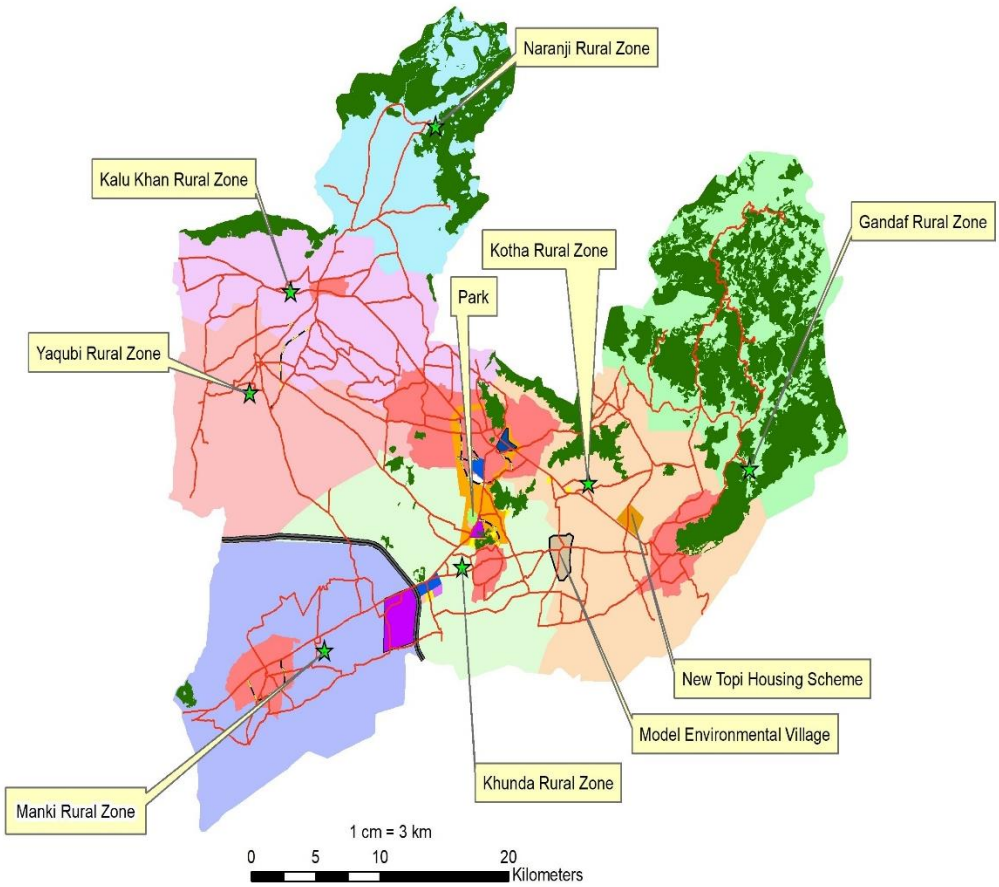
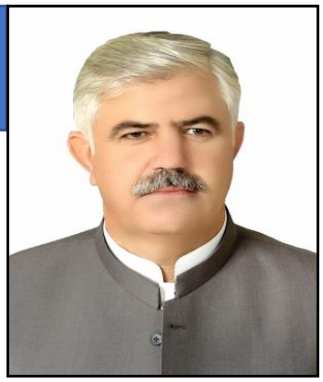
Urban Policy Unit – Provincial Land Use Plan (PLUP)
Planning and Development Department
Government of Khyber Pakhtunkhwa

Final Land Use Plan
District Swabi



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 Swabi 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 Swabi. 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

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Abbreviations and Acronyms

Term	Description
ADB	Asian Development Bank
ADP	Annual Development Programme
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 Truck Road
HHs	Households
Kms	Kilometers
KP	Khyber Pakhtunkhwa
DLUP	District Landuse 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
PVDA	KP Land Use and Building ControlAuthority
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

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1 BACKGROUND AND RATIONALE

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 carry out the development of all areas of the province by adopting an integrated and holistic Land Use Planning approach.

According to Section 4, Section 7 of the Khyber Pakhtunkhwa Land Use and Building Control Act 2021, and, the Provincial Land Use and Building Control Authority (PLUBCA) is required to formulate a Provincial Land Use Plan/Policy for the province.

A 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 in establishing a hierarchy of settlements and developing of satellite, intermediate, secondary and industrial towns as focal points for the future to cater for the rural areas and small towns.

The Land Use Plan will help to induce sustainable development, optimize exploitation of land and physical resources, enhance provincial income, increase overall activity and balanced 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 for undertaking integrated and coherent development programs.

1.2 PLUP INTRODUCTION

i. To provide a broad framework for District Spatial Plans and to 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 the feasible locations.
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 LANDUSE PLAN

Land-use planning has different levels such as 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 a national level is more economic in nature, but at lower levels such as urban or local, spatial aspects become more prominent.

Different kinds of decisions are taken at each level, where the methods of planning 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. At each successive level of planning, the degree of detail needed increases, and so too should the direct participation of the local people. Planning at different levels needs information at different scales and levels of generalization.

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 area of land 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 at least partially functional and is likely to 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.

District land use Plan deals with efficient placement of broad, district-level land uses 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 has to consider these all. Besides, the nature of land uses at District level are 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.

Despite the above however, it is important that while preparing urban plan, it should establish linkages with the District Plan. Urban Plan should be prepared within the broad framework provided by the District Plan, such as future urban growth direction, conserving prime agricultural land, avoiding flood prone areas, considering broad road network proposed in District Plan etc.

In the lowest rung of land use planning are local plans or action plans which are prepared within the framework of urban plans, just as urban plans or rural plans are prepared within the framework of District/Regional Plans.

1.4 PLANNING PARADIGM

In the traditional planning paradigm, usually separate spatial plans are prepared for urban and rural areas, while the district land use plan of Swabi is a shift from the traditional planning paradigm where spatial plans for urban and rural areas were prepared simultaneously. The Land Use Plan principally emphasizes two major planning techniques which are; projections according to existing scenarios that encompasses 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 Swabi. The land use plan provides both long-term broad policy guidelines and

short-term specific project proposals for cohesive development of the area. The implementation of the plan will reduce regional disparities and will ensure the balanced development of both urban and rural areas in the district.

1.4.1 SECTORAL COVERAGE

The sectors covered in the land use plan of Swabi are listed as under:

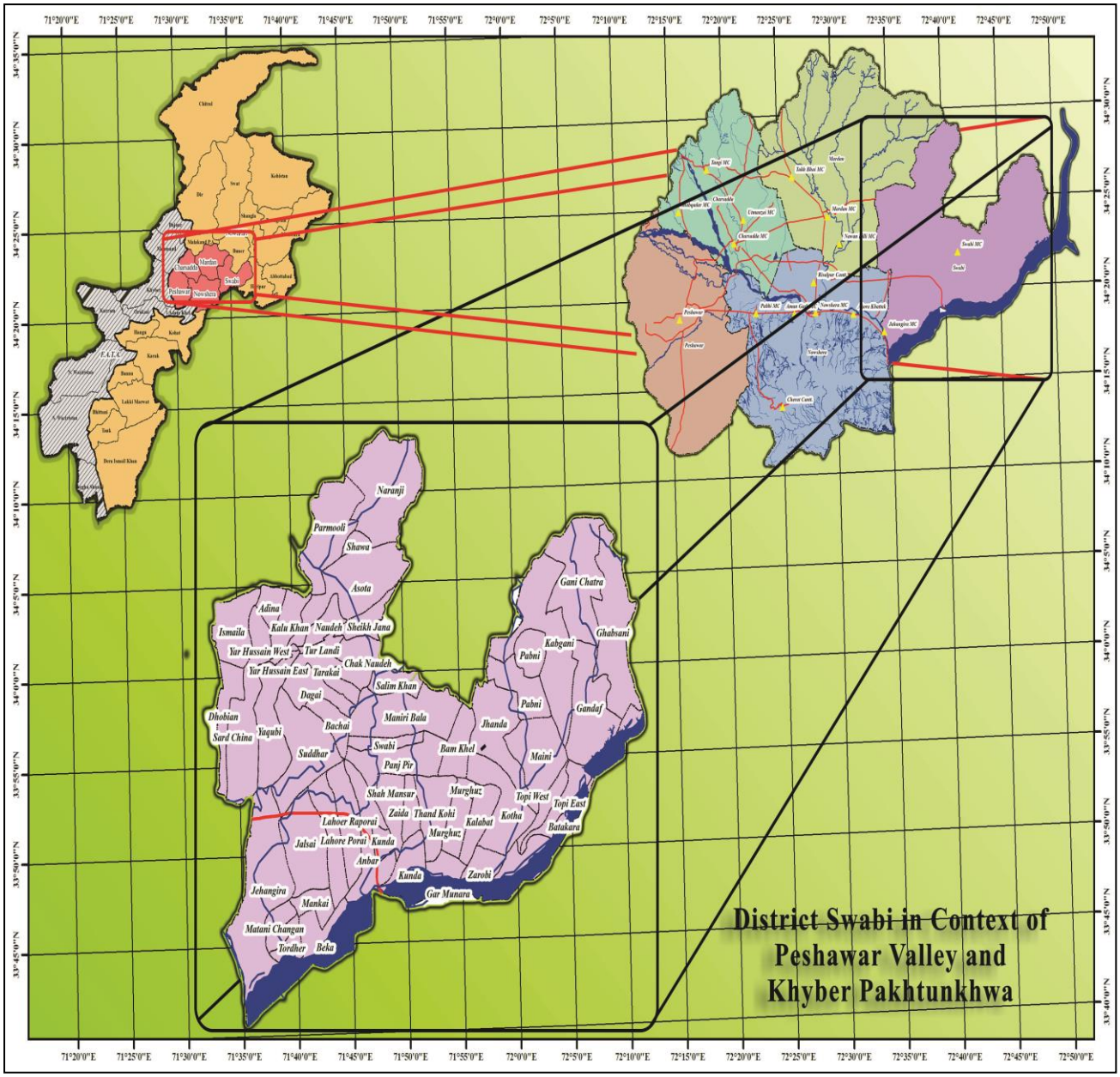
Urbanization and hierarchy of human settlement, Demography, Agriculture and livestock, Trade, Commerce and Industries, Mines, Minerals and Energy, Communication (Road, Rail and airways, postal services and Telegraphs), Health and Education, Tourism, Sports and Entertainment including historical and religious places, libraries, museum, zoo and open spaces, security, graveyards, Housing, Water (surface and ground water resources), district economy. For the preparation of the District Land Use Plan of Swabi (2019-39), all these sectors were thoroughly analyzed and mapped using modern techniques of GIS and Remote Sensing.

1.5 THE PROJECT AREA

District Swabi spatially located at 34°7'0N 72°28'0E. It stretches over an area of 1,543 square kilometers, and lies between the Indus and Kabul Rivers. Swabi got the status of the district on July 1st, 1988. Previously, it was a Tehsil of District Peshawar until 1937, when its administration as a tehsil came under the control of Mardan District after 1937. Pashto is the main language spoken in the district; however, Hindko is also spoken in some villages. Geographically Swabi is surrounded by beautiful mountains on its North side, and one of the largest River Indus on the South, irrigating its fertile land. Swabi is blessed with fertile agricultural land therefore; most of the people are associated with agriculture.

It is the gateway for Punjab Province to Khyber Pakhtunkhwa through motorway and GT road. According to Pakistan Bureau of Statistics District Swabi comprises of 56 Union Councils. It is bounded by District Buner to the North, Haripur District to the east, Attock District of the Punjab to the south, and Nowshera and Mardan Districts to the West. District Swabi stands at the cultural crossroad of history. The region lay in the path of all movements that took place between Sub-Continent and Central Asia.

Agriculture thrives in the district and wheat, barley, oilseed, maize, rice, and sugarcane are among its major crops. The district also has the finest marble resource in the country.



Map 1.5.1: District Swabi Map in Context of Peshawar Valley and Khyber Pakhtunkhwa

1.6 CLIMATE

Swabi has hot and humid summers and cold winters. High temperatures are recorded during the months of June and July, while the coldest months are December and January. Some areas like Mahaban is situated at an altitude of 7000 feet above sea level and have pleasant weather during summers. Generally, four seasons prevail in the area, which may climatologically be divided as:

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

Swabi's climate is classified as warm and temperate. In winter, there is much less rainfall as compared to summer. Köppen and Geiger classify this location as Cwa. The annual average temperature is 21.5

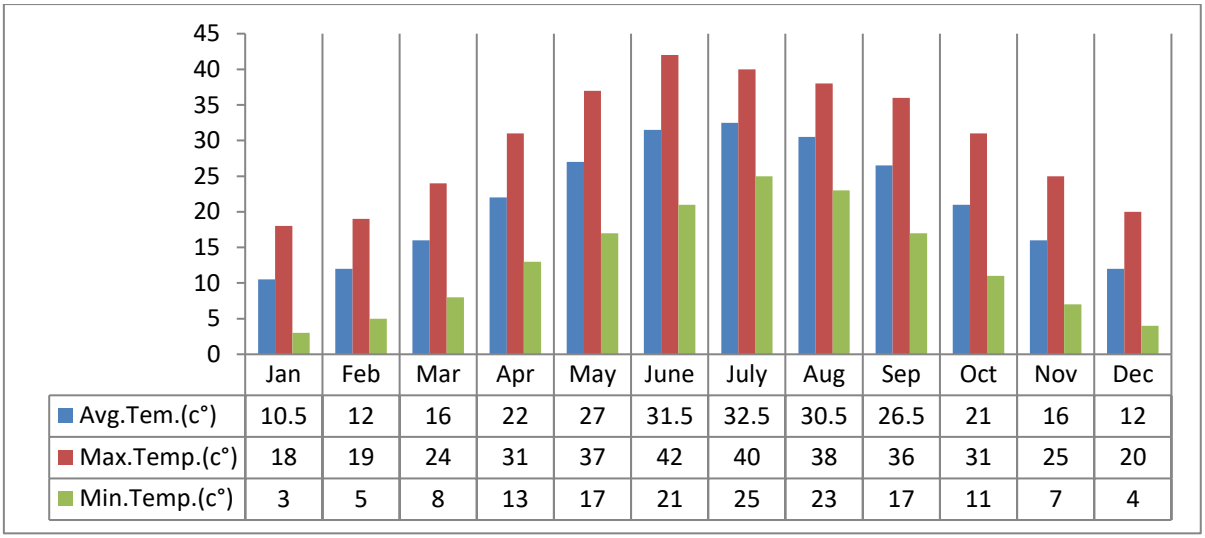
°C in Swabi. About 443 mm of precipitation falls annually. The least amount of rainfall occurs in November with average of 07 mm. While February is the most precipitative month of the year having 103 mm precipitation falls. The highest average temperature is recorded in July, which is around 32.5 °C. January has the lowest average temperature of 10.5 °C. Annually variation in the precipitation between the driest and wettest months is 96 mm. During the year, the average temperatures vary by 22 °C. The mean relative humidity ranges from 25 to 58 percent during the year. The surface wind speed varies during the year from 7.1 to 10 kilometeres, with variation in direction.

Table 1.6.1: Climatological Normal for Swabi, 2021[i1]

Parameters/Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Max Temp (C°)	18	19	24	31	37	42	40	38	36	31	25	20	30.08
Mean Min Temp (C°)	3	5	8	13	17	21	25	23	17	11	7	4	12.8
Mean Temp (C°)	10.5	12	16	22	27	31.5	32.5	30.5	26.5	21	16	12	21.45
Mean Rain Fall (Mm)	44	103	95	36	19	11	42	30	17	6	7	33	36.91
Mean R/H %[2]	34	35	41	38	32	25	28	34	58	44	25	35	35.75
Mean Wind Speed (Kms)	7.7	8.2	8.3	8.1	10	9.8	9.8	8.7	7.1	7.4	7.8	7.8	8.39

[1] https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/swabi_pakistan_1164216 Accessed on 12 July, 2021.

[2] https://www.worldweatheronline.com/swabi-weather/north-west-frontier/pk.aspx, Accessed on 12 July, 2021.



	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Avg.Tem.(c°)	10.5	12	16	22	27	31.5	32.5	30.5	26.5	21	16	12
Max.Temp.(c°)	18	19	24	31	37	42	40	38	36	31	25	20
Min.Temp.(c°)	3	5	8	13	17	21	25	23	17	11	7	4

Figure 1.6.1: Maximum, Minimum and Average Temperature (c°), 2021

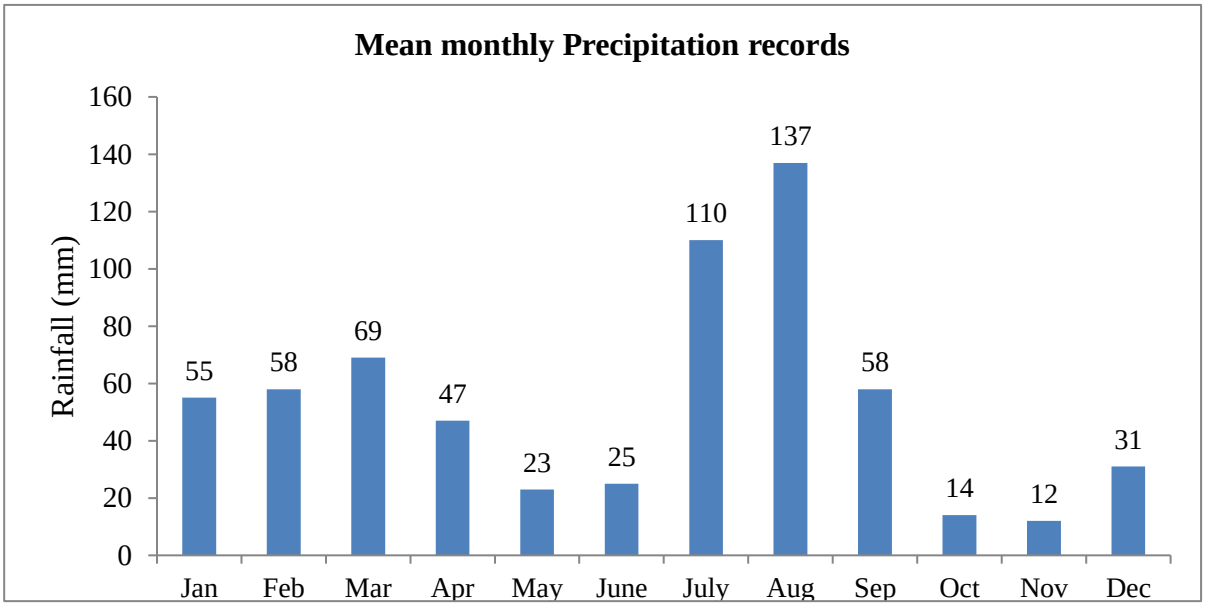


Figure 1.6.2: Monthly Rainfall (mm), 2021

December to February are the coldest months and the minimum temperatures vary between 3°C and 5°C in these months, whereas the maximum temperature during May to September varies between 36°C and 42°C. District Swabi has extremes in climates, with its summer season being very hot. A steep rise of temperature is observed from May to June; and even July, August and September are record quite high temperatures. There is a rapid fall of temperature from October onwards to the coldest month of January.

1.7 GEOLOGY

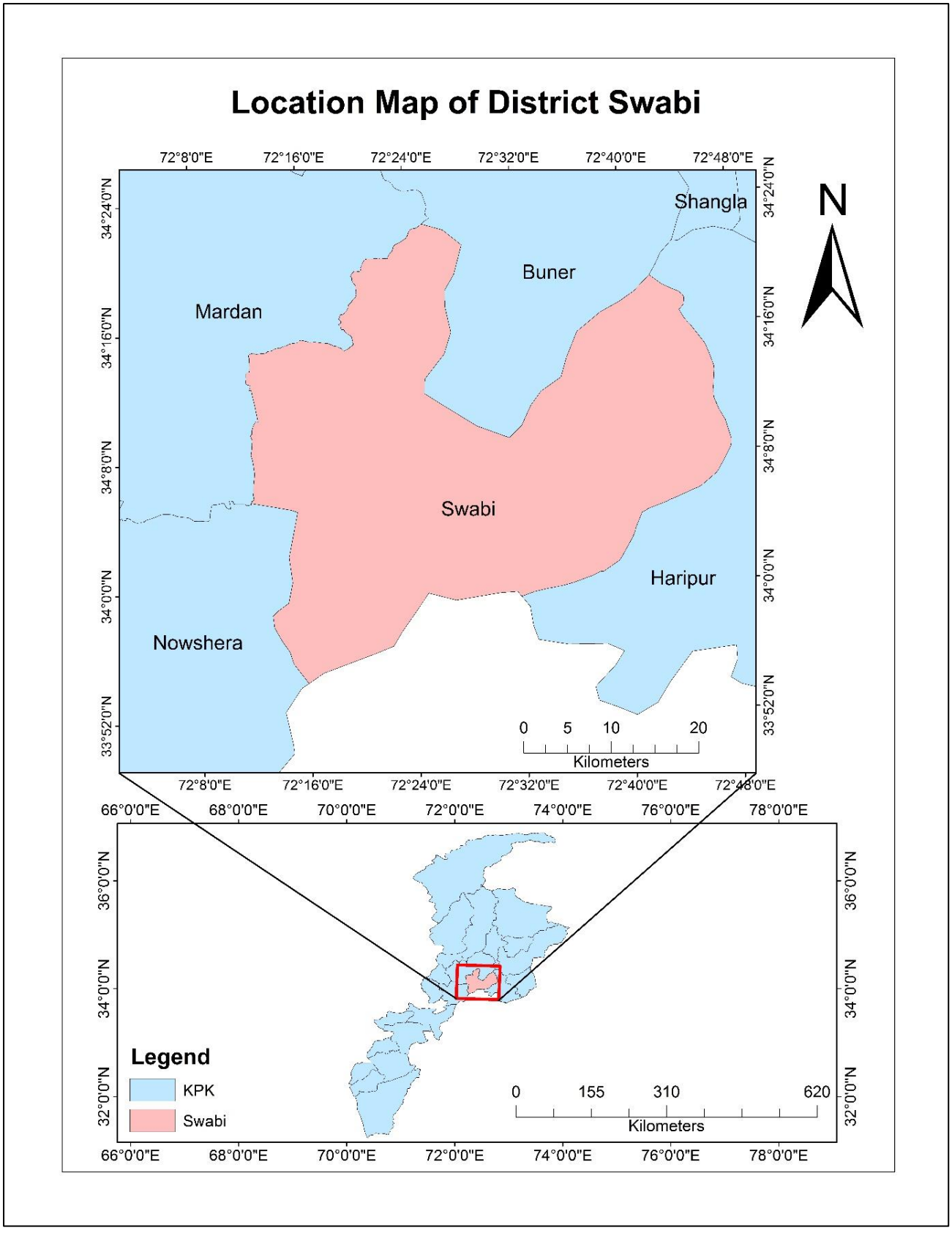
1.7.1 General:

Geological Survey of Pakistan is an attached Department of the Federal Ministry of Petroleum and Natural Resources, and is responsible for the study of geology of the country in all pertinent details and to assess 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.

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 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 Centre of Pakistan for the collection, dissemination, storing and updating of data of the country as a whole and also to make it available in print and electronic formats.



Map 1.7.1: Location Map of District Swabi

1.7.2 Geology of District Swabi

District Swabi constitute about 60% of Quaternary Alluvium these are unconsolidated deposit of gravel, sand, silt and clay. The remaining 40% of District in constitute of Tanawal and Manglaur formation undivided, Karora complex and Gandaf formation undivided, Landikotal slates and Manki formation undivided and Besham and Kotla complexes undivided from the Precambrian Era and from the Paleozoic Era it has Shewa, Ambela and Warsak Complexes undivided, Swat and Mansehra granite complexes undivided and Paleozoic Rocks undivided.

Quaternary Alluvium: Unconsolidated deposit of gravel, sand, silt and clay.

Precambrian Era:

Tanawal and Mangluar formations undivided: Peshawar basin and Hazara medium to coarse grained metaquartzite, subordinate garnet mica schist and quartzite of Manglaur formation.

Karora complex and Gandaf formation undivided: The Karora complex consist of muscouvite-biotile orthogenesisse, mafic intrusions, pegmatite and leucogranite. The Gandaf FM contains graphitic schist, graphitic slate, phyllite and schist, fine-grained metapsammite, argillite, marble and quartize.

Landikotal slates and Manki formation undivided: In Khyber area slate with subordinate argillaceous limestone intruded by dolorite dykes. Manki formation consist of Dark gray, black, thin bedded argillite sericite bearing slate, phyllite and subordinate lenses of limestone.

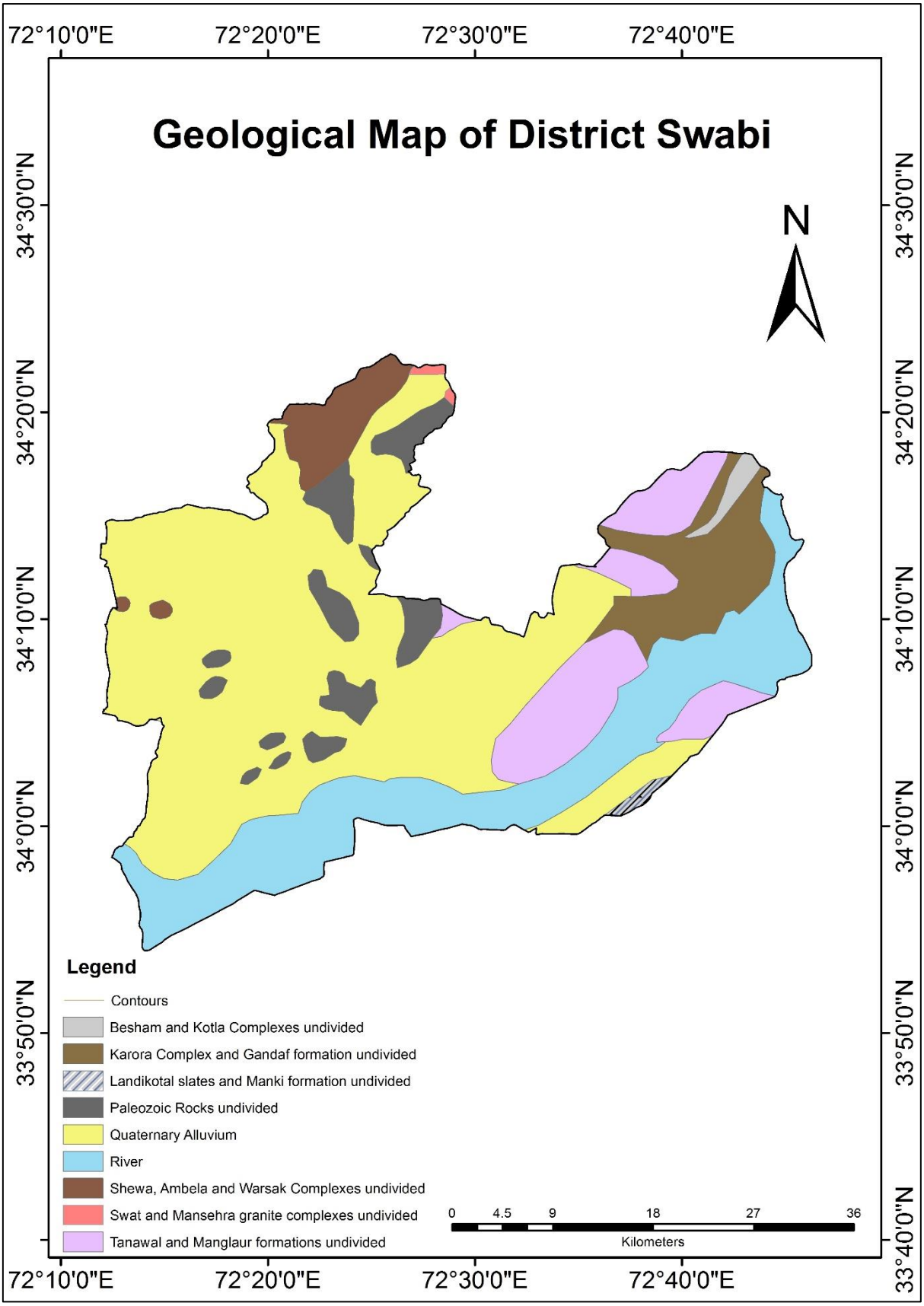
Besham and Kotla complexes undivided: The Besham complex comprises hornblende biotite granodiorite geniss, biotite orthogneiss, leucogneiss, leucogranites, pegmatites and mafic intrusion. Kotla complex consists of muscovite-biotite orthognesis, mafic intrusions, pegmatits and leucognesis. Early proterzoic.

Paleozoic Era:

Shewa, Ambela and Warsak Complexes undivided: The Shewa complex comprises alkaline microgranite and porphyry, intruded by dolorite. Ambela complex contain syenite, nepheline syenite, alkali granite and mnor carbonatite. Intruded by dolorite and tourmaline pegmatites. Age 279 to 315 Ma. The Warsak complex consist of micro porphyry, porphyritic granite, riebeckite, granite gneiss and intruded by basic rocks.

Swat and Mansehra granite complexes undivided: Mostly granite and leucogranite, siliceous gneiss ranging from finely foliated to coarse augen gneiss absolute age of mansehra granite is 516 ± 16 with mafic intrusions dated 284 to 262 Ma.

Paleozoic Rocks undivided: Jafar Kandao fm; Argillite, limestone, argillaceous and calcareous quartzite. **Lowara Mena fm;** Phyllite and phyllitic slate with beds of fossiliferous limestone, carbonaceous shale and dolorite dykes. **Warsak Metamorphic complex;** Quartz mica schist, garnet mica schist, amphibolite schist with hydrothermal quartz veins.

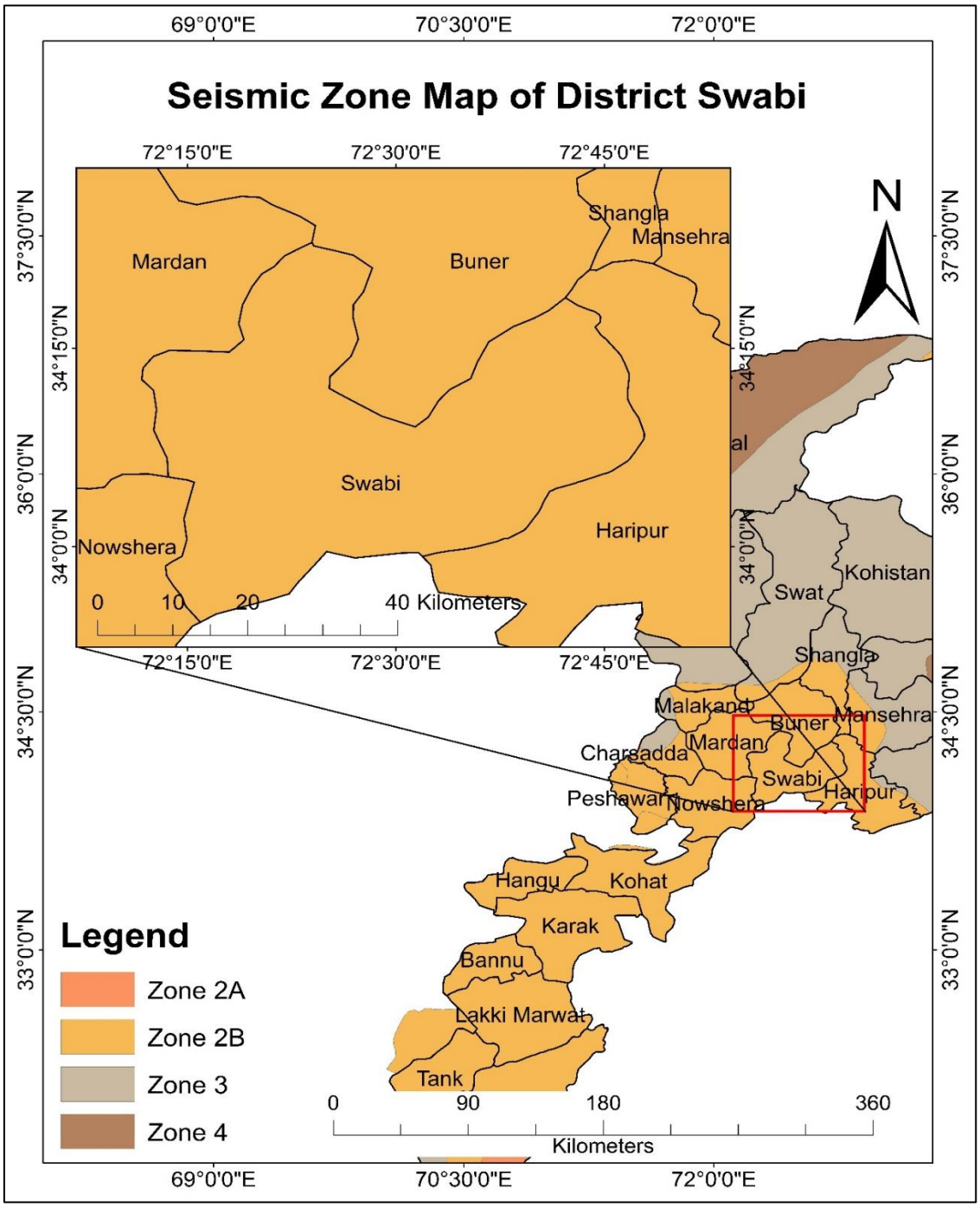


Map 1.7.2: Geological Map of District Swabi

1.7.3 Seismic Conditions of Swabi District:

Regarding seismicity in the District, Swabi lies in Zone 2B of minor damage zone corresponding to PGA (Peak Ground Acceleration) value of 0.0667g to 0.1g.

Expected epicenters cannot be predicted at any particular place. However, earthquakes can occur at active fault/thrust lines because energy is continuously stored during the movements of earth along the fault/thrust lines. The only active faulting in the southern Peshawar basin is Uch-Khattak fault, above the Panjal-Khairabad Thrust (PKT), which is in area across the Attock-Cherat range. Therefore, this active fault could be the future (with no period) epicenters of earthquakes in this region.



Map 1.7.3: Seismic Zone Map of District Swabi

1.7.4 Review of Geology Sector Policies

A lot of Geological work has been conducted since the independence of Pakistan in 1947. The Government owned organization Geological Survey of Pakistan that has the sole mandate to prepare geological maps of different parts/areas of Pakistan has carried out the major work. Till to date Geological Survey of Pakistan has prepared several geological maps of different region of Pakistan and has covered almost the entire area of Pakistan including Geological map of Khyber Pakhtunkhwa. The maps thus prepared are being used by various organizations as base map for geological information.

Besides, Organizations such as Geology Department and Centre of Excellence of Peshawar University have generated a lot of geological academic and research data of KP and northern areas. Pakistan Mineral Development Corporation (PMDC), Sarhad Development Authority (SDA), Punjab Mineral Development Corporation and Geology Department of Punjab University have also generated comprehensive data related to exploration of different metallic and non-metallic minerals of Pakistan and prepared respective maps.

1.7.5 Recommendations for Geology Sector

Oil and Gas Development Corporation (OGDC) and foreign oil companies which have been granted licenses for exploration of oil and gas in the different part of Pakistan and KP, have generated detailed exploration and geological data, but this data is not available to the public or research organizations. It is high time for Government of Khyber Pakhtunkhwa to ask Geological Survey of Pakistan to prepare separate district wise Geological maps with all the relevant information. These maps should be available to public on payment of nominal charges.

Government of Khyber Pakhtunkhwa and Geological Survey of Pakistan should jointly conduct hazardous sites mapping of landslides/slopes and vulnerability assessment for all districts of the Province through a doable mechanism. The information gathered through this exercise will be vital for construction of roads, canals, dams, hydro-electric power plants and industrial plants etc.

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

Directorate of Mines and Mineral Department should facilitate local privates Investors in the mineral sector. There is, as such, no provincial agency which provides technical and financial assistance in the form of technical services and relevant packages, machinery and soft loans to the private mine owners and mining communities.

To overcome the shortcomings, there is a need to establish Mineral Facilitation Cell under the control of district government having necessary equipment facilities to play promotional role in offering technical assistance and generation of exploration/mine development data packages to facilitate investors in mineral sector of districts. The Government of Pakistan should take measures to control environmental issues developed as a result of mining activities and urbanization. Geochemical data will be generated of the mining areas to monitor the environmental degradation.

1.8 ENVIRONMENT

Khyber Pakhtunkhwa is divided into four agro-ecological zones based on climate, rainfall, temperature, altitude and topography in the Environmental Profile developed by the Environmental Protection Agency of Khyber Pakhtunkhwa. This Zonal distribution has been used to identifying potential future impacts from external forces such as climate change. Table 1.8.1 show the detail description of zones and districts under these zones. Based on this classification District Swabi lies in Zone c of the Central Valley Plain.

Table 1.8.1: Agro-ecological zones of Khyber Pakhtunkhwa

ZONE	DESCRIPTION	DISTRICTS
A	Higher northern mountains, northern mountains	Buner, Shangla, Dir/Lower and Upper, Swat and Chitral
B	Sub humid eastern mountains and wet mountains	Haripur, Batagram, Mansehra, Abbottabad, Kohistan, Torghar
C	Central Valley Plain	Peshawar, Mardan, Charsadda, Nowshera, Swabi, Kohat, Hangu
D	Piedmont plain, Suleiman piedmont	Bannu, Karak, LakkiMarwat, Tank, D.I. Khan

In general, there are several environmental issues such as water, air and noise pollution. Water pollution is the presence of harmful and objectionable materials in water, obtained from sewers, industrial wastes and rainwater surface run-off in sufficient concentrations to make it unfit for drinking purpose. 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 as 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 odor in harmful amounts. That is, amounts which 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, as well as damage the ozone layer. It can also cause haze, reducing visibility in green spaces and wilderness areas. Pollution has also a negative impact on the weather and climate. One of the reasons for the increase in air pollution is low quantity of rainfalls that caused increase in smog and carbon dioxide contributing global warming.

Noise from vehicles and other powered mechanical equipment is intermittent. Transportation vehicles are the worst offenders, with aircraft, railroad stock, trucks, buses, automobiles, and motorcycles all producing excessive noise. Construction equipment, e.g., jackhammers and bulldozers produce substantial noise pollution. Besides, with the growing level of air and water pollution, noise pollution has been recognized rising threat to the inhabitants of cities. Mitigation of

road traffic noise is the big challenge for urban planners and environmental engineers in cities. The volume of a sound above the permissible level of 65 decibels (dB) unit is called noise.

The effects of Noise are both on physical and behavioral in nature. This unwanted sound (noise) can damage physiological and psychological health. Noise pollution can cause annoyance and aggression, hypertension, high stress levels, hearing loss, sleep disturbances, and other harmful effects. Older males exposed to significant occupational noise demonstrate significantly reduced hearing sensitivity than their non-exposed peers.

High noise levels can contribute to cardiovascular effects and exposure to moderately high levels during a single eight-hour period causes a statistical rise in blood pressure of five to ten points and an increase in stress leading to the increased blood pressure noted above as well as to increased incidence of coronary artery disease.

This section describes the environmental pollution particularly parameters of water, air and noise pollution in Swabi[3]. In order to take relative measurements of these parameters, the spot values of pollution indicators have been considered and compared with the permissible standards.

1.8.1 Air Quality

Air samples in Swabi is collected from Swabi main chowk (aman chowk), TMA house chowk and shah mansoor town of district Swabi. Table below shows values of parameters for the air samples of Swabi. Pakistan environmental protection agency standards for ambient air are also shown.

Nitric Oxide (NO)

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

Possible impacts of high NO levels

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

Carbon Monoxide (CO)

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

Possible impacts of high CO levels

- If CO increase from the NEQs then it enters into the blood stream and reduce oxygen delivery to body's organs and tissues.
- It can create vision problems
- At very high level, CO is poisonous and can cause death

[3] Source: The Landuse 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 Landuse Project.

Nitrogen Dioxide ($N0_2$)

NO_2 was within limits at Aman Chowk and TMA House Chowk. However, it was not detected in Shah Mansoor Town of Swabi.

Possible impacts of high levels of $N0_2$

Same as that of NO

1.8.2 Noise Level

A comparison between the National/KP Environmental Quality Standards (NEQS and KPEQS) are listed beside International standard of WHO/IFC. Noise level guidelines for noise levels measured outdoors are given in Table 1.8.2.

The current noise level of District Swabi is higher than both the National and International standards.

Table 1.8.2: Comparison between International and National Noise level[4]

Category of Area/Zone	Limit in dB (A) One Hour L Aeq			
	WHO/IFC		NEQS /KPEQS	
	Day Time (07:00 – 22:00)	Night Time (22:00 – 07:00)	Day Time (07:00 – 22:00)	Night Time (22:00 – 07:00)
Residential area (A)	55	45	55	45
Commercial area (B)	70	70	65	55
Industrial area (C)	70	70	75	65
Silence zone (D)	55	45	50	45

Impacts of higher noise levels

- Higher noise level 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 behavioral stress. A person may feel disturbed in the presence of loud noise such as produced by beating of drums.
- Noise increases the chances of occurrence of diseases such as headache, blood pressure, heart failure, etc.
- Exposure to excessively loud noise, over long periods, can also lead to partial deafness.
- Noise disturbs feeding and breeding patterns of some animals and has been identified as a contributing factor of the extinction of some species.

[4] Source: Guidelines for Community Health, World Health Organization (WHO), 1999

Sources of Noise Pollution

Sound is essential to our daily lives, but noise is not. Noise is generally used as an unwanted sound, or sound, which produces unpleasant effects and discomfort on the ears. Noise is generated from many sources, which include; household sources, industries, generators, transportation etc.

Transportation is a big source of noise pollution in urban area. Increasing traffic has given rise to traffic jams in congested areas where the repeated hooting of horns by impatient drivers pierce 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 school, colleges, hospitals etc.
- Construction of soundproof rooms for noisy machines in industrial and manufacturing installations must be encouraged.
- Noise producing industries, airports, bus and transport terminals and railway stations to be sited far from living places.
- Vegetation (trees) along roads and in residential areas is a good way to reduce noise pollution as they absorb sound.

1.8.2.1 Test of Ambient Air & Noise Pollution

The ambient air quality of District Swabi as shown in table 1.8.3. There are four sample sites were identified as Spot 1= Swabi Main chowk, Spot 2= TMA House and Spot 3= Shah Mansoor Town. Results were compared with Pak EPA, all the obtained results shows that air quality of obtained samples is far below from the National standards. Similarly, the particulate matter in all three spots are much high from the National standards. The Noise level both in residential and commercial is high from the standard devised by EPA for residential and commercial areas.

1) Ambient Air Quality (Equipment used for air quality): NOVA Model 600-2-3-4-5-7-10, Canada)

Table 1.8.3: Air quality Samples Results of District Swabi

Parameters	Unit	Spot #1	Spot #2	Spot # 3	Standards Pak EPA
Nitrite Oxide (NO)	ug/m^3	N.D	4.305	7.38	40 ug/m^3 for 24 hours
Carbon Monoxide	mg/m^3	N.D	N.D	N.D	10 mg/m^3 for 1 hour
Nitrogen Dioxide (NO_2)	ug/m^3	2.82	1.88	N.D	80.00 ug/m^3 for 24 hour
Hydrogen Sulfide (H_2S)	mg/m^3	N.D	N.D	N.D	-
Carbon Dioxide (CO_2)	Ppm	548.00	473.00	456.00	-
Ammonia (NH_2)	ppm	N.D	N.D	N.D	-

Spot #1 = Swabi Main Chowk (Aman Chowk). Spot # 2 = TMA House (Chowk) & Spot #3 = Shah Mansoor Town

2) Air Pollution: (HAZ Dust Particulate Air Monitoring Equipment, Model: EPAM-5000, USA)

Table 1.8.4: Air Pollution Samples Results					
Parameters	Result				Standards Pak EPA
	Unit	Spot # 1	Spot # 2	Spot # 3	35.00
Particulate Matter ($PM_{2.5}$)	Ug/m^3	297.00	191.00	199.00	

3) Noise Level Test/Analyzer

Table 1.8.5: Noise Level of District Swabi				
Parameters	Result			Instrument
Noise	Spot # 1	Spot # 2	Spot # 3	Sound Level Meter Model: TES 1350A, Range 30-130 dB
	84.98	79.03	73.14	
Standard Pak EPA	65 dB	65 dB	55 dB	

Commercial Area =65 dB Residential Area = 55 dB

1.8.3 Drinking Water

Water samples were collected from Aman Chowk, TMA House Chowk and Shah Mansoor Town. For each sample, various quality parameters were tested. The results of drinking water samples along with their statistical analysis is given below and is shown in the table 1.8.3.1.

- **PH**

The PH of all samples is within the NEQS limits

- **Total Dissolved Solid (TDS)**

The TDS of all samples is within the limits. Total Dissolved Solid (TDS) is a measurement of inorganic salts, organic matter and other dissolved materials in water. The amount of TDS help us to 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 bitter taste it is difficult to drink.

- **Turbidity**

The turbidity level for all samples of Swabi 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 Swabi is within the NEQS limits.

- **Chlorides as Cl**

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

- **Impacts**

Higher chlorides impart taste to drinking water. There are no health-based impacts.

1.8.3.1 Major causes of water Pollution

The major source of surface and ground water pollution is injudicious discharge of untreated industrial effluents directly into the surface water bodies resulting in serious surface and ground water pollution. This loss of water quality is causing health hazards and death of human beings, livestock and death of aquatic lives, crop failure and loss of aesthetics. This problem is aggravated by lack of awareness, lack of wastewater treatment facilities, lack of financial resources and the inefficient environmental laws. From the present research study, it can be concluded that although the results are some what in line with the safe limits of NEQS as well as WHO but the toxic level of harmful materials can mix up with the ground water if no precautionary measures were taken for filtering of the industrial effluents. Table 1.8.3.1 shows Chemical Analysis of water for District Swabi.

For the water quality analysis of the district Swabi three water samples were collected from three different spots as Main Swabi chowk, TMA chowk and Shah Mansoor. The result shown as below.

(Sample ID- Swabi) Spot #1 = Swabi Main Spot #1 = Swabi Main Chowk (Aman Chowk) Spot # 2 = TMA House (Chowk) & Spot #3 = Shah Mansoor Town

1.8.3.2 Physicochemical & Heavy Metals Analysis of Drinking Water

Table 1.8.3.1: Water Quality Assessment of District Swabi							
Parameters	Method #	Units	Spot #1	Spot #2	Spot #3	Expanded Uncertainty (±)	WHO Limits Drinking Water
*pH	45000-H*B	-	7.49	7.47	7.91	0.18	6.50-8.5
*Sodium as Na	3500-Na	mg/L	126.13	67.47	73.60	1.70	200.00
*Potassium as K	3500-K	mg/L	4.37	3.07	3.97	0.64	75.00
*Total Hardness as $CaCO_3$	2340. C	mg/L	194.39	192.61	100.44	3.33	500.00
*Calcium as $CaCO_3$	3500*Ca. B	mg/L	122.90	121.71	75.04	2.47	250.00
Magnesium as $CaCO_3$	3500*Mg. B	mg/L	71.48	70.90	25.40	-	150.00
*Total Alkalinity as $CaCO_3$	2320. B	mg/L	319.72	277.79	179.90	3.27	500.00
P-Alkalinity as $CaCO_3$	2320. B	mg/L	NIL	NIL	NIL	-	30.00
Chloride as Cl	4500*Cl. B	mg/L	32.42	21.51	35.07	-	250.00
Conductivity	2510.B	uS/cm	600.00	460.00	330.00	-	-
Total Dissolved Solids (TDS)	2540.C	mg/L	473.33	336.67	263.33	-	1000.00
Total Suspended solids (TSS)	2540.D	mg/L	3.67	3.33	3.67	-	5.00
Sulphate as SO_4	4500*SO_4.E	mg/L	24.61	27.80	17.46	-	250.00

The same samples were tested for different parameters such as color, Temperature, turbidity etc. the results were shown as below.

Table 1.8.3.2: District Swabi Water Quality Physicochemical Assessment						
Parameter	Method No	Units	Result			WHO limits For Drinking Water
			Spot # 1	Spot # 2	Spot # 3	
Color	2120.B	-	Color less	Color less	Color less	Color less
Temp	2550.B	°C	28.10	28.40	28.30	-
Turbidity	2130.B	NTU	0.64	0.40	0.34	5.00

Taste	2160.A	-	Unobjectionable	Unobjectionable	Unobjectionable	Unobjectionable
Nitrate as NO_3	4500-NO_3.B	mg/L	14.21	18.14	19.10	50.00
Ammonia as NH_4	4500-NH_3.F	mg/L	0.08	0.07	0.09	-
Iron as F_e	3500-F_e	mg/L	0.44	0.05	0.04	-
Manganese as M_n	3500-M_n	mg/L	0.05	0.05	0.05	0.50

(Sample ID- Swabi= Spot #1 = Swabi Main Chowk (Aman Chowk). Spot # 2 = TMA House (Chowk) & Spot #3 = Shah Mansoor Town

1.8.4 Review of Environment Sector Policies

Before the enactment of the Eighteenth Amendment, 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 and as a result, the provinces now have exclusive jurisdiction to frame laws for the protection of environment and ecology. One immediate consequence of this new state of affairs was that, the federal PEPA 1997 was no more applicable to the provincial territories and only applicable to the Islamabad Capital Territory having separate administrative jurisdiction. The PEPA 1997 has been replaced by the KP Environmental Act, 2014. Some of National regulations and guidelines applying to environmental aspects are presented and their relevance briefly discussed in the Table 1.8.6.

Table 1.8.6: Summery of Pakistan National Legislation/Guideline of Environment in Pakistan

Legislation/Guideline	Description
National Environmental Policy (2005) (NEP)	NEP is the primary policy of Government of Pakistan addressing environmental issues. The broad Goal of NEP is, "to protect, conserve, and restore Pakistan's environment in order to improve the quality of life of the citizens through sustainable development". The NEP identifies a set of sectoral and cross-sectoral guidelines to achieve its goal of sustainable development.
Pakistan Environmental Protection Agency Regulations, 2000	It provides lists of projects requiring IEE and EIA, briefly describing preparation and review of environmental reports. In accordance with Regulation 4, an EIA for the proposed project satisfying the requirements of the Section 12 of PEPA Act 1997 needs to be submitted to concerned EPA, Environmental Protection

	Department (EPD), for reviewing environmental approval. These Regulations clearly defines the categories of the projects requiring an IEE or EIA, review fees by EPA, filing process of the environmental reports, public participation, decisions by EPA, conditions of approval, compliance reports, and monitoring of the environmental parameters etc. Pak–EPA contains the following sets of information relevant to the proposed project.
Pakistan Environmental Protection Act, 1997 (PE PA–1997)	It was enacted by repealing Pakistan Environmental Protection Ordinance 1983. It provides framework for implementation of NCS, establishment of provincial sustainable development funds, protection and conservation of species, conservation of renewable resources, establishment of environmental tribunals, environmental assessment leading to Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA), prior to commencement of construction or operation of a Project.
National Environmental Quality Standards (NEQS) 1997	NEQS 1997 and various amendments make it illegal to discharge any effluents or emit any pollutant gaseous materials or noise exceeding the NEQS prescribed standards.
National Conservation Strategy (NCS) Mar 1992	It is the principal policy document on environmental issues in the country. It outlines country's primary approach towards sustainable development concerning natural resources and its management on a 10 years planning and implementation cycle. NCS has 68 specific programs in 14 core areas in which policy investment is considered crucial for conserving Pakistan's natural and physical environment.

Following the Eighteenth Amendment, the Khyber Pakhtunkhwa EPA noted that proper procedures are required for implementing the environmental policy and pollution control protocols. For this purpose, Khyber Pakhtunkhwa EPA passed the Environmental Protection Act, 2014. Under this Act the EPC power and function is to co-ordinate, supervise and support enforcement of the provision of this Act and the rules made thereunder; including levying the pollution charge, development of 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 issue is to adopt a carrot and stick policy to educate people, investors and institutions to reduce waste and pollution, and at the same time to levy fines on those who violate environmental regulations and pollute environment. The KP EPA takes this one-step further, recommending that all fines and fees relating to IEE, EIA, environmental reports and laboratory analysis must be used for environmental rehabilitation projects in the province.

The KP EPA recommends that specific rules must be 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’ on the basis of 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.

With regard to the issuing of 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, to halt all project activities (temporarily or permanently) and to impose spot fines. The KP EPA recommends that the Director-General of the EPA should have the power to levy spot fines on those violating EPO.

It may further be argued that the environmental issues are best dealt 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 charges for pollution may be collected at local level by the TMA.

It may be added here that a number of important issues will need to be considered before any provincial legislative action can begin. Following measures will be required by the provincial and federal governments for the environmental protection legislation:

- Rules and regulations under PEPA 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 reporting mechanism should be 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, 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), 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. The purpose of administrative penalties needs 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 geographical area unless it is to strengthen the standards. The relevant provisions must be amended.

1.9 FLOODS

Based on National Disaster Management Authority's (NDMA) multi-hazard vulnerability assessment[5].

District	Flood	Landslide	Avalanche	Drought	GLOF	Multi-hazard
Swabi	Very high	Low	Very Low	Low	-	High

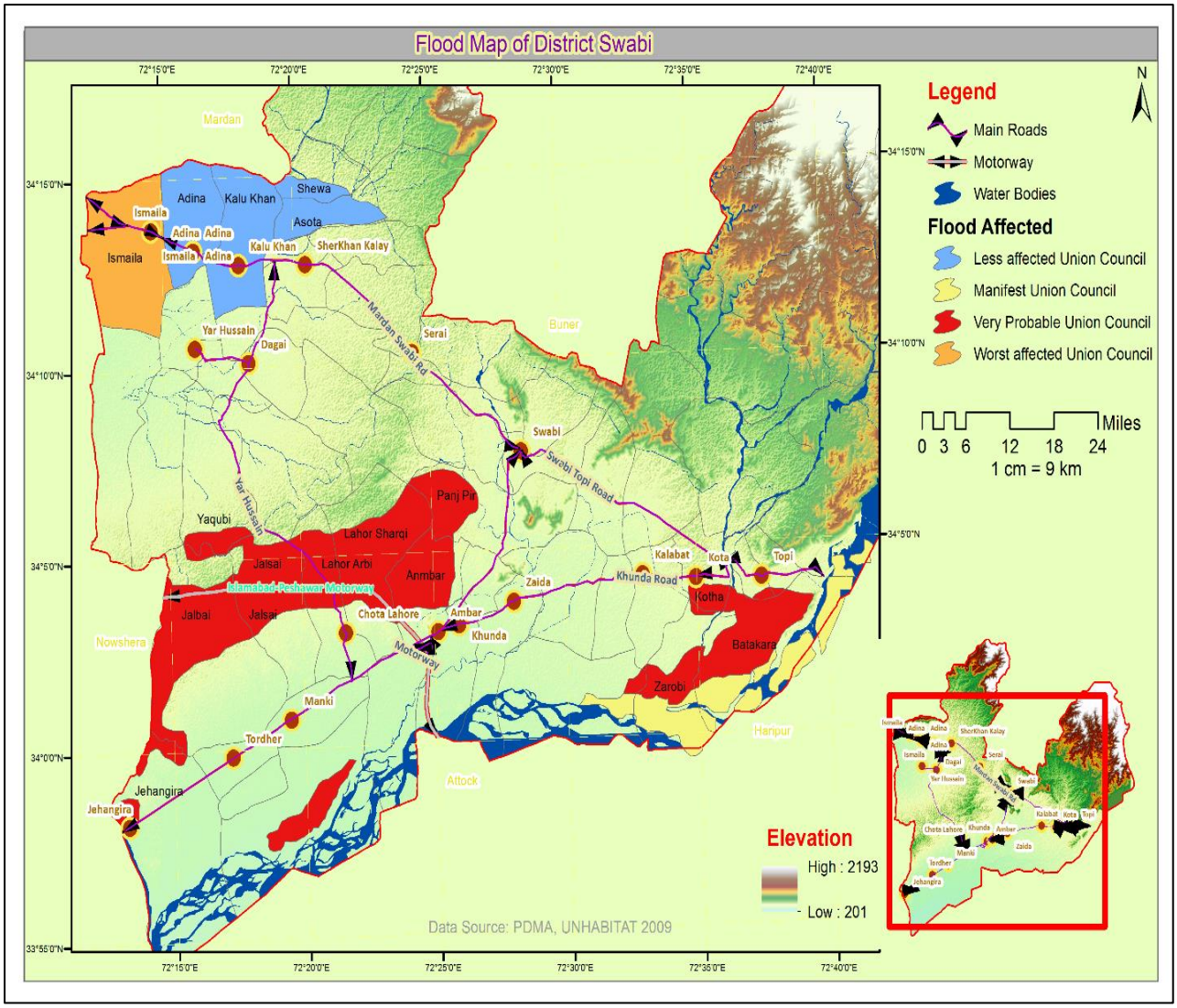
District-Swabi Natural Hazards Vulnerability Assessment by NDMA

Indus River is running close to District Swabi. Due to this river system, the region is prone to flash flooding during heavy monsoon season. Heavy rainfall on 16 August, 2009 caused flash floods originated from the Karamar Mountains in Swabi and Mardan Districts in Khyber Pakhtunkhwa, Pakistan. Swabi experienced even worse flooding in 2009 – the worst in recent history - resulting in displacement of hundreds of thousands of people. The following years - 2011, 2012, 2013, 2014 and 2015 - saw a repetition in the pattern, admittedly though, with less intensity. The repetitive flooding over the years with rehabilitation from previous floods still underway made conditions even more challenging and costly. The numbers of affected people remain undetermined. According to various sources, there are reports of 27 deaths, nine people missing, an estimated 400-450 houses destroyed along with massive losses to crops and livestock. The most affected Union Councils were Ismaila, Kalu Khan and Adina in Swabi District. The District Administration in Swabi has declared a state of emergency in Adina, Ismaila and Kalu Khan. The District Swabi Coordination Officer (DCO) reported that about 70,000 to 80,000 people have been affected in the region. The UN assessment team reported that approximately 100 houses have been damaged in Kalu Khan in Swabi District.

There were 6 villages which required urgent assistance i.e. Mukhtairabad, Naseerabad, Chota Ismaila, Surarah, Sarey Sher Garay and Hajiabad. In Kalu Khan UC there were three affected villages, Khat Kallay, Manan Khel and Loda Khel. Khat Kalay was worst affected in the Kalu Khan UC. The village is situated next to the Narangi Khowan river stream which flooded and inundated the settlements on the river bank. The village main route which was connected through the Kalu Khan Khat Bridge was been collapsed due to the flooding and alternative route has to be taken to approach the village. Approximately 50-100 houses in this village have been damaged.

As the water swept through the villages, the roofs of mud houses collapsed and caused the majority of the deaths. Concrete houses were mostly unaffected. The flood waters submerged the cultivated land in these regions and much of maize, rice, sugarcane and tobacco crops were destroyed. Livestock was washed away and drowned. In addition, valuables in homes were completely swept away and stored grains in houses were destroyed. Traffic between Swabi and Mardan, was totally cut off.

[5] NDMA, 2015. National Monsoon Contingency Response Directive 2015. Accessed from Accessed from <http://www.ndma.gov.pk/PDF/Directive_2015.pdf>



Map 1.9.1: Flood Map of District Swabi

1.9.1 Short-Term and Long-Term Plans

Reasons and Justifications

The shortfalls in 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[6]**:**

Short-Term Plans

i. Early warning system through WAPDA and Irrigation Department.
ii. Pakistan Metrological Department flood forecasts/warnings and weather forecasts.
iii. Flood warning by the Local Administration and community based mechanisms
iv. Removal of Encroachments
v. Re-construction of irrigation channels.
vi. Repair and maintenance of Drainage System.
vii. Restoration of Damage flood protection works
viii. Improvements in flood mitigation measures over Rivers 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 warning by Revenue Department and Irrigation Department.
iii. Establishment of observation posts by Irrigation Department in the likely flood areas.
iv. Civil Defense Staff and volunteers should be made fully functional.
v. Evacuation centers should be earmarked with the assistance of education department.
vi. For sensitive buildings and record, each Department should prepare its own Standard Operating Procedures.
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 whenever required.
ix. The encroached areas, particularly along waterways and flood-prone areas should be identified and requisite measures taken for their removal.

1.9.2 Integrated Approach in Flood Management

Flood management play important role in protecting people and their socio-economic activities in flood plains from flooding. The development in the river basins has been closely linked with 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 the moment an extraordinary or unforeseen event occurs. These traditional approaches, where the risks are merely transferred spatially, are likely to

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

generate conflicts and inequities. Environmental degradation has the potential to threaten human security, including life and livelihoods, 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 issues of human security against flood risks and sustainable development within the framework of Integrated Water 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 at minimizing loss of life from flooding while maximizing the net benefits derived from flood plains.

1.9.3 Floods and the Development Process

Historically, flood plains are preferred places for socio-economic activity as evident that very high densities of human settlement found there. 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 support agriculture and fisheries system, 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.

Recurrent and extreme flooding, however, pose grave risks to development and have negative impacts on 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 have the potential to put development back by five to ten years, particularly in developing countries. The spiraling economic losses in developed countries also have given rise to 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. There is a need, therefore, to find ways of making life sustainable in the floodplains. The best approach is to manage floods in an integrated manner.

1.9.4 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 that gave no thought to the consequences of flood risks for upstream and downstream areas. Thus, flood management practices have largely focused on mitigating floods intensity and reducing their localized damages to private and public property. Traditional flood management has employed both structural and non-structural interventions, besides, physical and institutional interventions. These interventions were employed prior, during and after flooding and have often overlapped. The traditional flood management interventions are listed below;

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

ii. **Storage of runoff:**
   - Detention Basins, reservoirs etc.;

iii. **Capacity enhancement of Headwork/Barrages across rivers:**
   - Remodeling of Barrages/Headwork's, provision of Bypass/Escape channels etc.;

iv. **Separation of rivers and populations:**
   - Land-use control, flood plan mapping & zoning, removal of illegal encroachments, construction of flood protection infrastructure.

vi. **Emergency management during floods:**
   - Flood forecasting & warnings, flood fighting works i.e. raising/strengthening flood embankments, evacuation of flood Affectees from dangers zone and their temporary settlement at safe places; and

vii. **Flood recovery:**
   - Compensation of flood Affectees and restoration of damaged public infrastructure.

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

Seemingly self-evident, but regularly overlooked in practice, is the need to make flood management a part not only of the planning and design, but also of the operation of reservoirs. Release of surplus water from reservoirs at the time, when rivers in the downstream areas experiencing high flood flows can create risks, therefore, careful operation of reservoirs can minimize the loss of human life and damages to property due to properly managed releases. In this context trans boundary cooperation is indispensable.

Flood embankments are most likely to be appropriate for floodplains that are already intensely used, in the process of 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. Where land is under development pressure, however, especially from informal development, land-use control is less likely to be effective. Flood protection or construction of houses at high elevation is most appropriate where development intensities are low and properties are scattered, or where 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 flood on the economy.

Flood Forecasting & issuance of timely warnings are complementary to all forms of intervention. A combination of timely, clear & accurate warning messages with a high level of community awareness gives the best level of 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 upon the local circumstances. Outward evacuations are generally necessary where the depths of water 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. The provision of basic amenities such as water supply, sanitation and security in areas where affectees gather is particularly important in establishing a viable evacuation system.

1.9.5 Challenges of Flood Management

Besides many other challenges, climate change is emerging as perhaps the greatest environmental challenge for Pakistan causing floods, droughts and increasing hunger, poverty, displacement, soil degradation, desertification and deforestation. Rising number of extreme climate events, shift of monsoon rainfall zone from North-east to North-west. Intense, concentrated monsoon rains in short time of interval, inconsistent behavior 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 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. In developing countries with primarily agricultural economies, food security is synonymous with livelihood security. Floodplains contribute substantially to the food production that provides nutrition for the people of these countries. Asia-Pacific region is under the very frequent and severe impacts of floods because of its geographical composition. Majority of the region's major cities are riverine or coastal, which have concentration of population, assets, economic & 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 not only the prosperities but also a series challenge, 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 constraint country with a fast-growing population, low natural resource development based and unfavorable local socio-cultural conditions, and climate change is an

additional stress for the country. Educating masses about natural disasters and building up their preparedness at educational institutions can be of great help to 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 System in place.

1.9.6 Climate Variability and Change

Apart from the antecedent basin conditions, flood magnitudes depend on precipitation intensity, depth, timing, and spatial distribution. A variety of climatic and non-climatic parameters influence flood processes. Temperature and wind affect snowmelt, which in turn affects flood magnitudes. The projected effects of global warming include changes in atmospheric and oceanic circulation, and many subsystems of the global water cycle are likely to intensify, leading to altered patterns of precipitation and runoff. Various climate model simulations show complex patterns of precipitation change, with some regions receiving less and others receiving more precipitation than they do now.

Pakistan Meteorological Department (PMD), in a recent monsoon rainfall distribution analysis, assessed that climate change has rendered a 100-km spatial shift towards west in the overall monsoon pattern in the country. Rainfall distribution patterns have not only shifted spatially but also seasonally. The analysis showed that summer monsoon rainfalls have shifted towards late season; similarly, winter rain and snowfall have also shifted towards late February and March. Changing patterns result as emergence of new vulnerable areas to floods, which include Khyber Pakhtunkhwa (KP), South Eastern Punjab and Central Sindh.

According to an analysis of fifty-year data, variation in the co-efficient of variability was highest in post-monsoon and pre-monsoon seasons as compared to the winter and monsoon seasons. It further revealed that most of the northern areas (upper KP and Gilgit Baltistan) remain in the same old pattern except in the post-monsoon period while the central and southern half suffers throughout the year in terms of high rainfall variability, he informed. It is also observed that more snowfall is received in the month of February as compared to January over recent years.

The floods may be managed through the following actions by different Departments/agencies[7]:

Table 1.9.1: Flood Management Measures Required

Departments	Flood Management Measures Required:
Revenue Department	• 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 to be removed with the assistance of DCO, TMA, and

[7] Source: Adapted from: Monsoon Contingency Plan – 2011, Provincial Disaster Management Authority, KP, June, 2011.

Table 1.9.1: Flood Management Measures Required	
Departments	Flood Management Measures Required:
	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 affected population in an orderly manner. • The Regional Transport Authorities should coordinate with respective DCOs for needful arrangements.
Health Department	• When required, the Department should establish a Health Emergency Preparedness and Response Cell. • 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 population that may be affected by floods.
Information Department	• FM radio stations should be established for advance warnings and to sensitize the public as soon as flood warnings are received. These stations should guide the public about nearby safer places, food stuff, health care facilities, health tips and other precautionary measures. • The Department should also arrange press briefings/press conferences.

Table 1.9.2: Measures to Manage Floods		
National Level	Provincial Level	District/Local Level
Early warning system through WAPDA and Irrigation Department regarding floods	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 situation.	Flood warning by the Local Administration and community based mechanisms
Early warning through existing mechanisms.	Pakistan Metrological Department flood forecasts/warnings and weather forecasts.	Removal of Encroachments
	Restoration of Damage flood protection works	Re-construction of irrigation channels.
	Improvements in flood mitigation measures over river and its tributaries.	Repair and maintenance of Drainage System.

	Arrangements for quick dissemination of flood warning by Revenue Department and Irrigation Department.	To receive real time information about water levels, a network of community level organizations and community volunteers be organized in the catchment areas.
	Establishment of observation posts by Irrigation Department in the likely flood areas.	Civil Defense Staff and volunteers should be made fully functional.
	Evacuation centers should be earmarked with the assistance of education department.	The encroached areas, particularly along waterways and flood-prone areas should be identified and requisite measures taken for their removal.
	For sensitive buildings and record, each Department should prepare its own Standard Operating Procedures.	
	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 whenever required.	

1.10 WATER LOGGING AND SALINITY

Waterlogged areas are often found near rivers or lakes and have mineral soil that drains very slowly. It is important to consider waterlogged areas in a Land Use Plan because any development on such areas are much more expensive. Thus, such areas in a Land Use Plan should be identified and avoided for projects involving construction, for which dry land should be preferred.

If for some reason a development proposal in Land Use Plan on such a land is mandatory, it would require special attention. Either the soil has to be removed or strengthened by suitable means after ascertaining its (soil) properties. It is also important to ensure that the foundation of buildings rests on sound soil so that when the super structure (building) is completed, the weight would be evenly spread. Water from the ground poses challenge to the buildings. Thus, as already stated, if any development on waterlogged area is necessary, water resisting membrane to check dampness of the walls should be used. The type of filling done before the foundation matters a great deal. On waterlogged lands, use of clay materials should be avoided. This is because when the water table

diminishes, the clay will shrink thereby creating a space underneath the slab and causing cracks on the building in future.

Poor management of irrigated field agriculture results in water logging and salinity problems. The percolating water raises the water table which reaches the surface, suffocates the roots and after evaporation deposits salts on surface, thus causing water logging and salinity. A significant portion of the irrigated land in Pakistan has been affected by water logging and soil salinity and it is feared that many areas might get converted into wet desert. Water logging and salinity have caused threat to crop production, and natural environment in the country. Pakistan is an agricultural country and about 70% of its population earns their living from this sector. Therefore, Government of Pakistan has assigned high priority to the control of water logging and salinity. To cope with the problem, the Government of Pakistan started the Salinity Control and Reclamation Project (SCARP), in different parts of the country. The main objectives of the SCARP project were: to lower the water table; to reclaim saline soil; and to provide full management of groundwater resources (Qamar, 1990).

Swabi SCARP falls in the area of Swabi, Mardan, Charsadda Districts as well as Malakand Agency of

1.10.1 Swabi SCARP (1995-1999)

NWFP. The installation of tile drainage system in Swabi SCARP was started during 1995 and was completed in June 1999 with the objective of lowering the water table from about 1 to 1.5 m more below the ground surface. The project area to North West and East is bounded by Abazai and Machai branch canals of the Upper Swat Canal irrigation system, to the South by Balar drain and to South-west by the Lower Swat Canal (LSC) and Kalpani river. Swabi SCARP Project cover a gross command area of 113,800 ha out of which cultivable command area (CCA) is 79,115 ha. One of the objectives of Swabi SCARP was to increase the water from 4 cusecs per 1000 acres to 9 cusecs per 1000 acres. The Project focused on those areas that draw water from the Upper Swat Canal system.

The cropped area in Swabi has not registered any changes under the SCARP Program, and the cultivated as well as cultivable area has remained unchanged during this period. Though there may have been some achievements but the gains and the loss of area to water logging and salinity has 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 water logging and salinity.

SCARP was aimed 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 using perforated PVC pipes and effluent disposal system comprising open drains, canal remodeling works to handle increased deliveries, watercourse modifications to improve on-farm water use, gypsum application, rural roads", and improved agricultural extension services. Floods make the situation again

worsened. Under the NDP Project the around Kabul river system drainage was improved to achieve equitable distribution of irrigation supplies.

The estimated 15,000 hectares in District Swabi 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 introduce in this regard.

1.10.2 Current status and efficacy of the SCARP Project

It was noticed from the study findings that 78% of land has been reclaimed due to the implementation of the SCARP project but yet the problem exists and according to the 22% of the total population the water logging and salinity problem still occur and the efficiency of the SCARP project is not satisfactory. In reference to the current study findings Khan *et al* (1997) and Sarwar *et al* (2002) reported that water logging and salinity problems has reduced up to 50% due to the implementation of Mardan Swabi SCARP project. Similarly, Tariq *et al* (2002) also concluded that SCARP project has reduced the water logging and salinity problems up to greater level.

1.10.3 Conclusion

The present study revealed that water logging and salinity is a major problem to the crops and causes great amount of reduction in crops production. It was found that the water logged and saline lands have a decreasing trend of crops production approximately 88% as compared to the non-water logged and non-saline lands. Tobacco and maize is mostly affected due to water logging and salinity as compared to the wheat while rice is greatly tolerant to water logging and salinity. The major causes responsible for water logging and salinity are seepage from canals (48%), Turbela Dam and poor and unscientific irrigation and agricultural practices. Soil analysis also revealed that the pH and EC of the water logged and saline lands were high as compared to the non- water logged and non-saline soil. High pH decreases the amount of nutrient's in-take by crops and thus reduced crop production. Similarly, high electric conductivity increases the concentration of salt and its solubility due to which the salts in-take is increased and water in-take declines, severely affected crops growth and production.

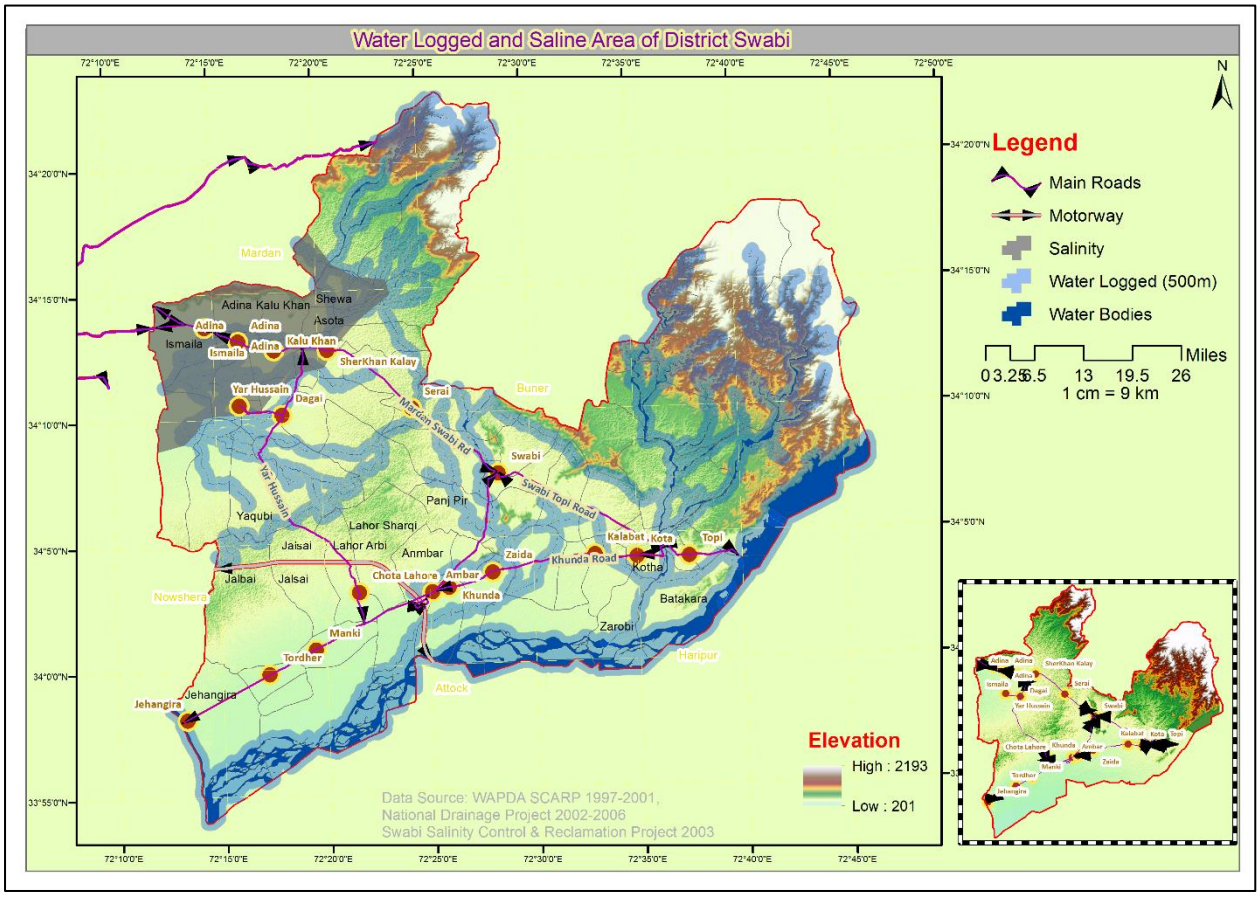
For salinity, soil is tested for Electric conductivity in the laboratory along with other analysis to find the salt as sodic or calcite in parts per million, ppm. Saline water which leads to salinity has 400 to 700 ppm. Agriculture department and farmers have a simple way of checking salinity visually. If salt is seen as white layer known as 'Kullur', one to two centimeters of earth from top is removed, and the soil is allowed to stay in sun for three; and then salt is rechecked. The scientific method however is to check the Electric Conductivity (EC) of soil, which varies and for this a device is used to determine the value of EC, based on which salinity is classified as below:

Table 1.10.1: Salinity Classes

Class	**Salinity Class**

All land naturally contains some salt. Class 0 sites do not exhibit any signs of salinity and are referred to as non-saline. Some non-saline areas exhibit mild to severe water logging. Mildly waterlogged areas can exhibit good summer growth of pastures due to the high level of soil moisture. Severe water logging can cause bare soil, yellowing of crops and pasture and tree death due to excess soil moisture and poor soil aeration. Even though the soil and water may be non-saline the area can become saline and should be monitored for any early signs of salinity.

Non-saline	0
Slightly saline	1
Moderately saline	2
Very saline	3
Highly saline	4



Map 1.10.1: Water Logging and Salinity Map of District Swabi

Water logged areas are not very productive for farming and agriculture, unless these areas are used for special farming/plantations which consume a lot of water, and with proper drainage system provided. Under SCARP Project in Swabi, substantial water-logged areas have been reclaimed.

Prior to construction of Ghazi Barotha and the Pehrur Canal, entire District was waterlogged and showed low levels of salinity. However, Ghazi Barotha helped in reducing this problem as the seepage from Indus and around Tarbela was collected and carried by the concrete drains. The soil along the water bodies, unlined canals and Khawars remains water logged. Some of the area has water table below 3 meters and is highly water logged, while from 1.5 meters to 3 Meters depth is moderately water logged while the land with less than 1.5 meters water table is categorized as low water-logged

area. Map indicates the water-logged area. Water logging degree varies with rain fall and seasons, for instance during monsoons the degree increases and during dry months of winters it reduces[8].

The areas under water logged lands in the five Districts are given in the Table below. Around 37% of area in District Swabi is water logged.

Table 1.10.2: Water Logged Areas in the Districts[9]

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 Swabi:

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 Swabi, 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 Swabi may be replaced by hardy crops such as sugar cane and tobacco production.

v. The water-logged areas in the District should be forested by appropriate trees in the affected zones.

vi. 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 within the districts so that the wastewater does not increase the salt content in the water bodies.

[8] WAPDA SCARP Project 1996 , and NDP 2004

[9] Calculated from GIS maps of the Districts.

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.

1.10.4 Recommendations

As a result of Swabi 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 wherever 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. 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.

xii. 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.

xiii. 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.

xiv. 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.

1.10.5 Proposals for Future to Reduce the Effect of Water Logging and Salinity

The problem of water logging and salinity 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 at the provincial level through the Irrigation and Drainage Authority.

The Irrigation department has prepared future Action Plans on short, medium and long-term basis. These plans include one lines statement of reducing water logging and salinity, and details in terms of statistics of areas, users and type of actions are not given.

Since there are a number of programs and initiatives adopted by the federal and provincial governments, which include:

- On Farm Water Management Program (OFWM program)
- Rural Support Program (RSPs program)
- National Drainage Program, (NDP)
- Lining of canals, distributaries and water courses and
- Adoption of new and improved means of irrigation that include drip irrigation and rain water harvesting.

The government has also introduced the facility of providing extension services through Agronomists and agricultural scientist to replace the crops in the water-logged areas by hardy crops. This has already been adopted by local farmers by replacing fruit trees with sugar cane and tobacco production.

Similarly, delicate crops in the water logged and saline areas can be replaced by Forestation, i.e., increasing growth of trees in the affected zones, which can be a source of income and sustain environment through shady trees and provide timber for furniture.

Government surveys estimated deforestation rate over the 1990-2005 period at 2.1 per cent annually. According to a World Bank report, forest types included in this definition of forests are Coniferous forest, Riverain and Mangrove forest. It is estimated that the most valuable coniferous forest is declining at the rate of 40,000 hectares annually. Northern Areas and Khyber Pakhtunkhwa have the highest annual rates of deforestation – about 34,000 hectares in Northern Areas and 8,000 hectares in KP.

Riverain and mangrove forests are also decreasing at the rate of 2,300 and 4,900 hectares annually. This is an alarming rate given the quite high ecological value of these types of forest. Trends and prospects of deforestation vary greatly depending on climatic conditions and social responses. Various tree planting projects under implementation and the tree cover in the district shall be initiated to increase the area under forestry. Projects of forestry resource development shall be implementation in order to achieve a six per cent vegetative cover target.

Around urban areas the concept of Urban Forests that include shady trees which grow on waste and waterlogged land shall be introduced. The benefits of urban forest are multiple:

i. conserve and sustain the environment;
ii. Help mitigate the impact of climate change;
iii. Timber can be used for economic gains.

In short it is proposed to adopt following strategy to combat water logging and salinity:

- Introduce and adapt participatory initiative of drainage and managing water courses
- Forestation of water logged and saline areas by appropriate trees
- Five highly appropriate tree species for water logged areas are Alder, Willow, Poplar and Swamp Cypress
- Initiating the concept of urban forests around urban areas
- Changing the cropping pattern i.e, replacing delicate fruit and vegetable crops by more hardened crops like sugar cane tobacco etc.
- 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.
- Training and creating awareness amongst farmers to adopt Integrated Water Resource Management initiative.
- Provide easy access to farm inputs like seeds, fertilizer, farm implements, farm to market roads and agricultural credit.

Out of total area of the district, some 99,000 hectares are the cultivable land. While, Only 73 hectares, including a small area of forest land and the waste area are uncultivable. The district needs to prioritize and increase cultivable and forest and reduce the wasteland. Even if at a slow pace of

bringing in 5 % of the wasteland under cultivation is adopted the land under cultivation will become almost 100,000 hectares increase of almost 90 %.

Similarly, area under forests can be gradually increased by 5 % annually, this will result in an increase of eliminate the problems in a short span of ten years the forest area will become almost 15000 hectares which will increase to almost 31,000 in 25 years.

Above proposed strategy will help the district to increase its agro-income, enhance employment, sustain, and upgrade environment.

Other major action to be adopted is to implement the environmental laws on industries, and the wastewater disposal shall be monitored in accordance with the Environmental Act.

The district has large cantonments and educational institutions managed by the defense ministry.

The wastewater from these areas shall also be monitored for primary treatment.

It may be argued here that the proposals to reduce or manage water logging and salinity shall 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 shall also be encouraged.

1.11 WATER RESOURCES

1.11.1 Water Resources in District Swabi

In District Swabi the main source of water is the surface water. The two great rivers, the Indus and the Kabul River. There are also several hilly streams, which bring the water to the rivers. The tributaries include two major canals. In addition to the hilly streams, there are many springs, which include a unique stream at Maini; the water emerges from the center of the village. It is used for irrigation. This stream is called *cheena* in the local language, meaning "spring". The villages of Kotha, Topi and Maini are collectively called *Utman*. They all have natural springs called *cheena* in Maini, *chino* in Kotha and *Bayin* in Topi. For irrigation there are also dug wells and the Tube wells which draw ground water from the Aquifer.

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.

Swabi has River Kabul and River Indus which merge near Attock and the area engulfed by the two rivers near the junction is called "Doabba" which is very fertile and suitable for high valued crops. However, in 2010 the Doabba was completely submerged by the flood waters and the damage of assets and crops were extremely high.

1.11.2 Sediment Load and Its Effect on Agriculture

Swabi can truly be called the land of rivers. River Swat, River Kabul and River Indus along with the upper & Lower Swat canal, The Upper Swat Canal (USC) system is presently irrigating 11 1,700 ha (276,000 acres) of land in three districts; Charsadda, Mardan and Swabi of KP Province of Pakistan.

The existing system was designed in 1915 with a head works on the Swat River at Amandara to divert 51 m3/sec (1800 cfs) of water. A scheme to improve irrigation in the District Swabi was initiated in 1971 when the water rights to the area were provided from Terbella Reservoir. As a consequence, water was supplied to Pehur Branch Canal through a pump station from Terbella[10] and provision for a high-level canal was left by providing an irrigation tunnel portal in the reservoir. The present scheme for remodeling of the old system and construction of Pehur High-Level Canal started in 1991. The major features of the scheme are: (1) a shift from supply-based to crop-based by increasing water duty of the command area from 0.30 l/s/ha[11] to 0.70 l/s/ha(4.5 to 10 cusecs per 1000 acres); and (2) an addition of 20,000 ha (49,400 acres) in command area.

The Upper Swat Canal (USC), which takes water from the Swat River at the Amandara Headworks, was originally designed for a discharge of 68.6 cumecs (2,420cusecs) to irrigate an area of 127,500 ha (315,000 acres) of the Charsadda - Mardan -Swabi Plain. The canal, after traversing the narrow ridge of Malakand hills through the unlined Benton Tunnel, eventually bifurcates at Dargai into the two branches of Machai and Abazai.

The Pehur High Level Canal, KP, Pakistan, is the world's largest true parabolic canal; this canal is 26 km long with a capacity of 30m^3/sec. It is designed for downstream control with self-regulating gates, - the first canal in Pakistan to be automated in this way[12].

The aquifers of the Swabi is 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 water 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 District Swabi 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 physico-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

[10] The Trabela Dam is located along the boundary of district Haripur and Swabi, and has a major impact on the water resources of Swabi.

[11] Liters per second per hectare; 28.32 L/sec = 1 cfs

[12] Designed by Adrian Laycock.

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 AI, 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

1.11.3 Quality of Water Swabi District

greater input from the rocks of the Kohistan island arc in northern regions of the basin.

The water quality in Swabi varies with the seasons, during summers the concentration of light elements and turbidity increases due to low precipitation, similarly during the dry season of winters the concentration is relatively high. The rainy season viz., Monsoons (July – August) and during winter rains of March the dissolved elements get diluted. It has been observed that the effluent from the adjoining areas contaminates the water from old tube wells with rusted and relatively outlived pipes. However, the deep ground water is of relatively good quality.

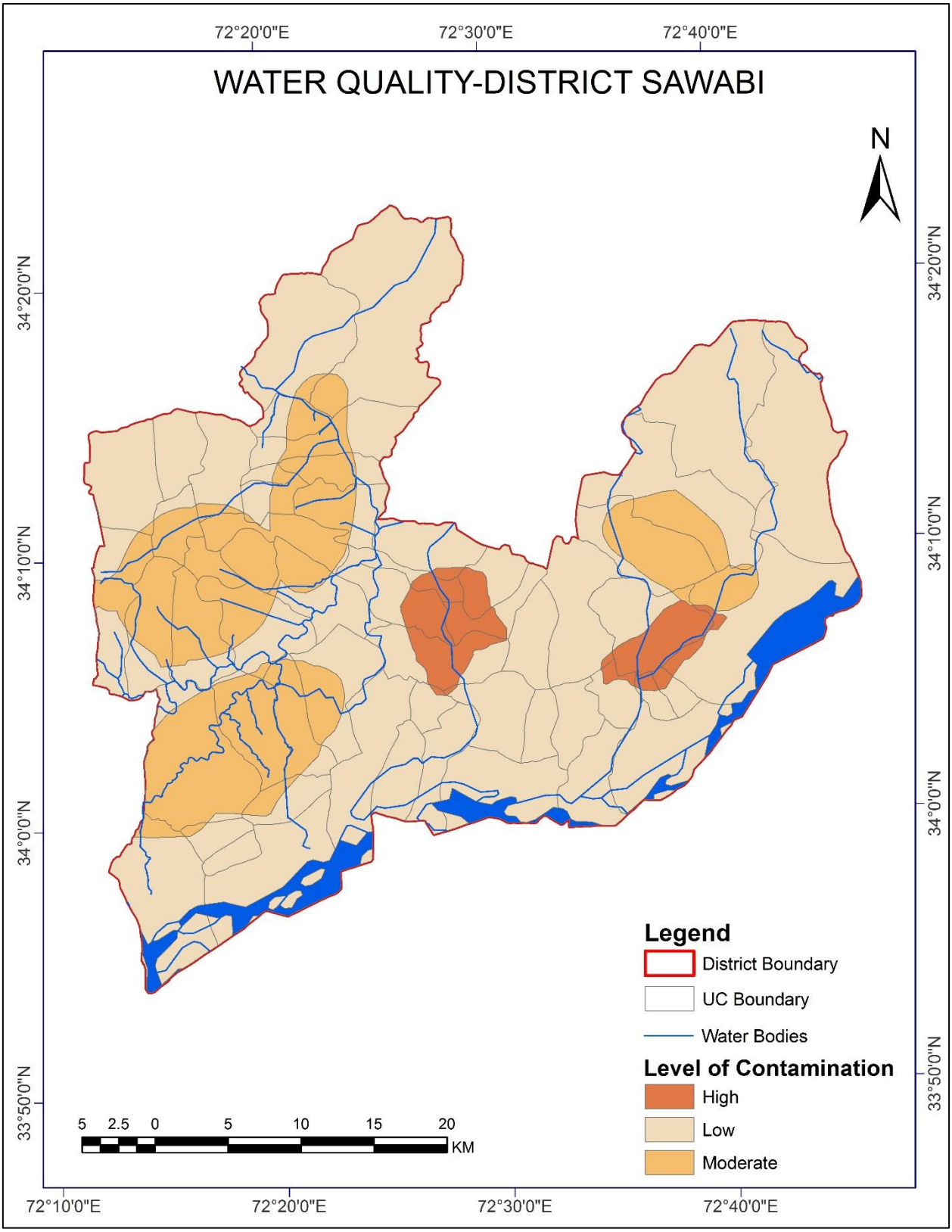
The earlier studies suggest that the aquifers in the basin are generally replenished both by rivers and rain water. This suggests that the contamination in these rivers may have direct effect on the underground water especially the shallow water (dug wells). If the disposal of municipal and industrial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

1.11.4 Ground Water

The groundwater is available mostly at the optimum depth for economical 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 District Swabi occurs mainly through existing water wells and outflow to rivers. Tarbela Dam and evapo-transpiration water table near to the ground surface. The water table in the district rises during rainy season, especially monsoons and recedes during dry season of winters and summers. During the dry season, the groundwater abstraction is also higher (WAPDA, 2008).

The quality of water in Swabi 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.



Map 1.11.1: Water Quality Map of District Swabi

1.11.5 Constraints

Land erosion has created a serious problem for irrigation infrastructure development. Flash 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 parts of Swabi District. Farmers lack the resources, both technical and financial, to operate and maintain irrigation superstructure such as head-works, 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 a lack of inter -sector 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.

In Swabi district, the irrigation department shall introduce the process of trickle irrigation to conserve water. Additionally, the extension of lined minors and construction of distributaries will help the farmers in mitigating the drought conditions.

Department Level Technical Coordination Stakeholder Participation

During 2010 floods, the analysis of the Disaster Management Authority and that of various technical committees indicated that the flash floods from the hills in the North West create a major problem of flooding and damage to the property and assets. The construction of small dams and head works will help in storage of water and reduce the damage due to backlog of water creating heavy floods. It is recommended that the technical coordination committee, Provincial Irrigation Department 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

The industrial units discharge their untreated effluents directly into surface water and the seepage taking from the effluents as well as other anthropogenic activities impair the quality of surface and ground water; making them unfit for irrigation and drinking purposes. So, the treatment of the effluents before disposal into surface drains should be practiced in all industrial premises of Swabi District, KP province and the country to safeguard rivers water.

1.11.6 Recommendation

The locals both farmers and industrialist's users of water are completely ignorant of the quality and quantity issues. The wastage of water resources and unnecessary exploitation of ground water is indiscriminately in vogue.

The Govt. of KP shall develop a major campaign to raise public awareness of the water resources; especially on use, conservation and pollution. Some of the recommendations are presented below:

- 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 metered system
- Train farmers and agriculturists in using alternative methods of irrigation and conserving water
- Assess the need for incentives to industries to comply with EPA effluent disposal regulations.
- Determine the needs for legislation for regulation of agricultural and industrial development, enforcement of standards.
- Introduce the water abstraction licensing; to discourage indiscriminate water pumping by the private sector.
- Implement the national water quality-monitoring program.
- Execute the public awareness campaign on the environment
- Support municipal and industrial wastewater control measures.
- Water treatment plants should be installed in municipal and industrial sites.
- Enact new legislation where required.
- Construct small dams where ever feasible

1.12 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 Swabi land use plan 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. 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 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:

1.12.1 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.

About 65% of District Swabi is underlain by recent alluvium. These include recent river, stream, flood plain and lake deposits and belong to the Pleistocene age group. These are classed into the following four types: i.e. Stream beds, Fan deposits, Alluvium and Lacustrine deposits. Apart from these, about

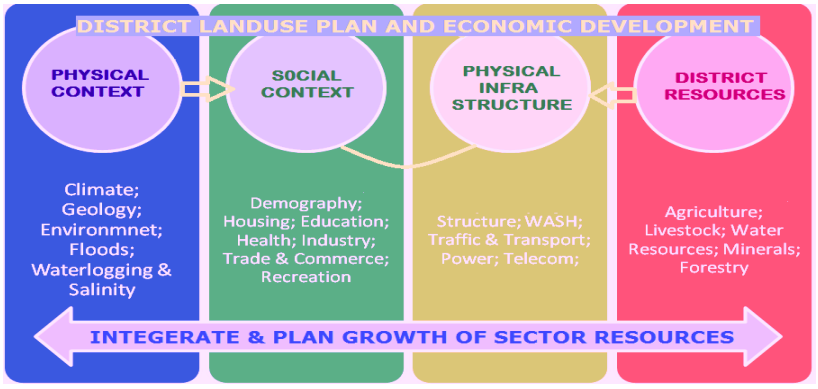


Figure 1.12.1: District Land Use Plan and Economic Development

35% of the area of the District is covered by Paleozoic Rocks and Subsurface Geology.

The environmental problem 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. Around 70 sq. kms area in District Swabi is prone to flooding, which is around 5% of the total District area. In 2010 floods, there were 6 worst affected villages in District Swabi and the number of households in affected area was 3,320. Details about flood damages in the District are given in Chapter 4 of District Studies Report.

Table 1.12.1: Flood Prone Area[13]

Flood Prone Area (Sq. km)	% of Total District Area	Affected Villages (2010 floods)	Total HHs in Affected Area
70	5%	6	3,320

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 results in minimizing the adverse effect on economy, thus contributing to economic growth.

Water logged area in District Swabi is around 541 square kilometer, which is about 37% of the total District area and is highest in the five Districts of Peshawar valley. The Government of KP initiated partnership and participatory programs for reclaiming waterlogged area and land affected by sodality 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 On-Farm Water Management (OWFM) and the Rural Support Program (RSP) have shown remarkable success in terms of reducing water logging and salinity and increasing agricultural incomes for farmers, contributing to economic development.

1.12.2 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. 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.

Under Land use Plan of District Swabi, proper demographic projections have been made for the District for next 20 years using forecasting model of extrapolation.

[13] DSR, 2010.

Based on 2017 census the current) population of District Swabi is 1.62 million, likely to be increase about 2.8 million in the year 2040. The implications of planning proposals for economic development of the District in context of housing, education health and industry are given below:

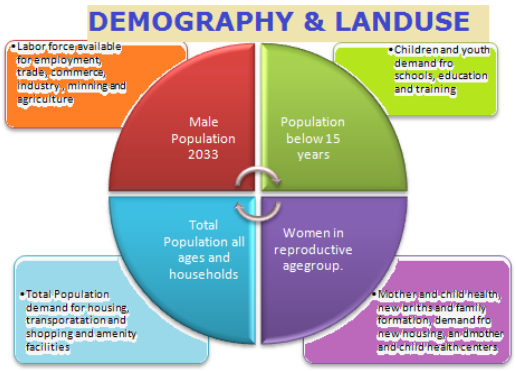


Figure 1.12.2: Demography & Land Use

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 land values, proximity to urban services, availability of transportation linkages, employment opportunities, availability of construction materials and technology; health and education facilities have been considered. Prime agricultural land has been reserved for farming only and conversion of such land to housing and other urban uses is proposed to be prohibited.

The housing demand during 2021-2025 and 2026-2040 will be 30180 and 139975 respectively, while the current housing backlog is 65381. The total housing required for the next 20 years, including the existing backlog, is estimated to be 205356 housing units. This will generate economic activity both during land development and construction as well as employment in education, health, commerce and transportation.

The Landuse Plan and Education sector are vital for the continuous evolution of the community. Access to quality educational opportunities within convenient access boosts the chances of a success land use plan. The educational opportunities in Swabi will reduce migration towards larger urban centers, and will also attract many new residents and businesses in the District. The Landuse Plan encourages education sector to establish new institutions that provide people with the skills they need for the changing job market.

Table 1.12.2: Literacy Ratio[14]

Literacy Ratio	Participation Rates	
	Primary	Middle & High
73	59	34

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 District Swabi will ultimately serve the province and the nation, thereby generating higher household, regional and national income.

[14] Development statistics of KP, 2020.

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.

Table 1.12.3: Health Facilities[15]

Hospitals	Dispensaries	RHCs	BHUs	Others	No. of Beds/1000 population
6	10	9	35	6	0.70

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.

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.

There are a total of 248 industrial units in Swabi, of which 163 are closed and 85 are operational. The 85 running units include textile mills, employing a total of 7,764 persons, which is more than 62% of the total industrial Labour in the District. Around 84% of the industrial units in District Swabi are concentrated in Gadoon Amazai Industrial Estate, which is located on Swabi-Topi Road. Gadoon Amazai Industrial Estate was established to prevent cultivation of poppy crop in the area, and to provide an alternate source of employment to the local population/land owners of District Swabi. Besides, some industries are located on major inter-city roads, particularly Swabi-Jahangira Road.

Swabi Landuse Plan also focuses on trade & commerce, as it is the major income and employment-generating sector, and a large proportion of population of all ages directly or indirectly depends on it. Trade and commerce at present is widely spread, intermixed with residential areas and scattered along roads and streets. Trade/Commercial activities generate employment and income directly and indirectly thus contributing to the economic development of the region and the province.

1.12.3 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.

Transportation network in an area influences land use and development trends and thus the obvious need of integrating transportation and land use proposals. Effective road network and proper management of transport system play major role in the efficient functioning of a habitat. One of the

[15] Development statistics of KP, 2017.

main objectives of Land Use Plan at District level is to increase the capacity of existing roads, opening up new areas for development, and decentralization and traffic management in the inner city.

The main transport infrastructure in District Swabi is provided by several links to various highways including the Motorway (M-1), Nowshera Road, Mardan Road and Topi Road. The impact of the proposed roads at District level and creation of a planned extension of Swabi will result in efficient movement of goods and passengers providing inter-city 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 for drivers, cleaners, managers, maintenance workers, gas stations, repair shops and a host of other activities.

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

Power generation capacity in District Swabi is 67 MW, whereas average demand is 89 MW. Based on average demand, the shortfall is 22 MW. 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.

Table 1.12.4: Power Generated[16]

Power Generated	Average Demand	Shortfall
67 MW	89 MW	22 MW

1.12.4 Economic Development – District Resources

Table 1.12.5: Crop Production[17]

Crops	Wheat	Maize	Sugar Cane	Rice	Tobacco
Production in metric tons (2018-2019)	75155	64163	101337	803	35183

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

[16] Development statistics of KP, 2020.

[17] Development statistics of KP, 2020.

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 possibility has been retained for agricultural land use, with recommendations to prohibit any urbanization related activity in that area.

Total Cultivable Area in District Swabi is 87046 hectares. District Swabi is the second largest producer of wheat and maize after District Mardan, although the difference in wheat production between Mardan and Swabi is minimal, while it is substantial in case of maize (44% in case of Mardan Vs 24% in Swabi). Thus, District Swabi has a comparative advantage in wheat production, and this advantage can be further enhanced by the following measures:

- 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 culturable 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. The number of Livestock (aggregate of all species) in District Swabi is 1674393. Additionally, there are 387 poultry farms 197 fish farms in District Swabi, all privately owned.

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 should be exploited to increase the provincial income and economic development of the region.

Main minerals in District Swabi include marble, dolomite, slate stone and lime stone. In fact, most of the above minerals in Peshawar Valley are extracted in Swabi District.

Table 1.12.6: Minerals[18]

Minerals in District Swabi	Marble	Dolomite	Slate Stone	Lime Stone
Production (metric tons)	79680	50616	2187	242990

[18] Development statistics of KP, 2020.

CHAPTER 2

EXISTING LAND USE DISTRIBUTION

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 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 land resource for the coming generation. The optimum utilization of land is, in fact, the main objective of the Land use Plan.

More specifically, objective of the Project is:

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

2.2 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[19].

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

[19] Source: National Reference Manual on Planning and Infrastructure Standards, Chapter 10, Section 10.0, Page 300.

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 2.2. 1: Land use Distribution in Housing Scheme[20]

S. 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

Table 2.2. 2: Land use Distribution in Industrial Estates[21]

S. No.	Land uses	Percentage
1	Factory Plots	60-65
4	Roads	Up to 20
5	Open Spaces	Up to 20
6	Administrative and Other Buildings	5-10

Table 2.2. 3: Land use Distribution at Town/City Level (100,000-499,000 Population)[22]

S. No.	Land uses	Percentage
1	Residential	26-48
2	Industrial	3-8
2	Commercial	0.5-2
3	Institutional	2-10
4	Arterial Circulation/Terminals	12-29
5	Recreational Open Spaces	1-7
6	Graveyards	0.5-4
	Vacant	3-17

[20] ibid, Page 301, Table 10.1.
[21] ibid, Page 90, Table 5.6.
[22] ibid, Page 305, Table 10.2.

2.3 EXISTING LAND USE DISTRIBUTION – DISTRICT SWABI

Total area of District Swabi is 1478.78 square km, comprising of the following four Tehsils:

- Swabi Tehsil
- Topi Tehsil
- Razzar Tehsil
- Lahor Tehsil

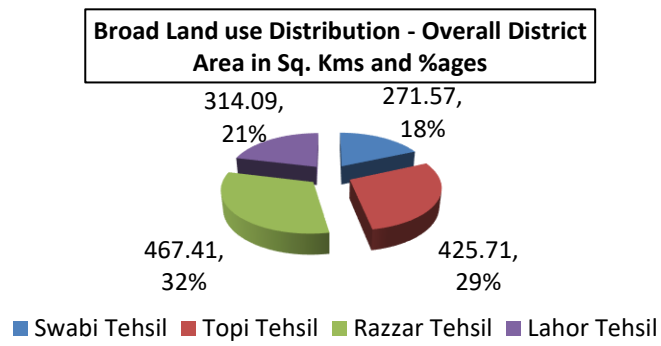


Figure 2.3.1: Tehsil wise area distribution

Of the above, Swabi Tehsil is 426.69 square kilometers, or about 18% of the total District area, Topi Tehsil is 425.71 square km or 29% of the total District area, Razzar Tehsil is 467.41 square km or 32% of the total District area, while Lahor Tehsil is around 314.09 sq. km or 21% of the total area. Land use Distribution in the District is described below.

2.3.1 Land use Distribution in Overall District

The maximum area in District Swabi is under Agriculture category (66.36%), followed by Shrubs & bushes land (15.76%), Settlements (7.42%), Water bodies (5.82%), forest (2.14%), transportation i.e. roads/terminals (0.87%) and others.

The area and their percentages are given in Table 2.3.1. The distribution is shown graphically in Fig. 2.3.2 and Map 2.3.1.

Table 2.3. 1: Existing Land Use Areas- Overall District[23]

Sr. No.	Land use	Area (Sq. Km)	%age
1	Roads	12.82	0.87
2	Forest	31.66	2.14
3	Range land	3.16	0.21
4	Barren land	14.38	0.97
5	Shrubs & bushes	233.03	15.76
6	Agriculture	981.53	66.36
7	Graveyard	5.07	0.34

[23] Areas have been calculated by GIS maps developed in house by plup.

8	Fruit Orchard	3.84	0.26
9	Water Bodies	86.05	5.82
10	Settlement	106.32	7.19
11	Industry	3.13	0.21
12	Recreational facilities	0.91	0.062

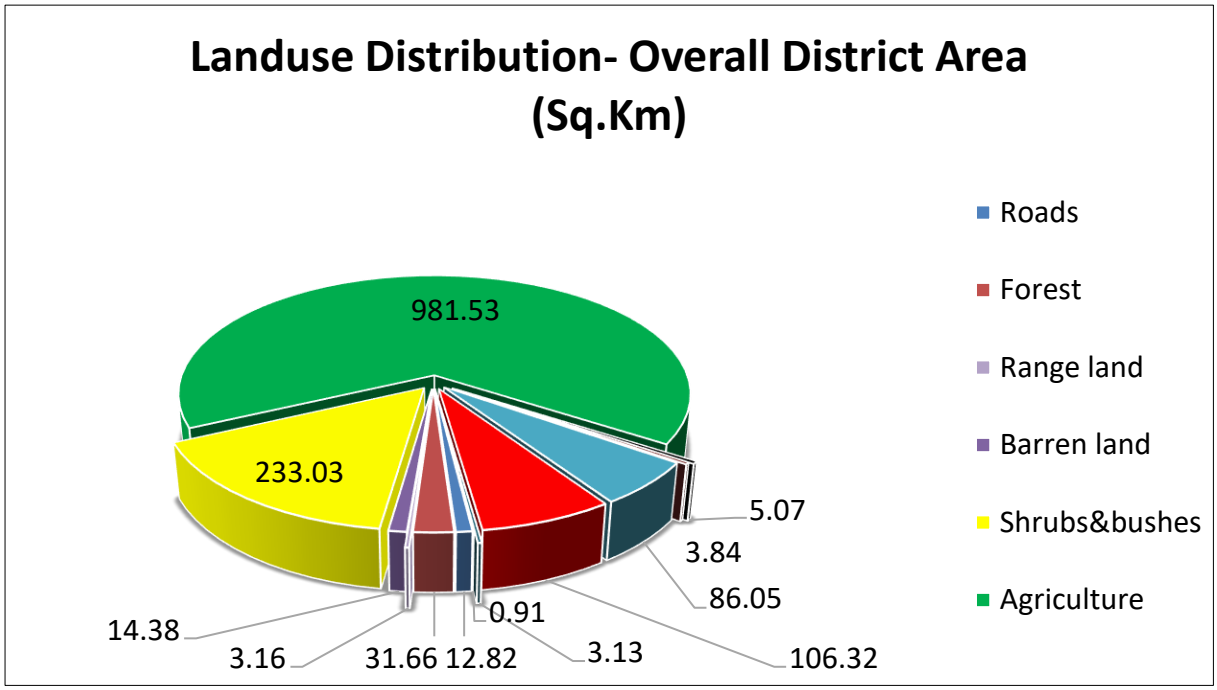
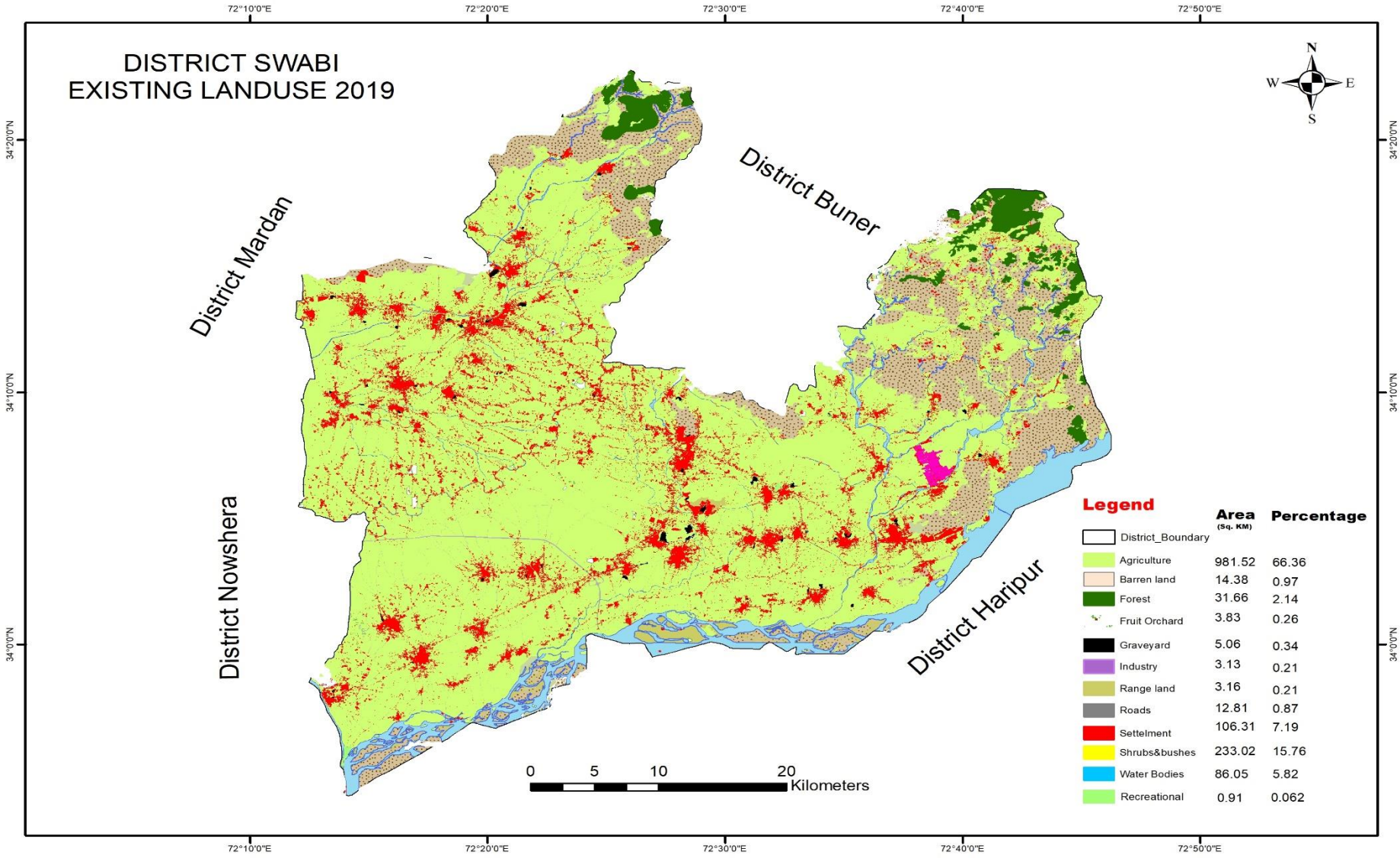


Figure 2.3.2: Graphical Representation of land use of district Swabi



Map 2.3.1: Existing Land use Map of District Swabi

2.3.2 Land use Distribution in District Swabi Urban Areas

District Swabi Current urban area is obviously different from that reported in 1998, as substantial sprawl has taken place over the last 21 years. The following methodology has been used to assess the current urban area of Swabi.

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

Total urban area thus delineated and works out to be 109.7 sq. km, of which Urban Residentiary area is 12.81 square kilometers or about 11.66 % of the total urban area. As already stated, Urban Residentiary area is pre-dominantly residential area and includes the local level facilities i.e. primary, small health centers, religious buildings, local roads, shops etc.

Transportation category includes urban roads & railways, terminals i.e. (bus/truck terminals and railway stations). The area under transportation uses is 1.45 square kilometers, i.e. about 1.3 % of the total urban area.

Statistics about other Land uses in urban area of Swabi and standard of other land use are given in Table 2.3.2.

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

Table 2.3. 2: Land use Distribution in Swabi Vs Other Urban Areas in the Country

Land uses	Residential	Industrial	Commercial	Institutional	Arterial Circulation/ Terminals	Recreational Open Spaces	Grave yards	Vacant
Swabi Urban Area	11.66%	---	0.95%	0.36[24]%	1.3%	0.07%	0.81%	---%
Other Urban Areas[25]	26-48 %	3-8%	0.5-2%	2-10%	12-29%	1-7%	0.5-4%	3-17%

The following are the main inferences that can be drawn from Table 2.3.2:

i) Urban residential area is within the range but closer to lower end of the range.

[24] Includes public/community uses, main educational and health facilities.
[25] Source: National Reference Manual on Planning and Infrastructure Standards, Page 305, Table 10.2.

ii) Swabi urban area has virtually no industrial area; industries are located mostly in Gadoon Amazai industrial estate or scattered in different parts of the District, but not within urban area.

iii) Commercial area is within the range of such areas in urban areas of similar population sizes in the Country.

iv) The percentage of area under arterial circulation/terminals is far lesser than even the lower end of range in other urban areas.

v) Swabi is woefully short of recreational areas, i.e. 0.07% as compared to 1-7% in other urban areas.

2.3.3 Land use Distribution in Swabi Municipal Committee (MC)

The Swabi MC comprises of 59.34 square kilometers. Major Land uses in Swabi Mc are agriculture (51.54 square kilometer or 86.88%) followed by Settlements (8.74%), shrubs/bushes (2.49%), water bodies (0.01%), transportation i.e. roads, bus/truck terminal, (1.13%), Barren land (0.02%), Graveyard (0.68%) and Fruit Orchard (0.06%).

Land uses Statistics in Swabi MC are shown in Table 2.3.3. and illustrated graphically in figure 2.3.3, and Map 2.3.2.

Table 2.3. 3: Existing Land Use - Swabi Mc.

Sr.No	Land use	Area in (Sq.km)	%age
1	Roads	0.67	1.13
2	Water Bodies	0.01	0.01
3	Barren land	0.01	0.02
4	Shrubs&bushes	1.48	2.49
5	Settlements	5.19	8.74
6	Agriculture	51.54	86.88
7	Graveyard	0.4	0.68
8	Fruit Orchard	0.04	0.06

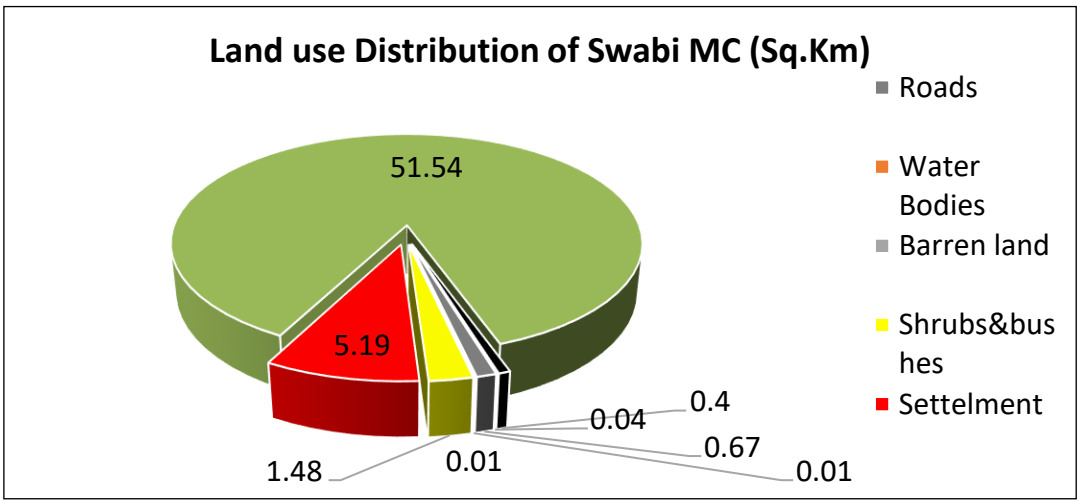
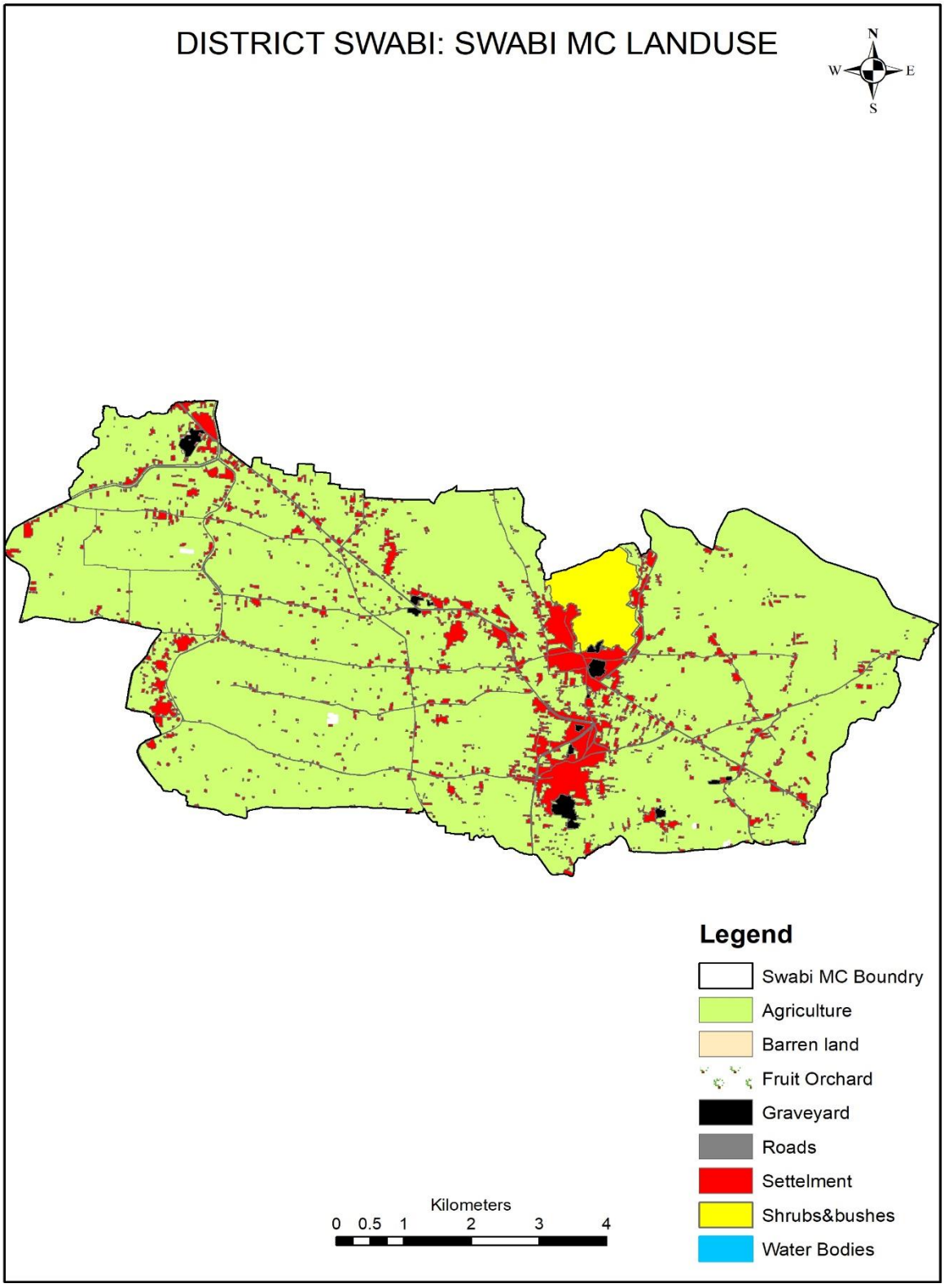


Figure 2.3.3: Graphical representation of Swabi MC land use distribution.



Map 2.3.2: Existing Land Use Map of Swabi Tehsil MC.

2.3.4 Land use Distribution in Topi Municipal Committee

Topi MC has an area of 20.93 square kilometer. The maximum area in this MC consist of Agriculture which is 15.61 square kilometer or 74.6% followed by Settlements (13.12%), shrubs and bushes (7.78%), Roads (1.24%), water bodies (0.42%) range land (1.95%) and other Land uses.

The areas and their percentages are given in Table 2.3.4. The distribution is graphically illustrated in Figure 2.3.4 and Map 2.3.3.

Table 2.3. 4: Existing Landuse- Topi MC

S.No	Land use	Area in (Sq.Km)	%age
1	Roads	0.26	1.24
2	Water Bodies	0.09	0.42
3	Range land	0.41	1.95
4	Shrubs&bushes	1.63	7.78
5	Settlement	2.75	13.12
6	Agriculture	15.61	74.6
7	Graveyard	0.18	0.86
8	Fruit Orchard	0.01	0.04

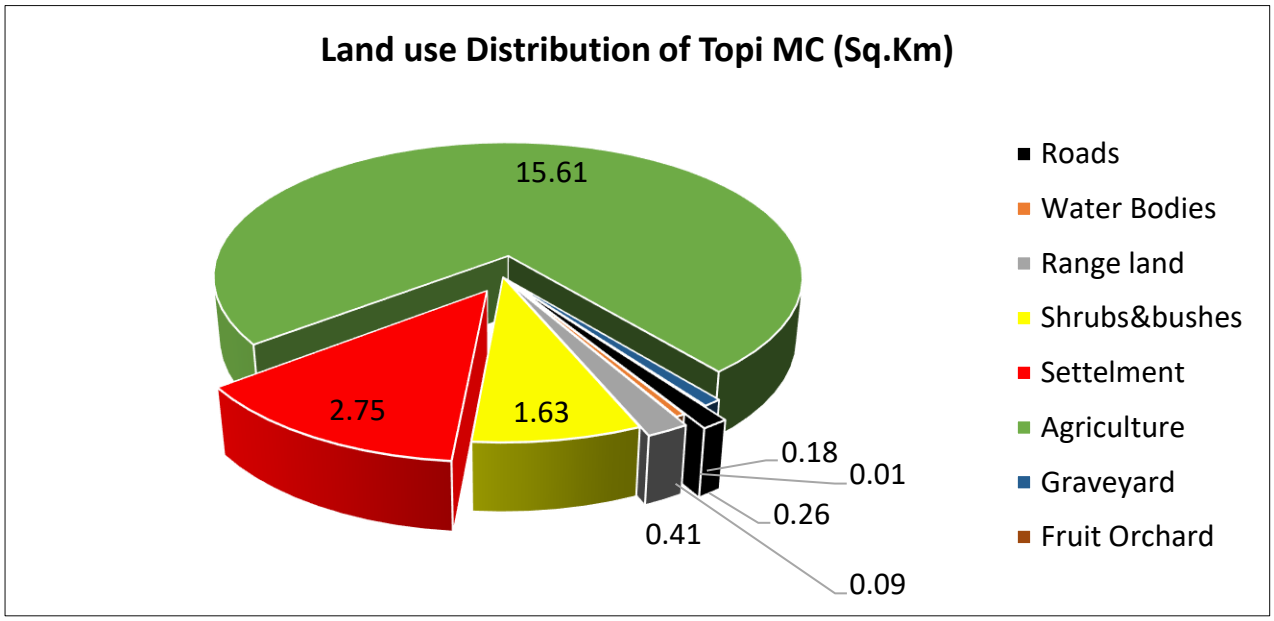
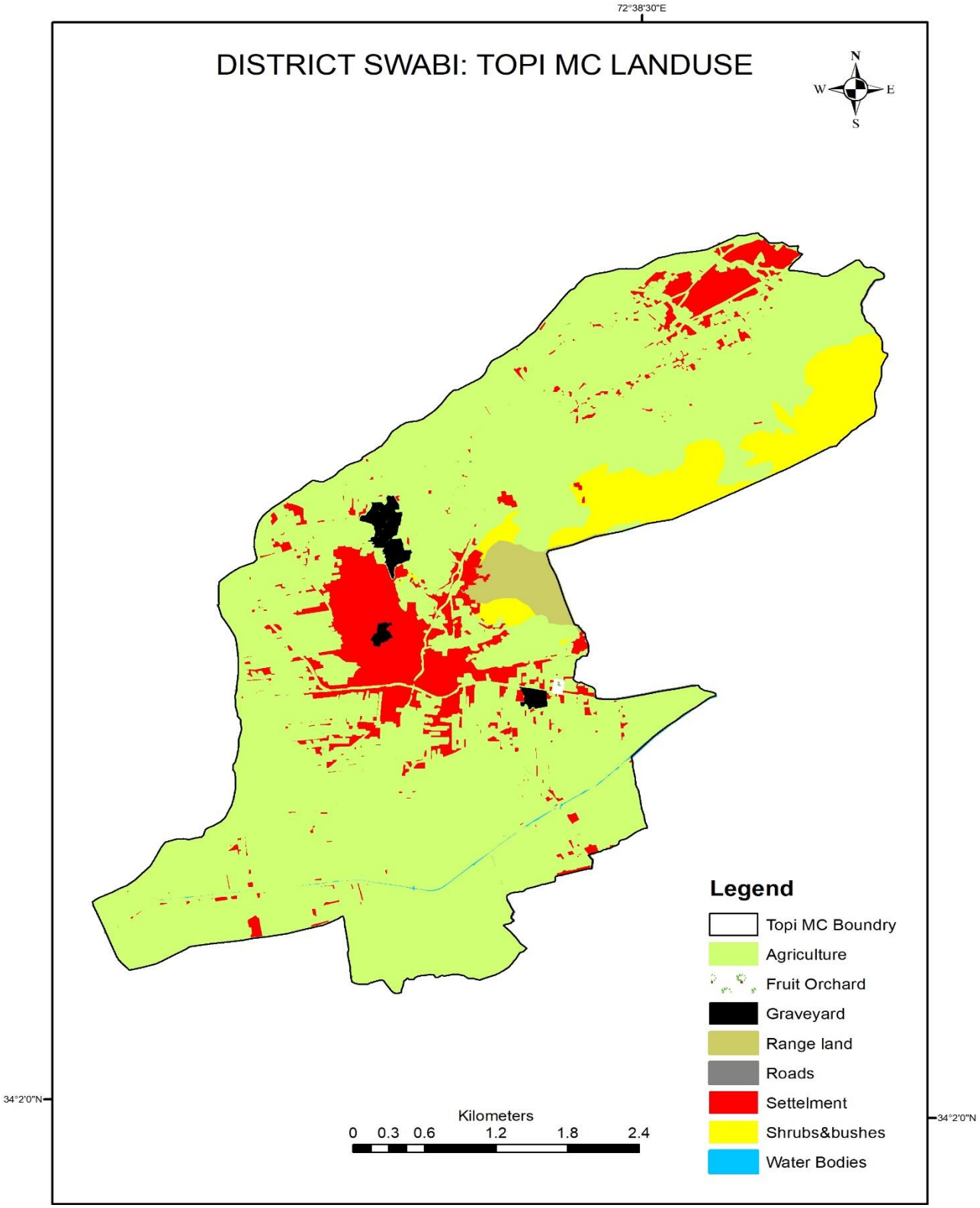


Figure 2.3.4: Graphical representation of Topi MC land use distribution.



Map 2.3.3: Existing Land Use Map of Topi MC.

2.3.5 Land use Distribution in Tordher Tehsil Committee

The Tordher TC comprises of 19 square kilometer. Most of the area in this MC is under agriculture, which is 16.74 square kilometer or 88.09% followed by Settlements (9.97%), Roads (1.75%), Graveyard (0.23%).

Detailed Statistics about Land use distribution in Tordher TC are given in Table 2.3.5 and illustrated graphically in figure 2.3.5 and Map 2.3.4

Table 2.3. 5: Existing Land Use Areas- Tordher TC

S.No	Land use	Area in (Sq.Km)	%age
1	Roads	0.33	1.75
2	Settlements	1.89	9.97
3	Agriculture	16.74	88.09
4	Graveyard	0.04	0.23

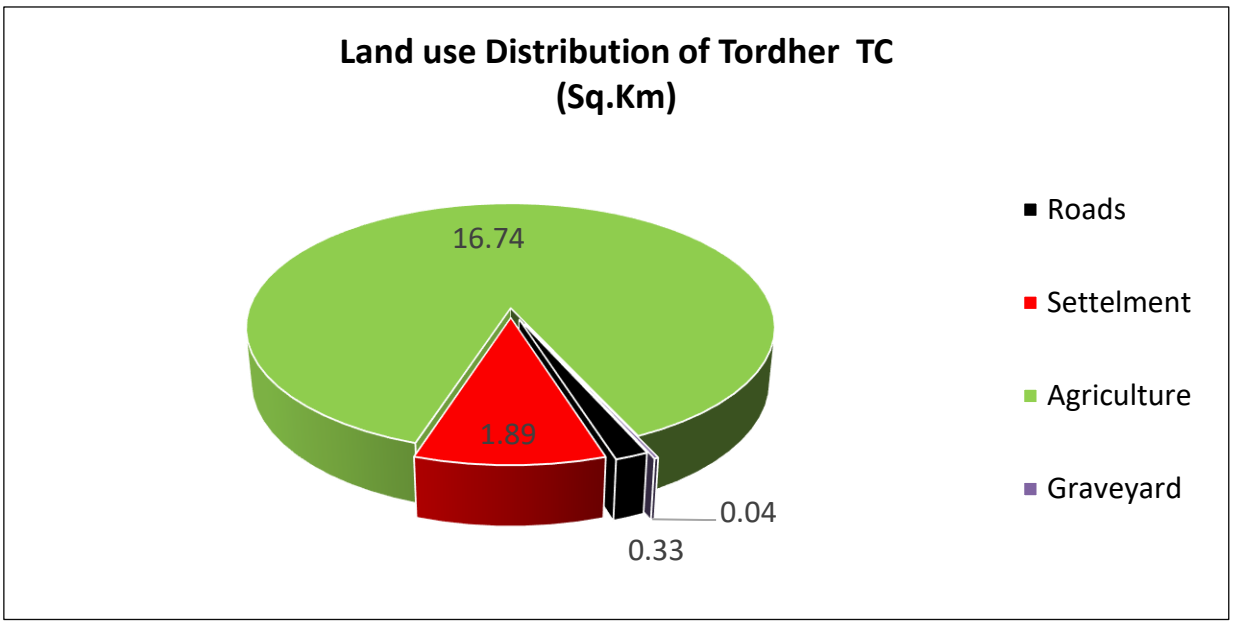
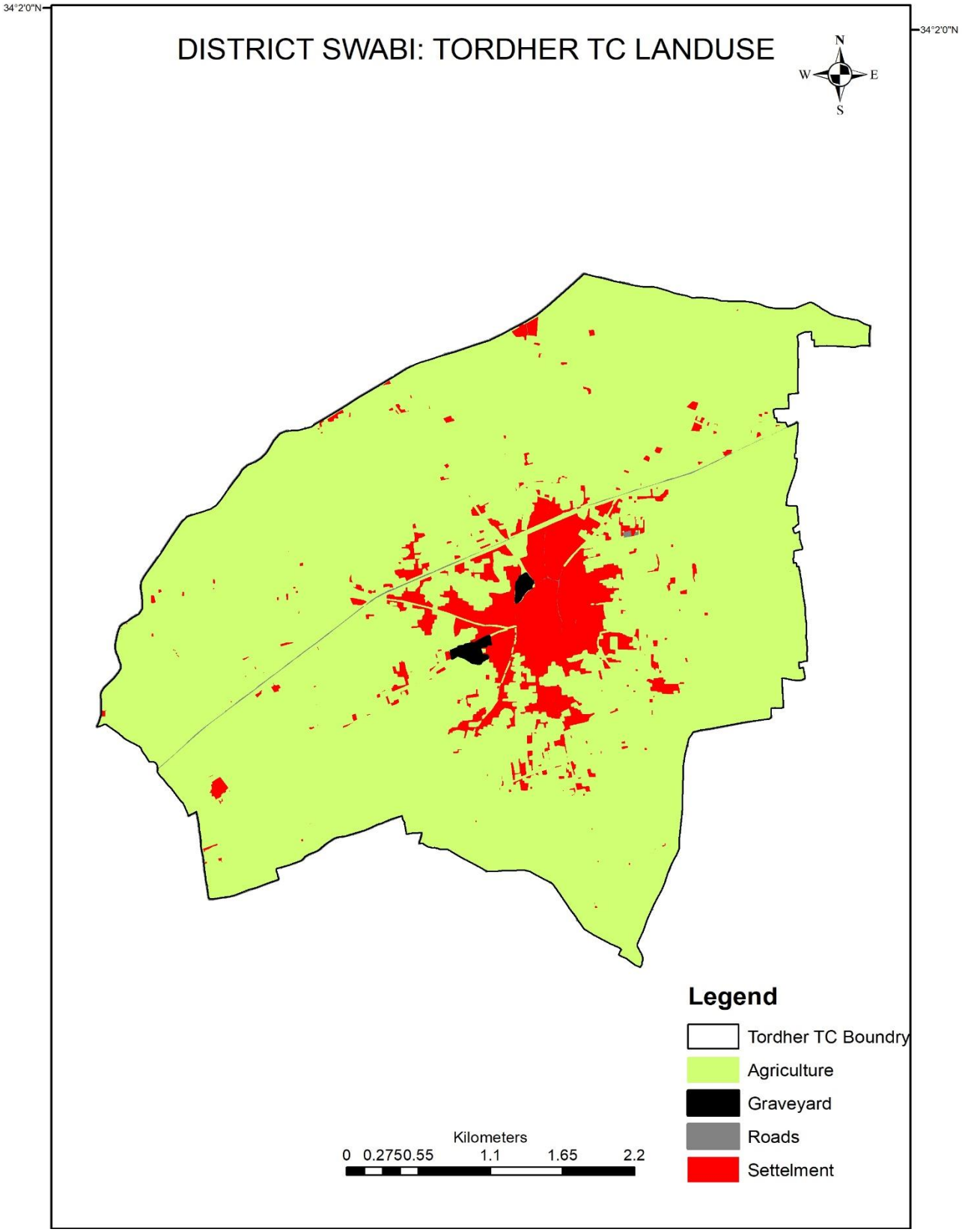


Figure 2.3.5: Graphical representation of Tordher TC land use distribution



Map 2.3.4: Existing Land Use Map of Tordher MC

2.3.6 Land use Distribution in Zaida Municipal Committee

The Zaida comprises the area of 7.49 square kilometre. Maximum area in this MC consists of Agriculture, which is 5.52 square kilometre or 73.73% followed by Settlement (22.38%), roads (1.6%) and Graveyard (2.28%).

Statistics about Land uses in Zaida MC are given in Table 2.3.6 and illustrated graphically in figure 2.3.6 and Map 2.3.5

Table 2.3. 6: Existing Land Use- Tordher MC

S.No	Land use	Area in (Sq.Km)	%age
1	Roads	0.12	1.6
2	Settlement	1.68	22.38
3	Agriculture	5.52	73.73
4	Graveyard	0.17	2.28

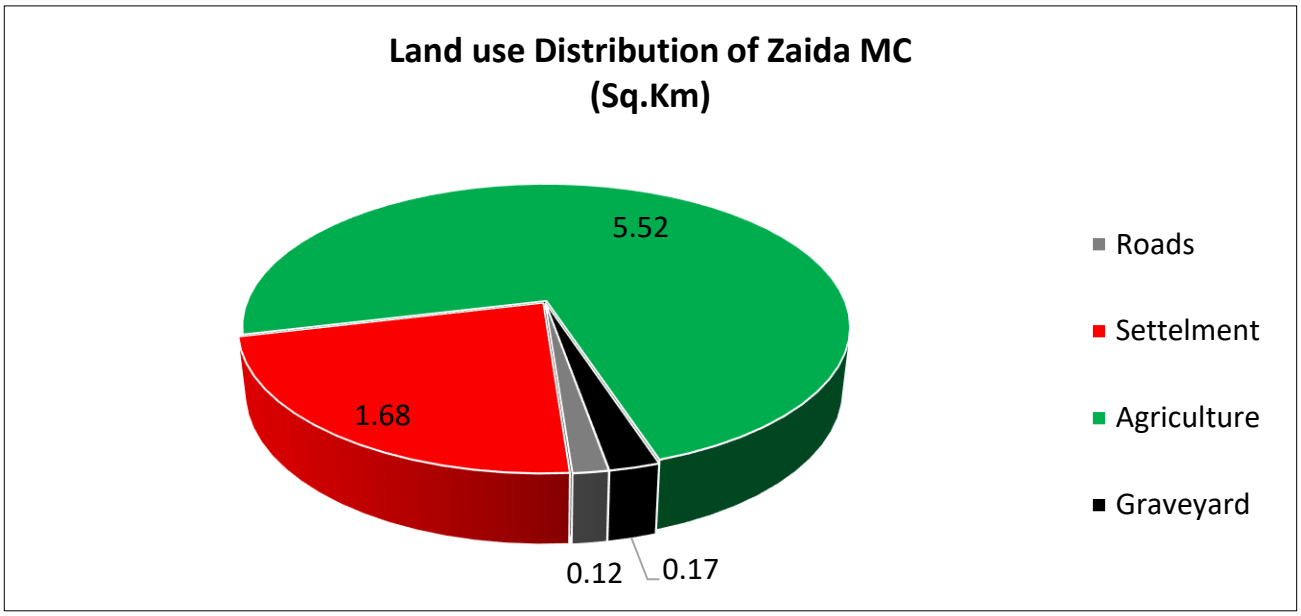
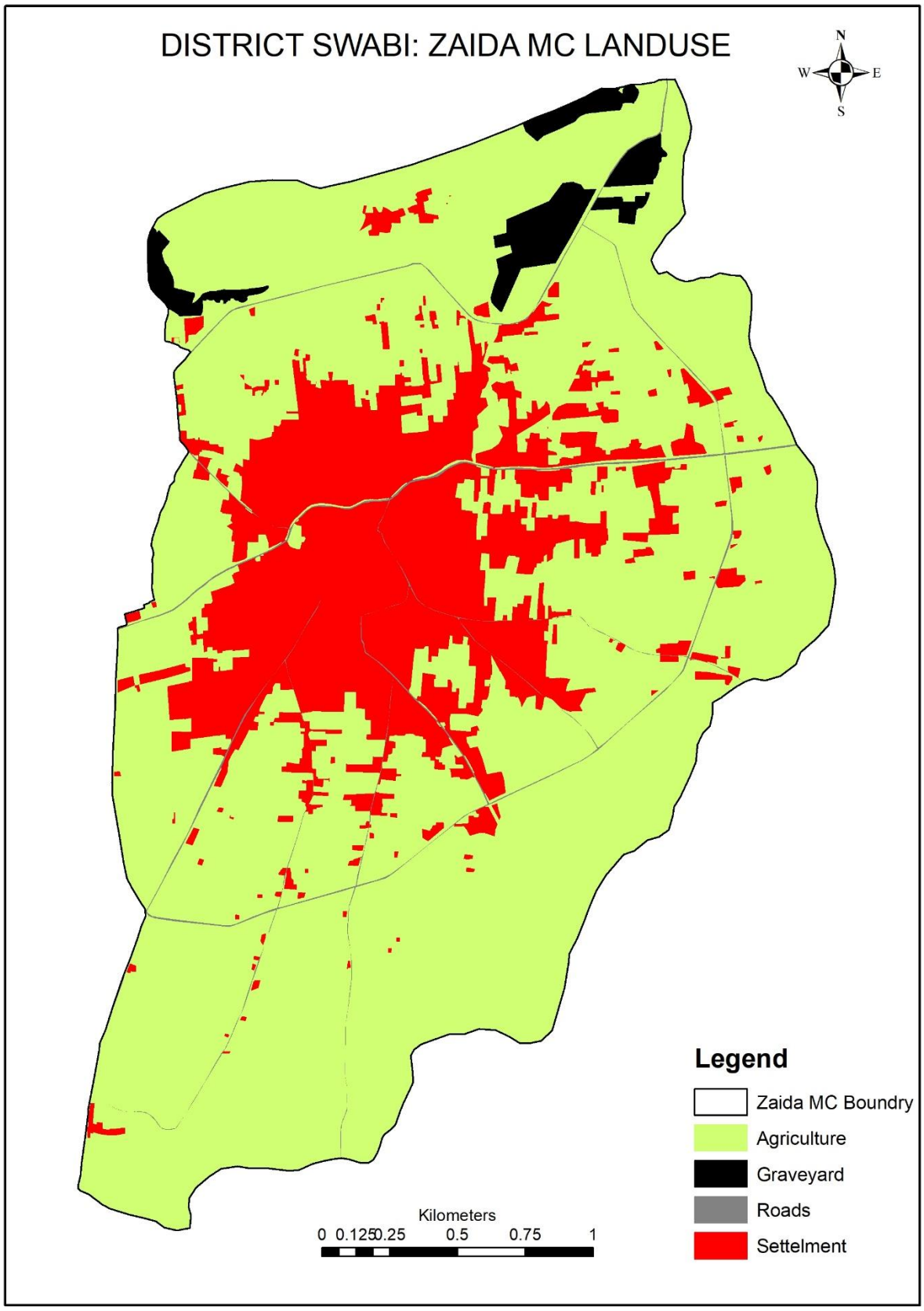


Figure 2.3.6: Graphical representation of Zaida MC land use distribution



Map 2.3.5: Existing Land Use Map of Zaida TC

2.3.7 Land use Distribution in Nawa Killi Tehsil Committee

The Nawa Killi TC comprises an area of 3.02 square kilometre. Maximum area in this TC consists of Agriculture, which is 1.54 square kilometre or 50.92% followed by Settlement (43.01%), roads (2.38%) and Graveyard (3.7%).

Statistics about Land uses in Zaida MC are given in Table 2.3.7 and illustrated graphically in figure 2.3.7 and Map 2.3.6.

Table 2.3. 7: Existing Land Use- Nawa Killi TC

S.No	Land use	Area in (Sq.Km)	%age
1	Roads	0.07	2.38
2	Settlement	1.3	43.01
3	Agriculture	1.54	50.92
4	Graveyard	0.11	3.7

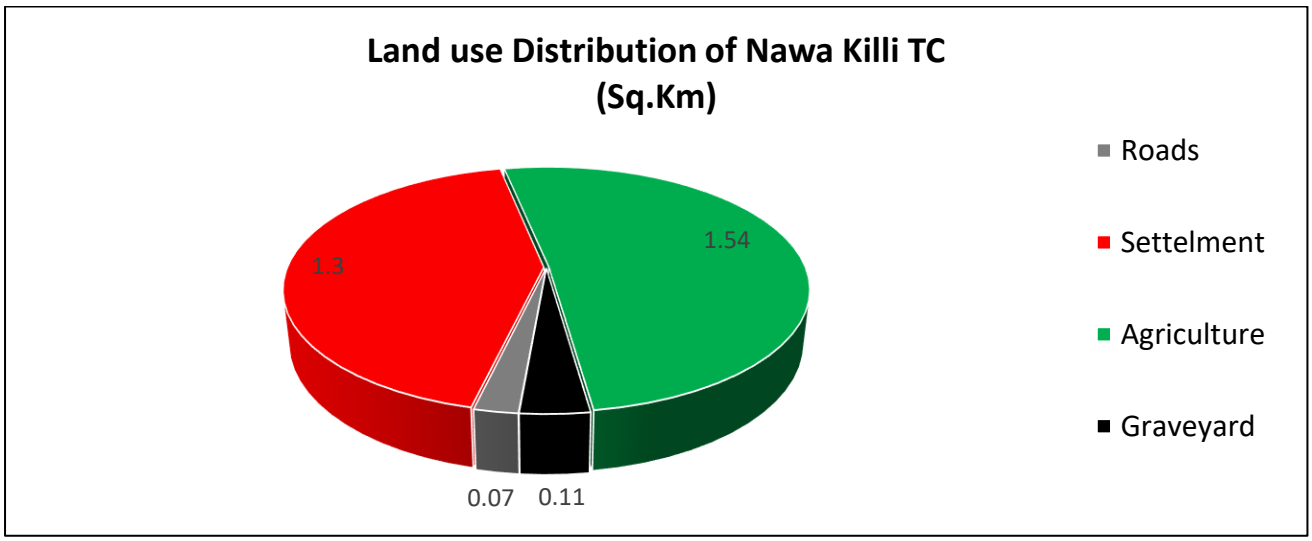
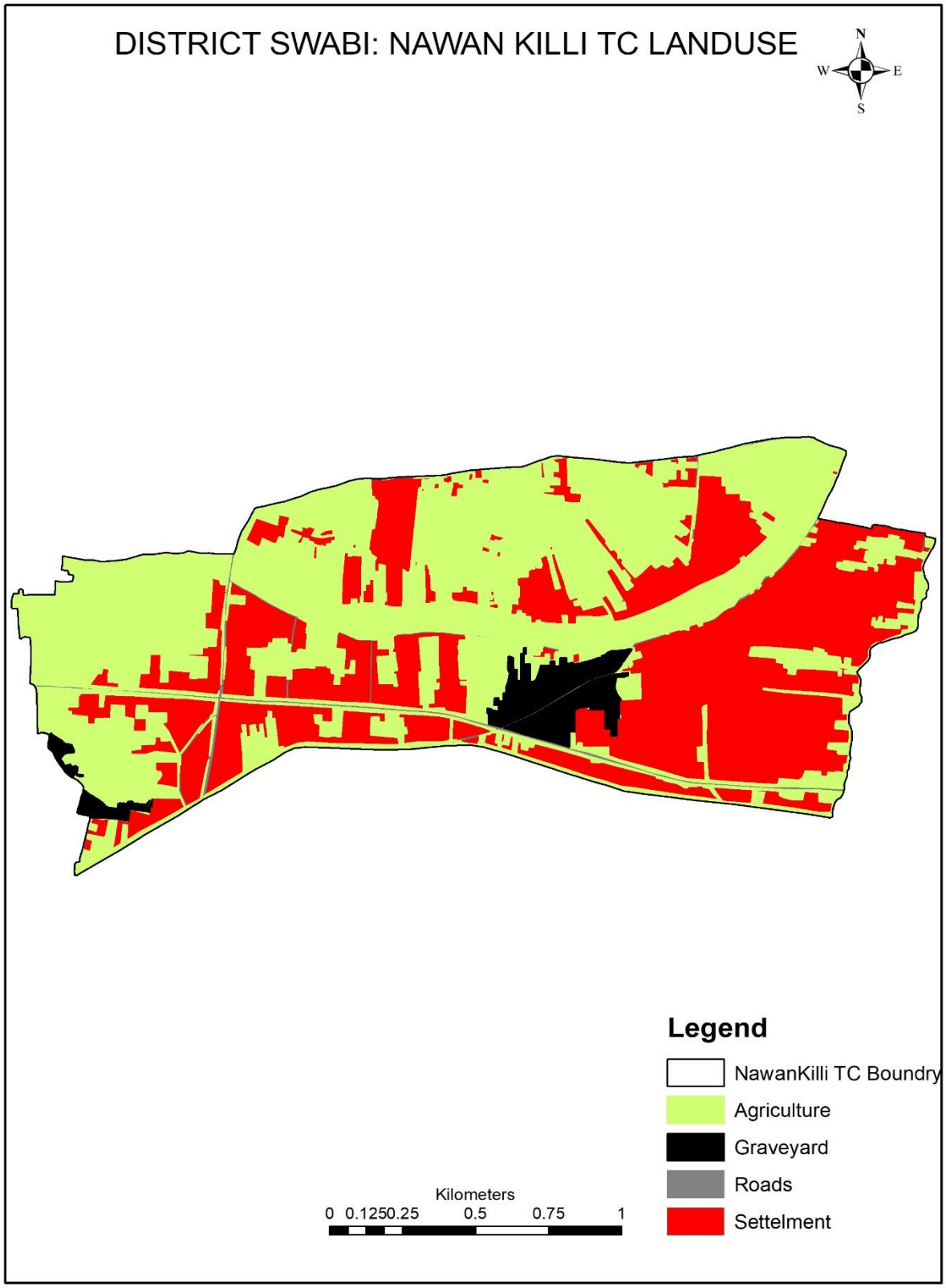


Figure 2.3.7: Graphical representation of Nawa Killi TC land use distribution



Map 2.3.6: Existing Land Use Map of Nawa Kally TC

CHAPTER 3

POPULATION – CURRENT AND FORECASTS

3. POPULATION - CURRENT AND FORECASTS

3.1 PAST GROWTH TRENDS: PROVINCE VS DISTRICT SWABI

Inter-census growth rates of the province and district Swabi (from 1951 to 2019) are given in table 3.1.1. It is clear from the table that in case of the province, except for the period 1961-72, the growth rate has been consistently declining. It was 3.6% during 1961-72, declined to 3.3% during 1972-81, and declined further to 2.8% during 1981-98. In case of district Swabi, the growth rate has been highest during 1961-72 i.e. 3.7%, declined to 2.5% during 1972-81, but rose to 3.0% during 1981-1998. The district growth rates have been higher than the provincial growth rates except during the period 1972-81 and 1998-2017 when the district growth rate was 2.5% and 2.44 as against 3.3% and 2.89% for the province.

Table 3.1. 1: Past Growth Trends

Inter-Censual Period	Average Annual Growth Rate (%)	
	Province[26]	District[27]
1951-1961	2.30%	2.00%
1961-1972	3.60%	3.70%
1972-1981	3.30%	2.50%
1981-1998	2.80%	3.00%
1998-2017	2.89%	2.44%

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 Swabi have been made by the following method. National growth rate during 1998-2017 was used to estimate expected population in the District Swabi . There had been no inward or outward movement from both urban and rural parts of the District, assuming uniform natural increase. When these figures are compared with actual population as recorded in 1998 census, the difference is the contribution of net migration. Migration is never unidirectional,

Table 3.2. 1: District Population – Migration Vs Natural increase

2017 Census Population[28]	1624616	(i)
2017 (using National G.R@2.4% during 1998-2017)	1611645	(ii)
1998 Census Population	1027000	(iii)
Additional Population (1998-2017)	597616	(i)-(iii)=(iv)
Migration	12971	(i)-(ii)=(v)
Natural Increase	584645	(iv)-(v)

[26] 1998 census population, Pakistan page 1, table 1

[27] District Census report page 25, table 2.1

[28] http://www.pbs.gov.pk/content/block-wise-provisional-summary-results-6th-population-housing-census-2017-january-03-2018

but there is no way (short of migration census) to assess inward and outward movements separately. However, the net migration figure is a robust assumption.

The overall national growth rate during the period 1998-2017 was 2.4%. Using this growth rate, the population of District Swabi in 2017 is calculated to be 1705020. The actual 2017 census population of the District was 1624616 implying a net in-migration of 12971. The additional population during 1998-2017 was 597616, of which, as already stated, migration component was 12971 (around 2.17%) and 584645 (97.82%) was caused by natural increase. The basis and calculations for this are given in Table 3.2.2.

3.2.2 Transient Migration

Transient/temporary migration in context of District Swabi 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 April 2011, and reported that there are 15,479 families (85,848 persons) living in camps in Swabi/Mardan. There are no separate figures available for District Swabi. Afghan refugees residing outside regular camps comprise of 2,252 families or 10,879 persons.

IDPs due to Border Disturbances

There are only 5 families living outside IDP camps in District Swabi[29].

Flood Affectees/Earthquake Impact

At present there are no displaced persons living in Swabi due to flood effect of 2010 or earthquake of 2005. The summary of transient population in District Swabi is given in Table 3.2.1.

Table 3.2. 2: Transient Population[30]

Transient Population	Number of Persons	Number of Families
Afghan Refugees	85,848[31]	15,479
Internally Displaced Persons	35	5
Affectees of Flood/Earthquake	-	-
Total	85,883	15,484

3.3 POPULATION FORECASTS

As required under the TOR, population of District Swabi has been projected for the next 20 years using Extrapolation forecasting models. These include:

[29] Source: Chief Coordinating Officer, Provincial Disaster Management Authority, KP.

[30] Source: Chief Coordinating Officer, Provincial Disaster Management Authority, KP.

[31] Includes those living in District Mardan. There are no separate figures available for District Swabi.

3.3.1 Population Forecasts by Extrapolation

Population of District Swabi has also been projected by extrapolation method, using the following formula:

$P_{n=}P_0 X (1+r/100)^t$

Where:

P_n =Population of desired year

P_0 = Population of base year

r = Population growth rate

t = Time period

Past population, growth rates of the District along with declining trends are given in Table 3.3.1.

Table 3.3. 1: Change in Growth Rates (1972/81) to (1981/98)

Time Period	Growth Rates (%)
1961-72	3.7
1981-98	3.0
Decline over 37 years	0.7
Decline over 1 year	0.02
Decline over 5 year	0.09

3.3.2 Recommended forecasts

In the year 2017, the population of District Swabi is 1624616. The population for next five year will be about 1970122. The population for the year 2039 will be around 2809972.

Table 3.3.2 summarizes population projections for District Swabi, under extrapolation forecasting model, as stated above. These forecasts are also illustrated graphically.

Table 3.3. 2: Population Forcasts for the plan period (2021-2040)

Year	Projected Population		
	Urban	Rural	District
2017	275925	1348691	1624616
2021	302081	1486960	1789041
2025	330717	1639405	1970122
2030	370359	1852124	2222483
2035	414752	2092443	2507195
2040	446027	2363945	2809972

The Age-Sex distribution of population in the year 2017 is shown in the pyramid below[32].

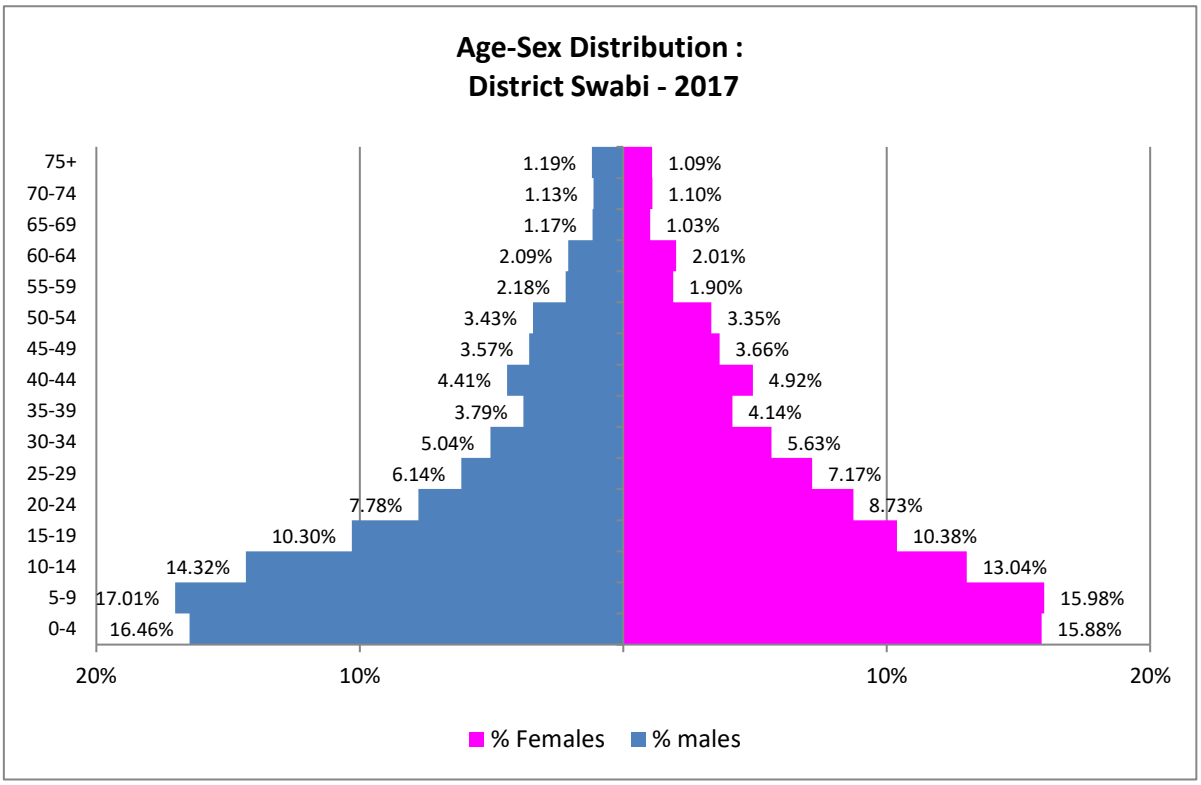


Figure 3.3.1: Age-Sex Distribution: District Swabi - 2017

[32] In terms of percentages, the age-sex distribution remains fairly stable and does not significantly change over a period of time; the distribution is based on 1998 census.

CHAPTER 4

REGIONAL CONTEXT

4. REGIONAL CONTEXT

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 farmland, 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:

4.1 HIERARCHY OF SETTLEMENTS

4.1.1 Objectives of Hierarchy of Settlements

The overall objective of establishing hierarchy of 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

4.1.2 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 centres such as Utmanzai or Tangi; and such smaller urban centres 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 KP Land Use and Building ControlCorridor 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 as below:

Table 4.1. 1: Criteria-wise Score

Sr.No.	Criteria	Score
1	• Settlement Population	1 for every 100,000 population
2	• Location with respect to KP Land Use and Building ControlCorridor	• 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 4.1.2. The result of this exercise is given in the Table below:

Table 4.1. 2: Hierarchy of Settlements Score-wise

Settlements	Population Score		Location (inside/Outside RDC)	Number of Hospital Beds/1000 Population	Number of Universities	Airport	Administrative Status (DHQ/THQ)	Total Score	Hierarchy
	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

4.1.3 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.

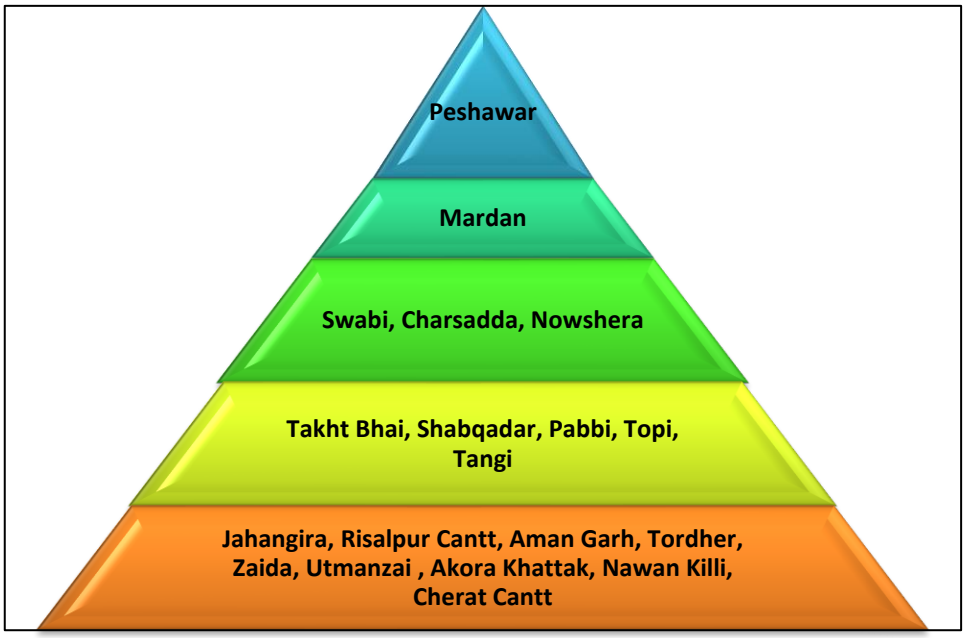


Figure 4.1.1: Hierarchy of Urban Settlements in Peshawar Valley

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.

4.2 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 4.2.1 shows the existing urban settlements and there growth rate. There are 4 urban settlements whose growth rate is higher than 3 and 9 urban settlements whose growth rate is in between 2 to 3, while rest settlements growth rate is below.

Table 4.2. 1: Urban Settlements: District Peshawar Vs. Peshawar Valley					
Districts	**Tehsil**	**Urban Settlements**	**Population (Census Year)**		**Growth Rate (1998-2017)**
			1998	**2017**	
Peshawar[33]	Town-I	Peshawar MC	910807	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[34]	Mardan	Mardan MC	141,842	238,629	3.11
		Mardan Cantt	6,135	7,297	1.02
	Takht Bhai	Takht Bhai MC	18,325	49,202	5.98
Nowshera[35]	Nowshera	Nowshera MC	56576	83,567	2.06
		Nowshera Cantt	33,237	36,564	-0.32
		Risalpur Cantt	31,416	36,653	0.81
		Pabbi MC	31,153	55,255	3.06
		Jahangira MC	31,115	52,839	2.83
		Aman Garh Industrial Area TC	21,476	38624	3.14
		Akora Khattak MC	19530	32883	2.78
		Cherat Cantt	2,527	2265	-0.57
Swabi[36]	Swabi	Swabi MC	80,157	123,412	2.2
		Zaida MC	22,656	31,949	1.82
	Topi	Topi MC	30458	52983	2.9
	Razer	Nawan Killi TC	18082	26,161	1.96
	Lahor	Tordher TC	41,420	27,861	2.1
Charsadda[37]	Charsadda	Charsadda MC	87,218	114565	1.45
		Shabqadar MC	55,439	91857	2.69
		Utmanzai MC	24,848	30747	1.13
	Tangi	Tangi MC	25,346	33012	1.4

[33] Source: Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report Peshawar, 1998, Page 52, Table 2.

[34] Source: Source: Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report Mardan, 1998, Page 53, Table 2.

[35] Source: Source: Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report Nowshera, 1998, Page 52, Table 2.

[36] Source: Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report Swabi, 1998-2017.

[37] Source: Pakistan Bureau of Statistics, Govt. of Pakistan, District Census Report Charsadda, 1998, Page 56, Table 2.

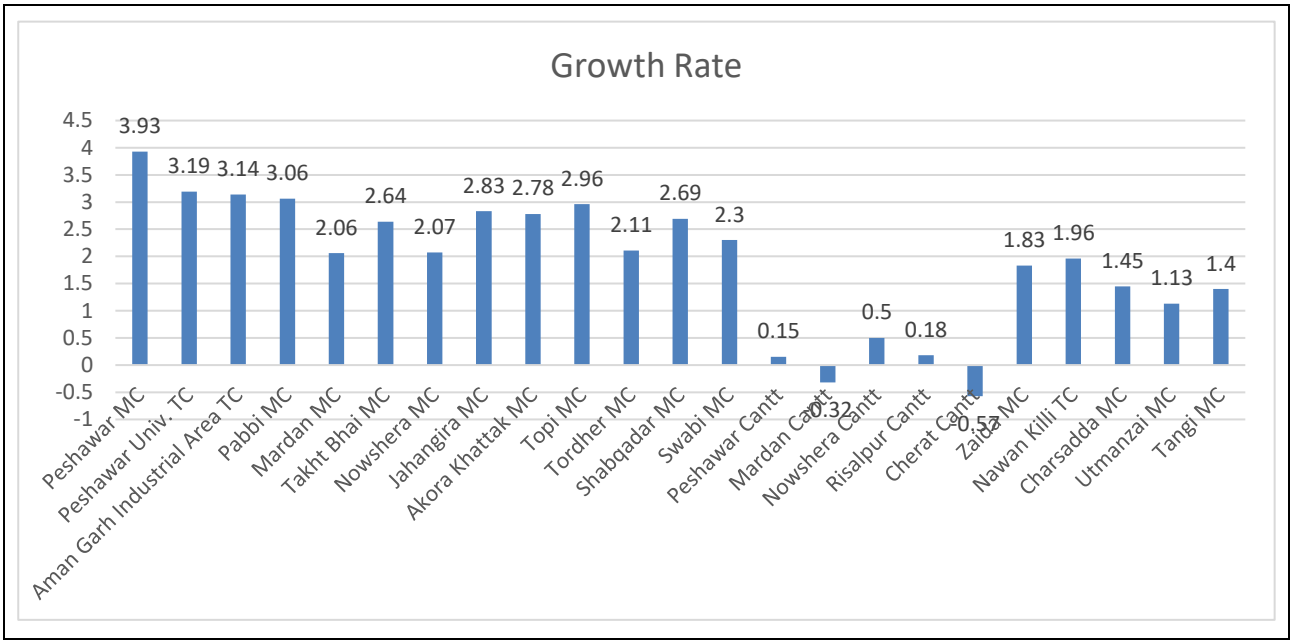
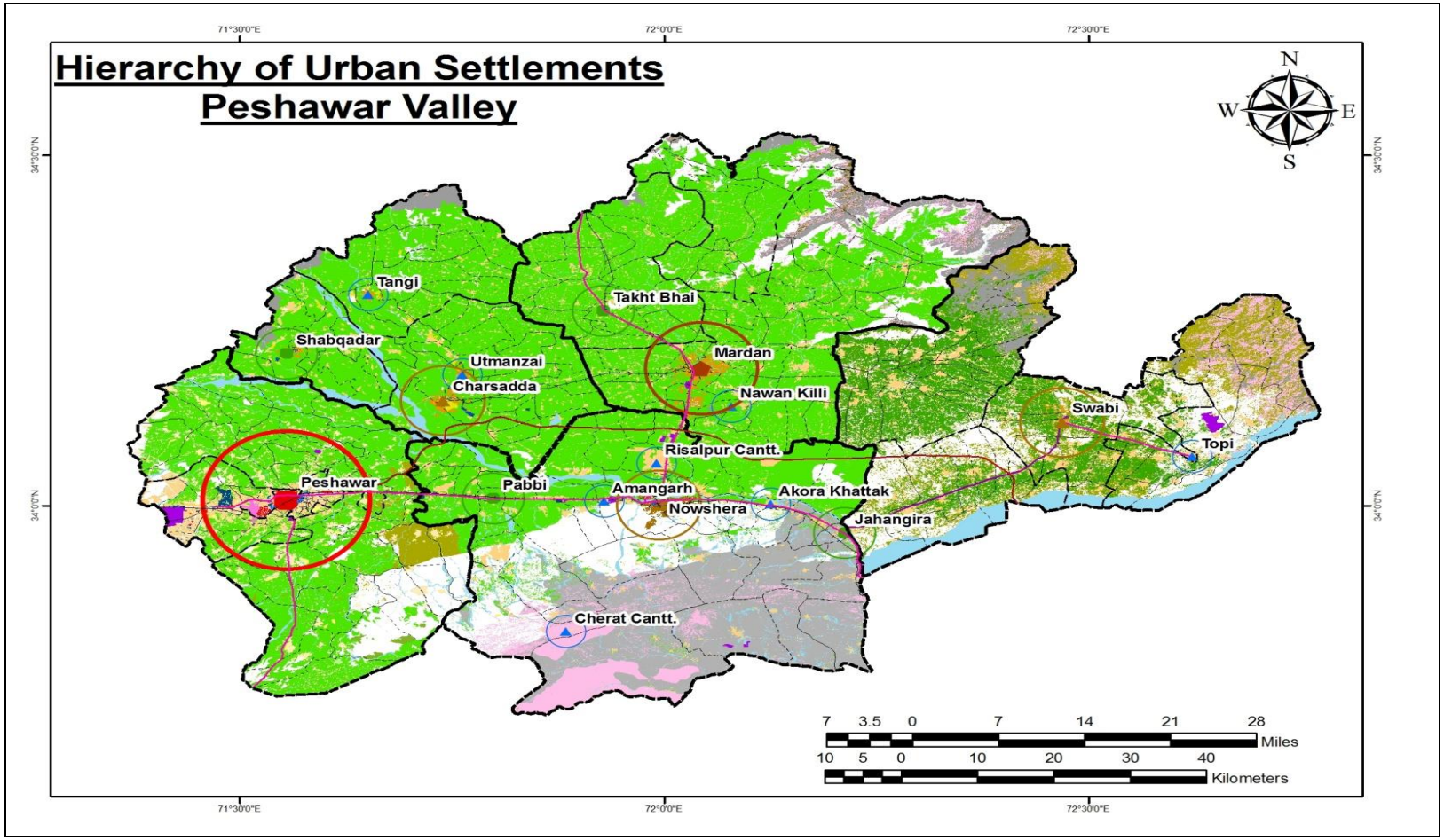


Table 4.2. 2: Growth of different Settlements of Peshawar valley		
Urban Settlements	**Growth Rate (1998-2017)**	**Comments**
Peshawar MC	3.93	Above 3 and Below 4
Peshawar Univ. TC	3.19	
Aman Garh Industrial Area TC	3.14	
Pabbi MC	3.06	
Mardan MC	2.06	Above 2 and Below 3
Takht Bhai MC	2.64	
Nowshera 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 4.2.1: Hierarchy of Urban Settlements Map of Peshawar Valley

Note: The radii of circles correspond to population sizes of settlements

(Radii Not to Scale)

4.3 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.

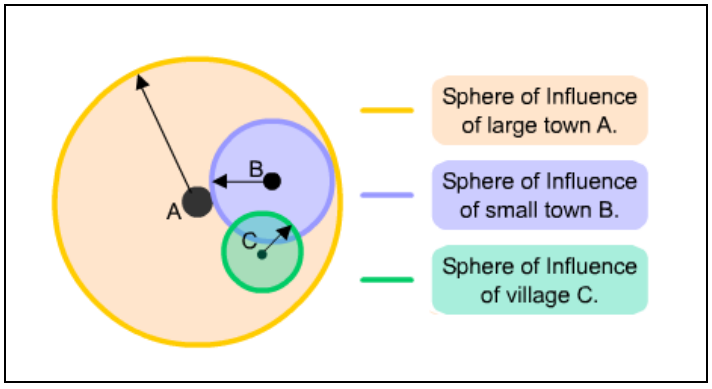


Figure 4.3.1: Spheres of Influence of Urban Settlements

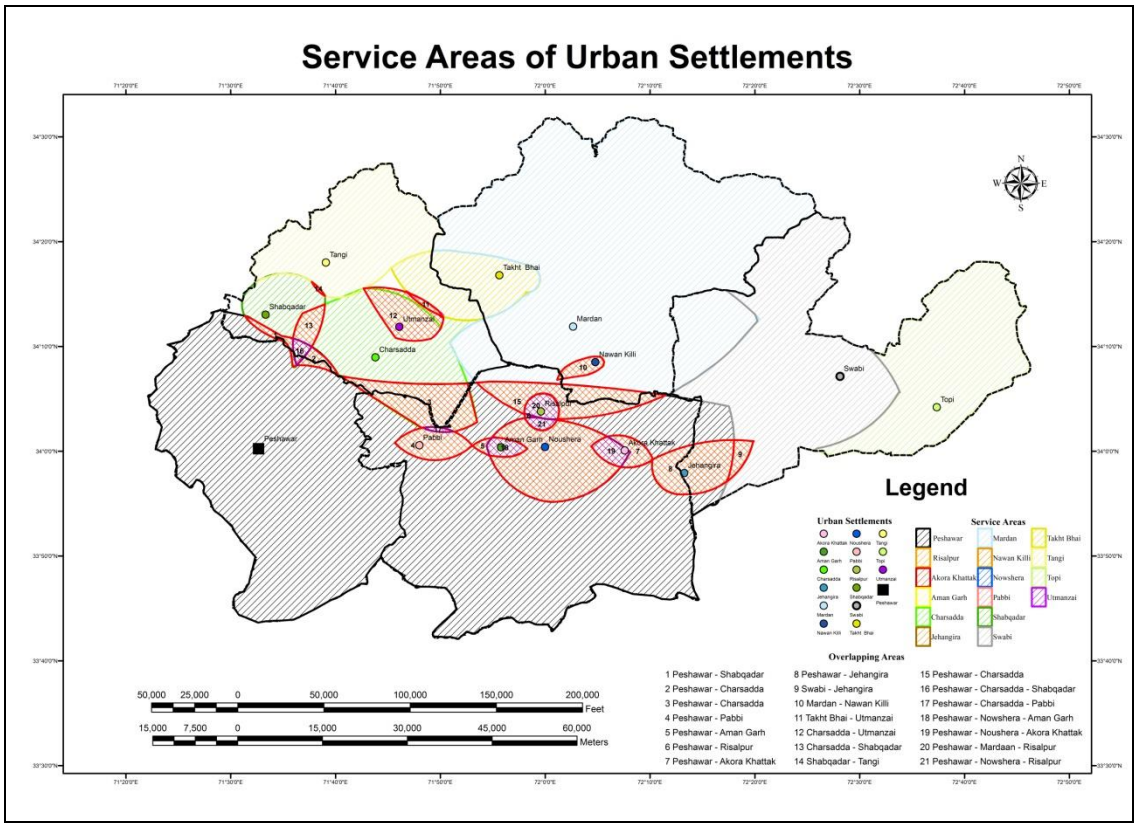
Gravity models measure the pulling power of competing locations, whether cities, shopping centres or towns and the influence this has on the customers that reside within the boundaries. Models identify a boundary line, called the breaking point, at which customers that reside within the boundaries, either 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:

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

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 4.3.1: Services Area Map of Urban Settlements

Peshawar being the provincial capital and primate city has area of influence spread all over KP and well beyond the provincial boundaries. However, for the purposes of retail trading, Peshawar's influence extends to entire District Peshawar and Nowshera, and small parts of other Districts. Within the five Districts, each settlement has its own area of influence as shown in Map 4.3.1.

4.4 PARAMETERS FOR REDUCING MIGRATION TO BIG URBAN CENTRES

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 centres 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 centres.

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 Centre', 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 centres 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.

4.5 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 2025, and others by 2040. PVDC is a vision with the long-term planning up to 2040.

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 2025, 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.

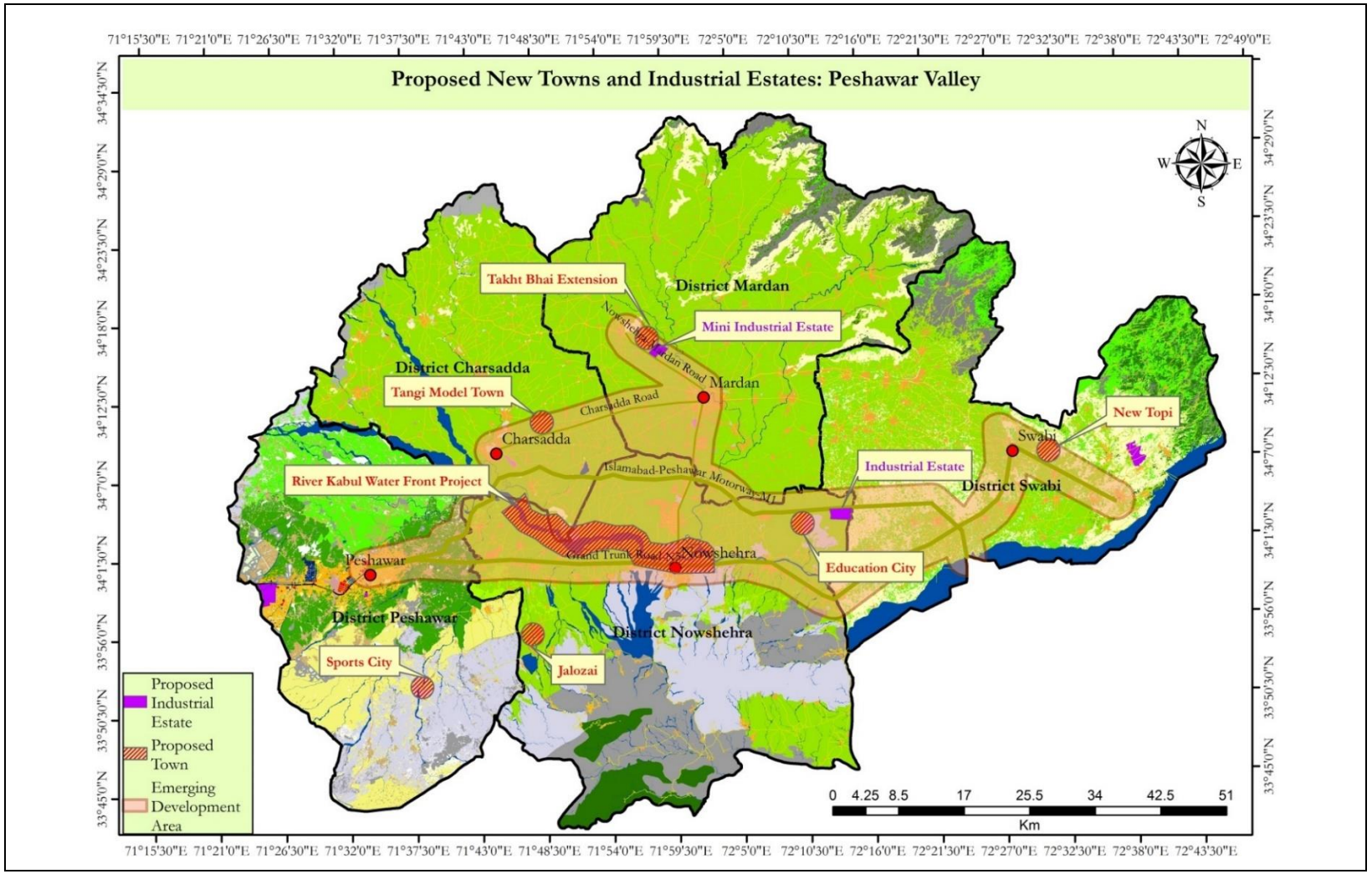
The PVDC aims to benefit the economic and social development of all regions in Khyber Pakhtunkhwa and provide effective inter-district connectivity. With the implementation of various projects, PVDC will play an increasingly important role in promoting the economic development and uplifting living standard 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.

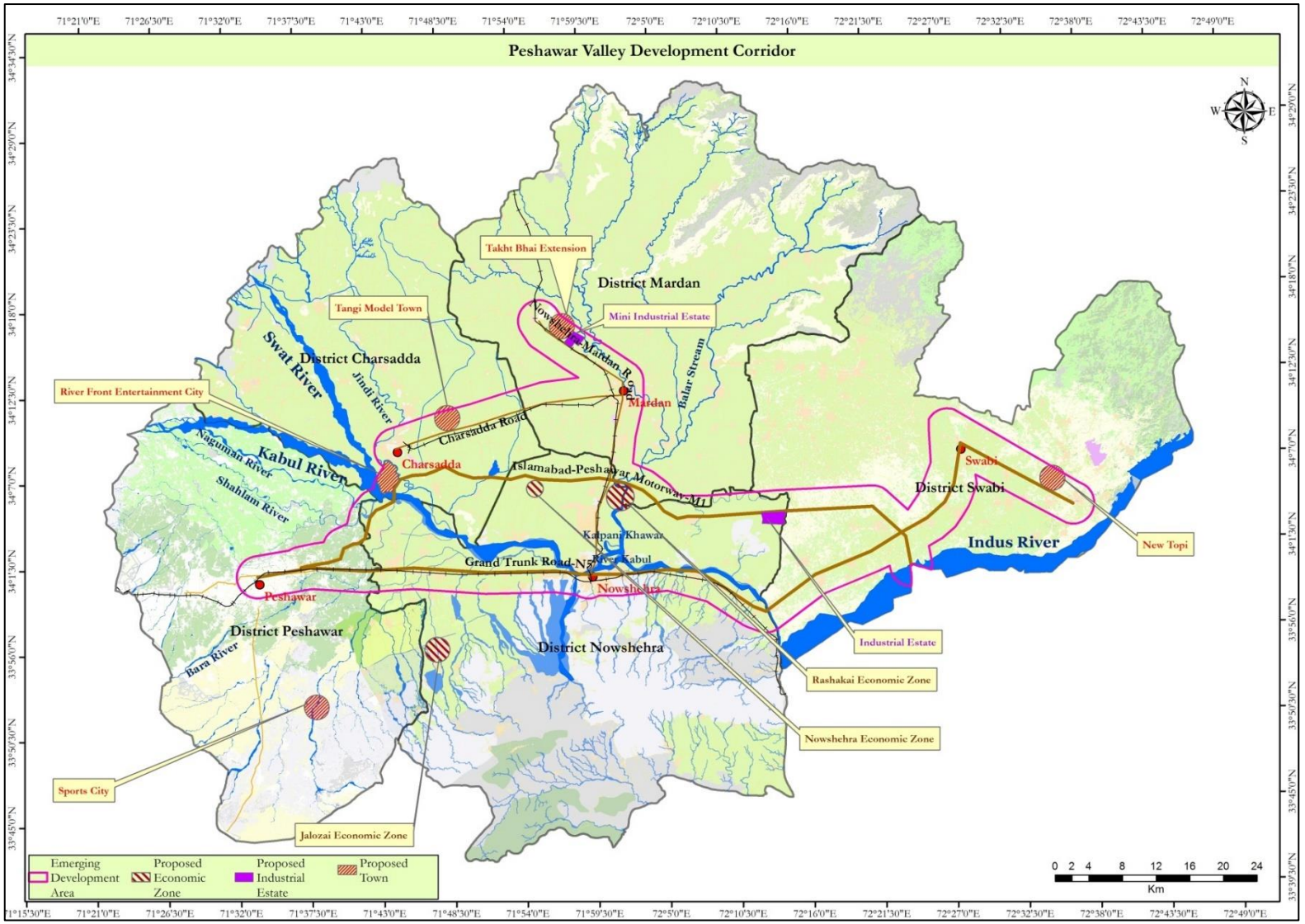
It is important that the identified corridors should be able to generate densification activities, and efforts to stimulate SMEs in the proposed corridors. It is also important to establish an appropriate legal and institutional framework before the project gets rolling.

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 4.5.1: Proposed Towns and Industrial Estates Map of Peshawar Valley



Map 4.5.2: KP Land Use and Building ControlCorridor

4.6 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 towns, 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 centres for agricultural and other primary goods. They also serve as centres 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 labour 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:

4.7 ECONOMIC ZONES

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

4.7.1 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 immanent 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 predominant investment favorability for industries in fruit & food packaging, textile and auto manufacturing. Further expansion of around 5,000 acres is also under consideration.

4.7.2 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.

4.7.3 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.

4.8 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.

4.9 ENTERTAINMENT CITY

There is 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.

4.10 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.

4.11 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 (Peshaware Chapal). 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 Northeast 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.

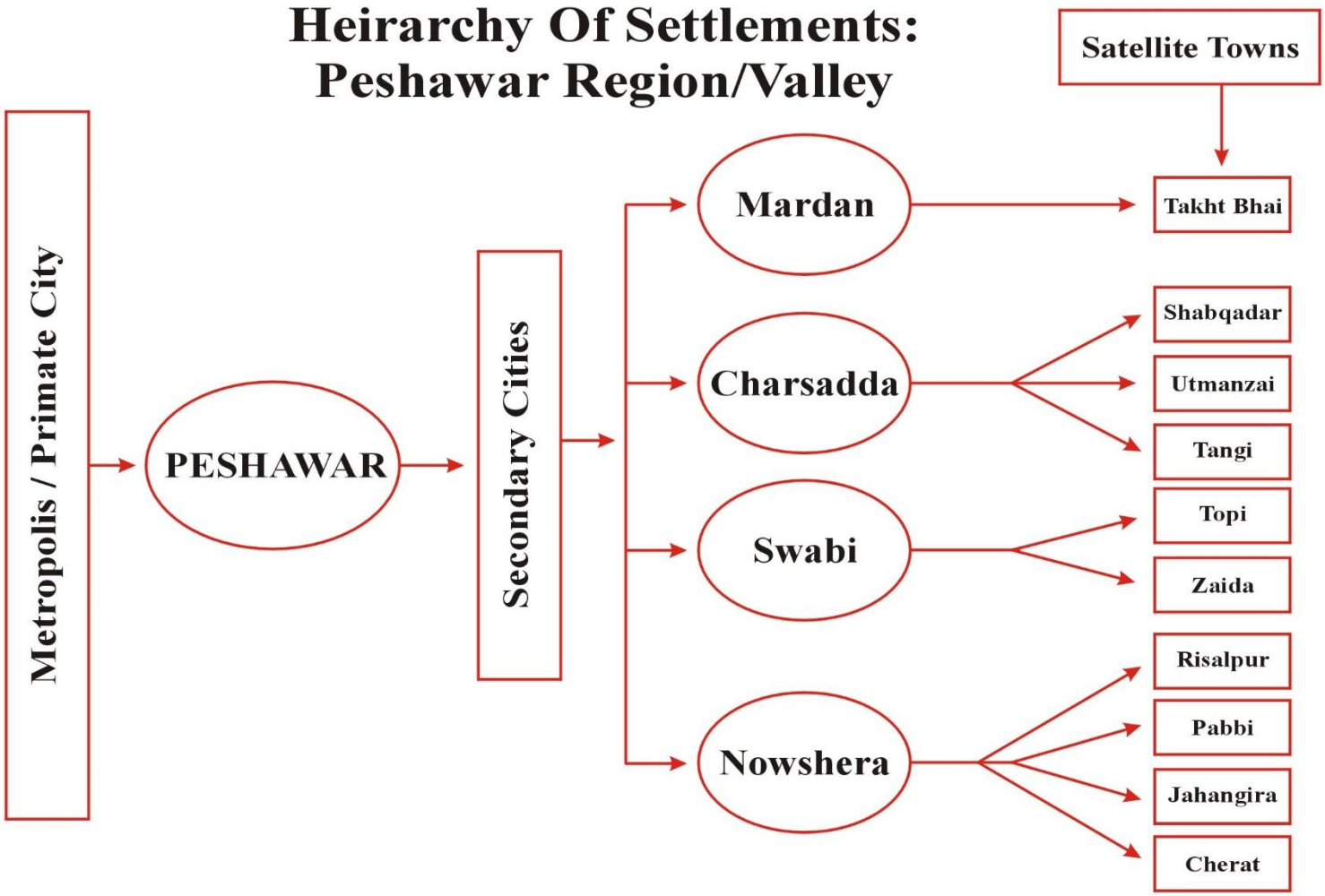


Figure 4.11.1: Hierarchy of Settlements: Peshawar Region/Valley

CHAPTER 5

DISTRICT LAND USE PLAN

5. THE LAND USE PLAN

5.1 OVERVIEW

There was always a felt 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 or 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 whose framework 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 various kind of activities including 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 rationalized. Land also required for grazing, but un-controlled grazing will convert the pasture into a barren unfortunately many of grazing areas have been eliminated.

The Land use plan have taken a holistic view of land as a resource and each parcel of land has been assigned to a designated use with compromising the competing uses. For example, prime agriculture land will not be used for urban development or industrialization.

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 larger cities like Peshawar. 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.

5.2 FRAMEWORK FOR DISTRICT SPATIAL PLAN AND BROAD GUIDELINES TO UNDERTAKE THE PROJECT.

Currently in the province of Khyber Pakhtunkhwa there is no specialized entity for implementation of land use planning management and development control. The Local Government Act, 2013 empowers TMAs for the function of land use planning but due to the complex nature and involvement of a variety of stakeholders TMAs are unable to do this function efficiently. TMAs only

perform the building control function up to some extend only in the urban centers. Due to the capacity issue of local governments (TMAs) there is a felt need to establish Land use planning and Management Authority at the province level. To implement the Land Use plans for the five Districts, there is a need to form a regional body such as Land Use and Building Control Authority (LUBCA), 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 Greater Peshawar Region.

Thus, to oversee and coordinate the activities of these projects, it is important to create an agency such as LUBCA, which may be established in the Urban Policy Unit KP. A senior officer may be assigned the duties of Chief, LUBCA. 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.

The abundance of local planning authorities without an apex body at regional level contributes to the emergence of complex problems such as unclear roles, overlapping functions and responsibilities not fully discharged. These activities impact the growth and development in the region. With no definite policy at the Provincial level, the government employs ad-hoc measures in response to physical development problems. The Plans are articulated poorly as the processes involved are not properly followed due to existence of many planning authorities with few qualified Urban & Regional Planners, and lead to little impact in promoting efficient urban and regional development.

Every planning authority has a specific task it performs in ensuring that proper planning is achieved. The proposed LUBCA is expected to implement the District Land Use Plans of the five Districts while the local government planning authorities such as Peshawar Development Authority, Mardan Development Authority, Provincial Housing Authority, Khyber Pakhtunkhwa Economic Zones Development and Management Company, Development Authority etc. are empowered by law to carry out specific planning roles. LUBCA is not meant to take over their roles, but ensure that all plans are prepared within the framework of District Land Use Plans.

Planning authorities have the responsibility of approving planning schemes and the administration of various town and country planning laws and also empowered to declare any area a planning area within their jurisdiction, after making adequate investigation about it from PDA. Lack of linkage between the local authorities and the regional authority such as PDA leads to the negligence, as the problem is not really addressed, leading to haphazard development.

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 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 Planning & Development Department, Local Government, Elections & Rural Development Department, City District Government, TMAs, Urban Policy Unit/PLUP, and urban local councils in a focused direction.

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 LUBCA about inter-district planning issues and their resolution.

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

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

The LUBCA 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, LUBCA 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 LUBCA 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.

The proposed LUBCA will have jurisdiction over all the five Districts, including urban and rural areas.

5.3 THE GROWTH DIRECTION

The population growth will give us the critical mass of people and skills to build better infrastructure for our cities, suburbs and towns; deliver services to our ageing population; transition to a low-carbon economy; and profit from the opportunities exists.

We need to see this population boom as an opportunity for our district to grow more liveable, more sustainable and more prosperous.

For that to happen, we need to grow in controlled ways.

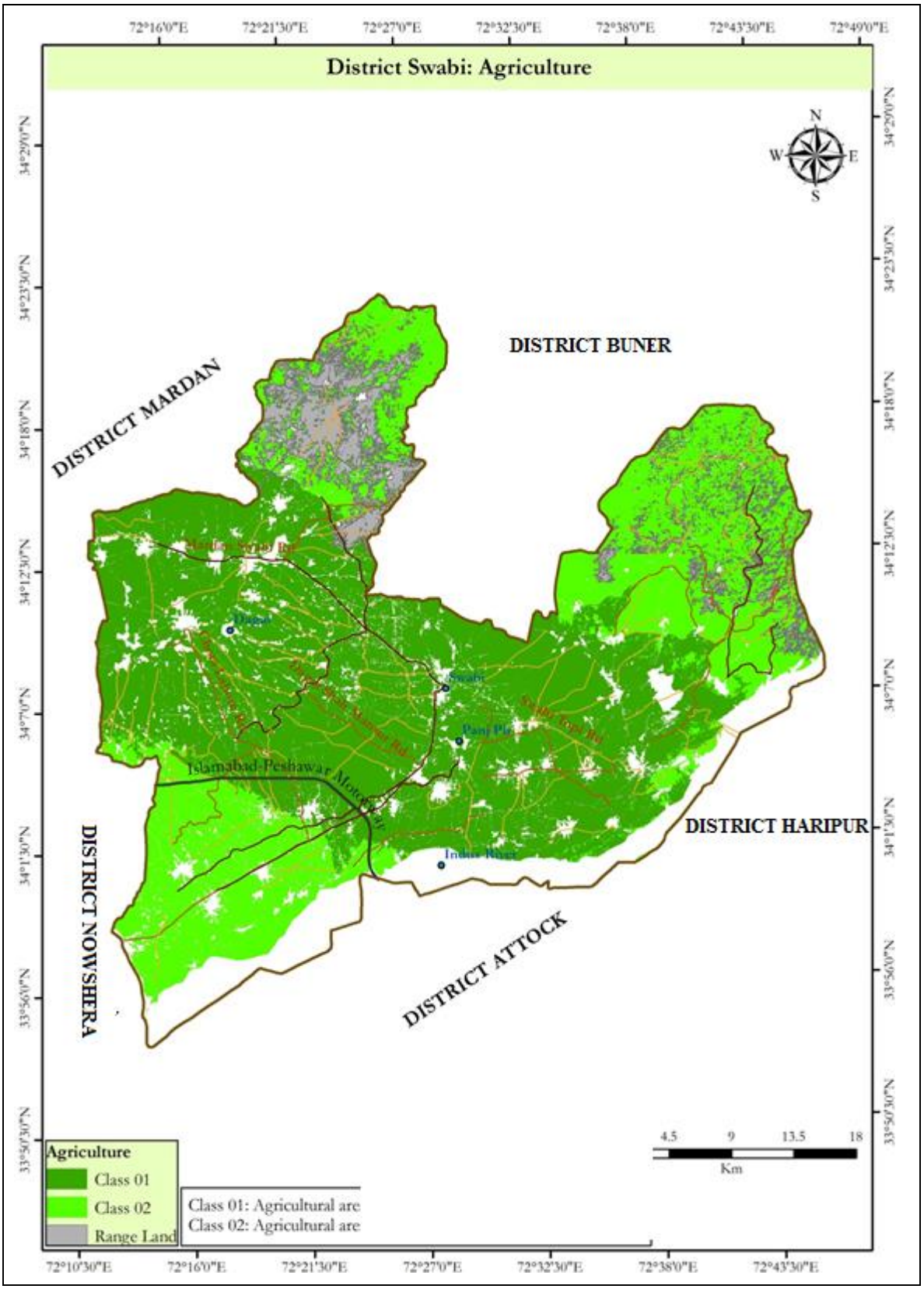
That means stopping urban sprawl on precious agriculture land, ensuring our regional cities remain affordable and liveable, making smart investments in infrastructure that encourage job growth outside the CBD, and giving local people to participate in the development of local area plans. The urban area of District Swabi, 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.
- The city area's expansion create hurdles for the development authority and TMA's to provide facilities according to the standards set by PEPIC 1985 or developed by Development authorities/TMA's in the shape of Acts, Ordinance and Bylaws.
- There is a dire 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 (Figure 5.3.1).

    - Class 1: 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 Swabi has very fertile agricultural land. As seen in Chapter 2, around 66.36% of area in the District is under 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/Development



Map 5.3.1: Agriculture Map of District Swabi

Besides agriculture, about 0.97% of the District area is vacant while around 15.76% is under grassland/bushes. Combining the above, about 16.73% area is vacant/grassland; efforts need to be made to bring all or most of this area under agriculture.

It is clear from the map that most of the good quality agricultural land lies in the central part of District Swabi, while area, south of motorway and the two protruded portions of the District towards North are under Class II agriculture.

The following important factors have also been considered for Land use planning of District Swabi:

- The two main sources of surface water in the District are Rivers Indus and Kabul, which form the South-Eastern and South-Western boundaries of the District. There are also several hilly streams which bring water to the rivers.
- Flash floods originating from Karamar Mountains caused by heavy rainfall result in heavy losses in some parts of District Swabi. The most affected parts of the District lie towards North-West, and comprise of union councils such as Ismailia, Kalu Khan, and Adina. These union councils population increase from about 90144 in 2017 to 94458 in 2019. The proper planning of these areas and the development control of these areas will protect these areas from future flood destruction.
- The areas along Rivers Indus/Kabul and the areas towards North-West are thus prone to flooding and future human habitations in these directions must be discouraged.
- As present expansion is taking place haphazardly along inter-city roads in leapfrog 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. The proper land use plan will help the local authority to devise best communication routs so that ribbon development can be controlled along the major roads of the district.
- In view of the above rationale, it is suggested that most of the urban expansion should take place towards East of the existing city along Swabi-Topi road and Swabi-Jahangira Road.

5.3.1 PROPOSED DISTRICT LAND USE PLAN

Preceding analyses pertaining to social, physical, housing, environmental and economic spheres of human society are eventually transformed into a composite land use proposal map of District Swabi for the next 20 years. On the whole variety of land use demands are clubbed into four major land uses, namely; natural land uses, production land uses, infrastructure land uses, and settlements land uses—specified in percentages and the acreage.

Proposed land use plan for district provides framework for better provision of social and municipal infrastructure and the optimization of land resources for variety of land uses in competition with each other. The plan divides the whole district into different zones in which urban and rural areas are counted. The Growth Zone applies to land that has been identified for future District development.

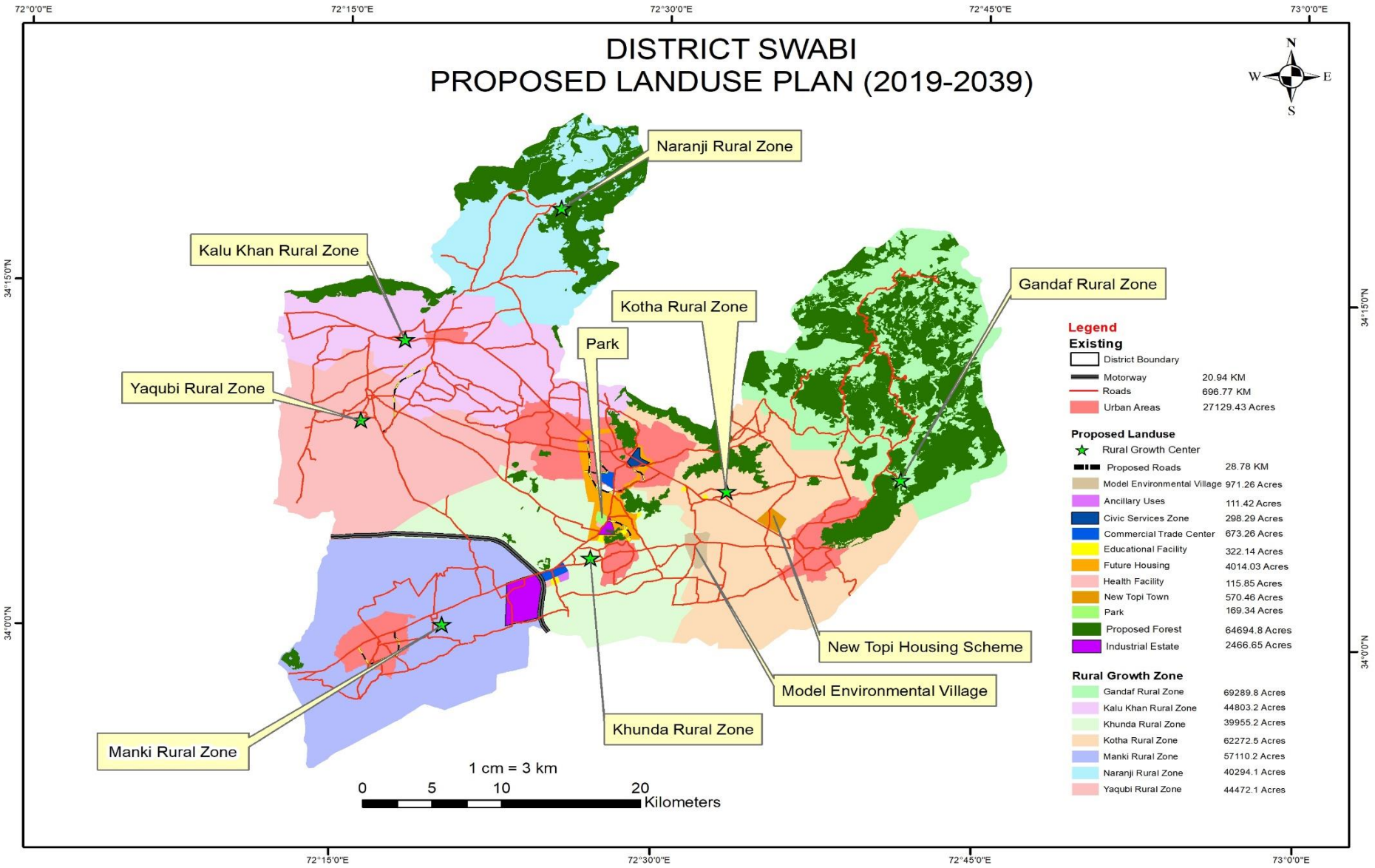
The zone may also be applied to land adjacent to regional cities and towns where a judicious strategy has been formulated that clearly identifies which land is suitable for future development in the District.

Growth potential sites are proposed after projecting all required sectors i.e. education, health, parks, playgrounds, and other amenities. There are Rural Growth Centres—shown in the final map. On the basis of population, 7 rural growth zone centres (Gandaf, Kalu Khan, Khurda, Kotha, Manki, Naranji and Yaqubi) are selected while projecting their population to obtain the future demand for hard and soft infrastructure. By designating growth centres, communities can experience growth within a set boundary—extending the existing pattern of development while maintaining a clear edge between town and countryside. Growth centres typically include a mix of uses and public amenities and benefit from access to existing municipal infrastructure.

This land-use map highlights the communication network for both major and proposed roads for the better connectivity within district and with other adjoint districts. There are total of 28. 78 kilometres of road network are proposed in different areas of the district to inter connect urban- rural area and industries to boost economy of the district.

To cater for current and future housing needs in the district, different areas are demarcated to fulfil the demand for housing. There are almost 21,250.8 acres will be required for the next 20 years for the future generation. Areas around the municipal committees and tehsil committees with there future growth are also shown in proposed map of the district Swabi. Due to irregular growth pattern of District Swabi Municipal areas, A Model town of 568 acres near Topi Municipal committee is also proposed to regulate the physical infrastructure growth pattern. Location of this town and proposed housing expansion areas has graphic represented in below map. Similarly, separate area demand is calculated for each rural settlement for the next twenty years and for this purpose a total of 3580 acres is allocated specific to individual settlements demands. Other social amenities like small industrial estate of about 2471 acres, for education purpose 321 acres, small parks of about 169.34 acre are also proposed, for the improvement of forest area 64,496 acres, commercial area 667 acres, ancillary use 111 acres and civic service of 296.5 acres are proposed. There spatial distributions are provided in Map 5.3.2.

In Short, the final land use plan of district Swabi is the combination of all Social, and economical, hard and soft infrastructures to provide the vision of future development of District.



Map 5.3.2: Potential Growth Map of District Swabi

5.4 EXTENT OF SPATIAL GROWTH

Assessing extent and direction of spatial growth of Swabi to cater for the growing population over the next 20 years is vital for formulating a realistic land use plan. It is our plan to manage growth in the city and suburbs to the year 2040. It seeks to integrate long-term land use, infrastructure and transport planning, and, in doing so, meet the city's future environmental, population, housing and employment needs.

This section therefore attempts to determine the land required in urban and rural areas of the District for the plan period.

Spatial growth of Swabi over the plan period depends on future housing demand, transportation network, new commercial areas, industry, major health, educational and recreational facilities etc. These aspects are described in this section.

5.4.1 Population Densities

The total area of District Swabi is about 1,543 sq. km, of which only about 106.32 sq. km is categorized as urban. Table below shows Population densities of urban and rural area in the District.

Table 5.4. 1: Gross Population Densities

Locality	**Population (2017)**	**Population (2021) Based on Projection**	**Area 2021**	**Population Density**
Urban Area	275925[38]	302081	195.77 sq.km (27127.2 acre)	2630.2 persons per sq. km (10.64 persons per acre)
Rural Area	1348691[39]	1486960	963.68 sq.km 380394 Acre	920.05 persons per sq. km (3.724 persons per acre)
District Total	1624616[40]	1789041	1159.46 sq.km (383508 acre)	1098.62 persons per sq. km (4.45 persons per acre)

It is clear from above Table 5.4.1 that the current urban density is 10.64 persons per acre (PPA). This is somewhat on the higher side, and calls for reduction in urban density for decongestion; there is also 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.

[38] District-wise Census Result, 2017
[39] Obtained by subtracting urban population from the total District Population.
[40] Source: District Studies Report Swabi, KP Landuse Project, Chapter 3, Table 3.3.2.

5.4.2 Urban Area - 2039

As the population of Swabi City continues to grow, its urban boundary needs to be re-defined. The existing urban area is around 106.32 sq. km, to which about 63 Sq. Km, would be added, as calculated below. The gross urban area by the end of plan period would thus be about 172.9 sq. km.

- Urban Population (2017) = 275925[41]
- Urban Area (2017) = 12.90 sq. km[42].
- Urban Population (2021) = 302081
- Urban area (2021) = 106.78 sq.km
- Current Urban Population Density = 2630.2 persons/sq. km.
- Additional Urban Population (2019-2039) = 166033[43]
- Future Area required = Additional Population/Density = 166033 /2630.2= 63 sq. km.

5.5 INTERMEDIATE TOWNS

5.5.1 General

Every person has a basic right for a suitable living environment. The realization of a suitable living environment requires access to basic needs and services, such as health, education, fresh air, clean water, neighborhood facilities and other convenient services. These may be achieved through proper planning of the new settlements and streamlining the existing settlements.

The general pattern of growth and development of human settlements, both urban and rural of district Swabi, is uncontrolled and is haphazard. Majority of the urban settlements contains sub-standard areas all over, with the exception of small pockets of planned development like shah Mansoor Township. There is a rapid growth in population as shown in chapter 3 the existing population of district Swabi is 1.624 million, which will increaser into 2.8 million in 2040, due to natural increase, and the migration of the people to the city the urban area is becoming congested. This rapid growth of population and urbanization, coupled with the poor availability of urban services such as, water supply, sewerage, garbage and solid-waste collection and disposal system, is largely responsible for the poor living-environment. Therefore, there is a need to organize the efforts and resources to provide safe and comfortable living-environment, with proper basic services and utilities (such as drinking water, sanitation facilities, education, health and urban services) so that a healthy living environment may be provided to our human settlements. Intermediate towns will 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 Swabi city, but Swabi city have no more carrying capacity to accommodate such a huge number of population.

Intermediate towns will perform social and economic functions, which are important for regional development, functioning quite reasonably. Therefore, the intermediate towns are important not

[41] Source: Table 5.1
[42] Source: Chapter 2, Table 2.5.
[43] Source: Table 5.14.

merely because of their size, but because of the services, they render to the rural areas. As services centers, these towns will provide public, social, commercial and personal service not only to its own population but also to the surrounding rural hinterlands.

Three Intermediate Towns are proposed in District Swabi, the villages, which are included in these towns, are given below, in Table. 5.5.1.

Table 5.5.1: Villages in Intermediate Towns

Town	Villages
Tordher Town	Chota Lahor, Jalsai, Qaziabad, Jalbai, Mankai, Tano, Beka, Jabbar, Alla Dher, Jangira
Topi Town	Boko, Jhanda, Farid Abad, Jalalabad, Maini, Pabaini, Bam Khel, Kalabat, Kotha, Hamlet, Galla, Batakara, Zarobi, Pontia
Sher Khan Town	Shewa, Asota Sharif, Spen Kani, Shera Ghund, Kalu Khan, Adina, Ismaila, Baghicha Dheri, Nazar Kali, Turlandi, Hamza Dheri, Mansabdar, Taraki, Managi, Firdus Abad, Kaludher, Showand, Mian Kali, Muslim Abad, Serai, Paloo Dank, Salim Khan Kali, Naro Banda, Mamo Banda, Shaheeda Banda, Speen Khel, Maneri Payan

5.5.2 Policies and Programs Related to Intermediate Town

In Pakistan, there is no direct policy related to the intermediate town issues in the country. However, there are other policies, both integrated and sectoral, which address the issues related to the human settlements, such as, National Settlement Policy (NSP), Management of Cities Policies, Settlement Planning, Shelter, Site and Services including Housing Policies, National Conservation Strategy (NCS) and Sarhad Provincial Conservation Strategy. All these policies mainly concentrate on the big cities of the country. Some specific policies for the development of intermediate- size towns with indirect policies and sectoral development programs, such as, farm to market roads and highways in Punjab Province of Pakistan, which has very strong effect on the development of intermediate towns. So also, area-development projects, particularly in Punjab province of Pakistan, i.e., Sargodha and Multan Areas Development Projects, Fruit and Vegetable Development Projects and other micro-enterprises development, particularly by AKRSP in Northern Areas and Chitral, Agricultural Development Bank, Small Industrial Development Board, Livestock, Horticulture and Tourism departments and small hydro- power generation projects.

5.5.3 Theoretical Framework for Intermediate Town

The study of intermediate towns, particularly with their location characteristics, growth and function, is very important for rural development. The study of why and how these service functions concentrate together in certain location is called Central Place Theory presented by Walter Christaller. He referred to the rural settlement that developed from this tendency as “Central Place”. This study

concentrates only on the central places with size between 25,000 to 99,999. The small and intermediate towns perform lesser function, are more in number and relatively located near to each other, while the large towns and big cities perform more functions, are few and located apart from each other.

5.5.4 Functional Role of Intermediate Towns

Size of urban settlement is fundamental to the pattern of urban systems and their development-functions in a region. Intermediate towns will provide particular locations to the specialized goods and services and make them available to the consumer throughout the fringe areas of the region. They will have access to lower- order development, as these towns can provide a de- concentrated, articulated and integrated system of cities with potential access to markets. They have access to lower-order goods and services in local market, as well as higher-order functions that have to be located in main city of the district, and it constitutes a "balanced" pattern of urbanization.

5.5.5 Intermediate Towns as Service Centers

Intermediate towns would 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.

These towns have sufficiently large populations to offer economies of scale for a wide variety of health, education and welfare services. Economies of intermediate towns would usually dominate by basic consumption and personal services. Study of intermediate cities in developing countries points out that "as they grow, manufacturing and productive services, construction, transport, communications, financial repair and related activities are more important.

Apart from the "Formal" sector of services, the "informal" sector of the economy of the intermediate towns would also play an important role, not only in supporting a large number of people earning their income, but also a large number of consumers who can get their daily needed things at cheaper rates at the most accessible locations.

5.5.6 Intermediate Towns as Agro-Processing Centers

Relatively large populations allow intermediate towns to stimulate agricultural production in their hinterlands. As the intermediate towns grows, it will reflect more and more intensification of agricultural production in the hinterlands. The tendency for farmers is to switch from subsistence to cash-crop production, the introduction of new advanced agricultural methods and procedures, and the diversification of village economies to meet the demand for agricultural and artisanal goods within these towns. In many Third World countries, the intermediate towns have grown as the result of their agricultural processing and distribution functions.

Intermediate towns will promote equitable economic growth in rural regions. In a study for the World Bank, Richardson argues that these benefits can include commercialization of agriculture, provision of better services to people in rural regions, national spatial integration, diffusion of social and technical innovations from the major metropolitan areas, and from abroad, the decentralization of job opportunities, and "most important of all, the more equitable distribution of welfare, among urban areas and among regions resulting from an intermediate-city strategy". These towns act as cultural places and provide access to the services, facilities, and resources needed for rural development. They can provide better marketing- facilities for the agricultural products produced in the surrounding rural areas and create a more efficient way for agro-processing and agricultural-support industries in rural areas, which increase food production, and provide off-farm employment opportunities.

Development of intermediate towns will spread the benefits of development as widely as possible throughout the district economic sector and geographical area and the resulting effects will be a more balanced development. Moreover, strengthening of Intermediate towns and the linkages between them and cities can stimulate equitable bottom-up development.

Distribution of welfare, among urban areas and among regions resulting from an intermediate-city strategy". These towns would act as cultural places and provide access to the services, facilities, and resources needed for rural development. They will provide better marketing- facilities for the agricultural products produced in the surrounding rural areas and create a more efficient way for agro-processing and agricultural-support industries in rural areas, which increase food production, and provide off-farm employment opportunities.

Intermediate towns play an increasingly important role in the development-process of the developing countries. This is because of more emphasis on agriculture and rural development; growing awareness towards formulation of urbanization-policies and strategies; and planned dispersal of development-activities, particularly in countries that have attained reasonable high level of urbanization and industrialization.

5.6 ZAIDA SATELLITE TOWN

5.6.1 General

Satellite town is the concept, which was first introduced in 1915. The concept was then adopted by town planners as an approach to relive concentration of people and economic activities from the large metropolitan cities centres. It is defined as smaller metropolitan areas which are located near to larger metropolitan areas, but independent on services and infrastructure. The establishment of satellite town in the fringe of the city offers a solution in reducing traffic congestion at the city center, strengthening socio-economic activities, and reducing expansion and formation of new unplanned settlements. The Need for decentralization of activities to reduce the burden on the city traffic congestion at the city center, strengthening socio-economic activities, and reducing expansion and formation of new unplanned settlements

Zaida satellite town will be such that; at least socially and economically it will partially independent from Swabi city. It will physically separate from the Swabi City by a major geographic barrier of a hill.

Reasons for Satellite Town

- Several uncontrolled and scattered growth of urban population
- Problems in managing already over strained city.
- Increase in the demand for infrastructure facilities and amenities.
- Land shortage, housing backlog and inadequate transportation.
- Challenges in management of essential infrastructure like water supply, sewerage, drainage, solid waste management system.
- Planned development to discourage scatter growth and reduce the exploitation of precious agriculture land.
- Need to decentralization of activates so as to reduce the burden of Swabi city.

5.6.2 Need for Zaida Satellite Town

Zaida is located in the south of Swabi city at a distance of approximately 8 km. it lies in the jurisdiction of Swabi tehsil and declared as urban area in 2017 census. Settlements pattern of District Swabi is very unique all the settlements are scattered all around the district with small urban centers at growth poles. The existing population of Swabi tehsil and Zaida is 426,312 and 42159 which will become double up to 2040. In the next two decades 9651 labors will required industries, 207,675 people will have required housing, recreational, health education and other amenities. To fulfill their basic need of housing, industry, education, health and recreation 11686 acres of land will be required, while both areas are surrounding by fertile agriculture land with acute amount of vacant land for future development.

Both areas are facing unplanned and linear development which may cause agglomeration in future. To cope up with the existing and future demand of public amenities, it is necessary to declare Zaida as a satellite town. Following will be the features of Zaida satellite town.

5.6.3 Features

The planning process of the Mother town and the Satellite townships shall be integrated through inclusion of suitable representation of the Satellite Township in the Metropolitan Planning Committee of the Mother Town.

- Town will have all the necessary amenities and facilities present within their limits except for a few purposes like employment and sometimes education, they have to depend on the main city i.e. Swabi city.
- Transportation means such as public transportation will connect Zaida Town with Swabi city so that travelling to Swabi city for work is not an issue. It is free to decide its economic, social and cultural activities.
- Satellite town generally develop beyond the rural area; Dara, Kaddai and shah Mansur Township will be the rural belt between Swabi city and Zaida satellite town.
- It will consider as a part of the market for some goods and services that are produced in Swabi City.
- The planning of the town shall address environmental sustainability issues, green buildings and disaster mitigation aspects.
- Incremental approach in providing for infrastructure / facilities
- have rational and judicious use of scarce resources both in the form of land and fiscal resources

5.6.4 Characteristic

- It shall be independent urbanized area
- Have their own bedroom communities:
- Have a traditional downtown surrounded by traditional "inner city" neighborhoods
- It will be counted as independent part of Swabi City “Combined Statistical Area”

5.6.5 Outcomes of Satellite Township Development

Zaida satellite town will have the following outcomes.

- Amelioration of population pressure on Swabi city.
- Improved financial management in urban local bodies.
- Improvement in basic infrastructure and service delivery related to water supply, sanitation and solid waste management.
- Discourage scatter growth of the area, people will prepare to live in urbanized area
- Improved urban planning
- Capacity Building of Urban Local Bodies
- Improved urban environment
- Improved services to urban poor

- Implementation of public–private partnership projects for mobilizing investments and efficiency gains.

5.7 HOUSING DEMAND (2021-2040)

5.7.1 Demand for Additional Population

It is estimated that the additional population of District Swabi during the period 2021-2025 will be around 181,081, while that in the subsequent 15 years (2025-2040), the additional population will be about 839850. The housing demand in these two-time periods will accordingly be 30180 and 139975 respectively (Table 5.7.1). This is based on the assumption by taking 6 persons per household.

Table 5.7. 2: Current Housing Backlog in District Swabi

Population	Housing require	Housing stock(7.7 HH)	Housing backlog
17,89,041	2,98,174	2,32,343	65,831

Table 5.7.1 Housing Demand For Additional Population in the District Swabi

Year	District Population	Additional Population				Housing Demand			
		2021-2025	2026-2030	2031-2035	2036-2040	2021-2025	2026-2030	2031-2035	2036-2040
2021	1789041								
2025	1970122	181081				30180			
2030	2222483		252361				42060		
2035	2507195			284712				47452	
2040	2809972				302777				50463
Total		**1020931**				**170155**			

The main facets that need to be considered for assessing housing backlog include population, existing

5.7.2 Housing Shortage/Backlog

number of families, household size and the current housing stock. The current (2021) population of District Swabi as calculated in previous Chapter is given in Table 3.3.2. The Table shows required number of Houses (assuming family size of 6), and the existing housing stock the difference between the two is the current housing shortage. Based on statistics in the Table 5.7.2, the current housing backlog in District Swabi is about 65,831.

5.7.3 In-fill Development

i. Public Sector Housing Schemes

Shah Mansur Township is the only public-sector housing scheme in Swabi. The Township was originally developed by Mardan Development Authority (MDA) in 1992, which was later transferred to Swabi Development Authority (TMA). It is located 7 kms away from the existing Swabi city on

Swabi-Jahangira Road. The scheme provides 1,639 developed plots for upper, middle and lower income groups. The plot size distribution in Shah Mansur Town is given in Table 5.7.3.

Table 5.7. 1: Plot-Size Distribution in Shah Mansoor Town

Size of Plot	No of Plots	%age
1 Kanal	287	17.52
10 Marla	614	37.48
7 Marla	222	13.55
5 Marla	388	23.63
3 Marla	128	7.82
Total	**1639**	**100**

II Private Housing Schemes:

There is no approved private housing scheme in District Swabi. However, there are small unapproved schemes and include Sher Shah Model Town and Khyber Model Town.

ii. Utilization of Vacant Urban Land for In-Fill Development:

There are 0.42 sq. km[44] (around 103.7 acres) of land is lying vacant in the existing built-up area of Swabi City, i.e. land where no activity is taking place. It needs to be noticed that area under agriculture (which is 90.95 square km or 22,4704.2 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 103.7 acres. Applying Housing Density of 9 Houses per Acre on available 103.7 acres, around 933.3 plots (9 x 103.7 acres) can be carved out of this land.

5.7.4 Net Housing Demand in the District

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

Demand:

Housing Demand for Additional Population (2021-2040): 170155 houses

- Current Backlog: 65831 houses
- Gross Demand: 170155+65831=235986---(A)

Potential:

- Plots in private housing schemes: NA
- Plots in Public housing schemes: 1,639

[44] Chapter 3, Table 2.3.3. of this Report

- Plots through in-fill development of vacant land: 933.3
- Total available plots/potential: 2572.3 – (B)

Net Housing Demand at District Level: A-B= 233413.7---(C)

- Considering housing density is 9 houses per acre **(D)**
- Total area required for housing in 2039: **C/D= 25935 Acres.**

5.7.5 Housing Demand: Urban-Rural Split

As seen in previous section, the housing demand in the District over the next 20 years is 170155. Total demand during 2021-2025 is 30180, which has been split into 25% for urban, and 75% rural, resulting in housing demand of 9,117.2 and 27351.38 respectively. Total demand during 2026-2040 is 139975, in which 19218 will be required in urban and 120757 in rural sector.

It is also clear from the Table 5.7.4 that the housing demand in urban area during the first five years of plan period (2021-2025) would be around 4773, while for rural area it would be 25408. The demand for rural area and the total demand for the overall District for the long-term plan is shown in Table 5.7.4.

Table 5.7.4: Housing Demand Urban-Rural Split Swabi

Year	Additional Population			Housing Demand		Total
	Urban	Rural	Total	Urban	Rural	
2021-2025	28636	152,445	181,081	4773	25408	30180
2026-2040	115310	724,540	839,850	19218	120757	139975
Total	143946	876,985	1,020,931	23991	146164	170155

5.7.6 Housing Demand in Individual Urban Settlements of District Swabi

There are five urban settlements in District Swabi and include Swabi, Topi, Zaida, Nawan killi and

Tordher. The housing demand in these settlements is calculated as below:

It is estimated that gross housing demand for additional population in all five urban settlements of District Swabi during the period 2021-2025 will be around 4,773, while that in the subsequent 15 years (2026 -2040), it will be 19,219. This is based on the assumption that each family of 6 will have one house. Settlement-wise statistics are presented in Table 5.7.5.

Table 5.7. 5: Housing Demand for Additional Population in Urban Settlement of District Swabi							
Urban Settlement of District Swabi	Population			Additional Population		Housing Demand	
	2021	2025	2040	2021 -2025	2026 -2040	2025	2040
Swabi MC	135111	147919	199493	12808	51574	2135	8596
Topi	58006	63504	85646	5498	22142	916	3690
Torder	45346	49645	66955	4299	17310	717	2885
Zaida	34978	38293	51645	3315	13352	553	2225
Nawi Kaly	28641	31356	42289	2715	10933	453	1822
Total	302082	330717	446028	28635	115311	4773	19219

5.7.7 Area Requirements

Considering Population density as 9 houses per acre[45], all values (number of houses) in Table 5.7.6 are divided by 9 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 2135.39 acre of which 530.28 acres is the requirement of short term plan. The details of area requirement for the timeframe of plan are given in Table 5.7.6.

Table 5.7. 6: Area Requirement (Acre)		
Urban Area	**2021 -2025**	**2026 -2040**
Sawabi MC	237.19	955.07
Topi	101.81	410.04
Torder	79.61	320.56
Zaida	61.39	247.26
Nawi Kaly	50.28	202.46
Total	**530.28**	**2135.39**

[45] Source: Inferred from Table 4.5, Page 61 of National Reference Manual.

5.7.8 Proposed Locations for New Housing Areas

The new housing is proposed along Swabi-Jahangira Road & Swabi-Topi Road i.e. towards South and South-East of the District. 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 as per proposed land use strategy, most of the future housing developments are proposed towards South (adjacent to Swabi Town) and South-East, close to Topi.

5.8 TRAFFIC AND TRANSPORTATION

A: EXISTING SITUATION

Accessibility is prerequisite for organizing all kinds of social or economic activities. This makes transport a core of development planning, cutting across every element of socio-economic system. Transport plays a crucial role in generating growth by facilitating both domestic and international trade, and by increasing access to other social infrastructures such as schools, hospitals, parks and so on. Transport investment has potential to raise social return to both public and private capital and also significantly contributes to lowering cost of production. The quality of transport infrastructure and level of services is therefore among the key factors that determine the overall efficiency of an economy. This Chapter describes the traffic and transportation network in District Swabi, and what needs to be done to alleviate the problems of this sector.

The main transport infrastructure in District Swabi is provided by several road links to various highways including the Motorway (M-1), the Grand Trunk Road (N-5), the Karakoram Highway (N-35) and many provincial highways, enabling rail, road and air connections (through Bacha Khan International Airport, Peshawar served by all Pakistani airlines, and till recently some foreign airlines to all Pakistani cities as some gulf countries. Swabi itself has no airport.

5.8.1 Roads and Bridges

i. Motorway – M1

Pakistan's third motorway M-1, links Peshawar with the federal capital, Islamabad, has been operational since 30 October 2007. It joins M-2 at Islamabad Interchange as a continuation of Motorway network. Emanating from Peshawar Ring Road, it moves in an Eastern direction, crossing over the Kabul River. From here, it passes through Charsadda, Risalpur, Swabi and Rashakai before crossing the Indus River. It leaves Khyber-Pakhtunkhwa province and enters into Punjab, in which it passes through Attock, Burhan and Hasan Abdal. The whole stretch of the M1 consists of 6 lanes with a number of rest areas along the route.

The M1 is a motorway in Khyber-Pakhtunkhwa and Punjab, Pakistan. It is 155 km long, with 108 km in Khyber-Pakhtunkhwa and the remaining 67 km in Punjab. It has become a vital link to Afghanistan and Central Asia and is expected to take much traffic off the highly used N5. It is part of Pakistan's Motorway Network.

M1 has 10 interchanges at Fatehjang, Bhatar, Burhan/ Attock/ Hassan Abdal, Rashaki/ Mardan/ Nowshera, kernel sher khan, Swabi/ Topi, Chachh, Charsadda/ Takht-e-Bhai, Northern Bypass and

Ring road on N-5. There are 3 major bridges on Haro, Indus and Kabul rivers, 18 flyovers, 27 other bridges, 137 underpasses and 571 culverts. Total 10 services areas including both mini and main— five on each side of the motorway— are provided (four mini service areas at km-4 and km-106 and six main service areas at Haro Bridge, Indus River and Kabul River).

ii. National Highways

Pakistan has a nationwide network of national highways that are distinct from its motorways. The main difference between the two is that, unlike motorways, national highways are not controlled-access or limited access. As in the case of motorways, Pakistan's National Highway Authority is responsible for all national highways. National Highways are pre-fixed with the letter 'N' followed by a numeral or numerals and a hyphen in between, e.g. N-5. Pakistan's National Highways include famous highways such as the G T Road, Indus Highway, Karakoram Highway and Makran Coastal Highway. Over 1,563 km (16.35 %) of total 9,555 km National Highways Network falls in the province of Khyber Pakhtunkhwa.

iii. Provincial Highways & Roads

In the entire Province, about 13,414 KMs of Provincial Highways and Roads have been reported by Communication & Works Department in the year 2009. These include 9,179 KMs of High Type highways and roads, and 4,234 KMs of Low Type highways and roads.

iv. Secondary Roads

In the District Swabi, total 19 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 over 140 Kilometers, Right of Way ranging from 6.1 meters to 13.41 meters, Black Top width from 3.66 meters to 5.48 meters and Shoulder width from 0.61 to 1.22 meters. Details regarding these road names, length, right of way, carriageway and shoulder width are given in the Final District Study Report:

v. Access Roads in District Swabi

In District Swabi, total 140 Access roads have been reported by Communication & Works Department Peshawar. This type of roads is fourth category of roads, denoted as 'A' by C & W Department, and include local and farm to market roads. Total length of the roads is over 480.10 Kilometers, Right of Way ranging from 5.48 meters to 27.43 meters, Black Top width from 3.66 meters to 7.32 meters and Shoulder width from 0.61 to 1.83 meters. Details regarding road names, length, right of way, carriageway and shoulder width are given in the District Studies Report of Swabi.

vi. Bridges in District Swabi

In the district Swabi, total 22 bridges have been reported by Communication & Works Department, Peshawar. These are all made of Pre-Stressed Girders, with width ranging from 1.22 to 10.36 meters, length from 2.74 to 198.11 meters and height from 1.53 to 8.22 meters. Details regarding road name, segment, bridge type, width, length and height are given below:

Overall density of all the national & provincial highways and roads in province is 0.23 km/ sq. km and for only provincial highways and roads are 0.180 km/ sq. km (year 2009). Accordingly, overall road

density in District Swabi (excluding Motorway and National highways) is 0.405 km/ sq. km, which shows concentration of roads more than double of provincial density. It is because that Swabi is an important district and well connected through rail and road network including Pakistan Motorway M-1.

5.8.2 Vehicles Registered in District Swabi

Total 12,163 vehicles are registered (year 2009) in District Swabi whereas 13,015 are reported to be On-Road. Evidently, the total vehicles plying in the district are more than registered here. Two types of vehicles i.e., Motor Cycles / Scooters and Motor Cab Rickshaws are strikingly on higher side while remaining are lesser in number, as seen in the following table:

Table 5.8. 1: Motor Vehicles Population in District Swabi[46]

Type of Vehicles	Registered Vehicles		Vehicles on Road	
	Number	% age	Number	% age
Motor Cycle/Scooters	8,493	70	9,684	74
Motor Cars/Jeeps/Taxi	1,390	11	1,298	10
Buses/Mini Buses	1,294	11	1,286	10
Motor Cabs Rickshaws	114	1	180	1
Public Carrier Trucks	205	2	136	1
Other Vehicles (Tractors, Private Trucks, Dumpers, Ambulances, Cranes, Water Tankers, Delivery Vans & Pickups)	667	5	431	3
Total	12,163	100	13,015	100

The fleet of passenger transport in District Swabi comprises of total 12,163 vehicles i.e., 8,493 Motor Cycles/ Scooters, 1,390 Cara/ Jeeps, 1,294 Buses/ Mini Buses/ Wagons and 114 Motor Cabs/ Taxis. Broadly, it comprises of 88 % private vehicles and 12 % public service vehicles (PSV) only. Seating capacity wise percentage age share of PSVs is 83 % and that of private vehicles is only 17 %, showing the efficiency and effectiveness of the public transport.

The projected vehicles in District Swabi in 2021 and 2031, based on average annual growth rate of 3.5 % for last 10 years are respectively estimated at 18,379 and 25,926 total vehicles, as seen in the table given below:

Table 5.8. 2: Projected Motor Vehicles in Distt. Swabi for Next 10 & 20 Years

Vehicles Type	2009	%age	2021	2031
Motor Cycle/Scooter	8,493	70	12,834	18,103

[46] Provincial Excise & Taxation Department KP, Peshawar

Motor Cars/Jeeps/Taxi	1,390	11	2,100	2,963
Buses/Mini Buses	1,294	11	1,955	2,758
Motor Cabs Rickshaws	114	1	172	243
Public Carrier Trucks	205	2	310	437
Other Vehicles (Tractors, Private Trucks, Dumpers, Ambulances, Cranes, Water Tankers, Delivery Vans & Pickups)	667	5	1,008	1,422
Total	12,163	100	18,379	25,926

5.8.3 Traffic Surveys

i. Traffic Volumes

In order supplement to above described traffic data and to have firsthand data on traffic volume and nature, fresh traffic counts - Manual Classified Counts (MCC) have been conducted by the Consultants, on primary roads of District Swabi at entry and exit points, along with OD survey to have an up-to-date scenario. Following tables and figure present existing traffic volume and nature on primary roads in District Swabi:

Table 5.8. 3: Traffic Volume on Primary Highways in District Swabi[47]

Sr. No	Description	Mardan Road	Nowshera Road	Ghazi Road	Total
1	In-Coming	5272	5213	1386	11871
2	Out-Going	4957	5531	1979	12467
	Total	10229	10744	3365	24338

The traffic density on primary roads of district Swabi is fairly within limits as per lane traffic carrying capacities defined in National Reference Manual on Road and Infrastructures. However, traffic density increases on the primary roads when these entre into urban limits as local/ intra city traffic gets mixed.

The table below presents the mix of almost all motorized modes of transport, on all the primary highways. Detailed statistics are presented in the District Studies Report, Swabi. Following are the main inferences:

i. Total Traffic volume on the three primary roads of District Swabi (in-coming plus out-going) is 24,338 vehicles, of which maximum volume is on Nowshera Road (about 44% of total flow, both ways), closely followed by Mardan Road (42%), and Ghazi Road (about 14%). The vehicles include all modes of traffic including motor Cycles/ Scooter, Car/Jeep, Wagons/Mini Buses, Buses, pickups, trucks, and tractor trolleys.

[47] Field Surveys by the Consultants, January 2013.

ii. In terms of modal split, 32% of the total traffic volume (on all four primary roads, both ways) comprises of motor cycles/scooters, followed by cars/jeeps (30%), wagons/mini buses (15%) and around 9% pick-up trucks. Other modes are relatively much less.

iii. Of the total cars/jeeps, about 48% ply on Mardan Road, 37% on Nowshera Road, and 15% on Ghazi Road.

iv. Among the motor cycles/scooters, about 55% ply on Nowshera Road, 33% on Mardan Road, and 15% on Ghazi Road.

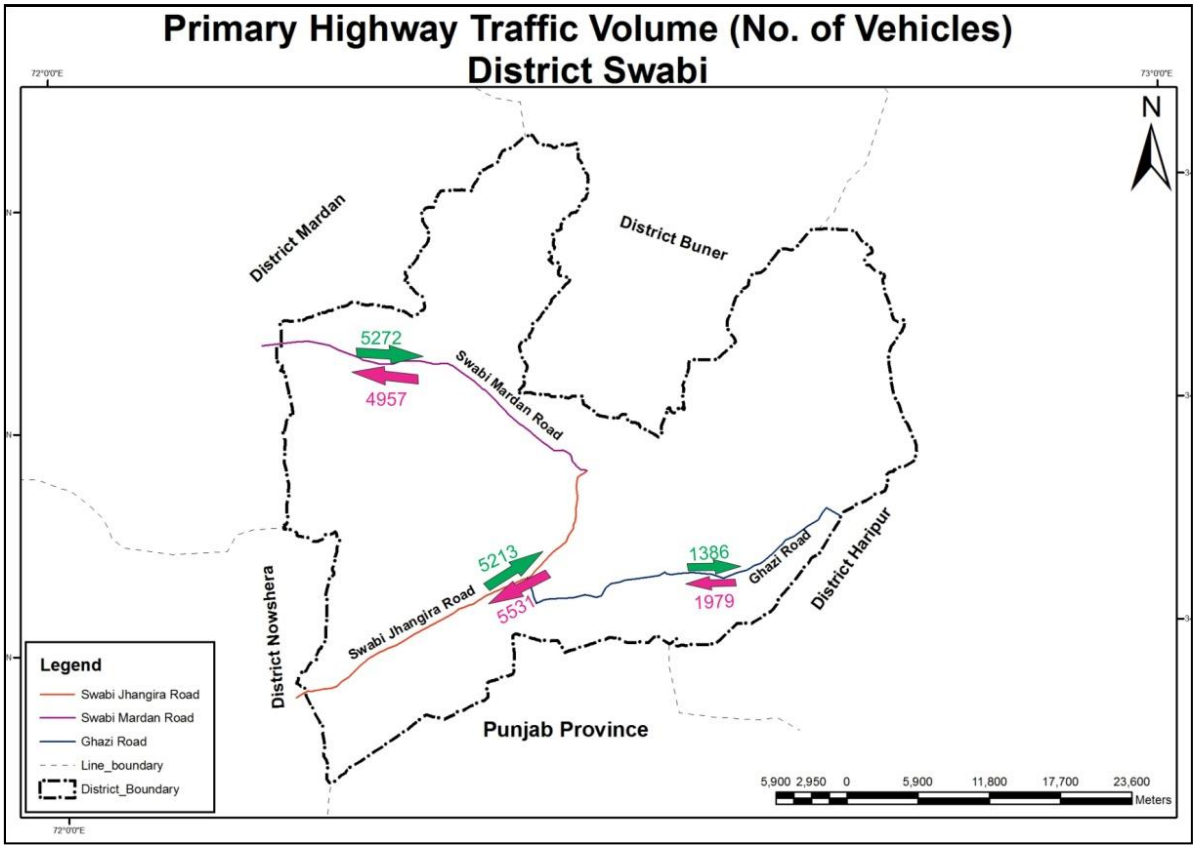
v. Of the total wagons/mini buses about 42% ply on Nowshera Road, followed by Mardan Road (41%), and Ghazi Road (17%).

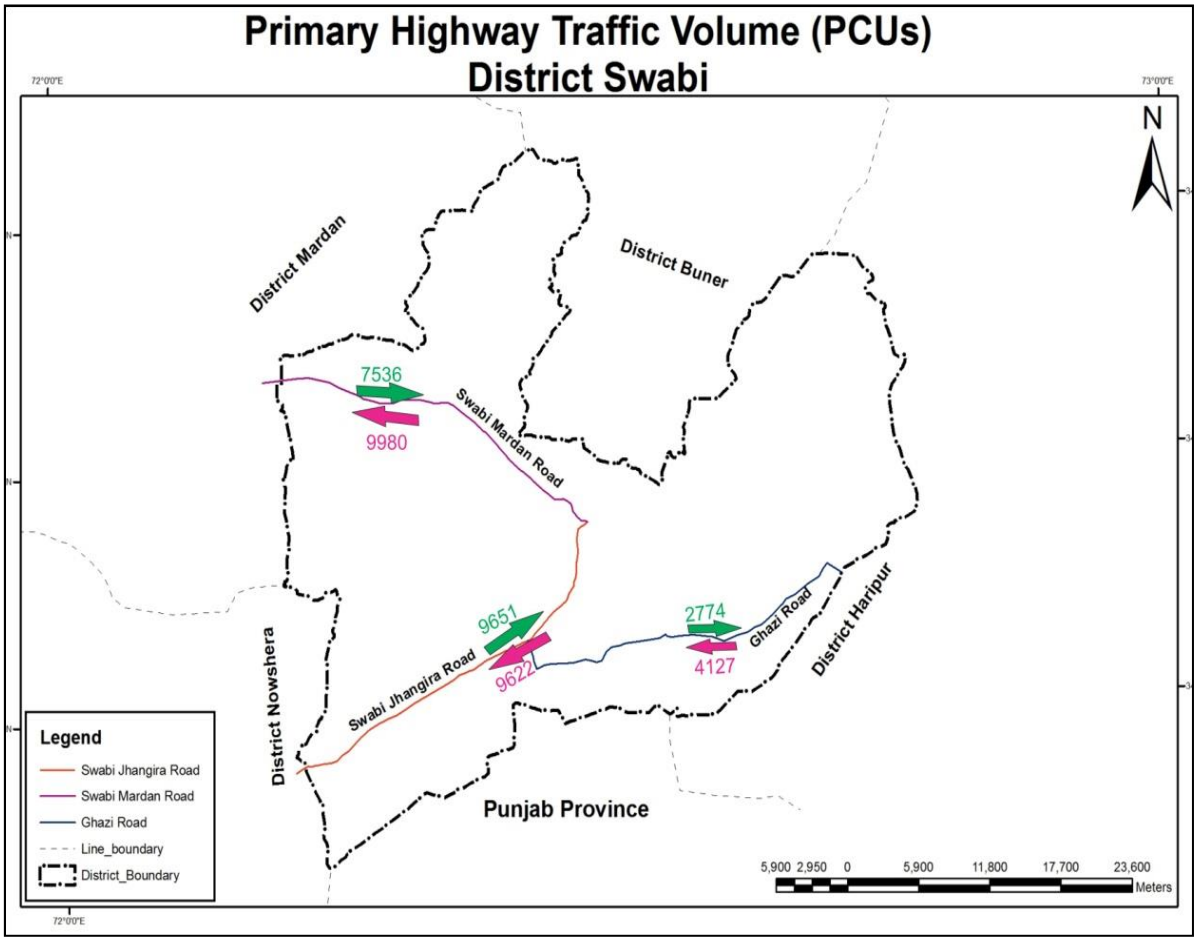
Detailed statistics are presented in below Table:

Table 5.8. 4: Traffic Volume and Nature on Primary Highways in District Swabi[48]

S/N	Vehicles Type	Direction	Mardan Road	Nowshera Road	Ghazi Road	Total Vehicles
1	Motor Cycle/ Scooter	In-Coming	1,597	2,089	380	4,066
		Out-Going	968	2,259	559	3,786
		Total	2,565	4,348	939	7,852
		%	32.67	55.37	11.96	100.00
2	Car/ Jeep / Taxi	In-Coming	2,130	1,214	467	3,811
		Out-Going	1,366	1,447	594	3,407
		Total	3,496	2,661	1,061	7,218
		%	48.43	36.87	14.70	100.00
3	Wagons/Mini Bus/ Medium Bus (12 to 20 seats)	In-Coming	571	857	241	1,669
		Out-Going	912	666	356	1,934
		Total	1,483	1,523	597	3,603
		%	41.16	42.27	16.57	100.00
4	Large Bus (over 20 seats)	In-Coming	114	12	78	204
		Out-Going	109	13	247	369
		Total	223	25	325	573
		%	38.92	4.36	56.72	100.00
5	Pickup/ Truck (open back)	In-Coming	302	488	153	943
		Out-Going	665	537	118	1,320
		Total	967	1,025	271	2,263
		%	42.73	45.29	11.98	100.00
6	Truck (2 Axle Rigid)	In-Coming	176	213	9	398
		Out-Going	403	238	9	650
		Total	579	451	18	1,048
		%	55.25	43.03	1.72	100.00
7	Truck (3 Axle Rigid)	In-Coming	130	125	7	262
		Out-Going	369	111	6	486
		Total	499	236	13	748
		%	67	32	2	100
8	Articulated Truck (4, 5, 6 or more Axles)	In-Coming	16	-	-	16
		Out-Going	27	-	-	27
		Total	43	-	-	43
		%	100	-	-	100
9	Tractor Trolley	In-Coming	236	215	51	502
		Out-Going	138	260	90	488
		Total	374	475	141	990
		%	38	48	14	100
10	Total all Vehicles	In-Coming	5,272	5,213	1,386	11,871
	Total all Vehicles	Out-Going	4,957	5,531	1,979	12,467
	Total all Vehicles	Both Sides	10,229	10,744	3,365	24,338
		%	42	44	14	100

[48] Field Surveys by the Consultants, January 2013





Map 5.8.1: Traffic Volume (No. of Vehicle and PCUS) on Primary Roads – District SWABI

ii. Level of Service

To determine level of service against traffic carrying capacity of primary roads in District Swabi, maximum traffic flows during peak hours have been converted into equivalent passenger car units (PCUs), so that level of service of the roads can be determined, as would be seen in next paragraph. Maximum traffic flows during peak hour, in terms of number of vehicles as well as PCUs is detailed in following Table. Of the total traffic volume in peak hour, about 52% PCUs are on Nowshera Road, followed by Mardan Road (39%), and Ghazi Road (10%) (Table 5.8.5)

Table 5.8. 5: Maximum Hourly Traffic Flow on Primary Roads, District Swabi[49]

S/N	Vehicles Type	PCU Ratio	Mardan Road		Nowshera Road		Ghazi Road	
			Hr 3 (9-10 AM)		Hr 2 (8-9 AM)		Hr 3 (9-10 AM)	
			Vehs	PCUs	Vehs	PCUs	Vehs	PCUs
1	Motor Cycle/ Scooter	0.33	321	106	528	174	92	30
2	Car/ Jeep / Taxi	1	379	379	356	356	118	118
3	Wagons/Mini Bus/ Medium Bus (12 to 20 seats)	1.5	167	251	323	485	67	101
4	Large Bus (over 20 seats)	4	58	232	1	4	49	196
5	Pickup/ Truck (open back)	4	108	432	237	948	22	88
6	Truck (2 Axle Rigid)	4	89	356	71	284	0	0
7	Truck (3 Axle Rigid)	4	56	224	46	184	0	0
8	Articulated Truck (4, 5, 6 or more Axles)	4.5	14	63	0	0	0	0
9	Tractor Trolley	4.5	51	230	125	563	12	54
Total			1243	2273	1687	2998	360	587
%				38.80		51.18		10.02

For determining the existing level of service of roads under the given traffic flow and other conditions, following standards of traffic density ranges have been adopted. Level of service is qualitative measure describing operational conditions within a traffic stream and their perceptions by motorists and / or passengers. Its different levels tabulated below:

Table 5.8. 6: Standard Levels of Service (Traffic Flow on Roads)[50]

Service Levels	Operation Conditions	Density Range (PCU/ Min/Lane)	Density Range (PCU/ Hr/Lane)

[49] Estimation/ Conversions by the Consultants.

[50] www.regionomics.com (American Association of State Highway and Transportation Officials–AASHTO)

A	Free Flow	0 – 11.0	0 – 660
B	Reasonably Free Flow	11.1 – 18.0	666 – 1080
C	Stable Flow	18.1 – 26.0	1086 – 1560
D	Approaching Unstable Flow	26.1 – 35.0	1566 – 2100
E	Unstable Flow	35.1 – 45.0	2106 – 2700
F	Forced Flow	> 45.0	> 2700

Accordingly, following are the existing levels of service delivered by primary roads of district Swabi, under the given conditions of traffic flow, roads, etc. It has been estimated that Mardan road is the busiest road but offering stable flow of service, followed by the Nowshera road where traffic flow is reasonably free.

Table 5.8. 7: Level of Traffic Flow on Primary Roads, District Swabi[51]

Primary Roads	Operation Hours	Total PCUs	Lanes	PCU/ Lane	Level of Traffic Flow	
Mardan Road	9-10 AM	2,272	2	1136	C	Stable Flow
Nowshera Road	8-9 AM	2,997	4	749	B	Reasonably Free Flow
Ghazi Road	9-10 AM	587	2	293	A	Free Flow

iii. Origin-Destination Survey

Traffic Origin-Destination Survey was conducted in January 2013 on primary roads of District Swabi, at boundaries and entry/ exit points. The survey was single day based and covered mainly peak hours of traffic flow.

Following are the main inferences of O-D survey:

i. A total of 322 vehicles were interviewed of which 39% were cars/jeeps, followed by 19% wagons/mini buses, 17% pick-ups, about 6% large buses, 14% trucks of different categories and about 5% tractor trolleys.
ii. Most of the vehicles interviewed for origin/destination were on Nowshera Road (47%), followed by 32% on Mardan Road, 21% on Ghazi Road.
iii. Of those who originated from Swabi, about 41% were destined for Nowshera, around 22% for Mardan, about 15% for FATA, and 14% for Punjab/Islamabad.
iv. Of those whose destination was Swabi, 34% were coming from Nowshera, about 29% from Mardan, and about 17% from FATA and other areas of KP. Detailed statistics are given in O-D Tables, Chapter 5 of District Studies Report Swabi.

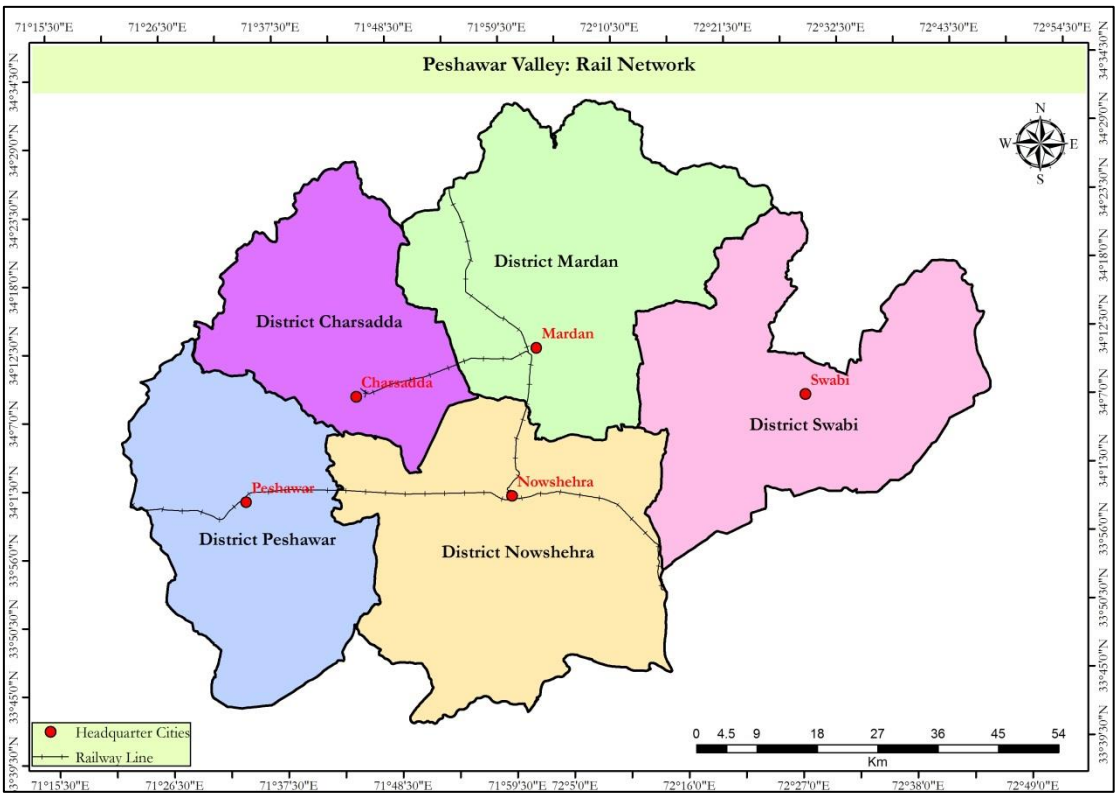
[51] Traffic Analysis by the Consultants.

5.8.4 Railway and Air Network

The total railway route in KP is about 228 kilometer, all of which is broad gauge. In the five Districts of Peshawar Valley, the track lengths are as below. Swabi has no railway link and hence no railway station.

- Peshawar: 31 kms
- Mardan: 51 kms
- Nowshera: 72 kms
- Charsadda: 15.5 kms
- Swabi: 0 kms

District Swabi has no functional railway station. Similarly, there is no airport in District Swabi. There are six civil airports in the province but the main and only international airport is Peshawar Airport (Bacha Khan International Airport), serving the entire Province. It is maintained by Civil Aviation Authority, which oversees and regulates all aspects of civil aviation in Pakistan.



Map 5.8.2: Rail Network Map of Peshawar Valley

5.8.5 TRANSPORTATION PROPOSALS FOR LAND USE PLAN

Roads are the backbone of a civilized society. Effective road network and proper management of transport system play an important role in the efficient functioning of a habitat. Uncontrolled developments along major road can create disastrous consequences. 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.

Swabi Ring Road

As already stated previously, total Traffic volume on the three primary roads of District Swabi (in-coming plus out-going) is 24,338 vehicles, of which maximum volume is on Nowshera Road (about 44% of total flow, both ways), 42% on Mardan Road, and 14% on Ghazi Road. The vehicles include all modes of traffic.

To cope with this traffic, a Ring Road is proposed around Swabi 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., Mardan Road, Jahangira Road and Topi Road. The broad alignment of the proposed ring road is shown in the Plan. The traffic jams on urban roads are significant. The Ring Road proposed 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.

5.8.6 Improvement of Road Linking Tehsil Headquarters

It is important to link tehsil headquarters for administrative, economic and social reasons, and to open up the lagging areas of the District. Currently linkages exist, but are not in good shape and need to be improved/upgraded. These roads include:

i. Lahor-Razzar Road
ii. Swabi-Topi Road
iii. Ghazi Road linking Lahore with Topi

5.8.7 New Urban Roads

For planned urbanization of Swabi, modular roads are proposed linking Jahangira Road within Swabi urban area to the proposed Ring Road. Thus, there will be a mesh of new roads allowing the town to expand in a planned and phased manner.

5.8.8 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.

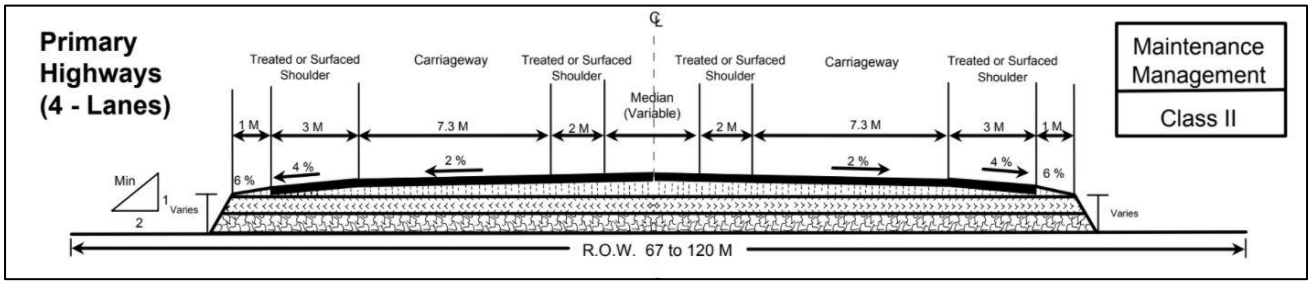


Figure 5.8.1: Primary Highways (4 – Lanes)

5.8.9 Secondary Highways

Along with widening the District Roads into Primary Highways, the Local Road which connects the main centers of District Swabi 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.

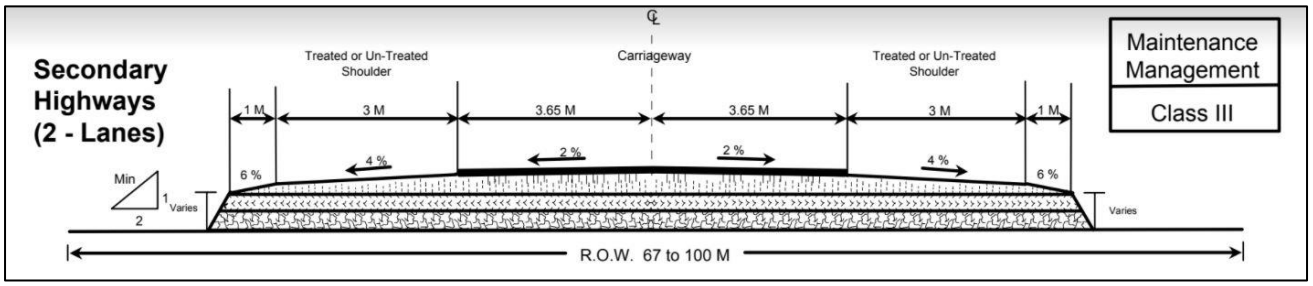


Figure 5.8.2: Secondary Highways (2 – Lanes)

5.8.10 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.

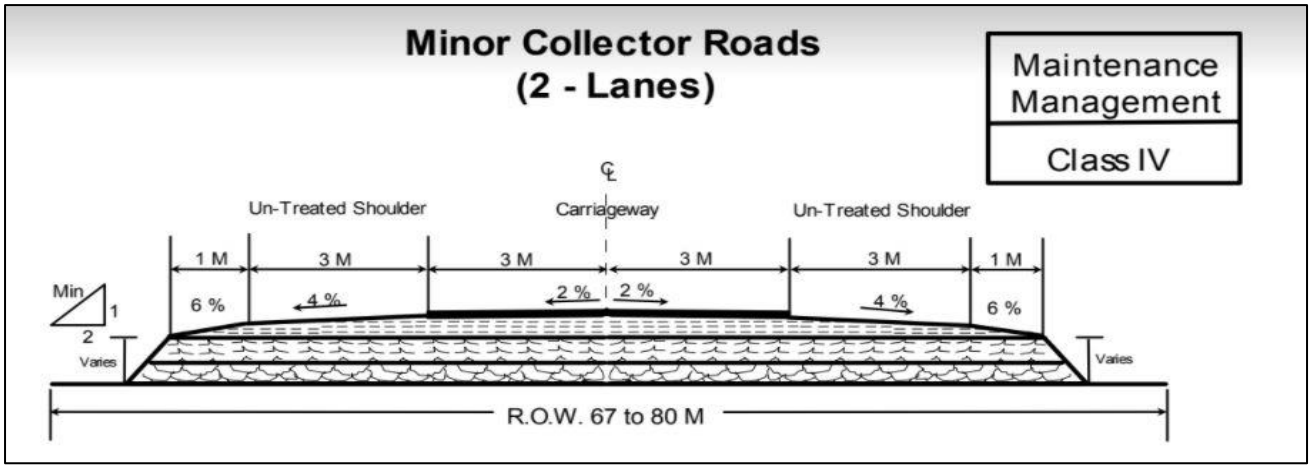
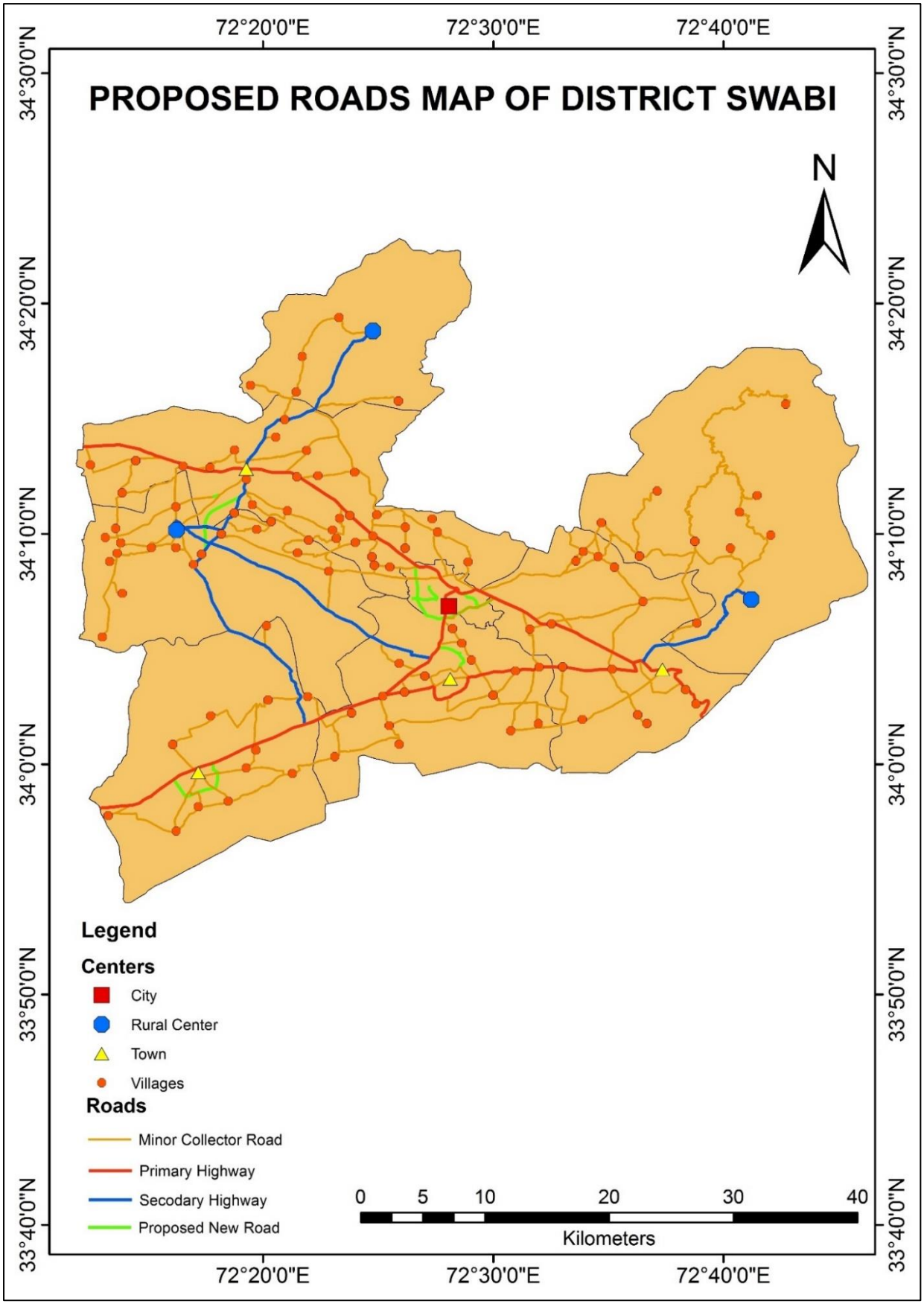


Figure 5.8.3: Minor Collector Roads (2 – Lanes)

5.8.11 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.



Map 5.8.3: Proposed Roads Map of District Swabi

5.9 MULTIPLE LANDUSE COMPLEX

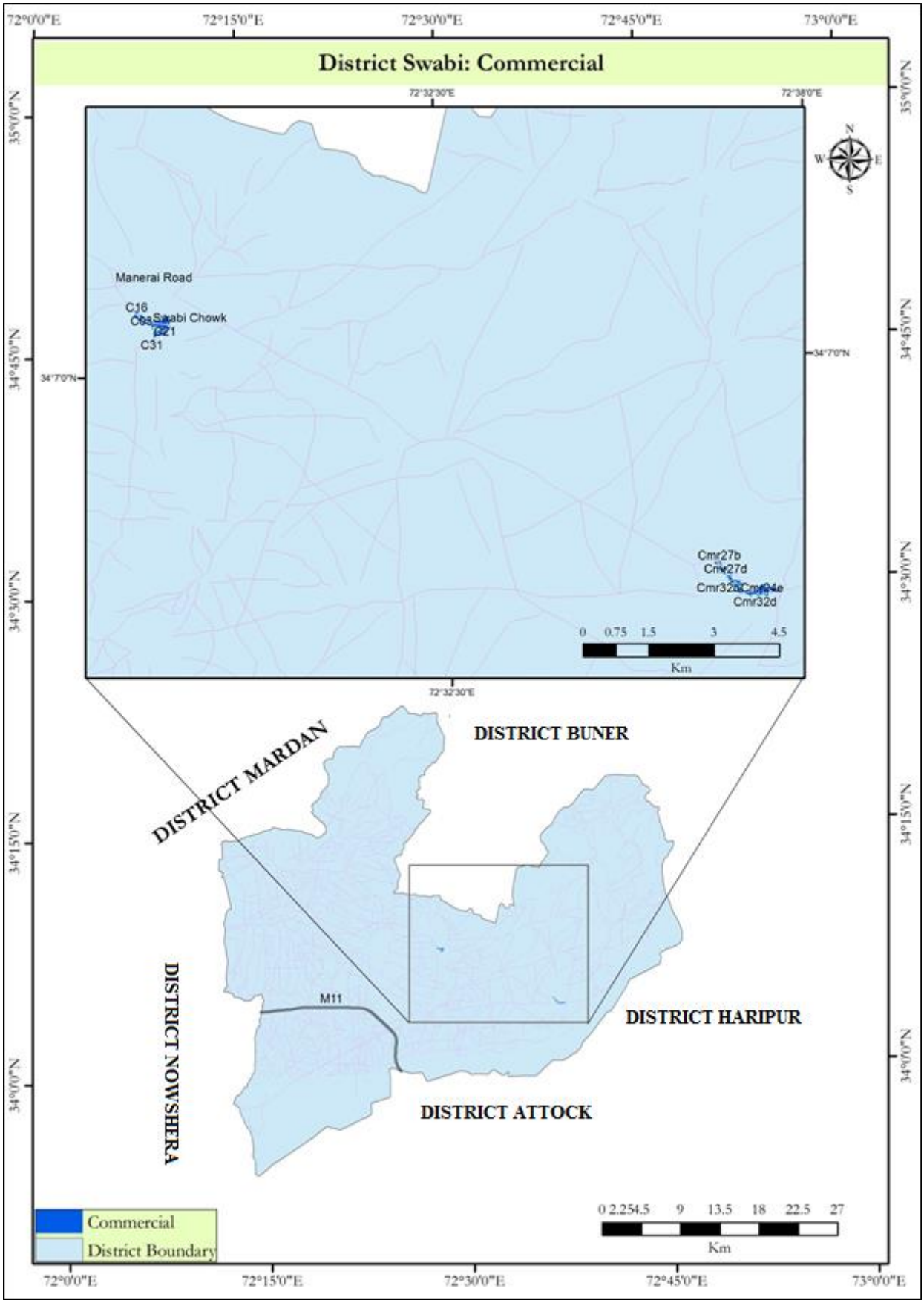
District Swabi has potential to enhance district's income manifold by allocating more land and financial resources to local business and trade to meet local demands and develop export oriented production in KP. For this, Swabi would have to depend heavily on safety and security of people and assets for the desired rapid commercial growth. Businesses and commerce shall be evolved and developed like the other developed countries. To this end the skill improvement, and increase in efficiency with which new processes are adopted. Besides, flow of information, better infrastructure, availability of funds and quality inputs, and investor/entrepreneurs' managerial capabilities shall be streamlined. Empirical evidence shows that suitable commercial, financial, economic and trade policies directly influence the productivity and economic growth.

The main trade and commercial centers of Swabi are:

i. Mardan Road
ii. Jhangira Road
iii. Saddar Bazaar Tordhair

Other commercial areas include Panjpeer, Yar Hussian, Bazar, Tordhair, Saddar Bazar, Swabi City Bazar, Ziarat Road, Raja Bazaar, Meena bazaar and link road. All types of markets are located there, including food items, garments, shoes, cloths etc.

Mardan Road is the main commercial hub of Swabi, where most of electronics shops are present. Moreover, there are markets comprising fertilizers, travel agency, medical stores and clinics of different doctors.



Map 5.9. 1: Commercial Areas Map of District Swabi

Some of the major constraints that need to be removed for sustainable development of commerce and trade are listed below:

1. Lack of properly planned and developed land
2. Threat due to terrorism and absence of emergency disaster response, like firefighting, and emergency exits, as such many lives assets and property has been damaged during recent terrorists' attacks.
3. Large fluctuation in prices and rates of products and services
4. Frequent Power outages
5. Uncontrolled inflation
6. No standardization for specifications of products
7. Lack of quality standards
8. Lack of adequate and proper Car Parking area
9. Absence of loading and unloading bays
10. Lack of solid and liquid waste disposal.
11. Life threatening mix of petrol pumps, CNG stations, hotels, restaurants and motels
12. Mixed and conflicting land use of education, health, residential small industry and commercial land use.
13. Absence of basic facilities for the customers like toilets, rest areas, lockers etc.
14. Lack of firefighting safety and security system
15. Mix of hazardous and non-hazardous commercial uses.

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.

Swabi has few city-level planned commercial centers with adequate parking. Generally, Land use pattern in Swabi 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 Swabi.

Future Land use policy for Swabi should respect the fact that much of Swabi'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 Multiple Landuse Complex including a Commercial Zone in it Swabi will maximize the aggregate convenience of traders and the inhabitants. By providing such a Centre, the present Central Business District of Swabi and the inner city can be decongested, and the residents can avoid areas of traffic clogging.

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.

As is clear from the Table, 5.9.2. Total 14.32 acres of commercial area will be required during the first years of plan period (2021 -2025), and 57.66 acres during the subsequent 15 years.

Table 5.9.1: Total Future Trade Zone & Commercial Area Required (2021-40)

Year/Period	**Urban Population**	
2021	302081	**Commercial Area Required** @0.5 acres/1000 persons)
2025	330717	
2040	446027	
Additional urban Population (2021 -2025)	28636	14.32 Acres
Additional urban population (2026 -2040)	115310	57.66 Acres
Total Additional Urban Population (2021 -2040)	143946	71.97 Acres

The total requirements of commercial area thus, during the entire plan period will be 71.97 acres.

5.9.1 Future Commercial Area Requirement

5.9.2 Current Commercial Area Gap

The current commercial area gap has been calculated as below:

Urban Population (2021): 302081

- Commercial Area required (@0.5 acres/1000 persons)[52]= 151 acres

[52] Source: Adapted from National Reference Manual on Planning and Infrastructure Standards, Page 307, Table 10.4.

- Current area under commercial Land use: 64 acres[53]
- Commercial area deficiency: 151-64= 87 acres

It is clear from the above that by the end of plan period, the total commercial area requirement would include 87 acres to meet the current deficiency, and 510.47 acres to meet the future requirement. The total would be thus 87+510.47 = 597.47 acres.

Multiple Landuse Complex is proposed to be located at the confluence point of Motorway and Jahangira Road. The following are also proposed to form a part of this Complex:

- Medical Complex
- Swabi University
- Ancillary uses

5.10 PUBLIC AND COMMUNITY FACILITIES

5.10.1 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, 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, Degree Colleges. Educational statistics in the District, including number of different institutions, enrollment and teaching staff are given in the Table 5.10.1 below:

Table 5.10. 1: Educational Statistics in District Swabi (2018-2019)[54]

Institutions	Number			Enrolment			Teaching Staff		
	Total	M	F	Total	M	F	Total	M	F
Primary	1018	573	445	178,389	93,130	85,259	4,051	2,448	1,603
Middle	129	69	60	60,447	35,463	24,984	717	399	318
High	125	76	49	26,761	16,226	10,535	2,082	1,301	781
Higher Secondary	43	25	18	5,758	4,091	1,667	1,378	1,105	363
Colleges	16	7	9	8,087	4,606	3,481	387	173	214
Universities	3	2	1	--	--	--	--	--	---

[53] Chapter 2, Table 2.4 of this Report

[54] Development statistics- 2020

5.10.2 Educational Institutions in Private Sector

The total number of private primary schools in the Province is 2,127[55]. Since the number of Districts is 24, the average number of primary schools per District works out to be about 89, as against 60 in District Swabi (Table 5.10.2). Thus, the number of private primary schools in District Swabi is 102. The details of Middle, High and Higher Secondary Schools are 163, 125 and 56 respectively.

Table 5.10. 2: Number and Enrolment in Private Institutions[56]

Level	Number of Institutions	Enrolment	Staff
Primary Schools	102	13290	757
Middle Schools	163	31374	1694
High Schools	125	51464	2433
Higher Secondery Schools	56	24465	1244

Literacy Ratio

A person was treated as literate in 1998 Census if he could read newspaper or a journal of the same standard and could write a simple letter in any language. The literacy is measured as the ratio, in percentage, of literate population to corresponding population aged 10 years and over. The literacy ratio in District Swabi in 2014-2015 was 49%.

Literacy rate is calculated as the percentage of total number of literates divided by total population. Thus, total number of literates can be calculated using the below formula:

Based on calculation by using the above formula the current literate population of the district Swabi 835452.45. By projecting the current population to 2039, the literate people will be 1354420.3.

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

Table 5.10. 3: Participation Rate in The District[57] (2018-19)

Schools	Total	Male	Female
Primary	59	59	60
Middle & High	34	38	29

[55] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020.

[56] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020.

[57] Elementary and Secondary Education Department. Govt: of Khyber Pakhtunkhwa

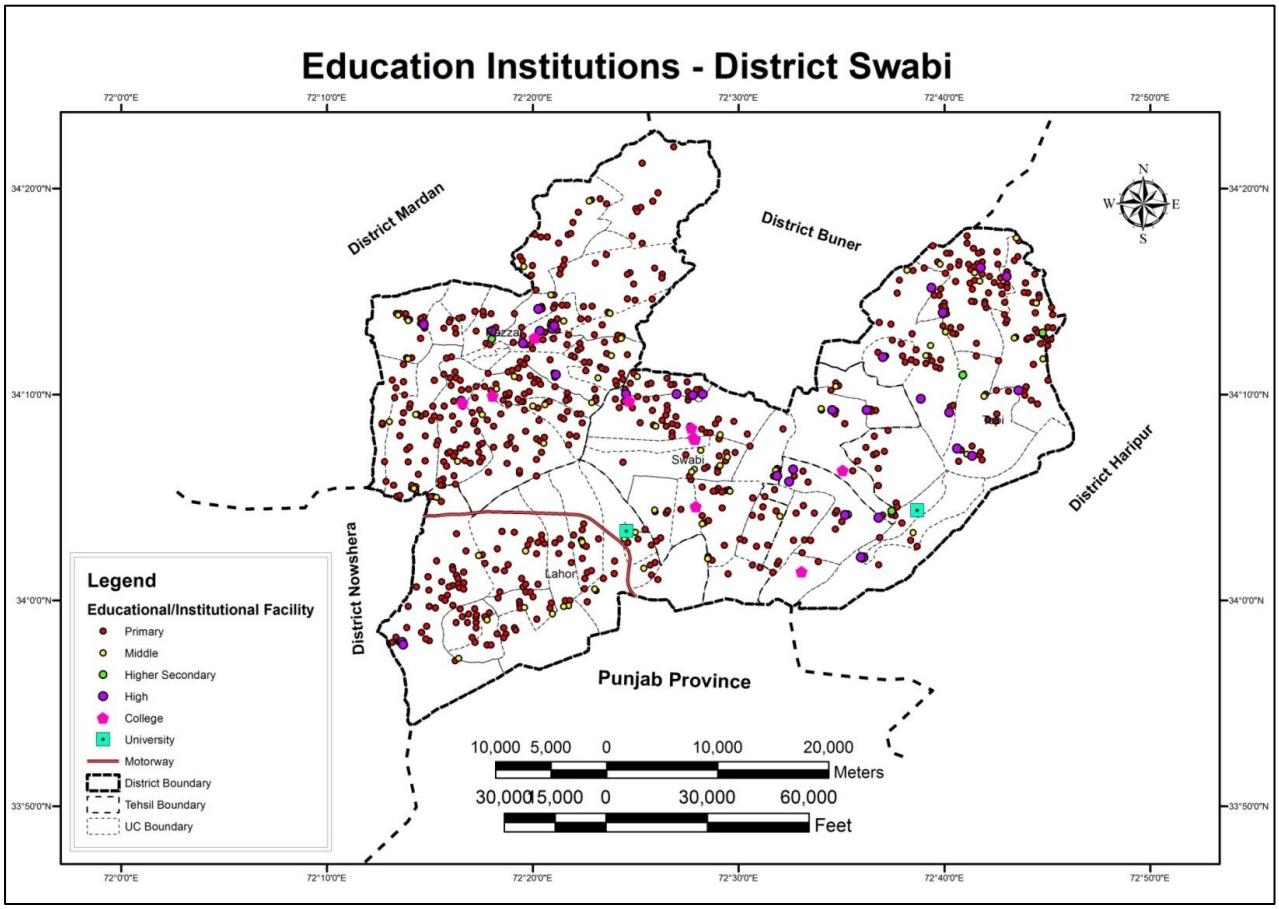
group of the level, considered. The age group of the population eligible for primary stage education is 5-9 years.

At primary level, the participation rate in District Swabi for both sexes is around 59.89 (59 for males and 60 for females). At middle and high level, the participation rates in the same order are around 34, 38 and 29 respectively. (Table 5.10.3).

Universities

District Swabi has the following universities:

- University of Swabi
- GIKI
- Swabi Women University



Map 5-1: Education Institutions Map of District Swabi

5.10.3 Educational Plan

Short Term Education Plan (2021 -2025)

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

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 5.10. 4: 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 @1acrs/ps**
Urban	302,081	330,717	28,636	4	4
Rural	1,486,960	1,639,405	1,52,445	20	20
Total	1, 789,041	1,970,922	1,81,081	24	24

Table 5.10. 5: 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 @4acrs/ss**
Urban	302,081	330,717	28,636	2	8
Rural	1,486,960	1,639,405	1,52,445	13	52
Total	1, 789,041	1,970,922	1,81,081	15	60

Long-Term Education Plan (2026-2040)

Table 5.10. 6: Additional Colleges Required In Short- term Plan (2021 -2025)					
District Area	**Population 2021**	**Population 2025**	**Additional Population (2021 - 2025)**	**No of colleges required @1 college for 400,000 pop**	**Aggregate Land required @10acrs/c**
Urban	302,081	330,717	28,636	-	-
Rural	1,486,960	1,639,405	1,52,445	-	-
Total	1, 789,041	1,970,922	1,81,081	-	**10**

It is estimated that during the Long-term plan, the District Swabi require 105 additional primary schools, 66 secondary schools and 2 colleges. Tables 5.10.7 give requirements for urban as well as rural areas of District Swabi.

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.

Besides, as already stated, a Swabi University is also proposed in the Multiple Land use Complex, at the confluence point of motorway and Jahangira Road.

Table 5.10. 7: 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 @10acrs/ps
Urban	338290	446027	107,737	14	14
Rural	1679899	2363945	6,84,046	91	91
Total	2,018,189	2,809,972	791,783	105	105

Table 5.10. 8: Additional Secondary 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 @4acrs/ss
Urban	338290	446027	107,737	9	36
Rural	1679899	2363945	6,84,046	57	228
Total	2,018,189	2,809,972	791,783	66	264

5.11 HEALTH

5.11.1 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[58]:

i. 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 Centre.

ii. Dispensary

It is a health institution having less than 10 beds.

iii. Rural Health Centre (RHC)

Table 5.10. 9: Additional Colleges 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 acres/college
Urban	338290	446027	107,737	0	0
Rural	1679899	2363945	6,84,046	2	20
Total	2,018,189	2,809,972	791,783	2	20

A Rural Health Centre 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 micro-surgery. Rural Health Centers are linked through tehsil hospitals to District Headquarter Hospitals, which have all medical facilities.

iv. Sub-Health Centre

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

v. Basic Health Unit (BHU)

Under the present concept, 4 Basic Health Units are linked to a Rural Health Centre. A BHU is provided to serve about 5,000 to 10,000 populations. It is responsible for comprehensive health care which,

[58] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020.

among other things, includes midwifery, child care, immunization, diarrhea diseases, malaria control, child spacing, mental and school health services within its areas.

Table 5.11.2 gives distribution of health facilities in the Province as well as in District Swabi. The total number of hospitals in Khyber Pakhtunkhwa (Government as well as private) is 196, of which 6 hospitals (about 3.4%) are in District Swabi. Similarly of the total 973 dispensaries in the Province, 10 dispensaries (about 3%) are in District Swabi. There are 9 Rural Health Centers in the District. The details about TB Clinics, MCH centers, sub-health centers, Basic Health Units and leprosy clinics are given in Table 5.11.1.

Table 5.11. 1: Health Institutes in District Swabi 2019.[59]

BASIC HEALTH UNIT

S.No	Inst ID	Inst Name	Tehsil/	Class	Beds	Locality	Status
1	352001	BHU Dagai	Lahore	I	-	R	Functional
2	352002	BHU Jalbai	Lahore	I	-	R	Functional
3	352003	BHU Jalsai	Lahore	I	-	R	Functional
4	352004	BHU Lahore Poray	Lahore	I	-	R	Functional
5	352005	BHU Lahore Rapory	Lahore	I	-	R	Functional
6	352006	BHU Mangolchai	Swabi	I	-	R	Functional
7	352007	BHU Mankai	Lahore	I	-	R	Functional
8	352009	BHU Qadra	Swabi	I	-	R	Functional
9	352010	BHU Shah Mansoor	Swabi	I	-	R	Functional
10	352011	BHU Tarakai	Swabi	I	-	R	Functional
11	352013	BHU Bachai	Swabi	I	-	R	Functional
12	352014	BHU Parmoli (Bahadar Abad)	Swabi	I	-	R	Functional
13	352015	BHU Baja	Swabi	I	-	R	Functional
14	352016	BHU Beka	Lahore	I	-	R	Functional
15	352017	BHU Dhobian	Lahore	I	-	R	Functional
16	352018	BHU Fazal Abad	Lahore	I	-	R	Functional

17	352019	BHU Gandaf	Swabi	I	-	R	Functional
18	352020	BHU Gani Chatra	Swabi	I	-	R	Functional
19	352021	BHU Ismaila	Swabi	I	-	R	Functional
20	352023	BHU Jehangira	Lahore	I	-	R	Functional
21	352024	BHU Kalabat	Swabi	I	-	R	Functional
22	352025	BHU Mian Killi	Swabi	I	-	R	Functional
23	352026	BHU Maini	Swabi	I	-	R	Functional
24	352027	BHU Sadri Jadid	Swabi	I	-	R	Functional
25	352028	BHU Sard China	Swabi	I	-	R	Functional
26	352030	BHU Zaida	Swabi	I	-	R	Functional
27	352031	BHU Zarobi	Swabi	I	-	R	Functional
28	352032	BHU Adina	Swabi	I	-	R	Functional
29	352033	BHU Beta Kara	Swabi	I	-	R	Functional
30	352034	BHU Dheri Zakria	Lahore	I	-	R	Functional
31	352036	BHU Check Nodeh	Swabi	I	-	R	Functional
32	352037	BHU Punj Pir	Swabi	I	-	R	Functional
33	352038	BHU Salim Khan	Swabi	I	-	R	Functional
34	352039	BHU Shewa	Swabi	I	-	R	Functional
35	352040	BHU Tando Kohi	Swabi	I	-	R	Functional
36	352041	BHU Yaqoobai	Lahore	I	-	R	Functional
37	352068	BHU Gabasni	Swabi	I	-	R	Functional
DISPENSARIES							
1	352042	CD Bam Khel	Swabi	I		R	Functional
2	352043	Civil Dispy: Shewa.	Swabi	I	-	R	Functional

3	352044	Civil Dispy: Bada	Swabi	I	-	R	Functional
4	352045	Civil Dispy: Gajjai	Swabi	I	-	R	Functional
5	352047	Civil Dispy: Col:Sher Kali (Nawan K	iSwabi	I	-	U	Functional
6	352048	Civil Dispy: Pehure hemlet	Swabi	I	-	R	Functional
7	352050	Civil Dispy: Utla	Swabi	I	-	R	Functional
8	352051	Civil Dispy: Naranji	Swabi	I	-	U	Functional
9	352065	Civil Dispy: Malak Abad	Swabi	I	-	R	N/Functional
10	352066	Civil Dispy: Sookalai	Swabi	I	-	R	N/Functional
11	352067	Civil Dispy: Gani Kot	Swabi	I	-	R	N/Functional
12	352069	Civil Dispy: Chanai	Swabi	I	-	R	Functional
13	352071	Civil Dispy:Asota Sharif	Razar	I	-	R	Functional
HOSPITALS							
1	352005	THQ Lahoor	Lahore	I	110	U	Functional
2	352054	Civil Hospital Kab Ganai	Swabi	I	10	R	Functional
3	352055	Type D Hospital Kalu Khan	Razar	I	50	R	Functional
4	352056	Civil Hospital Topi	Swabi	I	50	U	Functional
5	352064	DHQ: Hospital, Swabi	Swabi	I	110	U	Functional
6	352070	Bacha Khan Medical Complex	Swabi		200	U	Functional
Total Beds					**530**		
LEPROSY CLINIC							
1		Leprosy clinic, Swabi	Swabi	I	-	U	Functional
MCH CENTRES							
1	352058	Govt. MCH Centre Lahore	Lahore	I	-	R	Functional

2	352059	Govt. MCH Centre Swabi	Swabi	I	-	U	Functional
3	352060	Govt. MCH Centre Topi	Swabi	I	-	U	Functional
4		Govt.MCH Center Baja	Swabi	I	-		Functional
RURAL HEALTH CENTRES							
1	352008	RHC Marghuz	Swabi	I	18	R	Functional
2	352029	RHC Sheikh Jana	Swabi	I	18	R	Functional
3	352061	RHC, Anbar Kunda	Swabi	I	18	R	Functional
4	352072	RHC, Kotha	Swabi	I	8	R	Functional
5	352012	RHC, Tordher	Swabi	I	10	R	Functional
6	352062	RHC, Yar Hussain	Swabi	I	18	R	Functional
7		RHC, JHANDA	Swabi	I			
	Total Beds				**90**		
T.B CLINICS							
1	352063	TB clinic civil Hospital, Kalu Khan.	Swabi	I	-	R	Functional
2		TB clinic, DHQ Hospital, Swabi.	Swabi	I	-	U	Functional

Table 5.11. 2: Distribution of Health Institutions: Khyber Pakhtunkhwa Vs District Swabi[60]

Area	Number of Health Institutions in 2019[59]							
	Hospitals	**Dispensaries**	**RHCs**	**TB Clinics**	**MCH Centers**	**Sub-Health Centers**	**BHUs**	**Leprosy Clinics**
Khyber Pakhtunkhwa	196	973	125	73	151	26	943	23
District Swabi	6	10	9	2	3	0	35	1
% in District Swabi	3.06%	1.1 %	7.2%	2.7 %	1.9%	0%	3.7 %	4.3

5.11.2 Private Health Institutions

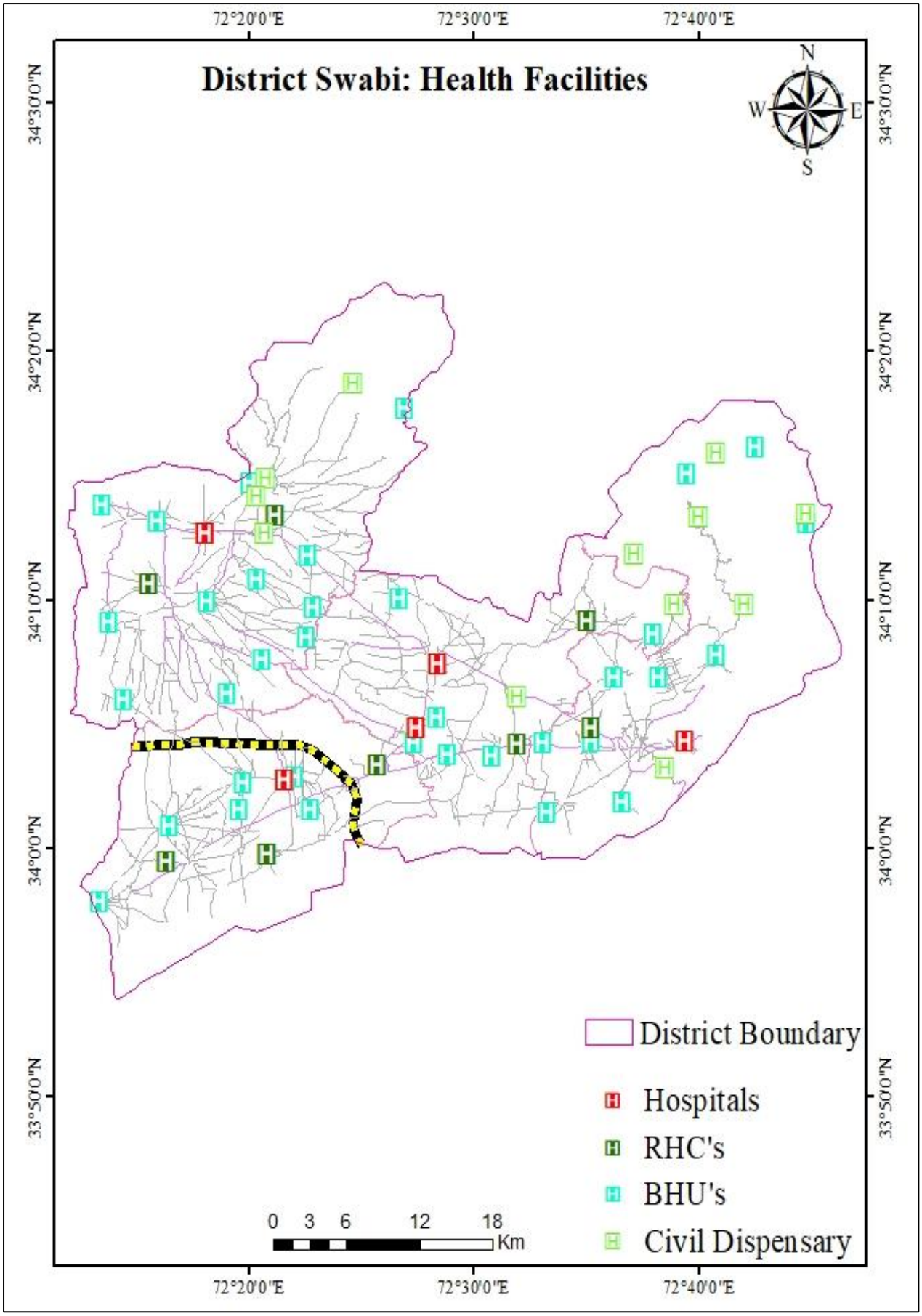
Apart from total numbers, it is also important to study the contribution of private sector in provision of health facilities. Table 5.11.3 gives the government-private split for hospitals of the total 172 hospitals in the Province, 80.2% are Government owned and about 19.8% are being run by private sector. However, as seen in the Table, in case of District Swabi, there are 6 hospitals all of which are Government owned; there is no private hospital in the District. The distribution map of health facilities in context of district Swabi is shown in the map below.

Table 5.11. 3: Distribution of Govt. Vs. Private Hospitals[60]

Area		Number of Institutions (2019)		
		Government	**Private**	**Total**
Khyber Pakhtunkhwa	No.	138	34	172
	%	80.2	19.8	100%
District Swabi	No.	6	0	6
	%	100	0	100%

[59] Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020, (includes institutions in private sector).

[60] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020.



Map 5.11.1: Health Facilities Map of District Swabi

5.11.3 Distribution of Beds

Table 5.11.4 presents the distribution of beds in the province as well as in the district health institutions. There is 20,825 beds in the province, of which more than 90% are in hospitals and 8.5% in rural health centers. In district Swabi, about 83% of the total beds are in hospitals as against about 17% in Rhcs, while there are no beds in dispensaries.

Table 5.11. 4: Distribution of Beds in Health Institutions: Khyber Pakhtunkhwa Vs District Swabi[61]

Area		Number of Beds (2019)				Total
		Hospitals	Dispensaries	RHCs	TB Clinics	
Khyber Pakhtunkhwa	No.	20,835	12	1,802	52	22,701
District Swabi	No.	650	0	180	0	830
District Swabi share in whole province	%	3.2%	0%	9.9%	0%	3.6%

Table 5.11.5 gives distribution of beds in Government health institutions against private institutions.

In the Province, more than 94.3% of the beds are in government institutions as against 5.7% in private institutions. In District Swabi, there are no private hospitals, and hence no beds.

Table 5.11. 5: Distribution of Beds in Govt. Vs. Private Institutions[62]

Area		**Number of Beds (2019)**		
		Government	**Private**	**Total**
Khyber Pakhtunkhwa	No.	20,835	1275	22110
	%	94.3 %	5.7%	100%
District Swabi	No.	650	175	825
	%	78 %	22 %	100%

In the year 2016, there were on average, 1927 persons per bed in the Province as against 2304 persons per bed in District Swabi[63].This shows that the ratio is much better in the overall Province than in District Swabi, since the number of persons per bed in the Province is around higher than in District Swabi.

[61] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics 2016, Page 158.
[62] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2016, Page 157.
[63] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2016, Page 159.

5.11.4 Patients Treated in Health Institutions: Indoor and Outdoor

Table 5.11.6 shows that in 2019, the Province has more than 23.6 million patients were treated in health institutions, of which about 96.7% were outdoor patients and around 3.3% were indoor patients. The former includes old and new cases.

In case of District Swabi, patients treated were about 17.6% Indoor and 82.4% Outdoor.

Table 5.11. 6: Patients Treated: Province Vs. District Swabi[64]

Area		Patients Treated in 2019		
		Indoor	Outdoor[65]	Total
Khyber Pakhtunkhwa	No.	981,704	28,557,178	29,538,882
	%	3.3%	96.7%	100%
District Swabi	No.	300,079	1,403,132	1,703,211
	%	17.6%	82.4%	100%

5.11.5 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 had 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

[64] Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2020.
[65] Outdoor patients include old and new cases.

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

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

3.2 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 under age 5 mortality to at least as low as 25 per 1,000 live births.

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

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

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

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

3.7 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.

3.8 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.

3.9 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.

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.b 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.c 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.

5.11.6 Major Diseases in Last Two Years

Coronavirus or COVID19: The coronavirus or COVID19 pandemic is an ongoing pandemic caused by severe acute respiratory syndrome. The first case of corona was identified in early December, 2019 in Wuhan province of China. The WHO declared public emergency on 30th January, 2020 and later a pandemic on 11th March 2020. At present (April 8, 2021), more than 132 million cases and 2.88 million deaths have been confirmed due to COVID19 making it one of the deadliest pandemic in history[66].

The common symptoms of COVID19 includes dry cough, fever, tiredness, aches and pains, sore throat, headache, loss of taste, and diarrhea and serious symptoms include difficulty in breathing, chest pain, and loss of speech or movement. The precautionary measures required for preventing one from getting exposed to COVID19 includes: use of face mask, wash hands frequently for 20 seconds etc[67].

First case of COVID19 was registered in Pakistan on 26th February, 2020 in Karachi. In Khyber Pakhtunkhwa, 88099 cases and 2363 deaths due to COVID19 were registered till March 31, 2021. 76640 people have recovered from COVID19 in Khyber Pakhtunkhwa. Swabi has been severely affected by COVID19 having 1941 cases and 85 deaths are registered till March 31st, 2021. 1422 people have recovered from COVID19 in Swabi.[68]

Table 4-29: Corona Cases in District Swabi Vs Khyber Pakhtunkhwa (March, 2021)

Corona Cases in District Swabi Vs Khyber Pakhtunkhwa (March, 2021)						
	Cases total	**24hrs**	**Deaths total**	**24hrs**	**Recoveries**	**Active Cases**
KP	88099	1044	2363	21	76640	9096
Swabi	1941	37	85	1	1422	434

Anemia Among Women

Anemia is a condition that develops when your blood lacks enough healthy red blood cells or hemoglobin. Hemoglobin is a main part of red blood cells and binds oxygen. If you have too few or

[66] https://en.wikipedia.org/wiki/Coronavirus

[67] https://covid.gov.pk/

[68] http://healthkp.gov.pk/public/uploads/sitrep_Sitrep%20-%202021_03_31.pdf

abnormal red blood cells, or your hemoglobin is abnormal or low, the cells in your body will not get enough oxygen.

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. 5.11.7 Shows the detailed statistics of Anemia among Women in Swabi.

Table 5.11. 7: Anemia among Women in Swabi

Year	First Antenatal care visits in the facility	ANC-1 women with Hb. under 10 g/dl	Percentage
2019 -1st Quarter[69]	8389	1073	12.79
2018 -3rd Quarter[70]	9907	1487	15
2018 2nd Quarter[71]	10675	1665	16
2018 1st Quarter [72]	9328	1162	12.46

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. 5.11.8 Shows the detailed statistics in Swabi.

Table 5.11. 8: Malaria Parasite in Swabi

Year	Slides examined	MP positive	Percentage
2019 1st-Quarter[73]	1740	41	2
2018 3rd -Quarter[74]	2690	426	16
2018 2nd- Quarter[75]	2268	246	11
2018 1rd Quarter[76]	2155	92	4

Plasmodium Falciparum

[69] District health information system: 1st Quarter Report 2019

[70] District health information system: 3 rd Quarter Report 2018

[71] District health information system: 2nd Quarter Report 2018

[72] District health information system: 1st Quarter Report 2018

[73] District health information system: 1st Quarter Report 2019

[71] District health information system: 3rd Quarter Report 2018

[75] District health information system: 2nd Quarter Report 2018

[76] District health information system: 1st Quarter Report 2018

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. 5.11.9 Shows the detailed statistics in Swabi.

Table 5.11. 9: Plasmodium Falciparum in Swabi

Year	Slides examined	Slides P. Falciparum +ve	Percentage
20191st-Quarter[70]	1740	1	0.06
2018 3rd -Quarter[71]	3410	22	0.65
2018 2nd -Quarter[72]	1944	0	0
2018 1st -Quarter[73]	2155	2	0.09

Hepatitis B +ve

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. 5.11.10 shows the detailed statistics in Swabi.

Table 5.11.10: Hepatitis B +ve in Swabi

Year	Patients screened	Hepatitis B +ve	Percentage
Annual Health Report 2018	7366	112	1.52
Annual Health Report 2017	5948	92	1.55
2016[77]	3286	71	2.16
2015[78]	710	49	6.90

Hepatitis C +ve

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 do not 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. 5.11.11 shows the detailed statistics in Swabi.

[77] District health information system: Annual Report 2016

[78] District health information system: Annual Report 2015

Table 5.11. 11: Hepatitis C +ve in Swabi

Year	Patients screened	Hepatitis C +ve	Percentage
Annual Health Report 2018	7366	199	2.70
Annual Health Report 2017	5948	158	2.66
2016[74]	3286	169	5.14
2015[75]	710	52	7.32

5.11.7 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.

Major Diseases in KP And District Swabi 2019						
Region Location	Cases total	In 24hr	Total Deaths	In 24hr	Rcoveries	Active cases
KP	88099	1044	2363	21	76640	9096
Swabi	1941	37	85	1	1422	434
Noeshera	3614	66	68	0	2734	812

- 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 Swabi.
- 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.

5.11.8 Health Plan

Health Proposals for Short-Term (2021 -2025)

i. Provision of Basic Health Units

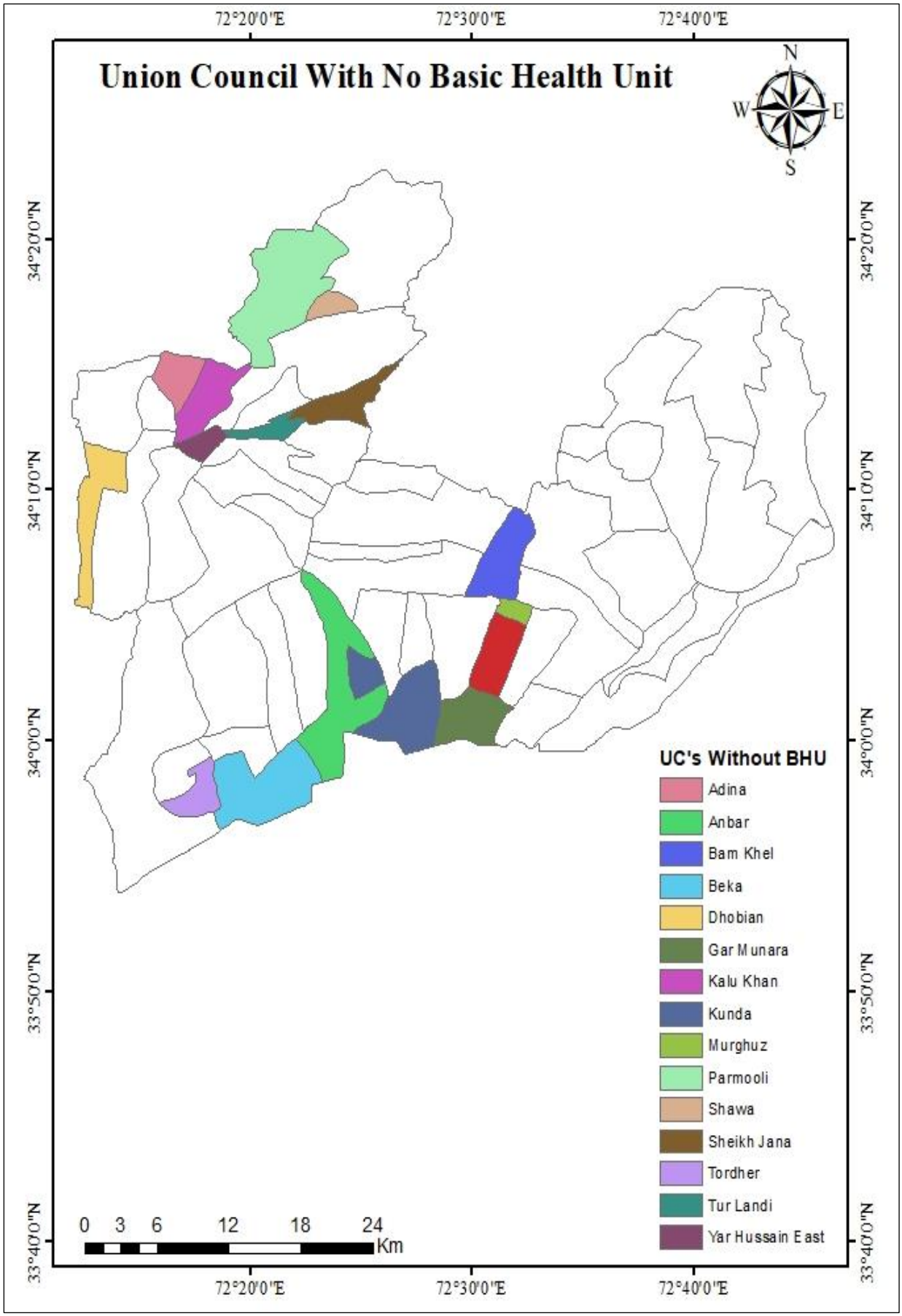
The total number of UCs (urban as well as rural) in the District is 55, of which 3 UCs are urban / urbanizing and remaining 52 UCs are rural. The 3 urban/urbanizing UCs are well-served with medical facilities, and are not dependent on BHUs. These lie in the Core of Swabi and include hospitals, medical centers and private health institutions. Thus, in the 3 urban UCs, BHUs are not required. In 52 rural UCs, 15 rural UCs are without any BHU, and thus need at least one BHU in each of these. However, 19 UCs have 1BHU, 12 UCs have 2BHU and 6 UCs have more than 2 BHU. The details are provided in Table 5.11.12. However, as already stated, 15 rural UCs of the District are without any health facility, and need at least one BHU in each. The consultants did not come across any health standards manual in KP, and therefore consulted District Planning Manual of Punjab. The standards given in National Reference Manual is to provide one Basic Health Unit for every 10,000 persons. The District Planning Manual[79]however states that due to resource constraint, it might be more practicable to set up at least one basic health unit in every union council. However, population is not the sole criteria for estimating the number and location of BHUs. The Manual provides the yardstick for selecting a village where BHU is to be located.

These 15 UCs without a single BHU is shown in Map 5.11.2.

[79] Planning and Development Board, Government of Punjab, 2002, page 58.

Table 5.11. 12: Rural Union Councils with Number of BHUs in District Swabi

S. No.	Rural UCs Vs BHUs	Number of UCs	Names of UCs
1	UCs with no BHU	15	Kunda, Bam khel, Gar Munara, Anbar, Beka, Tordher, Yar Hussain East, Parmooli, Shawa, Adina, Dhobia, Tur Landi, Todher, Murghuz, Kalu Khan
2	UCs with 1 BHU	19	Narangi, Naudeh, Chak Naudeh, Yar Hussain West, Ismaila, Bachai, Salim Khan, Yaqubi, Matani Changan, Mankai, Shah Mansur, Zaida, Batakara, Topi East, Topi West, Ghabsani, Kabgani, Jhanda, Pabni
3	UCs with 2 BHU	12	Jehangira, Lahore Porai, Thand kohi, Murghuz, Zarobi, Kotha, Pabni, Gani chatra, Sudhar, Dagai, Asota, Tarakai
4	UCs with more than 2 BHU	6	Sard China, Jalsai, Lahoer Raporai, Kalabat, Gandaf, Maini



Map 5.11 2 Union Councils without BHU provision

Table 5.11. 13: Rural Health Centres Required in the Short-Term Plan (2021-2025)				
Rural Population 2021	Rural Population 2025	RHCs Required in 2025	Existing RHCs	Net Required by 2025
1,486,960	1,639,405	22	4	18

ii. Provision of Rural Health Centers (RHCs)

Based on population criteria of 1 RHC for 75,000 populations[80], a total of 22 RHCs are required by the end of short-term plan period. The existing number of RHCs is 4, entailing a net requirement of 18 RHCs in rural areas of the District Swabi.

iii Increasing Number of Beds:

Applying the national standard of 2 beds per 2000 persons[81], the gross number of beds required at the end of short-term period is 3940, while the existing numbers of beds are 825. Thus, additional 3,115 beds will be required by the year 2025. (Table 5.11.15)

Table 5.11. 14: Number of Beds Required in Short Term Plan (2021-2025)				
Population 2021	Population 2025	Number of Bed required in 2025	Existing number of Beds	Net Required by 2025
1,789,041	1,970,122	3940	825	3115

Health Proposals for Long-Term Plan (2026 -2040)

i. Provision of Basic Health Units

For the period 2026-2040, it is proposed that each of the 51 rural union council should have at least two BHUs in each during the long-term period are as below:

Table 5.11.16: Union Councils Proposed to have Two BHUs in the Long-Term Plan

Kunda, Bam khel, Gar Munara, Anbar, Beka, Tordher, Yar Hussain East, Yar Hussain West, Parmooli, Shawa, Adina, Dhobia, Tur Landi, Todher, Shah Mansur, Murghuz, Kalu Khan, Narangi, Naudeh, Chak Naudeh, Yar Hussain West, Ismaila, Bachai, Salim Khan, Yaqubi, Matani Changan, Mankai, Shah Mansur, Zaida, Batakara, Topi East, Topi West, Ghabsani, Kabgani, Jhanda, Pabni

[80] Source: National Reference Manual on Planning and Infrastructure Standards, Table 6.7, Page 122.
[81] Source: National Reference Manual for Planning & Infrastructure Standards, Section 6.2.2, Page 122.

ii Provision of Rural Health Centers (RHCs)

Based on population criteria of 1 RHC for 75,000 populations[82], a total of RHCs will be required by the year 2040 . During the short-term plan of first five years (2021 -2025), 18 RHCs are proposed to be provided. If this proposal is implemented, 10 additional RHC will be required during 2026 -2040.

Table 5.11. 15: Rural Health Centres Required in the Long-Term Plan (2026-2040)

Rural Population 2026	Rural Population 2040	RHCs Required in 2040	Existing RHCs upto 2025	Net Required by 2040
1679899	2,363,945	32	22	10

iii. Increasing Number of Beds

Applying the national standard of 2 beds per 1000 persons[83], number of beds required for the additional population during the period 2026-2040 are 5620 in which 3940 are proposed to be constructed in the short term plan. (Table 5.11.16).

Table 5.11.16: Number of Bed Required in Long Term Plan (2026-2040)

Population 2026	Population 2040	Number of Bed required in 2040	Existing number of Beds upto 2025	Net Required by 2040
2,018,189	2,809,972	5620	3940	1680

Besides, as already stated, a medical complex is also proposed in the Multiple Land use Complex, at the confluence point of motorway and Jahangira Road.

5.12 TRADE AND COMMERCE

5.12.1 Distribution of Different Level Commerce and Trade Centers

District Swabi is located in the main stream of KP. It touches three districts of KP i.e. Mardan, Nowshera and Buner. The main product of this area is tobacco and sugarcane. Cereal crops are also grown in the area in a large amount. The main commercial areas of Swabi are Panjpeer, Yar Hussian, Barar, Tordhair, Saddar Bazar, Swabi City Bazar, Ziarat Road, Raja Bazaar, Meena bazaar and link road. It has an industrial zone called gadoon amazai, which has seventy industries in service, which

[82] Source: National Reference Manual on Planning and Infrastructure Standards, Table 6.7, Page 122.
[83] Source: National Reference Manual for Planning & Infrastructure Standards, Section 6.2.2, Page 122.

produced feed mills, chappel, soap, cigarettes and marble factories. Apart from this a very precious wood called "Sheesham" is also sent to other parts of the country.

The District has a national as well as regional impact, and even to some extent, international linkages.

At international level, tiles are imported, mainly from China while Swabi's exports to foreign countries include oranges. At national level, in-coming commodities from other parts of the Country (Punjab &Sindh) include Vegetables, Fruits, Tiles, Garments and Electronic goods while in other hand there is no as such outgoing good from District Swabi.

At regional level, commodities brought to Swabi include variety of fruits and vegetables. These are mainly brought from Swat, Chitral and Nowshera. The goods sent from Swabi to other parts of the Province include Guava, Peanut, Melon, Tobacco and Vegetable (Radish and Carrot).

The details are shown in Table 5.12.1 and trade flows at different levels are shown in Figure 5.12.1.

Table 5.12. 1: Trade and Commerce Linkages of Swabi at International, National and Regional Levels

Level	In-Coming Commodities	Out-Going Commodities
International	Tiles (China)	Oranges
National	Vegetables (Punjab) Electronics (Punjab, Gujrat, Gujranwala and Faisalabad) Jewelries and Garments (Punjab) Fruits (Punjab) Tiles (Lahore, Karachi)	---
Regional	Vegetables (Charsadda, Mardan and Nowshera) Onion (Swat) Fruits (Charsadda, Mardan and Nowshera)	Guava Peanut Vegetable (Radish and Carrot) Melon Tobacco
Sub-Regional/Local	Vegetables Jewelries	---

5.12.2 Commerce and Trade Centers in Swabi

The main trade and commercial centers of Swabi are:

i. Mardan Road
ii. Jhangira Road
iii. Saddar Bazaar Tordhair

All types of markets are located there. Many small villages of Tordhair depend on this bazaar. The commodities of this bazaar include all food items, garments, shoes, cloths etc.

In Tordhair there are soap industries as well namely Sharon soap. Another soap factory of ceramics is at Bagh e Irum.

Table 5.12.2: Out-Going Commodities from District Swabi

Commodities	International	National	Regional	Sub-Regional/Local
Guava			√	
Peanut			√	
Vegetable (Radish, Carrot)			√	
Melon			√	
Tobacco			√	
Oranges	√			

Mardan Road is also the main commercial hub of Swabi, where most of electronics shops are present. Moreover, there are markets comprising fertilizers, travel agency, medical stores and clinics of different doctors.

Melon and tobacco are the intra-provincial exports of District Swabi. Beside this orange are exported to Afghanistan and other foreign countries.

5.12.3 Service Area of Commerce and Trade Centers

Data/information regarding service area of Swabi for trade and commerce was collected through field surveys.

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 is 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. Based on the above methodology and statistics given below, the tributary area of Swabi is shown in the Figure below.

Table 5.12.3: Parameters to Determine Service Area of Swabi under Gravity Model			
Cities	**City Population (Current)**	**Distance from Swabi (Km)**	**Breaking Point (Km)**
Swabi	288748	-	-
Mardan	458240	47.4	21
Nowshera	341470	65.4	31
Haripur	126577	67.9	41
Peshawar	2100971	102	28

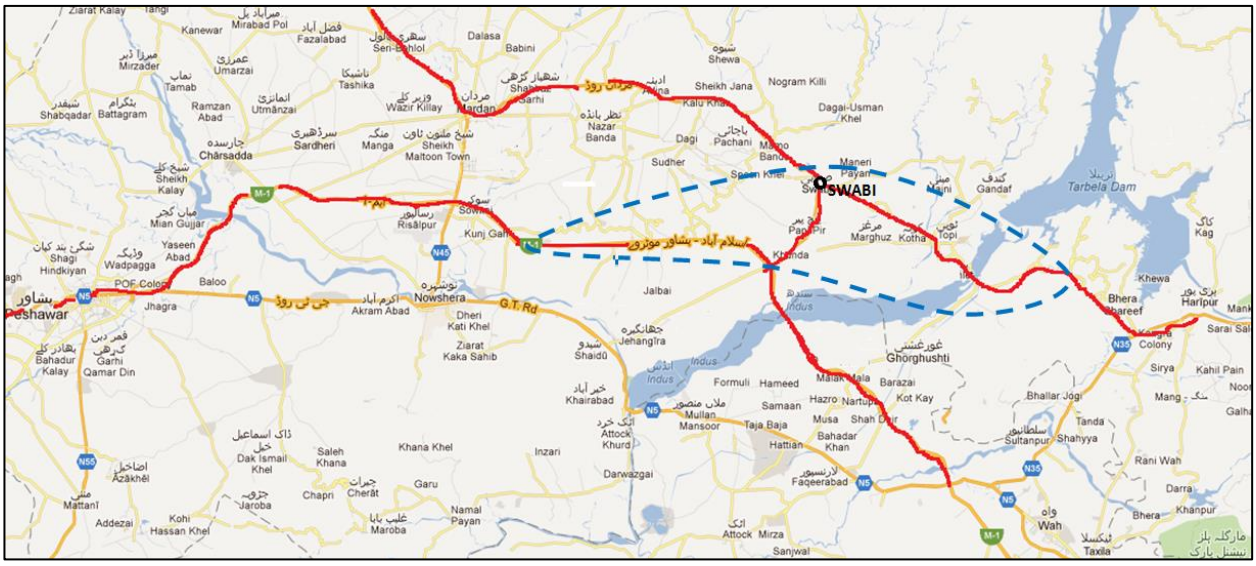


Figure 5.12.1: Trade and Service Area of District Swabi

5.12.4 Current Commercial Area Gap

The current commercial area gap has been calculated as below:

- Urban Population (2017): 275925
- Urban Population (2021): 302081
- Commercial Area required (@0.5 acres/1000 persons)[84]= 151 acres

[84] Source: Adapted from National Reference Manual on Planning and Infrastructure Standards, Page 307, Table 10.4.

- Current area under commercial Land use: 64 acres[85]
- Commercial area deficiency: 138-64= 71 **acres**

5.12.5 Dry Ports

There is no dry port in District Swabi. Therefore, in the context of dry port, details such as export/import of various goods/commodities, service area, locational aspects and foreign exchange component etc, do not apply.

In the Country as a whole, there are six dry ports running under the management of Pakistan Railways:

- Lahore Dry Port Established in 1973
- Karachi Dry Port Established in 1974
- Quetta Dry Port Established in 1984
- Peshawar Dry Port Established in 1986
- Multan Dry Port Established in 1988
- Rawalpindi Dry Port Established in 1990

In addition to the above, there are four Dry Ports established and running under the management of private sector

- Sialkot Dry Port Established in 1986
- Faisalabad Dry Port Established in 1994
- Pak-China Sust Dry Port
- NLC Dry Port at Thokar Niaz Beg Lahore
- NLC Dry Port at Quetta

5.12.6 Export Processing Zones

There is no Export Processing Zone in Swabi. In this context therefore, details such as export/import of various goods/commodities, service area, locational aspects and foreign exchange component etc. do not apply.

There are four operational export-processing zones in the Country, i.e.:

- Karachi
- Risalpur
- Sandak
- Sialkot
- Duddar

[85] Chapter 2, Table 2.4 of this Report

Risalpur Export Zone is a Joint Venture between Sarhad Development Authority (SDA) and Export Processing Zones Authority. It is located on Nowshera-Mardan road and is spread over 92 acres, providing 137 plots of different sizes.

5.12.7 Impact of Trade and Commerce on Economy

Trade is the backbone of any country and so is the case with Pakistan as well. It has played a pivotal role in the development of Pakistan's economy. It making a significant contribution in terms of tax returns and providing employment. In Pakistan Trade and Commerce Department is run under the Ministry of Commerce. Trade not only serves to contribute to the national economy through trade liberalization and facilitation, improving export competiveness and reducing cost of doing business. Aim to achieve higher market access for Pakistani products in existing markets as well as new markets with ultimate aim of improving quality of life of the people of Pakistan. The fiscal year 2018-19 witnessed a muted growth of 3.29% against the challenging target of 6.2 percent. The target was based upon sectoral growth projections for agriculture, industry, and services at 3.8 percent, 7.6 percent, and 6.5 percent respectively. The actual sectoral growth turned out to be 0.85 percent for agriculture, 1.4 percent for industry, and 4.7 percent for services. The fixed investment as GDP percentage remained 13.8% against the target of 15.6 percent, while public and private investments remained at 4.0 and 9.8% against the target of 4.8 and 10.8 percent respectively. The National Savings remained at 10.7 percent of GDP against the target of 13.1 percent. The consumption growth was recorded at 11.9 percent compared to 10.2 percent growth recorded last year. As percentage of GDP, it increased to 94.8 percent compared to last year's figure of 94.2 percent.

Khyber Pakhtunkhwa's share of Pakistan's total GDP has historically comprised 10.5%, although the province accounts for 11.9% of Pakistan's total population. The part of the economy that Khyber Pakhtunkhwa dominates is forestry, where its share has historically ranged from a low of 34.9% to a high of 81%, giving an average of 61.56%. Currently, Khyber Pakhtunkhwa accounts for 10% of Pakistan's GDP, 20% of Pakistan are mining output and since 1972, it has seen its economy grow in size by 3.6 times.

After suffering for decades due to the fallout of the Soviet invasion of Afghanistan, today again they are being targeted for totally a different situation of terrorism. Agriculture remains important and the main cash crops include wheat, maize, Tobacco (in Swabi), rice, sugar beets, as well as various fruits are grown in the province. Some manufacturing and high-tech investments in Peshawar has helped improve job prospects for many locals, while trade in the province involves nearly every product. The bazaars in the province are renowned throughout Pakistan. Numerous workshops throughout the province support the manufacture of small arms and weapons of various types. The province accounts for at least 78% of the marble production in Pakistan.

The economy of Punjabis largely based on agriculture and industry. Punjab has the largest and fastest growing economy in the country compared to other provinces and administrative units. Punjab's economy has quadrupled since 1972. Its share of Pakistan's GDP was 54.7% in 2000 and 59% as of 2010. It is especially dominant in the Service & Agriculture sectors of the Pakistan

Economy. With its contribution ranging from 52.1% to 64.5% in the Service Sector and 56.1% to 61.5% in the Agriculture Sector. It is also major manpower contributor because it has largest pool of professionals and highly skilled (Technically trained) manpower in Pakistan. It is also dominant in the Manufacturing sector, though the dominance is not as huge, with historical contributions raging from a low of 44% to a high of 52.6%. In 2007, Punjab achieved a growth rate of 7.8% and during the period 2002-03 to 2007-08, its economy grew at a rate of between 7% to 8% per year, and during 2008-09 grew at 6% against the total GDP growth of Pakistan at 4%.

Sindh has the second largest economy in Pakistan. Its GDP per capita was $1,400 in 2010 which is 50 per cent more than the rest of the nation or 35 per cent more than the national average. Historically, Sindh's contribution to Pakistan's GDP has been between 30% to 32.7%. Its share in the service sector has ranged from 21% to 27.8% and in the agriculture sector from 21.4% to 27.7%. Performance wise, its best sector is the manufacturing sector, where its share has ranged from 36.7% to 46.5%. Since 1972, Sindh's GDP has expanded by 3.6 times. Endowed with coastal access, Sindh is a major center of economic activity in Pakistan and has a highly diversified economy ranging from heavy industry and finance centered in and around Karachi to a substantial agricultural base along the Indus. Manufacturing includes machine products, cement, plastics, and various other goods. Agriculture is very important in Sindh with cotton, rice, wheat, sugar cane, bananas, and mangoes as the most important crops.

The economy of Baluchistan is largely based upon the production of natural gas, coal and minerals. Agriculture and livestock also dominate the Baloch economy. Horticultural development is a fairly recent, yet growing phenomenon. Other important economic sectors include fisheries, mining, manufacturing industries, trade and other services being rendered by public and private sector organizations in the province. Limited farming in the east as well as fishing along the southern Arabian Sea coastline are other forms of income and sustenance for the local populations. Due to the tribal lifestyle of many people, animal husbandry is important, as are trading bazaar found throughout the province. Though the province remains largely underdeveloped, there are currently several major development projects in progress in Baluchistan, including the construction of a new deep-sea port at the strategically important town of Gwadar. The port is projected to be the hub of an energy and trade corridor to and from China and the Central Asian republics.

5.12.8 Work Force

Both in 1998 as well as in 1981, the work force in trade and commerce is categorized as "Major Division 6 – Wholesale and retail trade and restaurants and hotels".Based on the given criteria, the percentages of workforce in trade and commerce, in the years 1981 and 1998 are presented in the graph. Most prominent changes have been in self-employed category, which have increased from around 74% in 1981 to about 87% in 1998. The percentage of unpaid family workers on the other hand has decreased from 4.81% in 1981 to only around 0.39% in 1998. Comparative statistics about other categories of work force are presented in the graph.

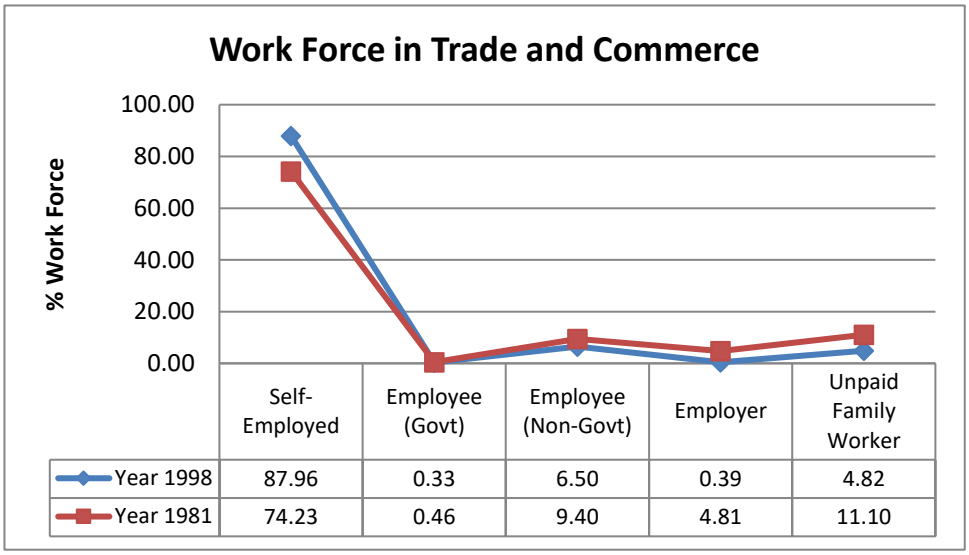


Figure 5.12.2: Work Force in Trade and Commerce

Source For 1981: District Census Report of Mardan, 1981, Page 52, Major Division 6. Source For 1998: District Census Report of Swabi, 1998, Page 162, Industrial Division 6.

In District Swabi, 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.

5.12.9 Constraints

Swabi would have to depend more heavily on safety and security of people and assets for the desired rapid commercial growth. Businesses and commerce shall be evolved and developed like the other developed countries. To this end the skill improvement, and increase in efficiency with which new processes are adopted. To this end the flow of information, better infrastructure, availability of funds and quality inputs, and investor/entrepreneurs' managerial capabilities shall be streamlined. Empirical evidence shows that suitable commercial, financial, economic and trade policies directly influence the productivity and economic growth.

Some of the major constraint to sustainable development of commerce and trade are listed below:

- Lack of properly planned and developed land
- Threat due to terrorism and absence of emergency disaster response, like firefighting, and emergency exits, as such many lives assets and property has been damaged during to recent terrorists' attacks.
- Large fluctuation in prices and rates of products and services

- Frequent Power outages
- Uncontrolled inflation
- No standardization for specifications of products
- Lack of quality standards
- Lack of adequate and proper Car Parking area
- Absence of loading and unloading bays
- Lack of solid and liquid waste disposal.
- Life threatening mix of petrol pumps, CNG stations, hotels, restaurants and motels
- Mixed and conflicting land use of education, health, residential small industry and commercial land use.
- Absence of basic facilities for the customers like toilets, rest areas, lockers etc.
- Lack of firefighting safety and security system
- Mix of hazardous and non-hazardous commercial uses.

5.13 INDUSTRY

5.13.1 Industries – District Swabi

There are total of 367 industrial units in district Swabi, of which 325 are in the Gadoon Industrial Estate. Table 5.13.1 presents industrial distribution by type. Of the total 325 industrial units in Gadoon Industrial Estate, 55 units (more than 29%) are Rubber & Plastic Good units.

Table 5.13. 1: Number of Industry in District Swabi

Sr. No	Particulars	Total No. of Units	Employment
1	Total No. of Units in Gadoon Economic zone.	325	32,328
2	Total No. of Units Outside Small Industrial Estate.	42	1944
	Total	**367**	**34,272**

The number of total industrial units in Khyber Pakhtunkhwa has been increasing since the year 2004 to 2010, except the year 2008-09 when there was a decline from 2254 in 2007-08 to 2207 in 2008-09. However, this is the total number of industrial units, which include running as well as closed units (Table 5.13.2).

The Table also provides historical data for District Swabi giving total number of units, running units and closed units in the past number of year. In District Swabi, the running units have generally been on the increase since the year 2006-07. In the 2007-08,

The numbers of running units however dropped to 248 from 289 in the previous year. Table 5.13.2 presents total, running and closed units as absolute numbers as well in form of percentage of

provincial total. The main reasons attributed to closures are inconvenient locations, (away from the seaport), non-availability of skilled labor, inconsistent government policies, dearth of local capital, and comparatively poor law & order situation, due to Afghan War, etc.

Table 5.13. 2: Total Number of Registered Industrial Units Running & Closed[86]

Year	Khyber Pakhtunkhwa			District Swabi			% District Swabi with Province		
	Total	Running Unit	Closed Unit	Total	Running Unit	Closed Unit	Total	Running Unit	Closed Unit
2004-05	1967	1230	737	266	80	186	13.52%	6.50%	25.24%
2005-06	2219	1479	740	288	103	185	12.98%	6.96%	25.00%
2006-07	2236	1437	799	289	103	186	12.92%	7.17%	23.28%
2007-08	2254	1552	702	248	85	163	11.00%	5.48%	23.22%
2008-09	2207	1591	616	253	88	165	11.46%	5.53%	26.79%
2009-10	2239	1701	538	258	113	145	11.52%	6.64%	26.95%
2013-14	2222	1888	334	253	146	107	11.38%	7.7%	32.03%
2014-15	2526	2163	363	274	142	132	10.84%	6.56%	36.36%
2015-16	2584	2222	362	294	162	132	11.3%	7.29%	36.36%

Table 5.13.3 presents industrial distribution by type. Of the total 325 industrial units in Gadoon Industrial Estate, 55 units (more than 29%) are Rubber & Plastic Good units.

Table 5.13. 3: Number of Industry by Type[87]

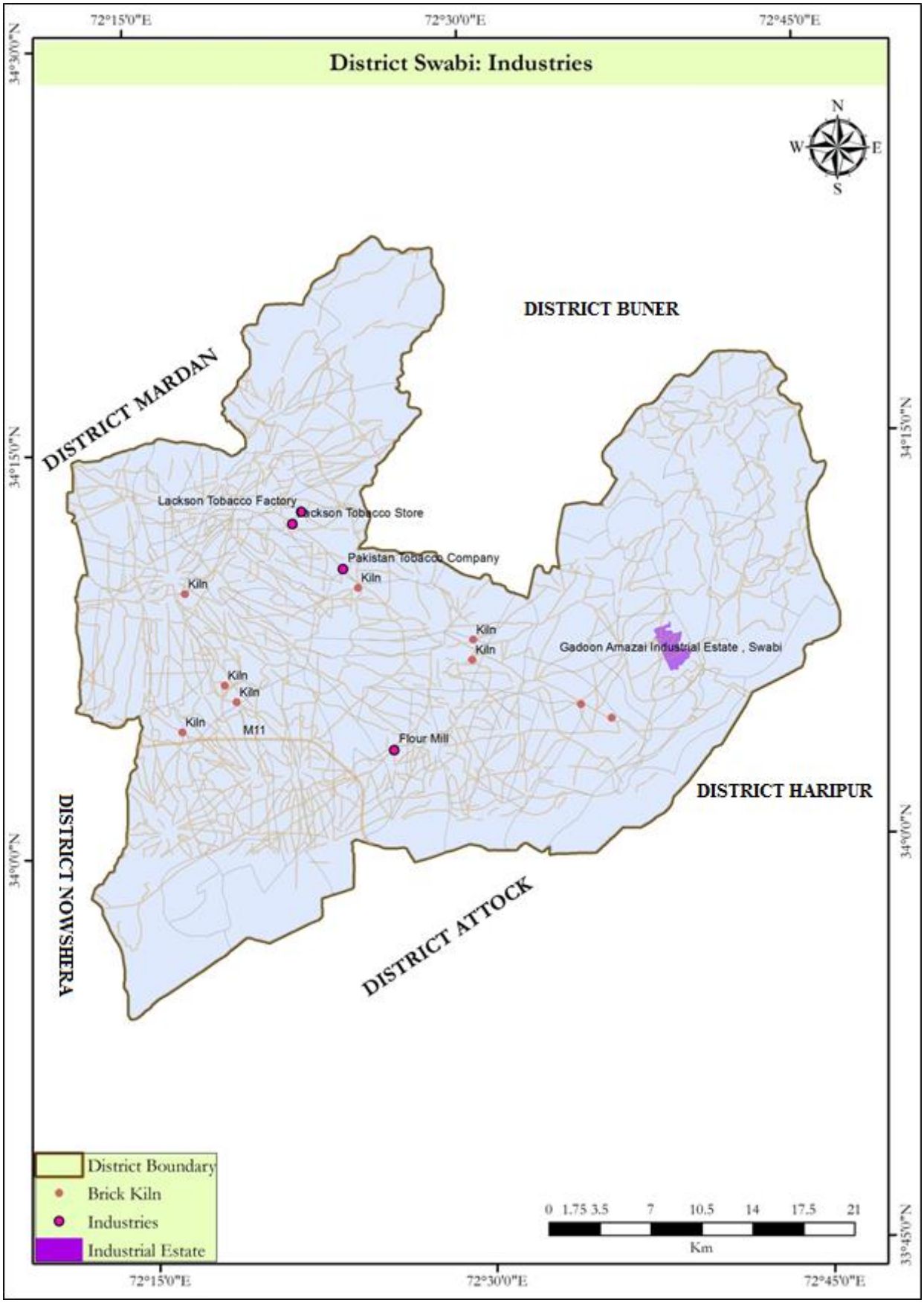
Sr. No	Type of Industry	Number of Units		
		Industrial Estate Gadoon Amazai	Outside Industrial Estate	Total
1	Ghee	3	0	3
2	Textile	31	0	31
3	Acrylic Polyester & Meta Yarn	1	0	1

[86]Source: Bureau of Statistics, Planning & Development Department, Govt. of Khyber Pakhtunkhwa, Khyber Pakhtunkhwa Development Statistics, 2007, Page 181, Table 136 (for the years 2004-2005, 2005-2006 and 2006-2007). For years 2007-2008, 2008-2009 and 2009-2010, the source is Khyber Pakhtunkhwa Development Statistics, 2010, Page 192, Table 140.

[87] Source: Directorate of Industrial Establishment 2011, Government of Khyber Pakhtunkhwa Industries, Commerce, and Technical Education Department.

Sr. No	Type of Industry	Number of Units		
		Industrial Estate Gadoon Amazai	Outside Industrial Estate	Total
4	Silk	3	0	3
5	Paper & Paper Product Industry	2	0	3
6	Printing and Packaging Industry	15	0	15
7	Chemicals	18	0	18
8	Food & Beverages Industry	10	0	10
9	Soap	3	1	4
10	Plastic Industry	96	0	96
11	Adhesive	1	0	1
12	Foam & Allied Products	1	0	1
13	Marble and Granite Industry	12	10	22
14	Engineering	06	0	06
15	Electronic Goods	8	0	8
16	Other Metal Products	21	0	21
17	Flour	0	9	9
18	Corn	0	1	1
19	Ice	0	2	2
20	Cigarettes	0	5	5
21	Sports, Foot Wear & Pvc Shoes	2	1	3
22	Metal Products	0	1	1
23	Cement Based	0	8	8
24	Cold Storage	0	2	2
25	Cotton	2	0	2

Sr. No	Type of Industry	Number of Units		
		Industrial Estate Gadoon Amazai	Outside Industrial Estate	Total
26	Fabrics	2	0	2
27	Furnace and Re-Rolling	2	0	2
28	Furniture Industry	5	0	5
29	Paper Cone	2	0	2
30	Pharmaceutical Ind	17	0	17
31	Other Plastic	08	0	08
32	Polypropylene	04	0	04
33	Re-Rolling Mill	02	0	02
34	Spinning	07	0	07
35	Steel	35	0	35
36	Tin Making	02	0	02
37	Wood Industry	03	0	03
38	Others	29	0	29
	Sub Total	**353**	**40**	**394**
	Grand Total	**394**		



Map 5.13.1: Industries of District Swabi

5.13.2 Future Industrial Area Requirement

The industrial area requirement in District Swabi has been calculated on the basis of additional population for the first 5 years of plan period (2021-2025) and subsequent 15 years (2026-2040). The anticipated industrial labor force in these periods was calculated on the basis of 5% participation rate[88] and industrial area by applying the standard of 50 industrial workers per acre. The results are presented in the Table below. It is clear that over the entire plan period; 1059 acres would be required which includes 181 acres in the short-term (2021-2025) and 840 acres in the long-term period (2026-2040).

Table 5.13. 4: Future Industrial Area Requirements

Parameters	Short-Term Plan Period (2021-2025)	Long-Term Plan Period (2026-2040)	Total (2021-2040)
Additional population	181081	839850	1020931
Industrial labor force (@5%)	9054	41993	51047
Industrial area required[89]	181	840	1021 Acres

5.13.3 Current Industrial Area Gap in district

The current industrial area gap has been calculated as below:

- District Population (2021): **1789041**
- Industrial Labor Force (@5% of above): **89452**
- Industrial area required (@50 workers per acre) = **1789 acres**
- Current Industrial area in the District: **1045** [90]
- Industrial area deficiency: 1,789-1,045= **744 acres**

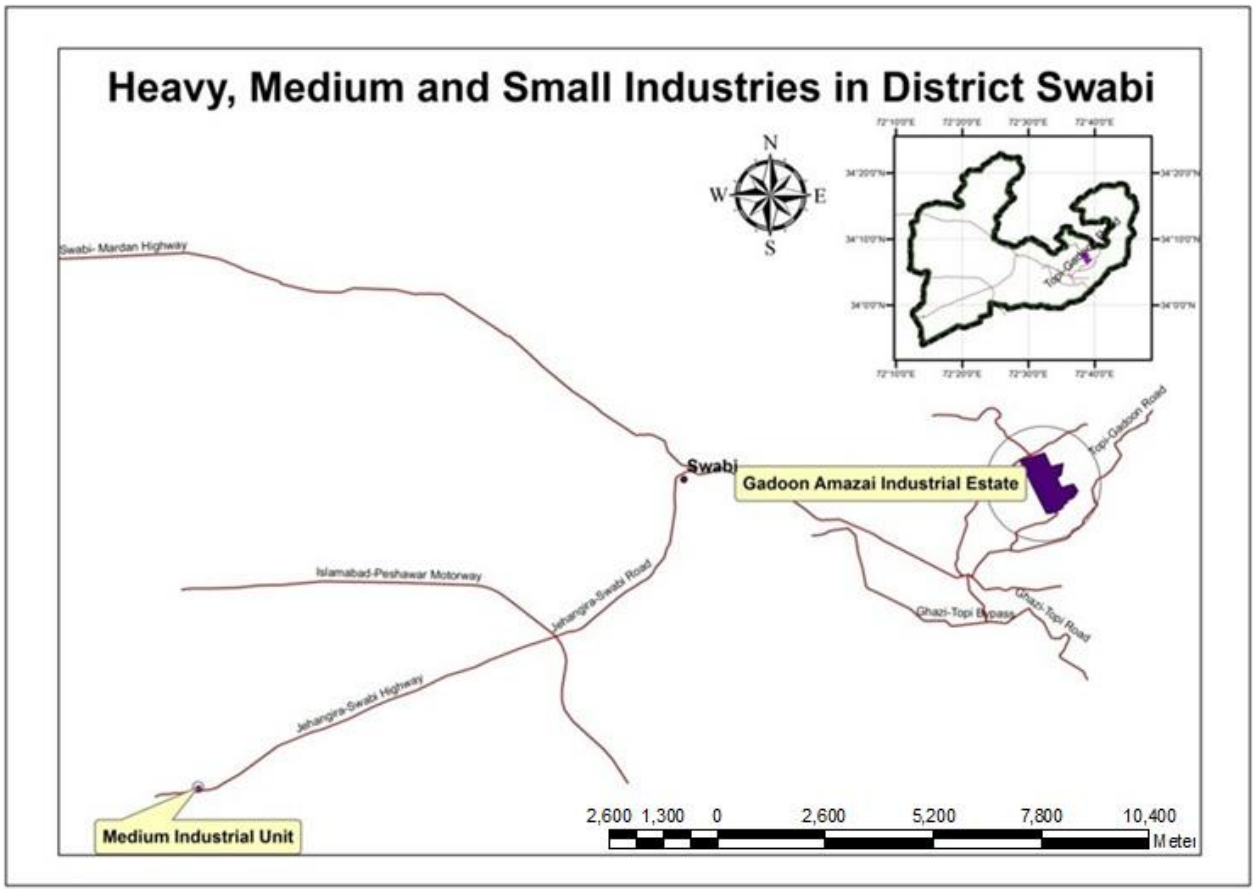
It is clear from the above that till the end of plan period, the total industrial area requirement would include 744 acres to meet the current deficiency, and 1789 acres to meet the future requirement. The total would be thus 1789+744= 2533 acres.

[88]Source: Pakistan Bureau of Statistics, Govt. of Pakistan, Labour Force Statistics 2008-2009, Table 21 (www.pbs.gov.pk). Labour force participation rate given here is 7.46% for population of 10 years & above. Averaging it over the gross population, the participation rate comes out to be around 5%.

[90] Chapter 2, Table 2.4 of this Report

5.13.4 Proposed Industrial Locations

Two industrial estates have been proposed in the District. These include a small industrial estate within Swabi Urban area. It will have housing-friendly and non-polluting industrial units in it. Besides, a larger industrial estate is proposed West of motorway, opposite to the proposed 'Multiple Landuse Complex'. It will have good linkages because of Jahangira Road, Motorway and Ghazi Road passing along its boundaries.



Map 5.13.2: Heavy, Medium and Small Industries in District Swabi

5.14 AGRICULTURE

5.14.1 General

The entire area of district Swabi is fertile and produces good crops. However, most of the cultivated area is barani and under favorable weather and sufficient rainfall, it gives very good output of wheat, maize, tobacco, etc. Tobacco is a popular cash crop of Swabi along with vegetables, wheat, sugar cane and maize. Swabi is rich with mineral resources founded in the Maneri village and its white marble is very popular throughout the country. Kharif crops include maize, rice, jowar, sugarcane and Ground nut. Rabi crops include wheat, barley, rape and mustard.

Most of the area is plain and fertile. A variety of fruit are grown by the local people for their own. A large quantity of orange and guava are produced in village Maini, Hianda, and Tordher basis. Its climate is ideally suited for citrus in particular while many other fruits like watermelon, peaches and apricots are also grown there. Kharif: Water melon, Musk Melon, Apricot, Guava, Pear, Peaches, Plum. Rabi: Citrus, Mulberry.

Table 5.14.1 indicated the district profile of Swabi containing the year wise data i.e. total reported area, the total cultivated area, how much area was cropped in the given year and how much area of the district is un-cultivated.

5.14.2 Area under Cultivation

According to the agriculture statistics of district Swabi the total area cultivated during 2018-19 was 87046 hectares which is 59% of the total reported area. If we compare the total uncultivated area with that of total reported area it indicated that about 41% of the total reported area is un-cultivated. Un-cultivated area is that area which is not under 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 5.48 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. (Cultivated Area: that farm area which sown at least once during the year under the report or for the year before. It is the sum of area Net Sown and Current Fallow). Net Sown is that cultivated farm area which was actually cropped during the year under report regardless of the number of crops raised and includes area under fruit trees for the same year, while Current Fallow is that cultivated farm area which was cropped neither during the census year nor in the year before that. Cropped Area means the aggregate area of crops raised in a farm during the census year including the area under fruits trees. Culturable Waste is that form of farm area which has the potential for being cultivation after either land leveling or stone removal etc. Forest Area is that uncultivated farm area which is under forest. Areas Not Available for Cultivation: Is that uncultivated area of the farm which is under home-stead, mountainous, farm roads rivers and other concern purposes, therefore, it is not available for cultivation)

Table 5.14. 1: Area Under Cultivation (Hectare)[91]										
Year	Reported Area	Cultivated Area			Cropped Area		Un-Cultivated Area			
		Total	Net Sown	Current Fallow	Total	Area Sown More Than	Total	Culturable waste	Forest	Not-available for cultivation
2016-2017	148689	87046	59502	27544	89171	29669	61643	26630	26505	8508
2017-2018	148689	87046	59502	27544	89171	29669	61643	26630	26505	8508
2018-2019	148689	87046	59502	27890	87956	28800	61643	26630	26505	8508

5.14.3 Distribution of Area by Crops

Table 5.14.2 gives a comparative statement of distribution of area by crops in District Swabi. According to the crop statistics, 2016-2017, 2017-18 and 2018-19, the total areas occupied by tobacco crop were 16383, 13066 and 12303 hectares respectively. Wheat ranks first in acreage and production among all food crops. Total area occupied by wheat crop in 2019 was 38727 hectares. In the same year, total areas occupied by sugarcane crop were 2612 hectares. Rice is the second major staple food of the most people of Pakistan. In District Swabi the rice was sown on an area of 419 hectares, while area under maize crop was 27896 hectares respectively.

Table 5.14. 2: Distribution of Area by Crops in District Swabi (Hectare)									
Type	2016-2017			2017-2018			2018-2019		
	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG
Wheat	37843	68444	1809	38567	72742	1886	38727	75155	1941
Maize	29957	66286	2213	29674	66394	2237	27896	64163	2300
Rice	449	851	1895	395	763	1932	419	803	1916
Jowar	878	441	502	748	376	503	744	374	503
Sugarcane	2251	86709	38520	2213	85761	38753	2612	101337	38797
Rape seed & Mustard	1490	1159	778	916	717	783	1140	922	809

[91] Khyber Pakhtunkhwa Development Statistic 2020.

Tobacco	16383	40370	2464	13066	38540	2950	12303	35183	2860
Barley	1105	1379	1248	780	972	1246	973	1209	1243

Vegetables

According to the development statistic 2020 the total area occupied by Rabi vegetables was 817 hectares with a production of 12190 yield per hectare in KG and Kharif vegetable was 295 hectares and 10271 hectares per hectare in KG. Comprising a total area of 1112 hectares and their production were 22461 hectares per hectare in KG. Table 5.14.3 show distribution of area by vegetable in district Swabi.

Table 5.14. 3: Distribution of Area by Vegetables in District Swabi (Hectare)[92]

Vegetables	2016-2017			2017-2018			2018-2019		
	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG
Rabi Vegetables	809	9856	12183	814	9903	12166	817	9959	12190
Kharif Vegetables	296	3044	10284	307	3156	10280	295	3030	10271
Total	1105	12900	22467	1121	13059	22446	1112	12989	22461

Fruits

The total area occupied by Rabi fruits in 2018-2019 was 510 hectares with a production of 9520 Yield per hectare in KG and that of Kharif fruits was 915 with a production of 8140 tones. The total area occupied by both rabi and kharif fruits were 1427 hectares with a production of 17660 tones.

Table 5.14. 4: Distribution of Area by Fruits in District Swabi (hectare)

Fruits	2016-2017			2017-2018			2018-2019		
	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG	Area	Production	Yield per Hectare in KG
Rabi Fruits	508	4843	9533	510	4855	9520	510	4855	9520
Kharif Fruits	891	7206	8088	898	7250	8073	917	7464	8140
Total	1399	12049	17621	1408	12105	17953	1427	12319	17660

[92] Khyber Pakhtunkhwa Development Statistic 2020.

5.14.4 Water Management

Table 5.14.5 shows show the different mode of irrigation use in district Swabi. The total irrigated area is 37317 in which 24814 hectares is irrigated through government canal, 94 hectares through tube wells, 11453 hectares is irrigated through wells.

Table 5.14. 5: Type of Irrigation Use for Agriculture in District Swabi[93]

Year	Total	Canals		Tanks	Tube wells	Wells	Left pump	Other
		Govt	Private					
2016-17	37312	24814	0	0	94	11448	121	835
2017-18	37317	24814	0	0	94	11453	121	835
2018-19	37317	24814	0	0	94	11453	121	835

5.14.5 Influence of Urbanization on Agriculture

Table 5.14.6 gives the total cultivable area in District Swabi in the years 1997-98 and 2018-19. Cultivable area is the farm area which was sown at least once during the census year. It is the sum of Net Sown and Current Follow areas.

The total cultivable area during 1997-98 was 87063 hectares, which almost remained the same (87,046 hectares) in 2018-19. Comparing cultivable area in 1997-98 with that in 2018-19, the decrease of cultivated area over the past 21 years has been just 21 hectares (about 42 acres), or an average of 1 acres per year. In other words, the overall cultivated has been more or less stagnant with no significant change over the last 21 years.

Table 5.14. 6: Change in Cultivation Area 1997-98 and 2018-19

Year	Cultivable Area		
	Total	Net Sown	Current Fallow
1997-98	**87063**	**74317**	**12719**
2018-19	**87046**	**59502**	**27890**

Urbanization is inevitable; with in-flow of rural migrants to urban areas of District Swabi, there have been changes in land utilization, cropping pattern and sources of irrigation. Generally, urbanization affects agriculture; such as loss of agricultural land to urban expansion and an urban bias in public funding for infrastructure, services and subsidies. However, this has not been the case in District Swabi, because agricultural producers and rural consumers also rely on urban-based enterprises for a wide range of goods and services, including access to markets.

Urbanization is inevitable; and this is also true for District Swabi, but with minimal effects on agriculture, since a number of other factors affect agriculture apart from urbanization, such as

sources of irrigation which change overtime. Thus, more area was brought under irrigated agriculture, neutralizes the impact of urbanization, if any.

5.14.6 Constraints

[93] Khyber Pakhtunkhwa Development Statistic 2020

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

i. Lack of Education /Technical knowledge

The farmers of Swabi are mostly un-educated and lack technical knowledge. They are unable to understand the modern scientific methods of agriculture and often remain ignorant of good means to protect and increase their yield. Their production is therefore low.

ii. Lack of Capital and Burden of Debts

Majority of farmers are poor and they often live in a hand to mouth condition. Most of them are always under heavy burdens of debts. So due to lack of capital they cannot afford to purchase modern implements, Fertilizers, improved seed etc. Hence, they cannot attain the required standards.

iii. Stickiness to the Old Traditional Farming

Most of the farmers of the locality are still stuck to the old traditions of their forefathers. The circumstances have compelled them to use the crude implements, because due to small holdings of land and poverty they are unable to acquire and use modern technology. That is why their Yield is lower than that of other provinces of the country.

iv. Water Logging and Salinity the Ailment to Soil

As salinity control and reclamation project (SCARP) have reclaimed more optimum areas from water logging and salinity but still a lot of water logged and saline areas prevail in the district Swabi.

v. Uneconomical Land Holdings Size

The small farmers are increasing in district Swabi like other districts as the lands are dividing generation by generation. So, there are large numbers of farmer who own less than 4 acres of land. These small farmers do not get credit facilities to purchase seeds, pesticides, fertilizers etc.

vi. Scarcity of Water for Irrigation

As we know that there is a lot of rainfed area in district Swabi the farmers have to face many problems due to scarcity of water which is one our major problems. As most of the area of the district is rainfed, so the irrigation sources should be improved.

vii. Land Tenure System

The land tenure system of Swabi has created a chain of intermediaries in between the state and the tenants. The system, instead of being conductive to agricultural development, stands in the way of its progress.

viii. Soil Erosion a Threat to Soils

In some areas of district Swabi, especially in hilly regions, the upper fertile soil is being eroded by different natural agents of change. Thus, the fertility is poor and soils are becoming less productive.

ix. Lack of Organized Marketing/ Regulated Marketing

The marketing facilities for agricultural products in district Swabi are still far from satisfactory level. Our cultivators cannot get just prices for their produce due to defective marketing organization. Moreover, the chain of middlemen between the producers and ultimate consumers take a heavy share of their produce. Thus, the cultivators do not take much real interest in increasing their product too.

x. Pests and Crop Diseases Break Through

Due to lack of agricultural education and methods of modern research, the farmers of the locality cannot control the various diseases of crops and attacks of pests and insects.

xi. Poor Means of Transportation

Most of Swabi villages have no or Poor roads to the markets. So, farmers have to face innumerable hardships to sell their products. Hence the farmers take very little interest in their profession and production suffers.

xii. Low Yield per Acre of crops, Fruit and Vegetables

The average yield of the district is much low than the required yield, as there is a huge gap between the productive yield and wanted yield.

xiii. Water Wastage

Water wastage is very high in the locality. The archaic method of flood irrigation is still in practice in whole of the district.

5.14.7 Recommendations

The land which has been declared useless due to salinity and water-logging should be reclaimed. Tube-wells should be installed in the affected areas to decrease the salinity by reducing water table. Beds of new canals should be made of concrete to avoid water-logging. Reclamation of waterlogged and saline area should be cover through plantation of Eucalyptus and poplar trees. These measures should be taken on priority basis to avoid further deterioration of land.

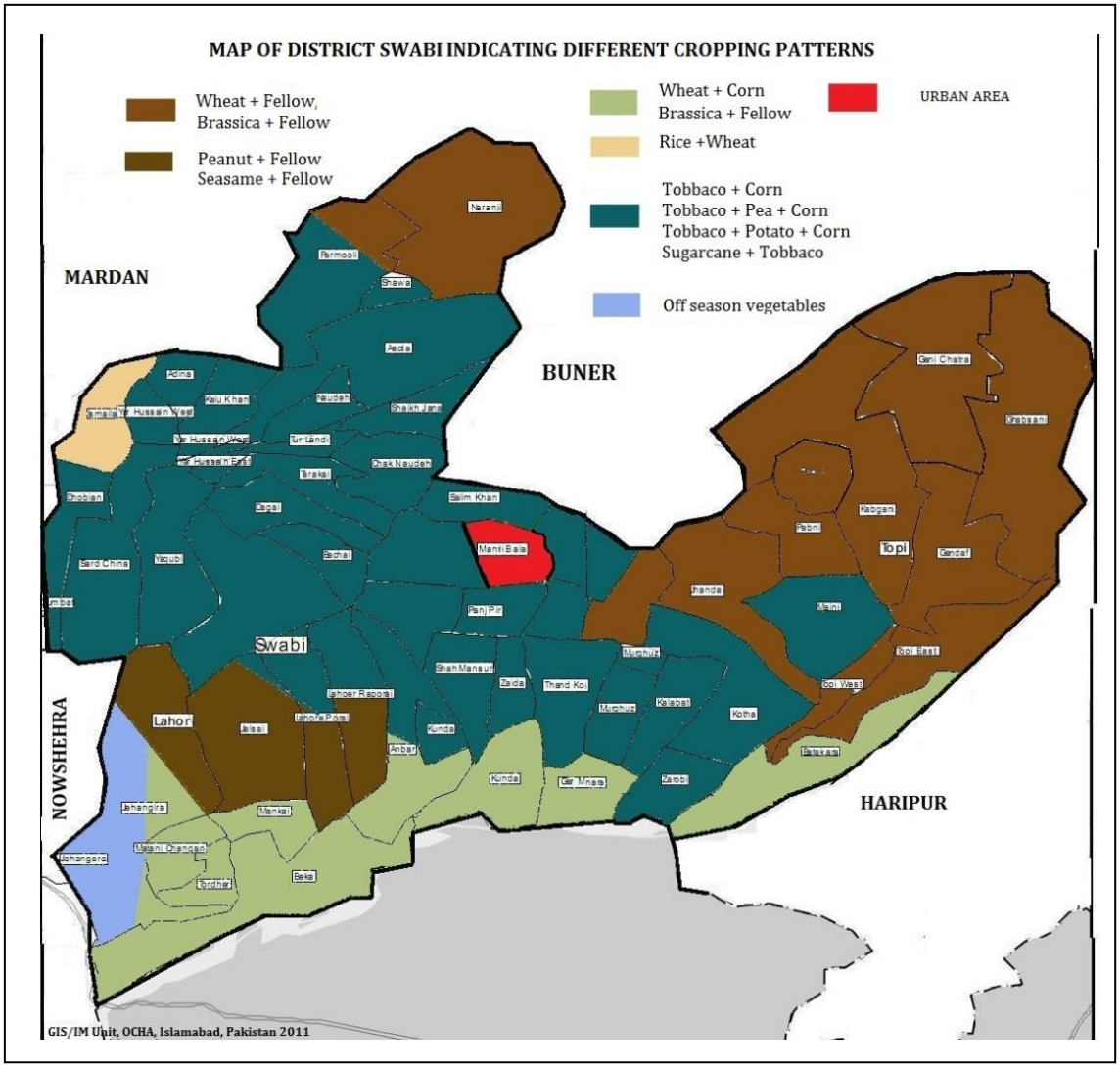
- In rain-fed area those farmers who have made their own tube wells their water canals should be concreted to decrease their water loses and fuel consumption and increase their profitability.
- As a lot of area of district Swabi is left uncultivated which can be used profitably by tree plantation.
- The water storage capacity is decreasing due to sedimentation. In order to increase production to meet food requirements of the locality, additional water has to be provided. The additional water reservoirs may therefore be started immediately.
- The agricultural yield can also be increased to a great extent by using fertilizers. The use of fertilizers should be provided on low prices because due to poverty and illiteracy the farmers hesitate to purchase the fertilizers. Also, organic sources of fertilizers should be introduced in the locality which can enhance soil fertility.
- The use of better seeds, fertilizers, 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 commercial banks also grant loans to the farmers, but still there is a need for more facilities as our farmers are very poor. The commercial banks may be encouraged to provide credit to small farmers in addition to Zarai Tarqauati Bank.
- 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 damage a large part of our crops. But our procedures should be simplified and various marketing facilities should be provided to the cultivators. Farmers have no effective control over them. Therefore, preventive and narrative measures should be taken.
- As most of the villages of the district are located on a distant from the main markets, so the transportation system should be improved through roads.
- Establishment of seed industry in Swabi

The agriculture sector of Khyber Pakhtunkhwa should support and promote sustainable agriculture as an inclusive and dynamic source of economic growth and development; and a producer of food, incomes and employment. The specific goals and objectives for agricultural are

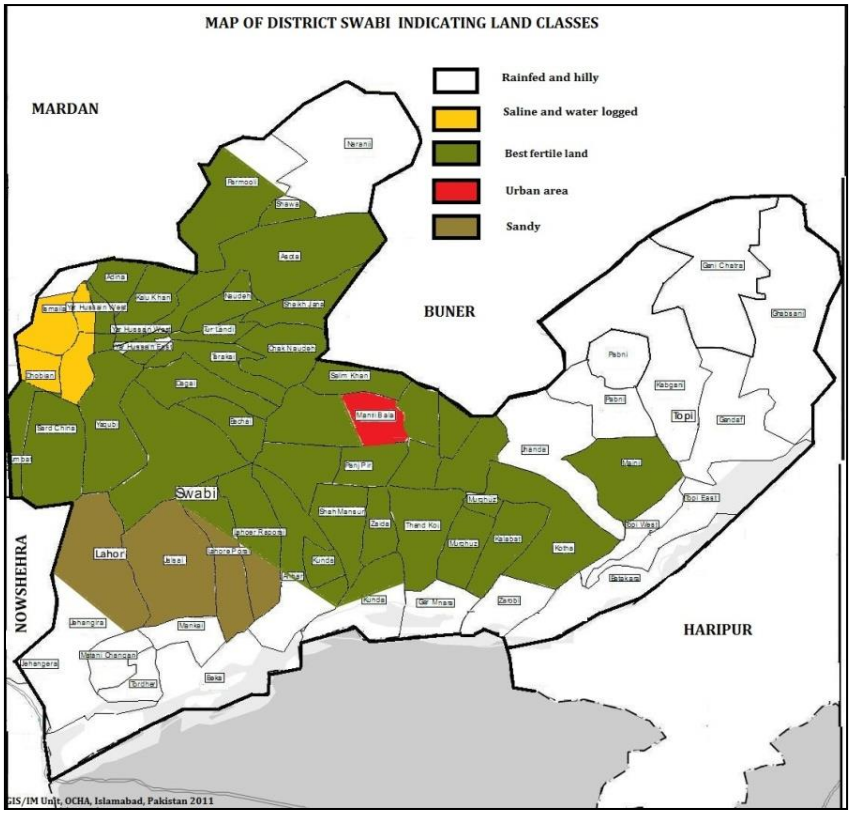
Enhance productivity and competitiveness by activities such as improving the supply chain, technology dissemination and trade promotion;

- Address food security and incomes needs of the vulnerable sections of the population and targeted actions are needed to improve food security,
- reduce poverty and enhance the role of women; and Improve national resource management,
- adaptation to climate change and disaster risk management.

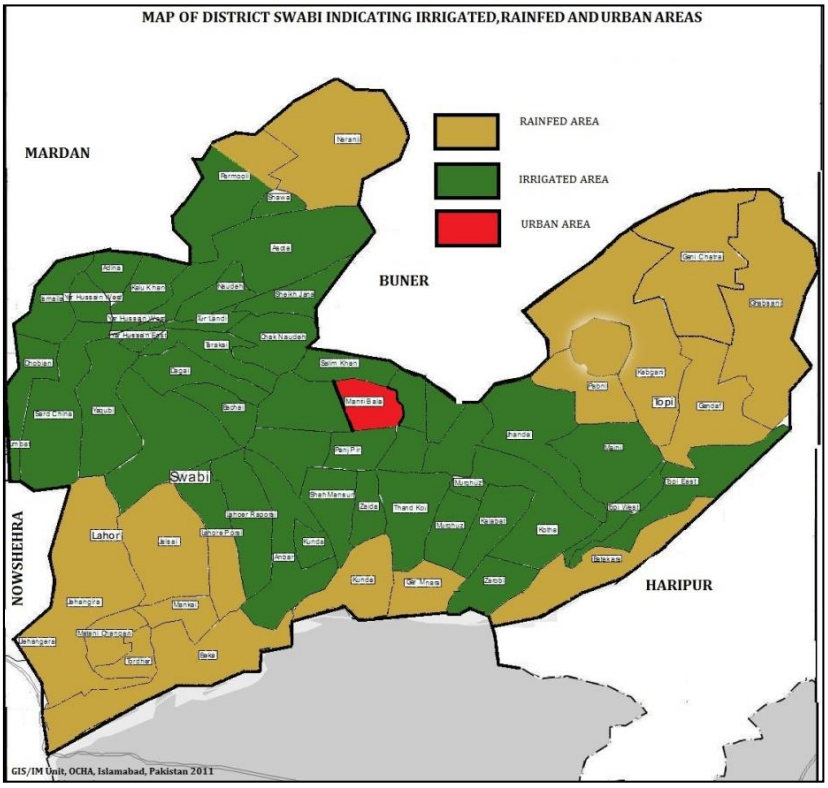
- Maize, particularly hybrid maize, in both irrigated and barani areas, for the feed industry; tobacco for industry and sugarcane for sugar industry and *Gurr* making.
- Fish from the streams and lakes in the higher valleys, as well as in the dam and lakes in the irrigated and rainfed areas.



Map 5.14.1: Cropping Pattern of District Swabi



Map 5.14.2: Land Classes Map of District Swabi



Map 5.14.3: Irrigated, Rainfed and Urban Area Map of District Swabi

5.15 RECREATION

In Swabi, disappearance of incidental open spaces and inadequate provision of planned open spaces is a problem. Provision of spaces for active outdoor recreation is hindered by high land prices, pressure on land and high population densities, no proper planning and inadequate budget from the sides of TMA's. Thus, reserving land for recreational purposes has to be stressed against many competing demands for land.

5.15.1 Sports Facilities

The available sports facilities in District Swabi are given below. Most of the above belong to various institutions, and there are few playgrounds for public.

i. Play Ground, Panjpir
ii. Play Ground, Manere
iii. Play Ground at Turlandi
iv. Hockey Ground at Village Salim Khan
v. Play Ground at Zaida
vi. Playground at Maneri Bala
vii. Playground at Sard China
viii. Playground at Village Pabbani
ix. Playground at Village Baja (Bamkhel)
x. Playground at Maneri Payan
xi. Playground at GHS Dobian
xii. Playground at Village Lahor

5.15.2 Entertainment

As already stated, under this category of Recreational Facilities include Hotels, Hill resorts, Cinemas, Arts councils and Theatres.

There are no registered hotels, restaurant, hill resorts, arts councils and theatres in Swabi. Some of the unregistered hotels and restaurants are mentioned below.

Hotels

i. Hotel 6
ii. Taj Mahal Hotel
iii. Samar Gull Kattwa Hotel
iv. Mahaban Hotel

Restaurants

i. Samar Gul Restaurant
ii. Alteen The Bakers
iii. Pizza Hut

iv. Pizza Point Restaurant & Cafe
v. Pizza House Point

5.15.3 Major Landmarks

Following are some major landmarks in District Swabi:

i. Hund

Hund is situated on the right bank of the river Indus above Attock and was the winter capital of the Hindu Shahi rulers. According to the Hudud al-Alam, an anonymous tenth century works, Hund was a large town and also had a small population of Muslims. It had fine gardens, numerous streams, good fruits, tall trees, freedom from pests and general prosperity of its people. On the outskirts of the city, were walnut and almond trees and within it bananas and the like. The houses were made of wood and dressed stones. The city lived on for a while as a frontier town of the Ghaznavid Empire, but gradually lost its glory, status and economic prosperity for ever.

Perceiving the great strategic importance of Hund as a crossing point, Akbar the Great, well-known Mughal emperor, ordered the construction of a fort on top of these mounds. Throughout the Mughal period Hund served as a military outpost.

ii. Ghulam Ishaq Khan Institute (GIKI)

The Ghulam Ishaq Khan Institute was established in 1993. One of the objectives is to raise the standard of engineering and technology and industrialization within the country. This was to be achieved by providing competent technical manpower of international to meet the country's requirements and to provide much needed technological Research and development support to key national industry through consultancy services. Ghulam Ishaq Khan Institute as a matter of policy compares its achievements with those of other leading international universities and research organizations.

The idea of such institutes was conceived by Mr. Ghulam Ishaq Khan, the former President of the Islamic Republic of Pakistan, in early 1950's. He cherished the idea for some time and broached the subject with leading scientists and engineers. The idea was converted into a practical proposition in Ghulam Ishaq Khan Institute.

5.15.4 Wildlife

There are hardly any forests or Wildlife Parks in District Swabi. However, a Zoo can be provided at a proper location for recreational attraction where suitable wildlife can be kept and looked after. However, a zoo in every District is neither feasible nor desirable. The location for such a facility has to be seen in the context of entire region/Peshawar Valley.

A wildlife Park already exists South of District Nowshera along Nizampur Road, which emanates from GT Road. However, there is hardly any wildlife or zoo in this area. Besides, the park itself is in poor shape and needs to be upgraded. A zoo may be a part of this upgraded plan for Wildlife Park. A similar

facility may also be provided in the proposed Abazai Recreational Park in District Charsadda. The details about these proposed recreational areas are given in the Studies Reports/Landuse Plans of the respective Districts.

5.15.5 Future Requirements for Parks and Stadiums

Apart from passive recreational facilities, District Swabi also needs active recreation in the form of playgrounds and stadiums. Following are the requirements:

Table 5.15. 1: Active Recreational Requirements in District Swabi

S. No	Category	Additional Population	Type	Active Recreational Facilities Required	Area Required (Ha)
1	**Urban**	143946	Cricket	0	0
			Foot Ball	1	1.4
			Hockey	1	1.5
			Community Play Ground	1	2.1
			Neighborhood Play Ground	6	9.8
2	**Rural**	876985	Cricket	3	6
			Foot Ball	4	5.6
			Hockey	4	6
			Community Play Ground	35	74.9
			Combine Play Field	9	19.3
Total		**1020931**		**64**	**126.6**
Swabi Passive Recreational Facilities					
Category		**Additional Population**	**Type**	**Active Recreational Facilities Required**	**Area Required (Ha)**
Urban		143946	City Park	0	0
			Community Park	1	4
			Neighborhood Park	6	19.5
			Mohallla Park	23	36.8
Rural		876985	City Park	2	24
			Community Park	9	36
			Neighborhood Park	35	113.75
			Mohallla Park	140	224
Total		**1020931**		**216**	**458.05**

Their areas are recommended to have 2 acres for cricket stadium and 1.5 acres for hockey stadium. Besides in rural areas, for villages larger than 5,000 populations, a combined playfield of 6 acres may be provided.

5.15.6 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 Swabi, such areas include prime agricultural land around the urban area, Rivers Kabul, Swat and their tributaries flowing through the District. These help 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.

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.

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 kms 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

5.16 MINES AND MINERALS

5.16.1 Minerals Mined/Extracted from Swabi District

i. Marble

Marble is a rock resulting from metamorphism of sedimentary carbonate rocks, most commonly limestone or dolomite rock. Metamorphism causes variable recrystallization of the original carbonate mineral grains.

The resulting marble rock is typically composed of an interlocking mosaic of carbonate crystals. Primary sedimentary textures and structures of the original carbonate rock (protolith) have typically been modified or destroyed.

Pure white marble is the result of metamorphism of a very pure (silicate-poor) limestone or dolomite protolithic. The characteristic swirls and veins of many colored marble varieties are usually due to various mineral impurities such as clay, silt, sand, iron oxides, or chert which were originally present as grains or layers in the limestone.

Green coloration is often due to serpentine resulting from originally high magnesium limestone or dolostone with silica impurities. These various impurities have been mobilized and recrystallized by the intense pressure and heat of the metamorphism.

Uses

White marble has been prized for its use in sculptures since classical times. This preference has to do with its softness, relative isotropy and homogeneity, and a relative resistance to shattering. Also, the low index of refraction of calcite allows light to penetrate several millimeters into the stone before being scattered out, resulting in the characteristic waxy look which gives "life" to marble sculptures of the human body.

Marble is extensive used as table and kitchen tops. Also, it is used for making decorative gift items of various uses.

Construction marble is a stone which is composed of calcite, dolomite or serpentine which is capable of taking a polish, more generally in construction, specifically the dimension stone trade, the term "marble" is used for any crystalline calcitic rock (and some non-calcitic rocks) useful as building stone.

Present Detail Profile of Marble:

Number of leases	13 (thirteen)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	18889.193 Acres
Production in Tones	996598 tons (2008)

Table 5.16. 1: Marble Leases in District Swabi[94]

S. No.	Location	Area (in acres)
1.	Ghundo Tarako Swabi	49.6737
2.	Village Ghundo Tarako Swabi	15.901
3.	Village Ghundo Tarako Swabi	9
4.	Bam Khel Swabi	311.49
5.	Village Salim Khan	87.35
6.	Kala Dara Swabi	299.228
7.	Village Ambar Swabi	48.756
8.	Jehangira Swabi	28.9
9.	Malka Kadi Swabi	706.61
10.	Village Ghundo Tarako Swabi	13.634
11.	Ghundo Tarako Swabi	6.53
12.	Village Salim Khan Swabi	87.34
13.	Village Amankot Swabi	224.78

ii. Dolomite

Dolomite is a carbonate mineral composed of calcium magnesium carbonate $CaMg(CO_3)_2$. The term is also used to describe the sedimentary carbonate rock dolostone.

Dolostone (dolomite rock) is composed predominantly of the mineral dolomite with a stoichiometric ratio of 50% or greater content of magnesium replacing calcium. Limestone that is partially replaced by dolomite is referred to as dolomitic limestone.

Uses

Dolomite is used as an ornamental stone, a concrete aggregate, and a source of magnesium oxide and also used for the production of magnesium. It is an important petroleum reservoir rock, and serves as the host rock for large strata-bound ore deposits of base metals such as lead, zinc, and copper. Where calcite limestone is uncommon or too costly, dolomite is sometimes used in its place as a flux for the smelting of iron and steel. Large quantities of processed dolomite are used in the production of float glass.

In horticulture, dolomite and dolomitic limestone are added to soils and soilless potting mixes to lower their acidity and as a magnesium source. Home and container gardening are common examples of this use.

Dolomite is also used as the substrate in marine (saltwater) aquariums to help buffer changes in pH of the water.

Present Detail Profile of Dolomite

[94] Source: Directorate General of Mines and Minerals, Government of KP .2011

Number of leases	10 (ten)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	1235.93 Acres
Production in Tones	431495 tons (2008)

Table 5.16. 2: Dolomite Leases in District Swabi[95]

S. No.	Location	Area (in acres)
1.	Bam Khel Swabi	45.11
2.	Ghundo Tarako Swabi	49.6737
3.	Ghundo Tarako Swabi	15.901
4.	Ghundo Tarako Swabi	9
5.	Bam Khel Swabi	311.49
6.	Village Salim Khan Swabi	87.35
7.	Kala Dara Swabi	299.228
8.	Village Ambar Swabi	48.756
9.	Village Maneri Bala Swabi	113.037
10.	Bam Khel Swabi	256.384

iii. Limestone

Limestone is a sedimentary rock composed primarily of calcium carbonate ($CaCO_3$) in the form of the mineral calcite. It most commonly forms in clear, warm, shallow marine waters. It is usually an organic sedimentary rock that forms from the accumulation of shell, coral, algal and fecal debris. It can also be a chemical sedimentary rock formed by the precipitation of calcium carbonate from lake or ocean water.

Uses

It is the raw material for the manufacture of quicklime (calcium oxide), slake lime (calcium hydroxide), cement and mortar. Pulverized limestone is used as a soil conditioner to neutralize acidic soils. It is crushed for use as aggregate (as solid base for many roads). Geological formations of limestone are among the best petroleum reservoirs. It is added to toothpaste, paper, plastics, paint, tiles, and other materials as both white pigment and cheap filler. It can suppress methane explosions in underground coal mines. Purified limestone is added to bread and cereals as a source of calcium.

Calcium levels in livestock feed are supplemented with it, such as for poultry (when ground).

[95] Source: Directorate General of Mines and Minerals, Government of KP .2011

It can be used for remineralizing and increasing the alkalinity of purified water to prevent pipe corrosion and to restore essential nutrient levels. Used in blast furnaces, limestone extracts iron from its ore.

Present Detail Profile of Limestone

Number of leases	13 (thirteen)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	758.209 Acres
Production in Tones	339957 tons (2008)

Table 5.16. 3: Limestone Leases in District Swabi[96]

S. No.	Location	Area (in acres)
1.	Bam Khel Swabi	49.99
2.	Ambar Swabi	50
3.	Miani Swabi	99.566
4.	Salim Khan Swabi	79.21
5.	Salim Khan Swabi	100
6.	Village Kala Dara Swabi	47.520
7.	Village Maneri Bala Swabi	50
8.	Sikandri Swabi	49.347
9.	Sikandri Swabi	49.62
10.	Ambar Swabi	50
11.	Maneri Bala Swabi	35.91
12.	Village Shah Mansoor Swabi	48.326
13.	Village Shah Mansoor Swabi	48.72

iv. Granite

The word granite comes from the Latin *granum*, a grain, in reference to the coarse-grained structure of such a crystalline rock. Granite is a common widely occurring type of intrusive, felsic, igneous rock. Granite usually has a medium- to coarse-grained texture. Occasionally some individual crystals (phenocrysts) are larger than the groundmass, in which case the texture is known as porphyritic. A granitic rock with a porphyritic texture is sometimes known as porphyry. Granites can be pink to gray in color, depending on their chemistry and mineralogy. By definition, granite is an igneous rock with at least 20% quartz by volume. Granite differs from granodiorite in that at least 35% of the feldspar in granite is alkali feldspar as opposed to plagioclase; it is the alkali feldspar that gives many granites a distinctive pink color. Outcrops of granite tend to form tors and rounded massifs. Granites

[96] Source: Directorate General of Mines and Minerals, Government of KP .2011

sometimes occur in circular depressions surrounded by a range of hills, formed by the metamorphic aureole or hornfels. Granite is usually found in the continental plates of the Earth's crust.

Granite is nearly always massive (lacking internal structures), hard and tough, and therefore it has gained widespread use as a construction stone. The average density of granite is between 2.65 and 2.75 g/cm^3, its compressive strength usually lies above 200 MPa, and its melting temperature is 1215 - 1260 °C.

Granitoid is a general, descriptive field term for light-colored, coarse-grained igneous rocks.

Uses

In some areas granite is used for gravestones and memorials. Granite is a hard stone and requires skill to carve by hand. Until the early 18th century granite could only be carved by hand tools with generally poor results.

Modern methods of carving include using computer-controlled rotary bits and sandblasting over a rubber stencil. Leaving the letters, numbers and emblems exposed on the stone, the blaster can create virtually any kind of artwork or epitaph.

Granite has been extensively used as a dimension stone and as flooring tiles in public and commercial buildings and monuments. With increasing amounts of acid rain in parts of the world, granite has begun to supplant marble as a monument material, since it is much more durable. Polished granite is also a popular choice for kitchen countertops due to its high durability and aesthetic qualities. In building and for countertops, the term "granite" is often applied to all igneous rocks with large crystals, and not specifically to those with a granitic composition.

Engineers have traditionally used polished granite surface plates to establish a plane of reference, since they are relatively impervious and inflexible. Sandblasted concrete with a heavy aggregate content has an appearance similar to rough granite, and is often used as a substitute when use of real granite is impractical

Present Detail Profile of Granite

Number of leases	05 (five)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	3976.814 Acres
Production in Tones	5897 tons (2008)

Table 5.16. 4: Granite Leases in District Swabi[97]

S. No.	Location	Area (in acres)
1.	Village Utla Swabi	1000
2.	Malka Kadi Swabi	706.61
3.	Natian Swabi	996.884
4.	Village Mir Ali Swabi	840.66
5.	Amankot Swabi	432.66

v. Slate Stone

Slates are dense and fine-grained rock. The colours of slates are generally grey, red, brown and green ranging from dark to light. It is produced by the compression of clays, shale, and various other rocks developing a characteristic cleavage consisting sericite and quartz with biotite, chlorite, and hematite as principal accessories.

In other words, slates are generally formed by low-grade regional metamorphism of pelithic sediments or fine-grained tuffs. It can be associated with other metamorphic sedimentary or volcanic rocks.

Slate Stone has developed well-marked splittable cleavages with or without developed re-crystallization & spots/knots of minerals like garnet, pyrite, andulasite, etc. They are normally fine to medium grained, moderately hard and compact, less homogeneous with varying textures and shades. It has an ability to split into thin layers along the plane of cleavages due to flattened and elongated minerals along the plane of cleavage.

Uses

- Paving
- Stepping stone in garden
- Combined with other materials gives quality and attractiveness
- Square blocks for a break band in section of granite paving
- Decorative clocks and thermometers
- Picture frame, mirrors, coasters, trivets, switch plates, candle holders.
- Engraved and painted in jewellery like earrings and pins.

Present Detail Profile of Slate Stone

Number of leases	02 (two)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	613.283 Acres
Production in Tones	44850 tons (2008)

[97] Source: Directorate General of Mines and Minerals, Government of KP .2011

Table 5.16. 5: Slate Leases in District Swabi[98]

S. No.	Location	Area (in acres)
1.	Ambar Swabi	113.38
2.	Khadi Shah Mansoor Swabi	499.903

vi. Sand stone

Sand stone is a sedimentary rock composed mainly of sand-sized minerals or rock grains composed of quartz and/or feldspar because these are the most common minerals in the Earth's crust. Like sand, sandstone may be any color, but the most common colors are tan, brown, yellow, red, gray, pink, white and black. Since sandstone beds often form highly visible cliffs and other topographic features, certain colors of sandstone have been strongly identified with certain regions.

Rock formations that are primarily composed of sandstone usually allow percolation of water and other fluids and are porous enough to store large quantities, making them valuable aquifers and petroleum reservoirs. Fine-grained aquifers, such as sandstones, are more apt to filter out pollutants from the surface than are rocks with cracks and crevices, such as limestone or other rocks fractured by seismic activity.

Uses

Sandstone has two major applications, as crushed stone and as dimension stone. “Dimension stone” is any rock material that is cut into specific sizes, typically as blocks and slabs and is used in buildings, both commercial and residential purposes.

Crushed sandstone is used in road and highway construction and maintenance.

Present Detail Profile of Sand Stone

Number of leases	01 (one)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	486.60 Acres
Production in Tones	2736 tons (2008)

Table 5.16. 6: Slate Leases in District Swabi[99]

S. No.	Location	Area (in acres)
1.	Village Gandaf Swabi	486.60

[98] Source: Directorate General of Mines and Minerals, Government of KP .2011

[99] Source: Directorate General of Mines and Minerals, Government of KP .2011

vii. Quartzite

Quartz is a chemical compound consisting of one-part silicon and two parts oxygen. It is silicon dioxide (SiO_2).

Quartzite is a hard, non-foliated metamorphic rock of sandstone, which is converted into quartzite through heating and pressure usually related to tectonic compression within orogenic belts. Pure quartzite is usually white to gray, though quartzites often occur in various shades of pink and red due to varying amounts of iron oxide (Fe_2O_3). Other colors, such as yellow and orange, are due to other mineral impurities.

When sandstone is metamorphosed to quartzite, the individual quartz grains recrystallize along with the former cementing material to form an interlocking mosaic of quartz crystals. Most or all of the original texture and sedimentary structures of the sandstone are erased by the metamorphism. Minor amounts of former cementing materials, iron oxide, silica, carbonate and clay, often migrate during recrystallization and metamorphosis. This causes streaks and lenses to form within the quartzite.

Orthoquartzite is a very pure quartz sandstone composed of usually well-rounded quartz grains cemented by silica. Orthoquartzite is often 99% SiO2 with only very minor amounts of iron oxide and trace resistant minerals such as zircon, rutile and magnetite. Although few fossils are normally present, the original texture and sedimentary structures are preserved.

Uses

Quartz is one of the most useful natural materials. Its usefulness can be linked to its physical and chemical properties. It has a hardness of seven on the Mohs scale which makes it very durable. It is chemically inert in contact with most substances. It has electrical properties and heat resistance that make it valuable in electronic products. Its luster, color and diaphaneity make it useful as a gemstone and also in the making of glass.

Geological processes have occasionally deposited sands that are composed of almost 100% quartz grains. These deposits have been identified and produced as sources of high purity silica sand. These sands are used in the glassmaking industry. Quartz sand is used in the production of container glass, flat plate glass, specialty glass and fiberglass.

The high hardness of quartz, seven on the Mohs Scale, makes it harder than most other natural substances. As such it is an excellent abrasive material. Quartz sands and finely ground silica sand are used for sand blasting, scouring cleansers, grinding media, and grit for sanding and sawing.

Quartz is very resistant to both chemicals and heat. It is therefore often used as foundry sand.

With a melting temperature higher than most metals it can be used for the molds and cores of common foundry work. Refractory bricks are often made of quartz sand because of its high heat resistance. Quartz sand is also used as a flux in the smelting of metals.

Quartz sand has a high resistance to being crushed. In the petroleum industry sandy slurries are forced down oil and gas wells under very high pressures. This high pressure fractures the reservoir rocks and the sandy slurry injects into the fractures. The durable sand grains hold the fractures open after the pressure is released. These open fractures facilitate the flow of natural gas into the well bore.

Quartz sand is used as a filler in the manufacture of rubber, paint and putty. Screened and washed, carefully sized quartz grains are used as filter media and roofing granules. Quartz sands are used for traction in the railroad and mining industries. These sands are also used in recreation on golf courses, volleyball courts, baseball fields, children's sand boxes and beaches.

High quality quartz crystals are single-crystal silica with optical or electronic properties that make them useful for specialty purposes. USGS estimates that about ten billion quartz crystals are used every year. Electronics grade crystals can be used in filters, frequency controls, timers, electronic circuits that become important components in cell phones, watches, clocks, games, television receivers, computers, navigational instruments and other products. Optical-grade crystals can be used as lenses and windows in lasers and other specialized devices. Although some natural quartz crystals are used in these applications, most of these special crystals are now manufactured.

Silica stone is an industrial term for materials such as quartzite, novaculite and other microcrystalline quartz rocks. These are used to produce abrasive tools, grinding stones, hones, oilstones, stone files, tube-mill liners and whetstones.

Tripoli is crystalline silica of an extremely fine grain size (less than ten micrometers). Commercial Tripoli is a nearly pure silica material that is used for a variety of mild abrasive purposes which include: soaps, toothpastes, metal polishing compounds, jewelry polishing compounds and buffing compounds. Tripoli is also used in brake friction products, fillers in enamel, caulking compounds, plastic, paint, rubber and refractories.

Present Detail Profile of Quartzite

Number of leases	01 (one)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	252.54 Acres
Production in Tones	5515 tons (2008)

Table 5.16. 7: Quartzite Leases in District Swabi[100]

S. No.	Location	Area (in acres)
1.	Village Baja Bam Khel Swabi	252.54

[100] Source: Directorate General of Mines and Minerals, Government of KP .2011

viii. Fuller Earth

Fuller's earth mineral is characterized by the property of absorbing basic colors and removing them from oils. It is composed mainly of alumina, silica, iron oxides, lime, magnesia, and water, in extremely variable proportions, and is generally classified as sedimentary clay. In color it may be whitish, buff, brown, green, olive, or blue. It is semi-plastic or non-plastic and may or may not disintegrate easily in water.

Uses

It was originally used in the fulling of wool to remove oil and grease but is now used chiefly in bleaching and clarifying petroleum and secondarily in refining edible oils.

Present Detail Profile of Fuller Earth

Number of leases	02 (two)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	259.24 Acres
Production in Tones	9511 tons (2008)

Table 5.16. 8: Fuller Earth Leases in District Swabi[101]

S. No.	Location	Area (in acres)
1.	Jehangira Swabi	28.9
2.	Village Jalsai Swabi	230.34

ix. Iron Oxide

Iron oxide(III) or ferric oxide having chemical formula Fe_2O_3. It is one of the three main oxides of iron, the other two being iron(II) oxide (FeO), which is rare, and iron (II, III) oxide (Fe_3O_4), which also occurs naturally as the mineral magnetite. As the mineral known as hematite, Fe_2O_3 is the main source of the iron for the steel industry. Fe_2O_3 is ferromagnetic, dark red, and readily attacked by acids. Rust is often called iron(III) oxide, and to some extent this label is useful, because rust shares several properties and has a similar composition. To a chemist, rust is considered an ill-defined material, described as hydrated ferric oxide.

Uses

The overwhelming application of Iron(III) oxide is as the feedstock of the steel and iron industries, e.g. the production of iron, steel, and many alloys.

[101] Source: Directorate General of Mines and Minerals, Government of KP .2011

A very fine powder of ferric oxide is known as "jeweler's rouge", "red rouge", or simply rouge. It is used to put the final polish on metallic jewelry and lenses, and historically as a cosmetic.

Rouge cuts more slowly than some modern polishes, such as cerium(IV) oxide, but is still used in optics fabrication and by jewelers for the superior finish it can produce. When polishing gold, the rouge slightly stains the gold, which contributes to the appearance of the finished piece. Rouge is sold as a powder, paste, laced on polishing cloths, or solid bar (with a wax or grease binder). Other polishing compounds are also often called "rouge", even when they do not contain iron oxide. Jewelers remove the residual rouge on jewelry by use of ultrasonic cleaning.

Products sold as stropping compound are often applied to a leather strop to assist in getting a razor edge on knives, straight razors, or any other edged tool.

Iron(III) oxide is also used as a pigment, under names "Pigment Brown 6", "Pigment Brown 7", and "Pigment Red 101".[1] Some of them, e.g. Pigment Red 101 and Pigment Brown 6, are Food and Drug Administration (FDA)-approved for use in cosmetics.

Being inexpensive and nontoxic, ferric oxide finds many niches uses. For example, in its granular form (GFO, granular-ferric-oxide), it is used to remove phosphates in aquariums.

Present Detail Profile of Iron Oxide

Number of leases	01 (one)
Mining Method	Surface mining
Scale of Mining	Small & primitive mining
Lease Area	23.00 Acres
Production in Tones	Nil tons (2011)

Table 5.16. 9: Fuller Earth Leases in District Swabi[102]

S. No.	Location	Area (in acres)
1.	Aman Kot Swabi	23

x. Minor Minerals

Sand, gravel and bajri are categorised as minor minerals, these are excavated though dredging on the banks of river/stream/nulla side in district Swabi. They are auctioned in blocks. The excavated material in quantity (tons) is not recorded. Their leases are granted for one year only.

Sand

It is a naturally occurring granular material composed of finely divided rock and mineral particles. The composition of sand is highly variable, depending on the local rock sources and conditions, but the

[102] Source: Directorate General of Mines and Minerals, Government of KP .2011

most common constituent of sand in inland continental settings and non-tropical coastal settings is silica (silicon dioxide, or SiO_2), usually in the form of quartz.

As the term is used by geologists, sand particles range in diameter from 0.0625mm (or 1⁄16 mm, or 62.5 μm) to 2 mm. An individual particle in this range size is termed a sand grain. The next larger size class above sand is gravel, with particles ranging from 2 mm up to 64 mm. The next smaller size class in geology is silt: particles smaller than 0.0625 mm down to 0.004 mm in diameter. The size specification between sand and gravel has remained constant for more than a century, but particle diameters as small as 0.02 mm were considered sand.

Sand feels gritty when rubbed between the fingers (silt, by comparison, feels like flour.

ISO 14688 grades sands as fine, medium and coarse with ranges 0.063 mm to 0.2 mm to 0.63 mm to 2.0 mm. In the United States, sand is commonly divided into five sub-categories based on size: very fine sand (1⁄16 - ⅛ mm diameter), fine sand (⅛ mm - ¼ mm), medium sand (¼ mm - ½ mm), coarse sand (½ mm - 1 mm), and very coarse sand (1 mm - 2 mm).

Uses

It is mixed with cement and sometimes lime to be used in masonry construction. Sand is a principal component of plaster in construction of buildings. It is the principal component raw material for making common glass.

In paints, it is: mixed to produces a textured finish for walls and ceilings or non-slip floor surfaces. In foundry, sand is used to make molds into which molten material is poured. This type of sand must be able to withstand high temperatures and pressure, allow gases to escape, have a uniform, small grain size and be non-reactive with metals.

Sandbags are made which protect against floods and gunfire. The inexpensive bags are easy to transport when empty, and unskilled volunteers can quickly fill them with local sand in emergencies.

Graded sand serves as an abrasive in cleaning, preparing, and polishing

Gravel

Gravel is composed of unconsolidated rock fragments that have a general particle size range and include size classes from granule- to boulder-sized fragments. Gravel can be sub-categorized into granule (>2 to 4 mm/0.079 to 0.16 in) and boulder (>64 to 256 mm, 2.5 to 10.1 in).

Uses

Gravel is an important commercial product, with a number of applications. It is used to make concrete, for road construction, for mixing with asphalt, as construction fill, and in the production of construction materials like concrete blocks, bricks, and pipes. It is also used to make roofing shingles.

5.16.2 Constraints and Recommendations in Mineral sector

KP is endowed with in exhaustible resources of variety of minerals. To exploit these resources the DGMM and other public sectors stakeholders have to address following constraints:

- To explore and evaluate the identified mineral deposits on scientific lines
- With the help of drilling and other geophysical methods reserve of mineral deposit have to be calculated.
- Geo chemical studies of each potential mineral deposit is necessary
- Capacity building is needed to meet the requirement of mining industry.
- In order to demonstrate mineral potential a systematic data generation and its documentation on sustainable basis is needed
- A step wise documented procedure be given in a booklet for starting a business in mining which should include, how to apply/renew/mine for a lease, what mining method one should adapt to mine/extract a particular mineral, what are the potential market and where to get human resource. All such information should be available free of cost. It will help the private entrepreneur to invest in mining sector.
- Other effective dissemination of mineral data as source of information should be used to attract as well as facilitate investment
- Bankable document on development of mine deposit be prepared so that banks can provide loans to the prospective entrepreneur in mining sector.
- Developing of curriculum for graduate/post graduate studies to suit to local mineral industry.
- Specialized training in coordination with public and private sectors should be arranged by the academia.
- Market oriented training and workshops be held on sustainable basis for the different level of stake holders for the improved mining and market practices.
- R&D work should be conducted using indigenous technology for value addition of mineral product to suit to local and international market.
- In gemstones an accredited laboratory should be established to evaluate finished and uncut gems for marketing of gems in international market.
- Mechanism and rules are too framed to prevent the leased area to sublet to contractor to extract the valuable mineral on contract basis which leads to wastage of the valuable minerals and destroy the deposit for further exploitation because of non-scientific mining practices.
- Leased holders should use scientific mining practices.
- Leased holders should employ skilled mine workers and mining engineers for exploitation and geologist for exploration.
- KP department should encourage corporate mining
- Leased should be granted to those prospector bidders who have sufficient investment available which should be made mandatory to use scientific practices in exploration and mining phases.

- At present there is no policy of collecting production data of minor mineral in the Directorate of Mine and Minerals. It is imperative that production data of minor minerals should be collected in order to visualize the damage if any can be assessed.
- A Geo data Centre should be established in line with NMP 1995.

5.17 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.

Existing Situation in Swabi

Electric power sector in Swabi such as transmission and distribution are managed by PESCO (Peshawar Electric Supply Company). There is no Hydel or Thermal power station in Swabi and all the required electric power is purchased from WAPDA National Grid.

Power Infrastructure: - District Swabi is 1543 sq. km, containing 02 divisions and 10 sub-divisions. The total length of transmission lines (all categories) in the District is 4290 kilometers, which is about 5.5 percent of the provincial total. The length of about 52% of the transmission lines is of 400 volts, while around 46% belong to 11 kV category. Thus, these two categories together form 98% of the total transmission lines length in the District. The total number of grid stations in District Swabi is 03, against 87 in the entire Province. In District Swabi, all 03 Grid Stations are of 132 Kv, (Table 5.17.1).

Table 5.17. 1: Power Infrastructure: Province Vs District Swabi

Description	Province	Swabi District
Service Area	74,521 Sq Km	1543 Sq Km
Number of Divisions	31 No	02 No
Number of Sub Divisions	143 No	10 No
LT (400v) Transmission Lines	42,526 km	2224 km
11 kv Transmission Lines	31,284 km	1981 km
33 kv Transmission Lines	311 km	0
66 kv Transmission Lines	861 km	0
132 kv Transmission Lines	1919 km	85 km
220 Kv Transmission Line	750 km	0
500 Kv Transmission Line	117 km	0
Total Transmission lines	**77,768 km**	**4290 km**
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**

Power Consumers

As on 2015, PESCO reported 2.8 million registered customers for the province. Approximately 98% of their customers are Domestic and commercial. The industrial customers are 1% of all customers served, while the rest are irrigation and other consumers (Table 5.17.2).

Table 5.17. 2: Power Consumers

S. No	Description	Province KP	Swabi District
1	Domestic Customers	2886597	195542
2	Industrial Customers	28967	2039
3	Tube Wells	21688	2391
4	Bulk Customers	848	3
5	Others	1010	61
Total		**2939110**	**200036**

Reasons for Load Shedding

The quantity of Electric Power generated is not enough to fulfill the demands of country, which necessitates load shedding. Table 5.17.3 explains the situation in the country, while Table 5.17.4, provides similar information for the Province and District Swabi.

Table 5.17. 3: Power Generation Vs Shortfall in the Country

Total Power generated in the country Oct 2010	14,840 M W
Total Power Generated in the country May 2011	12,999 M W
Peak Demand	17,847 M W
Short Fall	3,007 M W in Oct 2010 4,848 M W in May 2011
Short Fall (%)	16.8 % in Oct 2010 27 % in May 2011

Table 5.17. 4: Power Availability Vs Shortfall – KP Vs District Swabi[103]

S. No	Description	Province KP	Swabi District
1	Average Demand	2,100 MW	89 MW
2	Peak Demand	2,487 MW	107 MW
3	Available Power	1,179 MW	67 MW
4	Short Fall	921 MW	22 MW
5	Short Fall %	43.8 %	31 %

5.17.1 Existing Generating Capacity

Table 5.17.5 shows electric generation capacity in Pakistan, while the detailed existing installed capacity and capability of WAPDA system is shown in Table 5.17.5. As seen from Table 5.17.5, 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 5.17. 5: Electric Generation Capacity (2010)[104]

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 5.17. 6: 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

[103] PESCO Data

[104] Source: General Manager (Planning), WAPDA/NTDC

		Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
						Summer	Winter
		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	
			Sub-Total (WAPDA+GENCOs)		11273	9846	5883
	Nuclea	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	

		Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
						Summer	Winter
	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	
			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	

	Sr. No.	Name of Power Station	Fuel	Installed Capacity (MW)	Capability, (MW)	
					Summer	Winter
		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

5.17.2 Alternate Resources of Energy in SWABI

Table 5.17. 7: WAPDA/PEPCO System Historical Trends[105]

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

i. Coal Energy

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

[105] Source: General Manager Planning WAPDA / NTDC

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.

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. District Swabi do not have coal reserves; therefore, coal has to be imported from other areas to produce electric power.

ii. Energy Generation from Garbage

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 Mardan is 2,146,767. 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 536,691 kg, i.e. equal to 536.69 tons per day. 627 KWH energy can be produced from each ton of combusted solid waste. Approximately 15 percent of the energy produced is used to operate the plant which is 94 Kwh and the balance 533 Kwh can be sold to the energy customers. Therefore, a garbage plant in Mardan District can produce 286,055 Kwh of electricity to be available for public.[106]

iii. Electricity Generation from Drainage Water

Drainage water can also be used to produce electricity. The drain water is collected into a large reservoir and some of the water is piped to a lower level with gravity. At the lower end of pipe

[106] Report on urban environmental problems in Pakistan, case study, Hayatabad, Peshawar and Report on waste to power Karnataka, India

Turbine / Generator is installed. The flowing water is used to turn the turbine / generator to produce electricity. All details are similar to a small hydroelectric plant.

iv. 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 Swabi.

Mardan has solar energy of about 200 - 250 watt per m^2 in a day with about 2,889 sunshine hours in a year. 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.

5.17.3 Hydro Electric Potential in Khyber Pakhtunkhwa

Khyber Pakhtunkhwa is blessed with huge hydropower potential. The total hydroelectricity generation capacity is estimated to be more than 25,000 MW. This potential remained focus of interest to private investors and international funding agencies. For the purpose of Hydro Power generation in the province, (SHYDO) Sarhad Hydel Development Organization was established in 1986 to identify and explore the Hydel potential of the province. This organization is under the administrative control of Energy and Power Department of Provincial Government and is governed by Board of Directors. It has identified Hydel potential of more than 6000 MW, which can be explored through public sector, private sector of public private partnership. SHYDO has completed four projects with total installed capacity of 105.3 MW, out of which 81MW Malakand-III-HPP and 18MW Pehur HPP are connected to the national grid. The other two are Shishi HPP 1.8 MW and Rashoon HPP, 4.5 MW. Both are located in Chitral and the generated power is consumed locally in District Chitral. SHYDO has further planned to develop 56MW within next three years, 600MW in five years' time and 1500MW within ten years' time under its short, medium and long-term plan.[107]

5.17.4 Energy Units Consumed: Past Trends Vs Forecasts

Energy consumption is an index of prosperity and standard of living of people in a country. As a result of technological and industrial development, the demand of energy is rapidly increasing. The province will be facing the acute challenge of energy deficit in the future. Even today the primary energy supplies are not enough to meet the present demand. Therefore, the government needs to give serious thoughts to the development of indigenous alternative and renewable energy resources. In addition, environmental friendly renewable energy sources need to be developed and popularized to achieve the goal of sustainable development.

The annexure at the end of this chapter gives year-wise breakdown of units consumed in the past, during the period 2005 to 2010. The annexure also gives projected data for the next 20 years,

[107] SHYDO Brochure

computed by applying average growth rate. It is clear that that demand for Electric Energy will increase to about 2 times by the year 2030.

Industrial and Other Consumer Growth in District Swabi

The table shows the growth in industrial and other consumers of energy. The industry sector has a growth rate of 2.62 % in District Swabi. Therefore, by year 2030 the number of industries will increase 1.6 times in the District

Table 5.17. 8: Consumer Growth in District Mardan

Year	Domestic	Commercial	Industrial	Bulk	Tube Wells
2008-2009	149,005	9,611	1,599	71	2,498
%Growth	155,528	9,853	1,653	71	2,525
2009-2010	4.38	2.52	3.38	0.00	1.08
%Growth	162,700	10,250	1,690	71	2,545
2010-2011	4.61	4.03	2.24	0.00	0.79
%Growth	167,235	10,498	1,728	71	2,557
% Average Growth	2.79	2.42	2.25	0.00	0.47

The industry sector has a growth rate of 1.96 % in District Mardan. Therefore, by year 2030 the number of industries will increase 1.47 times in Mardan District

5.17.5 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.

5.17.6 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.

5.17.7 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 trippings 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.

5.17.8 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 mineral 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:

a. 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.

b. Approximately 95% of PESCO meters are still of the old Electro-Mechanical type. These are vulnerable to slowing and tampering by any one. 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.

5.18 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.

5.18.1 Distribution of Forest Land

Before proceeding further, it seems pertinent to define legal classifications of forests, which are as below:

a) 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.

b) Protected Forests:

The forests which have been declared as protected forests under the provision of the Khyber Pakhtunkhwa Forest Ordinance 2002 and have some rights and concessions of grazing, grass cutting and cutting of dry/wind fallen tree for domestic fuel wood consumption.

c) 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.

d) 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.

e) 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 5.18. 1: Distribution of Forest Land (2016-2017) Area in Acres[108]		
Forest Type	**KP**	**District Swabi**
Reserved Forest	232157	0
Protected Forest	1163276	0
Resumed Forest	90271	537
Unclassed Forest	259960	0
Section 38[2]	19183	0
Communal	122944	0
Guzara Forest	688123	39131
Private plantation	1767567	70703
Miscellaneous	307080	0
Total	4650561	110,371

Table 5.18.1 shows distribution of land in Khyber Pakhtunkhwa and District Swabi. The gross area under forests in the Province is 4650561 acres, out of which major forests are protected forests (25%) and Guzara forests (14.9%).

Table 5.18. 2: Distribution of Forest Land (2016-2017)[109]		
Forrest Type	**Areas (Acres)**	**%age**
Resumed Land	537	.5
Guzara Forest	39131	35.5
Private Plantation	70703	64
Total	110371	100

District Swabi is essentially devoid of any worthwhile forest land. There is only 537 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 Swabi is only about 0.02% of the total forest area in the Province.

[108] Khyber Pakhtunkhwa Development Statistic 2020.

[109] Deducted from Table 1

5.18.2 Forest Type – District Swabi

In District Swabi, the forest area is spread mostly towards east-north part of the District in the hilly area. Total area under forests in District Swabi is 110371 acres that is resumed land, Guzara Forest and Private plantation i.e. Resumed forest private lands taken over by the Government under various land reforms and regulations and managed by the Forest Department.

5.18.3 Forest trend in District Swabi

Total area in 1998 under forestry is 45267 hectares which is decline into 41684 hectares in 2016. Deforestation of 3583 hectares occur in the period of 18 years, or 199 hectares land is deforested every year since 1998.

Table 5.18. 3: Forest Trend Between 1998-2016 (ha)

Category	1998[110]	2016
Resumed Land	536	537
Section 38	3602	0
Guzara	39131	39131
Total	**45267**	**41684**

5.18.4 Comparison with Greater Peshawar Region

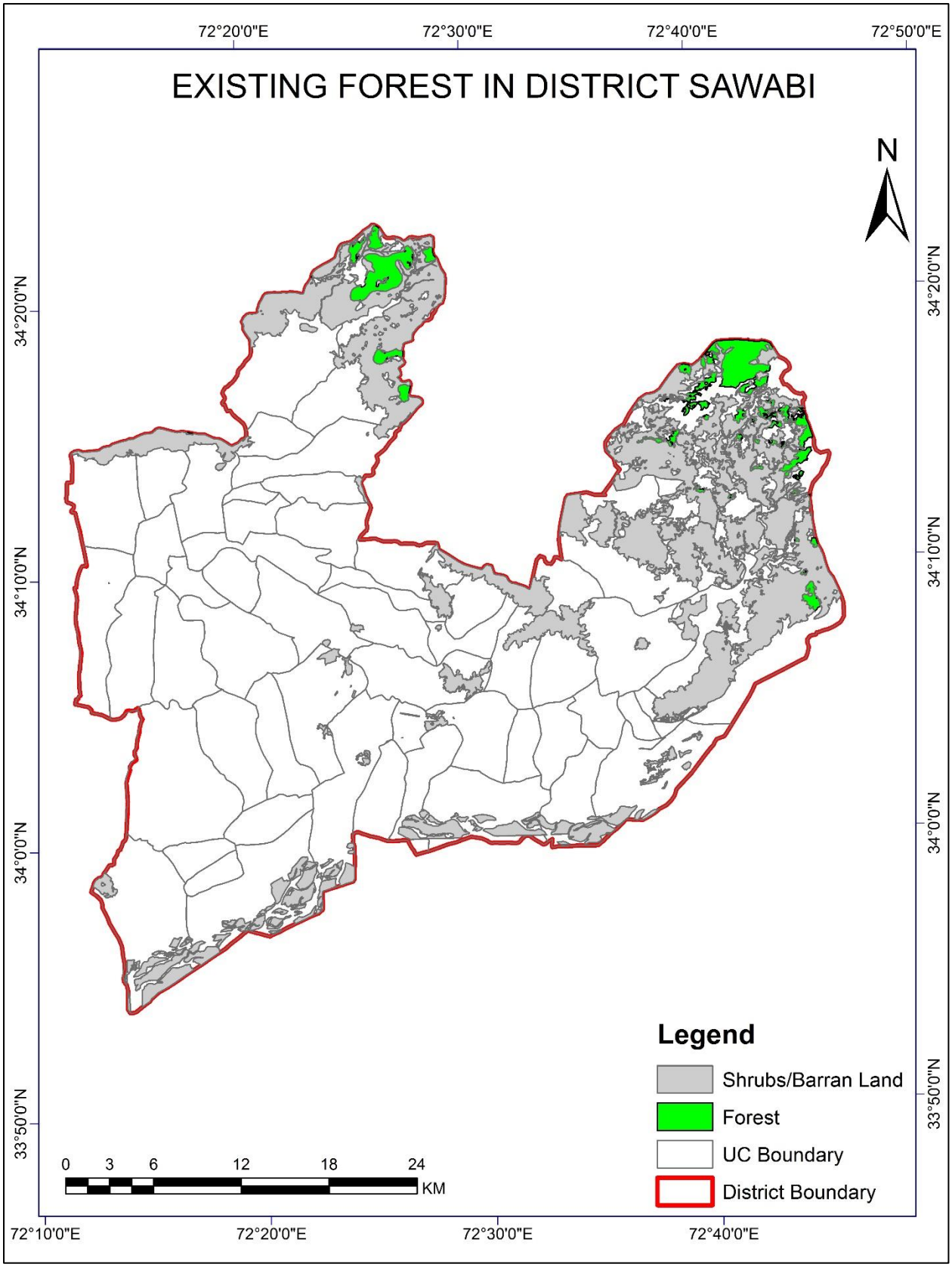
Forest area in Greater Peshawar Region is 6121621 hectares which consist of reserved forest, Resume land, land under section 38 Communal and Guzara Forest. Overall Contribution of district Swabi in forestry of Greater Peshawar Region is 18%. in resumed forest and private forest, the contribution is 13%. Guzara Forest in Greater Peshawar Region is 39131 hectares which totally lies in District Swabi.

Table 5.18. 4: Comparison with Greater Peshawar Region (2016-2017)[111]

Forest Type	Peshawar Region	Swabi	Contributing % of Swabi District
Reserved Forest	12936	0	0%
Protected Forest	0	0	0%
Resumed Land	4008	537	13%
Unclassed Forest	0	0	0%
Section 38[2]	52	0	0%
Communal	800	0	0%
Guzara Forest	39131	39131	100%
Private plantation	547946	70703	13%
Miscellaneous	7289	0	0%
Total	612162	110371	18%

[110] Sawabi District 1998 census report.

[111] Development Statistic of Khyber Pakhtunkhwa 2020



Map 5.18.1: Existing Forest in District Swabi

5.18.5 Impact of Deforestation on Environment [112]

God created this planet with utmost balance and made it a source of survival for mankind and other creatures living in it. Almighty decorated it with deep oceans, high mountains; snowcapped peaks, vast deserts and lush green fields and covered it with Ozone layer to protect it from the dangerous rays coming from sun to make it livable for its dwellers. But the haphazard interventions of man in the nature for the sake of development disturbed the ecological balance by the emission of greenhouse gases in enormous quantity and destroying the Ozone layer.

A report of the International Panel on Climate Changes says that in the past two decades the quantity of carbon has doubled resulting in 3.2 to 9.7 degree increase in the global temperature. The report warns that due to global warming, some glaciers are melting with a speed of 30 meter per year and till 2035, major glaciers are apprehended to disappear from this planet. Experts forecast that melting glaciers will ultimately raise sea level and major cities of the world may come under water.

General Secretary of United Nations has cautioned that, if this situation remains unchanged, 1.8 billion people will be forced to live in such areas where there will be acute shortage of water and till 2025, 2/3 of the world population will face water scarcity problems. A report of WHO discloses that 5 million people are falling prey to climatic diseases each year while 150,000 die due to it. Similarly, 60,000 persons suffer from skin diseases due to ultra violet rays every year.

Ironically, the most advanced and self- claimed civilized nations of the world are more responsible for environmental violations. The USA is emitting 40 percent of greenhouse gases alone, while G-8 countries are producing 70 percent of it. Perhaps it is time to take collaborative steps to check the alarming speed of environmental degradation. The developed countries must sense their duty and ensure measures to control emission of greenhouse gases. But, the developing countries should not overlook their endangered future and must plan for rectification of the environment in their jurisdictions. Such countries are adversely affected by climate changes as they are already deprived of the mechanism needed for the maintenance of the environment. Negligence of these nations towards environment can lead them to catastrophe because they don’t have enough resources to avoid the threat.

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. They purify air, prevent wind storms and protect soil erosion. Beside these functions, trees emit oxygen and maintain climate at a balancing point. A big size tree can provide oxygen sufficient for 36 infants, while 10 big size trees produce cooling equal to the cooling generated by a one-ton Air Conditioner. Trees also minimize air pollution, reduce noise and decrease the unpleasant smell by absorbing rotten substances from the drains.

[112] Source: http://www.khyberpakhtunkhwa.gov.pk/Departments/Forestry/MassPlantation.php

Unfortunately, forests cover 79.699 million hector areas in the country, constituting hardly 5 % of the total areas. Experts advise that at least 25 % of the total area of a country must be covered with forests. In Pakistan per capita forest areas is 0.037 acres while in the developed countries this ratio is one hector per capita. Forests cover 17% of the area of Kp, including 2.5 % area covered by trees grown in cultivable fields. The existing forest covered area is not sufficient to meet national needs and to cope with environment hazards. There is a dire need for increasing this area by massive plantation.

The current year has been declared as National year of Environment and that is why the KP Forest Department has chalked out a comprehensive plan for mass plantation. Under this plan 5.682 million saplings of different species will be planted with the help of defense forces, Government departments, educational institutions, civil society and farmers during this season in various parts of the province. Arrangements for sensitization of the community and provision of technical assistance to cultivators are also made. Similarly, Ashar plantation (Collective plantation) will be arranged in collaboration of the district administration and farmers at local level. Similarly, saplings raised in tubs in various field nurseries in the province are available at Rs.2 each for general public and at the rate of Rs1.50 each for provincial departments.

5.18.6 Constraints

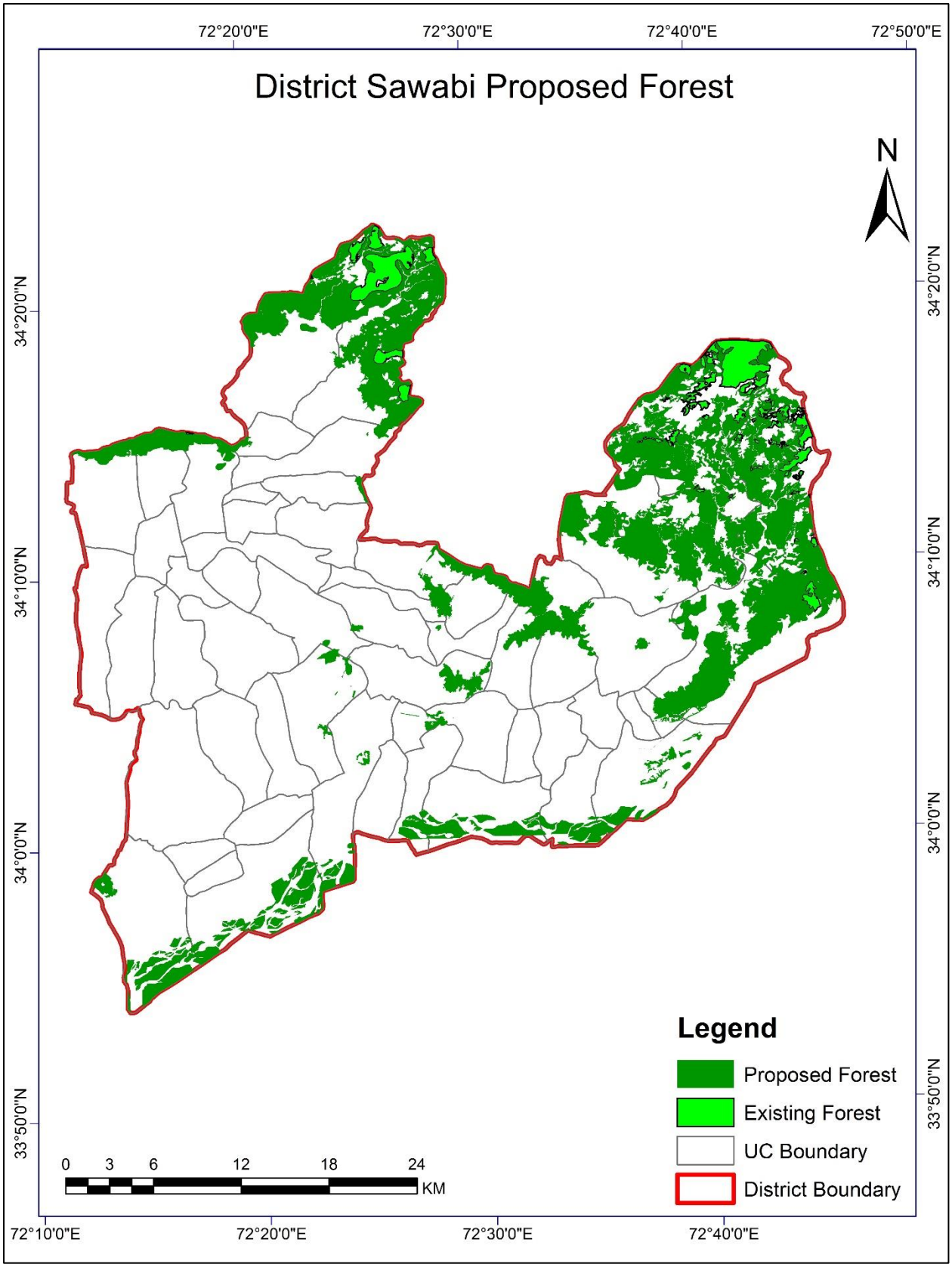
Total area of District Swabi is 1543 sq. kms with only 2.1% of forest land and 16.73% of barren land. In 1998 forest area is 45267 hectare which is now reduce into 41684 hectares[113].

- 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.

[113] Calculated from Base Map of district Swabi

5.18.7 Recommendations

- As the existing forest of district Swabi is in acute amount, the range land of Swabi which is about 19.57% should be used for afforestation (fruit orchard and tree plantation which will increase the scenic beauty of the area and in wide range it will contribute to reduce climate change and global warming).
- 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 Swabi should be preserved to deal with the arising environmental problems.



Map 5.18.2: Proposed Forest Map of District Swabi

CHAPTER 6

PLANNING FOR RURAL AREAS

6. PLANNING FOR RURAL AREAS

6.1 POLICY GUIDELINES FOR SUSTAINABLE DEVELOPMENT OF RURAL AREAS

District Swabi is 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'. Agricultural land exists throughout the District, including around the urbanized areas of Swabi. 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 SWABI

6.2.1 Number of Rural Settlements

As per District Census Report 2017 of District Swabi, there are 151 rural settlements in the District. From the same source, it has been calculated that in the year 2021, 75 of these villages had population of 5,000 and above, 56 villages had population between 1000 to 4,999 while 20 had population varying between 999 to 117. Thus, combining the above categories, 117 rural settlements (86.7%) had population of 1,000 and above, while the remaining about 13.2% had less than 1,000 populations.

Table 6.1. 1: PC wise List of District Swabi (2021-40)

TEHSIL	Patwar Circle	Village Name	Growth rate 1998-2017	Pop 2021	Pop 2025	Pop 2030	Pop 2035	Pop 2040
LAHOR TEHSIL	ANBAR PC	ANBAR	2.97	11265	11944	12664	13427	14236
		JANGI DHER	2.65	2904	3060	3224	3397	3579
		SHEIKH DHERI	0.02	4058	4060	4062	4064	4066
	BEKA PC	BEKA	2.78	11841	12509	13214	13959	14746
		NABI	1.94	5766	5992	6227	6471	6725
	HARYAN PC	DHERI ZAKRIA	2.51	1323	1390	1461	1535	1613
		HARYAN	2.12	3390	3535	3686	3844	4009
		SALLAH	2.63	4097	4315	4545	4787	5042
	HUND PC	HUND	2.51	12016	12627	13269	13943	14652

	JAHANGIRA PC	ALLAH DHER	2.99	3352	3555	3771	4000	4243
		CHAK KUND	3.5	290	311	333	357	382
		JAHANGIRA	3.42	41339	44215	47291	50581	54100
	JAL BAI PC	JAL BAI	2.45	35918	37700	39570	41533	43593
		JALBAI-MERA	4.18	3725	4043	4388	4763	5170
	JAL-SAI PC	JALSAI	2.77	24919	26319	27797	29358	31007
		JAL-SAI MERA	5.62	3453	3852	4297	4794	5348
	KUNDA PC	KUNDA	2.07	13760	14336	14936	15561	16212
		KUNDA MERA	6.08	7385	8310	9351	10523	11841
	LAHOR PORE (SHARQI) PC	LAHOR PORE (SHARQI)	2.61	24782	26093	27473	28926	30456
	LAHOR RAPORE PC	LAHOR RAPORE	2.27	24327	25444	26612	27834	29112
	MANKI PC	MANKI	2.51	24150	25378	26668	28024	29448
	TANNON PC	BAZAR	2.58	4275	4498	4733	4980	5240
		JABAR	2.18	2189	2285	2386	2491	2601
		TANNON	2.63	9044	9526	10034	10569	11132
RAZAR TEHSIL	DHOBIAN PC	DAULAT	1.43	6412	6597	6787	6982	7183
		DHOBIAN	2.18	22912	23922	24976	26077	27226
	SARD CHINA PC	BAZARGAI	2.1	11381	11864	12368	12893	13440
		SARD CHINA	2.12	20502	21380	22296	23251	24247
	SUDHER PC	ARMAL DHERI	2.53	10565	11106	11675	12273	12902
		GHAZI KOT	2.21	4487	4688	4897	5116	5345
		SADRI	2.35	7408	7760	8129	8516	8921
		SUDHER	2.24	12715	13291	13893	14522	15180
	YAQUBI PC	CHAK-YAR-HUSSAIN	2.01	11336	11796	12275	12773	13292
		YAQUBI	2.23	25741	26902	28115	29383	30708
	YAR HUSSAIN PC	YAR HUSSAIN	1.45	43367	44634	45938	47280	48661
	ZIAM PC	ZIAM	6.38	8003	9057	10250	11600	13127
	ADINA PC	ADINA	2.32	21098	22088	23125	24210	25346

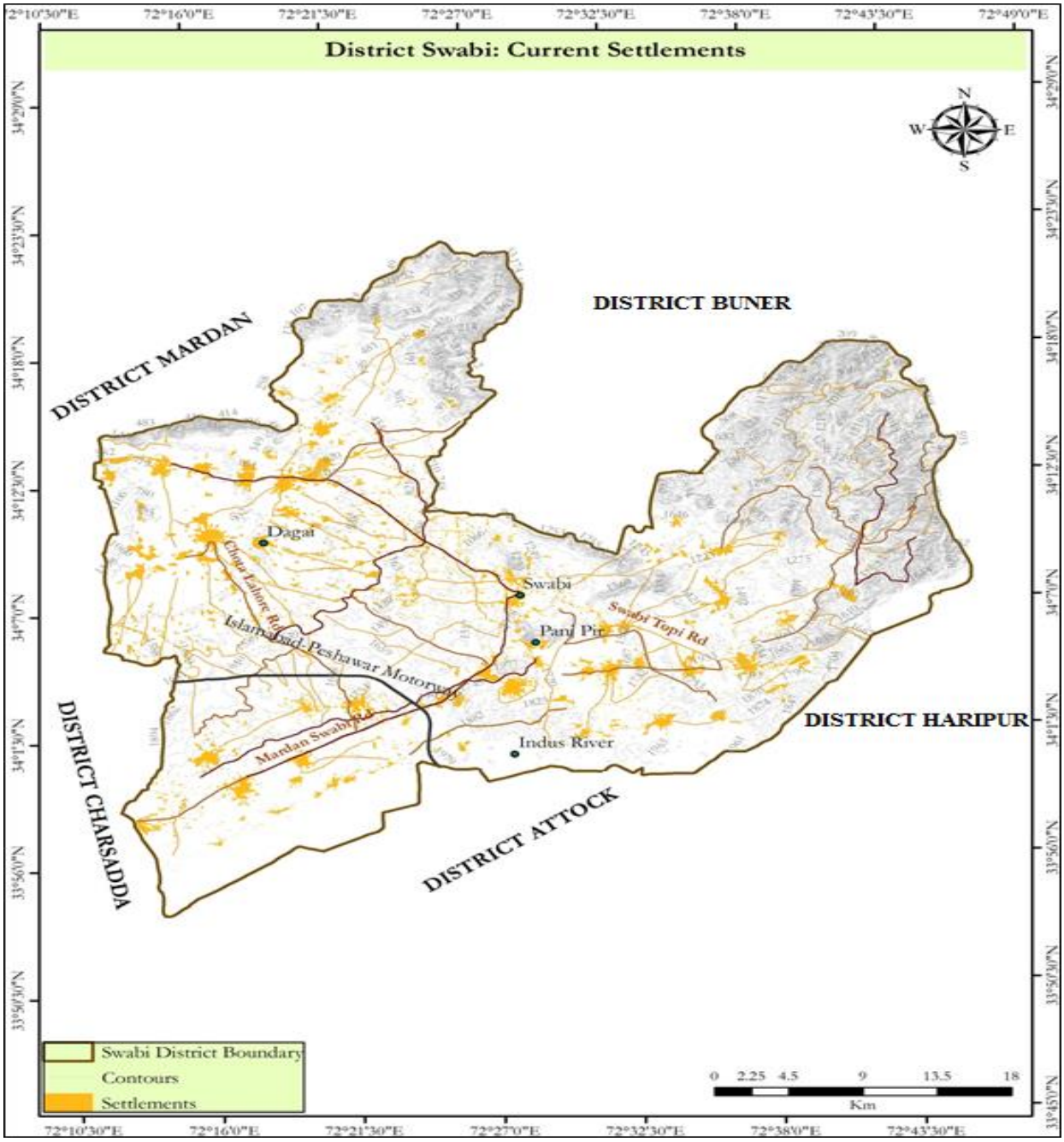
	ASOTA PC	ASOTA	2.49	9070	9527	10007	10512	11042
	ASPIN KANI PC	ASPIN KANI	2	5281	5494	5716	5947	6187
		CHAK-KHALIL	2.24	3062	3201	3346	3498	3656
		GANGOO DHER	4.62	3894	4262	4665	5106	5589
		KHALIL	1.52	2509	2586	2665	2747	2831
	BACHAI PC	BACHAI	1.44	9415	9688	9969	10258	10556
		SIKANDARI	2.22	12209	12757	13330	13928	14553
	CHAK NAUDEH PC	AHAD KHAN	2.11	5862	6112	6373	6645	6928
		CHAK NAUDEH	2.32	17689	18519	19388	20298	21251
		HAMZA DHER	3.68	6413	6894	7411	7966	8563
		MANSAB DAR	2.61	3192	3361	3539	3726	3923
	DAGAI PC	DAGAI	2.03	33317	34683	36105	37586	39127
	GHULAMAN PC	GHULAMAN	2.68	6214	6552	6908	7283	7679
		KHESHA	2.61	2476	2607	2745	2890	3043
		MEHAR ALI	2.31	3047	3189	3338	3494	3657
		SANG BATI	3.74	1098	1182	1272	1369	1473
		SHER DARRA	2.64	5407	5696	6001	6322	6660
	ISMAILA PC	ISMAILA	2.35	32013	33535	35130	36801	38551
		NAZAR	2.57	4632	4873	5127	5394	5675
	KALU KHAN PC	KALU KHAN	2.4	41347	43355	45461	47669	49985
	NARANJI PC	AMAN KOT KHADAR ZAI	3.79	3544	3818	4113	4431	4773
		AMAN KOT MAHMOOD ZAI	3.23	2470	2632	2805	2989	3185
		BAHI	2.26	3172	3317	3469	3628	3794
		KHAN PUR	0.37	1140	1148	1157	1166	1175
		NAIAN (NATVAN)	-1.72	119	115	111	107	103
		NARANJI	3.2	17394	18525	19730	21013	22379

	NAUDEH KERNAL SHER K. KILLI PC	NAUDEH (KERNAL SHER K. KILLI	3	12733	13508	14331	15204	16130
	PAR MOOLI PC	PAR MOOLI	2.8	19710	20829	22012	23262	24583
	SHEIKH JANA PC	SHEIKH JANA	2.25	28494	29791	31147	32564	34046
	SHEWA PC	SHEWA	2.3	30242	31649	33122	34663	36276
	TARAKI PC	MANAGI	2.13	6130	6394	6669	6956	7255
		SHAHEEDA	2.53	4822	5069	5329	5602	5889
		TARAKI	2.4	18974	19896	20862	21875	22938
	TURLANDI PC	TURLANDI	2.99	21505	22810	24194	25662	27220
SWABI TEHSIL	BAJA PC	BAJA	3.37	19540	20879	22310	23839	25473
	BAM KHEL PC	BAM KHEL	2.76	27391	28924	30543	32252	34057
	DARRA PC	DARRA	5.52	9678	10776	11999	13360	14876
		KALA	2.52	9762	10260	10784	11334	11912
	GAR MUNARA PC	GAR MUNARA	2.52	11532	12121	12740	13390	14073
		YOUSAFI	3.61	5573	5983	6423	6895	7402
	JHANDA PC	BOQA	2.13	3968	4139	4317	4503	4697
		JHANDA	3.9	7656	8265	8922	9631	10397
	KADDI PC	DOODHER	0.53	3695	3734	3774	3814	3855
		KADDI	2.26	10045	10504	10984	11486	12011
	MARGHUZ AKA KHEL PC	MARGHUZ AKA KHEL	2.1	12541	13073	13628	14206	14809
	MARGHUZ YARA KHEL PC	MARGHUZ-YARA KHEL	1.96	16503	17156	17835	18541	19275
	MIAN DHERI/SWABI PC	MIAN DHERI	4.42	1729	1885	2055	2241	2443
	PABINI PC	PABINI	2.16	12234	12768	13326	13908	14515
		PANJ MAN	2.41	6397	6709	7036	7379	7739
	PANJ PIR PC	PANJ PIR	2.45	23183	24333	25540	26807	28137
	SALIM KHAN PC	SALIM KHAN	2.78	34806	36768	38841	41031	43344
	SHAH MANSOOR PC	SHAH MANSOOR	2.13	20506	21389	22310	23271	24273

	THANDKOI PC	THANDKOI	2.46	18995	19941	20934	21977	23072
	ZAIDA PC	ZAIDA	5.29	9115	10105	11202	12419	13768
TOPI TEHSIL	BEESAK PC	BEESAK	1.61	6219	6421	6629	6844	7066
		KAK BANI	1.46	1898	1954	2011	2070	2131
	CHANAI PC	ACHELAI	2.46	1666	1749	1836	1927	2023
		CHANAI	1.81	4562	4729	4902	5081	5267
		DEWAL GARHI BALA	3.8	2189	2359	2542	2739	2951
		DEWAL GARHI PAYAN	2.6	1146	1206	1270	1337	1407
		GEERO	2.49	200	210	221	232	244
		KATGRAM	1.71	728	753	779	806	834
	GANDAF PC	BADA	1.31	2957	3035	3115	3197	3281
		DHERO	2.22	1552	1622	1695	1771	1851
		GANDAF	4.24	37661	40922	44466	48317	52501
	GANI CHHATRA PC	ATALI	4.67	1061	1162	1273	1395	1528
		DAGAI	3.23	1036	1104	1176	1253	1335
		DEWAL	2.71	4943	5215	5501	5803	6122
		GANI CHHATRA	2.77	3916	4136	4368	4613	4872
		NAROBANDA	1.83	813	843	874	906	939
		PANAWAL	2.05	1329	1384	1441	1501	1563
		POLA	3.03	579	615	653	693	736
		SAKELAI	0.89	1181	1202	1223	1245	1267
		SANDWA	1.61	2450	2530	2612	2697	2785
		SHANGRAI	2.13	1045	1090	1137	1186	1237
	GHABASNI PC	BEERG ALI	4.18	990	1074	1166	1266	1374
		BORI	2.68	296	312	329	347	366
		GHABAI	1.56	2538	2618	2700	2785	2873
		GHABASNI	1.99	3870	4026	4188	4356	4531
		GHANI KOT	2.76	1353	1429	1509	1593	1682
		KUND	2.36	983	1030	1079	1131	1185
		SAT KHETRA	2.59	747	786	827	870	916

		SERI UTMAN ZAI	1.61	1240	1280	1322	1365	1409
		SHALMAN	0.72	374	379	384	390	396
	MALAK ABAD PC	MALAK ABAD	2.57	10672	11228	11813	12428	13075
	MANGAL CHAI PC	DALORI BALA	1.43	2478	2549	2622	2698	2776
		DALORI PITAO	1.52	1032	1064	1097	1131	1166
		DALORI SARKOI(PIAN)	0.96	624	636	648	661	674
		KOLAGAR	1.19	690	707	724	741	759
		MANGAL CHAI	1.95	5835	6065	6304	6552	6810
		SHANAI	2.8	670	708	748	790	835
	QADRA PC	BADGAH	2.01	479	498	518	539	561
		GAJAI	2.3	2372	2482	2597	2718	2844
		JOGIA	7.88	44	51	59	69	80
		MERAGAI	8.84	12	14	17	20	24
		QADRA	3.74	5407	5819	6262	6739	7253
		SERI HASA ZAI	-0.45	223	221	219	217	215
		TAKAIL	2.79	6197	6548	6918	7309	7723
	UTLA PC	AMRAI BALA	2.29	1637	1713	1792	1875	1962
		AMRAI PAYAN	0.1	465	466	467	468	469
		LERAN	2.17	4126	4307	4496	4693	4899
		UTLA	1.62	6926	7152	7386	7627	7876
	BATA KARA PC	BATA KARA	2.63	9204	9694	10211	10755	11328
		PANTIA	5.34	2835	3146	3491	3874	4299
	GALLAH PC	GALLAH	3.2	8164	8695	9260	9862	10503
		PEHUR	0.48	2698	2724	2750	2776	2803
	KALA BAT PC	KALA BAT	3.89	20123	21719	23442	25301	27308
		KHAZANA	0.52	1789	1808	1827	1846	1865
	KOTHA PC	KOTHA	2.3	39245	41071	42982	44982	47075
	MAINI PC	HAJI KHEL	-0.21	968	964	960	956	952

		MAINI	2.66	33953	35783	37712	39745	41888
	TOPI PC	TOPI	3.08	10759	11432	12147	12907	13714
	ZAROBI PC	ZAROBI	1.61	19329	19956	20604	21273	21964



Map 6.2.1: Current Settlements Map of District Swabi

6.2.2 Growth Pattern of Rural Settlements

Based on the populations of villages as given in the census reports of 1998 and 2017, 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 6.2.2. As seen, of the total 867[114] rural settlements, 458 villages are rapidly growing, 235 have moderate growth and 174 villages have slow growth.

Table 6.2. 1: 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	32	425	48.85
Moderately Growing	47	48	41	45	82	263	33.22
Slow Growing	33	32	29	51	37	182	20.91
Total	**235**	**150**	**137**	**197**	**151**	**870**	**100**

6.2.3 Rapidly Growing Rural Settlements

As seen in Table 6.2.2 there are fast growing settlements in District Swabi. There is however vast variation in their growth rates of fast growing settlements, ranging from 3% to about 17%. Such settlements therefore have been divided into the following sub-categories based on their growth rates: High-High: Above 7%

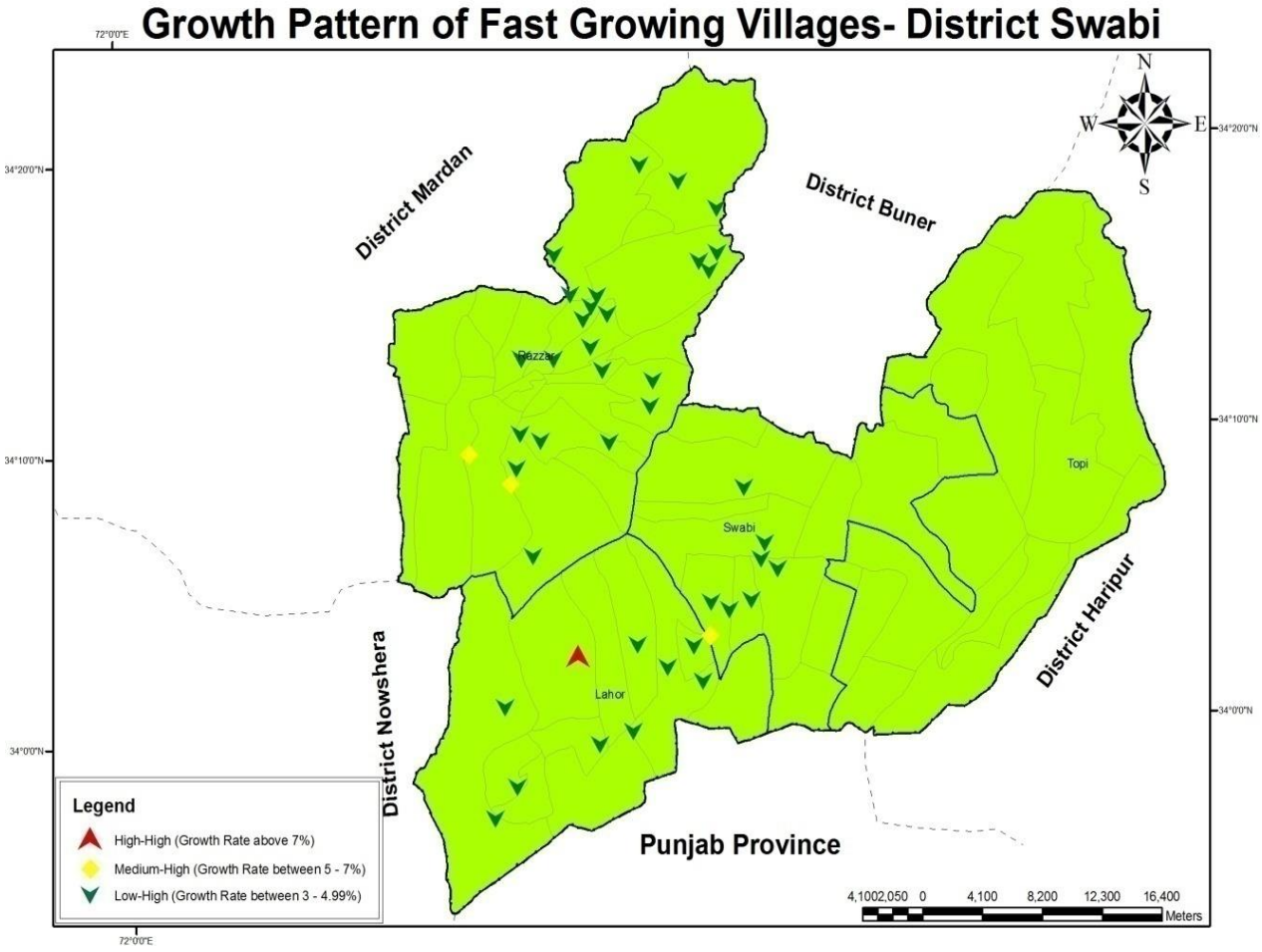
- Middle High: 5-7%
- Low High: 3-<5%

Based on the above categorization, the names of villages falling in these categories are given in Table

[114] There is discrepancy between the number of villages in Table 6.1 and 6.2; it is because a few villages in 1981 Census were not listed, and hence their growth rate could not be calculated.

Table 6.2. 2: Rapidly Growing Rural Settlements

Growth Category	Growth Rate	Number of Settlements	Names of Settlements
High-High	Above 7%	2	Jogia, Meragai
Medium-High	5% - 7%	5	Kunda Mera, Jal-sai Mera, Darra, Zaida, Pantia
Low-High	3% - 4.99%	23	Topi, Kala bat, Gallah, Qadra, Beerg ali, Atazi, Dewal Garhi, Mian Dheri, Jhanda, Yousaf, Baja, Kernal sher kalli, Naranj, Amam kot Khadarzai, Amam kot Mahmood zai, Sang Bhati, Hamza dher, Gango dher, Jhahangira, Jal-Bai, Gandaf, Dagai, Pola, chach Kund.



Map 6.2.2: Fast Growing Villages Map of District Swabi

6.3 RURAL DEVELOPMENT THROUGH GROWTH CENTRES

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 Swabi, 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 56 union councils in District Swabi, of which 14 are urban and 42 are rural[115]. 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.

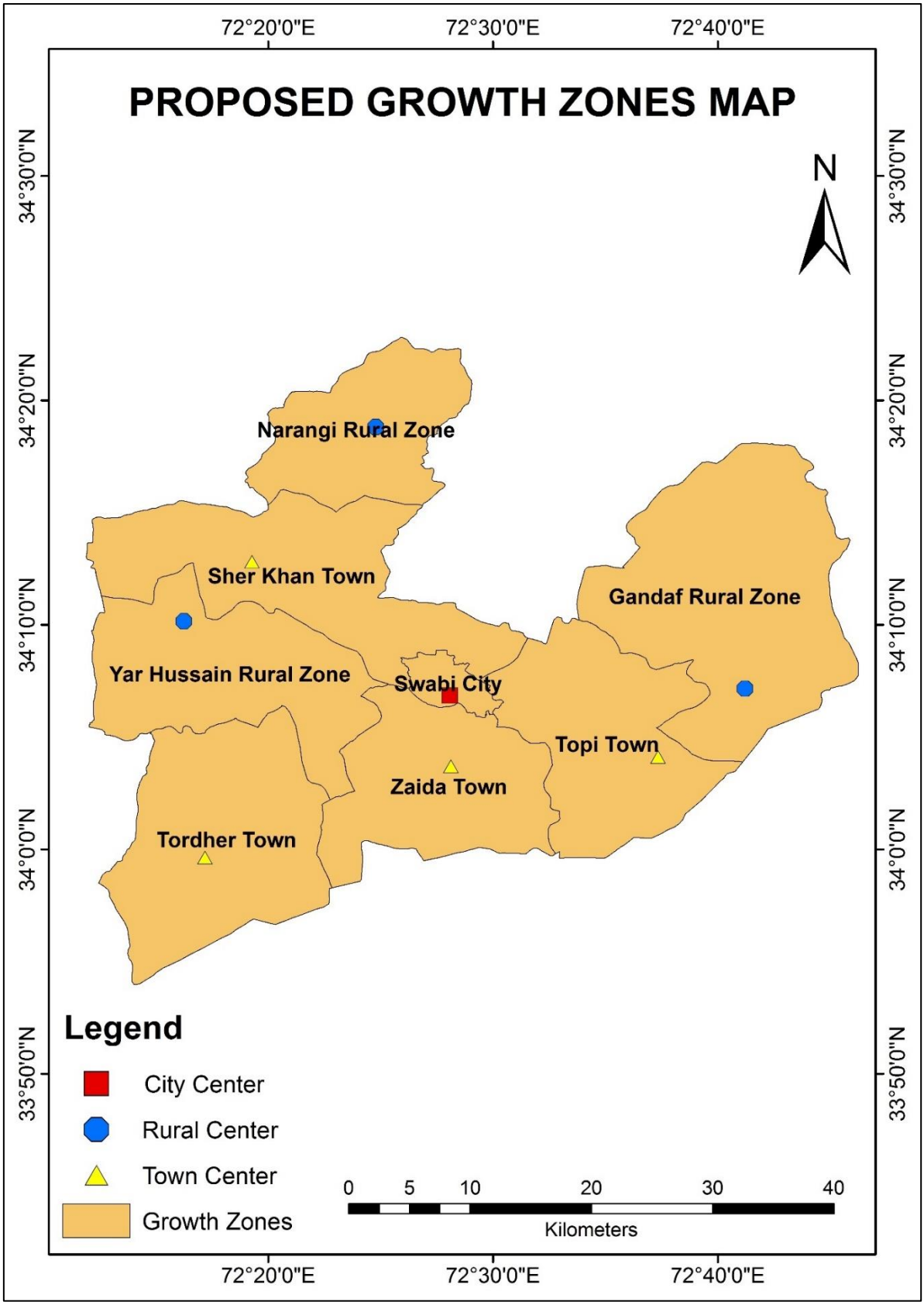
To achieve the above, rural area of District Swabi is proposed to be divided into a number of rural zones, and a centralized village within each such zone designated as Growth Centre for the rural zone. The Growth Centre will have following facilities to serve the rural zone.

- Model Rural Health Centre
- High School
- Veterinary Centre
- Repair shops for tractors and other agricultural implements.
- Play Ground
- Agro-based micro industrial sector
- Transport terminal
- Good quality rural roads, connecting Growth Centre with other main villages of the rural zone, and a road connecting Growth Centre 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

[115] Source: District Studies Report Swabi, Chapter 6.

Table 6.3. 1: Rural Growth Zones of District Swabi

Name of Growth Zone	Tehsil	Growth Centre (Name of Village)	UC in which Growth Center Lies	Other UC's in the Rural Growth Zone	Villages in the Rural Growth Zone
Gandaf	Topi	Gandaf	Gandaf	Gandaf, Kab Gani Chatra, Ghabsani, Pabni (Complete)	Gandaf, Gabasni, Dewel, Gadoon, Bada, Beesak, Panjman, Pabanai
Narangi	Razzar	Naranji	Naranji	Naranji, Parmoli (Complete)	Narangi,Sherdara, Parmoli, Meharali
Yar Hussain	Razzar	Yar Hussain	Yar Hussain West	Yar Husaain West, Yar Hussain East, Dagi, Bachai, Dobian, Sard Cheena, Yaqubi, Sudher, Lahore Sharqi (Complete)	Yar Hussain, Terwatu, Dandoka, Arakh Badraga, Dagi, Pachani, Rashaka, Ghazikot, Yaqubi Sard Chinna, Khatakano Koty, Masaud Abad, Dobian, Khoro, Daulat, Sodher, Jamra, Haryan



Map 6.3.1: Proposed Rural Growth Zones Map of District Swabi

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 included its growth rate, distance from existing urban Area, population and present area under village. 151 rural settlements/villages in District Swabi, 30 villages have growth rate of above 3%. The selected village 'Murghuz" is one of these rapidly growing villages.

Murghuz is located Between Topi road and Swabi-Jahangira Road, 8 km away from existing Swabi urban area in the South-Eastern direction. The current site area of Murghuz is 355 Acres. It is bound by agriculture land, range land and existing urban area in the North, agricultural land& Indus River towards South, agricultural and range land in East; and agricultural land towards West.

According to District Census Report 2017, population of settlement was 15875 and growing rapidly with a growth rate of above 3%. Population has been extrapolated till the year 2040. Considering Population density as 8 houses[116] per acre, the area under future houses in different time periods is given in Table 6.5.2.

Table 6.5. 1: Population Projection

Year	Projected Population
2017	15,875
2021	17867
2025	20110
2040	31331

Table 6.5. 2: Housing Demand for Additional Population (2021-2040)

Year	Population	Additional Population		Housing Demand	
		2021-2025	2026-2040	2021-2025	2026-2040
2021	17867	2243		374	
2025	20110				
2040	31331		11221		1870
Total Housing Demand for addition population				**2244**	

It is estimated that the additional population of Murghuz during the period 2021-2025 will be around 2243 while that in the subsequent 15 years (2026-2040), the additional population will be about 11221. The housing demand in these two-time periods will accordingly be 374 and 1870 respectively, based on the assumption that each family of 6[117] will have one house (Table 6.5.2).

[116] Source: Adapted from National Reference Manual, Table 4.5, Page 61.
[117] Based on National Housing Policy.

Table 6.5.3: Area Requirements (Acres)

Time Period	Required Area
2021-2025	46.75
2026-2040	233.75
Total	**280.5**

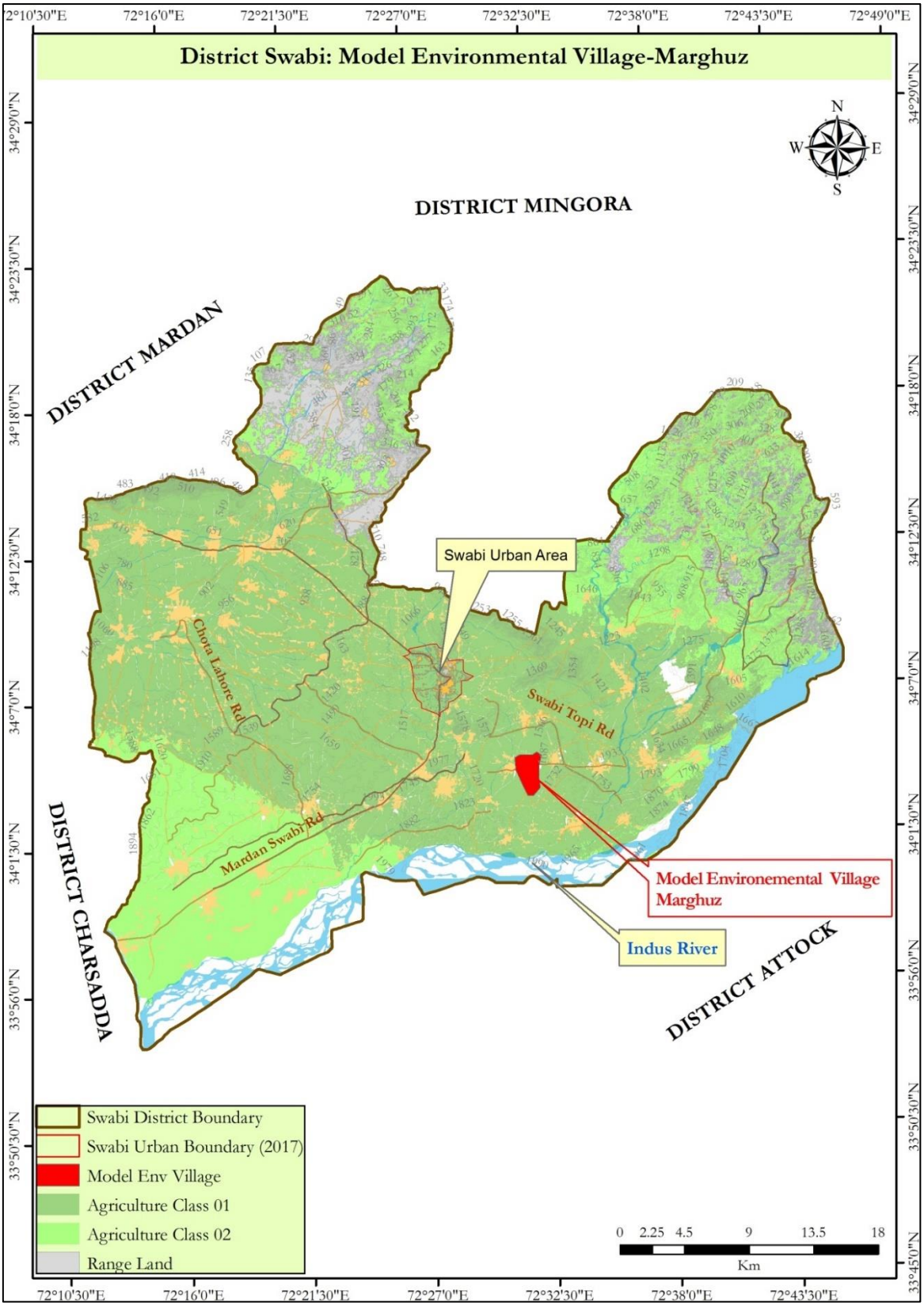
It is clear from Table 6.5.4 that 1.12 acres of commercial area will be required in the village during the first years of plan period (2021-2025), and 5.61 acres during the subsequent 15 years.

Table 6.5. 4: Total Future Trade Zone & Commercial Area Required (2021-2040)

Year/Period	Population	
2021	17867	**Commercial Area Required[118]**
2025	20110	
2040	31331	
Additional Urban Population (2021-2025)	2243	1.12 Acres
Additional Urban Population (2026-2040)	11221	5.61 Acres
Total Additional Urban Population (2021-2040)	13464	6.73 Acres

Apart from passive recreational facilities, Murghuz also needs active recreation in form of Village Playground, for which an area of 5 Kanal is proposed.

[118]@0.5 acres/1000 persons)



Map 6.5.1: Model Environment Village Location Map

Table 6.5. 5: Population categories of villages in 2021 – District Swabi

S. No.	Population category	No. of Villages	Percentage of villages	Name of villages
1	Above 25,000	14	9.3%	Jahangira, Jal-Bai, Yar Hussain, Yaqubi, Ismaila, Kalu Khan, Salim Khan, Shewa, Sheikh Jana, Kotha, Maini, Bamkhel, Gandaf, Kotta
2	15,001 - 25,000	18	11.91%	Jalsai, Lahor Pore, Lahor Rapore, Dhobian, Sard China, Gandaf, Adina, Chak Naudeh, Panj Pir, Par Mooli, Shah Mansoor, Taraki, Turlandi, Baja,Bam Khel, Kala Bat, Thandkoi, Zarobi, Baja,
3	10,000 - 15,000	17	11.25%	Anbar, Beka, Hund, Kunda, Bazargai, Sudher, Armal dheri, Chak-Yar-Hussain, Sikandari, Kernal sher Khan, Gur Manuara, Kaddi, Naudeh, Marghuz Aka khel, Pabini, Topi, Gar Munara, Malak abad.
4	5,000 - 9,999	24	15.89%	Malak Abad,Nabi, kunda mera, Daulat, Sardari, Ziam, Asota, Bachai, Ahad Khan, Hamza dher, Ghulman, Sher dhara, Managi, Darra, Kala, yousaf, Jhanda, Panjman, Zaida, Beasan, Qadra, Takail, Ulta, Bata kara, Gallah.
5	Below 5,000	78	51.6%	
	Total	151	100%	

CHAPTER 7

STRUCTURE FOR REGULAR MONITORING EVALUATION & UPDATION.

7. STRUCTURE FOR REGULAR MONITORING, EVALUATION & UPDATION.

7.1 PROPOSED STRUCTURE

Regular monitoring, evaluation and updating of the Landuse 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.

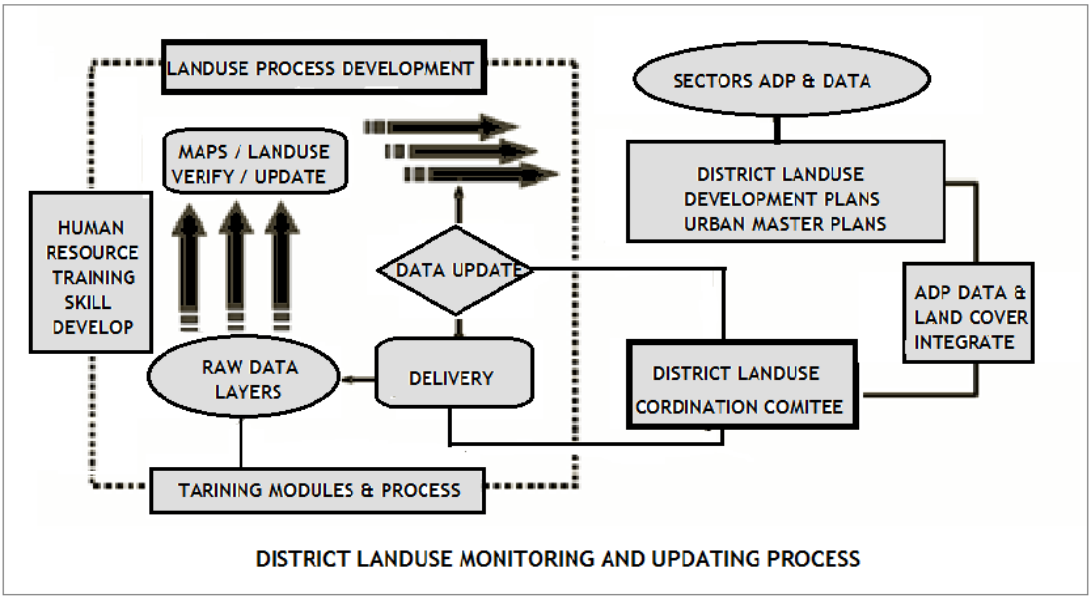


Figure 7.1.1: District Land Use Monitoring and Updating Process

The GIS based landuse 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 landuse 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 landuse 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 Landuse 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 Landuse 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 landuse 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 the proposed KP Land Use and Building Control Authority, 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 landuse 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 landuse; 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 landuse. 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.

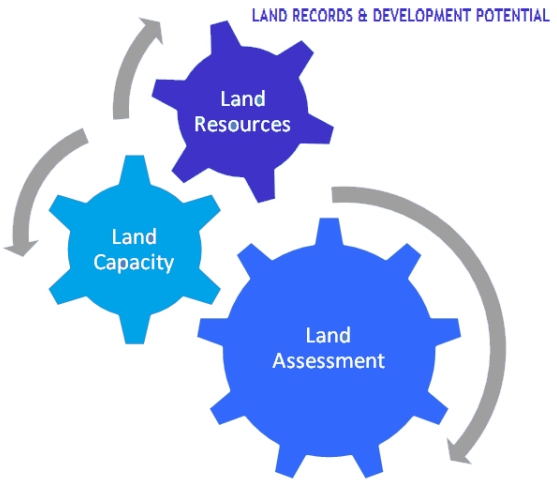


Figure 7.1.2: Land Records & Development Potential

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 landuses. 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 landuses 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 landuse 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 Landuse 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 landuse plans.

Table 7.1. 1: Sectors, Tasks and Manning

S.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, Tubewells, type of irrigation, Other data, ADP and Land Cover	Engineer, Data Entry Clerk,
4	Water Resources	Rivers, Canals, Wells, Tubewells, 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	
11	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	

Table 7.1. 1: Sectors, Tasks and Manning			
S.no	**Sectors**	**Tasks**	**Personnel**
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 Landuse, Data, Transportation Network and Annual ADP	Urban Planner and GIS Expert
19	Existing Landuse	District level landuse and Land cover by Type, vacant, rage land, Development Plans for Landuse 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 7.1. 2: Schedule of Expenditure

S.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 Landuse	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 landuse zones, as there is a strong need to clearly delineate zonal boundaries to distinguish between residential, large-scale commercial, industrial and other landuses 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 landuses
- Intensity of development

In the District Landuse Plan, like all other zones, specific landuse 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 Landuse control in each zone; these regulations are mainly influenced by the characteristics of the zones, and their perceived development pattern.

In Chapter 5, a Landuse strategy has been proposed for Swabi, including location and allocation of major landuse zones. For each of the proposed zones, it is important to have landuse 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 Swabi 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:

7.3 LANDUSE COMPATABILITY

7.3.1 Regulations for Residential Zones

Table 7.3. 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[119]. Raising of poultry for non-commercial purposes[120]. 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[121]	All uses permissible on appeal in low-density residential zone. Restaurants and hotels Hospitals[122] Petrol and Gas filling stations[123].
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 centres, 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.

[119] Should be located in local shopping centre
[120] Provided the birds are properly segregated from the habitable parts of the house.
[121] Subject to density limitations specified for the sub-zone.
[122] Not treating contagious diseases and mental patients
[123]Should be on sites located along roads having at lEast 30 metres right-of-way and 100 metres away from a crossing of two primary roads or a roundabout.

7.3.2 Regulations for Educational Zone

Table 7.3. 2: Regulations for Educational Zones		
Zone	**Uses Permitted**	**Uses Permitted on Appeal**
Educational Zone	Educational and Research Institutions Offices of Social and Cultural Organizations Religious Institutions Parks, Memorials and Monuments Recreational Uses Public Utilities and Buildings Community Facilities, Arts Councils and Auditoriums Government Offices Taxi Stands, Bus Halts Approved Parking Provisions	Hotels Offices of Commercial Institutions Restaurants and Clubs Commercial Recreational uses like theatre halls and cinemas Petrol and gas filling Station Limited Retail Shopping

7.3.3 Regulations for Trade Zone

Table 7.3. 3: Regulations for Trade Zones		
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.

7.3.4 Regulations for Industrial Zone

Table 7.3. 4: Regulations for Industrial Zones		
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	Bus and Truck Terminals Railway passenger and freight terminals Petrol and gas filling stations Taxi stands Junk Yards Recreational facilities for employees.

	Dwellings for watch and ward staff	
Medium-Heavy Industrial Area	All categories permitted in the light-medium industrial zone. Warehousing, storage depots[124] and incidental uses. Approved Parking Loading and unloading provisions. Dwellings for labour and watch and ward staff.	All categories permissible on special appeal in Light-Medium industrial zone. Warehousing of perishable and inflammable commodities.

7.3.5 Regulations for Recreational Areas

Table 7.3. 5: Regulations for Recreational Zones		
Zone	**Uses Permitted**	**Uses Permitted on Appeal**
Recreational Areas	Recreational areas including parks, playgrounds and related uses. Youth hostels and clubs Taxi and rickshaw stands 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.

7.3.6 Regulations for Agricultural Zone

Table 7.3. 6: Regulations for Agricultural Zones		
Zone	**Uses Permitted**	**Uses Permitted on Appeal**
Agricultural Zone.	Agriculture Horticulture Dairy and poultry farming Milk chilling and pasteurization centers Existing settlements Community facilities and public utilities Servicing/repair of farm equipment and machinery.	Storage, processing and sale of farm products in the zone where produced. Sale of agricultural supplies Parks and recreational uses Retail shopping and service uses

[124] Only non-perishable and non-inflammable commodities

ANNEXURE

ANNEXURE 1. Rural Settlement Wise Projection (2021-2040)

Settlement Wise Demographic Statistics												
Union Council	**Patwar Circle**	**Village Name**	**2017 Population**	**1998 Population**	**Growth rate**	**Pop 2021**	**Pop 2025**	**Pop 2030**	**Pop 2035**	**Pop 2040**	**Add Pop 19-24**	**Add Pop 39-24**
ANBAR	ANBAR PC	ANBAR	10,625	6095	2.97	11265	11944	12664	13427	14236	679	2292
		JANGI DHER	2,756	1677	2.65	2904	3060	3224	3397	3579	156	519
		SHEIKH DHERI	4,056	4041	0.02	4058	4060	4062	4064	4066	2	6
	HARYAN PC	DHERI ZAKRIA	1,259	786	2.51	1323	1390	1461	1535	1613	67	223
		HARYAN	3251	2181	2.12	3390	3535	3686	3844	4009	145	474
		SALLAH	3,890	2375	2.63	4097	4315	4545	4787	5042	218	727
	KUNDA PC	KUNDA MERA	6,563	2137	6.08	7385	8310	9351	10523	11841	925	3531
Total						**34422**	**36614**	**38993**	**41577**	**44386**	**2192**	**7772**
BEKA	BEKA PC	BEKA	11,209	6661	2.78	11841	12509	13214	13959	14746	668	2237
		NABI	5,549	3851	1.94	5766	5992	6227	6471	6725	226	733
	TANNON PC	BAZAR	4,063	2503	2.58	4275	4498	4733	4980	5240	223	742
		JABAR	2,097	1392	2.18	2189	2285	2386	2491	2601	96	316
		TANNON	8,586	5247	2.63	9044	9526	10034	10569	11132	482	1606
Total						**33115**	**34810**	**36594**	**38470**	**40444**	**1695**	**5634**
DHOBIAN	DHOBIAN PC	DAULAT	6,232	4760	1.43	6412	6597	6787	6982	7183	185	586
		DHOBIAN	21,945	14560	2.18	22912	23922	24976	26077	27226	1010	3304
Total						**29324**	**30519**	**31763**	**33059**	**34409**	**1195**	**3890**
JAHANGIRA	JAHANGIRA PC	ALLAH DHER	3,160	1805	2.99	3352	3555	3771	4000	4243	203	688
		CHAK KUND	271	141	3.5	290	311	333	357	382	21	71
		JAHANGIRA	38,650	20404	3.42	41339	44215	47291	50581	54100	2876	9885
Total						**44981**	**48081**	**51395**	**54938**	**58725**	**3100**	**10644**
JAL BAI	JAL BAI PC	JAL BAI	34,221	21613	2.45	35918	37700	39570	41533	43593	1782	5893

		JALBAI-MERA	3,432	1575	4.18	3725	4043	4388	4763	5170	318	1127
						39643	**41743**	**43958**	**46296**	**48763**	**2100**	**7020**
JALSAI	JAL-SAI PC	JALSAI	23,594	14036	2.77	24919	26319	27797	29358	31007	1400	4688
		JAL-SAI MERA	3,095	1096	5.62	3453	3852	4297	4794	5348	399	1496
Total						**28372**	**30171**	**32094**	**34152**	**36355**	**1799**	**6184**
KUNDA	HUND PC	HUND	11,435	7146	2.51	12016	12627	13269	13943	14652	611	2025
	KUNDA PC	KUNDA	13,208	8947	2.07	13760	14336	14936	15561	16212	576	1876
Total						**25776**	**26963**	**28205**	**29504**	**30864**	**1187**	**3901**
LAHORE SHARQI UC	LAHOR PORE (SHARQI) PC	LAHOR PORE (SHARQI)	23,537	14417	2.61	24782	26093	27473	28926	30456	1311	4363
						24782	**26093**	**27473**	**28926**	**30456**	**1311**	**4363**
LAHORE GHARBE UC	LAHOR RAPORE PC	LAHOR RAPORE	23,259	15197	2.27	24327	25444	26612	27834	29112	1117	3668
Total						**24327**	**25444**	**26612**	**27834**	**29112**	**1117**	**3668**
MANKI UC	MANKI PC	MANKI	22,982	14344	2.51	24150	25378	26668	28024	29448	1228	4070
Total						**24150**	**25378**	**26668**	**28024**	**29448**	**1228**	**4070**
SARD CHINA UC	SARD CHINA PC	BAZARGAI	10,918	7361	2.1	11381	11864	12368	12893	13440	483	1576
		SARD CHINA	19,660	13206	2.12	20502	21380	22296	23251	24247	878	2867
Total						**31883**	**33244**	**34664**	**36144**	**37687**	**1361**	**4443**
SUDLLER UC	SUDIIR PC	ARMAL DHERI	10,050	6247	2.53	10565	11106	11675	12273	12902	541	1796
		GHAZI KOT	4,295	2836	2.21	4487	4688	4897	5116	5345	201	657
		SADRI	7,072	4546	2.35	7408	7760	8129	8516	8921	352	1161
		SUDHER	12,164	7991	2.24	12715	13291	13893	14522	15180	576	1889
Total						**35175**	**36845**	**38594**	**40427**	**42348**	**1670**	**5503**
YAQUBI UC	YAQUBI PC	CHAK-YAR-HUSSAIN	10,894	7471	2.01	11336	11796	12275	12773	13292	460	1496
		YAQUBI	24,630	16190	2.23	25741	26902	28115	29383	30708	1161	3806
Total						**37077**	**38698**	**40390**	**42156**	**44000**	**1621**	**5302**
YAR HUSSAIN EAST/WEST	YAR HUSSAIN PC	YAR HUSSAIN	42,136	32057	1.45	43367	44634	45938	47280	48661	1267	4027
Total						**43367**	**44634**	**45938**	**47280**	**48661**	**1267**	**4027**
ADINA UC	ADINA PC	ADINA	20,152	13035	2.32	21098	22088	23125	24210	25346	990	3258
Total						**21098**	**22088**	**23125**	**24210**	**25346**	**990**	**3258**

ASOTA UC	ASOTA PC	ASOTA	8,635	5407	2.49	9070	9527	10007	10512	11042	457	1515
		SPIN KANI	5,076	3486	2	5281	5494	5716	5947	6187	213	693
		CHAK-KHALIL	2,929	1921	2.24	3062	3201	3346	3498	3656	139	455
		GANGOO DHER	3,558	1509	4.62	3894	4262	4665	5106	5589	368	1327
		KHALIL	2,434	1826	1.52	2509	2586	2665	2747	2831	77	245
Total						**23816**	**25070**	**26399**	**27810**	**29305**	**1254**	**4235**
BACHA UC	BACHAI PC	BACHAI	9,150	6969	1.44	9415	9688	9969	10258	10556	273	868
		SIKANDARI	11,684	7699	2.22	12209	12757	13330	13928	14553	548	1796
Total						**21624**	**22445**	**23299**	**24186**	**25109**	**821**	**2664**
BAM KHEL UC	BAM KHEL PC	BAM KHEL	25,939	15455	2.76	27391	28924	30543	32252	34057	1533	5133
Total						**27391**	**28924**	**30543**	**32252**	**34057**	**1533**	**5133**
BATA KARA UC	BATA KARA PC	BATA KARA	8,738	5336	2.63	9204	9694	10211	10755	11328	490	1634
		PANTIA	2,555	951	5.34	2835	3146	3491	3874	4299	311	1153
	GALLAH PC	GALLAH	7,666	4212	3.2	8164	8695	9260	9862	10503	531	1808
		PEHUR	2,672	2439	0.48	2698	2724	2750	2776	2803	26	79
	TOPI PC	TOPI	10,126	5687	3.08	10759	11432	12147	12907	13714	673	2282
Total						**33660**	**35691**	**37859**	**40174**	**42647**	**2031**	**6956**
CHAK NAUDEH UC	CHAK NAUDEH PC	AHAD KHAN	5,622	3781	2.11	5862	6112	6373	6645	6928	250	816
		CHAK NAUDEH	16,896	10934	2.32	17689	18519	19388	20298	21251	830	2732
		HAMZA DHER	5,966	3003	3.68	6413	6894	7411	7966	8563	481	1669
		MANSAB DAR	3,032	1860	2.61	3192	3361	3539	3726	3923	169	562
Total						**33156**	**34886**	**36711**	**38635**	**40665**	**1730**	**5779**
DAGAI UC	DAGAI PC	DAGAI	32,004	21832	2.03	**33317**	34683	36105	37586	39127	1366	4444
Total						**33317**	**34683**	**36105**	**37586**	**39127**	**1366**	**4444**
GABASNI UC	GHABASNI PC	BEERG ALI	912	419	4.18	990	1074	1166	1266	1374	84	300
		BORI	281	170	2.68	296	312	329	347	366	16	54
		GHABAI	2,461	1833	1.56	2538	2618	2700	2785	2873	80	255
		GHABASNI	3,720	2557	1.99	3870	4026	4188	4356	4531	156	505
		GHANI KOT	1,281	764	2.76	1353	1429	1509	1593	1682	76	253
		KUND	938	602	2.36	983	1030	1079	1131	1185	47	155

		SAT KHETRA	710	437	2.59	747	786	827	870	916	39	130
		SERI UTMAN ZAI	1,201	886	1.61	1240	1280	1322	1365	1409	40	129
		SHALMAN	369	322	0.72	374	379	384	390	396	5	17
	CHANAI PC	ACHELAI	1,587	1000	2.46	1666	1749	1836	1927	2023	83	274
		CHANAI	4,401	3132	1.81	4562	4729	4902	5081	5267	167	538
		DEWAL GARHI BALA	2,032	1001	3.8	2189	2359	2542	2739	2951	170	592
		DEWAL GARHI PAYAN	1,089	669	2.6	1146	1206	1270	1337	1407	60	201
		GEERO	190	119	2.49	200	210	221	232	244	10	34
		KATGRAM	704	510	1.71	728	753	779	806	834	25	81
	MANGAL CHAI PC	DALORI BALA	2,409	1840	1.43	2478	2549	2622	2698	2776	71	227
		DALORI PITAO	1,001	752	1.52	1032	1064	1097	1131	1166	32	102
		DALORI SARKOI(PIAN)	612	510	0.96	624	636	648	661	674	12	38
		KOLAGAR	674	538	1.19	690	707	724	741	759	17	52
		MANGAL CHAI	5,614	3893	1.95	5835	6065	6304	6552	6810	230	745
		SHANAI	634	375	2.8	670	708	748	790	835	38	127
Total						**34211**	**35669**	**37197**	**38798**	**40478**	**1458**	**4809**
GANDAF UC	GANDAF PC	BADA	2,881	2251	1.31	2957	3035	3115	3197	3281	78	246
		DHERO	1,485	979	2.22	1552	1622	1695	1771	1851	70	229
		GANDAF	34,660	15733	4.24	37661	40922	44466	48317	52501	3261	11579
Total						**42170**	**45579**	**49276**	**53285**	**57633**	**3409**	**12054**
GANI CHRATRA UC	GANI CHRATRA PC	ATALI	968	407	4.67	1061	1162	1273	1395	1528	101	366
		DAGAI	972	531	3.23	1036	1104	1176	1253	1335	68	231
		DEWAL	4,686	2822	2.71	4943	5215	5501	5803	6122	272	907
		GANI CHHATRA	3,708	2207	2.77	3916	4136	4368	4613	4872	220	736
		NAROBANDA	784	555	1.83	813	843	874	906	939	30	96
		PANAWAL	1,276	868	2.05	1329	1384	1441	1501	1563	55	179
		POLA	545	309	3.03	579	615	653	693	736	36	121
		SAKELAI	1160	981	0.89	1181	1202	1223	1245	1267	21	65
		SANDWA	2,373	1753	1.61	2450	2530	2612	2697	2785	80	255
		SHANGRAI	1002	671	2.13	1045	1090	1137	1186	1237	45	147

	UTLA PC	AMRAI BALA	1,565	1017	2.29	1637	1713	1792	1875	1962	76	249
		AMRAI PAYAN	464	455	0.1	465	466	467	468	469	1	3
		LERAN	3,953	2629	2.17	4126	4307	4496	4693	4899	181	592
		UTLA	6,707	4942	1.62	6926	7152	7386	7627	7876	226	724
Total						**31507**	**32919**	**34399**	**35955**	**37590**	**1412**	**4671**
GAR MUNARA UC	GAR MUNARA PC	GAR MUNARA	10,972	6839	2.52	11532	12121	12740	13390	14073	589	1952
		YOUSAFI	5,191	2648	3.61	5573	5983	6423	6895	7402	410	1419
	ZAIDA PC	ZAIDA	8,222	3090	5.29	9115	10105	11202	12419	13768	990	3663
Total						**26220**	**28209**	**30365**	**32704**	**35243**	**1989**	**7034**
ISMAIIA UC	ISMAILA PC	ISMAILA	30,560	19673	2.35	32013	33535	35130	36801	38551	1522	5016
		NAZAR	4,403	2721	2.57	4632	4873	5127	5394	5675	241	802
Total						**36645**	**38408**	**40257**	**42195**	**44226**	**1763**	**5818**
JHANDA UC	BAJA PC	BAJA	18,287	9748	3.37	19540	20879	22310	23839	25473	1339	4594
	JHANDA PC	BOQA	3,804	2550	2.13	3968	4139	4317	4503	4697	171	558
		JHANDA	7,092	3429	3.9	7656	8265	8922	9631	10397	609	2132
Total						**31164**	**33283**	**35549**	**37973**	**40567**	**2119**	**7284**
KABGANI UC	BEESAK PC	BEESAK	6,023	4448	1.61	6219	6421	6629	6844	7066	202	645
		KAK BANI	1,844	1401	1.46	1898	1954	2011	2070	2131	56	177
	QADRA PC	BADGAH	460	315	2.01	479	498	518	539	561	19	63
		GAJAI	2,267	1473	2.3	2372	2482	2597	2718	2844	110	362
		JOGIA	38	9	7.88	44	51	59	69	80	7	29
		MERAGAI	10	2	8.84	12	14	17	20	24	2	10
		QADRA	5,024	2500	3.74	5407	5819	6262	6739	7253	412	1434
		SERI HASA ZAI	225	245	-0.45	223	221	219	217	215	-2	-6
		TAKAIL	5,865	3474	2.79	6197	6548	6918	7309	7723	351	1175
Total						**22851**	**24008**	**25230**	**26525**	**27897**	**1157**	**3889**
KALA BAT UC	KALA BAT PC	KALA BAT	18,644	9027	3.89	20123	21719	23442	25301	27308	1596	5589
		KHAZANA	1,771	1606	0.52	1789	1808	1827	1846	1865	19	57
Total						**21912**	**23527**	**25269**	**27147**	**29173**	**1615**	**5646**
KALU KHAN UC	KALU KHAN PC	KALU KHAN	39,432	25108	2.4	41347	43355	45461	47669	49985	2008	6630

Total						**41347**	**43355**	**45461**	**47669**	**49985**	**2008**	**6630**
KOTHA UC	KOTHA PC	KOTHA	37,500	24333	2.3	39245	41071	42982	44982	47075	1826	6004
Total						**39245**	**41071**	**42982**	**44982**	**47075**	**1826**	**6004**
MAINI UC	MAINI PC	HAJI KHEL	972	1011	-0.21	968	964	960	956	952	-4	-12
		MAINI	32216	19556	2.66	33953	35783	37712	39745	41888	1830	6105
Total						**34921**	**36747**	**38672**	**40701**	**42840**	**1826**	**6093**
MARGHUZ UC	MARGHUZ AKA KHEL PC	MARGHUZ AKA KHEL	12030	8103	2.1	12541	13073	13628	14206	14809	532	1736
	MARGHUZYARA KHEL PC	MARGHUZ-YARA KHEL	15875	10983	1.96	16503	17156	17835	18541	19275	653	2119
Total						**29044**	**30229**	**31463**	**32747**	**34084**	**1185**	**3855**
NARANJI UC	NARANJI PC	AMAN KOT KHADAR ZAI	3,290	1623	3.79	3544	3818	4113	4431	4773	274	955
		AMAN KOT MAHMOOD ZAI	2,318	1266	3.23	2470	2632	2805	2989	3185	162	553
		BAHI	3,033	1985	2.26	3172	3317	3469	3628	3794	145	477
		KHAN PUR	1,132	1056	0.37	1140	1148	1157	1166	1175	8	27
		NAIAN (NATVAN)	123	171	-1.72	119	115	111	107	103	-4	-12
		NARANJI	16,332	8977	3.2	17394	18525	19730	21013	22379	1131	3854
Total						**27839**	**29555**	**31385**	**33334**	**35409**	**1716**	**5854**
PABINI UC	PABINI PC	PABINI	11722	7814	2.16	12234	12768	13326	13908	14515	534	1747
		PANJ MAN	6099	3878	2.41	6397	6709	7036	7379	7739	312	1030
	MALAK ABAD PC	MALAK ABAD	10144	6263	2.57	10672	11228	11813	12428	13075	556	1847
Total						**29303**	**30705**	**32175**	**33715**	**35329**	**1402**	**4624**
PANJ PIR UC	PANJ PIR PC	PANJ PIR	22,087	13936	2.45	23183	24333	25540	26807	28137	1150	3804
	DARRA PC	DARRA	8,692	3129	5.52	9678	10776	11999	13360	14876	1098	4100
		KALA	9,288	5790	2.52	9762	10260	10784	11334	11912	498	1652
	MIAN DHERI/SWABI PC	MIAN DHERI	1586	697	4.42	1729	1885	2055	2241	2443	156	558
Total						**44352**	**47254**	**50378**	**53742**	**57368**	**2902**	**10114**
PAR MOOLI UC	PAR MOOLI PC	PAR MOOLI	18,651	11030	2.8	19710	20829	22012	23262	24583	1119	3754
	GHULAMAN PC	GHULAMAN	5,894	3563	2.68	6214	6552	6908	7283	7679	338	1127
		KHESHA	2,352	1441	2.61	2476	2607	2745	2890	3043	131	436
		MEHAR ALI	2,911	1885	2.31	3047	3189	3338	3494	3657	142	468
		SANG BATI	1,020	508	3.74	1098	1182	1272	1369	1473	84	291

		SHER DARRA	5,132	3129	2.64	5407	5696	6001	6322	6660	289	964
Total						**37952**	**40055**	**42276**	**44620**	**47095**	**2103**	**7040**
SALIM KHAN UC	SALIM KHAN PC	SALIM KHAN	32,949	19582	2.78	34806	36768	38841	41031	43344	1962	6576
Total						**34806**	**36768**	**38841**	**41031**	**43344**	**1962**	**6576**
SHAH MANSOOR UC	SHAH MANSOOR PC	SHAH MANSOOR	19,660	13166	2.13	20506	21389	22310	23271	24273	883	2884
Total						**20506**	**21389**	**22310**	**23271**	**24273**	**883**	**2884**
SHEI KH JANA UC	SHEIKH JANA PC	SHEIKH JANA	27,254	17869	2.25	28494	29791	31147	32564	34046	1297	4255
Total						**28494**	**29791**	**31147**	**32564**	**34046**	**1297**	**4255**
SHEWA UC	SHEWA PC	SHEWA	28,897	18767	2.3	30242	31649	33122	34663	36276	1407	4627
Total						**30242**	**31649**	**33122**	**34663**	**36276**	**1407**	**4627**
TARAKI UC	TARAKI PC	MANAGI	5877	3935	2.13	6130	6394	6669	6956	7255	264	861
		SHAHEEDA	4587	2856	2.53	4822	5069	5329	5602	5889	247	820
		TARAKI	18,095	11539	2.4	18974	19896	20862	21875	22938	922	3042
Total						**29926**	**31359**	**32860**	**34433**	**36082**	**1433**	**4723**
THANDKOI UC	THANDKOI PC	THANDKOI	18,094	11399	2.46	18995	19941	20934	21977	23072	946	3131
	KADDI PC	DOODHER	3,656	3307	0.53	3695	3734	3774	3814	3855	39	121
		KADDI	9,606	6278	2.26	10045	10504	10984	11486	12011	459	1507
Total						**32735**	**34179**	**35692**	**37277**	**38938**	**1444**	**4759**
TURLANDI UC	TURLANDI PC	TURLANDI	20,274	11576	2.99	21505	22810	24194	25662	27220	1305	4410
	NAUDEH KERNAL SHER K. KILLI PC	NAUDEH (KERNAL SHER K. KILLI	12,002	6848	3	12733	13508	14331	15204	16130	775	2622
Total						**34238**	**36318**	**38525**	**40866**	**43350**	**2080**	**7032**
ZAROBI UC	ZAROBI PC	ZAROBI	18,721	13822	1.61	19329	19956	20604	21273	21964	627	2008
Total						**19329**	**19956**	**20604**	**21273**	**21964**	**627**	**2008**

Annexure 2. Urban Population Projection (2021-40)

MC/TC	URBAN 2017	URBAN 1998	2019	2024	2029	2034	2039	Add Pop 2024	Add pop 2039
TORDHER TC	41,420	27861	43345	48558	54398	60940	68269	5213	19711
KERNAL SHER KILLI TC	26,161	18082	27377	30669	34358	38490	43119	3292	12450
SWABI MC	123,412	80157	129147	144679	162079	181572	203408	15532	58729
ZAIDA MC	31,949	22656	33434	37455	41959	47005	52659	4021	15204
TOPI MC	52,983	30458	55445	62113	69584	77952	87327	6668	25214
Total			**288748**	**323474**	**362378**	**405959**	**454782**	**34726**	**131308**

Annexure 3. Rural Population based Educational Institutions for 2021

2021																			
Boys Schools										Girl Schools									
Primary		Middle		High School		High Secondary School		Degree		Primary		Middle		High School		High Secondary School		Degree clg	
Units	Area/1	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area
6	6	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
19	**19**	**9**	18	**3**	12	**0**	0	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
7	7	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
18	**18**	**8**	**16**	**3**	**12**	1	10	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**1**	**5**	**0**	**0**	**0**	**0**
13	13	6	12	2	8	1	10	0	0	10	10	1	2	2	10	0	0	0	0
16	**16**	**8**	**16**	**2**	**8**	**1**	10	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
23	23	11	22	3	12	1	10	0	0	17	17	2	4	3	15	1	10	0	0
25	**25**	**12**	**24**	**4**	**16**	**1**	10	**0**	**0**	**19**	**19**	**3**	**6**	**4**	**20**	**1**	**10**	**0**	**0**
20	**20**	**9**	**18**	**3**	**12**	**4**	**40**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
22	**22**	**10**	**20**	**3**	**12**	**1**	**10**	**0**	**0**	**17**	**17**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
14	**14**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
16	**16**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
7	**7**	**3**	**6**	**1**	**4**	**0**	**0**	**0**	**0**	**5**	**5**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
8	8	4	8	1	4	0	0	0	0	6	6	1	2	1	5	0	0	0	0
14	**14**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**11**	**11**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
14	14	6	12	2	8	1	10	0	0	10	10	1	2	2	10	0	0	0	0
14	**14**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**

14	14	6	12	2	8	1	10	0	0	10	10	1	2	2	10	0	0	0	0
14	**14**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
13	13	6	12	2	8	1	10	0	0	10	10	1	2	2	10	0	0	0	0
13	**13**	**6**	**12**	**2**	**8**	**6**	**60**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
6	**6**	**3**	**6**	**1**	**4**	**0**	**0**	**0**	**0**	**5**	**5**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
11	11	5	10	2	8	1	10	0	0	9	9	1	2	2	10	0	0	0	0
18	**18**	**8**	**16**	**3**	**12**	**1**	**10**	**0**	**0**	**13**	**13**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
6	6	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
7	7	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
20	**20**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
6	6	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
14	14	7	14	2	8	1	10	0	0	11	11	2	4	2	10	0	0	0	0
21	**21**	**10**	**20**	**3**	**12**	**1**	**10**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
24	24	11	22	3	12	1	10	0	0	18	18	3	6	3	15	1	10	0	0
24	**24**	**11**	**22**	**3**	**12**	**1**	**10**	**0**	**0**	**18**	**18**	**3**	**6**	**3**	**15**	**1**	**10**	**0**	**0**
12	12	5	10	2	8	5	50	0	0	9	9	1	2	2	10	0	0	0	0
12	**12**	**5**	**10**	**2**	**8**	**1**	**10**	**0**	**0**	**9**	**9**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
13	**13**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
7	7	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
12	12	6	12	2	8	1	10	0	0	9	9	1	2	2	10	0	0	0	0
15	15	7	14	2	8	1	10	0	0	11	11	2	4	2	10	0	0	0	0
15	**15**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**11**	**11**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
2	2	1	2	0	0	4	40	0	0	1	1	0	0	0	0	0	0	0	0
5	5	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
6	6	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
3	3	2	4	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
10	10	5	10	1	4	1	10	0	0	7	7	1	2	1	5	0	0	0	0
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
18	**18**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
19	19	9	18	3	12	1	10	0	0	14	14	2	4	3	15	0	0	0	0
19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1	1	1	2	0	0	3	30	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
21	21	10	20	3	12	1	10	0	0	16	16	2	4	3	15	1	10	0	0
23	**23**	**11**	**22**	**3**	**12**	**1**	**10**	**0**	**0**	**18**	**18**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	2	20	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
18	**18**	**8**	**16**	**3**	**12**	**1**	**10**	**0**	**0**	**13**	**13**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
6	6	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
15	**15**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**11**	**11**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
18	18	8	16	3	12	1	10	0	0	13	13	2	4	3	15	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0

20	**20**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
17	**17**	**8**	**16**	**3**	**12**	**1**	**10**	**0**	**0**	**13**	**13**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
3	3	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	1	2	0	0	1	10	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	2	4	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
13	**13**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**10**	**10**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
12	**12**	**6**	**12**	**2**	**8**	**1**	**10**	**0**	**0**	**9**	**9**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
23	23	11	22	3	12	1	10	0	0	17	17	2	4	3	15	1	10	0	0
23	**23**	**11**	**22**	**3**	**12**	**1**	**10**	**0**	**0**	**17**	**17**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
22	22	10	20	3	12	1	10	0	0	16	16	2	4	3	15	1	10	0	0
22	**22**	**10**	**20**	**3**	**12**	**1**	**10**	**0**	**0**	**16**	**16**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	19	9	18	3	12	1	10	0	0	14	14	2	4	3	15	0	0	0	0
19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
7	7	3	6	1	4	6	60	0	0	5	5	1	2	1	5	0	0	0	0
9	9	4	8	1	4	1	10	0	0	7	7	1	2	1	5	0	0	0	0
16	**16**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
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1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
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10	10	4	8	1	4	1	10	0	0	7	7	1	2	1	5	0	0	0	0
15	**15**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
7	7	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
4	4	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
6	6	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
16	**16**	**8**	**16**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
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5	5	2	4	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
5	5	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
25	**25**	**11**	**22**	**4**	**16**	**1**	**10**	**0**	**0**	**18**	**18**	**3**	**6**	**4**	**20**	**1**	**10**	**0**	**0**
11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0

	3	3	2	4	1	4	0	0	0	0	3	3	0	0	1	5	0	0	0	0
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	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
	21	**21**	**10**	**20**	**3**	**12**	**1**	**10**	**0**	**0**	**16**	**16**	**2**	**4**	**3**	**15**	**1**	**10**	**0**	**0**
	19	19	9	18	3	12	1	10	0	0	15	15	2	4	3	15	0	0	0	0
	19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**15**	**15**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
	11	11	5	10	2	8	3	30	0	0	9	9	1	2	2	10	0	0	0	0
	11	**11**	**5**	**10**	**2**	**8**	**1**	**10**	**0**	**0**	**9**	**9**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
	16	16	7	14	2	8	1	10	0	0	12	12	2	4	2	10	0	0	0	0
	16	**16**	**7**	**14**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
	17	17	8	16	2	8	1	10	0	0	13	13	2	4	2	10	0	0	0	0
	17	**17**	**8**	**16**	**2**	**8**	**1**	**10**	**0**	**0**	**13**	**13**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
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	3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
	11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0
	17	**17**	**8**	**16**	**2**	**8**	**1**	**10**	**0**	**0**	**12**	**12**	**2**	**4**	**2**	**10**	**0**	**0**	**0**	**0**
	11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0
	2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
	6	6	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
	18	**18**	**8**	**16**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
	12	12	6	12	2	8	4	40	0	0	9	9	1	2	2	10	0	0	0	0
	7	7	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
	19	**19**	**9**	**18**	**3**	**12**	**1**	**10**	**0**	**0**	**14**	**14**	**2**	**4**	**3**	**15**	**0**	**0**	**0**	**0**
	11	11	5	10	2	8	1	10	0	0	8	8	1	2	2	10	0	0	0	0
	11	**11**	**5**	**10**	**2**	**8**	**1**	**10**	**0**	**0**	**8**	**8**	**1**	**2**	**2**	**10**	**0**	**0**	**0**	**0**
Total	**772**	**772**	**358**	**716**	**114**	**456**	**48**	**480**	**0**	**0**	**580**	**580**	**82**	**164**	**114**	**570**	**11**	**110**	**0**	**0**

Annexure 4. Rural Educational Institutions for Additional Population 2019-2024

Additional 2024																			
Boys Schools										Girl Schools									
Primary		Middle		High School		High Secondary School		Degree		Primary		Middle		High School		High Secondary School		Degree	
Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**45**	**45**	**12**	**24**	**0**	**0**	**0**	**0**	**0**	**0**	**36**	**36**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Annexure 5. Rural Educational Institutions for Additional Population 2026-2040

Additional 2040																			
Boys Schools										**Girl Schools**									
Primary		**Middle**		**High School**		**High Secondary School**		**Degree**		**Primary**		**Middle**		**High School**		**High Secondary School**		**Degree**	
Units	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**	**Units**	**Area**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	3	6	1	4	0	0	0	0	4	4	1	2	1	5	0	0	0	0
6	**6**	**3**	**6**	**1**	**4**	**0**	**0**	**0**	**0**	**4**	**4**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
3	3	2	4	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
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1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

6	6	3	6	1	4	0	0	0	0	5	5	1	2	1	5	0	0	0	0
7	**7**	**3**	**6**	**1**	**4**	**0**	**0**	**0**	**0**	**5**	**5**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
4	4	2	4	1	4	0	0	0	0	3	3	1	2	1	5	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
3	3	2	4	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
3	**3**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	3	2	4	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
3	**3**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
3	**3**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	**6**	**3**	**6**	**1**	**4**	**0**	**0**	**0**	**0**	**4**	**4**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
4	4	2	4	1	4	0	0	0	0	3	3	1	2	1	5	0	0	0	0
4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
2	**2**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
3	3	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
2	2	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
3	**3**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	2	2	1	2	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0
	1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	4	**4**	**2**	**4**	**1**	**4**	**0**	**0**	**0**	**0**	**3**	**3**	**1**	**2**	**1**	**5**	**0**	**0**	**0**	**0**
	1	1	1	2	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	1	**1**	**1**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total	**135**	**135**	**63**	**126**	**12**	**48**	**0**	**0**	**0**	**0**	**104**	**104**	**12**	**24**	**12**	**60**	**0**	**0**	**0**	**0**

Annexures 6. Overall Educational Requirement for Rural settlements for both short and long term

RURAL UC'S						
Categories	2019		2024-19		2039-24	
	Boys	Girls	Boys	Girls	Boys	Girls
Primary School	772	580	45	36	135	104
Middle School	358	82	12	0	63	12
High School	114	114	0	0	12	0
Higher High School	48	11	0	0	0	0
Degree Colleges	0	0	0	0	0	0

Annexure 7. Urban Population Based Educational Institutions Requirement up to 2021

2021																			
Boys Schools										Girl Schools									
Primary		Middle		High School		High Secondary School		degree		Primary		Middle		High School		High Secondary School		Degree	
Units	Area/1 Acre	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area
6	12	2	4	2	8	1	10	0	0	5	10	1	2	1	4	1	10	0	0
4	8	1	2	1	4	1	10	0	0	3	6	1	2	1	4	0	0	0	0
17	34	6	12	6	24	4	40	0	0	16	32	4	8	4	16	2	20	0	0
4	8	1	2	1	4	1	10	0	0	4	8	1	2	1	4	0	0	0	0
7	14	2	4	2	8	2	20	0	0	7	14	2	4	2	8	1	10	0	0
38	76	13	26	13	52	10	100	1	15	35	70	9	18	9	36	4	40	1	15

Annexure 8. Urban Educational Institutions Requirement for additional Population 2021-2025

Additional 2025																			
Boys Schools										Girl Schools									
Primary		Middle		High School		High Secondary School		Degree clg		Primary		Middle		High School		High Secondary School		Degree clg	
Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area
1	2	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	4	1	2	1	4	1	10	0	0	2	4	1	2	1	4	1	10	0	0
1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	2	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0
5	10	2	4	2	8	1	10	0	0	4	8	1	2	1	4	1	10	0	0

Annexure 9. Urban Educational Institutions Requirement for additional Population 2026-2040

Additional 2040																			
Boys Schools										Girl Schools									
Primary		Middle		High School		High Secondary School		Degree		Primary		Middle		High School		High Secondary School		Degree	
Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area	Units	Area
3	6	1	2	1	4	1	10	0	0	2	4	1	4	1	4	0	0	0	0
2	4	0	0	1	4	0	0	0	0	2	4	0	0	0	0	0	0	0	0
8	16	2	4	3	12	2	20	0	0	7	14	2	8	2	8	1	10	0	0
2	4	0	0	1	4	1	10	0	0	2	4	0	0	0	0	0	0	0	0
3	6	1	2	1	4	1	10	0	0	3	6	1	4	1	4	0	0	0	0
18	36	4	8	6	24	4	40	0	0	16	32	4	16	4	16	2	20	0	0

Annexures 10. Overall Educational Requirement for Urban settlements for both short and long term

URBAN UC'S						
Categories	2021		2021-2025		2026-2040	
	Boys	Girls	Boys	Girls	Boys	Girls
Primary School	38	35	5	4	18	16
Middle School	13	13	2	1	4	4
High School	13	9	2	1	6	4
Higher High School	10	4	2	1	4	2
Degree Clg	1	1	1	0	0	0

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

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2	FAISAL AMIN	MIN	03345152307	[signature]
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15	Shahab Ali Shah	ACS		[signature]
16	Zaheer ul Islam	Sec LG		[signature]
17	Taimoor Jhagra	Minister Fin & Health	—	—