors as per Terms of Reference, formulating appropriate plans to achieve the specified objectives, including

protection of prime agricultural land, transport driven residential and commercial development, allocating spaces for vertical, residential and mixed development zones, and allocating suitable land for agriculture.

Housing is an important element of Land Use Planning. Locating housing areas appropriately in the Land Use Plans are based on proximity to urban services, employment opportunities, cost of infrastructure, and restrictions on conversion of prime agricultural land to housing and other urban uses. There is a need to promote full range of housing in all communities, including initiating a cooperative effort from the beginning of the planning process and based on situation, recommend minimizing regulations and generating adequate financing, in an attempt to make housing more affordable and available to all income groups.

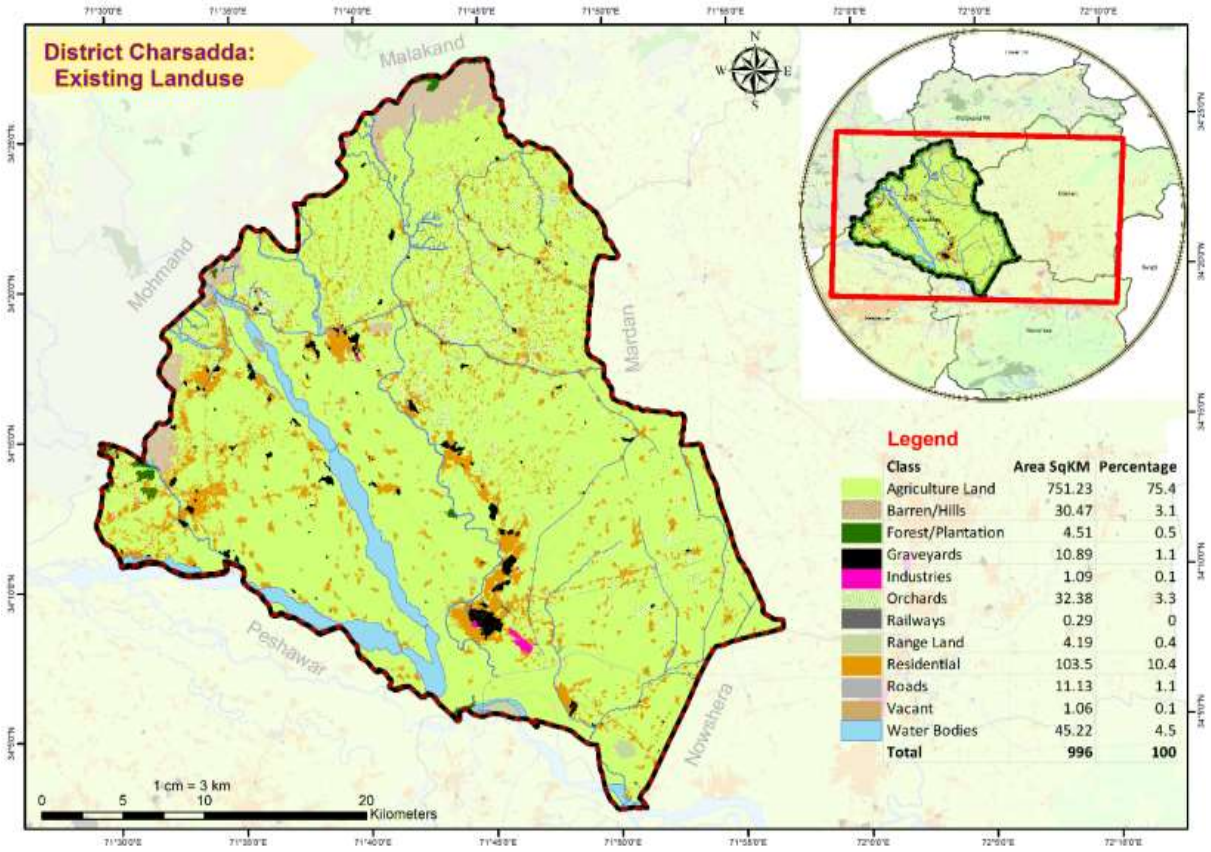
All social sectors in Land Use Planning are important, but health in particular needs to be emphasized as in the context of Land Use Planning, it is a sustainability issue. The link between health and sustainability is so apparent that many people do not always understand the way in which human health is affected by the shape, form, design and function of the communities in which people live.

Land Use decisions affect the physical development of communities, and also profoundly impact the health of people who live and work there. There is a strong correlation between healthy eating habits and physical activity with rising rates of obesity, diabetes, heart disease, asthma and other health issues. A growing body of evidence points to development practices and Land Use patterns as a major contributing factor in many illnesses, particularly when such practices and patterns discourage physical activity, restrict access to healthy foods and disproportionately expose neighborhoods to environmental pollutants that exacerbate health conditions such as asthma. Traditionally, in the context of Land Use Planning in Khyber Pakhtunkhwa (and for that matter in the Country as a whole), health has not been given high priority. That needs to be changed, as there is important link, as described above, between health, built environment and Land Use.

The Land Use Plan will facilitate in determining how much of job-producing land should be preserved for the future, and to preserve existing industrial land for industrial and job-generating purposes. The information will also help to determine nature and viability of current and future industrial uses, the ability to mix different uses, the transit-dependency and/or employment characteristics of the local labor force, although some areas may seem to have the same amount of residential or other uses in industrial zones, the impact may not be the same. Other aspects are industrial location, compatibility with surrounding Land Uses particularly housing and agriculture, industrial waste discharge, and industrial zoning with respect to present and potential industries, depending on their types, level of pollution, and traffic attracted/generated.

The decreasing recreational facilities and open spaces are a cause of concern. The pressure on land is increasing because of competing Land Uses. The Land Use Policy therefore stresses the need for reserving recreational spaces against many competing demands for land.

The Departments including Provincial Housing Department and KP Urban Policy Unit in consultation with planners, administrators, environmentalists, agricultural scientists, local people and NGOs should monitor the plans for Land Use development and review it periodically after every 5 years, in accordance with the changing socio-economic needs of the time. District Land Use Plans are a new concept in KP as well as the entire Country, and initially it may be difficult to introduce changes in the existing Land Use pattern, but with steady long-range planning and appropriate public information system, the Land Use proposals are not difficult to achieve.



Map 5-1: District Charsadda Existing Land Use

Map 5- 1 Indicates the existing Land Uses of District Charsadda with total area and percentages.

5.2 GUIDELINES FOR UNDERTAKING THE PROJECT

The Government of Khyber Pakhtunkhwa is committed to a sustainable future. Initiating District Land Use Plans is an important initiative of the Provincial Government to make Charsadda an attractive place to live and work. The Government is seeking to steer growth and change the district in ways that are economically, socially and environmentally sustainable.

The Land Use Plan will help government agencies to improve public facilities and services. The Plan identifies locations for different Land Uses at most suitable locations and directions, which will guide the implementing agency in rationalizing all Land Uses and objective planning and formulation based on the potential and requirements of the land resource. Implementation of District Land Use Plan (DLUP) will promote potential-based use of the land for maximum land resource conservation. It will also ensure sustainable use of resources for use for the coming generation. The optimum and guided utilization of land is, in fact, the main objective of the Land Use Plan.

It is a road map of sector strategies, subtly integrated, and derived from analysis of surveys and consultations with different stakeholders. District Land Use Planning is more than just long-term planning, where objectives are set for a specific period of time; it is more pro-active, based on anticipated changes in the years to come, thus making corrective alterations in the Plan after appropriate intervals, and involving various stakeholders at different levels of planning process, that may steer the City District Government, Urban Policy Unit/PMU, Development Authority and urban local councils in a focused direction.

To implement the Land Use Plans for the five Districts, there is a need to form a regional body such as Peshawar Valley Development Agency (PVDA), which can not only implement the plans for each of the five Districts, but do so in a coherent and integrated way, and also resolve the inter-District planning issues which may arise during the plan implementation process. At present there is no regional body which can provide framework for the implementation of Land Use Plans and take up development projects of regional level for valley as a whole. Different projects are being launched or are on-going in the five Districts of Peshawar Valley. Thus, to oversee and coordinate the activities of these projects, it is important to create an agency such as PVDA, which may be established in the Urban Policy Unit KP. A senior officer may be assigned the duties of Chief, PVDA. To assist the Chief and coordinate the activities, a number of Deputy Chiefs may be drawn from sectoral departments. The officials should represent their respective departments and provide guidance where necessary.

There is also a need for formation of an inter-District advisory committee comprising of elected representatives/senior officers of the five Districts to discuss and advise PVDA about inter-District planning issues and their resolution.

The proposed PVDA under the auspices of Urban Policy Unit will be responsible for:

i. Coordination with Districts to resolve inter-District planning issues, if any.
ii. Coordination with sectoral departments.
iii. Coordination with local councils.
iv. Planning, supervision, monitoring and implementation of Project.
v. Organizing and conducting various training programs.

The PVDA through Urban Unit/P&D Department shall also keep close liaison with donors and provide full support to induce their intervention in the target Districts. It will also coordinate the relevant activities of various departments/agencies and would coordinate annual review meetings with donors and executing line departments. As already stated, PVDA will be responsible for implementation, administration and coordination of District Land Use Projects in an integrated manner, including financial management, organization of training programs, association with line departments and the NGOs.

It is also important to intensify the involvement of line departments in the area. It is proposed to utilize the services of the experts working in these departments so that they can participate for implementation of the Land Use projects. Similarly, other agencies functioning at provincial and District levels, and have got the expertise relevant to the Project, should also be involved in the execution of the Project

Considering the complexity and enormity of planning issues in the districts, it is also seeming imperative to have a separate Executive District Officer for Land Use Planning, who will coordinate between the PVDA in Urban Unit and District Level Departments, authorities, and agencies responsible for implementation of various projects. This arrangement is likely to have salutary effects for achievement of the targets.

5.3 FRAMEWORK FOR DISTRICT SPATIAL PLAN

The urban area of District Charsadda, like all other urban areas, needs to expand to cater for the future population. Besides, currently most of the social facilities, institutions and amenity areas are concentrated in the existing urban area; provision has to be made for similar facilities in the peri-urban area which is likely to be urbanized over the next 20 years i.e. the duration of plan period.

The expansion however needs to be guided in the right directions because of the following reasons:

- Urbanization has far-reaching effects on agricultural lands. The process of urbanization usually triggers growth of urban housing, infrastructure, city-specific land-use forms such as recreational areas/stadiums, and public facilities etc. which further diminish cropland around the cities.
- There is thus a need on the part of the Government and the civil society to preserve this valuable natural gift i.e. agricultural land.

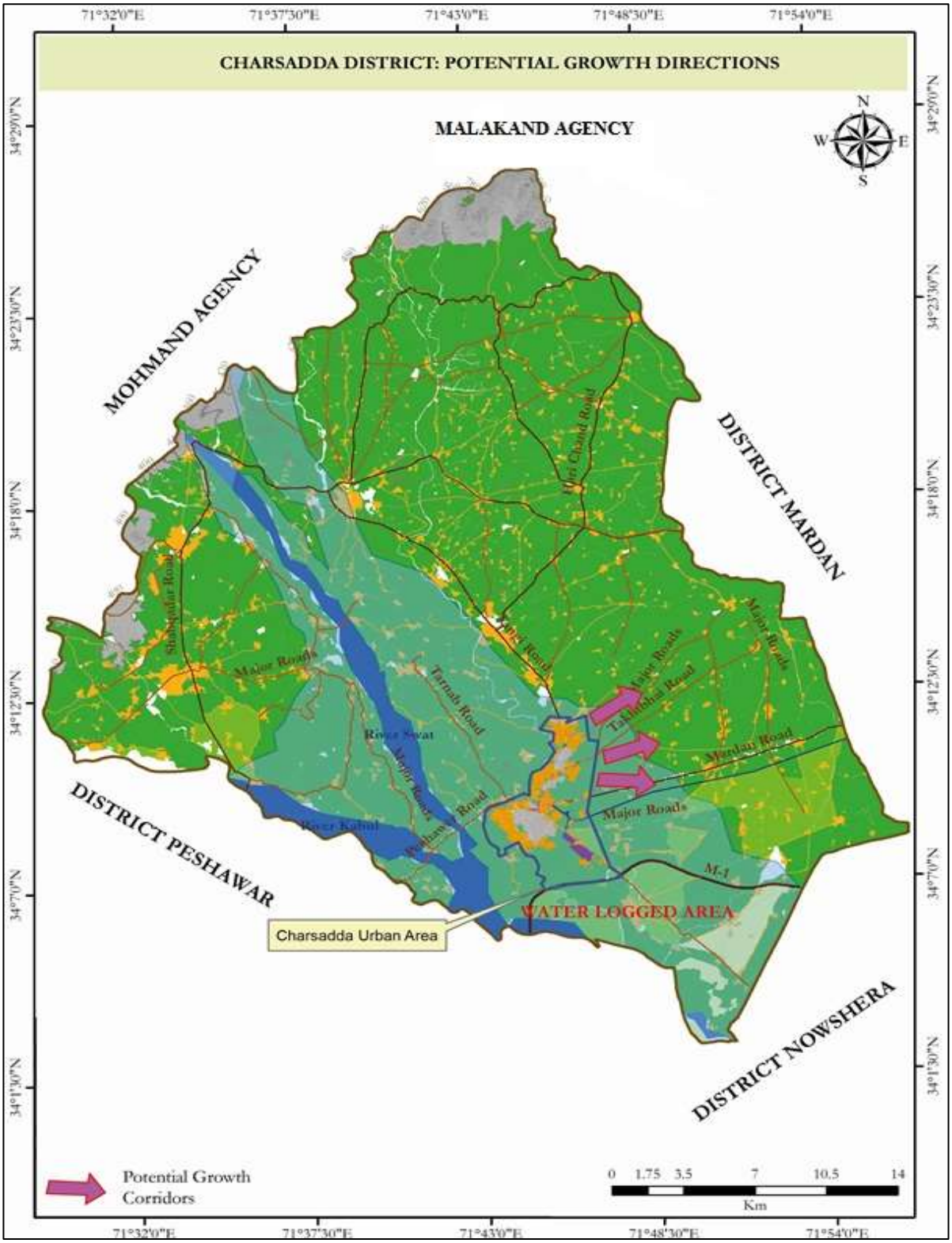
- Based on Consultants findings, the agricultural land in the district has been divided into three classes i.e. Class 1, Class 2 and Class 3.
    - Class1: Agricultural areas which are irrigated and productive; highly valuable not recommended for Land Use change.
    - Class 2: Agricultural areas which are productive but water logged
    - Class 3: Agricultural areas which are though productive, but are rain-fed; Land Use may be changed for future urbanization.

District Charsadda has very fertile agricultural land. As seen in Chapter 2, more than 80% of area of District Charsadda is agriculture, and most of it is good quality agricultural land. However, because of a number of factors which are explained in subsequent sections, some of the agricultural land, which is away from flood-prone area, will have to be utilized for future urbanization.

It is clear from the map that most of the good quality agricultural land lies towards North of the District. The following important factors have also been considered for Land Use Planning of District Charsadda:

- River Swat/Kabul and small rivers like Abazai and Jindai flow towards West and South of Charsadda City. Swat River merges into Kabul River at a location South-West of Charsadda. The area towards South-West and towards South is thus prone to flooding and future human habitations in these directions must be discouraged.
- At present expansion is taking place haphazardly along inter-city roads in leap-frog fashion, leaving fertile agricultural land trapped between these linear developments. Such trapped areas ultimately develop into slums. It is therefore important that guided development must be encouraged in compact form.
- In view of the above rationale, it is suggested that urban expansion should take place towards East of the existing city, in the area having Mardan Road towards South and along both sides of Takht Bhai Road, but in a compact manner utilizing all land in between inter-city roads to achieve economies of scale and avoid land wastage.

Base on the above analysis, the Consultants are of the opinion that Eastern and North-Eastern side of Charsadda city is the potential growth area for future Urbanization.



Map 5-2: Potential Growth Directions

5.4 SPATIAL GROWTH OF CHARSADDA

Assessing extent and direction of spatial growth of Charsadda to cater for the growing population over the next 20 years is vital for formulating a realistic Land Use Plan. This section therefore attempts to determine the land required in urban and rural areas of the District Charsadda for the plan period.

Spatial growth of Charsadda over the next 20 years depends on Housing Demand, transportation network, new commercial area, industry and major recreational, health and educational facilities etc. These are described in this Section.

5.4.1 Population Densities

The total area of District Charsadda is about 996.06 sq. km, of which only about 30.12 sq. km (3.02%) is categorized as urban. Table 5-1 below shows Population densities of urban and rural area in District Charsadda.

Table 5-1: Gross Population Densities

Locale	Population (2021)	Area	Population Density (Persons per Sq. Km)
Urban Area	**290045**	30.12[13] Sq. Km (7443 acres)	9292 persons per sq. km (38 persons per acre)
Rural Area	**1422697**	965.94 Sq. Km (238689 acres)	1473 persons per sq. km (6 persons per acre)
District Total	**1778704**	996.06[14] Sq. Km (246132 acres)	1709 persons per sq. km (7 persons per acre)

It is clear from above Table 5.1 that the current urban density is 38-40 persons per acre (PPA). This is a low figure and does not call for any reduction in urban density for decongestion; There is however a need for segregating non-compatible and traffic-attracting Land Uses from inner city. Such steps will result in better living environment for the residents.

[13]Ref. Chapter 2, (Land Use Distribution) of this Report

[14] Calculated from approved base map of Charsadda

5.4.2 Urban Area - 2040

As the population of Charsadda City continues to grow, its urban boundary needs to be re-defined. The existing urban area is around 30.12 sq. km, to which about 19 Sq. Km, would be added, as calculated below. The gross urban area by the end of plan period would thus be 43.75 sq. km.

- Urban Population (2021) =290045[15]
- Urban Area (2021) =30.12 sq. km[16].
- Current Population Density =9629 persons/sq. km.
- Additional Urban Population (2021-2040) = 116270

Future Area required= Additional Population/Density = 116270/9629=12.07 sq. km.

5.4.3 5.4.3 Union Councils to Urbanize by 2040

As already stated, the current urban area of District Charsadda is spread over 30.12 square km, and the area required for additional urban population during the period 2021-2040 would be 15 sq. km. The urban area of District Charsadda by the year 2039 would thus encompass 30.12+12.07=42.19 sq. km.

The criterion for envisaged urbanization by the year 2040 is not entirely density-based, but also stems from the proposed Land Use strategy. Future densities will be driven by the proposed Land Uses in a particular direction, even if the current densities over there are relatively lower than elsewhere, but expansion in that direction otherwise is desirable. Thus, the proposed trunk infrastructure in a particular direction, future housing, new commercial & industrial areas, health, education & recreational areas, major road network etc. will attract population there, resulting in enhanced densities.

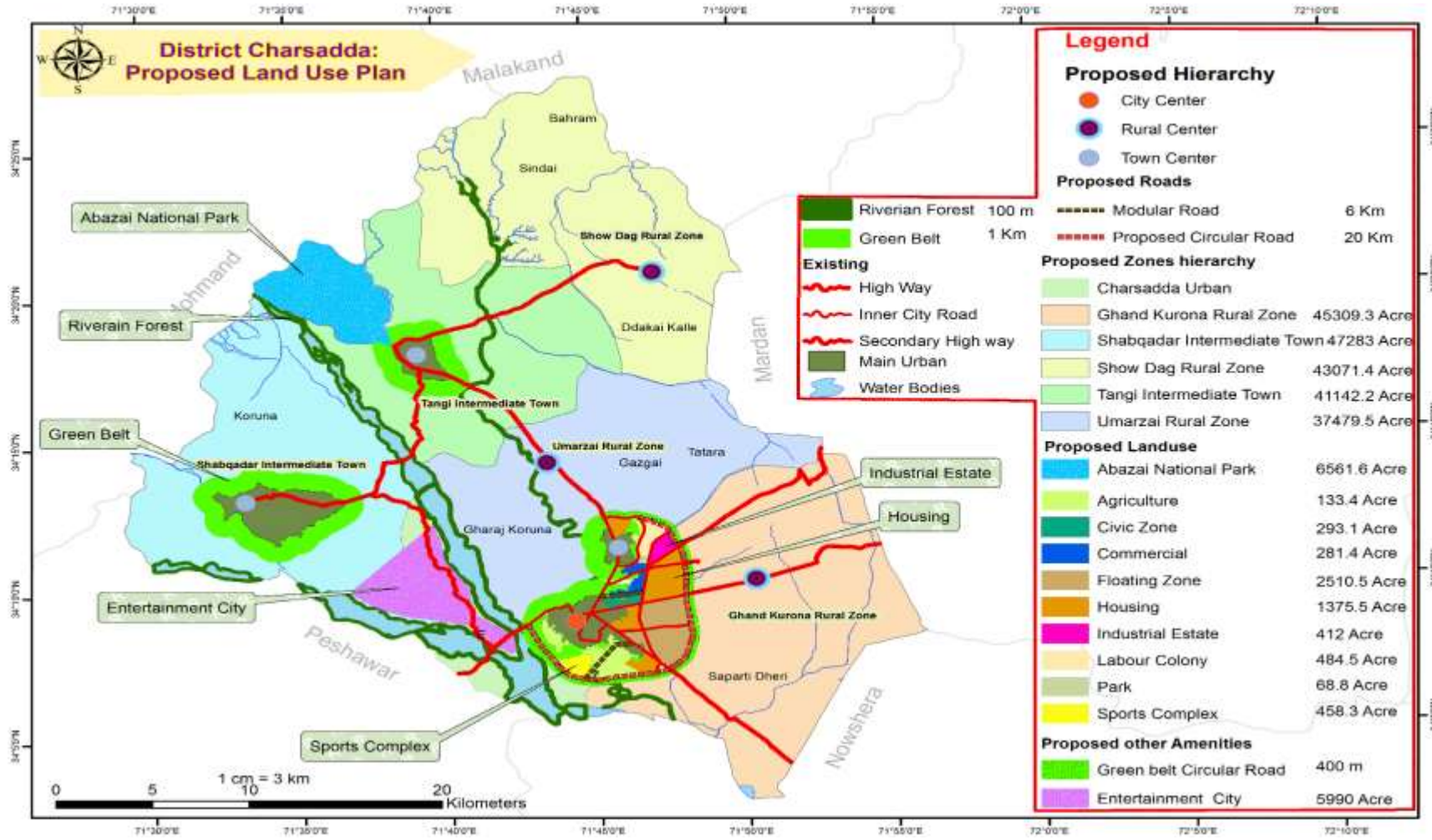
Table 5-2: UCs likely to Urbanize by 2040

Sr. No.	Name of UC
1	Turang Zai
2	Pazar-I
3	Pazar-II
4	Gunda Kar Kana
5	Maira Parang
6	Muhammad Nari

The currently rural/semi-rural UCs which would urbanize by 2040 are 6, as given in Table 5-2. All these UCs would partially urbanize, as the areas of UCs are very large.

[15] Source: 2017 Census Report.

[16] Source: Chapter 2, Table 2.5.



Map 5-3: Proposed Land Use of District Charsadda

Map 5-3 Indicates the Proposed Land Use Map of District Charsadda with total area.

5.5 HOUSING DEMAND (2021-2040)

5.5.1 Demand for Additional Population

It is estimated that the additional population of District Charsadda during the period 2021-2040 will be around 1029610 while that in the next 5 years (2021-2025), the additional population will be about 179082. The housing demand in these two-time periods will accordingly be 171602 and 29847 respectively, based on the assumption that each family of 6 will have one house (Table 5- 3).

Table 5-3: Housing Demand for Additional Population in the District Charsadda

Year	District Population	Additional Population				Housing Demand			
		2021-2025	2026-2030	2031-2035	2036-2040	2021-2025	2026-2030	2031-2035	2036-2040
2021	1778704								
2025	1957786	179082				29847			
2030	2207570		249784				41631		
2035	2489670			282100				47017	
2040	2808314				318644				53107
Total		**1029610**				**171602**			

5.5.2 Housing Shortage/Backlog

The main facets that need to be considered for assessing housing backlog include population, existing number of families, household size and the current housing stock. The population of District Charsadda in the year 2021 is given in Table 5- 4. The Table shows required number of Houses in the District (assuming family size of 6), and those currently available (@ household size of 7.3). The difference between the two is the current housing shortage. Based on statistics in the Table, the current housing backlog in District Charsadda is 75,393 plots/units.

Table 5-4: Current Housing Backlog in District Charsadda

Category	Population	Housing required	Housing stock	Housing backlog
Urban	290,045	48341	37621	10720
Rural	1,488,659	248110	183437	64673
Total	1,778,704	296,451	221058	75,393

5.5.3 Density and House Hold Size

Household size of District Charsadda was 6.6 in 1981 which increased to 8 in 1998 and slightly decreased to 7.3 up to 2017 while up to 2040 the household size will decline to 6.

Density is the number of people living in per square kilometer in 1981 Density of District Charsadda was 633 per sq. km which increased to 1027 in 1998 and 1623 per sq. km in 2017, the current density is 1786 while up to 2040 the density will increase into 2820 persons/per sq. km.

Table 5-5: Density & Household size of District Charsadda

Year	Density (per sq. km)	Household size
1981	633	6.6
1998	1,027	8
2017	1,623	7.3
2021	1,786	6
2040	2,820	6

5.5.4 Gross Housing Demand in the District

Based on calculations in earlier Sections, the summary of findings and gross housing demand is the district is given below:

Housing Demand for Additional Population (2021-2040) : 171602 houses

Current Backlog (2021) : 75,393 houses

Gross Demand : 171602 + 75393 = 246995

5.5.5 Net Housing Demand in the District

To calculate net housing scheme in the district, it is important to first assess the potential for in-fill development, which depends on:

- Available plots in public sector housing schemes
- Private housing schemes
- Vacant urban land for in-fill development

Public Sector Housing Schemes

There is only one approved housing scheme in private sector in District Charsadda. There are a number of reasons for this. Firstly, the District is very productive in terms of agriculture, and for private sector, conversion of such land to housing provides no value-added in terms of returns. Even in public sector no such initiative has been felt necessary, as Charsadda is under the shadow effect of Peshawar Metropolis, and people prefer to live or commute to Peshawar rather than in Charsadda.

Table 5-6: Approved Private Housing Scheme in Charsadda

Name	Nature of Scheme	Address	Approval Status	Area (In Kanals)
Turangzai Baba Town Charsadda	Private Scheme	Charsadda Road	Approved	1335.5

Unapproved Private Housing Schemes

There are however, a few unapproved housing schemes in the district, as per following details in (Table 5-7).

Table 5-7: Unapproved Private Housing Scheme in Charsadda

S.No	Name	Nature of Scheme	Address	Approval Status	Area (In Kanals)
1	Ayub Model Colony	Private Scheme	Mardan Road	Unapproved	81.25
2	Green Valley Housing Scheme Charsadda	Private Scheme	Peshawar Road	Unapproved	65.85
3	Ahmad Abad Phase 2	Private Scheme	Ghani Khan Road	Unapproved	19
4	Pakhtunkhwa Housing Society	Private Scheme	Nowshera Road	Unapproved	395.49

Utilization of Vacant Urban Land for In-Fill Development

There are 0.03 sq. km[17] (around 7.4 acres) of land is lying vacant in the existing built-up area of Charsadda City, i.e. land where no activity is taking place[18]. It needs to be noticed that area under agriculture (which is 16.63 square km or 4,108 acres in urban area) is not vacant; as an activity i.e., agriculture is taking place over it.

Assuming that 100% of available vacant land in urban area will be utilized for housing, the net available area, as already stated, is 7.4 acres. The average housing density of plots in unapproved housing schemes is 9 houses per acre. Applying the same on available 7.4 acres, around 67 plots (9 x 7.4 acres) can be carved out of this land.

Based on calculations above, the summary of findings and net housing demand is given below:

Demand

- Housing Demand for Additional Population (2021-2040): 171602 houses
- Current Backlog (2021) : 75,393 houses
- Gross Demand : 171602 + 75393 = 246995 (A)

[17] Chapter 2, Table 2.5 of this Report

[18] Source: Chapter 2, Table 2.2.

Potential

- Plots in private housing schemes : NA
- Plots in Public housing schemes : NA
- Plots through in-fill development of vacant land : 67
- Total available plots/potential : 67 (B)
- Net Housing Demand at District Level= A-B= 246928 (C)
- Considering housing density is 8 houses per acre (D)
- Total area required for housing in 2040 = C/D = 30,866 Acers.

5.5.6 Housing Demand in Individual Urban Settlements of District Charsadda

There are four urban settlements in District Charsadda which include Charsadda, Shabqadar, Utmanzai, and Tangi. The housing demand in these settlements is calculated as below. It is estimated that gross housing demand for additional population in all four urban settlements of District Charsadda during the period 2021-2025 will be around 2702 while that in the subsequent 15 years (2025-2040), it will be 11569. This is based on the assumption that each family of 6 will have one house. Settlement-wise statistics are presented in Table 5-7

Table 5-8: Additional Housing Demand for Additional Population in District Charsadda

Urban Area	Population in year			Additional Population		Additional Housing Demand	
	2021	2025	2040	2021-2025	2025-2040	2021-2025	2025-2040
Charsadda	121069	127942	157376	6873	29434	1146	4906
Shabqadar	97065	102576	126175	5511	23599	919	3933
Utmanzai	32493	34337	42237	1844	7900	307	1317
Tangi	34886	36867	45348	1981	8481	330	1414
Total				16209	69414	2702	11569

Housing Shortage/Backlog in Urban Settlements of District Charsadda

The main facets that need to be considered for assessing housing backlog include population, household size and the current housing stock. The overall required number of houses in each settlement was calculated by dividing the current population (2021) with the assumed family size of 6 as given in the National Housing Policy. The existing housing stock was calculated by dividing population with household size of the respective settlement that is 6. The difference between the number of houses required and the existing housing stock gives the current housing shortage. Settlement-wise housing backlog is given in the Table 5- 9

Table 5-9: Housing Shortage in Urban Settlements of District Charsadda

Urban Area	Population 2021	Housing Required	Existing Stock	Current Backlog
Charsadda	121069	20178	17656	2522
Shabqadar	97065	16178	13153	3025
Utmanzai	32493	5416	4983	433
Tangi	34886	5814	4283	1531

5.5.7 Gross Housing Demand in Urban Settlements

Table 5-10 below shows the number of houses required for additional population during the first five years (2021-2025), subsequent 15 years (2025-2040), the current housing backlog, and the gross housing demand over the next 20 years. The number of houses required by the end of plan period in Charsadda and Shabqadar are 8573 and 7876 and Utmanzai and Tangi is 2057 and 3275.

Table 5-10: Gross Housing Demand in Urban Settlements

Urban Area	Additional Housing Demand			Current Backlog	Gross Housing Demand (2021-2040)
	2021-2025	2025-2040	Total (2021-2040)		
Charsadda	1146	4906	6051	2522	8573
Shabqadar	919	3933	4852	3025	7876
Utmanzai	307	1317	1624	433	2057
Tangi	330	1414	1744	1531	3275

5.5.8 Area Required in Individual Urban Settlement of District Charsadda

The main facets that need to be considered for assessing housing backlog include population, household size and the current housing stock. The overall required number of houses in each settlement was calculated by dividing the current population with the assumed family size of 6 as given in the National Housing Policy. The existing housing stock was calculated by dividing population with household size of the respective settlement. The difference between the number of houses required and the existing housing stock gives the current housing shortage. By dividing the gross housing deand by 8 we will get the area required for the future housing demand.

(Area @ 8 Houses per Acre.) Settlement-wise housing backlog is given in the Table 5-10

Table 5-11: Area Required in Individual Urban Settlement of District Charsadda

Urban Area	Additional Housing Demand (2021-2040)	Current Backlog (2021)	Gross Housing Demand (2021-2040)	Area Required (Acres)
Charsadda	6051	2522	8573	1072
Shabqadar	4852	3025	7876	985
Utmanzai	1624	433	2057	257
Tangi	1744	1531	3275	409

5.5.9 In-fill Developments/Vacant Lands for Housing and Expansion of Urban Settlements

Table 5-12 below shows absorption capacity for housing through in-fill developments in housing schemes and vacant lands available in urban areas.

Table 5-12: Housing through In-fill Development Vs. Spill-Over (2013) in Urban Settlements

Urban Settlements	No. of Plots in Housing Schemes	Vacant Urban Land (Acres) [19]	Population that can be accommodated in vacant urban land[20]	Household Size[21]	In-fill Development on urban vacant land	Total Absorption Capacity (Plots in housing Scheme plus on vacant land)
	A	B	C	D	C/D=E	A+E=F
Charsadda	144[22]	593	28,464	6	4,744	4,888
Shabqadar	0	0	-	6	-	-
Utmanzai	0	13.82	663	6	111	111
Tangi	0	101.8	4886	6	814	814

Total areas required for residentiary areas (net residential plus ancillary uses) have been calculated for each urban settlement within urban areas and adding to it the area required outside current urban area i.e. spill-over (in whichever urban settlement applicable) to meet the total housing demand. The Land Use distribution standards as given in NRM were then applied to these to calculate settlement-wise Land Use areas required, as given in the Table (5-13) below.

[19] Calculated from GIS maps

[20] Current urban density multiplied by vacant area in urban area.

[21] Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report, Charsadda

[22] Source: Table 5.5 of this Chapter.

Table 5-13: Land Use Distribution Required in Urban Settlements of District Charsadda

Urban Settlement	Residential [23]	Commercial [24]	Community Facilities [25]	Road/Street [26]	Open Spaces [27]	Other [28]
Charsadda	788.3	40.21	144.7875	450.45	112.6125	72.39375
Shabqadar	443.695	22.6375	81.495	253.54	63.385	40.7475
Utmanzai	245.42875	12.521875	45.07875	140.245	35.06125	22.53938
Tangi	261.23125	13.328125	47.98125	149.275	37.31875	23.99063

5.5.11 Area Requirements

Considering Population density as 8 houses per acre, all values (number of houses) in Table 5-14 are divided by 8 to get Area required for housing in Acres.

For the total housing demand (additional for next 20 years plus current backlog), gross area required is 21450 acres, of which 2422 acres is in urban area and 19028 acres) in rural areas

Table 5-14: Area Required for Additional Housing Demand (Acres)

Time Period	Area		
	Urban	Rural	Total
2021-2025	444	3286	3731
2025-2040	1978	15741	17719
TOTAL	2422	19028	21450

5.5.12 Proposed Locations for New Housing Areas

The new housing is proposed towards North-East of the District between Mardan Road and Takht Bhai Road. Future housing is also proposed as infill development in vacant pockets and agricultural land falling within urban area, where necessary. However, as already stated and

[23] @49% of total required area.

[24] @2.5% of total required area.

[25] @9% of total required area.

[26] @28% of total required area.

[27] @7% of total required area.

[28] @4.5 % of total required area.

as per proposed Land Use strategy, most of the future housing developments are proposed towards North-East of the District, i.e. between Mardan Road and Takht Bhai Road. This proposal is based on two factors; firstly, it is in line with the existing growth trends as developments are taking place along these roads. Secondly, areas in all other directions i.e. North-West, West, South and South-East of existing Charsadda City are flood-prone areas, because of recurring seasonal floods in nearby River Kabul and River Swat.

5.6 TRANSPORTATION NETWORK

5.6.1 Roads and Bridges

The main transport infrastructure in District Charsadda is provided several links to various highways including the Motorway (M-1), the Grand Trunk Road (N-5), the Karakoram Highway (N-35), Nowshera - Dir - Chitral Highway (N-45) and Nowshera – Charsadda-Shergarh Highway (S-9), and a railway station enabling road, rail, and air connections (through Peshawar International Airport).

i. Motorway – M1

The M1 stretch of Motorway connects Peshawar with Islamabad, and joins M2 at Islamabad Interchange as a continuation of Motorway network. Emanating from Peshawar Ring Road, it moves in Eastern direction, crossing Kabul River, passing through Charsadda, Risalpur, Swabi and Rashakai before crossing the Indus River. The whole stretch of the M1 consists of 6 lanes with a number of rest areas along the route. It is expected to take much traffic off the highly used N5.

ii. Provincial Highways & Roads

In District Charsadda, there are about 381 KMs Provincial Highways and Roads, as per data reported by Communication & Works Department Peshawar. These all highways & roads are of high type.

iii. Secondary Roads

In the District Charsadda, 9 Secondary roads have been reported by Communication & Works Department Peshawar. This type of roads is third category of roads, denoted as ‘D’ by C & W Department. Total of the roads is about 88 Kilometers, Right of Way ranging from 7.3 meters to 30.2 meters, Black Top width from 3.6 meters to 7.00 meters and Shoulder width from 1 to 7 meters. Details regarding road names, length, right of way, carriageway and shoulder width are given in Chapter 14 of District Studies Report.

iv. Access Roads

A total of 42 access roads has been reported in District Charsadda by Communication & Works Department Peshawar. Total length of the roads is over 229 Kilometers, Right of Way ranging from 4.00 meters to 13.7 meters, Black Top width from 3.65 meters to 7.00 and Shoulder

width from 0.5 to 1.5 meters. Road-wise details are given in Chapter 14 of District Studies Report.

v. Bridges

There are 12 bridges in District Charsadda, as per details given in the Studies Report, including their names, segment, bridge type, width, length and height.

5.6.2 Vehicles Registered in District Charsadda

The total number of registered vehicles in District Charsadda is 6, 484, of which the fleet of passenger transport in District Charsadda comprises of total 5,057 vehicles (78%) comprising of cars/jeeps, motor cycles/scooters, buses/mini buses/ wagons etc., as given in the Table 5-15. below. Around 22% are non-passenger vehicles as detailed below.

Table 5-15: Registered Vehicles in District Charsadda (2009)

Vehicle Type	Number	% age
Motor Cycle/Scooter	1,715	26
Motor Cars/Jeeps/Taxi	990	15
Buses/Mini Buses	73	1
Motor Cabs Rickshaws	2,279	35
Sub-Total (Passenger Transport)	5,057	78%
Public Carrier Trucks	86	1
Other Vehicles (Tractors, Private Trucks, Dumpers, Ambulances, Cranes, Water Tankers, Delivery Vans & Pickups)	1,341	21
Sub-Total (Carrier Trucks/Others)	1,427	22%
Total	6,484	100

5.6.3 Vehicular Forecasts - District Charsadda

The projected vehicles in District Charsadda in 2021 and 2040, based on average annual growth rate of 3.5 % for last 10 years are estimated at 9452 and 18807 respectively, as shown in Table 5-16.

Table 5-16: Projected Motor Vehicles in Distt. Charsadda for Next 10 & 20 Years

Vehicles Type	2009	2013	2021	2,040
Motor Cycle/Scooter	1,715	1,968	2504	4982
Motor Cars/Jeeps/Taxi	990	1,136	1445	2875
Buses/Mini Buses	73	83	106	211
Motor Cabs Rickshaws	2,279	2,615	3327	6620
Public Carrier Trucks	86	98	125	249
Other Vehicles (Tractors, Private Trucks, Dumpers, Ambulances, Cranes, Water Tankers, Delivery Vans & Pickups)	1,341	1,529	1945	3870
Total	6,484	9,453	9452	18807

5.6.4 Traffic Surveys

Traffic Volumes

In order supplement to above-described traffic data and have firsthand data about nature and volume of traffic, fresh Manual Classified Counts (MCC) were conducted on primary roads of District Charsadda at entry and exit points. The survey was conducted on hourly basis, from 7 AM to 7 PM on February 19, 2013.

Analysis of the data obtained shows that the peak hours on different roads were as follows:

- Peshawar Road: 8-9AM
- Mardan Road: 4-5 AM
- Momend Road: 8-9 AM

Table 5-17 summarizes the existing traffic volume (in-coming and out-going) on the three primary roads of District Charsadda:

Table 5-17: Traffic Volume on Primary Roads of District Charsadda

Sr. No	Description	Peshawar Road	Mardan Road	Mohmand Road	Total
1	In-Coming	16,045	4,541	3,470	24,056
2	Out-Going	13,191	4,378	2,929	20,498
5.6.4.1.	Total	29,236	8,919	6,399	44,554

The detailed statistics are presented in the District Studies Report. Following are the main inferences:

i. Total Traffic volume on the three primary roads of District Charsadda (in-coming plus out-going) is 44,554 vehicles, of which maximum volume is on Peshawar Road (66% of total flow, both ways), followed by Mardan Road (20%) and Mohmand Road (14%). The vehicles

include all modes of traffic including motor Cycles/ Scooter, Car/Jeep, Wagons/Mini Buses, Buses, pickups, trucks, and tractor trolleys.

ii. In terms of modal split, 36% of the total traffic volume (on all three primary roads, both ways) comprises of cars/jeeps, followed by motor cycles (29%), wagons/mini buses (18%) and around 8% pick-up trucks. Other modes are relatively much less.

iii. The heavy flow on Peshawar Road is because Charsadda is very close to Peshawar in terms of travel time and distance; hence people commute to Peshawar on daily basis, mainly on cars and motor cycles.

iv. Of the total cars/jeeps, about 67% ply on Peshawar Road, 20% on Mardan Road and about 13% on Mohmand Road.

v. The trend in case of motor cycles/scooters is roughly similar as cars/jeeps.

vi. Of the total wagons/mini buses about 74% ply on Peshawar Road, followed by Mohmand Road (15%) and Mardan Road (11%).

vii. A different picture emerges in case of large buses. Of the total, most large buses (58%) travel on Mardan Road, followed by 42% in case of Peshawar Road. Details are given in Chapter 14 of District Studies Report.

viii. To determine level of service against traffic carrying capacity of these roads, maximum traffic flows during peak hour have been converted into equivalent passenger car units (PCUs).

ix. Of the total traffic volume in peak hour, more than 68% PCUs are on Peshawar Road, followed by Mohmand Road (20%) and Mardan Road (12%) (calculated from Table 5-18)

x. For determining the existing level of service of roads under the given traffic flow and other conditions, standards of traffic density ranges as explained in the Studies Report were adopted. Level of service is qualitative measure describing operational conditions within a traffic stream. It is seen that:

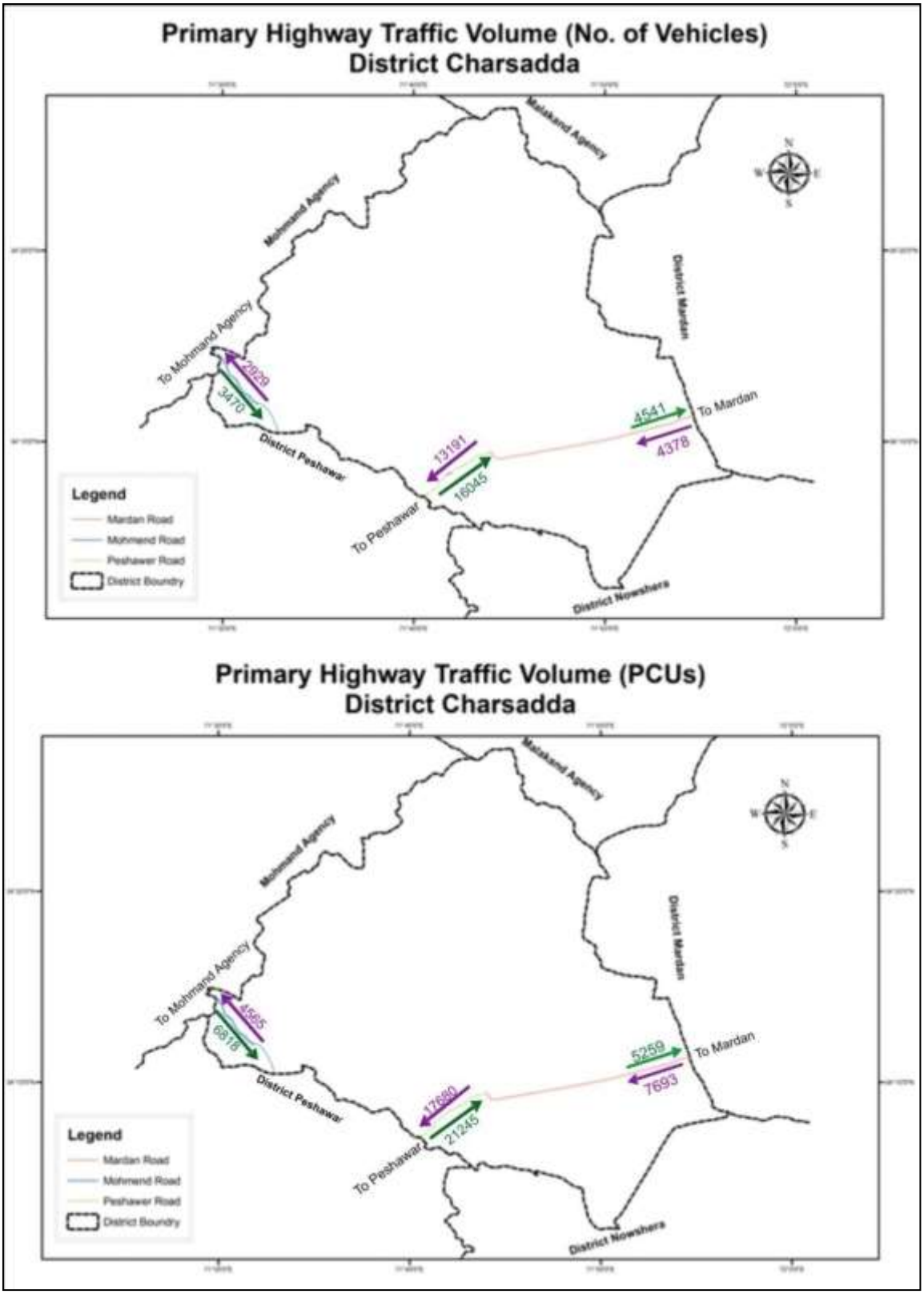
a. Flow of Traffic on Peshawar Road is unstable.

b. Reasonably free flow on Mardan Road.

c. Stable on Mohmand Road.

Table 5-18: Maximum Hourly Traffic Flow on Primary Roads, District Charsadda

Sr. No	Vehicles Type	PCU Ratio	Peshawar Road		Mardan Road		Mohmand Road	
			Hr. 2 (8-9 AM)		Hr. 10 (4-5 PM)		Hr. 2 (8-9 AM)	
			Veh.	PCU s	Veh.	PCU s	Veh.	PCU s
1	Motor Cycle/ Scooter	0.33	763	251.79	327	107.91	163	53.79
2	Car/ Jeep / Taxi	1	1442	1442	333	333	278	278
3	Wagons/Mini Bus/ Medium Bus (12 to 20 seats)	1.5	700	1050	56	84	210	315
4	Large Bus (over 20 seats)	4	1270	5080	124	496	388	1552
5	Pickup/ Truck (open back)	4	394	1576	163	652	61	244
6	Truck (2 Axle Rigid)	4	162	648	7	28	75	300
7	Truck (3 Axle Rigid)	4	21	84	9	36	30	120
8	Articulated Truck (4, 5, 6 or more Axles)	4.5	0	0	0	0	0	0
9	Tractor Trolley	4.5	91	409.5	29	130.5	41	184.5
10	Total	27.83	4,843	10,541	1,048	1,867	1,246	3,047



Map 5-4: Primary Highway Traffic Volume District Charsadda

Origin-Destination Surveys

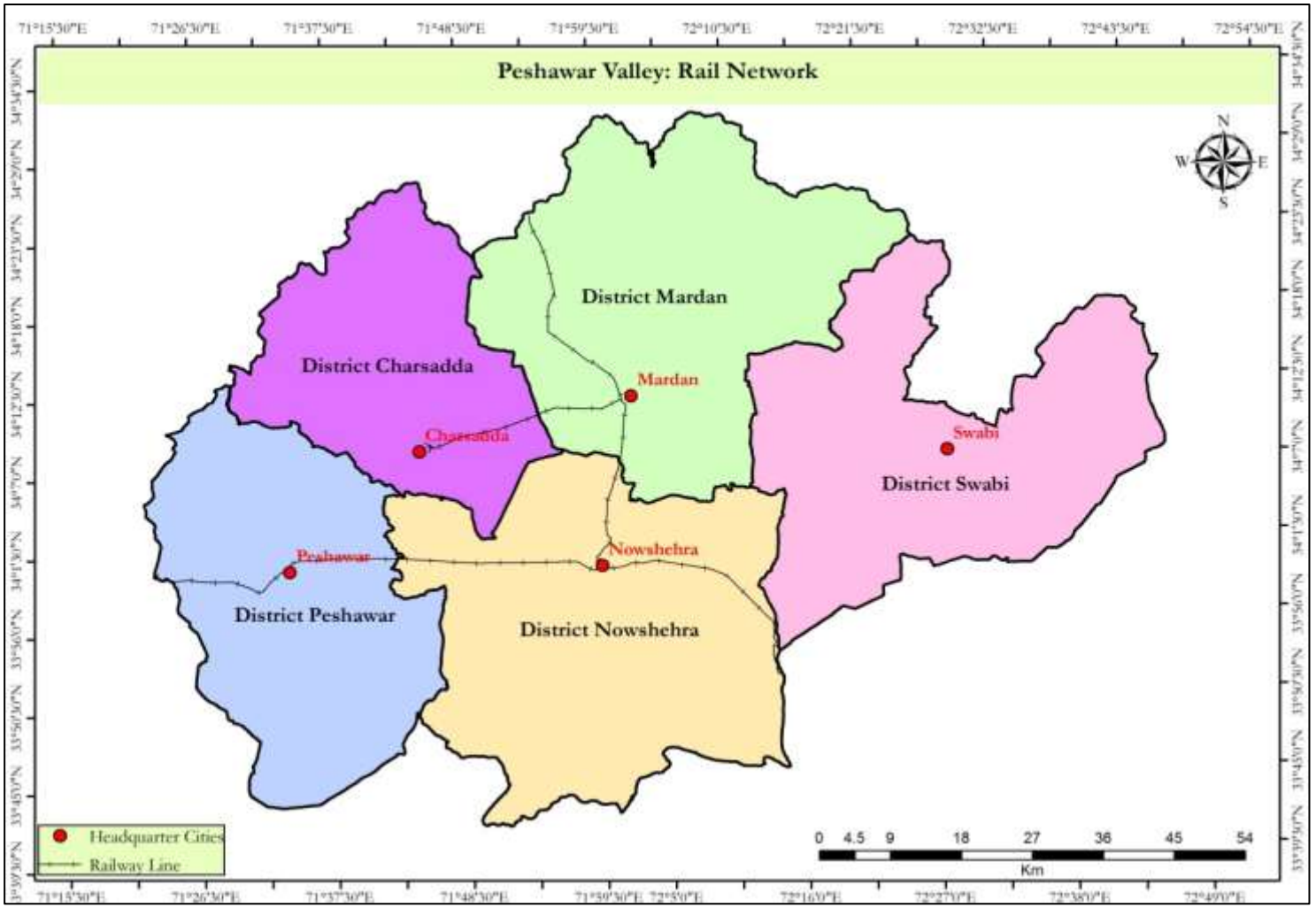
Traffic Origin-Destination Survey has been conducted during January 2013, on primary highways of District Charsadda, at boundaries and entry/ exit points. The roads included Peshawar Road, Mardan Road and Mohmand Road. The survey was single day based and covered mainly peak hours of traffic flow.

Following is the summary of inferences of O-D survey:

i. A total of 316 vehicles were interviewed of which 43% were cars/jeeps, followed by 19% wagons/mini buses, about 13% pick-ups, 9% tractor trolleys, 14% trucks of different categories, and less than 3% buses as inferred from relevant Table in Chapter 14 of District Studies Report, Charsadda.
ii. Most of the vehicles interviewed for origin/destination were on Peshawar Road (58%), followed by Mardan Road (29%) and Mohmand Road (13%).
iii. Of those who originated from Charsadda, about 58% were destined for Peshawar, around 23% for FATA, and about 18% for Mardan.
iv. Of those whose destination was Charsadda, 66% were coming from Peshawar, about 21% from FATA/FANA, and about 10% from Mardan. Detailed statistics are given in O-D Tables, Chapter 14 of District Studies Report.

5.6.7 Railway Network

There is only one Railway Station in District Charsadda. It was established in 1954. This railway station has not been in use for passengers for last 19 years. This was being used for freight traffic only, but in March 2010 it was also closed.



Map 5-5: Railway Network in Peshawar Valley

5.6.8 TRANSPORTATION PROPOSALS

Effective road network and proper management of transport system play major role in the efficient functioning of a habitat. One of the main objectives of Land Use Plan at District level is to increase the capacity of existing roads, opening up new area for development, and decentralization and traffic management in the inner city.

Primary Highways

Most of the traffic volume is on Nowshera Road (about 44% of total flow), followed by 42% on Mardan Road, and 14% on Ghazi Road. With the developments proposed in Topi and surroundings, the traffic between Swabi and Topi is likely to increase.

Thus, it is important to widen the existing District roads to Primary Highways, according to the NHA Standards.

The widening and improvement of above roads will also improve the linkages between Swabi and other urban centers in the district such as Sher Khan, Topi Zaida, and Tordher. After widening, the above roads need to be kept free from all types of permanent and mobile encroachments. From transportation perspective, all main urban settlements in the District need to be seen in holistically and linkages between one another need to be strengthened. This will also help to decrease the traffic load in urban areas of Swabi and also increase efficiency of District Road network.

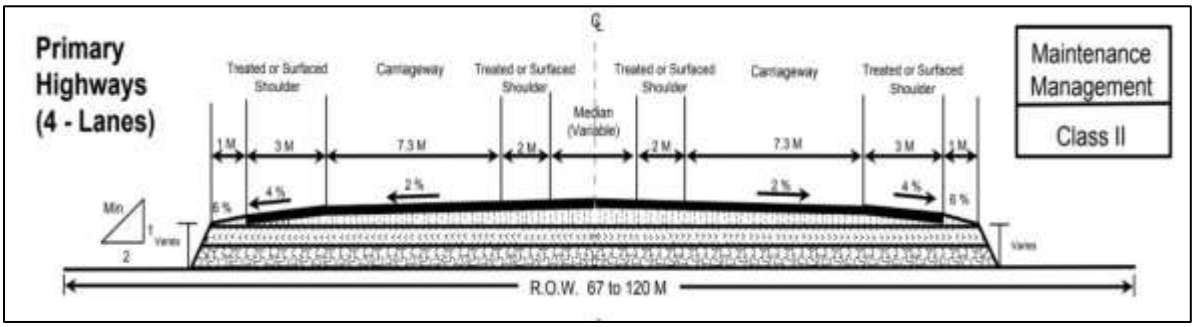


Figure 5-1: Primary Highways

Secondary Highways

Along with widening the District Roads into Primary Highways, the Local Road which connects the main centers of Swabi District and also connects the Growth Centers with each other and the Primary Highways, these Local Roads should be declared as Secondary Highways, according to the NHA Standards.

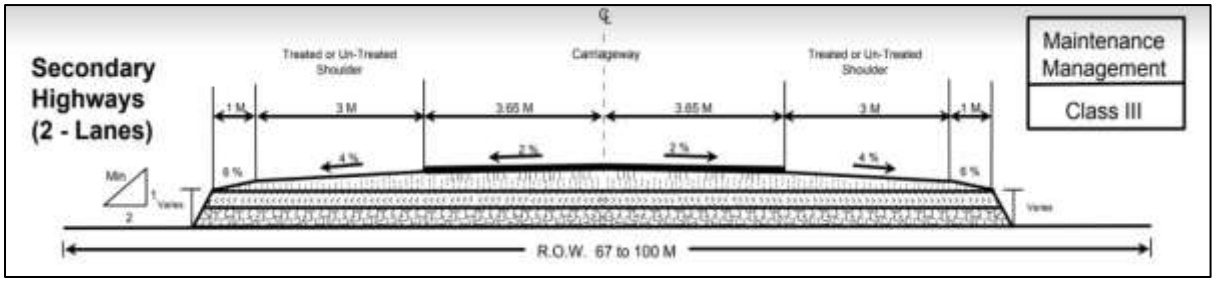


Figure 5-2: Secondary Highways

Minor Collector Roads

Minor Collector Roads would be that roads which connects the settlements and villages with each other, these roads should also be considered in the improvements as these are also important for the development of Swabi District.

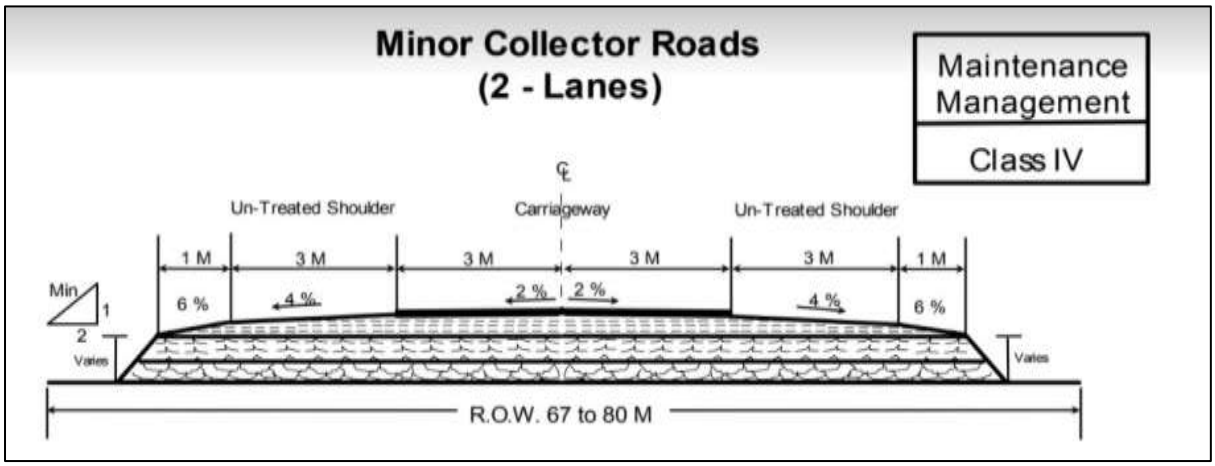


Figure 5-3:Minor Collector Roads

Charsadda Ring Road

A Ring Road is proposed round Charsadda City, in order to ease the traffic flow on arterial roads, by facilitating the inter-city traffic to bypass the city, without disturbing the down town activities and facilitate the efficient movement of intra- city traffic. The proposed Ring Road will interlink all primary (radial) roads of the city i.e., Peshawar Road, Nowshera Road, Mardan Road, Takht Bhai Road and Tangi Road. This road may be constructed in two phases i.e., Southern part in phase-I and Northern part in phase-II. The broad alignment of the proposed ring road is shown in the Plan.

Reducing Congestion in Central Area

One of the major problems being faced by Charsadda is that all main inter-city roads such as Peshawar Road, Nowshera Road and Mardan Road converge in the urban area of Charsadda causing immense traffic problems, as inter-city traffic mingles with the local traffic. Peshawar Road enters the district (and Charsadda City) from South West, Nowshera Road from South East, and Mardan Road from the East. Besides a number of other roads such as Prang Road,

Tarnab Road and Tangi Road also pass through Charsadda urban area. The traffic jams on urban roads are significant. The Ring Road proposed earlier will thus help to reduce congestion as all the through traffic will be diverted, and will move to their destinations via the Ring Road rather than passing through the urban area.

Widening of Inter-City Radial Roads

The problems identified above can be solved by supplementing the proposed ring road by widening existing radial roads, which are:

i. Charsadda-Peshawar Road
ii. Charsadda-Mardan Road
iii. Charsadda-Nowshera Road
iv. Charsadda-Tangi
v. Prang Road
vi. Takht Bhai Road
vii. Mandai-Tangi Road
viii. Tangi Road
ix. Shabqadar-Sardaryab Road
x. Shabqadar-Tangi Road

The widening and improvement of above roads will also improve the linkages between Charsadda and other urban centers in the District such as Tangi and Utmanzai. After widening, the above roads need to be widened and kept free from all types of permanent and mobile encroachments. From transportation perspective, all main urban settlements in the District need to be seen in holistically and linkages between one another need to be strengthened. This will also help to decrease the traffic load in urban areas of Charsadda and also increase efficiency of District road network.

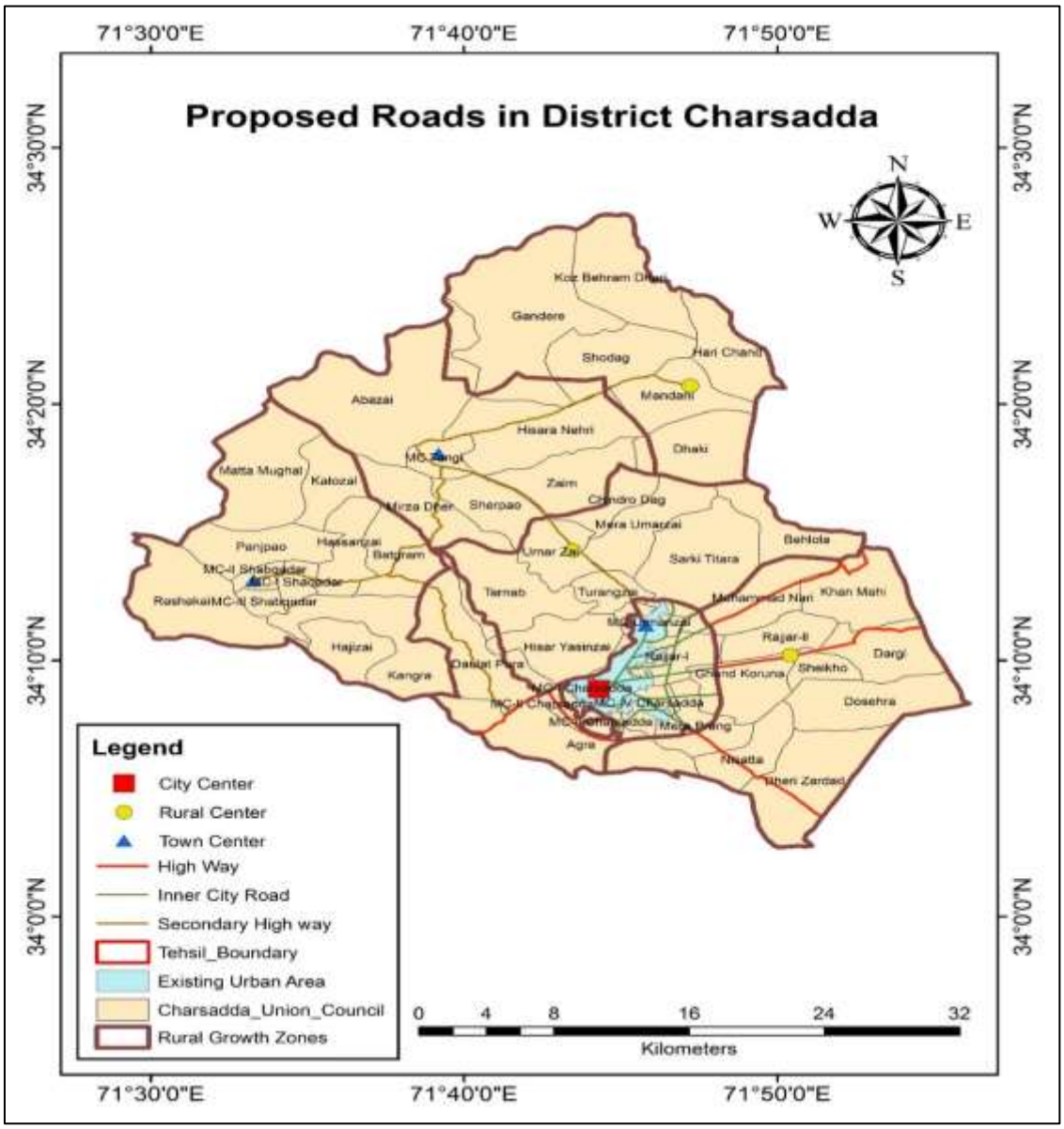
New Roads

In the Proposed area for urbanization in North-East, it has been proposed to create a mesh of new roads. The roads are proposed in such a way that each space or module surrounded by these roads facilitate in phase-wise spatial development of the District in an organized way. The Roads as described above will have at least 100 ft. right of way.

Shifting of Traffic-Generating Land Uses

The major traffic generating activities in the inner-city areas, such as transport terminals, wholesale commercial activities, administrative areas, and higher-level educational institutions etc. may be gradually shifted to suitable locations as proposed in the Land Use Plan. But shifting is a slow and difficult process, and can only be done with consent of all stakeholders.

There is a need to chalk out and implement workable policy for establishment and improvement of Private Passenger Transport Stands and Goods Forwarding Agencies. Relocation of General Bus Stand and Truck Stand for smooth traffic flow is also proposed as shown in the Plan.



Map 5-6:Indicates proposed Roads in District Charsadda

5.7 TRADE ZONE AND COMMERCIAL AREAS

5.7.1 Distribution of Commerce and Trade Centers

In District Charsadda there is a great potential to enhance District's income manifold by allocating more land and financial resources to local business and trade to meet local demands and develop export-oriented production in KP. To this end the flow of information, better infrastructure, availability of funds and quality inputs, and investor/entrepreneurs' managerial capabilities need to be streamlined. Empirical evidence shows that suitable commercial, financial, economic and trade policies directly influence the productivity and economic growth.

Charsadda is famous for Agricultural, fruit, Sugarcane, Tobacco, Marble and Cloth & Foot wears. The main trade and commercial centers of Charsadda are:

i. Charsadda Bazaar
ii. Utmanzo Bazaar
iii. Tangi Bazaar
iv. Ghafoor Market
v. Shabqadar Bazaar
vi. Committee Market, Charsadda
vii. Durrani Market
viii. Tilawat Khan Market, Shabqadar
ix. Barazai Bazar, Tangi

Because of market forces, rapid Land Use conversions are taking place, particularly from residential to commercial. This is creating multifarious problems including traffic congestion, pollution, delays, inefficient energy consumption, and loss of community character. The relationship between uses such as residential, commercial, industrial, institutional, educational and recreational, and the intensity of each use, directly impacts the City's character and quality of life. Any Land Use conversion thus deserves thorough review by the concerned planning agency, whichever is relevant for a particular location.

Charsadda has few city-levels planned commercial centers with adequate parking. Generally, Land Use pattern in Charsadda is mixed and commercial activities take place in many residential areas and along main roads. This trend is more pronounced in densely populated residential areas where ground floor is used for commercial purposes and subsequent floors for habitation. This is particularly true for inner areas of Charsadda.

Future Land Use policy for Charsadda should respect the fact that much of Charsadda's distinct character lies in its diversity of Land Uses, and its physical, economic and cultural characteristics. Complete segregation of Land Uses, particularly in the inner areas is neither possible nor desirable. However rampant Land Use conversions, which impede easy flow of traffic and a non-amenable living environment for the local residents must be controlled.

Congestion is not the only curse of indiscriminate Land Use conversion. It also puts further pressure on the already overburdened infrastructure and public services. Commercial areas are of course part and parcel of any human habitat. Planned commercialization itself is not bad; it is the indiscriminate conversion of Land Uses which should be controlled.

Commercial activities of higher order like wholesale markets and trade centers are presently fragmented, located in different parts of the City. A separate, properly planned Commercial Zone for Charsadda will maximize the aggregate convenience of traders and the inhabitants. By providing such a Center, the present Central Business District of Charsadda and the inner city can be decongested, and the residents can avoid areas of traffic clogging.

5.7.2 Service Area of Commerce and Trade Centers

Data/information regarding service area of Nowshera for trade and commerce was collected through field surveys, and has already been presented in Section 11.1.

One of the methods for assessing the service area of a Town is by applying the well-known Gravity Model. The gravity model takes into account the population size of two places and their distance. Since larger places attract people and commodities more than smaller places and places closer together have a greater attraction, the gravity model incorporates these two features. It helps to draw boundary of the tributary area of a city or delineate its functional region, using the distance between the settlements and population of each settlement. Larger a city, the larger would be its trade area. Two cities of equal size have a trade area boundary midway between the two cities. When cities are of unequal size, the boundary lies closer to the smaller city, giving the larger city a larger trade area.

$$BP = \frac{\text{distance between city a and b}}{1 + \sqrt{\frac{\text{pop. b}}{\text{pop. a}}}}$$

BP is distance from city a to breaking point

The formula shown is used to find the breaking point (BP) between two cities. One can determine the complete trade area of a city by determining the BP between multiple cities and then joining the breaking points by a smooth line. Shown in the table below (5-18)

Table 5-19: Parameters to Determine Service Area of Charsadda under Gravity Model

Cities	City Population (2019)	Distance from Charsadda (Km)	Breaking Point (Km)
Charsadda	1702715		
Peshawar	2100970	39.6	15.08
Mardan	458240	28.6	12.93
Nowshera	1604678	42.8	21.73
Swabi	288748	78.4	39.16

5.7.3 Future Commercial Area Requirement

The proposed Commercial Zone will cater for all kinds of clientele, and attract, city and local trade. It will include wholesale markets which are usually associated with bulk disposal of grains, fruits, vegetables, meats, and will also have large warehousing and storage facilities.

Table 5-20: Total Future Trade Zone & Commercial Area Required (2021-40)

Year/Period	Urban Population[29]	Commercial Area Required @0.5 acres/1000 persons)
2021	290045	
2025	311377	
2040	406315	
Additional Urban Population (2021-2025)	21332	10.66 Acres
Additional Urban Population (2025-2040)	94938	47.469 Acres
Total Additional Urban Population (2021-2040)	116270	58.135

As clear from the Table 5-20, 10.66 acres of commercial area will be required during the first years of plan period (2021-2025), and 47.469 acres during the subsequent 15 years. The total requirements of commercial area thus, during the entire plan period will be 58.135 acres.

5.7.4 Current Commercial Area Gap

The current industrial area gap has been calculated as below:

- Urban Population (2021): 290045

[29] Urban Population of Charsadda City in 1998 projected for the respective years using 1981-1998 urban growth rate of 1.98%.

- Commercial Area required (@0.5 acres/1000 persons)[30]= 145.02 acres
- Current area under commercial Land Use: 37 acres[31]
- Commercial area deficiency: 145.02 -37=108.02 acres

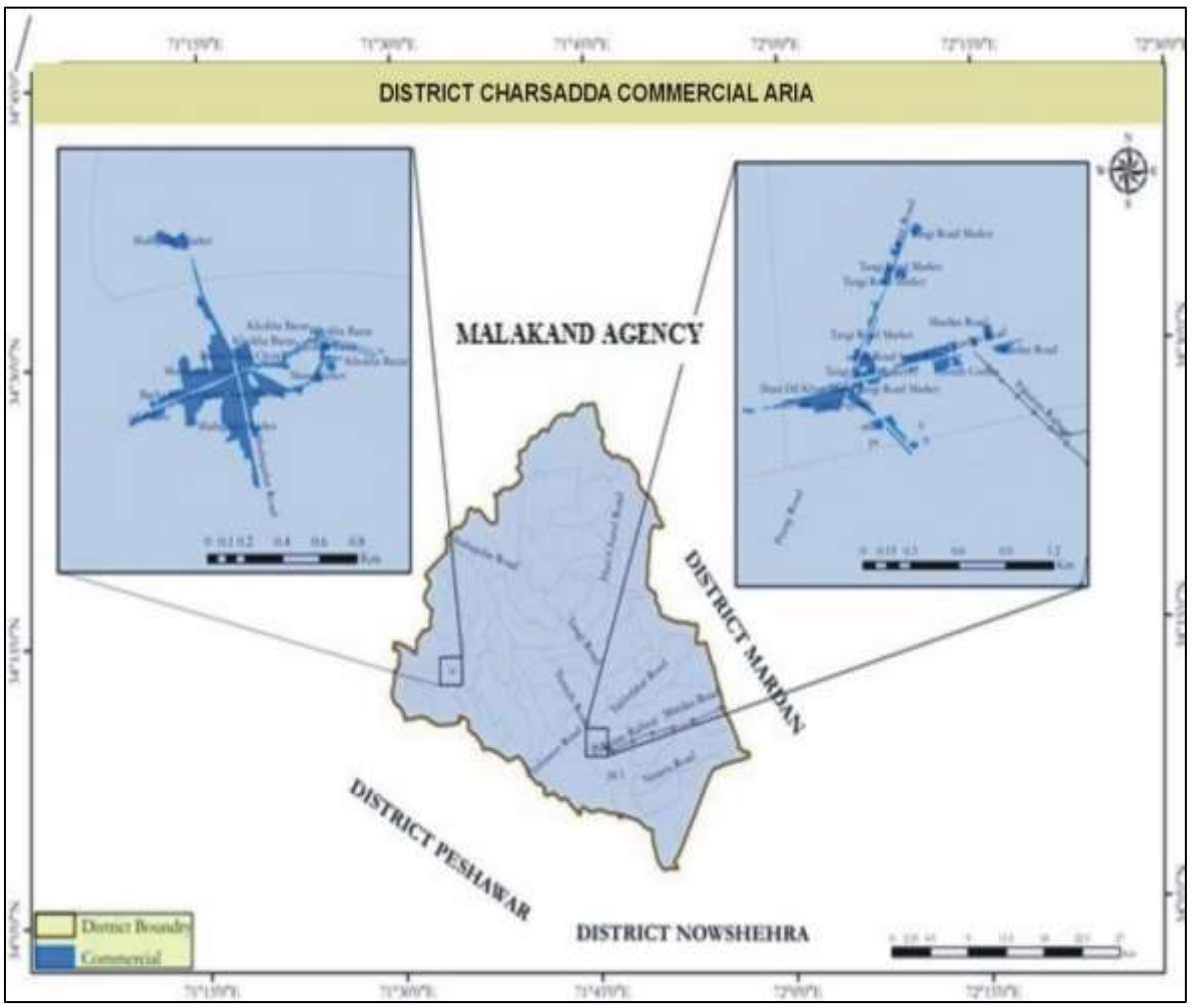
It is clear from the above that by the end of plan period, the total commercial area requirement would include 108.02 acres to meet the current deficiency, and 58.135 acres to meet the future requirement. The total would be thus 108.02 + 58.135 = 166.155 acres.

[30] Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Page 307, Table 10.4 (adapted)

[31] Chapter 2, Table 2.2 of this Report

5.7.6 Proposed Location of Trade/Commercial Zone

The proposed Site for Trade center / Commercial Area is proposed along Utmanzai Bye-Pass Road, East of Charsadda & Utmanzai. It lies roughly in the center of extended Charsadda area (i.e. future residential area as proposed in the Land Use Plan), having existing built-up areas of Charsadda & Utmanzai in the Far-West, the proposed industrial estate in the North and the proposed future residential area all around it. The proposed site is well connected to other areas through existing roads such as Mardan Road and Utmanzai Bye-Pass Road. Thus, by virtue of its location and linkages, the proposed site for Trade/Commercial center will become the future hub of commercial activities in District Charsadda.



Map 5-7: Commercial Areas in District Charsadda

5.8 EDUCATION

Vertical hierarchy is a basic feature in the delivery of formal education. It may be visualized as a pyramid, its base comprising of many hundreds of primary schools, while at the top may be a few universities providing specialized education to much lesser number of post graduate students. Specialized institutions such as universities are virtually limited to metropolitan cities. According to National Reference Manual for Planning & Infrastructure Standards[32], a unit at each level is fed by a catchment comprising 3-7 facilities of the next lower level. The next lower level in case of universities is Degree Colleges. Educational statistics in the District, including number of different institutions, enrolment and teaching staff are given in the Table (5-21) below:

Table 5-21:Educational Statistics in District Charsadda (2018-2019)

Institutions	Number			Students			Teachers		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Primary	941	494	447	158,849	82,223	76,626	3,540	2,040	1500
Middle	102	49	53	45,061	27555	17506	535	286	249
High	115	72	43	19,632	12331	7301	1,646	1,091	555
Higher Secondary	29	19	10	5,267	3719	1,548	938	632	306
Universities	41	27		6,915	1097	303	293	25	9
	1228			235,724	126,925	103,284	6,952		2,619

5.8.1 Educational Institutions in Private Sector

The total number of private primary schools in the Province is 2,127[33]. Since the number of Districts is 84, the average number of primary schools per District works out to be about 89, as against 84 in District Charsadda (Table 5-21). Thus, the number of private primary schools in District Charsadda is lesser than the District average.

Table 5-22:Number and Enrolment in Private Institutions

Institutions	Number of Institutions	Enrolment
Primary	84	13334
Middle	138	32893
High	155	64631
Higher Secondary	44	22979

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

[33] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2016, Page 126.

The number of private middle, high and higher secondary schools is 138, 155 and 44 respectively while the gross enrolment in these institutions is 133,837.

5.8.2 Literacy Ratio

A person was treated as literate in 1998 Census if he could read newspaper or a journal of same standard and could write a simple letter in any language. The literacy is measured as the ratio, in percentages, of literate population to corresponding population aged 10 and over. The literacy ratio in District Charsadda was increased from 13.3 % in 1998, to 31.1% in 1998 then increased to 52% in 2016-17. The literacy ratio for male is 68% in 2016-17 as against 35% for female. The ratio is much higher in urban when compared with rural areas both for male and female. Table 5-23 shows literacy ratio by rural and urban areas for the year 1981, 1998 and 2016-17.

Table 5-23: Literacy Ratio in District Charsadda

Area	1981			1998			2016-17		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
Overall District	13.3	21.4	4.2	31.1	46.9	14.1	52	68	35
Rural	11.7	19.1	3.4	29	44.9	11.9	0	0	0
Urban	19.2	30.1	7	39.8	55.3	23.1	0	0	0

Table 5-24 compares the literacy ratio of Khyber Pakhtunkhwa with the overall Pakistan statistics. Over the years, literacy rate in the province has been improving from 14.5% in 1972 to 57% in 2018-19, but it is still lower than the Pakistan average. In 2018-19, the literacy rate is reported to be 60% in overall country as against 57% in the province.

Table 5-24: Literacy Ratio: KP vs Pakistan

Area	KP			Pakistan		
	Total	Urban	Rural	Total	Urban	Rural
2018-19	57	67	55	60	74	51
2009	50	62	47	57	74	48
1998	37.3	58.7	32.5	45	64.7	34.4
1981	16.7	35.8	13.2	26.2	47.1	17.3
1972	14.5	33.7	11	21.7	41.52	14.3

5.8.3 Participation Rates

Participation Rate is defined as the total enrolment, divided by the population of the age-group, which corresponds to a specific level of education. Participation rate is calculated by only that part of the enrolment which corresponds to the age-group of the level considered. The age-group of the population eligible for primary stage education is 5-9 years.

At primary level, the participation rate in District Charsadda for both sexes are around 54% (52% for males and 56% for females). At middle and High level the participation rates in the same order are around 26%, 30% and 21% (Table 5-24).

Table 5-25: Participation rate in the District (2018-2019)

Schools	Both Sexes	Male	Female
Primary	54%	52%	56%
Middle & High	26%	30%	21%

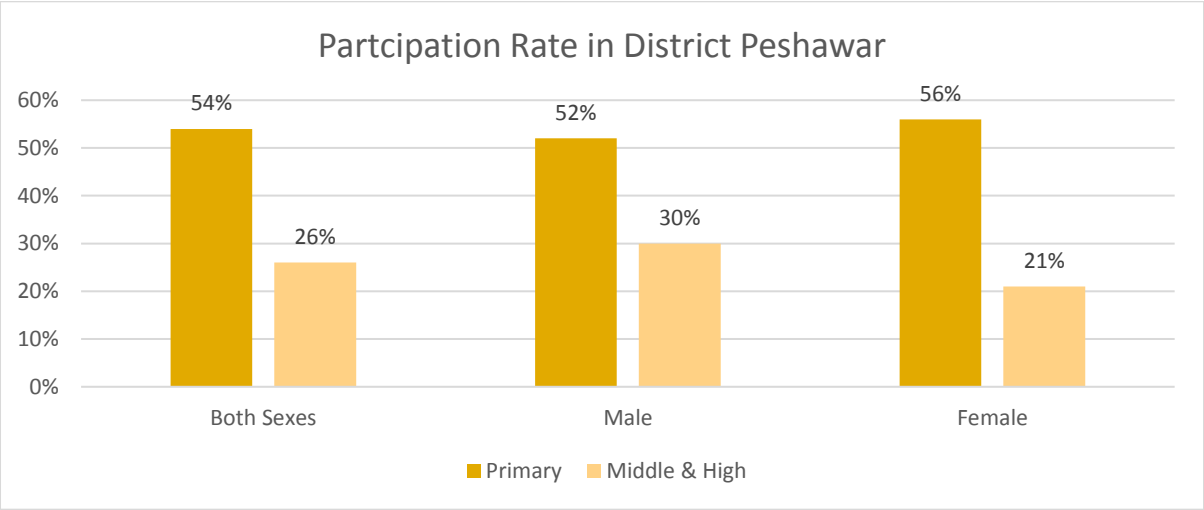


Figure 5-4: Participation rate in the District (2018-2019)

5.8.4 Teacher Student Ratio

Teacher to student ratio of District Charsadda show that at primary level one teacher is available for 45 students while at middle level the ratio increases into 84 students per teacher. The ratio at high school is 12 students per teacher. Table 5-25 give enrolment teaching staff and ratio of education institute hierarchy.

Table 5-26: Teachers-Students Ratio of District Charsadda (2018-2019)

Institution	Enrolment	Teaching Staff	Ratio
Primary	158,849	3,540	44.9
Middle	45,061	535	84.2
High	19,632	1,646	11.9
High Secondary	5,267	938	5.6

5.8.5 Educational Plan

Short Term Education Plan (2021-2025)

It is estimated that during the short-term plan, the District Charsadda requires 24 additional primary schools and 15 secondary schools. Tables below give requirements for urban as well as for rural areas of District Charsadda.

It is envisaged that primary and secondary schools will form part of the residentiary use. Their location has been broadly identified in terms of corridors, but exact location and space requirements, especially for primary schools would be governed by the detailed planning and designing of the relevant areas.

Table 5-27: Additional Primary School Required in Short Term Plan (2021-2025)

District Area	Population 2021	Population 2025	Additional Population (2021-2025)	No. of Primary Schools Required @1 PS for 7,500 pop.)	Aggregate Land required (@1 acre/PS)
Urban	**290,045**	**311,377**	**21,332**	**3**	**3**
Rural	**1,488,659**	**1,646,409**	**157,750**	**21**	**21**
Total	1,778,704	1,957,786	179,082	24	24

Table 5-28: Additional Secondary School Required in Short Term Plan (2021-2025)

District Area	Population 2021	Population 2025	Additional Population (2021-2025)	No. of SS Required @1 SS for 12,000pop.)	Aggregate Land required (@ 4acre/SS)
Urban	**290,045**	**311,377**	**21,332**	**2**	**8**
Rural	**1,488,659**	**1,646,409**	**157,750**	**13**	**52**
Total	1,778,704	1,957,786	179,082	15	**60**

Table 5-29: Additional Colleges Required in Short Term Plan (2021-2025)

District Area	Population 2021	Population 2025	Additional Population (2021-2025)	No. of Colloges Required @1 Colge for 4,00,000pop.)	Aggregate Land required (@ 10acre/C)
Urban	**290,045**	**311,377**	**21,332**	**0**	**0**
Rural	**1,488,659**	**1,646,409**	**157,750**	**0**	**0**
Total	1,778,704	1,957,786	**179,082**	0	0

5.8.6 Long-Term Education Plan (2024-2039)

It is estimated that during the Long-term plan, the District Charsadda require 107 additional primary schools, 66 secondary schools and 2 colleges. Tables below give requirements for urban as well as rural areas of District Charsadda.

It is envisaged that primary and secondary schools will form part of the residentiary use. Their location has been broadly identified in terms of corridors, but exact location and space requirements, especially for primary schools would be governed by the detailed planning and designing of the relevant areas.

College is proposed to be provided with balanced distribution over the city, corresponding with the distribution of population. The sites for these institutions should be scrupulously reserved, no matter how long these may take in actually being built.

Table 5-30: Additional Primary School Required in Long Term Plan (2026-2040)

District Area	Population 2026	Population 2040	Additional Population (2026-2040)	No. of Primary Schools Required @1 PS for 7,500 pop.)	Aggregate Land required (@1 acre/PS)
Urban	**316,950**	**406,315**	**89,365**	**12**	**12**
Rural	**1,688,393**	**2401999**	**713,606**	**95**	**95**
Total	2,005,343	2,808,314	802,971	107	107

Table 5-31:Additional Primary School Required in Long Term Plan (2026-2040)

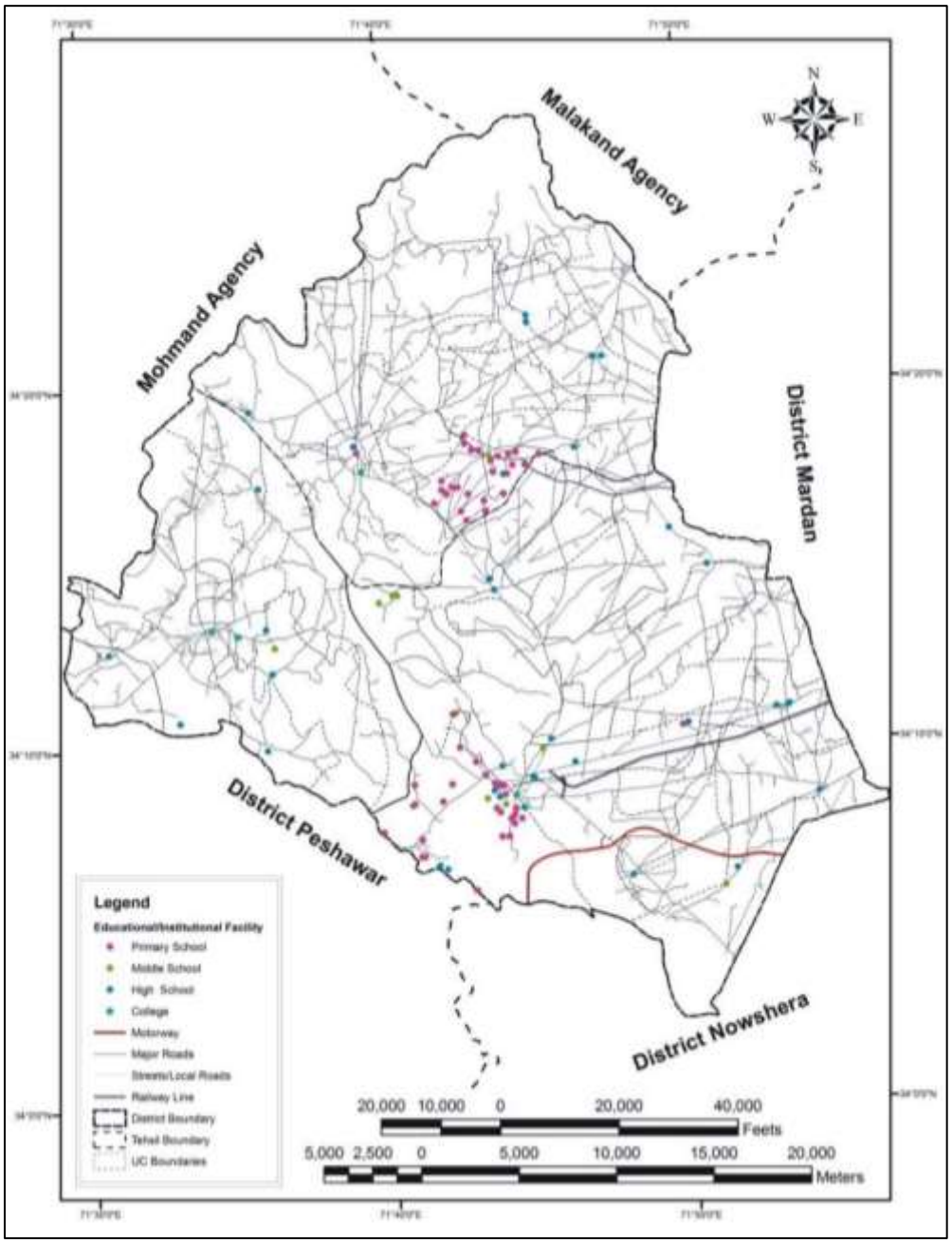
District Area	Population 2026	Population 2040	Additional Population (2026-2040)	No. of SS Required @1 SS for 12,000 pop.)	Aggregate Land required (@4 acre/SS)
Urban	**316,950**	**406,315**	**89,365**	**7**	**28**
Rural	**1,688,393**	**2,401,999**	**713,606**	**59**	**236**
Total	2,005,343	2,808,314	**802,971**	66	264

Table 5-32: Additional Primary School Required in Long Term Plan (2026-2040)

District Area	Population 2026	Population 2040	Additional Population (2026-2040)	No. of Colloges Required @1 colloge for 4,00,000 pop.)	Aggregate Land required (@10 acre/C)
Urban	**316,950**	**406,315**	**89,365**	**0**	**0**
Rural	**1,688,393**	**2,401,999**	**713,606**	**2**	**20**
Total	2,005,343	2,808,314	**802,971**	2	**20**

5.8.7 Proposed location of Educational Areas

Two educational areas are proposed, one for short-term and the other for long-term. The area for short-term is proposed along Takht Bhai Road (towards North), East of Utmanzai, as shown in the plan. For long-term, the educational area is proposed along Mardan Road, West of proposed Ring Road. The lower-level educational institutions such as primary and middle/secondary schools will be spread throughout the proposed residentiary areas at appropriate locations.



Map 5-8: Educational Institutes in District Charsadda

5.9 HEALTH

5.9.1 Distribution of Health Institutions

A health institution is defined as an institution which provides health services, curative and preventive to all specific classes of the public as outdoor/indoor patients. There is a hierarchy of health institutions as defined below:

Hospital

It is defined as a health institution having 10 or more than 10 beds. However, this definition is not valid where Government has named an institution differently, e.g. Rural Health Center.

Dispensary

It is a health institution having less than 10 beds.

Rural Health Center (RHC)

A Rural Health Center provides medical cover to a population of 10,000 to 50,000 persons. A rural health center may have up to 25 beds with laboratory, X-ray and Minor surgery. Rural Health Centers are linked through tehsil hospitals to District Headquarter Hospitals, which have all medical facilities.

Sub-Health Center

3-4 sub-health centers are attached to a rural health center. However, existing sub-centers are gradually being converted into Basic Health Units.

Basic Health Unit (BHU)

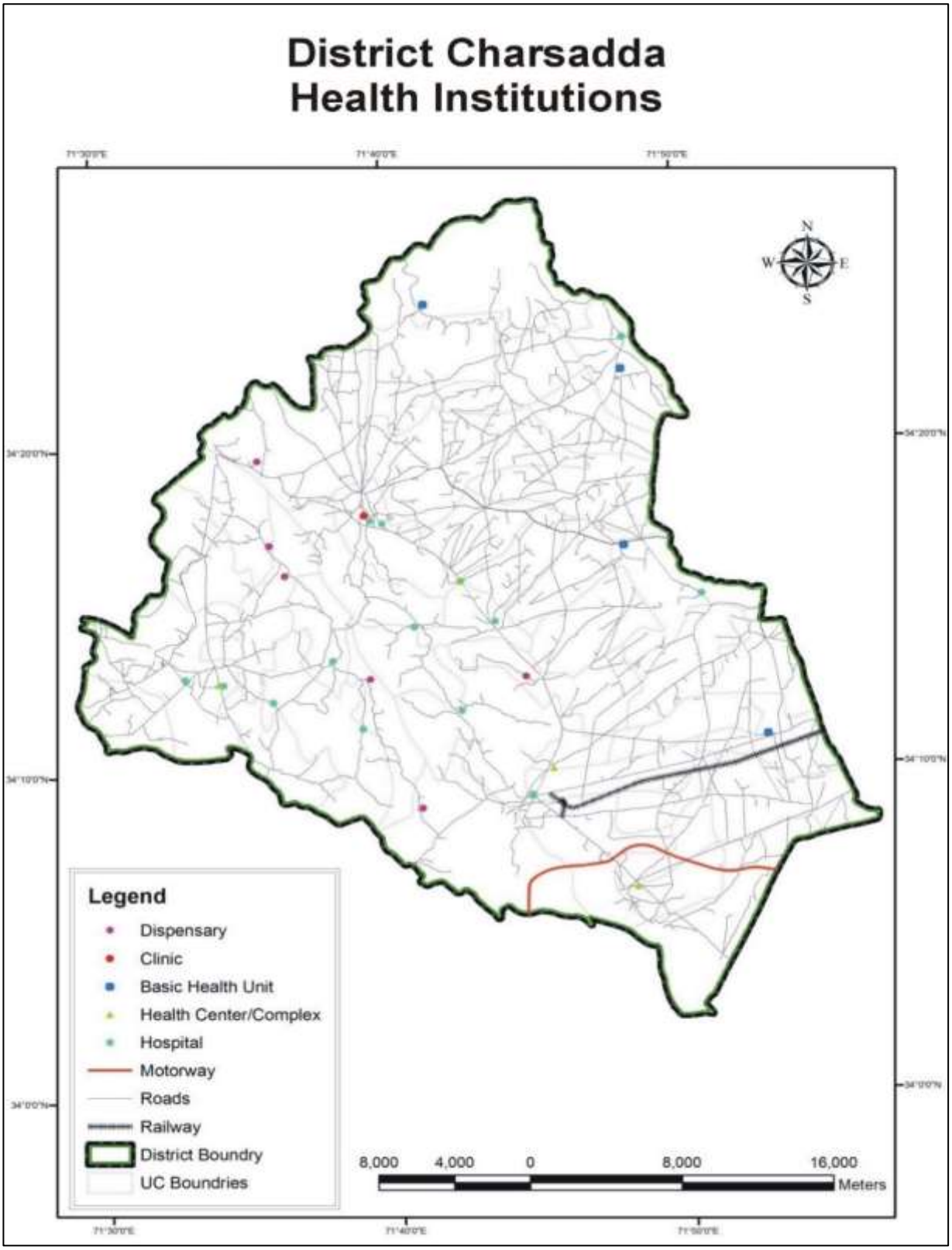
Under the present concept, 4 Basic Health Units are linked to a Rural Health Center. A BHU is provided to serve about 5,000 to 10,000 populations. It is responsible for comprehensive health care which, among other things, includes midwifery, child care, immunization, diarrhea diseases, malaria control, child spacing, mental and school health services within its areas.

The table (5- 33) below shows the total number of health institutions in the District Charsadda Vs Khyber Pakhtunkhwa.

Apart from total numbers, it is also important to study the contribution of private sector in provision of health facilities. Table 5- 33. gives the government-private split for hospitals. Of the total 271 hospitals in the province, 72% are Government owned and about 28% are being run by private sector. However, as seen in the Table, in case of District Charsadda, there are 5 hospitals all of which are Government owned; there is no private hospital in the district

Table 5-33: Hospital in District Charsadda and KP

Area	Total Hospitals	Government Hospitals	Private Hospitals
Khyber Pakhtunkhwa	271	196	75
District Charsadda	5	5	0
% in District Charsadda	1.85	2.55	0.00



Map 5-9: Health Institutes in District Charsadda

.

5.9.2 Distribution of Beds

Table 5-36 presents the distribution of beds in the province as well as in the district health institutions. There is a total of 20,835 beds in the province, of which more than 91.78% are in hospitals and 7.94% in rural health centers. In District Charsadda, about 93.84% of the total beds are in hospitals as against about 6.16% in RHCs, and around 0% in dispensaries. Comparing District with the Province in terms of overall number of beds, only 3% of the total beds in the province are in District Charsadda. Institution-wise split is shown in Table below:

Table 5-34: Distribution of Beds in Health Institutions: Khyber Pakhtunkhwa Vs District Charsadda

Area		Number of Beds (2019)				Total
		Hospitals	Dispensaries	RHCs	TB Clinics	
Khyber Pakhtunkhwa	No.	20,835	12	1,802	52	22,701
	%	91.78	0.05	7.94	0.23	100.00
District Charsadda	No.	640	0	42	0	682
	%	93.84	0	6.16	0	100
District Vs Province (%)	%	3.07	0	2.33	0	3.00

5.9.3 Patients Treated in Health Institutions: Indoor and Outdoor

Table 5- 35 shows that in the province in the year 2019, more than 20.9 million patients were treated in health institutions, of which about 96.68% were outdoor patients and around 3.32% were indoor patients. In case of District Charsadda total patients treated were around 1.35 million of which 1.77% were treated indoor and 98.23% outdoor patients.

Table 5-35: Patients Treated: Province Vs District Charsadda

Area		Patients Treated in 2019		
		Indoor	Outdoor	Total
Khyber Pakhtunkhwa	No.	981,704	28557178	29,538,882
	%	3.32	96.68	100
District Charsadda	No.	23902	1329405	1353307
	%	1.77	98.23	100
District Vs Province	%	2.43	4.66	4.58

5.9.4 Existing Health Polices

Sustainable Development Goals:

The Heads of State, Government and High Representatives, met at United Nations Headquarters in New York from 25th to 27th September, 2015 as the Organization celebrated its seventieth anniversary, they decided on that day a set of new global "Sustainable Development Goals".

In these Goals and targets, they set out a supremely ambitious and transformational vision. They predict a world free of poverty, hunger, disease and want, where all life can thrive.

They visualized a world free of fear and violence. A world with universal literacy. A world with equitable and universal access to quality education at all levels, to health care and social protection, where physical, mental and social well-being were assured. A world where they reaffirm their commitments regarding the human right to safe drinking water and sanitation and where there is improved hygiene; and where food is sufficient, safe, affordable and nutritious. A world where human habitats are safe, resilient and sustainable and where there is universal access to affordable, reliable and sustainable energy.

They announced 17 Sustainable Development Goals with 169 associated targets which are integrated and indivisible. Never before have world leaders pledged common action and endeavor across such a broad and universal policy agenda.

In these 17 goals, Goal-3 is to “Ensure healthy lives and promote well-being for all at all ages”.

Ensuring healthy lives and promoting the well-being for all at all ages is essential to sustainable development. Significant strides have been made in increasing life expectancy and reducing some of the common killers associated with child and maternal mortality. Major progress has been made on increasing access to clean water and sanitation, reducing malaria, tuberculosis, polio and the spread of HIV/AIDS. However, many more efforts are needed to fully eradicate a wide range of diseases and address many different persistent and emerging health issues.

Goal-3: Ensure healthy lives and promote well-being for all at all ages

4.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births.

4.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and underJ5 mortality to at least as low as 25 per 1,000 live births.

4.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases.

4.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.

4.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol.

4.6 By 2020, halve the number of global deaths and injuries from road traffic accidents

4.7 By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programs.

4.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all.

4.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate.

3.b Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all.

3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States.

3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

National Health Policy

The National Health Policy provides an overall national vision for the Health Sector based on "Health for All" approach. Under this approach, the national health policy aims to implement the strategy for protecting people against hazardous diseases, protecting public health, and upgrading curative care facilities. Under the new Health Policy, health sector investments are being viewed a part of the Government's Poverty Alleviation Plan. Priority attention has been accorded to the primary and secondary tiers of the health sector and good governance is seen as the basis for health sector reforms to achieve quality health care.

The key to the success of the new Health Policy lies in its implementation. This is not an easy task but is by no means impossible. The new Health Policy has outlined implementation modalities and has set targets and a time frame for each of the key areas identified that would be implemented over a 10-year period. These have to be implemented in partnership between the federal Ministry of Health and the provincial Departments of Health, and in close

collaboration with the District health set-up under the Local Government structure. The private health sector would also be taken on board while implementing the key policy initiatives.

The health policy has developed a clear view of what is required to be done in key areas, and the measures to be taken to achieve the envisioned goals. The Policy provides guidelines to the Provinces while implementing plans in the health sector in accordance with their requirements and priorities. The Key Areas of National Health Policy are as below:

- Key Area No.1: To reduce Widespread Prevalence of Communicable Diseases (i.e. EPI cluster of childhood diseases, TB, Malaria, Hepatitis-B and HIV-AIDS.
- Key Area No.2: To address inadequacies in primary/secondary health care services. The main inadequacies are identified as the deficient state of equipment and medical personnel at BHU/RHC level. Absenteeism is common. At the District/tehsil level hospitals there are major shortcomings in emergency care, surgical services, and anesthesia and laboratory facilities. There is no referral system in operation.
- Key Area No. 3: To Remove Professional and Managerial Deficiencies in District Health System. The main deficiencies have been identified as the ineffectiveness of the District health office to supervise health services in a District. DHOs generally lack in essential qualifications and management skills. A large number of posts of male and female doctors and paramedics at the primary and secondary health facilities are vacant, as well as specialist positions in District and tehsil hospitals. Mega-hospitals are managed in an ad-hoc manner.
- Key Area No. 4: To promote greater gender equity in the health sector.
- Key Area No. 5: To bridge the Basic Nutrition Gaps in the target-population i.e. children, women and vulnerable population groups.
- Key Area No. 6: To correct urban bias in the health sector.
- Key Area No. 7: To introduce required regulation in the private medical sector with a view to ensuring proper standards of equipment and services in hospitals, clinics and laboratories as well as private medical college and Tibb/Homeopathic teaching institutions.
- Key Area No. 8: To create mass awareness in public health matters.
- Key Area No. 9: To Effect improvement in the Drug Sector with a view to ensuring the availability, affordability and quality of drugs in the country.
- Key Area No. 10: Capacity Building for Health Policy Monitoring in the Ministry of Health.

5.9.5 5.9.5 Major Disease in Last 2 Years

Corona Virus:

Table 5-36: Corona Cases in District Charsadda Vs Khyber Pakhtunkhwa (March, 2021)						
	Cases total	**24hrs**	**Deaths total**	**24hrs**	**Recoveries**	**Active Cases**
KPK	88099	1044	2363	21	76640	9096
Charsadda	2402	4	15	0	2197	190

Anemia among Women

Pregnant women coming to the facility for antenatal care serve as a sample of women from the catchment population. The nutritional status among this sample of pregnant women is suggestive of the nutritional status of women in the catchment population. The Table 5- 37 shows the detailed statistics in Charsadda.

Table 5-37: Anemia among Women in District Charsadda

Year	First Antenatal care visits in the facility	ANC-1 women with Hb. under 10 g/dl	%age
2017 1st quarter[34]	8095	1940	24
2017 2nd quarter[35]	8664	1128	13.02
2016[36]	32057	5932	18.50
2015[37]	30536	3532	12

Malaria Parasite

The malaria parasite produces a molecule that affects red blood cells, luring mosquitoes to bite infected people, and may enhance the parasite's spread. Malaria parasites are spread by bites from infected mosquitoes. The Table 5- 39 shows the detailed statistics in Charsadda.

[34] District health information system: 1st Quarter Report 2017

[35] District health information system: 2nd Quarter Report 2017

[36] District health information system: Annual Report 2016

[37] District health information system: Annual Report 2015

Table 5- 1: Malaria Parasite in District Charsadda			
Year	**Slides examined**	**MP positive**	**%age**
2017 1st quarter[34]	18281	581	3
2017 2nd quarter[35]	21136	238	8.94
2016[36]	79988	9782	12.23
2015[37]	41533	6218	15

Plasmodium Falciparum Rate

Plasmodium falciparum is a protozoan parasite, one of the species of Plasmodium that cause malaria in humans. It is transmitted by the female Anopheles mosquito of the six malarial parasites. Plasmodium falciparum causes the most-often fatal and medically severe form of disease. The Table 5- 38 shows the detailed statistics in Charsadda.

Table 5-38: Plasmodium Falciparum in District Charsadda

Year	Slides examined	Slides P. Falciparum +ve	%age
2017 1st quarter[34]	18281	12	0.07
2017 2nd quarter[35]	21136	6	0.03
2016[36]	79988	236	0.30
2015[37]	41533	165	0.40

Hepatitis B +ve Proportion

Hepatitis B is a serious liver infection caused by the hepatitis B virus (HBV). For some people, hepatitis B infection becomes chronic, meaning it lasts more than six months. Having chronic hepatitis B increases your risk of developing liver failure, liver cancer or cirrhosis. Most people infected with hepatitis B as adults recover fully, even if their signs and symptoms are severe. Infants and children are more likely to develop a chronic hepatitis B infection. A vaccine can prevent hepatitis B, but there's no cure if you have it. If you're infected, taking certain precautions can help prevent spreading HBV to others. The Table 5- 39 shows the detailed statistics in Charsadda.

Table 5-39: Hepatitis B +ve in District Charsadda

Year	Patients screened	Hepatitis B +ve	age
2017 1st quarter[34]	6642	54	0.81
2017 2nd quarter[35]	nn	nn	nn
2016[36]	17798	169	0.95
2015[37]	16300	142	0.87

Hepatitis C +ve Proportion

Hepatitis C is an infection caused by a virus that attacks the liver and leads to inflammation. Most people infected with the hepatitis C virus (HCV) have no symptoms. In fact, most people

don't know they have the hepatitis C infection until liver damage shows up, decades later, during routine medical tests. Hepatitis C is one of several hepatitis viruses and is generally considered to be among the most serious of these viruses. Hepatitis C is passed through contact with contaminated blood, most commonly through needles (Syringes). The Table 5-40 shows the detailed statistics in Charsadda.

Table 5-40: Hepatitis C +ve in District Charsadda

Year	Patients screened	Hepatitis C +ve	%age
2017 1st quarter[34]	6642	63	0.95
2017 2nd quarter[35]	nn	nn	nn
2016[36]	17798	208	1.17
2015[37]	16300	117	0.72

(nn= not noted)

5.9.6 Constraints

The emphasis in the past has been to increase the quantity of health-related services, i.e. number of doctors, rural health centers, basic health units etc. The numbers are important, but equally important is functionality of health centers. Most of these are not as functional as they should be, because of various factors such as shortage of medicines or staff, often both.

The above factors become constraints due to the following reasons:

- The zeal to meet the numerical target has compromised the quality and type of facility provided.
- The end result has been unmanned and unsupervised health services.
- The focus has been on quantity rather than quality and performance.
- While facilities have been provided in many areas, the absence of medical staff allocated to those facilities has made them less effective.
- There are weaknesses in managerial, administrative, and coordinating to ensure the efficiency of health delivery mechanism.
- The private sector in health sector is weak in District Charsadda.
- However, private sector has profit motive. There is at present no mechanism whereby the private sector can support efforts of the government in providing healthcare to those who cannot afford the higher private sector prices.

5.9.7 Health Proposals for Short-Term (2021-2025)

Provision of Rural Health Centers (RHCs)

Based on population criteria of 1 RHC for 75,000 populations[38], a total of 19 RHCs are required by the end of short-term plan period. The existing number of RHCs is 3, these existing RHC's are required to be maintained and shall be upgraded keeping in view the demands of future population needs under short term plan. Details are given below in the table below (Table 5-41)

Table 5-41: Rural Health Centres Required in the Short-Term Plan (2021-2025)

Rural Population 2021	Rural Population 2025	Existing RHCs	Current Requirement	Current Shortage	RHCs Required in 2025	Net Required by 2025
1,488,659	1,646,409	3	20	17	22	19

Increasing Number of Beds

Applying the national standard of 2 beds per 1000 persons[39], the gross number of beds required at the end of short-term period is 3916 while the existing number of beds is 640. Thus additional 3276 beds will be required by the year 2025. (Table 5- 42).

Table 5-42: Number of Beds Required in Short Term Plan (2021-2025)

Population 2021	Population 2025	Existing number of Beds	Current Requirement	Current Shortage	Number of Bed required in 2025	Net Required by 2025
1,778,704	1,957,786	640	3557	2917	3916	3276

5.9.8 Health Proposals for Long-Term Plan (2026-2040)

Provision of Rural Health Centers (RHCs)

Based on population criteria of 1 RHC for 75,000 populations[40], a total of 32 RHCs will be required by the year 2040. During the short-term plan of first five years (2026-2040), the number of RHC's required by 2025 were 22 and the present RHC's number was 3. The details are given in (Table 5- 45).

[38] Source: Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Table 6.7, Page 122.

[39] Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual for Planning & Infrastructure Standards, Section 6.2.2, Page 122.

[40] Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual on Planning and Infrastructure Standards, Table 6.7, Page 122.

Table 5-43: Rural Health Centers Required in the Long-Term Plan (2026-2040)

Rural Population 2026	Rural Population 2040	RHCs Required in 2040	Existing RHCs up to 2025	Net Required by 2040
1688393	2,401,999	32	22	10

Increasing Number of Beds

Applying the national standard of 2 beds per 1000 persons[41], number of beds required for the additional population during the period 2026-2040 are 6291, (Table 5- 44)

Table 5-44: Number of Bed Required in Long Term Plan (2026-2040)

Population 2026	Population 2040	Number of Bed required in 2040	Existing number of Beds up to 2025	Net Required by 2040
2,005,343	2,808,314	5617	3916	1701

5.9.9 Conclusions

- Health Sector needs to be emphasized as in Land Use Plans, as it profoundly impacts the health of people who live and work there.
- There is a need to focus attention towards developing broad policies and general strategies to improve community design and building practices and reverse the negative trends related to human health.
- There needs to be a clear view of what is required to be done in key areas, and the measures to be taken to achieve the envisioned goals. The National Health Policy provides guidelines to the provinces while implementing plans in the health sector in accordance with their requirements and priorities.

[41] Source: Environment and Urban Affairs Division, Govt. of Pakistan, National Reference Manual for Planning & Infrastructure Standards, Section 6.2.2, Page 122.

5.10 INDUSTRY

5.10.1 Industries – District Charsadda

There are total of 47 industrial units in District Charsadda, of which so far none are in the Small Industrial Estate and all 47 existing units are outside it (Table 5- 45).

Table 5-45: Number of Industry in District Charsadda		
Sr. No.	**Particular**	**Number of Units**
1	Total No. of Units in Small Industrial Estate Charsadda	0
2	Total No. of Units Out Side Small Industrial Estate Charsadda	47
Grand Total		47

Table 5- 48 presents the total number of industrial units. of the total 47 units, 25 are cement-related units while 11 are flour units. Together, these are about 76% of the total units. Details are presented in the table below.

Table 5-46: Industrial Units in District Charsadda

Sr. No	Nature of Units	Total Number of Units
1	Sugar	1
2	Flour Mills	11
3	Vermicelli's	1
4	Ice Factories	5
5	Cigarettes	1
6	Paper & P. Board	1
7	Cement Based	25
8	Marble	1
9	Biscuit & Sweet	1
Total		47

5.10.2 Small Industrial Estate Charsadda

A small industrial estate is established on Charsadda Mardan road with the capacity of 139 plots on an area of 30 acres, but currently no operational unit exist. Investor will be attracted through different strategies to made the industrial estate functional. Table 5- 49 show the specification of small industrial estate Charsadda.

Table 5-47: Small Industrial Estate Charsadda

Location	Takht Bhai, Rajjar Road Charsadda
Area	30 Acres
No. Of plots	139
No, of units in Operation	Nil
No. of Units Closed	Nil
Total Number of Units under Construction	Nil
Infrastructure Facilities	Available

5.10.3 Future Industrial Area Requirement

The industrial area requirement in District Charsadda has been calculated on the basis of additional population for the first 5 years of plan period (2021-2025) and subsequent 15 years (2025-2040). The anticipated industrial labor force in these periods was calculated on the basis of 5% participation rate and industrial area by applying the standard of 50 industrial workers per acre. The results are presented in the Table 5- 48 below. It is clear that over the entire plan period 1029.52 acres would be required which includes 179 acres in the short-term (2021-20) and 850.52 acres in the long-term period (2025-2040).

Table 5-48: Future Industrial Area Requirement (Acres)

Parameters	Short-Term Plan (2021-2025)	Long Term Plan (2025-2040)	Total
Additional Population	179082	850528	1029610
Industrial Labor Force	8954	42526	51480
Industrial Area Required	179	850.52	1029.52

5.10.4 Current Industrial Area Gap

The current industrial area gap has been calculated as below:

- District Population (2021): 1778704
- Industrial Labor Force (@5% of above): 88935
- Industrial area required (@50 workers per acre) = 1778 acres

- Current Industrial area in the district: 259 acres[42]
- Industrial area deficiency: 1778-259=1519 acres

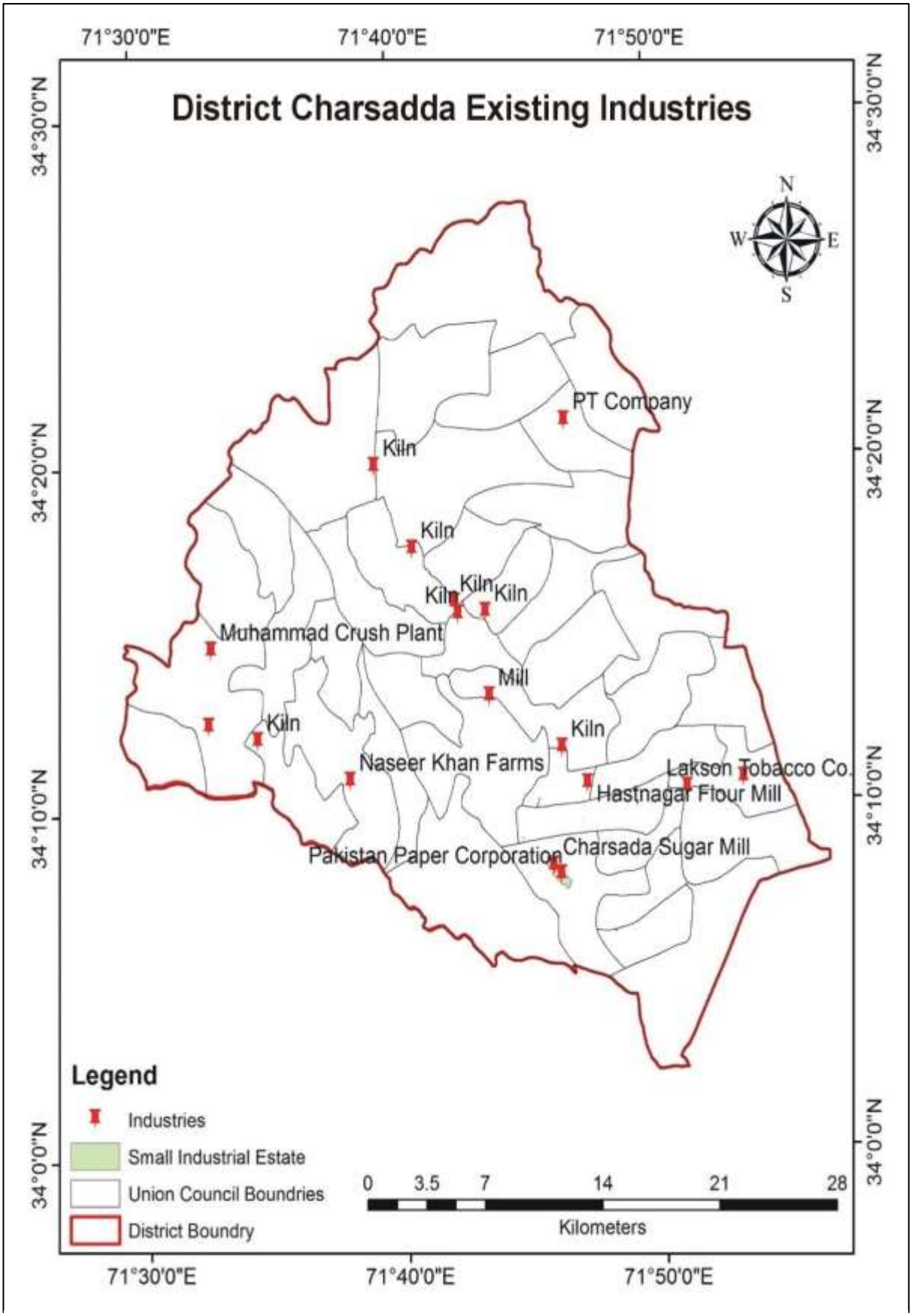
It is clear from the above that till the end of plan period, the total industrial area requirement would include 1519 acres to meet the current deficiency, and 1029.52 acres to meet the future requirement. The total would be thus 1519+1029.52 = 2548.52 acres.

5.10.5 Proposed Industrial Locations

In Khyber Pakhtunkhwa ADP of 2012-2013, there is no specific industrial project for District Charsadda.

The new industrial area for Charsadda is proposed between Takht Bhai Road and Utmanzai Bye-Pass Road, towards North-East of Charsadda City. It has access to Mardan through Utmanzai Bye-Pass Road, Takht Bhai, and all surrounding cities/roads through the proposed Ring Road. The proposed site is away from flood-prone area.

[42] Chapter 2, Table 2.1 of this Report



Map 5-10: Existing industries in District Charsadda

5.11 PARKS AND RECREATIONAL FACILITIES

District Charsadda offers diverse nature of active and passive recreational facilities including archeological and many historical places. The district offers many traditional and cultural uniqueness such as Charsadda Chappals, Gur, Rajjar khadar (a kind of handmade clothes) and sweets. Many visitors from adjacent District come here to enjoys boat riding and eating fish at the bank of rivers. however, due to rapid urbanization and ribbon development the district is losing their agricultural beauty. The pressure on land is increasing because of competing Land Uses. The planning agencies therefore, should stress the need for reserving recreational spaces against many competing demands for land.

5.11.1 Historical/Important Places

Following are some historical places in District Charsadda:

i. Sardaryab

Sardaryab is located on the bank of river Kabul, that is a major picnic spot of the area. People from different areas visit this place to enjoy the scenery as well as the fish cooked there which has a special taste of its own.

ii. Hissa Dheri

The ruins at Hissa Dheri are very important in the sense that they provide a vital link about pre-Islamic history of the region. It also reveals the fact that Charsadda was once the center of civilization and seat of governance. The area known as Pushkalawati at that time was the capital of the Gandhara. Pushakalawati means tulip in Sanskrit.

iii. Shabqadar Fort

The Shabqadar fort is situated an impressive monument of the military endeavors of the Sikhs and the English in this part of the country. Constructed by the Sikhs during their short stint of power, this fort was used by the British against the onslaughts of the invading Mohammad during Raj. The Sikhs called this area as Shankargarh, which later on took the name Shabqadar. This Sikhs called this area as Shankargarh, which later on took the name of Shabqadar. The fort is part of a series of forts built along a line to forestall the attacks of the tribal people. The other important forts are Balahisar, Mackeson, Saragarhi, Lockhart and Cavagnari.

iv. Tangi (Charsadda)

Tangi Sub Division of Charsadda is famous for Gur. A top quality of the Gur is prepared here which is exported to Peshawar and the southern District of the Province.

v. Ser-Dheri

Ser-Dheri is famous for tobacco. The government has established a depot for collecting/purchasing tobacco from the farmer at Ser-Dheri for further export to the

cigarettes manufactures. Similarly, Mandani is famous for good quality of tobacco which is also exported nationally and internationally.

vi. Rajjar

Rajjar is a neighboring town of Charsadda and famous for the special type of sweets with an odor like Gur. This sweet is getting popularity among the adjacent Districts. People from within the District and outside the District serve these sweets on the occasion like “Eid’s” and marriages etc. Local made cloth Khadar is also famous exportable item of Rajjar.

vii. Munda Headwork at Abazai and Munda Dam

Although not exactly in the Charsadda this headwork provide water to District Charsadda and now dam at the same site is proposed which would not only provide water for irrigation but more importantly generate electricity as well as store water. The provision of cheap electricity is an important issue on the national agenda as its price is increasing with each passing day and we required cheap sources of energy for rapid industrial growth. Similarly, water is also termed as one of the potential flash points of the next years and we do need huge water storage facilities to cater for need in the coming years.

viii.Shar-i-Napursan

Shar-i-Napursan is an archaeological site in Charsadda tehsil near the village Rajjar Excavations have unearthed two distinct settlements of the Buddhist period and two of the Muslim periods. Coins of Manander, Hermaeous and Kanishka have been unearthed.

5.11.2 Sports Facilities

- Cricket Stadium at Charsadda
- Football Ground
- Volleyball Court
- Basketball Court
- Fitness Center
- Football Ground, Utmanzai
- Basketball Court, Utmanzai
- Bhusa Khel Ground
- Football Stadium Prang Charsadda
- Khan Abdul Wali Khan Sports Complex is in process of being developed in Charsadda.

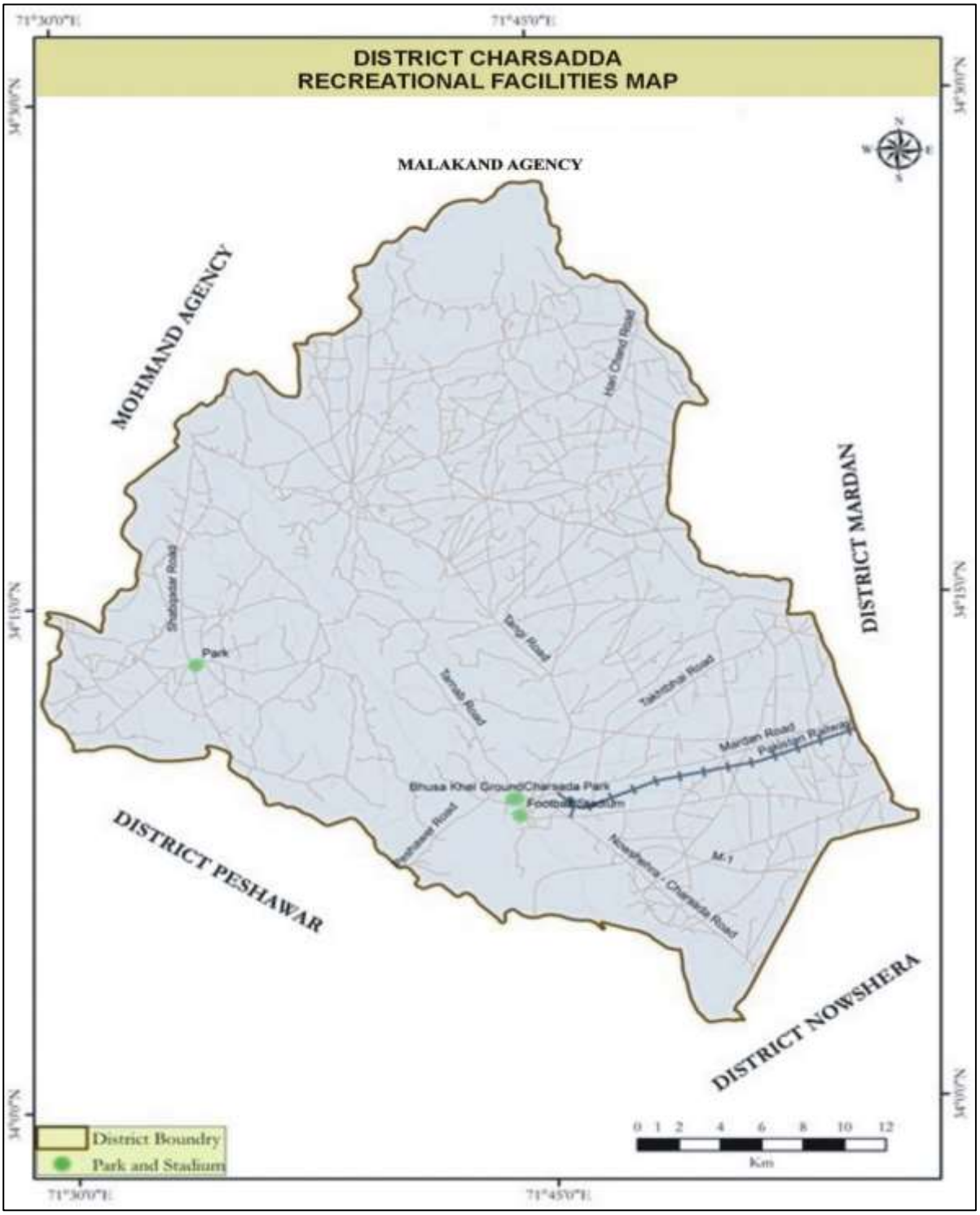
5.11.3 Parks and open spaces

i. Charsadda park

Charsadda Park is located along Charsadda–Peshawar Road in the urban area of the District Charsadda.

ii. Hazrat Baba-ul-Din Nimoun Forest

The location of Hazrat Baba-ul-Din Nimoun Forest is between the Tangi and Tarnab Road, towards north of Charsadda Urban Area.



Map 5-11: Recreational Facilities in District Charsadda

5.11.4 Future Requirements for Parks and Stadiums

i. Abazai National Park Near Munda Headwork

Although not in District Charsadda, Munda Headwork and under-construction dam provide water to District Charsadda. Near this area in District Charsadda, there are mango farms along which River Swat flows. It is a lush green and serene area with a number of canals for irrigation purposes; and is a good picnic spot. In this area, Abazai National Park is proposed to be properly developed for District/Regional level recreation.

ii. Playgrounds and Stadiums

District Charsadda also needs active recreation in form of playgrounds and stadiums. Following are the requirements:

Table 5-49: Active Recreational Requirements in District Charsadda

District Area	Population			Additional Population (2021-2040)	Recreational Standards	Requirements
	2021	2025	2040			
Charsadda Urban	**121300**	**128440**	**159161**	**37861**	Cricket Stadium for population above 300,000 Hockey Stadium for population above 200,000	It is clear that the populations of urban areas are not sufficient for separate cricket or hockey stadium. Instead, a multi-purpose stadium may be provided at tehsil headquarters i.e. Charsadda and Tangi and Shabqadar.
Shabqadar Urban	**96875**	**102576**	**127112**	**30237**		
Tangi Urban	**34850**	**36901**	**45728**	**10878**		
Utmanzai Urban	**33082**	**35029**	**43408**	**10326**		
Rural	**1488659**	**1646409**	**2401999**	**913340**	For bigger villages/settlements above 5,000 populations, a combined playfield may be provided.	

Their areas are recommended to be 5 acres for cricket stadium and 3 acres for hockey stadium. Besides in rural areas, for villages larger than 5,000 populations, a combined playfield of 2 acres may be provided.

5.11.5 Conserving Areas of High Landscape and Tourism Value

For areas of high landscape value, the primary responsibility for protective measures lies with relevant line Departments, in coordination with the Environmental Protection Agency (EPA).

In context of Charsadda, most of the district has very fertile agricultural, which helps to maintain the integrity and diversity of ecosystems, protect flora and fauna, and facilitate

ecological processes such as water flows, soil regeneration, nutrient cycling and so on, which is vital for all life. Due to population pressures, such areas need to be managed with a sustainable balance of human populations.

Lack of protective measures in these areas is resulting in loss of their natural beauty and environmental degradation. These areas need serious attention as their delicate eco-system is getting unbalanced because of uncontrolled and unregulated physical developments. The remedial measures in the past have been inadequate, resulting in major damages to these environmentally sensitive areas.

Owing to various historic and institutional reasons, the effectuation of protective measures including Land Use and building control regulations have remained limited to major urban centers. Rural and special areas such as above have been largely neglected resulting in their haphazard and uncontrolled growth and negative impact on the areas of high landscape value. In these areas, the problems get proliferated and involve heavy financing to cure. Scarce budgetary resources constrain such an option. Under the circumstances, it is feared that some of the problems of special areas may become impossible to eradicate unless some timely measures are adopted. A cogent solution is therefore need of the hour. This calls for strict protective measures for these areas, which are as below:

- To conserve natural beauty of such areas, development should not be allowed in areas where it may block views or vistas of outstanding quality.
- There should be a ban on new housing schemes in areas of high landscape value.
- Developments near rivers/water bodies and other flood prone areas should be discouraged not only for aesthetics, but also for reasons of safety, since floods can cause immense damage to life and property, natural vegetation and agriculture as has been witnessed in recent floods.
- A riverine forest is a dire need of District Charsadda to be developed in near future to mitigate the flood affects and also it plays a great roll in stopping the land from erosion along with the safety from floods it will also enhance the aesthetic beauty.

An important consideration for areas of high landscape values should be to regulate their growth and to make such areas environmentally sustainable. Involvement of private sector in development efforts for areas of high landscape value in view of funding constraints in the public sector should be encouraged.

The most important consideration for the development of special areas is the need for preservation of its physical environment that is the greatest asset of the special areas. Land Use and building control regulations, if implemented properly, are effective tools to ensure the preservation of physical environment.

These may include:

- Ban on construction of all type of buildings within 2 km's of river banks.
- Ban on disposal of liquid and solid waste into rivers/streams.
- No industrial activity in areas of high landscape value.
- Protect the water flowing through the area from any form of pollution.
- Control damage/destruction of vegetation
- Green belts to be developed along the main urban settlements to eliminate the chance of future irregular growth of the city.

5.12 FOREST

We depend on forests for our survival, from the air we breathe to the wood we use. Besides providing habitats for animals and livelihoods for humans, forests also offer watershed protection, prevent soil erosion and mitigate climate change. Yet, despite our dependence on forests, we are still allowing them to disappear.

5.12.1 Distribution of Forest Land

Before proceeding further, it seems pertinent to define legal classifications of forests, Table 5- 50 shows the distribution of forests which are as below:

i. Reserved Forests

The forests under the control of Forest Department which have been declared as Reserved Forests under Khyber Pakhtunkhwa Forest Ordinance 2002 and are generally without rights and privileges.

ii. Protected Forests

The forests which have been declared as protected forests under the provision of the Forest Act 1927 and have some rights and concessions of grazing, grass cutting and cutting of dry/wind fallen trees for domestic fuel wood consumption.

Table 5-50: Distribution of Forest Land (2015-2016) Area in Acres

Forest Type	KP	District Charsadda
Reserved Forest	232157	0
Protected Forest	1163276	0
Resumed Forest	90271	120
Unclassed Forest	259960	0
Section 38[2]	19183	0
Communal	122944	0
Guzara Forest	688123	0
Private plantation	1767567	176757
Miscellaneous	307080	0
Total	4650561	176,877

iii. Unclassed Forests

The public forest lands under the control of Forests Department which are neither reserved forests nor protected forests and are known as Unclassed Forests.

iv. Resumed Lands

These are private lands taken over by the Government under various land reforms and martial law regulations and managed by the Forest Department.

v. Guzara & Community Forests

These are forest areas which are the joint property of villagers or owned by the individuals and are managed by the Forests Department.

Table 5- 51 shows distribution of land in Khyber Pakhtunkhwa and District Charsadda. The gross area under forests in the Province is 4650561 acres, out of which major forests are protected forests (25%), Guzara forests (14.7%) and private plantation (38%).

Table 5-51:Distribution of Forest Land (2015-2016) Area in Acres

Forest Type	KP	District Charsadda
Reserved Forest	232157	0
Protected Forest	1163276	0
Resumed Forest	90271	120
Unclassed Forest	259960	0
Section 38[2]	19183	0
Communal	122944	0
Guzara Forest	688123	0
Private plantation	1767567	176757
Miscellaneous	307080	0
Total	4650561	176,877

District Charsadda is essentially devoid of any worthwhile forest land. There is only 120 acres of land under forests, all of which is resumed land. Resumed lands are private lands taken over by the Government under various land reforms and martial law regulations and managed by the Forest Department. In terms of percentage, forest area in District Charsadda is 0.004% of the total forest area in the province.

5.12.2 Forest Type – District Charsadda

In District Charsadda, the forest area is spread towards north-east part of the district. Total area under forests in District Charsadda is 176877 acres which hold 176877 acres of private plantation and an acute amount of 120 acres of resumed forest. Resumed forest means private lands taken over by the Government under various land reforms and regulations and managed by the Forest Department. Table 5- 54 shows the forest type in District Charsadda.

Table 5-52:Forest Type in District Charsadda

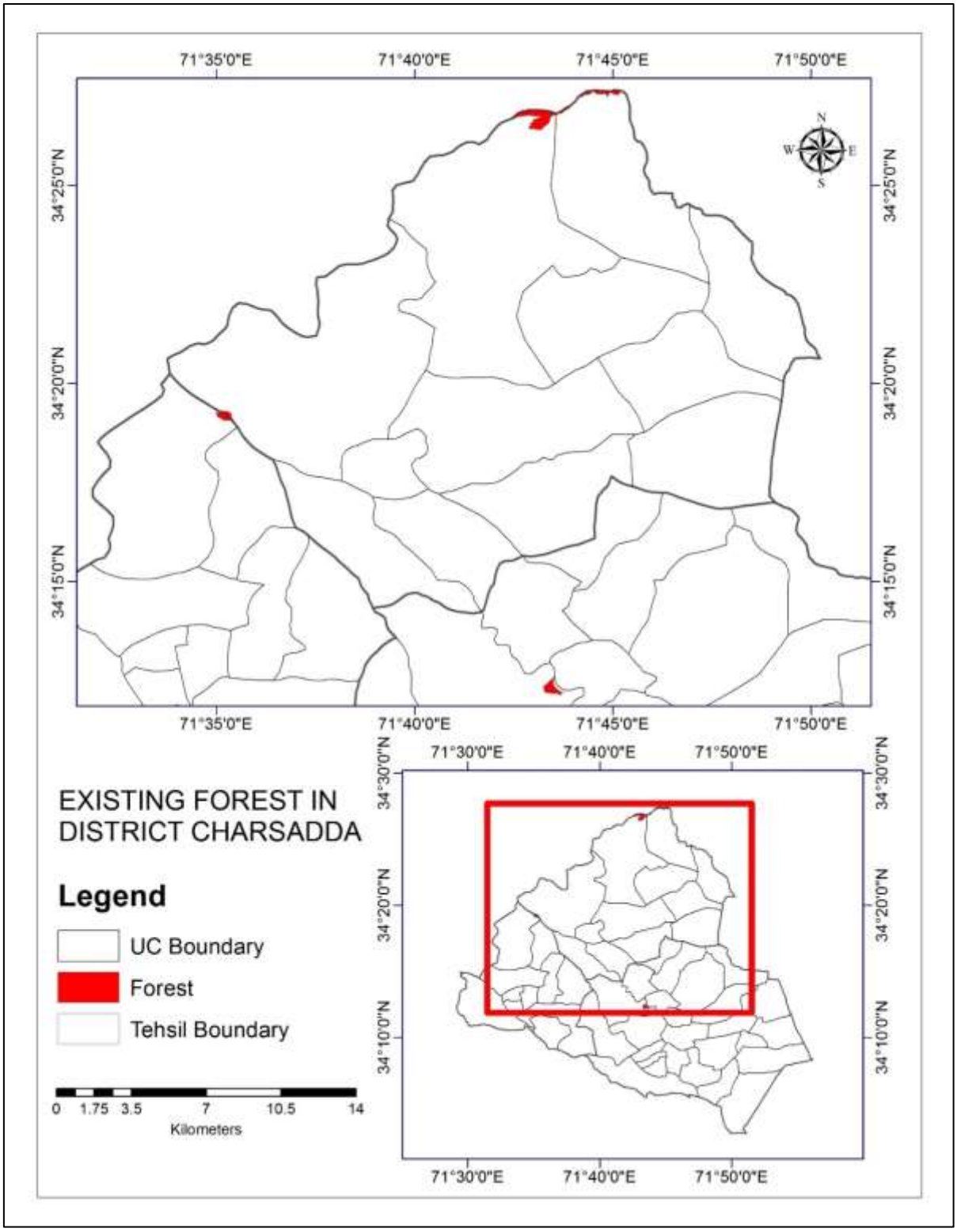
Year	2013-2014	2014-2015	2015-2016
Resumed Forest	120	120	120
Private plantation	176757	176757	176757
Total	176877	176877	176877

5.12.3 Comparison with Greater Peshawar Region

Table 5- 53 show the comparison of District Charsadda with greater Peshawar region and the contribution of Charsadda forest in greater Peshawar region. Forest area in Peshawar Region is 6121621 hectares which consist of reserved forest, Resume land, land under section 38 Communal and Guzara Forest. Overall Contribution of District Charsadda in forestry of Greater Peshawar Region is 29% which Mostly consist of private plantation on an area of 176757 acres and an acute amount of resumed land on an area of 120 acres.

Table 5-53: Comparison with Greater Peshawar Region (2015-2016)

Forest Type	Peshawar Region	Charsadda	Contributing % of District Charsadda
Reserved Forest	12936	0	0%
Protected Forest	0	0	0%
Resumed Land	4008	120	3%
Unclassed Forest	0	0	0%
Section 38[2]	52	0	0%
Communal	800	0	0%
Guzara Forest	39131	0	0%
Private plantation	547946	176757	32%
Miscellaneous	7289	0	0%
Total	612162	176877	29%



Map 5-12: Existing Forest District Charsadda

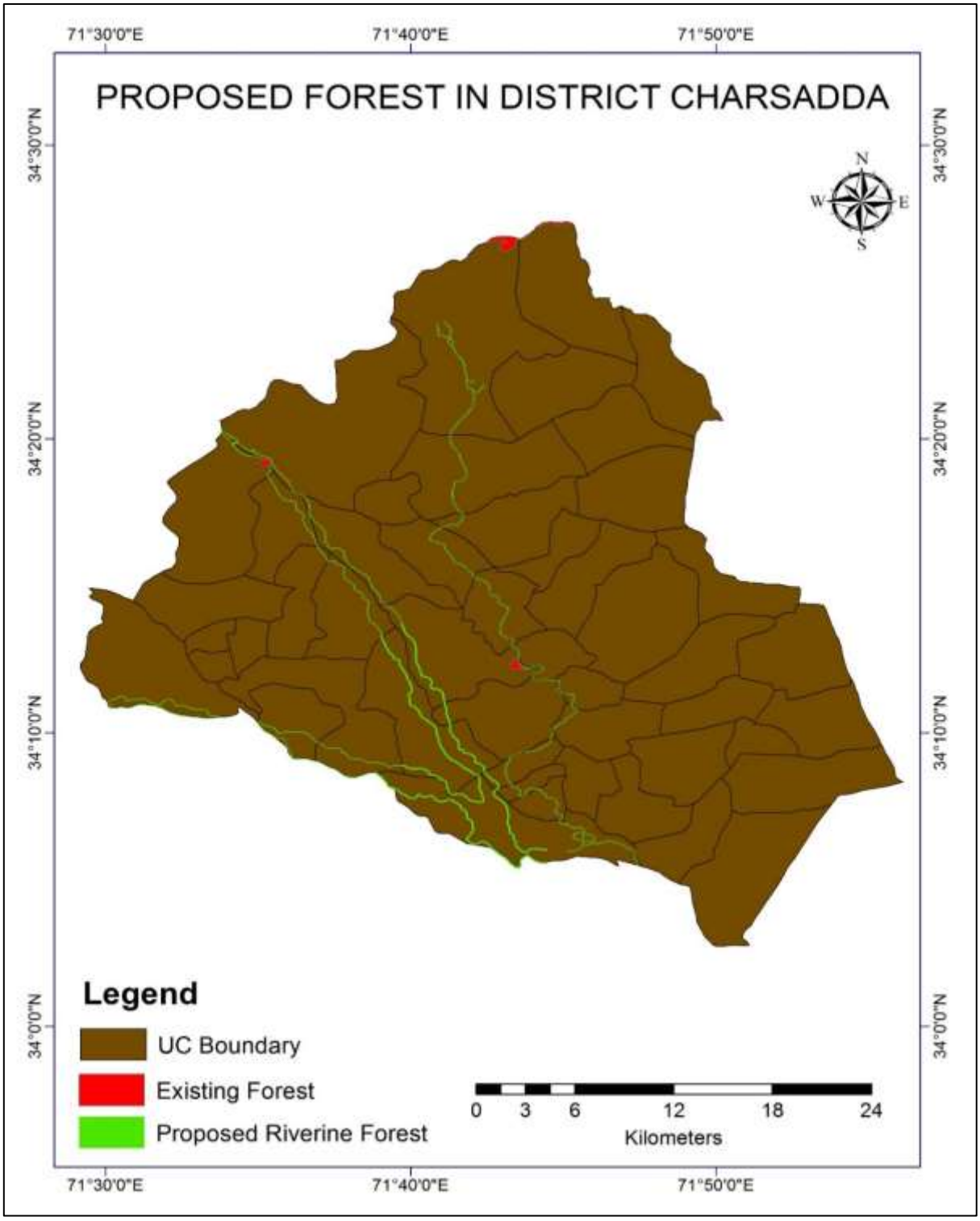
Map 5-12 indicates the Existing Forest in District Charsadda

5.12.5 Constraints

- Total area of District Charsadda is 996 sq.km which cover 1.6% Range land, 0.2 % Shrubs and Bushes, 16 % forest and 82.2 % other Land Uses.
- There are three rivers in District Charsadda namely; River Kabul, River Swat and River Jindi. The land on both sides of the river is suitable for riverine forest.it will contribute toward environmental conservation and will act as flood barriers.
- The planet has been affected in current times with the greenhouse gasses which is detrimental to maintaining life and sustainable environment on earth. Pakistan is a very small contributor in greenhouse effect; Pakistan contributes only 0.2 % greenhouse gases of the whole world.
- The deforestation is also causing Soil erosion leading the area to be the barren land.
- Many wonderful species of plants and animals have been lost, and many others remain endangered.
- Another constraint is the Climate change where plants absorb Carbon Dioxide CO2 (a greenhouse gas) from the atmosphere and uses it to produce food (carbohydrates, fats, and proteins that make up trees). In return, it gives off Oxygen. Destroying the forests mean CO2 will remain in the atmosphere and in addition, destroyed vegetation will give off more CO2 stored in them as they decompose. This will alter the climate of that region. Cool climates may get a lot hotter and hot places may get a lot cooler.

5.12.6 Recommendations

- On both side of Swat and Kabul River 100-meter wide riverine forest is proposed in Agra and Daulat Pura UCs while the width of river Kabul in Hajizai, kangra, Rashaki UCs and river swat in Batagram, Hassanzai, Katozai, Matta Mughal UCs will be 50-meter. All over in District Charsadda 25-meter afforestation shall be done on river Jindi.
- The Government should plant more renewable and sustainable energy resources which are naturally replenished on a human timescale, such as sunlight, wind, rain, tides, waves, and geothermal heat to reduce the use of wood for the daily use.
- The forest land in Charsadda should be preserved to deal with the arising environmental problems.



Map 5-13: Proposed Forest in District Charsadda

5.13 POWER DEVELOPMENT

Power sector is an important part of Provincial Land Use Plan. This plan is being prepared to provide systematic planning and to coordinate development activities for next 20 years for rural and urban population. In Khyber Pakhtunkhwa, Electric power generation, transmission and distribution is facing a number of challenges. These include availability of reliable and affordable power, rehabilitation of aging and inadequate transmission and distribution system, and efficient construction, operation and maintenance.

5.13.1 Existing Situation

Electric power sector in Charsadda such as transmission and distribution are managed by PESCO (Peshawar Electric Supply Company). There is no Hydel or Thermal power station in Charsadda and all the required electric power is purchased from WAPDA National Grid.

The service area of District Charsadda is 996 sq. km, containing 01 division and 05 sub-divisions. The total length of transmission lines (all categories) in the district is 2480 kilometers, which is about 3.18 percent of the provincial total. The length of about 60% of the transmission lines is of 400 volts, while around 36% belong to 11 KV category. Thus, these two categories together form 96% of the total transmission lines length in the District.

The total number of grid stations in District Charsadda is 03, against 87 in the entire Province. In District Charsadda, all 03 Grid Stations are of 132 KV, (Table 5- 54).

Table 5-54: Power Infrastructure: Province Vs District Charsadda

Description	Province	District Charsadda
Service Area	74,521 Sq. Km	996 Sq. Km
Number of Divisions	31 No	01 No
Number of Sub Divisions	143 No	05 No
LT (400v) Transmission Lines	42,526 km	1502 km
11 kv Transmission Lines	31,284 km	883.79 km
33 kv Transmission Lines	311 km	0
66 kv Transmission Lines	861 km	0
132 kv Transmission Lines	1919 km	95 km
220 Kv Transmission Line	750 km	0
500 Kv Transmission Line	117 km	0
Total Transmission lines	77,768 km	2480.79km
Grid Station 33 kv	06	0
Grid Station 66 kv	18	0
Grid Station 132 kv	59	03
Grid Stations - 220 kv	03	0
Grid Stations 500 kv	01	0
Total Grid Stations	87	03

5.13.2 Power Consumers

In 2015 PESCO reported. Approximately 92.39% for domestic and commercial purposes, the other predominant category is industrial, comprising not more than 10% customers. The industrial customers are less than 6.41% of all customers served (Table 5- 55).

Table 5-55: Power Consumers (Million KW)

Sr. No	Description	Province KP	District Charsadda
1	Domestic/Commercial Customers	4600.17	270.39
2	Industrial Customers	1888.96	18.77
3	Tube Wells	109.14	3.33
4	Bulk Customers	243.96	0.01
5	Other	20.23	0.14
	Total	6862.46	292.64

5.13.3 Reasons for Load Shedding

The quantity of Electric Power generated is not enough to fulfill the demands of country, which necessitates load shedding. Table 5- 56 explains the situation in the country, while Table 5- 58 provides similar information for the Province and District Charsadda.

Table 5-56: Power Generation Vs Shortfall in the Country

Total Power generated in the country Oct 2010	14840 MW
Total Power Generated in the country May 2011	12999 MW
Peak Demand	17847 MW
Short Fall	3007 M W in Oct 2010 4848 M W in May 2011
Short Fall (%)	16.8 % in Oct 2010 27 % in May 2011

Table 5-57: Power Generation Vs Shortfall – KP Vs District Charsadda

S. No	Description	Province KP	District Charsadda
1	Average Demand	2100 MW	48 MW
2	Peak Demand	2487 MW	56 MW
3	Available Power	1179 MW	36 MW
4	Short Fall	921 MW	12 MW
5	Short Fall %	43.8 %	25 %

5.13.4 Existing Generating Capacity

Table 5- 59 shows electric generation capacity in Pakistan, while the detailed existing installed capacity and capability of WAPDA system is shown in previously. As seen in Table 5- 60, the total installed capacity from different sources of generation is 19,246 megawatts, of which dependable capacity is 17,779 megawatts. Source-wise installed and dependable capacities are shown in the table below. In winter, hydro availability is based on last 5 years average. The availability excludes 10% forced outages for GENCOs and 6% for IPPs and rentals.

Table 5-58: Electric Generation Capacity (2010)

Type of Generation	Nameplate / Installed Capacity (MW)	Derated / Dependable Capacity (MW)	Availability (MW)	
			Summer	Winter
WAPDA Hydro	6,444	6,444	6,250	2,300
GENCOs	4,829	3,580	2,780	3,222
IPPs (including Nuclear)	7,911	7,695	5,750	6,900
Rental	62	60	60	60
Total	19,246	17,779	14,840	12,482

Table 5-59: Existing Installed Capacity &Capability of WAPDA System (Nov. 2010)

		Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
						Summer	Winter
Public Sector	Hydel	1	Tarbela		3478	3521	1101
		2	Mangla		1000	1014	409
		3	Ghazi Barotha		1450	1405	580
		4	Warsak		243	171	145
		5	Chashma Low Head		184	91	48
		6	Small Hydels		89	64	20
			Sub-Total (WAPDA Hydel)		6444	6266	2303
	Thermal (GENCOs)	7	TPS Jamshoro # 1-4	Gas/Fo	850	700	
		8	GTPS Kotri #1-7	Gas	174	140	
			Sub-Total GENCO-I		1024	840	
		9	TPS Guddu Steam # 1-4	Gas	640	270	
		10	TPS Guddu C #5-13	Gas	1015	886	
		11	TPS Quetta	Gas	35	25	
			Sub-Total GENCO-II		1690	1180	
		12	TPS Muzaffargarh # 1-6	Gas/FO	1350	1130	
		13	NGPS Multan #1&2	Gas/Fo	195	60	
		14	GTPS Faisalabad # 1-9	Gas/HSD	244	210	
		15	SPS Faisalabad # 1&2	Fo	132	100	
		16	Shahdra G. T	Gas	44	30	
			Sub-Total GENCO-III		1965	1530	
		17	FBC Lakhra	Coal	150	30	
			Sub-Total GENCO-IV		150	30	
			Sub-Total GENCOs		4829	3580	

		Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
						Summer	Winter
			Sub-Total (WAPDA+GENCOs)		11273	9846	5883
	Nuclear	18	Chashma Nuclear (PAEC)		325	300	
			Total Capacity (Public)		11598	10146	
Private Sector	Hydel	20	Malakand – III Hydel		81	81	
			Sub-Total (Hydel IPPs)		111	111	
		21	KAPCO	Gas/FO	1638	1386	
		22	Hub Power Project (HUBCO)	FO	1292	1200	
	Thermal	23	Kohinoor Energy Ltd (KEL)	FO	131	124	
		24	AES Lailpur Ltd	FO	362	350	
		25	AES Pak Gen (Pvt) Ltd	FO	365	350	
		26	Southern Elec. Power Co Ltd (SEPCOL)	Fo	135	119	
		27	Habibullah Energy Ltd (HCPC)	Gas	140	129	
		28	Uch Power Project	Gas	586	551	
		29	Rouch (Pak) Power Ltd	Fo	450	395	
		30	Fauji Kabirwala (FKPCL)	Gas	157	151	
		31	Saba Power Company	FO	134	126	
		32	Japan Power Generation Ltd	Fo	135	120	
		33	Liberty Power Project	Gas	235	211	
		34	Altern Energy Ltd (AEL)	Gas	31	31	
		35	Attock Generation PP	Fo	163	156	
		36	ATLAS Power	Gas	219	219	
		37	Engro PP Daharki. Sindh	Gas	227	217	
		38	Saif PP Sahiwal, Punjab	RFO/Gas	225	225	
		39	Orient PP Balloki, Punjab	RFO/Gas	225	225	
		40	Nishat PP Near Lahore, Punjab	RFO	200	200	
		41	Nishat Chunian Proj. Near Lahore	RFO	200	200	

	Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
					Summer	Winter
		Sapphire PP Muridke, Punjab	Rfo/Gas	225	225	
		Sub-Total (Thermal IPPs)		7475	6909	
	42	Gulf Rental PP Gujranwala	Rfo	62	62	
		Sub-Total (Rental)		62	62	
		Total Thermal (IPPs)		7537	6971	
		Total Capacity (Private)		7648	7082	
Total		Total Hydel (Public + Private)		6555	6377	2414
		Total Thermal (Public + Private)		12691	10851	
		Total (PEPCO System)		19246	17228	13265

5.13.5 Alternate Resources of Energy in Charsadda

i. Coal Energy

Table 5-60: WAPDA / PEPCO System Historical Trends

Year	Peak Historical (MW)	Forecast Peak (MW)	Difference (%)
1999-00	9289	9311	0.24
2000-01	9718	9736	0.18
2001-02	10922	10243	-6.21
2002-03	10484	10799	3.00
2003-04	11078	11398	2.80
2004-05	12035	12087	0.43
2005-06	13212	12916	-2.20
2006-07	15138	15213	0.50
2007-08	16838	16480	-2.10
2008-09	17252	17867	3.50
2009-10	17847	19451	8.90

Coal has always been a primary source of energy used to produce electricity, for several reasons. First and foremost, coal is abundant. It is found all over the country and it is easy to get. It is also easy to transport and store, compared to other fuels. Coal is one of the principal minerals produced in Pakistan. The measured coal reserves as on June 30, FY-2009 is 3.46 billion tones. The estimated coal reserves are around 185 billion tones, only a fraction of which is utilized.

Pakistan Economy Watch in a statement said that Pakistan reserves of coal worth USD 25 trillion, can cater the electricity requirements of the country for next 100 years District Charsadda do not have coal reserves, therefore coal has to be imported from other Districts to produce electric power.

Coal is oldest technique to run steam turbines for producing electricity. Coal is composed of many types of gases, like carbon, nitrogen and hydrogen. The major disadvantages of coal energy when it is burnt are that it releases harmful gases in the air. The presence of these harmful gases along with the waste of industrial processes has resulted in immense global warming. Coal which contains high content of sulfur results in acidic rain. The burning of coal results in flue gas, fly ash and bottom ash which contain thorium, mercury and other metals. Among all the non-renewable energy sources this is the highest pollution producing fuel. The emission of gases and material into the air and water causes many dreadful diseases like dust nuisance, lung cancer and influenza. The process of coal burning generates many greenhouse gases like carbon dioxide which have resulted in the destruction of ozone layer and global warming**.** Nevertheless, coal is an immense resource for power generation, and its adverse impacts can be mitigated by adopting proper measures.

Coal reserves are not available in District Charsadda and importing coal from other areas will involve a high cost of transportation. So, it is not an economical choice for Power generation.

ii. Energy Generation from Garbage[43]

Electricity can be generated from garbage at District Level by utilizing waste management process. The brief description of the process is as follows:

Collection trucks bring waste to the power plant and it is unloaded into the refuse bunker. From refuse bunker it is transferred to combustion chamber for burning. The heat generated by burning the waste is used to heat the boiler and produce steam. The gases of combustion pass through a scrubber for removal of acid which is hazardous and cannot be released in the air. The clean gases are then dispersed to the atmosphere through the smoke stack.

Waste generated by public is 0.5 kg per person per day. The population of District Charsadda is 1,572,474. Since the total population is not urbanized and may not generate 0.5 kg per day of garbage. Therefore 50 % population can be considered that generate 0.5 kg per day. The waste generated will be approximately 393,119 kg, i.e. equal to 393.119 tons per day. 627 KWH energy can be produced from each ton of combustible solid waste. Approximately 15 percent of the energy produced is used to operate the plant which is 59 Kwh and the balance 334 Kwh can be sold to the energy customers. Therefore, a garbage plant in District Charsadda can produce 131,262 Kwh of electricity to be available for public.

[43] Source: - Report on urban environmental problems in Pakistan, case study, Hayatabad, Peshawar and Report on waste to power Karnataka, India

iii. Solar Energy

Solar Energy is an environment friendly and needs to be developed and popularized to achieve the goal of sustainable development. The Solar energy source is widely distributed and abundantly available in Charsadda.

Table 5-61: Climate data for Charsadda (2010) (Source: Pak Metrological Deptt.)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Average high °C	20.9°C	19.7 C	29.8 C	33.8 C	37.2 C	38.1°C	37.2°C	33.7°C	34.7°C	32°C	26.6°C	19.7°C	30.3°C
Average low °C	4 °C	8.2 °C	14.9 °C	18.9 °C	21.9 °C	23.6 °C	26.4 °C	26.2 °C	22.8 °C	18.2 °C	9.4°C	2.6 °C	16.4°C
Sunshine hours	195.3	192.1	195.3	231.0	297.6	300.0	272.8	263.5	258.0	266.6	234.0	182.9	2,889.1

Charsadda has solar energy of about 200 - 250 watt per m^2 in a day with about 2,889 sunshine hours in a year. This figure is the same as for Peshawar District because of close vicinity.

Solar insulation "IS" is 19 - 20 Mega Joules/meter sq. a day (1.93 - 2.03 mwh per m^2 in a year) with annual mean sunshine duration of 8 - 8.5 h. Such conditions are ideal for Photovoltaic (PV) and other solar energy applications.

5.13.6 National Power Sector Policy

Water & Power Development Authority (WAPDA) is the main public-sector body involved in generation, transmission and distribution of electric power in Pakistan except Karachi, where KESC is doing the same function. Electric power generated by every power station such as Tarbela, Warsak, and Mangla etc. is evacuated to the National Grid System. All the generated electricity is purchased by WAPDA at an-agreed price. The Provinces get the royalty of the generated power called "Net Hydel Profit" from WAPDA. (NTDC) National Transmission and Dispatch Company is responsible for transmission, dispatch and distribution. (PESCO) Peshawar Electric Supply Company, is a distribution company, it purchases the energy units required in the Province from WAPDA, sell to consumers and collect revenue.

Federal Power Policy 2002 provides the facility that any investor can develop Hydel as well as other power projects in Pakistan. Private Power Infrastructure Board (PPIB) under Ministry of Water and Power, Islamabad is the focal body to coordinate such projects. PPIB website has E-Library to provide details of power policy and guidelines for investors to establish power plants.

5.13.7 Provincial Power Policy

Govt. of Khyber Pakhtunkhwa through SHYDO can offer hydropower projects up to 50 MW through private / public sector development with the following incentives Project sites, with

estimated power potential of more than 5 MW, will be offered for lease through International Competitive Bidding (ICB) on the basis of available power potential at site of the proposed project. The baseline lease price for the purpose of ICB is fixed as Rs. 1000/- per KW per annum. The site will be awarded on the basis of highest bid received above the baseline lease price. The approved lease price will be escalated @ 25% after every 10 years of the lease period. For solicited cites, the power potential determined in the feasibility report will be considered for estimating the total lease money payable per annum to SHYDO.

If the sponsor of the power project succeeds to arrange funds, himself or through a joint venture with other investors, for building another legally permitted project of integrated industry of any type with captive use of the power project, the Govt. of Khyber Pakhtunkhwa will offer incentives for establishing the industry provided that the commercial production from the industry starts with a year from date of commercial operation of the power plant. 5 % duty on import of machinery required for the industry. Lease of public land for the life of the industrial plant, if available.

5.13.8 Constraints

i. Safe and reliable transmission and distribution of electricity is a major problem due to weak infrastructure of Transmission Lines and Grid Stations. Shut down and tripping are more frequent due to this problem.

ii. Seasonal variation in hydro power generation due to less water available in winter is a serious problem. Therefore, full capacity of hydro power cannot be generated in winter season.

iii. Some of the thermal power plants are run by fuel oil, which is an imported item; the cost of electricity generation is very high as compared to other renewable energy systems.

iv. Coal is available in very large quantity but federal government does not encourage power production from coal.

v. Power production from solar energy is not developed on large scale. Peak demands during the day can be met with the support of this energy.

5.13.9 Recommendations

i. Federal and Provincial Govt. should launch a large-scale expansion program to use the renewable Hydro Electric Potential for power generation.

ii. Coal is one of the principal minerals available in abundance in the country.

iii. Govt. should develop a policy to install large power plants to utilize this mineral; at District level, small scale coal gasification plants can be installed to add to existing power generation.

iv. Solar energy is available free of cost and there is a need to develop and popularize the solar power plants on large scale at District level.

v. The provincial Govt. should increase awareness among the public to use renewable energy. A commercial module shall be developed so that the private sector can follow on the same lines.

vi. The available infrastructure of transmission lines and grid stations should be repaired and upgraded to reduce technical losses and to reduce shut downs. The ratio of HT to LT line length needs to be improved by extending more HT lines. Selective re-conducting of heavily loaded feeders should be do ne to reduce HT losses.

vii. Theft of electricity and losses can be reduced to an acceptable limit as follows:

- The Open conductor LT lines are notoriously vulnerable to unauthorized hooking or kunda connections. Some of the open LT transmission lines should be replaced with NEW TECHNOLOGY, Covered Multiplex Conductors. This would assist in limiting loss from this source.
- Approximately 95% of PESCO meters are still of the old Electro-Mechanical type. These are vulnerable to slowing and tampering by anyone. Large-scale meter tampering, and illegal kunda connections are done with the help of company employees. Therefore, replacement of these meters with electronic units will reduce meter tempering.

5.14 RESOLUTION OF INTER-DISTRICT PLANNING ISSUES

To resolve the inter-District planning issues and to implement the Land Use Plan, there is a need to form a regional body such as Peshawar Valley Development Agency (PVDA), which can not only implement the plans for each of the five Districts, but do so in a coherent and integrated way, and also resolve the inter-District planning issues which may arise during the plan implementation process. At present there is no regional body which can provide framework for the implementation of Land Use Plans and take up development projects of regional level for valley as a whole. A senior officer may be assigned the duties of Chief, PVDA. To assist the Chief and coordinate the activities, a number of Deputy Chiefs may be drawn from the relevant line departments as well as the five Districts. The officials should represent their respective departments/Districts and provide guidance where necessary. There is also a need for formation of an inter-District advisory committee comprising of elected representatives/senior officers of the five Districts to discuss and advise PVDA about inter-District planning issues and their resolution.

The proposed PVDA under the auspices of Urban Policy Unit will be responsible for:

i. Coordination with Districts to resolve inter-District planning issues, if any.
ii. Coordination with sectoral departments.
iii. Coordination with local councils.

iv. Planning, supervision, monitoring and implementation of Project.
v. Organizing and conducting various training programs.

The PVDA through Urban Policy Unit/P&D Department shall also keep close liaison with donors and provide full support to induce their intervention in the target Districts. It will also coordinate the relevant activities of various departments/agencies and would coordinate annual review meetings with donors and executing line departments. As already stated, PVDA will be responsible for implementation, administration and coordination of District Land Use Projects in an integrated manner, including financial management, organization of training programs, association with line departments and the NGOs. It is also important to intensify the involvement of line departments in the area. It is proposed to utilize the services of the experts working in these departments so that they can participate for implementation of the Land Use projects. Similarly, other agencies functioning at provincial and District levels, and have got the expertise relevant to the Project, should also be involved in the execution of the Project

Considering the complexity and enormity of planning issues in the Districts, it is also seeming imperative to have a separate Executive District Officer for Land Use Planning, who will coordinate between the PVDA in Urban Unit and District level Departments, authorities, and agencies responsible for implementation of various projects. This arrangement is likely to have salutary effects for achievement of the targets.

6 PLANNING FOR RURAL AREAS

6.1 POLICY GUIDELINES FOR SUSTAINABLE DEVELOPMENT OF RURAL AREAS

District Charsadda is a one of the most fertile and agriculturally productive Districts of Khyber Pakhtunkhwa. Being under the shadow-effect of Peshawar, the pace of urbanization has been lesser, and hence the agricultural land in the vicinity of the urban/built-up areas has not been substantially absorbed by urban growth. However, the in the years to come, the pace of urbanization is likely to increase. This may have adverse impact on agricultural activities and can shatter the rural character and economy of the surrounding villages. These rural settlements are gradually getting converted to 'entrapped urban villages. Already, Utmanzai is now essentially a part of urban Charsadda because of spatial amalgamation. Agricultural land exists throughout the district, including around the urbanized areas of Charsadda. The agricultural tracts in the entire District are productive, being served with water from the two rivers, canals and irrigation minors.

This Chapter proposes guidelines on different aspects of Land Use Planning in rural areas of the district. Planning policies should facilitate and promote sustainable patterns of development in rural areas. This should include policies to sustain, enhance and, where appropriate, revitalize rural settlements and villages for strong, diverse, economic activity, whilst maintaining local character and a high-quality environment. To ensure this, local planning authorities should be aware of the circumstances, needs and priorities of the rural communities and businesses in their area, and of the interdependence between urban and rural areas.

People who live or work in rural areas should have reasonable access to a range of services and facilities. Local planning authorities should facilitate and plan for accessible new services and facilities, particularly where there is an identified need for new or expanded services to strengthen the role of a particular local service center. It should also be ensured that where possible, new development in identified service centers is supported through improvements to public transport, and to walking and cycling facilities; and support mixed and multi-purpose uses that maintain community vitality.

The Planning Authority should also support the provision of small-scale, local facilities to meet community needs outside identified local service centers, particularly where they would benefit those rural residents who would find it difficult to use more distant service centers. These local facilities should be located within or adjacent to existing villages and settlements where access can be gained by walking, cycling and (where available) public transport.

There needs to be a positive approach to planning proposals designed to improve the viability, and community value of existing services and facilities, e.g. village shops and post offices, rural petrol stations, mosques and community buildings, that play an important role in sustaining village communities.

Many villages are of considerable historic value, or make an important contribution to local rural character. Planning authorities should ensure that development respects and, where possible, enhances these particular qualities. It should also contribute to a sense of local identity and regional diversity and be of an appropriate design and scale for its location.

Planning authorities should take a positive approach to innovative, high-quality contemporary designs that are sensitive to their immediate setting and help to make country towns and villages better places for people to live and work.

It should be ensured that the quality and character of rural areas is protected and, where possible, enhanced. There should be particular regard to any areas that have been statutorily designated for their landscape, wildlife or historic qualities where greater priority should be given to restraint of potentially damaging development.

The objective of sustainable developments in rural areas is to raise the quality of life and the environment in rural areas through the promotion of:

- Good quality, sustainable development that respects and, where possible, enhances local distinctiveness and the intrinsic qualities of the countryside; and
- Continued protection of the open countryside for the benefit of all, with the highest level of protection for our most valued landscapes and environmental resources.
- To promote more sustainable patterns of development:
- Focusing most development in, or next to, existing towns and villages;
- Preventing urban sprawl;
- Promoting a range of uses to maximize the potential benefits of the countryside fringing urban areas; and
- Providing appropriate leisure opportunities to enable urban and rural dwellers to enjoy the wider countryside.
- To promote sustainable, diverse and adaptable agriculture sectors where farming achieves high environmental standards, minimizing impact on natural resources, and manages valued landscapes and biodiversity; contributes both directly and indirectly to rural economic diversity; is itself competitive and profitable; and provides high quality products that the public wants.

6.1.1 Key Principles

i. Sustainable development is the core principle and foundation of good Land Use Planning. The following key principles should be applied:

Decisions on development proposals should be based on sustainable development principles, ensuring an integrated approach to the consideration of:

- Social inclusion, recognizing the needs of everyone;

- Effective protection and enhancement of the environment;
- Prudent use of natural resources; and
- Maintaining high and stable levels of economic growth and employment.

ii. Good quality, carefully-sited accessible development within existing towns and villages should be allowed where it benefits the local economy and/or community (e.g. affordable housing for identified local needs); maintains or enhances the local environment; and does not conflict with other planning policies.

iii. Accessibility should be a key consideration in all development decisions. Most developments which are likely to generate large numbers of trips should be located in or next to towns or other service centers that are accessible by public transport, walking and cycling. Decisions on the location of other developments in rural areas should, where possible, give people the greatest opportunity to access them by public transport, walking and cycling, consistent with achieving the primary purpose of the development.

iv. New building development in the open countryside away from existing settlements, or outside areas allocated for development in development plans, should be strictly controlled; the overall aim is to protect the countryside for the sake of its intrinsic character and beauty, the diversity of its landscapes, heritage and wildlife, the wealth of its natural resources and so it may be enjoyed by all.

v. Priority should be given to the re-use of previously-developed ('brownfield') sites in preference to the development of greenfield sites, except in cases where there are no brownfield sites available, or these brownfield sites perform so poorly in terms of sustainability considerations (for example, in their remoteness from settlements and services) in comparison with greenfield sites.

vi. All development in rural areas should be well designed and inclusive, in keeping and scale with its location, and sensitive to the character of the countryside and local distinctiveness.

6.1.2 Agriculture and Farm Diversification

The Government recognizes the important and varied roles of agriculture, including in the maintenance and management of rural areas. Thus, there is a need to proposals that will enable farming and farmers to:

i. Become more competitive, sustainable and environmentally friendly;

ii. Adapt to new and changing markets;

iii. Diversify into new agricultural opportunities

iv. Broaden their operations to 'add value' to their primary produce.

The presence of best and most fertile agricultural land should be taken into account alongside other sustainability considerations (e.g. biodiversity; the quality and character of the landscape; its amenity value or heritage interest; accessibility to infrastructure, workforce and markets; maintaining viable communities; and the protection of natural resources, including soil quality).

Where significant development of agricultural land is unavoidable, local planning authorities should seek to use areas of poorer quality land in preference to that of a higher quality, except where this would be inconsistent with other sustainability considerations. If any undeveloped agricultural land needs to be developed, any adverse effects on the environment should be minimized.

6.1.3 Tourism and Leisure

Tourism and leisure activities are vital to many rural economies and sustaining many rural businesses. Tourism industry is significant source of employment and help to support the prosperity of villages, local heritage and culture.

Sustainable rural tourism and leisure developments that benefit rural businesses, communities and visitors and which utilize and enrich, but do not harm, the character of the countryside, its towns, villages, buildings and other features.

Area with high landscape value, nature conservation or historic qualities should be recognized and designated as such. The provision of essential facilities for tourist visitors is vital for the development of the tourism industry in rural areas.

6.2 RURAL SETTLEMENTS IN DISTRICT CHARSADDA

6.2.1 Number of Rural Settlements

As per District Census Report (1998) of District Charsadda, there are 200 rural settlements in the district. From the same source, it has been calculated that in the year 1998, 60 of these villages had population of 5,000 and above, 70 villages had population between 2,000 to 4,999 while 32had population varying between 1,000 to 1,999. Thus, combining the above categories, 162rural settlements (81%) had population of 1,000 and above, while the remaining about 19% had less than 1,000 populations.

Table 6-1: Number of Rural Settlements

PC	Settlements (Villages)	1998 POPULATION	Growth Rate	2017 Population	POP 2021	POP 2025	POP 2030	POP 2035	POP 2040
Agra	Agra	7308	2.52	11719	12946	14301	16196	18342	20772
	Jangal	131	-100	0	0	0	0	0	0
Chak Charsadda	Chak Charsadda	5003	2.98	8747	9837	11063	12813	14839	17186
	Nawan Killi	2320	0.16	2393	2408	2424	2443	2463	2483
Chak Hisar	Chak Hisar	4981	6.07	15263	19320	24456	32835	44087	59193
	Faqir Abad	886	-2.15	586	537	492	442	396	355
	Kodian	1398	-5.94	437	342	268	197	145	107
Chak Nissatta	Chak Nissatta	3267	1.71	4510	4826	5165	5622	6120	6661
Charsadda	Charsadda	6281	3.36	11760	13422	15319	18071	21318	25149
	Ghunda Karkana	3847	2.32	5948	6519	7146	8014	8988	10080
	Malika Dher	2994	2.29	4606	5043	5521	6182	6923	7753
Daulat Pura	Daulat Pura	6566	2.05	9661	10478	11364	12577	13921	15407
	Jhamat	2082	1.03	2530	2636	2746	2891	3042	3202
Dheri Samandar	Dheri Samandar	1858	0.78	2153	2221	2291	2382	2476	2574
	Ghurambak	2472	2.79	4170	4655	5197	5963	6843	7852
	Sandasar	1591	1.43	2085	2207	2336	2508	2692	2890
	Sarwani	2028	-0.02	2022	2020	2019	2017	2015	2013
Dheri Zardad Khan	Aziz Abad	4492	2.24	6847	7481	8175	9132	10202	11397
	Boobak	4212	1.96	6086	6577	7108	7833	8631	9511
	Dheri Zardad Abad	7436	4.23	16330	19273	22747	27983	34424	42347
	Tulandi	6590	3.1	11761	13289	15015	17491	20375	23735
Maira Nissatta	Maira Nissatta	8212	3.11	14697	16612	18777	21885	25506	29727
Maira Parang	Chitli Mankrai	669	6.83	2347	3057	3982	5540	7709	10726
	Chitli Tapo	32	15.58	501	894	1596	3291	6788	14000
	Maira Prang	8112	2.81	13736	15346	17145	19693	22620	25982
	Najim Abad	2277	0.6	2552	2614	2677	2758	2842	2928
Nissatta	Nissatta	21290	2.04	31249	33878	36728	40630	44947	49723
	Palosa	3592	1.93	5167	5578	6021	6625	7289	8020
Prang Sadu Khel	Manduri	440	4.88	1087	1315	1591	2019	2563	3252
	Prang Sadu Khel	740	-1.48	557	525	494	459	426	395
	Prang Safar Khel	2713	4.28	6010	7107	8404	10363	12779	15758
Prang Yasin Zai	Gidder	2566	2.21	3888	4243	4631	5166	5762	6428
	Prang Yasin Zai	3135	4.62	7400	8865	10621	13311	16684	20911
Sheikh Killi	Dehri Shahbara	495	7.75	2045	2757	3716	5397	7838	11384

	Dogar	373	0.22	389	392	396	400	405	409
	Gana Bela	67	-10.58	8	5	3	2	1	1
	Saboke	119	1.12	147	154	161	170	180	190
	Sheikh Killi	1939	2.26	2966	3243	3547	3966	4435	4959
	Sheikh Bela	483	-100	0	0	0	0	0	0
Sheikho	Shaku	12621	-1.8	8935	8309	7727	7056	6443	5884
	Sheikhu	0	2.58	9199	10186	11278	12810	14550	16527
	Surkhatki	1759	2.01	2568	2781	3011	3326	3674	4059
	Zarin Abad	5041	3.46	9628	11031	12639	14982	17760	21052
Sukker	Ambadher	2394	1.33	3078	3245	3421	3655	3904	4171
	Sukar	5291	1.32	6792	7158	7543	8054	8600	9183
Bhaloola	Bahola	11621	2.46	18443	20326	22401	25295	28563	32254
	Gardi	716	-1.87	500	464	430	391	356	324
	Mir-Abad	2109	1.17	2633	2758	2890	3063	3246	3441
	Sarki Masharan	3603	1.79	5047	5418	5817	6356	6946	7590
Chak Razar	Chak Razar	3879	4.31	8653	10244	12128	14976	18494	22838
Chak Utmanzai	Chak Utmanzai	1140	-0.44	1048	1030	1012	990	968	947
	Gangu	1586	-0.47	1449	1422	1395	1363	1331	1300
	Kot	1586	5.12	4098	5004	6110	7843	10067	12922
Chindro Dag	Akhun Dheri	4687	2.54	7545	8341	9222	10454	11851	13434
	Chindro Dag	4130	2.68	6822	7583	8429	9621	10981	12534
	Mahmood Abad	4041	3.65	7982	9213	10633	12721	15218	18206
Dargai	Dargai	6367	1.61	8630	9199	9806	10621	11504	12461
	Khuda Khel	3690	3.05	6530	7364	8304	9650	11214	13032
	Mani Khel	3275	3.14	5896	6672	7550	8813	10286	12006
	Qulat Nasir	4496	1.97	6512	7041	7612	8392	9252	10200
Khan Mahi	Gul Abad	4514	2.13	6733	7325	7970	8855	9839	10933
	Khan Mahi	10173	2.01	14856	16087	17420	19242	21256	23479
	Mufti Pur	1810	0.95	2166	2249	2336	2449	2568	2692
	Umari	2119	1.05	2585	2695	2810	2961	3120	3287
Maira Turangzai	Ghazgi	6566	1.56	8813	9376	9975	10778	11645	12582
	Maira Turang Zai	8453	2.78	14244	15895	17738	20344	23334	26763
	Sarki Titara	2445	1.35	3152	3326	3509	3752	4012	4291
	Tebana	6492	1.9	9281	10007	10789	11854	13024	14309
Mera Utmanzai	Anwar Killi	3656	3.87	7515	8748	10182	12311	14885	17997
	Deputy Killi	585	6.26	1855	2365	3015	4085	5534	7496
	Mera Utman Zai	3002	6.5	9930	12775	16434	22516	30849	42266
	Sadat Abad	2579	-3.6	1284	1109	958	797	664	553
Mira Umarzai	Mira Umarzai	9617	3.15	17323	19611	22201	25925	30274	35352

	Spinwari	1627	2.38	2544	2795	3071	3454	3885	4370
	Zarbab Garhi	4788	1.34	6162	6499	6854	7326	7830	8369
Panerak Mohd Nari	Badraga Dheri	3628	2.02	5303	5745	6223	6878	7601	8400
	Mufti Abad	3244	4.39	7337	8713	10346	12826	15899	19709
	Munaf Killi	1347	1.05	1642	1712	1785	1881	1982	2088
	Panerak Mohd Nari	7398	3.53	14303	16432	18878	22454	26707	31765
	Shah Afzal Abad	1776	3.94	3703	4322	5044	6120	7424	9007
	Shali Bagram	1731	2.01	2528	2737	2964	3274	3617	3995
Razar	Mahun Dehri	1465	1.39	1903	2011	2125	2277	2440	2614
	Rahima	1303	0.62	1464	1501	1538	1586	1636	1688
	Razar	25083	2.37	39114	42956	47175	53037	59627	67035
	Shakkar Dhand	3513	1.83	4957	5330	5731	6275	6870	7522
	Wardagha	6969	3.99	14661	17145	20049	24381	29649	36055
Shah Dand	Dusara	7575	1.1	9321	9738	10174	10746	11350	11988
	Haryana	1275	-0.76	1104	1071	1039	1000	962	926
	Ibrahim Zai	4135	1.73	5732	6139	6575	7164	7805	8504
	Kholay	2982	0.59	3336	3415	3497	3601	3709	3819
	Shah Dhand	2997	0.63	3374	3460	3548	3661	3778	3898
	Shakara	1316	4.73	3168	3811	4585	5777	7279	9171
Shahi Kulali	Abu-Bakri	1448	1.16	1802	1887	1976	2093	2218	2349
	Chitta	324	1.76	451	484	519	566	617	674
	Dagi Faiz-ULLAH	1424	0.15	1466	1475	1484	1495	1506	1517
	Dagi Ghulam Qadir	949	-0.49	865	848	832	811	792	773
	Shahi Kulali	1193	1.16	1486	1556	1630	1726	1829	1937
Tarnab	Aspalmai	632	0.52	697	712	727	746	765	785
	Malmala	4006	1.14	4972	5203	5444	5761	6097	6453
	Tarnab	5950	2.63	9737	10802	11984	13646	15537	17690
Turang Zai	Turang Zai	10244	1.82	14425	15504	16664	18237	19958	21841
Umar Zai	Chak Amir Khan	654	3.82	1334	1550	1801	2172	2619	3160
	Chak Kaka Khel	388	2.31	599	656	719	806	904	1013
	Umar Zai	22682	2.04	33307	36109	39147	43306	47908	52998
Batgram	Batgram ALLAH dad Khel	5009	2.99	8766	9862	11096	12857	14897	17262
	Batgram Chura Khel	4467	-1.04	3660	3510	3366	3195	3032	2878
	Garhi Abdur Rehman	1912	4.93	4773	5786	7014	8923	11350	14437
	Mathra	4387	2.2	6636	7240	7898	8806	9818	10947

Dalazak	Dalazak	6431	2.14	9609	10458	11383	12654	14067	15638
	Daman Shabqadar	5605	7.77	23210	31309	42234	61397	89256	129756
Haji Zai	Haji Zai	4356	1.98	6323	6839	7397	8159	8999	9926
	Tarkha	4074	2.77	6842	7632	8514	9760	11189	12827
Kangra	Kangra	7976	1.36	10311	10883	11488	12290	13149	14068
Katuzai Bala	Garhi Nazar	1328	2.5	2124	2344	2588	2928	3313	3748
	Katuzai Bala	5869	3.8	11920	13838	16064	19357	23325	28107
	Malik Abad	3137	0.89	3711	3845	3984	4164	4353	4550
Katuzai Payan	Bela	1428	1.7	1966	2103	2250	2448	2663	2897
	Katuzai Payan	9134	0.71	10449	10749	11057	11456	11868	12295
	Sadgar Gari	1257	0.8	1462	1509	1558	1622	1687	1756
Kharki	Garhi Ghagar	519	2.59	844	935	1036	1177	1337	1520
	Kharki	4040	0.89	4778	4950	5129	5361	5604	5858
	Nahqi	3474	1.1	4273	4464	4664	4926	5203	5496
Kotak Tarnab	Hassan Zai	3364	2.12	5013	5452	5929	6585	7313	8122
	Kotak Tarban	5641	1.29	7195	7574	7972	8500	9062	9662
	Mula Khel	614	1.41	801	847	896	961	1031	1105
Matta Hamza Khel	Matta Hamza Khel	7423	2.31	11461	12557	13758	15423	17288	19379
	Matta Palang Zai	5618	0.96	6742	7005	7278	7634	8007	8399
Matta Rustam Khel	Kabli	361	2.6	588	652	722	821	933	1061
	Matta Rustam Khel	16847	2.74	28174	31391	34976	40037	45831	52464
Mirzai	Mirzai	9685	2.35	15050	16515	18123	20355	22862	25678
	Sukhta	2846	2.28	4369	4781	5232	5857	6556	7338
Panjpao	Panjpao	12398	3.69	24677	28526	32975	39525	47376	56786
Rashkai	Mian Khel	5562	1.09	6829	7132	7448	7863	8301	8763
	Norani	4442	2.12	6618	7197	7827	8693	9654	10722
	Rashkai	5782	2.82	9809	10963	12253	14081	16182	18596
Sareekh	Mandey Zai	4546	0.5	4997	5098	5200	5332	5466	5604
	Marozai	3109	3.21	3815	4329	4912	5753	6737	7890
	Sareekh	3287	2.16	4932	5372	5852	6511	7246	8063
Ucha	Garhi Jala Banan	996	2.89	1711	1918	2149	2478	2857	3295
	Mahzara	5116	0.65	5787	5939	6095	6296	6503	6717
	Ucha Wala	5908	3.72	11817	13676	15827	18999	22805	27374
Yaghi Banda Payan	Bak Yana	3444	1.66	4709	5030	5372	5833	6333	6877
	Dehri Banda Mathra	303	4.48	697	831	990	1232	1534	1910
	Haryana	1072	2.45	1699	1872	2062	2327	2627	2965
	Yahhi Bandan Bala	475	-1.06	388	372	356	338	320	304

	Yaghi Bandan Miana	1017	-0.01	1016	1016	1015	1015	1014	1014
	Yaghi Bandan Payan	1053	1.37	1363	1439	1520	1627	1741	1864
Aba Zai	Aba Zai	2978	0.74	3425	3528	3633	3770	3911	4058
	Maira Aba Zai	4060	5.26	10757	13205	16211	20947	27066	34974
Amir Abad	Amir Abad	9272	2.92	16018	17972	20165	23287	26891	31053
	Sarki Kashran	4852	2.1	7204	7828	8507	9439	10472	11619
Bar Behram Dheri	Bar Behram Dheri	2864	4.62	6760	8099	9702	12160	15241	19102
	Koz Behram Dheri	9539	2.93	16524	18547	20819	24053	27789	32106
Bari Bandan	Bari Bandan	10795	3.56	20972	24122	27744	33047	39364	46887
	Mandani	6684	2.56	10800	11949	13220	15002	17023	19316
China	China	3645	1.47	4810	5099	5406	5815	6255	6728
	Daulat Pura	343	3.71	685	792	917	1100	1320	1583
	Dildar Garhi	2624	1.58	3532	3761	4004	4330	4683	5065
	Mirza Dher	4346	1.2	5450	5716	5996	6364	6755	7170
Dakki	Dakki	6911	2.72	11508	12812	14264	16312	18655	21334
	Kiramat Shah Koroona	4225	1.7	5818	6224	6658	7243	7880	8573
	Sahib Gul Koroona	4373	2.6	7119	7889	8742	9939	11300	12847
Dubandi	Asghar	1349	0.6	1512	1549	1586	1634	1684	1735
	Dubandi	2749	6.12	8501	10781	13673	18401	24764	33328
	Palli Bara Zai	376	8.27	1701	2337	3212	4779	7110	10578
	Palli Nasrat Zai	1982	3.31	3680	4192	4775	5620	6613	7783
	Qilla	1092	-0.28	1035	1023	1012	998	984	970
Gandira Bala	Behram Khan Dehri	3344	2.63	5478	6077	6742	7677	8741	9952
	Gandira Bala	5600	1.79	7840	8417	9036	9874	10790	11791
	Gandira Payan	3687	4.7	8822	10601	12739	16028	20165	25371
	Shakoor	5683	2.25	8670	9477	10359	11578	12941	14464
Hisara Barani Payan	Hisara Barani Miana	6324	2.83	10745	12014	13433	15444	17757	20416
	Hisara Barani Payan	7054	2.37	11018	12100	13289	14940	16796	18883
Hisara Nehri	Hisara Barani Bala	4363	3.21	7956	9028	10244	11997	14050	16455
	Hisara Nehra	13463	2.39	21104	23195	25493	28689	32285	36332
Juraa	Aisogi	287	1.42	375	397	420	450	483	519

	Garhi Main Sahib	206	7.13	762	1004	1322	1866	2632	3715
	Gari Bihar	1005	0.72	1151	1185	1219	1264	1310	1357
	Juraa	1461	0.56	1624	1661	1698	1746	1796	1847
	Sahra Sang	255	-1.22	202	192	183	172	162	152
	Sangar	216	-12.26	18	11	6	3	2	1
	Tarlandi	231	3.12	414	468	529	617	720	839
Namun	Dang Qilla	621	-1.14	499	477	455	430	406	383
	Duba	356	7.39	1379	1834	2439	3484	4976	7108
	Namun	2385	2.83	4054	4533	5068	5827	6699	7703
	Shahgai	514	3.36	963	1099	1254	1480	1746	2059
	Totakai	850	1.47	1122	1189	1261	1356	1459	1569
Qaidabad	Qaidabad	9539	2.41	15008	16508	18158	20454	23040	25954
	Rai Killi	7192	2.1	10684	11610	12617	13998	15531	17232
Sher Pao	Chak Sher Pao	606	5.06	1548	1886	2298	2941	3764	4818
	Sher Pao	13909	1.97	20159	21795	23564	25978	28640	31574
Showdag	Chhel	4752	2.93	8223	9230	10360	11969	13829	15977
	Moza Khan Koroona	4681	2.61	7642	8472	9391	10683	12151	13822
	Showdag	7097	2.2	10739	11716	12781	14250	15888	17715
Tangi Bara Zai	Maira Tangi Bara Zai	9744	7.14	36145	47627	62757	88597	125077	176578
	Tangi Bara Zai	5271	2.69	8729	9707	10794	12326	14076	16074
Tangi Nusrat Zau	Gumbati	786	-0.48	717	703	690	674	658	642
	Qulba Sherpao	545	3.85	1118	1300	1512	1827	2207	2666
	Tangi Nusrat Zai	2438	1.8	3419	3672	3943	4311	4714	5153
Ziam	Hawara	9994	1.53	13335	14170	15057	16245	17526	18909
	Zaim	9597	2.64	15754	17485	19405	22106	25182	28686
Total Rural Population		**829513**	**2.58**	**1,346,023**	**1,505,301**	**1,690,687**	**1,967,724**	**2,308,678**	**2,733,379**

6.2.2 Growth Pattern of Rural Settlements

Based on the populations of villages as given in the census reports of 1998 and 1981, growth rate of each rural settlement was calculated, based on which these settlements have been divided into 3 categories as per following criteria:

- Rapidly growing villages (growth rate above 3%)
- Moderately growing villages (growth rate between 2%-3%).
- Slowly growing villages (growth rate below 2%)

The results are presented in Table 6-2 As seen, of the total 867[44] rural settlements, 458 villages are rapidly growing, 235 have moderate growth and 174 villages have slow growth.

Table 6-2: Growth Pattern of Rural Settlements in Peshawar Valley

Type of Rural Settlement	No. of Rural Settlements					Total	%age
	Peshawar	Mardan	Nowshera	Charsadda	Swabi		
Fast Growing	155	70	67	101	65	458	52.83
Moderately Growing	47	48	41	45	54	235	27.10
Slow Growing	33	32	29	51	29	174	20.07
Total	235	150	137	197	148	867	100

6.2.3 Rapidly Growing Rural Settlements

As seen in Table 6-1, there are 101 fast growing settlements in District Charsadda. There is however vast variation in their growth rates, ranging from 3% to about 17%. Such settlements therefore have therefore been divided into the following sub-categories based on their growth rates:

- High-High: Above 7%
- Middle High: 5-7%
- Low High: 3-<5%

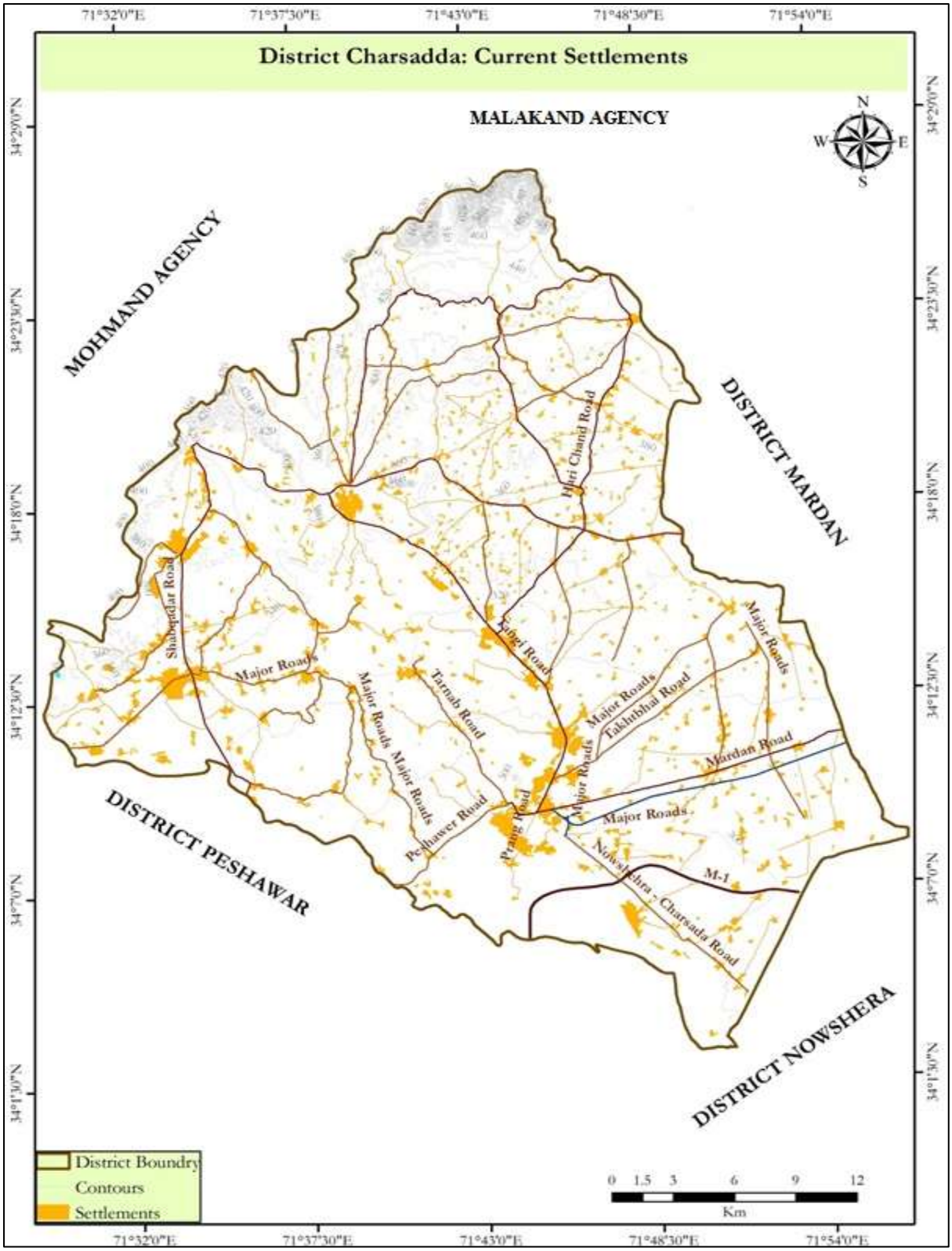
Table 6-3: Rapidly Growing Rural Settlements

Growth Category	Growth Rate	Number of Settlements	Names of Settlements
High-High	Above 7%	19	Garhi Ghagar, Bela, Bar Behram Dheri, Chitli Mankrai, Deputy Killi, Gana Bela, Haryana, Kodian, Mahmood Abad, Saboke, Sadat Abad, Shahgai, Shali Bagram, Dogar, Dheri Shahbara, Gidder, Sheirk Bela, Sadar Gari, Sheikh Killi
Medium-High	5% - 7%	9	Prang Sadu Khel, Aba-Bakri, Asghar, Chak Hisar, Gangu, Hisara Nehri, Kholay, Palli Nasrat Zai, Qilla
Low-High	3% - 4.99%	73	Kangra, Amir Abad, Badraga Dheri, Bahola, Bak Yana, Bari Bandan, Behram Khan Dheri, Chak Charsadda, Chak Utmanzai, Charsadda, Dagi Ghulam Qadir, Dakki, Daulat Pura, Dildar Garhi, Duba, Dubandi, Gandira Bala, Garhi Jala Banan, Gari Bihar, Ghunda Karkana, Gumbati, Hawara, Hisara Barani Bala, Hisara Barani Miana, Hisara Barani

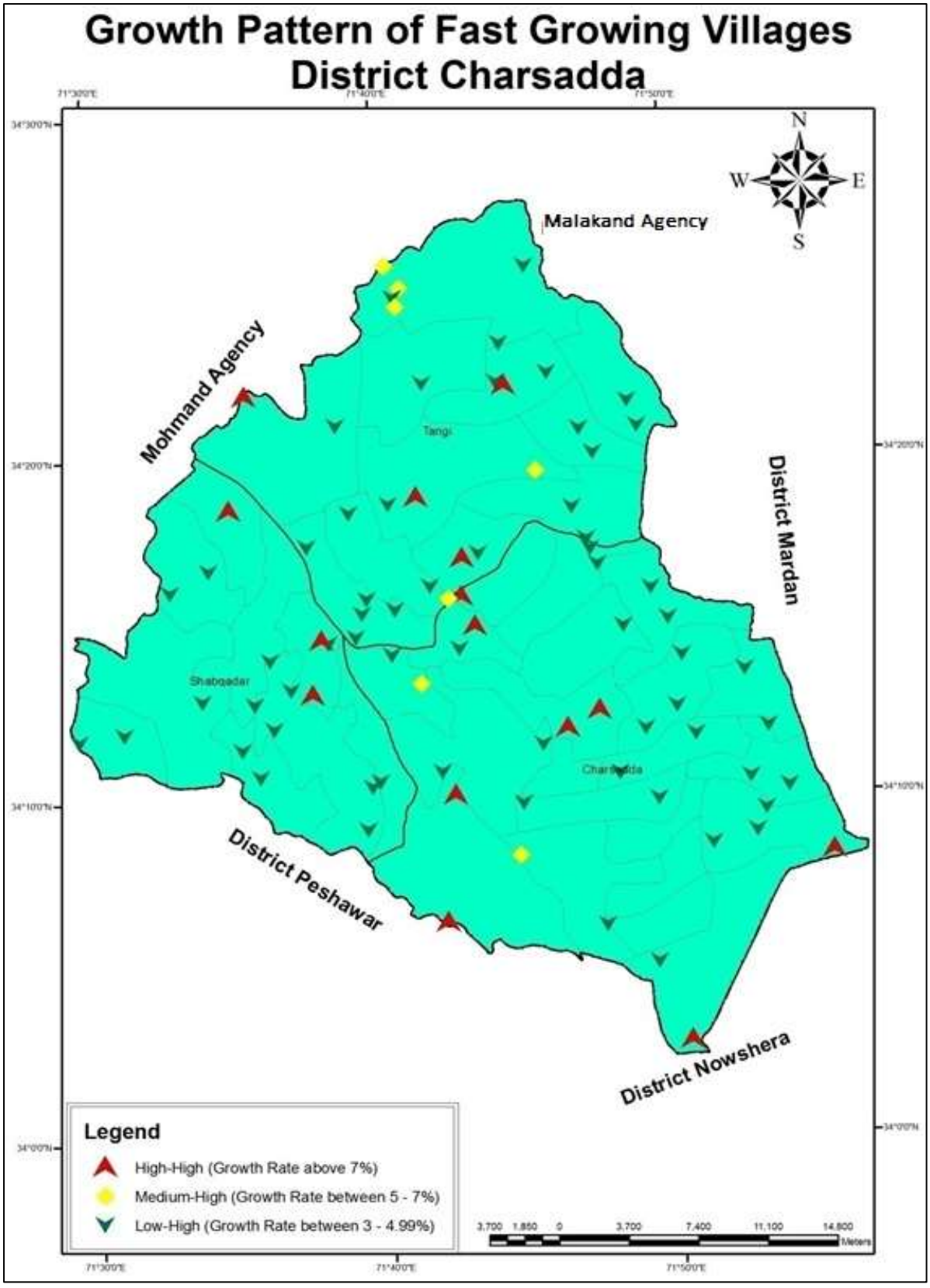
[44] There is discrepancy between the number of villages in Section 5.3.1 and Table 5.4; it is because a few villages in 1981 Census were not listed, and hence their growth rate could not be calculated.

			Payan, Ibrahim Zai, Juraa, Khanmahi, Koz Behram Dheri, Mahun Dheri, Mahzara, Maira Nissatta, Maira Tangi Bara Zai, Mandani, Mandey Zai, Matta Hamza Khel, Matta Palang Zai, Matta Rustum Khel, Mian Khel, Mira Umarzai, Mirza Dher, Moza Khan Koroona, Mufti Abad, Mufti Pur, Palli Bara Zai, Panerak Mohd Nari, Qulat Nasir, Rai Killi, Sahib Gul Koroona, Sareekh, Sarki Kashran, Sarki Titara, Sarwani, Shah Afzal Abad, Shakara, Shakkar Dhand, Shakoor, Sher Pao, Showdag, Sukhta, Tangi Bara Zai, Tangi Nusrat Zai, Tebana, Totakai, Tulandi, Ucha Wala, Umari, Wardagha, Zarbab Garhi, Ziam, Prang Yasinzai, Batgram Chura Khel, Daman Shabqadar

Based on the above categorization, the names of villages falling in these categories are given in the table above.



Map 6-1: Existing Settlements in District Charsadda



Map 6-2: Growth Pattern of Fast-Growing Settlements in District Charsadda

6.3 RURAL DEVELOPMENT THROUGH GROWTH CENTERS

For rural development, it is important to conceive a strategy of developing growth centers aimed at strengthening local governments' financial and administrative capabilities, and improved channels for effective citizen participation in solving problems of common concern. This calls for additional investments in infrastructure and the provision of incentives for micro/cottage industries and services to be located in the identified growth centers. In rural areas, opportunities need to be created to make rural life more bearable, so that these areas can retain their human capital for agricultural, agribusiness and off-farm activities instead of losing them to the urban centers where opportunities may be limited. This would entail developing rural infrastructure including schools and health clinics and feeder roads to enhance market access for farming households.

No regional development concept or theory has received greater attention among regional planners than growth pole theory. It has been subject to various definitions and interpretations, and its application has spread across the globe considerably. The growth pole theory, as originally formulated, assumes that growth does not appear everywhere at the same time, but it manifests itself in "points" or "poles" of growth, and the growth spreads by different channels and eventually affects the economy as a whole.

In order to attract private sector initiative to accelerate employment-generating activities in the rural areas, it is important to provide urban amenities in rural areas with the objective of stimulating high growth in rural economies. The development of agribusiness and agro-industrial enterprises should be the starting point of any sustainable industrialization process. Agribusiness and agro-industry development can be catalyzed by supporting funding for installation, rehabilitation, and operation of critical infrastructure of "public good" nature that connect rural to urban centers and help integrate the rural economies with the more advanced urban economies.

Such critical infrastructure includes feeder roads, telecommunications systems, public utilities (water supply and sanitation, and energy), and transport facilities. Market access is key to a sustainable increase in agricultural and related products, for without improved access to markets, increases in agricultural productivity cannot translate into higher incomes. Urban bias in terms of investment and infrastructure, in isolation of rural area can be detrimental and costly for the concerned District/region as a whole. These negative aspects may include:

- Proliferation of urban sprawl;
- Premature conversion of rural agricultural land and timberland into urban uses;
- Escalation in urban-fringe land prices;
- Lowering water quality due to disturbance of the natural hydrological
- function;
- Impairing the quality of rural living.

For District Charsadda, a number of villages throughout the District have been identified which are proposed to be developed as growth centers in the District rural system. These would be the places that could grow to fill the gap between the urban area and smaller villages.

There are 49 union councils in District Charsadda, of which 9 are urban and 40 are rural[45]. To reduce migration to urban areas, a number of measures can be taken such as employment opportunities near or around the villages, better inter-village road connectivity, provision of basic facilities such as good healthcare, quality education, provision of adequate infrastructure and physical improvement of villages including village streets and houses.

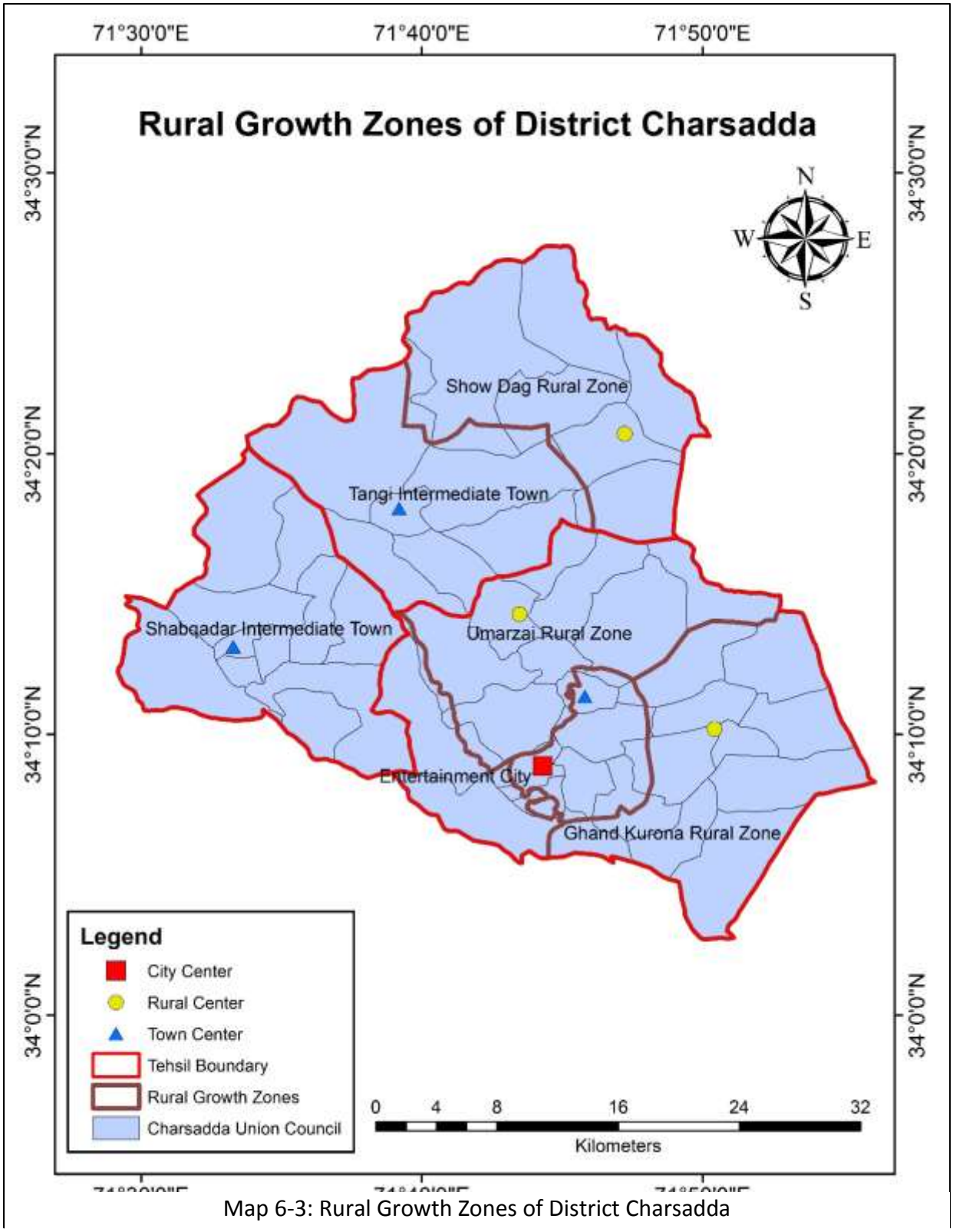
To achieve the above, rural area of District Charsadda is proposed to be divided into a number of rural zones, and a centralized village within each such zone designated as Growth Center for the rural zone. The Growth Center will have following facilities to serve the rural zone.

- Model Rural Health Center
- High School
- Veterinary Center
- Repair shops for tractors and other agricultural implements.
- Play Ground
- Agro-based micro industrial sector
- Transport terminal
- Good quality rural roads, connecting Growth Center with other main villages of the rural zone, and also a road connecting Growth Center with the nearby highway/major road.
- Fruit/vegetable market, which may serve as sale as well as purchase point.
- Grain market/godowns, where applicable.
- Central commercial area.
- Bank
- Post Office
- Sub-Police Station
- Revenue Office

[45] Source: District Studies Report Charsadda, Chapter 6.

Table 6-4 : Rural Growth Zones – District Charsadda

Name of Growth Zone	Growth center (Name of village)	UC in which Growth Center Lies	Other UC's in the Rural growth zone
Ghand Kurona	Ghand Kurona	Ghand Kurona	Agra, Dargai, Dheri Zardad, Ghand Kurona, Doshera, Khan Mahi, Muhammad Nari, Razzar-II, MC Utmanzai, Mc Charsadda-IV, Nissata, Mera Parang, Razzar-I
Show Dag	Madani	Madani	Koz Behram Dheri, Dakki, Gandere, Hari Chand, Hisara Nehri, Show Dag, Madani
Umarzai	Umarzai	Umarzai	Behlola, Mira Umarzai, Turangzai, Tarnab, Sarki Titara, Umarzai, MC Utmanzai, Hissar Yaseenzai, Chindro Dag



Map 6-3: Rural Growth Zones of District Charsadda

6.4 GUIDELINES

FOR RURAL HOUSING AND OTHER AMENITIES

Developing rural areas in a sustainable manner, through better regulatory measures can be highly helpful for better and balanced physical as well as economic development.

Lack of guidelines and regulatory measures in rural areas are resulting in uncontrolled and unregulated housing and other physical developments. There have hardly been any remedial measures in the past, resulting in major damages to rural environment. Thus, owing to various historic and institutional reasons, the effectuation of protective measures including Land Use and building control regulations have remained limited to major urban centers. Rural areas have been largely neglected resulting in their haphazard and uncontrolled growth. In these areas, the problems get proliferated and involve heavy financing to cure.

The following guidelines are proposed for rural areas:

- Land for rural housing should be capable of being served with essential infrastructure such as link to road network, water supply, drainage and sanitation at reasonable costs. One of the most critical factors is the availability of suitable land for various activities. There is a need to identify such land and secure/ safeguard it for planned development.
- The land should be economically developable and should have appropriate location and accessibility to services.
- Conventional Land Use regulations are not applicable in rural areas, as these entail high building costs and standards which are not affordable by most rural households. To make the regulations realistic for rural areas, the procedures and standards must be cut down. At present there are no Land Use and building control regulations for rural areas. These should be formulated and implemented to ensure preservation of rural physical environment.
- Strict Land Use control in rural areas, at current level of the socio-economic development is neither desirable nor possible. Nevertheless, there have to be some guiding principles to rationalize and reasonably exercise control over Land Use and developments in rural areas.
- The Land Use control in rural areas should focus on improving accessibility, control on development activities along major highways, and simplifying the plan approval process.
- Involvement of private sector in development efforts in view of funding constraints in the public sector.

6.5 POSSIBLE MODEL ENVIRONMENTAL VILLAGE: DETAILS OF SITE AREA AND OTHER REQUIREMENTS

For selecting a possible Model Environmental Village, the criteria for selection included its growth rate, distance from existing urban Area, population and present area under village. Of the total 200 rural settlements/villages in District Charsadda, 101 villages have growth rate of above 3%. The selected village 'Umarzai" is one of these rapidly growing villages. The population forecasted is shown in (Table 6-5).

Table 6-5: Population Projection

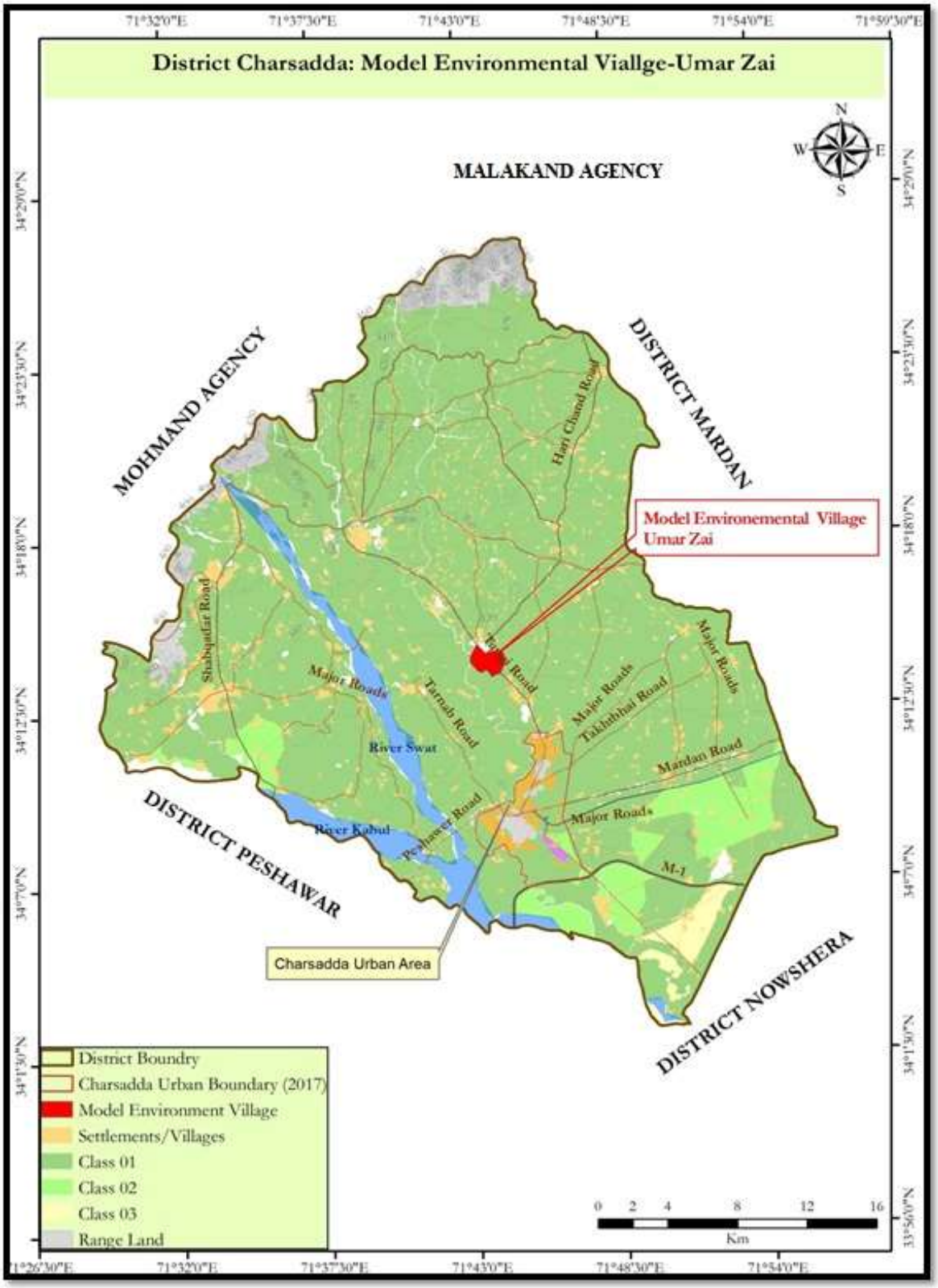
Year	Projected Population
1998	22,682
2017	33307
2021	36109
2025	39147
2040	52998

Umarzai is located along Tangi Road, 6km away from Utmanzai urban area in the North-Western direction. The current site area of Umarzai is 406 Acres. It is bound by agriculture land in the North, existing urban area towards South, agricultural land in East; and Jindi River and Kabul River in West. Tangi Road connects the village to existing urban area in the South-Eastern Direction.

According to District Census Report 1998, population of settlement was 22,682 and growing rapidly. It is estimated that the additional population of Umarzai during the period 2021-2025 will be around 3038 while that in the subsequent 15 years (2025-2040), the additional population will be about 13851. The housing demand in these two-time periods will accordingly be 506 and 2308 respectively, based on the assumption that each family of 6 will have one house (Table 6-6).

Table 6-6: Housing Demand for Additional Population (2021-2040)

<table>
<tr><th rowspan="2">Year</th><th rowspan="2">Population</th><th colspan="2">Additional Population</th><th colspan="2">Housing Demand</th></tr>
<tr><th>2021-2025</th><th>2025-2040</th><th>2021-2025</th><th>2025-2040</th></tr>
<tr><td>2021</td><td>36109</td><td rowspan="2">3038</td><td rowspan="2"></td><td rowspan="2">506</td><td rowspan="2"></td></tr>
<tr><td>2025</td><td>39147</td></tr>
<tr><td>2040</td><td>52998</td><td></td><td>13851</td><td></td><td>2308</td></tr>
<tr><td colspan="4">Total Housing Demand for addition population</td><td colspan="2">2814</td></tr>
</table>



Map 6-4: Environmental Village District Charsadda

Considering Population density as 8 houses per acre, the area under future houses in different time periods is given in Table 6- 7

Table 6-7: Area Requirements (Acres)

Time Period	Required Area
2021-2025	63.25
2025-2040	288.5
Total	351.875

It is clear from Table 6- 8 that 1.52 acres of commercial area will be required in the village during the first years of plan period (2021-2025), and 6.92 acres during the subsequent 15 years.

Table 6-8: Total Future Trade Zone & Commercial Area Required (2021-40)

Year/Period	Population	Commercial Area Required[46]
2021	36109	
2025	39147	
2040	52998	
Additional Urban Population (2021-2025)	3038	1.52Acres
Additional Urban Population (2025-2040)	13851	6.92 Acres
Total Additional Urban Population (2021-2040)	16889	8.44 Acres

Apart from passive recreational facilities, Umarzai also needs active recreation in form of Village Playground, for which an area of 5 Kanal is proposed.

[46]@0.5 acres/1000 persons)

Table 6-9: Population Categories of Villages In 2021 – District Charsadda

Sr. No.	Population category	No. of Villages	% of villages	Name of villages
1	Above 25,000	4	2%	Nisatta, Matta Rustam Khel, Razar, Umar Zai
2	15,001 - 25,000	9	5%	Shako, Panjpao, Behola, Kamahi, Turang Zai, Bari Bandana, Hisara Nehri, Sher Pao, Hawara
3	10,000 - 15,000	26	13%	Agra, Daulat Pura, Dheri Zardad, Tulandi, Maira Nisatta, Maira Parang, Kangra, Katu Zai Payan, Matta Hamza Khel, Mirzai, Mira Umarzai, Dusara, Ghazgi, Maira Turang zai, Panerak Mohd Nari, Wardagha, Amir Abad, Koz Behram Dheri, Mandani, Dakki, Hisara Barbani Payan, Qaidabad, Rai Killi, Showdag, Maira Tangi Bara Zai, Ziam
4	5,000 - 9,999	21	11%	Chak Charsadda, Charsadda Zarin Abad, Sukar, Batgram Allah Dad Khel, Dala Zak, Daman Shabqadar, Katuzai Bala, Kotak Tarnab, Matta Palang Zai, Mian Khel, Rashakai, Mahzara, Ucha Wala, Dargai, Tebana, Tarnab, Gadara Bala, Shakoor, Hisara Barbani Miana, Tangi Bara Zai
5	Below 5,000	140	70%	
Total		200	100%	

7 STRUCTURE FOR REGULAR MONITORING, EVALUATION & UPDATION.

7.1 PROPOSED STRUCTURE

Regular monitoring, evaluation and updating of the Land Use Planning System at District level are important features of the Project, particularly because of involvement of assembly and integration of geographic information. Based on this system, alternative spatial development strategies over the years can be developed depending upon changed circumstances.

Introduction of GIS in the Land Use Plan will enhance the rationality of the future decision-making process by improving data accuracy and accessibility and as a consequence will lead to 'better' decision making. The analysis of information, if posted on web shall help to describe the existing situation, contribute to improved understanding of local problems and constraints to development by providing key factors and variables.

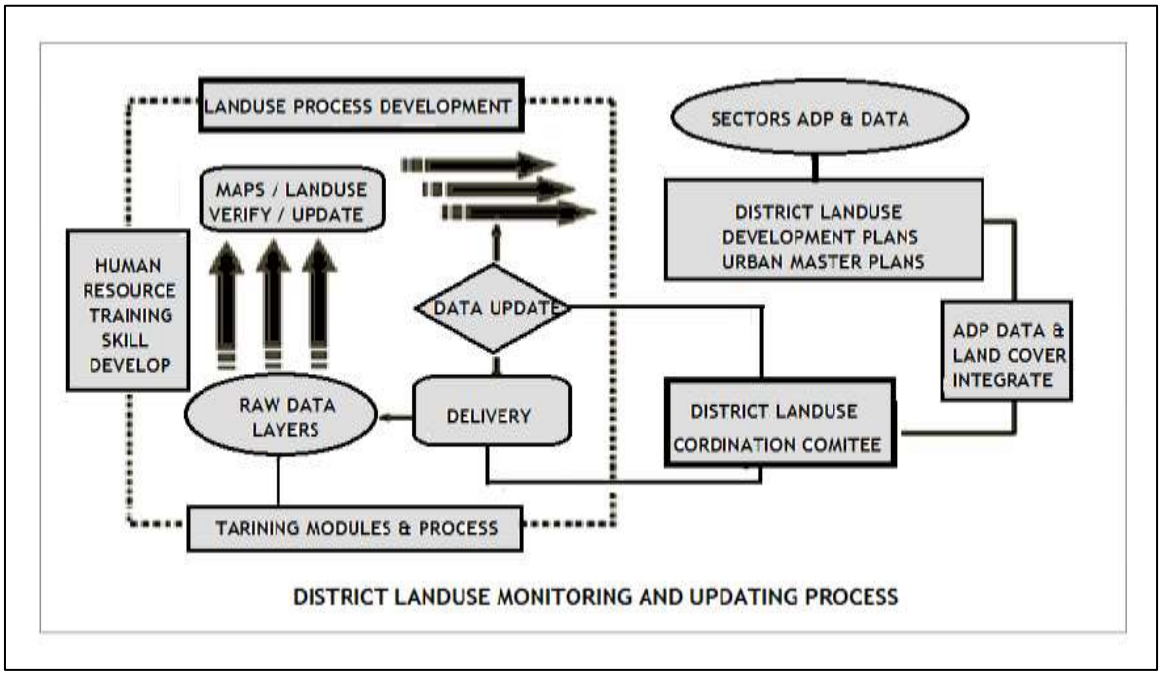


Figure 7-1: District Land Use Monitoring and Updating Process

The GIS based Land Use Plan can be used by various departments/agencies for the purpose of data updating and enhancement. The data sharing and the information updating will be a two-way process as both the stake holders and the government departments/ agencies will be able to exchange information and achieve continuous improvement in the quality and quantity of information.

Generally, the Land Use Plans in the past were produced using traditional sectoral land cover plans, which described a state of land cover by sectors and plans to be implemented independently without any coordination with other sectors. The result was that more often some sectors were over emphasized and received higher investment, while others which are

equally important were marginally developed. Though the process was continuous and cyclical in nature, however there was no coordination and no Land Use was available at District or provincial level. It was considered a purely town planning subject limited to urban areas only.

The approach used while preparing this Plan focuses on planning based on updated sectoral data and electronic mapping using the Geographical Information systems based on the identification of needs and goals. This coupled with the formulation and evaluation of alternative courses of action, resulted in mapping the information in different layers. This strategy needs updating, developing and implementing the Geographical Information System (GIS) as a new tool and approach for planning. A well-integrated and comprehensive database is an important element that could determine the ultimate success of GIS application in development planning.

The functionality of Land Use Plan can be enhanced by coordinating with all the departments and developing data integration tools to existing system. Consequently, it will be used to assist decision-making, taking into account among other things, the current scenarios of the proposed development, physical constraint and future impacts.

Implementation of District Land Use Plan necessitates development of a module for capacity building of institutions via skill improvement of human resources; and coordination amongst different sectors/departments. It is also recommended to develop web-based GIS Land Use maps for implementation of development plan and for project monitoring. This information should be made available and accessible to the general public with a special application for feedback (refer Figure above).

Proper and effective planning generally involves close monitoring growth, review of Annual Development Plans as well as policy appraisal. Plan Implementation calls for comprehensive information concerning the past, present and future. As spatial representation is critical to development, the attribute data related to the problems or issues to be addressed needs to be translated into spatial manifestation to ease the process of analysis and decision making. A Planning Agency such as Urban Policy Unit or Land Use and Building control authority KP is proposed, to develop, implement and continually update the mapping via GIS calls for planning and monitoring functions, especially to integrate, assemble and coordinate the information obtained from a wide range of sectors, departments and sources.

An Electronic Data Bank (EDB) should be developed to serve as the eyes and ears to the monitoring process, so as to help in the surveillance of compliance with planning proposals. The EDB shall be provided inputs by all the departments and it is estimated that almost 130-person months of senior level officials, GIS experts and data entry personnel will be involved in managing and updating the EDB. Of these some 120 man-months will be consumed by the respective departments while a Deputy Director assisted by the GIS expert, and data entry

persons as well assistants involving 40-person months will be required at the central coordinating office where the District Land Use Plans will be updated.

Methods of creating, obtaining and distributing information for the purpose of mid-term reviews, which shall determine policy and implementation issues for further improvement, are imperative. Additionally, for monitoring the process of updating the geospatial information of Land Use; vertical integration of the developed and maintained datasets is essential. To this end the information from TMAs, Development Authorities and line departments at the provincial and District levels should be given due consideration and the relevant persons at each organization shall be properly trained to follow the monitoring software and develop electronic data base.

The P&D Department /Urban Policy Unit established at the provincial level should be expanded to include the incorporation of the GIS into the development plan preparation process at all planning hierarchy, be it the macro or micro level. As such, GIS technology shall be applied in planning activities, which essentially include plans formulation as well as development control.

The use of web-based GIS will be the best approach in overcoming the constraints in development planning, setting targets and resolving disputes involved in the planning process. When the system is properly monitored and updated on regular basis with access to the general public, it will provide huge potential for improving the planning system especially in terms of transparency and accessibility and consequently contributes to better governance.

At present the land records both for urban and rural areas are managed by the age-old Patwari system, which has all the record of landholdings and Land Use. The District Land Use Plans and the EDBs will enable the Urban Policy Unit/ P&D Department to update and have easily accessible land records by type, geospatial information, and liable to any disaster such as floods, landslides, earth quake etc.

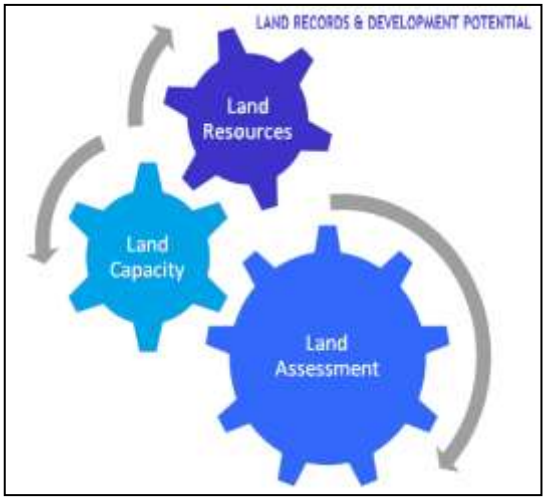


Figure 7-2: Land Records and Development Potential

Regular updating and electronic monitoring of the land cover will enable the provincial government to introduce a transparent method of land revenue/ property tax and tax on commercial, industrial, agricultural and other Land Uses. This will help the Provincial Revenue Department to update its records and collect the property tax and land revenue etc.

Based on the land cover and Land Uses the provincial government/District government will be able to introduce plans and programs for tree plantation, forestation and land conversion

thus enhancing both personal income and provincial income. The development of range lands and forests will also help to achieve the goals of environmental protection.

The electronic data sharing with the citizens and the government departments will be more efficient, more effective, and cost effective, as with a click any one will be able to update its records and initiate information coordinating between stakeholders.

The Land Use development plans monitoring in GIS will support the P&D Department of KP, and the Urban Unit in controlling and monitoring development projects. The implementation will be strongly supported by the EDB & GIS which will provide inputs for the planning information needed through continuous data gathering, updating and, storage.

The District Land Use Plan Monitoring emphasizes on Geospatial physical planning involving spatial data, location and Land Use activities of proposed development. It will be possible to check whether Land Use development in the District complies with the planning proposals in the District by comparing current Land Use development with that proposed.

A series of workshops and trainings may be arranged to ensure smooth technology transfer to acquire the appropriate knowledge and skills to users. The training modules will serve as a supporting factor to GIS capacity building, covering various aspects including competency, infrastructure, procedures and resources essential for overall monitoring, evaluation and updating of Land Use Plans.

Table 7-1: Sectors, Tasks and Manning			
Sr. No	**Sectors**	**Tasks**	**Personnel**
1	industries & Commerce	Industrial Estates, Future Development Plans, Type of Industries, Land cover, Data, Annual ADP	Supervisor, Software Manager
2	Agriculture	Cropping Pattern, Land cover, Data, Annual ADP	Supervisor, Software Manager
3	Irrigation	Canals, Wells, Tube wells, type of irrigation, Other data, ADP and Land Cover	Engineer, Data Entry Clerk,
4	Water Resources	Rivers, Canals, Wells, Tube wells, Land cover, Data, Quantity of water, Annual ADP	Engineer, Data Entry Clerk,
5	Water Logging and Salinity	Data on SCAP, Land cover, Data, Financing, Annual ADP	SCARP In charge, Data Entry/ GIS Expert
6	Water Supply and Sewage	Urban Plans, Land cover, Data, Annual ADP	Municipal Engineer, GIS Expert
7	Climate & Weather	Information from Meteorological Department, Data, Annual ADP	Met Officer and Data Entry Clerk
8	Floods/ Disaster	Land cover, Data, Financing, Annual ADP	Engineer, Data Entry Clerk,
9	Environment	Land cover, Data, Financing, Annual ADP	
10	Communications	Land cover, Data, Financing, Annual ADP	
1	Transportation	Land cover, Data, Financing, Annual ADP	
12	Rail and Air	Land cover, Data, Financing, Annual ADP	
13	Housing	Land cover, Data, Financing, Annual ADP	
14	Demography	Data on settlements, Financing, Annual ADP	Demographer
15	Health	Hospitals, Health Centers by location, size and type, Land cover, Data, Annual ADP	Dy. Secy Health, Information Manager
16	Education	Data on Schools, Higher Education, Training Institutes, by size, type and location, Education Plans and Annual ADP	Dy. Secy Education, GIS Expert and Information Manager
17	Tourism/ Entertainment	Hotels, Historic Places, Pars, resorts etc., Data, Annual ADP	Tourism Officer, and Data Entry Clerk
18	Urban Planning/ Expansion	Information from TMAs, Development Authorities, Land cover by type, Urban Land Use, Data, Transportation Network and Annual ADP	Urban Planner and GIS Expert

19	Existing Land Use	District level Land Use and Land cover by Type, vacant, rage land, Development Plans for Land Use Change Data, and Annual ADP	Supervisor and GIS Expert
20	Mining	Type, size and location of mines, Land cover, Data, Annual ADP	Information from Dy. Director Mining Department, Data Entry Clerk

Table 7-2: Sectors, Tasks and Manning		
Sr. No	**Sectors**	**Staffing**
1	industries & Commerce	Supervisor,
		Software Manager
2	Agriculture	Supervisor,
		Software Manager
3	Irrigation	Engineer
		Data Entry Clerk,
4	Water Resources	Engineer
		Data Entry Clerk
5	Water Logging and Salinity	SCARP In charge
		Data Entry/ GIS
6	Water Supply and Sewage	Municipal Engineer
		GIS Expert
7	Climate & Weather	Met Officer
		Data Entry Clerk
8	Floods/ Disaster	Engineer
		Data Entry Clerk
9	Environment	Engineer
		Data Entry Clerk
10	Communications	Engineer
		Data Entry Clerk
11	Transportation	Engineer
		Data Entry Clerk,
13	Housing	Engineer
		Data Entry Clerk
14	Demography	Demographer
15	Health	Dy. Secy Health
		Information Manager
16	Education	Dy. Secy Education
		GIS Expert
		Information Manager
17	Tourism/ Entertainment	Tourism Officer
		Data Entry Clerk
18	Urban Planning/ Expansion	Urban Planner
		GIS Expert
19	Existing Land Use	Dy. Director/ Senior level planner
		Supervisor/ Coordinator
		GIS Expert

20	Mining	Information from Dy. Director Mining Department
		Data Entry Clerk
Professionals @ Rs.250,000/month Others @ Rs. 150,000		
Other Costs 75 % of above		

7.2 ZONING

The total area of the District needs to be divided in different Land Use zones, as there is a strong need to clearly delineate zonal boundaries to distinguish between residential, large-scale commercial, industrial and other Land Uses in the District. The purpose is to control and direct the use and development of land and properties. Primarily objective of zoning is to improve the efficiency derived from agglomeration economies, ensure minimum standards of health and safety and provide land for public goods and services. The criteria for earmarking the zones have been based on the following characteristics:

- Physical and spatial Characteristics
- Predominant Land Uses
- Intensity of development

In the District Land Use Plan, like all other zones, specific Land Use parameters have been formulated for different zones to facilitate better and effective planning control in the area.

In this Chapter, specific set of parameters have been proposed for better Land Use control in each zone; these regulations are mainly influenced by the characteristics of the zones, and their perceived development pattern.

In Chapter 6, a Land Use strategy has been proposed for Charsadda, including location and allocation of major Land Use zones. For each of the proposed zones, it is important to have Land Use parameters, to facilitate effective planning control. The agricultural area should be preserved in a manner that its character as a green belt is protected to maximum possible extent. In the existing built-up areas, there should be a gradual shifting of non-conforming uses from a particular zone so as to cause minimum hardship to the owners of non-conforming uses. The obnoxious industries may for example be assigned high priority for shifting, depending on the nuisance of the industries. It is high time that stringent steps are taken to adopt a clear-cut policy based on identification and gradual elimination of non-conforming uses located in various zones.

Land Uses permitted/permitted on appeal in different planning zones of Charsadda are proposed in sections below. Permitted Land Uses are those, which the City Government/Planning Agency may allow in a particular zone. Land Uses that can be ‘permitted on appeal’ should be carefully scrutinized by the planning agency and decided upon on case-to-case basis. Uses not specifically provided in a particular zone are prohibited

and should not be permitted. The important thing to emphasize is that a building or Land Use shall not be used in a manner inconsistent with the prescribed use.

Zone-wise regulations considering compatibility of various Land Uses are proposed in section below:

7.2.1 Regulations for Residential Zones

Table 7- 1: Regulations for Residential Zones

Residential	Uses Permitted	Uses Permitted on Appeal
Low Density Residential	Detached/semidetached dwellings Mosques Primary/High Schools Clinics/Dispensaries Social/Cultural Institutions Local Shopping Areas/Retail Shops Offices of Professionals with adequate parking facilities Parks and Playgrounds Local Recreational Uses Non-commercial vegetable gardens and nurseries. Ancillary uses clearly incidental to residential uses, which must be free from nuisance and hazard.	Commercial Offices and Service Shops of Local Character[47]. Raising of poultry for non-commercial purposes[48]. Petrol pump, gas filling station. Taxi/rickshaw stand.
Medium Density Residential	Apartment Buildings / Multi-family dwellings Colleges and Research Institutions Hostels, Guest Houses Offices of TMAs/other tiers of Local Govt. All uses permitted in low density residential zones[49]	All uses permissible on appeal in low-density residential zone. Restaurants and hotels Hospitals[50] Petrol and Gas filling stations[51].

[47] Should be located in local shopping center

[48] Provided the birds are properly segregated from the habitable parts of the house.

[49] Subject to density limitations specified for the sub-zone.

[50] Not treating contagious diseases and mental patients

[51]Should be on sites located along roads having at least 30 meters right-of-way and 100 meters away from a crossing of two primary roads or a roundabout.

High Density Residential	All uses permitted in Medium Density Zone Public Utilities and Buildings Recreational Uses Taxi and Rickshaw Stands	All uses permitted on appeal in medium density zone.
Major Commercial Areas	Shopping plazas, Shops and commercial centers, educational institutions, recreational places, parks and open spaces, public and religious buildings and service industries and firefighting arrangements governed by the building and space regulations.	Petrol filling stations, Hospitals, residences, transport terminals, cinemas, clubs and all sort of storage.

7.2.2 Regulations for Educational Zone

Table 7- 2: Regulations for Educational Zone

Zone	Uses Permitted	Uses Permitted on Appeal
Trade Zone	Wholesale/retail commercial markets and establishments. Restaurants/Hotels. Business and professional offices Transportation Terminals Recreational Uses Public utilities and buildings Approved parking provisions.	Petrol and gas filling stations Hospitals not treating contagious diseases or mental patients.

7.2.3 Regulations for Industrial Zone

Table 7- 3: Regulations for Industrial Zone		
Zone	**Uses Permitted**	**Uses Permitted on Appeal**
Light-Medium Industrial Area	Auto-Mechanic Shops/Yards Motor Bargains Cottage Industrial Units Warehouses and Storage Public Utilities and Buildings Canteens Agriculture (until the area is required for development) Approved Parking Loading and Unloading Provisions Dwellings for watch and ward staff	Bus and Truck Terminals Railway passenger and freight terminals Petrol and gas filling stations Taxi stands Junk Yards Recreational facilities for employees.
Medium-Heavy Industrial Area	All categories permitted in the light-medium industrial zone. Warehousing, storage depots[52] and incidental uses. Approved Parking Loading and unloading provisions. Dwellings for labor and watch and ward staff.	All categories are permissible on special appeal in the Light-Medium industrial zone. Warehousing of perishable and inflammable commodities.

7.2.4 Regulations for Recreational Areas

Table 7- 4: Regulations for Recreational Areas		
Zone	**Uses Permitted**	**Uses Permitted on Appeal**
Recreational Areas	Recreational areas include parks, playgrounds, and related uses. Youth hostels and clubs Taxi and rickshaw stand Bus halts and car parking areas. Dwellings for watch and ward staff. Public utilities and municipal facilities.	Restaurants and establishments selling eatables Incidental recreational uses. Graveyards Adequate parking provisions.

[52] Only non-perishable and non-inflammable commodities

GOVERNMENT OF KHYBER PAKHTUNKHWA
LOCAL GOVERNMENT, ELECTIONS & RURAL DEVELOPMENT DEPARTMENT

No.SO(UADAs)/LG/1-34/LUBC/2022
Dated the Peshawar, 15th ASeptember,2022

To

1. Minister for Local Government and Rural Development Khyber Pakhtunkhwa
2. Minister for Agriculture, Livestock and Cooperative Khyber Pakhtunkhwa
3. Minister for Industries Khyber Pakhtunkhwa
4. Minister for Environment Khyber Pakhtunkhwa
5. Senior Member Board of Revenue, Revenue and Estate Department
6. Secretary to Government of KP, Housing Department
7. Secretary to Government of KP, Public Health Engineering Department
8. Secretary to Government of KP, Communication and Works Department
9. Secretary to Government of KP, Irrigation Department
10. Secretary to Government of KP, Transport and Mass Transit Department
11. Secretary to Government of KP, Environment Department
12. Secretary to Government of KP, Industries Department
13. Secretary to Government of KP, Agriculture, Livestock and cooperative Department
14. Secretary to Government of KP, Local Government and Rural Development Department
15. Professor Dr. Rawid Khan, Deptt: of Civil Engineering, UET Peshawar
16. Mr. Abdul Halim Paracha, Master in Civic Design, United Kingdom
17. Mr. Hifz-Ur-Rehman, Ex-Secretary
18. Mr. Adnan Ahmad Khan, HOD Architecture Department, CECOS University of I.T and Engineering Sciences, Peshawar
19. Dr. Nasir Javed, (Ex-PAS Officer) Urban Development Specialist

Subject: **1ST MEETING OF THE PROIVINCIAL LAND USE AND BUILDING CONTROL COUNCIL KHYBER PAKHTUNKHWA HELD ON 14/09/2022.**

Sir:

I am directed to refer to the subject noted above and to state that 1st meeting of the Provincial Land Use and Building Control Council was held on 14/09/2022 at Chief Minister House under the kind chairmanship of the Honorable Chief Minister Khyber Pakhtunkhwa. During meeting the plans were principally approved, however, the Honorable Chief Minister has very kindly directed to share copies of all the six completed District Land Use Plans of District Peshawar, Mardan, Swabi, Charsadda, Nowshera and Abbottabad with all members of the Council for their views/comments and inputs with in one week time positively.

I am further directed to enclose here with soft copies of the completed District Land Use Plans (DLUPs) of District Peshawar, Mardan, Swabi, Charsadda, Nowshera and Abbottabad for your views/comments and inputs within one week time positively for further processing of these plans please.

Section Officer (UADAs)

Endst: No. & Date Even:

Copy Forwarded to:

1. The PSO to Chief Minister Khyber Pakhtunkhwa
2. The PS to Additional Chief Secretary P&D Department
3. The DG, Provincial Land Use and Building Control Authority, LGE &RD Department
4. The Executive Director, UPPU, P&D Department
5. The Project Manager PLUP, UPPU, P&D Deprtment

Section Officer (UADAs)

19/9/22

MINUTES OF 1ST MEETING OF PROVINCIAL LANND USE AND BUILDING CONTROL COUNCIL KHYBER PAKHTUNKHWA. HELD ON 14/09/2022.

In order to discuss and approve the finalized District Land Use Plans of six Districts of Peshawar, Mardan, Nowshera, Charsada, Swabi and Abbottabad, 1st meeting of the Provincial Land Use and Building Control Council was held on 14/09/2022 at 11:00 AM at Chief Minister House under the kind chairmanship of the honorable Chief Minister Khyber Pakhtunkhwa.

Mr. Shahab Ali Shah, Additional Chief Secretary P&D Department briefed the forum on the objectives of the Land Use Plan and specially the importance and need of the District Land Use plans for streamlining the development. The purpose of the preparation of these plans is to ensure optimum utilization of land through better management for getting maximum benefit out of it. Peshawar's population is growing at 3.99% which indicates that the population will almost become double after 18 to 20 years. These plans will be a policy document and will serve as planning guidelines for line departments to regulate development at the district level and to know as to how to cater the needs and demands of the growing population in the next twenty years. He further explained that through a comprehensive study suitable zones have been identified in each of the district for each sector like Housing, industries, Tourism, Agriculture land and Livestock, Health services, Education services, Communication/Transport, Parks and green areas, recreational facilities, public buildings, Forest and Range lands, Mines and Minerals, Energy and Power, Trade and Commerce and Natural hazards etc. These plans have been shared with the relevant stakeholders at various planning stages. He requested the chair for principal approval of these plans so that its implemented may be started.

Planning and Development Department, UPPU, gave a detailed presentation of the district land use plan of Peshawar District, whereas the land use proposals contained in each of the remaining five District Land Use Plans were also presented and discussed in details. The forum appreciated all these plans.

The Honorable Chief Minister Khyber Pakhtunkhwa also appreciated the efforts of the Planning and Development Department. The honorable Chief Minister after detailed discussions directed that:

- These plans shall be in line with the Plans and Policies of the Departments and there shall be no overlap and duplication.
- These plans shall be shared with the concerned administrative secretaries/members of the councils for their views/comments and inputs, if any, within one week time positively, before circulation of the minutes.
- All the Departments shall execute/implement these Plans in letter and spirit.

- Agriculture Department was directed to stop any further housing activities on the agriculture lands.
- The LG&RDD was directed that PDA/TMAs may not issue any NOCs for any housing societies/schemes towards North of District Peshawar. Such like NOCs, if required, shall be issued towards south of District Peshawar in the area specified for housing sector under the DLUP Peshawar.
- Progress of the Population department regarding the population control shall be reviewed.
- All the illegal encroachment along the rivers and streams side shall be stopped.
- Grievances redressal mechanism shall be established at District as well as provincial level so as to address any complaint regarding these District Land use plans.
- Similar District Land Use Plans shall also be prepared for all the remaining District of Khyber Pakhtunkhwa including newly Merged Districts.

Decision:

After detail discussion the following decisions were arrives at:

1. All the Six completed District Land Use Plans of District Peshawar, Mardan, Nowshera, Charsadda, Swabi and Abbottabad were principally approved for their further implementation and execution at District level.

The meeting ended with a vote of thanks from and to the chair.

FIRST MEETING OF THE PROVINCIAL LAND USE AND BUILDING CONTROL COUNCIL DATED 14/09/2022

PARTICIPANT LIST

S.No	Name	Designation	Contact No	Signature
1	S.M/Shah	Minister	034475711	
2	FAISAL AMIN	MIN	03345152307	
3	Abdul Karim	SP Asst Cm Industries	03135280001	
4	AMBER ALI KHAN	Secty Housing	0344-9271558	
5	Rawid Khan	PM. UET	0300 5734427	
6	Muhammad Arif	SSC(Dev) DS LCBA	0301-5971237	
7	Adnan A. Khan	Architect	0301-8498899	
8	Abdul Halim Paracha	Urban & Regional Building Control Specialist	0301-8595859	
9	Idrees	Secretary	03335533382	
10	Jamil Gul	C&W Spl: Secy	03105880989	
11	Amer [illegible]	Secy IPT	091 9210316	
12	Abid Majeed	Secy Env		
13	M. Nawaz	Add-Sec	03036077773	
14	Zakir Mhd	SMBR		
15	Shahab Ali Shah	ACS		
16	Zaheer ul Islam	Sec LG		
17	Taimoor Jhagra	Minister Fin & Health	—	—