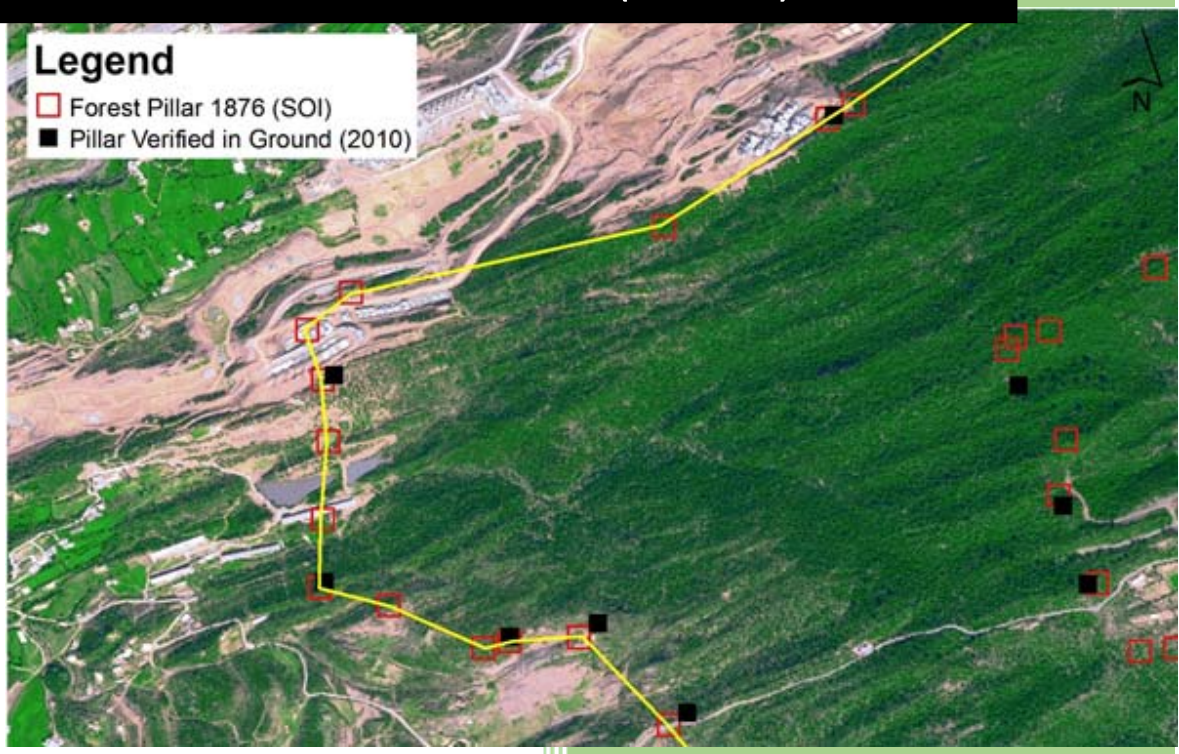
2019

Punjab Urban and Peri-Urban Forest Policy (Draft), 2019



The Urban Unit

4/8/2019

Punjab Urban and Peri-Urban Forest Policy (Draft), 2019

THE URBAN UNIT

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DEDICATION

This Policy is dedicated to all the citizens who participated in the Billion Tree Tsunami project, which according to Inger Anderson, head of IUCN, is *"a true conservation success story"* and a massive reforestation project, making the hills of KPK alive again.

Trees are poems that the earth writes upon the sky

- **Kahlil Gebran**

Love the trees until their leaves fall off, then encourage them to try again next year

- **Chad Sugg**

ACKNOWLEDGEMENT

The team wishes to acknowledge with thanks and appreciation the support they have received throughout the completion of Punjab's first ever Urban and Peri-Urban Forest Policy.

Honorable Justice Jawad Hassan, Judge Lahore High Court, Lahore, played the most pivotal role in conceiving this idea for having an Urban Forest Policy. Without his support and leadership, drafting of this policy would not have been possible.

The Stakeholder consultation sessions were very useful in the formulation of this policy and our gratitude extends to Mr. Rai Shahid Saleem Khan (Assistant Advocate General Punjab), Mr. Osama Zafar (Advocate), Ms. Sadia Malik (Assistant Attorney General), Mr. Rafay Alam and Mr. Ahmed Hassan, both prominent Environmental Lawyers. Whilst we cannot name them all here, our particular thanks to Mr. Sheikh Asim Farooq (Petitioner), Ms. Zara Gillani and Amir Azam (Concerned Citizens Foundation), and Ms. Saima Abbasi (President Go Green), Mr. Shahzad Sabir (Agriculture Department), Mr. Tehseen (Directors of Parks & Horticulture Authority PHA Lahore), Mr. Syed Tahir Ikhlaq and Akhlaq Ahmed (Izhar Manoo Developers), who attended the consultative session and provided useful input.

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PREAMBLE

In order to administer the notified forest land in each province, the provincial forest policies only cater to the issues related to assigned or notified forest land, missing the promotion of tree plantation on the land not owned or possessed by the Provincial Forest Department. Likewise, there is no legal or regulatory framework in the province focusing on an integrated approach towards improving and sustaining the forestation of Punjab. The province of Punjab is extremely deficient in forestry sector resources with only around 3% of its land area under forests in the public sector, whereas it is believed that for a balanced economy of the country an area of 20–25% should be under forest. In line with obligations under international agreements, target 11.1 of SDGs aims to ensure the conservation, restoration and sustainable use of terrestrial ecosystems and their services, in particular forests, by 2020, by improving the forest area as a proportion of total land area. It is about time that the potential of urban forests in achieving these goals is harnessed.

Urban sprawl, coupled with rapid increase in vehicle and industrial emissions in the urban and peri–urban areas of Punjab, has resulted in multiple environmental issues like urban heat islands, smog, fluctuating precipitation patterns, health problems, etc. Such environmental conditions require initiatives of tree plantation by all the concerned provincial departments, autonomous bodies, development authorities and horticulture authorities in the Province, as increase in tree cover is inevitable for carbon sequestration and emission of oxygen.

The first step in this regard is to develop an integrated urban and peri–urban forest policy, which gives direction to all the concerned departments and organizations for their contribution in promotion of an active urban tree management system. This Umbrella policy will also provide different departments and autonomous bodies a legal instrument to synchronize their role, through necessary changes wherever required in their laws and rules, in order to achieve the goals and objectives of this Policy.

The following departments, autonomous bodies and private sector entities have been short listed for their contribution towards implementation of policy actions contained in this Policy:

i. Punjab Forest, Wildlife and Fisheries Department
ii. Agriculture Department
iii. Local Government & Community Development Department
iv. Cooperatives Department
v. Social Welfare Department
vi. Environment Protection Department
vii. Housing, Urban Dev., and Public Health Eng. Department
viii. Revenue Department
ix. Irrigation Department
x. Industries Department
xi. School Education Department
xii. All Housing Societies
xiii. All Development Authorities in Punjab
xiv. All Parks Horticulture Authorities in Punjab
xv. All Sub National Governments
xvi. The Urban Unit/SSU/Spatial Planning Authority Punjab
xvii. Private Housing Societies
xviii. Civil Society
xix. Public & Private Universities

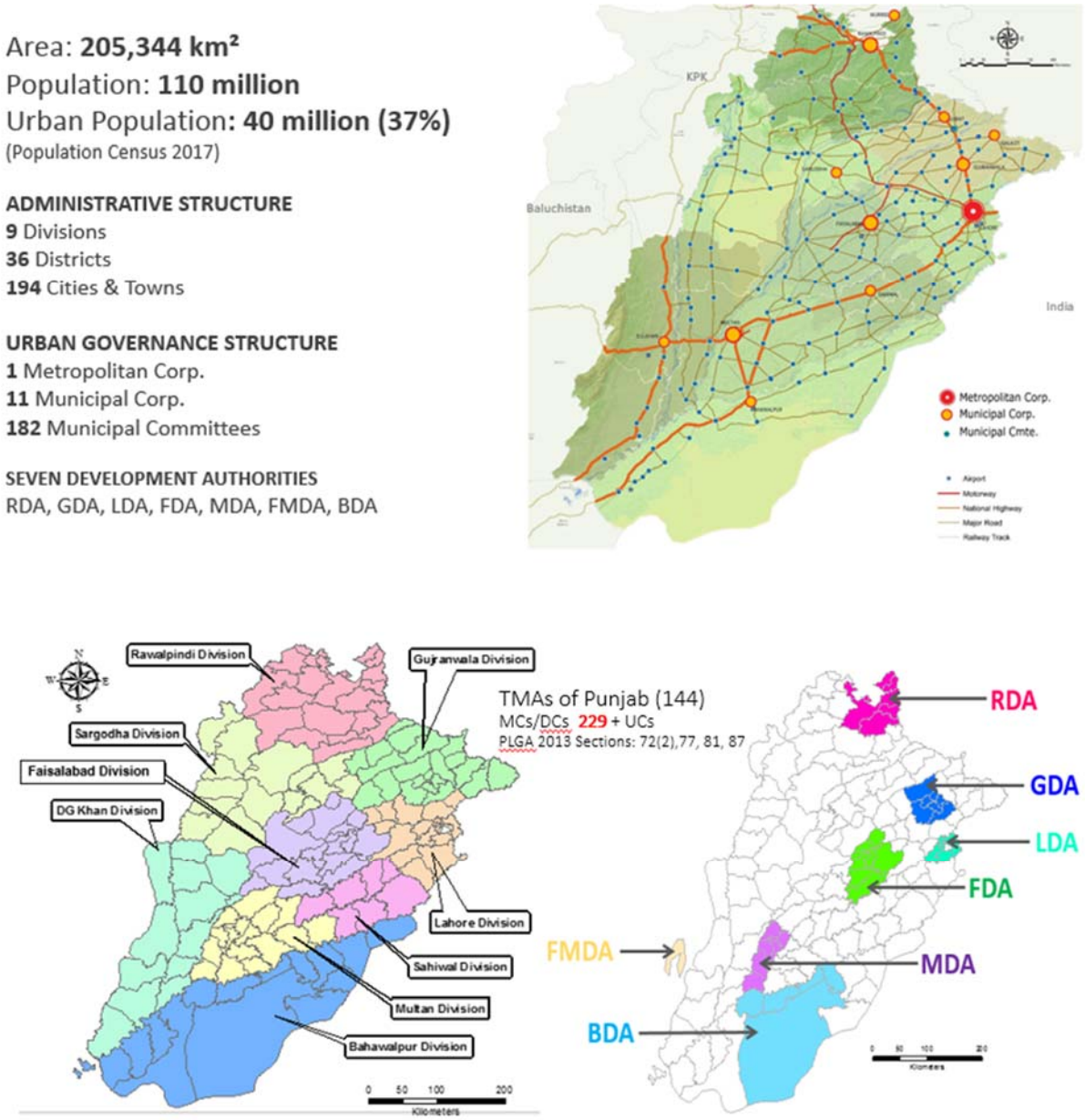

Figure 1: Urban Governance Structure of Punjab

Figure 1 shows the devolved governance structure of Punjab. Various planning aspects as well as most of the implementation of provincial policies is ultimately undertaken by 182 Municipal Committees, 11 Municipal Corporations or the Metropolitan Corporation of Lahore. There are seven Development Authorities for major urban areas. For rural areas, there are 35 district councils. Punjab is divided into nine administrative divisions and 36 districts, which comprise of 194 cities and towns. Of these, the 50 largest cities constitute 87% of the urban population.

Such an entangled mesh of administrative, regulatory and planning units leads to utter chaos, and a disconnect between the planning process and its actual implementation on ground. For this purpose, an authority is needed for regional and provincial planning, as well as regulation. This authority would then make spatial policies pertaining to zoning of land for various sectors, such as for crops, industries, ecological areas, tourism areas, etc. Punjab Spatial Strategy has

proposed the formation of Spatial Planning Authority of Punjab, which aims to bridge this disconnect.

The policy actions have been formulated after considering best practices internationally and in consultation with all the stakeholder departments, with reference to their Rules of Business as well as various Acts & Rules of each department. Priority is given to use the existing laws by ensuring that they are implemented strictly, rather than recrafting new ones. However, departments may propose certain changes or additions if required, in their legal instruments, to align their roles towards promotion of tree plantation in the urban and peri–urban areas of Punjab. However, the overall ownership of the execution of the policy shall be with the Planning & Development Department (P&D) through The Urban Unit (Urban Sector Planning & Management Services Unit (Pvt.) Ltd., a public sector entity), to oversee its planning, monitoring, implementation and reporting.

CHAPTER 1: INTRODUCTION

1.1 State of Environment in Punjab

Punjab is undergoing unplanned urban growth at an exponential growth rate. Presently 35% of the Punjab's population is living in urban centers. According to some estimates, by the year 2047, 70% of the province's population will be located in urban areas. Prior to 1998 the majority of urban growth (74%) was generated by natural increase and only 15% was due to rural–urban migration. However, the recent jump in urban growth indicates an increasing rural–urban migration. According to the Punjab Cities Growth Atlas,[1] from 1995 to 2015, the area of the top 50 cities almost tripled from 891 km^2 to 2,589 km^2, constituting around 1.26% of total land area in Punjab. Of this, Lahore, the capital, constituted around 18% of the overall expansion followed by the 4 large cities (secondary gateways) at 25%. The next 30 Intermediate cities comprising district headquarters only accounted for 18% of this expansion.

Figure 2: Temporal Analysis of Cities Growth (from 1995 to 2015)

[1] A publication of the Urban Unit

Uncontrolled and unregulated land use patterns in the urban areas has led to environmental degradation. This has resulted in haphazard development of houses, roads, parking areas, commercial centers, industries and allied facilities without any regard for urban land use planning and traffic regulations. Devastating and irreversible effect on urban environment leading to congestion, traffic jams, air pollution and conflict has been experienced in the cities. Improvement in the quality of life driven by increased urbanization and industrialization are the factors adversely affecting the air quality in Punjab. The issue is becoming critical in larger cities of Lahore, Gujranwala, Rawalpindi, Multan and Faisalabad where vehicular and industrial emissions have exceeded the prescribed limits. The problem is compounded due to the location of industries within and around the human settlements in urban centers.

In the urban areas of Punjab, vehicular emissions have also led to environmental decay directly impacting the health of the people depending upon the level of exposure. Air pollution is responsible for a large number of respiratory diseases and heart ailments caused by the inhalation of air pollutants (Figure 3). According to a World bank study conducted in 2006, air pollution causes 22,000 premature deaths among adults and 700 young deaths among children in Pakistan. Over the past several years, thick smog engulfs major cities of Punjab in months of November and December. The situation has exasperated over the past 5 years owing to poor quality of air and increasing pollution. Rapid industrialization, deforestation, growing vehicular emissions, tree slashing, coal plant emissions and increased crop burning (particularly across the international border) has aggravated the situation.

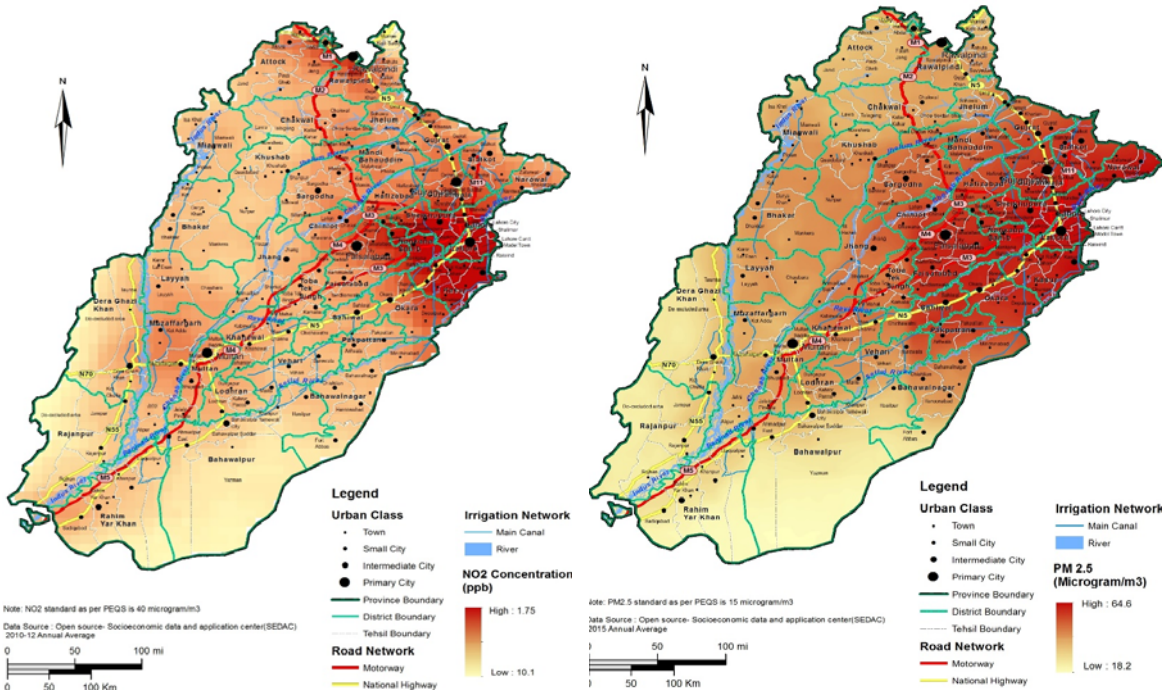

Figure 3: Concentration of air quality pollutants ($PM_{2.5}$ and NO_2) in Punjab

Punjab has experienced extreme events in the last two decades in the form of flood, drought, unprecedented monsoon rainfalls and exceptionally high temperature. Some of these events have been destructive causing heavy loss of life and property. The occurrences of extreme

events are narrowing the doubts that man-made warming is disrupting the climate change which is manifesting itself in the form of extreme events.

Climate change is already evident in the province through rising temperatures over the past 40 years and is likely to have adverse impact on the forests in the form of reduced productivity, change in species composition and reduced forest area. High temperature (Figure 4) and frequent rainfalls are going to increase forest insects, forest pests and weeds, which may result in greater damage to forests vegetation.

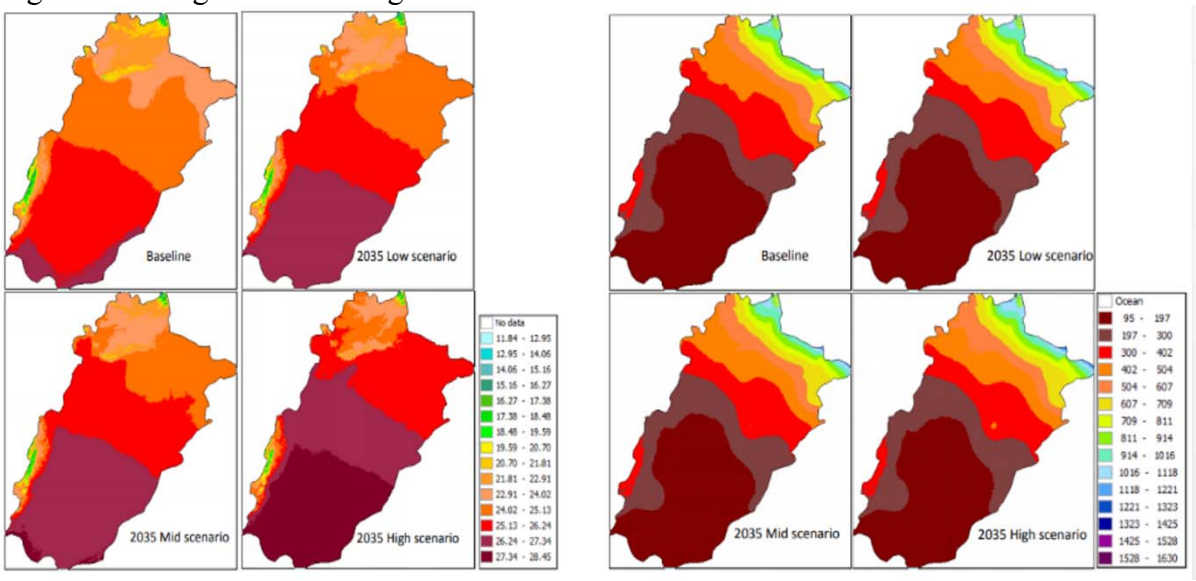

Figure 4: Projected mean annual temperature and precipitation in Punjab (2018-2035)

Punjab is home to a diversity of wild animal species, providing a wide range of habitat types. These include wet temperate and sub–tropically hill areas, salt ranges, deserts, riparian ecosystems and wetlands. Biodiversity is already declining across the province due to the influence of human activities resulting in shrinking habitats.

Due to increase in population, the cutting of trees to meet the requirement of firewood and timber requirement is leading to deforestation. The lopping of trees for commercial purposes also causes forest depletion. Due to severe arid and semi-arid climatic conditions, the uncultivated area gets completely denuded and devoid of any vegetation.

Punjab's forests are also under threat from deforestation and the degradation of forested areas (Figure 5), along with regeneration failure that leads to a decline in productivity. There are many factors that have contributed to this situation: population growth, change in land use, encroachments (Figure 6), over-exploitation, illegal felling, low investments and lack of concern for the environmental services that forests provide.

In order to address the above stated situation of environmental threats, it is imperative to take initiative to increase the tree cover in the Province as one of the vital actions towards mitigating the impacts of climate change. At the same time, it is also essential to take all the concerned provincial departments and autonomous bodies on board, which have direct or indirect role in the tree plantation activities. The development of urban and peri–urban forests requires

adequate baseline data, professional guidance, time, funding and the collaboration of multiple stakeholders. Those responsible for implementation should undertake the actions specified in the management plan in a timely, effective and efficient manner. Similarly, the effective governance of urban forests requires policies and laws aimed at harmonizing the range of interests in urban land by developing and strengthening a common vision and collaborative actions for urban forestry in and around cities.

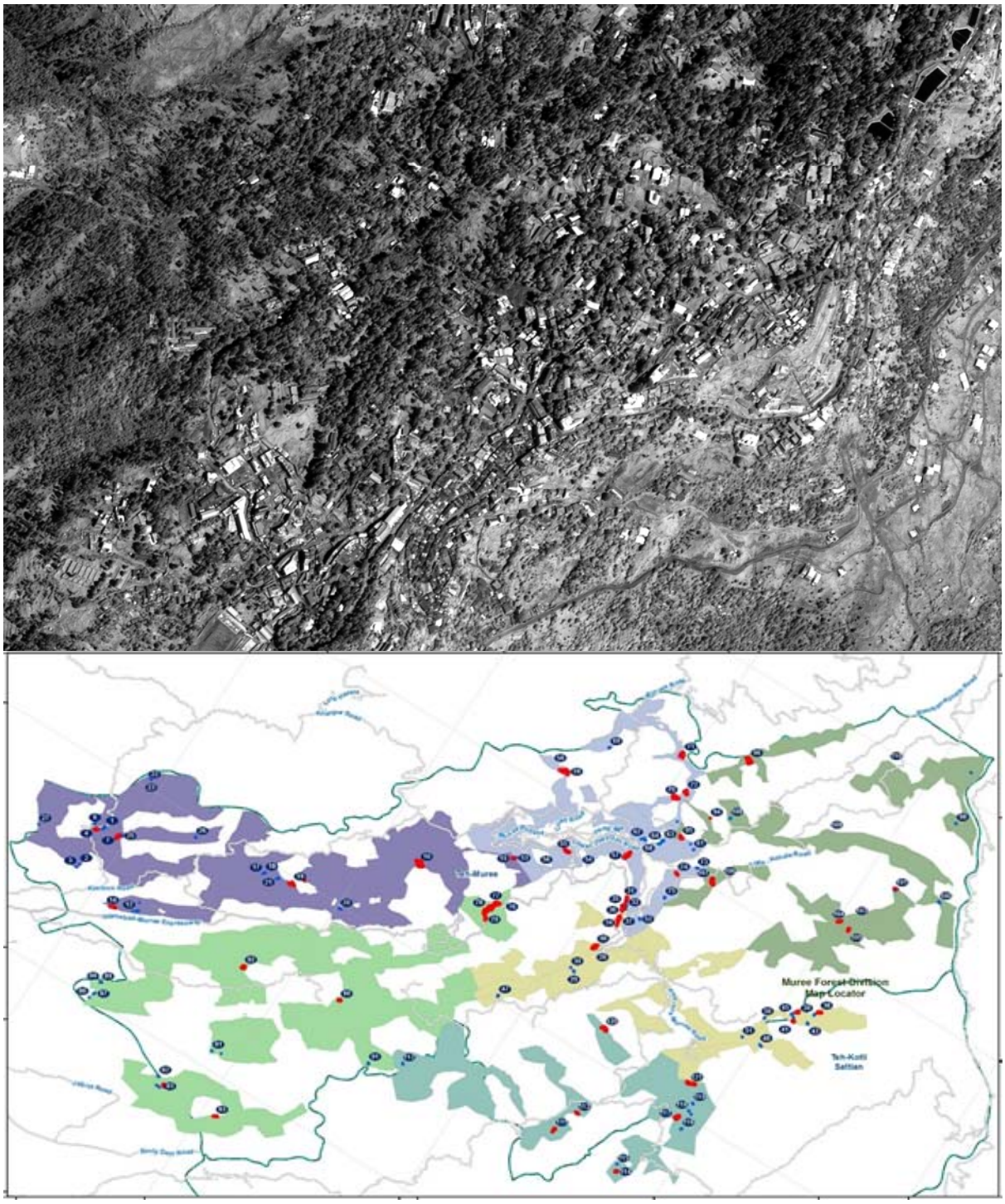

Figure 5: Murree Satellite imagery (1999) and Blank Areas in Plantation (2015)

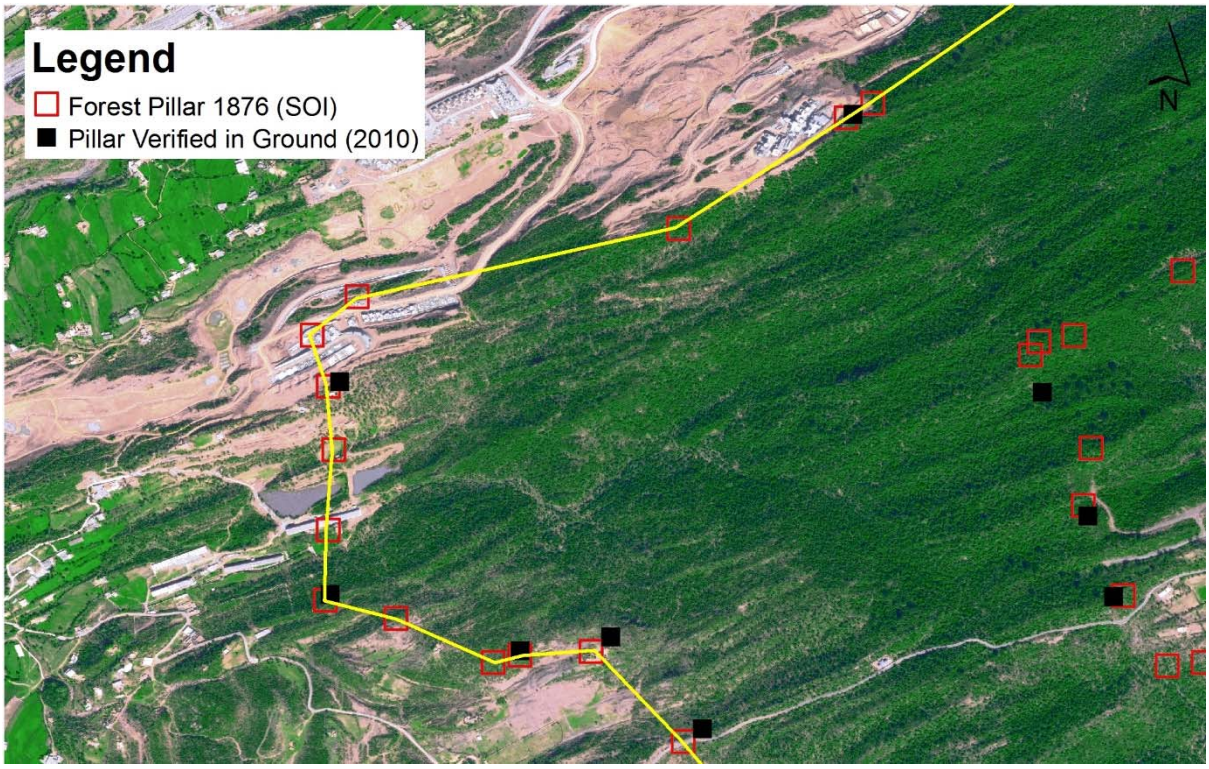

Figure 6: Encroachments and Land Use Conversion, Murree

1.2 Urban and Peri-Urban Forest – An Overview

Urban forestry can be defined as networks or systems comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas; they include, forests, street trees, trees in parks and gardens, and trees in derelict corners. Urban forests are the backbone of the **green infrastructure**, bridging rural and urban areas and ameliorating a city's environmental footprint. Green infrastructure is defined as natural vegetation and green technologies designed to support natural processes. Green infrastructure takes many forms including but not limited to the following: urban forests, natural areas, greenways, streams and riparian zones, meadows and agricultural lands; green roofs and green walls; parks, gardens and landscaped areas, community gardens, and other green open spaces; rain gardens, bioswales, and engineered wetlands. While green infrastructure refers to projects that draw from nature to achieve desired results, grey infrastructure includes the pipes, pumps, ditches, and detention ponds engineered by people to manage natural processes.

Urban forestry can contribute to climate-change mitigation, both directly by sequestering carbon, and indirectly by saving energy and reducing the urban heat island effect. According to the Census of Manufacturing Industries 2015-16,[2] more than 95% of industrial units are located within 2 km of the major roads and highways in Punjab (Figure 7), i.e. around the Urban areas. The top four industrial districts (Faisalabad, Sialkot, Lahore, Gujranwala) house 62.42% of Punjab's overall industry, thereby multiplying the problems of urban sprawl,

[2] Census conducted by the Urban Unit in conjuction with the Industries Dept. Results are not yet made open to the public

environmental degradation and climate change. Urban forestry can play key roles in making Punjab more resilient to the effects of climate change by mitigating storm water runoff, improving air quality, storing carbon, decreasing urban energy consumption by shading and cooling, and reducing the impacts of extreme weather and floods.

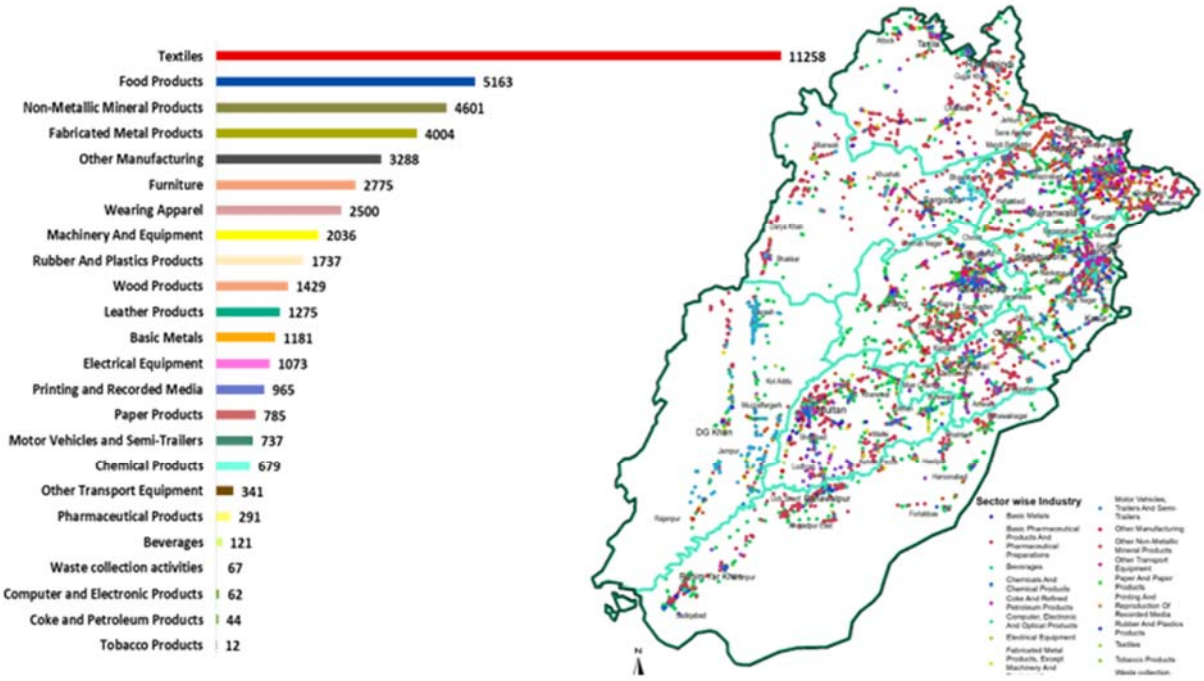

Figure 7: Census of Manufacturing Industries 2015

Main Urban Forest Types

The urban forest can be characterized into following types: -

a. Peri–Urban forests and woodlands: Forests and woodlands surrounding towns and cities that can provide goods and services such as wood, fiber, fruit, other non-wood forest products, clean water, recreation and tourism while making sure that environmental benefits and forests' sustainability is not compromised and continue to benefit within the principle of inter-intra generation equity.
b. City parks: Large urban or district parks with a variety of land cover and at least partly equipped with facilities for leisure and recreation
c. Small parks and gardens with trees: Small district parks equipped with facilities for recreation/leisure, and private gardens and green spaces
d. Trees on streets or in public squares: Linear tree plantation, small groups of trees, and individual trees in squares, parking lots, streets, etc.
e. Other green spaces with trees: For example urban agricultural plots, sports grounds, vacant lands, lawns, river banks, open fields, cemeteries and botanical gardens
f. Roadside Plantation: The linear rows of trees along the right of way of road network including median between the roads

g. Canal-side Plantation: Plantation on the either side of canals running through the urban and peri–urban areas
h. Public & private sector premises: All premises including industries, health, education and other provincial departments, where plantation of trees is carried out
i. Roof-top plantation: plants or landscaping on top of roofs
j. Vertical plantation: a garden that grows upwards using some support

1.3 Existing institutional framework

The Local Government & Community Development Department, Government of the Punjab vide Notification No. SOR (LG) 35 – 1 / 2003 dated 11th March, 2008 has notified Punjab Land Use (Classification, Re-Classification and Re-Development) Rules, 2008 in the Punjab Gazette.

The above rules have in detail described the land use classification, procedure for land use classification, land use re–classification and re–development planning. Under the rules, the residential, commercial, industrial, peri–urban, agricultural and notified areas have been classified. Likewise, certain areas have been defined as under: -

a) Peri–Urban Area

An area that spans the landscape between contiguous urban development and rural countryside with low population density and is predominantly being used for agricultural activity and is likely to be urbanized in the next twenty years.

b) Agricultural Area

Land outside the peri–urban area which is predominantly used for the cultivation of crops and includes cropland, pastureland, orchards, nurseries, dairy farms.

c) Notified Area

i. Horticulturally Significant Area
An area designated under any law for the time being in force as historically, architecturally or archeologically significant area.

ii. Environmentally Sensitive Area
An area includes a natural park, wildlife park, forest, mountainous terrain, mining area or a watershed area.

iii. Public Sector Institution Area
An area reserved for Federal Government, Local Government, any other public body or an agency thereof.

iv. Other Restricted Area
Area in which the Federal Government, the Provincial Government or a local government has imposed certain building or area development restrictions.

v. **Intercity Service Area**
An area designated by City District Government or a Tehsil Municipal Administration as service area along the intercity road outside the peri – urban area.

The Punjab Land Use (Classification, Re-Classification and Re-Development) Rules, 2008 also explain various activities which are permitted and prohibited in different classified areas. In addition, they also cover details of administration and enforcement of activities corresponding to different tiers of city and tehsil municipal administrations, as regard their responsibility is concerned. Though these rules have the following provisions, these are not neither planned nor implemented in true spirit:

> *Rule 11. Land use in peri-urban area.- A City District Government or a Tehsil Municipal Administration shall ensure that land use in a peri-urban area is in accordance with the peri-urban area structure plan.*
>
> *Rule 12. Land use in agricultural area.- A City District Government or a Tehsil Municipal Administration shall ensure that the following land use provisions under permitted, permissible and prohibited uses are strictly followed in an agricultural area*
>
> *Rule 13. Land use in notified area.- A City District Government or a Tehsil Municipal Administration shall ensure that the following land use provisions under permitted, permissible and prohibited uses are strictly followed in a notified area*

Although, the rules provide details of permissible and obligatory activities to be undertaken in different land use classification, the provision of development of green area and minimum number of plants corresponding to unit of land are not included in the list of activities. In light of the current policy, the Local Government and Community Development Department, may incorporate the enabling provisions to carry out the interventions related to urban and peri–urban forestry.

Likewise, The Punjab Plantation and Maintenance of Trees Act, 1974, prescribes plantation and maintenance of three trees per acre by the occupier and in case the occupier fails to comply to do so, the required number of trees shall be caused to be planted in his land by the Forestry and Wildlife Department. Implementation and enforcement of this requirement has been limited and therefore requires an integrated approach towards the desired objective.

The proposed changes/additions in rules in the policy shall act as the principal document explaining land use for implementation of 'Urban and Peri–Urban Forest Policy.' All the regulatory functions for observance of rules under different land use rests at provincial, district and tehsil level. Hence, in the implementation plan of the Policy, the basis unit shall be the district, under whose administrative control district management plans shall be prepared for implementation of policy statement by all stakeholders in an integrated way.

1.4 Commitments to International conventions

Pakistan secured a score of 54.9 (rank of 126 globally) against a far better regional average of 64.1, lower than regional peers Bangladesh's 59.3 (rank 111) and India's 59.1 (rank 112) on the 2018 Sustainable Development Goals SDG Index.[3] Considering the far-reaching benefits of urban forests and their potential to benefit in an integrated manner, several economies have already started working on forest-based solutions for accelerating achievement of SDGs (Figure 8). Table 1 provides an insight into how urban forests can be useful in achieving certain targets under multiple SDGs and hence act as a trigger to achieving Pakistan's SDGs.

Sustainable Development Goal	Target	The role of urban forests
	1.5	Urban forests create employment, provide a resource for entrepreneurs, reduce the cost of urban infrastructure, provide ecosystem services for all citizens, improve the living environment and increase property values, ultimately boosting local green economies
	2.1 2.2 2.3 2.4	Urban forests are direct sources of food (e.g. fruits, seeds, leaves, mushrooms, berries, bark extracts, saps and roots, herbs, wild meat and edible insects). Indirectly, they support healthy eating by providing affordable woodfuel, high-quality water and improved soil for sustainable agricultural production
	3.4 3.9	Forests and other green spaces in and around cities provide ideal settings for many outdoor recreation and relaxation activities, thereby contributing to the prevention and treatment of non-communicable diseases and the maintenance of mental health. Urban forests filter and efficiently remove pollutants and particulates, which also helps reduce the incidence of non-communicable diseases
	6.3 6.6	Urban forests are efficient regulators of urban hydrological cycles. They filter drinking water by reducing biological and chemical pollutants, reduce the risk of floods and erosion, and reduce water losses by minimizing mesoclimatic extremes through evapotranspiration processes

[3]2018 Interactive SDG dashboard(https://dashboards.sdgindex.org/#/)

	7.1	The sustainable management of urban forests can produce renewable energy for use by urban communities. This is a vital function for billions of urban and peri-urban dwellers worldwide, particularly in lower-income countries, where woodfuel is often the most affordable and sometimes only available source of energy
	8.4 8.9	Investments in urban forests and other green infrastructure add significantly to green economic growth by providing an attractive environment for tourism and business, improving home values and rental rates, creating job opportunities, providing materials for housing, and generating savings in the costs associated with energy and the maintenance of human health
	11	Well-designed and managed urban forests make significant contributions to the environmental sustainability, economic viability and liveability of cities. They help mitigate climate change and natural disasters, reduce energy costs, poverty and malnutrition, and provide ecosystem services and public benefits
	13.1 13.2 13.3	Trees and forests in and around cities contribute to climate-change mitigation directly by sequestering carbon and reducing greenhouse gas emissions and indirectly by saving energy, reducing the urban heat island effect, and mitigating flooding
	15.2 15.3 15.9	Urban forests help create and enhance habitats, constitute a pool of biodiversity, significantly improve soil quality, and contribute to land restoration

Figure 8: Role of Urban Forests in achieving SDGs

While there is no specific Multilateral Environmental Agreement (MEA) that aims to regulate forests directly, there are several global conventions targeting certain activities related to forests and their environmental, social and economic aspects. Potentially the most important global conventions related to forests to which Pakistan is a signatory are the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD) and the United Nations Convention to Combat Desertification (UNCCD). Commitments focusing on Green House Gas (GHG) reduction, conservation of biological diversity and sustainable land management under these MEAs can be achieved through urban forests.

a) As part of Pakistan's Intended Nationally Determined Contributions (INDCs) under UNFCCC, Pakistan intends to reduce up to 20% of its projected GHG emissions subject to availability of grants.[4] Considering the potential of urban forests to capture GHGs like Carbon dioxide and prevent dangerous anthropogenic interference with the climate system, it is about time that their benefits are fully utilized

[4] Pakistan's INDCs report, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Pakistan%20First/Pak-INDC.pdf

b) Various goals and targets under CBD aiming at mainstreaming the understanding of biodiversity, reducing pressure, improving status and enhancing the benefits of biodiversity[5] can be tapped through urban forests
c) Land degradation Neutrality (LDN) targets under UNCCD build on the Target 15.3 of SDGs, and urban forests can contribute by combating desertification, restoring degraded land and soil, climate change mitigation and adaptation, biodiversity conservation, ecosystem restoration, food and water security, Disaster Risk Reduction (DRR), and poverty[6]

Pakistan has also been active at United Nations forums on Forests and in fact, improvement in the quantity and quality of Urban forests shall assist meeting the requirements of United Nations Strategic plan for forests 2017-2030. There is no doubt how increasing focus on urban forestry provincially shall complement Pakistan's compliance with MEAs.

In 1992, the Earth Summit of Rio de Janerio (UN Conference on Environment & Development, UNCED), developed an action plan called *Agenda 21* (UN, 1992). Whereas the conference was primarily on sustainable development, it stressed on the close linkages between disaster losses and environmental degradation. Principle 19 of *Rio Declaration* called for the international community to assist the states afflicted by natural disasters. Also at Rio, the UN Framework Convention on Climate Change (UNFCCC) was adopted, which holds annual Conference of Parties (COP) (Figure 9). In 1994, the First World Conference on Natural Disasters was held in Yokohama, Japan, which adopted the *Yokohama Strategy* for a safer world (UN, 1994), which vide Principle 5 realized that *"Early Warnings and their effective dissemination using telecommunications, including broadcast services, are key factors to successful disaster prevention and preparedness."* In 1997, the *Koyoto Protocol* was signed to enforce the UNFCCC decisions.

On the turn of the century, the UN sponsored *Millennium Declaration*[7] resolved to reduce the effects of natural and man-made disasters. This was followed by launching of the International Strategy for Disaster Reduction (ISDR) by the UN Economic and Social Council (ECOSOC). The UN Office for Disaster Risk Reduction (UNISDR) serves from within the UN secretariat as the focal point for coordination of disaster reduction.[8] In 2005, the Second World Conference on Disaster Reduction was held in Kobe, which culminated in the *Hyogo Framework for Action* (HFA), which was designed to build the resilience of nations and communities to disasters and stresses on IT for EW (UNISDR, 2015). In its *Action Plan 2005-15*, it calls for "transfer of knowledge, technology and expertise to enhance capacity building for disaster risk reduction (UNISDR, 2015)." The plan stresses that risk assessment and EWS are essential investments rather than reliance on post-disaster response and recovery. These systems should be people centered, taking into account all stake-holders, assisted by disaster managers and decision makers.

[5] Pakistan – National Targets, https://www.cbd.int/countries/targets/?country=pk
[6] The LDN Target setting program, https://www.unccd.int/actions/ldn-target-setting-programme
[7] UN General Assembly Resolution 55/2, September 2000
[8] http://www.unisdr.org/ accessed 1 October 2015

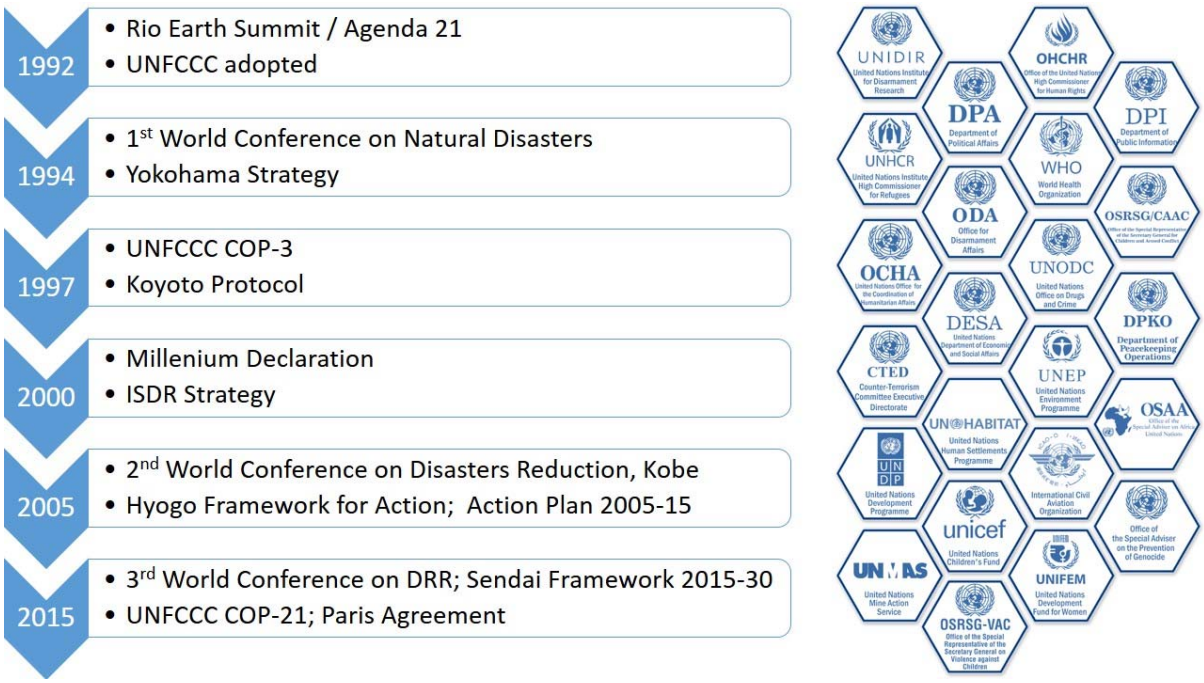

Figure 9: The UN System and its major Conferences

Recently, in 2015, the Third UN World Conference on Disaster Risk Reduction (WCDRR) led to the *Sendai Framework 2015-30*, which enumerates on multi-hazard EWS and *Disaster Risk Information* (UN, 2015). It also calls for information management and exchange between all stake-holders, particularly using the space-based technologies (UNISDR, 2015). Recently, the UNCCC Conference of Parties (COP-21) was held at Paris where the Paris Agreement pledges to hold the increase in global temperature to below 2 ℃ above the pre-industrial levels, by governing the green-house gas emissions from 2020.

In the same way, the International Union for Conservation of Nature (IUCN) program in Pakistan over the years have focused on biodiversity conservation, particularly in the country's forest areas, and addressing ongoing challenges to ecosystems and biodiversity preservation, especially in the face of climate change impacts.

1.5 Comparative Analysis

As part of Policy drafting, the team studied multiple forest policies and guiding documents following under the domain of Urban and Peri-Urban Forestry. The scope of these documents range from towns to national level. Some of the policies consulted in this regard are as under;

i. United States of America (USA)
ii. India
iii. City of Riverside USA
iv. City of Tacoma USA
v. Newcastle, United Kingdom (UK)
vi. Randwick, New South Wales, Australia
vii. City of Sydney Australia
viii. City of Helsinki Finland
ix. Town of Lumsden Canada
x. Guidelines by Food and Agriculture Organization (FAO) of UN

CHAPTER 2: POLICY OBJECTIVES

2.1 Purpose of Policy

To provide important directional statements that will guide towards better management of Punjab's urban forests. To emphasize the role of the urban forest as an inter-generational resource that provides multiple benefits to the community, and the need to improve the capacity to provide these benefits.

2.2 Vision for Punjab

An attractive and livable province with a thriving urban forest that provides economic, ecological and social benefits as part of Punjab's green and sustainable valued infrastructure.

2.3 Scope

The policy is applicable to urban and peri-urban areas of 50 major cities of Punjab (attached as Annex B). These constitute 87% of the Province's urban population. In the second phase, the policy will be expanded to all the 194 cities and towns of Punjab.

2.4 Goals

i. To recognize the importance of the urban forest to the health and well-being of Punjab and to its ecological and economic security;
ii. To maximize the capacity of Punjab's urban forest to provide ecological, economic, social and aesthetic benefits to both present and future generations;
iii. To sustain and expand Punjab's urban forest on an inter-generational life cycle basis; and
iv. To contribute to Pakistan's commitments in SDGs

2.5 Objectives

The following objectives are to be achieved through adoption of an integrated approach by all the key stakeholders: -

Quality & quantity of urban forest

- Promote increased long-term public and private interventions in the urban forest to provide benefits to:
    - microclimate regulation
    - soil and water management
    - air quality management
    - carbon storage
    - biodiversity conservation
    - recreation
    - culture & aesthetics
    - traffic management
    - sustainable development
    - economic products

- increase the aggregate extent of the urban forest to achieve density targets, once these targets have been determined for Pakistan's urban conditions
- compensate for loss of urban forest potential resulting from development processes
- improve the overall structure, health and condition of the urban forest

Planning processes

- integrate planning for the urban forest with local and regional processes for land use and master planning
- improve the compatibility of trees and vegetation with buildings and infrastructure through planning, design, engineering and arboricultural practices

Education & research

- improve knowledge and understanding of Punjab's urban forest, its ecological processes, the benefits it provides and how it should be managed.
- monitor changes in Punjab's urban forest over time.

Community focus

- involve the community as a key partner in managing Punjab's urban forest

2.6 Strategy

This policy will assist the Punjab Growth Strategy 2018-23 and complement the Punjab Spatial Planning Strategy 2019. The strategy will be to use the new institution of Spatial Planning Authority Punjab (SPAP), which is being developed under the Punjab Spatial Planning Strategy 2019. The SPAP will develop Rules to plan, and then to execute and monitor, the implementation of this policy.

2.7 Guiding principles

The delivery of this policy will be through 4 principles:

Departmental integration

A wide variety of disciplines and stakeholders should provide input to the management processes, and the essence of this policy revolves around integrating all of the relevant departments. Integrated management shall be crucial towards properly managing, developing, protecting and conserving the environment.

Systematic asset management

Urban & peri-urban trees are a living asset, subject to growth and decay. Treating them as Punjab's asset, they need to be managed effectively and adopt a cyclic outlook aiming at maintaining and renewing the planted trees through designated levels of service. It is well-understood that the health of trees is dependent on proper monitoring & funding, therefore adequate sources & mechanisms should be devised beforehand. Updated & accurate information on the extent and condition of trees and their potential to provide benefits during

different stages should play a key role in planning and management processes. Incorporation of ICT and GIS tools and systematic information systems, coupled with improving understanding on the urban ecosystem processes and interactions, and their intrinsic and monetary value shall help in this regard.

Spatial & holistic approach

Urban forestry is considered as an integral component of Punjab's urban structure. These shall, therefore be managed as part of an overall city structure with common goals and not in isolation. Considering the contribution of urban forest to Punjab's environment, it shall be managed so as to maximize its contribution.

Urban forestation initiatives shall utilize a wide range of tools, including spatial planning and regulatory mechanisms, adequate funding for planting and monitoring, capacity building, research, public awareness and active inclusion of all stakeholders. Spatial planning shall help in evidence-based decision making and prioritization of activities accordingly.

Community Integration

Urban forests provide a local identity to Punjab and therefore the citizen's community should be a direct participant in formulating and implementing urban forest measures. Consultation shall be sought from community, including local experts, conservation groups, indigenous groups and from associated professionals in engineering, urban planning, architecture and other fields.

Plant species

The planted species may be indigenous in nature, or where bio-diversity is needed, imported from abroad. Nurseries in public and private sector will be encourage to create seed banks and help propagate more local species, some of which are endangered.

2.8 Targets

Tree canopy cover, or more precisely, the amount and distribution of leaf area, is the driving force behind the urban forest's ability to produce benefits for the community. As canopy cover increases, so do the benefits afforded by leaf area: climate control and energy savings improvement of air, soil; and water quality; mitigation of storm water runoff; reduction of the greenhouse gas carbon dioxide; provision of wildlife habitat; and increased real estate value and continuity vitality.

The proposed target for Tree Canopy is as under to be achieved by Departments and entities in their respective area;

- Streets : 5%
- Urban Area : 10%
- Peri-Urban : 15%

The rule of one tree per 10 meters will be observed in city streets, roads, housing societies, and other facilities of Public and Private sector.

CHAPTER 3: POLICY INTERVENTIONS

3.1 Legal Framework

At the moment there is no legal provision related to urban forest in Punjab. Subjects that include forestation, green spaces, plantation, etc., are targeted in isolation in separate policies and acts. Therefore, there is a need to develop an Urban Forest Act for Punjab Province, aiming at all relevant stakeholders through an integrated approach.

All urban forestry-related laws and provisions shall be reviewed for updating. Where appropriate, they shall be integrated through a smaller number of more comprehensive and updated Acts in order to eliminate overlaps.

The appropriateness and need of each urban forest-related institution to have a supporting legal cover shall be examined; where found necessary for institutional effectiveness; such a supporting legal cover shall be provided.

In addition to a new Act, this policy suggests development of guidelines for related activities that includes, but is not limited to, Tree Conservation Guidelines, Tree Removal Guidelines, Street Tree Asset Guidelines, Master Urban Forest Guidelines and Tree Plantation Guidelines

All persons performing tree work on urban forestry trees should be trained according to international tree care standards. Forest Department should make sure that relevant trainings and certifications are easily available either through Forest institute or other training institutes.

Relevant Authorities may introduce the concept of **Tree Warden** to oversee the care and maintenance of trees. The overall responsibilities of a tree warden may include, but not limited to;

- Identification of appropriate planting sites
- Provide guidance on planting new trees
- Pruning of trees for safety and health
- Removal of trees that are dead or dying (from storms, insects, disease, or old age)
- Creation or updating of a tree inventory
- Assessment of trees for potential hazards to public safety
- Oversight of utility arboricultural operations
- Conduct of public meetings and tree hearings, if needed Reporting non-compliance of Urban & Peri-Urban Forest Policy

Departmental Role: Concerned Departments shall contribute towards drafting of Urban Forest Act, related guidelines and Standard Operating Procedures (SOPs) as required. These will then be submitted to competent authority for approval and notification.

Urban Unit/Strategic Support Unit (SSU) Role: Planning and Development Department through Urban Unit/ Strategic Support Unit (SSU) will provide technical support to the relevant departments (i.e. Forest department, Horticulture authorities, etc.) for the preparation of Urban Forest Act and related guidelines.

3.2 Peri Urban Areas

Peri-urban forests and woodlands are those forests and woodlands surrounding towns and cities that can provide goods and services such as wood, fibre, fruit, non-wood forest products, clean water, recreation and tourism. Faisalabad peri-urban structural plan 2014, proposed that minimum 10% of land use proportion be reserved for green spaces. Taking notes form international best practices, this policy proposes that for every owner (either public or private) having at least 12 acres of land, it is mandatory to reserve 1 acre out of every 12 acres of land for forest, following the Rules under this policy for number and type of species and plants cultivated per acre, and their cutting and replenishing. For smaller land owners, 10 trees per acre must be grown.

For peri urban areas on public land, forests can be designed as "fruit forests" or "food forests" with multiple layers of organically grown vegetation for local communities to benefit from. Stewardship of such forests can be given to same communities who benefit from it. Forest may be grown with an aim to generate income (e.g. timbering) as long as replenishment or management plan for the same area is approved by Urban Unit.

Departmental Role: The Extension wing of Agriculture Department will take the lead in Peri-Urban areas. The departments, as per legal requirement will prepare master plans for plantation in their jurisdiction along with its implementation and monitoring arrangement. Concerned departments shall develop and finalize their Peri urban forest plans and submitted to Urban Unit/SSU for validation and approval.

Urban Unit/ Strategic Support Unit (SSU) Role: Urban Unit/SSU will provide technical guidelines to support the concerned departments in the development of Peri-Urban Forest Plans. Urban Unit will prepare guidelines support in selection of indigenous species for forestation and monitoring.

3.3 Housing Societies

Punjab Housing Societies and Land Sub-Division Rules 2010 draw planning standards for housing Societies. The rules state that while planning a housing society, the developer has to reserve at least seven percent (7%) of its area for open space or parks. However this rule has no provision on urban forestation. This policy recommends that there is a need to update the existing housing society rules with the incorporation of 2.5% of area of the housing society (from within the 7% area for open space and parks) specified for Urban Forest, following the Rules under this policy for number and type of species and plants cultivated per acre, and their cutting and replenishing.

Departmental Role: Housing societies (existing and new) will submit their Urban Forest Plan to Concerned departments (Cooperative department, LG&CD, HUD&PHED, Development/ Housing Authorities EPD and PHA) for review and approval. Concerned departments will review the submitted plan as per their legal framework and submit to SSU for verification.

Urban Unit/ Strategic Support Unit (SSU) Role: Urban Unit/SSU will review the submitted plans by concerned departments and approve accordingly. It will also provide policy support in determining land use criteria for Urban Forest in housing societies, to be incorporated in the Urban Forest Act. SSU will also provide recommendations on updation of Punjab Housing Societies rule.

3.4 Horticulture authorities & generation nurseries

The first step towards sustainable plantation program is the cuttings or seedlings which must be raised in nurseries for some months, which will help in production of healthy seed and cuttings. For safe and healthy plants having height and leaves it should be grown in nursery for at least fifteen days.[9] For any sustainable and long term forestation program the speedy production of high quality seedlings in nurseries is a pre-requisite. It is always difficult to formulate a quality producing nursery because of unavailability of microbial populations which is helpful in seedling production as the nursery soil is often collected from sub soil or barren soil[10]. Raising of proper nurseries for commercial species has a high importance to encourage plantation.[11] It is worth mentioning here that although a good number of nurseries in Pattoki area provide major supply of saplings for tree plantation and horticultural activities, most of these nurseries are importing containers of ornamental plants from China.

Departmental Role: Horticultural authorities and forest department shall support nurseries by developing programs to incentivize and capacitate the existing nurseries as well as establish new nurseries that will form the basis of continuous supply of saplings for desired objective of Urban Forestation. These departments will also create enabling environment for support and establishment of private nurseries.

Urban Unit/SSU Role: Urban Unit/ SSU shall provide technical and analytical support to concerned departments in identifying potential areas for establishment of nurseries based on region specific need assessment.

3.5 Urban Agriculture

Urban agriculture encompasses comprehensive and diverse food production-- including community gardens, cultivation, processing, marketing and distribution of food in Punjab's urban areas. For urban agriculture, it is important to encourage the use of native and/or regionally produced edible plants or seeds for use in urban agriculture. Provision of enabling environment for selection and care of plants in a manner that does not threaten the health of the urban forest ecosystem must be ensured. Rules shall be framed for specifying the minimum area of cultivation for urban agriculture for certain specific types of buildings.

For urban agriculture on public land, forests can be designed as "fruit forests" or "food forests" with multiple layers of organically grown vegetation for local communities to benefit from. Stewardship of such forests can be given to same communities who benefit from it. Forest may be grown with an aim to generate income (e.g. timbering) as long as replenishment or management plan for the same area is approved by Urban Unit.

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[9] Sengar, S.H., S.Kothari, (2008). Thermal Modeling and Peformance Evaluation of Arch Shape Greenhouse for Nursery Raising. African Journal of Mathematics and Computer Science Research, 1(1):001-009.

[10] Muthukumar,T., K. Udaiyan and V.Rajeshkannan, (2001). Response of Neem (A.Indica A.Juss) to Indigenous Arbuscular Mycorrhizal Fungi, Phosphate-Solubilizing and Asymbiotic Nitrogen-Fixing Bactria Under Tropical Nursery Conditions. Bio/Fert Soils, 34:417-426.

[11] Gregorio N., J.I.Herbohn and S.R. Harrison, (2004). Small Scale Forestry Development in Leyte, Philippinwa. The Central Role of Nurseries. Small Scale Forest Economics, Management and Policy, 3(3):3337-351.

Departmental Role: Concerned Departments (Agriculture department, Irrigation department, EPD, LG&CD) shall prepare plans/guidelines/regulations for urban agriculture and for promoting enabling environment for selection of Plants. Departments shall potentially also collaborate with Research Institutes/ Universities working in the same domain.

Urban Unit/SSU Role: In this regard, Urban Unit/SSU will support relevant departments (i.e. development authorities and housing societies) in developing zones, identifying and prioritizing areas for potential urban agricultural sites. SSU also work towards healthy and sustainable urban agriculture by adopting integrated pest management.

3.6 Green belts, park & pedestrian areas

The emergence of more integrative green space planning approaches links up to treating green belts as 'patchworks' of land use, ownership, changing functions, etc. Rather than using a 'one-fits-all', top-down approach to allocating and conserving green belts, more adaptive approaches are likely to emerge and become successful.

Street trees are trees growing in the rights-of-way, usually next to an improved surface, such as a street, alley, or sidewalk. Green Belts promote 'leap-frogging' of development from the large cities they surround to more dispersed locations, thereby increasing commuting times to major cities and exacerbating problems such as increased greenhouse gas emissions.

This policy aims to prioritize tree planting and landscaping in street and freeway rights-of-way, in particular in highly visible locations such as business districts and major corridors. Policy may include utility rights-of-way, parks, school sites, and other publicly owned property when and where appropriate. Green belts can be provided with varied forms, textures, structure, flowering characteristics and other aesthetic benefits to enhance the types of street environments found in the Cities. When defining Green Belt boundaries, plans should:

- ensure consistency with the development plan's strategy for meeting identified requirements for sustainable development;
- not include land which is necessary to be kept permanently open;
- where necessary, identify areas of safeguarded land between the urban area and the Green Belt, in order to meet longer-term development needs stretching well beyond the plan period;
- Planning permission for the permanent development of safeguarded land should only be granted following an update to a plan which proposes the development;
- be able to demonstrate that Green Belt boundaries will not need to be altered at the end of the plan period; and
- define boundaries clearly, using physical features that are readily recognisable and likely to be permanent.

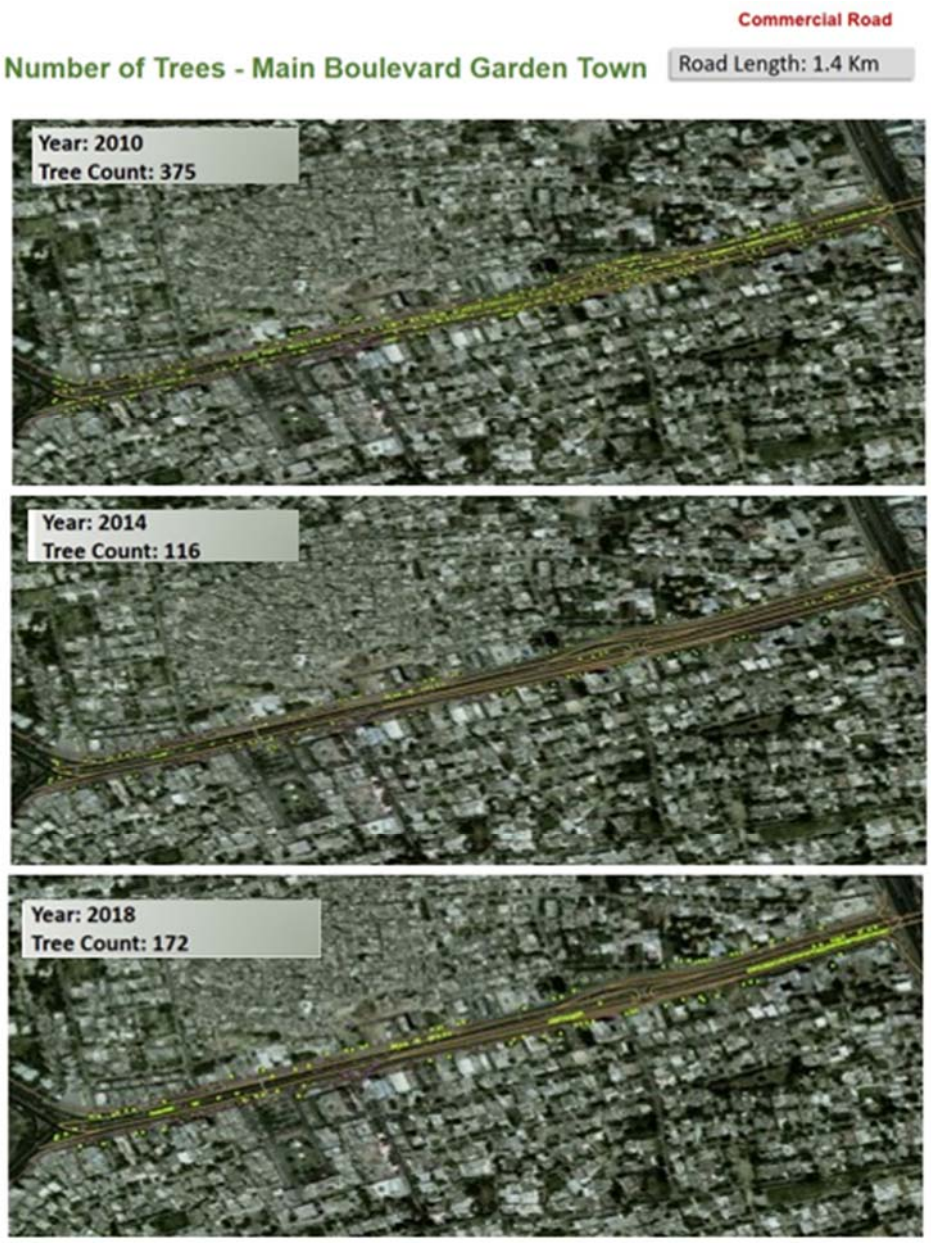


Figure 10: Spatial and temporal representation of Trees at Main Boul. Garden Town

Departmental Role: Concerned departments (Cooperative department, PHA, EPD, Development/ Housing Authorities, LG&CD) shall develop Green belt plan, while ensuring the desired criteria stated above. They are also responsible for plan implementation and monitoring.

Urban Unit/SSU Role: Urban Unit/SSU will provide support in identifying open spaces, develop departmental capacities in geo-tagging and counting of trees at green belts, pedestrian areas & parks and periodic monitoring. Monitoring and evaluation is an important aspects that has been emphasized through satellite imagery and remote sensing technology in this policy.

3.7 Landscaping, Urban Catchment & Rain Water Harvesting

Alignment of the City's landscape regulations and storm water management must be ensured to promote the integration of landscaping elements and low impact development urban catchment approaches. Emphasis must be given to the use of principles which can effectively achieve multiple urban forestry and urban catchment objectives in an integrated manner, such as native vegetation preservation, urban ecology, landscape ecology, landslide management, native soil retention & soil amendment, storm water dispersion and infiltration.

Departmental Role: Concerned departments (LG&CD, HUD & PHED, PHAs, EPD, Development/ Housing Authorities, Cooperative Department) shall prepare landscaping plan and sustainable urban drainage design to capitalize on the potential of urban water catchment and rain water harvesting. Departments will also develop legal framework, plans and SOPs for effective implementation. This may require incorporation of such provisions into their bylaws.

Urban Unit/SSU Role: Urban Unit/SSU shall provide policy support in developing guidelines for urban catchment to utilize cities landscaping in full potential on the potential of urban water catchment and rain water harvesting for urban forest. SSU will also facilitate to establish coordination among development authorities, municipal corporations and utility providers when planning and designing public projects that include landscaping and urban tree plantation.

3.8 Public buildings

Public buildings present a huge opportunity to harness the potential of Urban trees in benefitting the environment. The beauty of such trees is that they don't require a minimum area to be planted and considering the availability of unused spaces in the public buildings of Punjab, especially in the 5 major cities (Lahore, Gujranwala, Faisalabad, Multan, and Rawalpindi), these can be used for urban forestation. Some of the buildings that can be targeted in this regard include:

i. Schools
ii. Higher Education institutions
iii. Auqaf (at shrines)
iv. Health (for dispensaries, hospitals, etc.)
v. Public Health (at all WASA and water scheme sites)
vi. C&W and NHA (along highways)
vii. Railways (along rail tracks)
viii. Irrigation (along canals, majors, minors)
ix. Mines (for any mining areas in peri-urban locations)
x. Others large campus building owners (such as PESSI, TEVTA and Police)

Departmental Role: Concerned departments shall adopt a green infrastructure and nature based solution for planning, designing and managing the public buildings to integrate and maximize the benefits from trees and forest. They will also prepare guiding documents and supporting tools to serve a sound development of Urban Forestry.

Urban Unit/SSU Role: Urban Unit will provide technical support in developing appropriate tools and techniques to fully utilize the benefits of urban forestry.

3.9 Urban Vegetation and Rooftops

A green roof, also known as a vegetated roof, rooftop garden, living roof, kitchen gardens, or eco-roof, is an extension of an existing roof which involves high quality waterproofing membrane, root repellent system, drainage system, filter cloth, lightweight growing medium (soil), irrigation system, and plants. Green roofs are one of the few building technologies that provide multiple social, environmental and economic benefits. They are used around the world as an important climate change adaptation tool. Emerging paradigm of vertical gardens using some support mechanism can also be incorporated.

The policy recognizes that significant planter box landscaping on roofs and podiums can also provide benefits to the building and surrounding environment. Green Rooftops can be actively supported through;

- Direct financial incentives such as grants and subsidies;
- Indirect financial incentives such as fee reductions and floor space density bonuses;
- Regulations and standards that encourage or mandate green roof installations; and
- Intangible incentives – by far the most common form of support. Examples include research, education and training, technical guidelines and awards programs.

Since infrastructure for Urban Vegetation and Rooftops has a relatively high development and maintenance cost, so initiatives in this area shall be encouraged for high rise private buildings or where appropriate, by the relevant department in case of public buildings.

Departmental Role: Concerned departments (Forest department, PHAs LG&CD, Corporative department and Development/ Housing Authorities) shall draft guidelines and SOPs for setting up rooftops and also recommend techniques that can be successful in the local scenario.

Urban Unit/SSU Role: Urban Unit/SSU will provide policy support to concerned departments for development of guidelines to set out green rooftops on public and private buildings. SSU will also support concerned departments in establishing successful models to utilize full potential of green rooftops to combat urban pollution and climate change.

CHAPTER 4: BIODIVERSITY AND NATIVE SPECIES

Tree diversity within an urban forest landscape provides functional, aesthetic, biological and ecological advantages. Selection criteria needs to be developed to provide a quantitative and qualitative basis for the Master List of Street and Park Trees. It is also important to understand that there is no one type of urban environment. The urban environment is a varied conglomeration of microclimates and heterogeneous soil conditions. Above-ground or underground site conditions can change dramatically within the space of a few meters. Climate change and increases in temperatures will also require consideration when selecting tree species.

Adaptability to urban conditions is a key characteristic of plant tolerances that make a particular species or cultivar more or less suited to planting in urban landscapes. Thirteen base selection criterion for adaptability to urban conditions have been identified. They reflect the species' ability to respond to drought, heat, wind and pollution, and the species' lifespan, pathogen and pest susceptibility and manageability, effect on community health and allergies, the degree and quality of shade cast, maintenance requirements and extent of tree litter produced. The base criteria includes:[12]

i. Drought tolerance
ii. Heat tolerance
iii. Wind tolerance
iv. Longevity
v. Pollution tolerance
vi. Pathogen, pest susceptibility and manageability
vii. Potential as allergen
viii. Shade cast (spreading crown)
ix. Maintenance required
x. Tree litter
xi. Tree Foliage (evergreen, semi evergreen, deciduous)
xii. Height suitability for chosen location
xiii. Growth rate

Other important factors may be the quantity of water the tree uses, and its impacts on the available water table level. Trees such as Maple are known for reducing the pollution from air, and native Chinar or *Platanus Orientalis* (shown below) is known for its spreading crown.

[12] Urban Forest Diversity Guidelines 2011, Tree Species Selection Strategy for the City of Melbourne

Likewise, there are many techniques that can be used for plantation. One such technique that can be mainstreamed in local scenario is the 'Miyawaki' method that have been proven to be effective in Punjab's conditions and aims at recreating native forests with native trees. A preliminary list of selected species that can be positively used for urban forestation in Punjab (Table 1). These are locally available, endemic and have proven to be effective for Punjab's urban forests. During the selection of specific species, pest attacks on native species must be fully considered and imported species be chosen according to local conditions, pest management potential and suitability to biodiversity. However this list, as well as any additions to this, must be validated through research studies involving the academia and local research centers.

Non-rated Criteria

Additional considerations that may be used to further refine the selection of a street tree include, for example, heritage, biodiversity goals, microclimate goals, aesthetics and character, particularly for landscaping purposes.

Table 1: List of identified Native Species for Urban Forestry in Punjab

Common Name	**Botanical Name**
Amaltas/Indian laburnum	*Cassia fistula*
Amla	*Phyllanthus emblica*
Arjun	*Terminalia Arjuna*
Babul (Kikar, pahadi kikar)	*Acacia eburnea*
Bahera	*Terminalia balerica*
Barma (Barna)	*Crateva religiosa*
Bel Pattia (Bil) (Local Bel Giri)	*Agele marmelos*
Beri (Jharberi/Jhaepala/mallha)	*Ziziphus nummularia*
Bhani / desert poplar	*Populus euphratica*
Chakotra	*Citrus decumana*
Charr/ karanj	*Pongamia pinnata*
Dhak (Chichera)/ palash	*Butea monosperma*
Gular	*Ficus racemosa*
Kachnar	*Bauhinia malabarica*
Khatta	*Citrus medica*
Lasura	*Cordia myxa*
Mango	*Mangifera indica*
Mulberry(tut)	*Morus indica/laevigata*
Nim/ neem	*Azadirachta indica*
pilkkhan/ pilkhan	*Ficus virens*
Pipal	*Ficus religiosa*
Shisham(tali/tahli)	*Dalbergia sissu*
Simbal/ shemal / silk cotton	*Bombax ceiba*
Sohanjana(horse radish tree)	*Moringa concanensis*
Injeer/ anjeer/ common fig	*Ficus carica*
Paras Peepal/indian tulip tree	*Thespesia populnea*
Kakronda/ karonda	*Carissa carandas*
Gul e Nishtar	*Erythrina suberosa*
Har Singhar	*Nyctanthes arbor-tristis*
Falsa	*Grewia asiatica*
Anar	*Punica granatum*
Jamun(small leaf wild variety)	*Syzygium cumini*
Mava/ mahuva	*Madhuca longifolia*
Simal	*bombax malabaricum*
Sweet acacia/ needle bush	*Vachellia farnesiana*
Gaab/ malabar ebony	*Diospyros malabarica*
Khirni	*Manilkara hexandra*
Sambhaloo	*Vitex negundo*
Kikar/ Babul	*Acacia nilotica*
Phulai	*Acacia modesta*
Acer / Maple	*Acer negundo*
Chhiku	*Achras sapota*
Ailanthus / Tree of heaven	*Ailanthus excelsa / glandulosa*
White Siris	*Albizia procera*
Shaitan / Saitan / Shatin	*Alstonia scholaris*
Norfolk Island Pine	*Araucaria heterophylla*
Dhwe / Dheu	*Artocarpus lakoocha*
Bamboo	*Bambusa Spp.*
Mahwa	*Bassia latifolia*
Gulabi Kachnar	*Bauhinia purpurea*
Anderkani	*Bischofia javanica*
Kaghzi Tut	*Broussonetia papyrifer*

Brachychiton	*Brachychiton diversifoli*
Najor	*Bursera serrata / simaru*
Papita / Papaya	*Carica papaya*
Cassia tree / Java Shower	*Cassia javanica*
----	*Castanospermum austra*
Kharak / European nettle tree	*Celtis australis*
Carob	*Ceratonia religiosa*
Budha tree / Floss silk tree	*Chorisia insignis*
Chukrassia	*Chukrasia tabularis*
Camphor / Kafoor	*Cinnammomum campho*
Saroo / Cypress	*Cupressus semperviren*
Cypress	*Cupressus funebris*
Trkoli	*Dalbergia lanceolaria*
Darris	*Darris robusta*
Gul-e-Must	*Dillenia indica*
Lokat	*Eriobotrya japonica*
Sufeda	*Eucalyptus citriodora*
Bohr	*Ficus bangalensis*
Kali Ficus / Kubra	*Ficus benjamina*
Rubber plant	*Ficus elastica*
Pandurata	*Ficus lyrata*
Silver Oak / Silk Oak / Sha balut	*Grevillea robusta*
Nag Phalie	*Heterophargama Adenophyllum*
Gul-e-Neelam	*Jacaranda mimosifolia*
Gul-e-fanoos / Sausage tree	*Kigelia pinnata*
Maclura	*Maclura aurantiaca*
Paper Bark	*Melaleuca leucadendro*
Villayti Shishum	*Millettia ovalifolia*
Molsari	*Mimusops elengi*
Shehtut	*Morus alba*
Litchi / Lychee tree	*Nephelium litchi*
Talwar Phali	*Oroxylum indicum*
Avocado / Alligator	*Persea americana*
Chair / Pine	*Pinus roxburghii*
Kaker / Mastic tree / Kang	*Pistacia integerima*
Gul-e-Cheen / Cade	*Plumeria obtusa*
Ulta Ashok	*Polyalthia longifolia*
Popular	*Populas alba / nigra*
Aaroo / Peach	*Prunus persica*
Kanak champa	*Pterospermum acerifolium*
Nashpati / Pear	*Pyrus communis*
Majnun / Baid-e-majnun	*Salix babylonica*
Reetha / Soap nut tree	*Sapindus trifoliatus*
Ashoka	*Sarace indica / asoca*
Shamma	*Sophora Secundiflora*
Jungle Badam	*Sterculia colorata*
Imli / Tamarind	*Tarmindus indica*
Sagwan / Teak	*Tectona grandis*
Urhar / Bhera / Bidda nut	*Terminalia bellirica*
Tumri / Gamhar	*Trewia nudiflora*
Ber / Jujube / Simli	*Ziziphus jujube*
Kamrukh / Kamranga	*Averrhoa carambola*
Buddha	*Chorisia insigni*

CHAPTER 5: IMPLEMENTATION, MONITORING & FISCAL FRAMEWORK

5.1 Policy Implementation

The policy statement regarding the roles and responsibilities of stakeholders has been explained in Annex C. Each provincial department and autonomous body has to develop its own short, medium and long term strategies. In consideration to the strategy and the funds provided to respective departments and autonomous bodies, further necessary allocation shall be made to their representative in the respective district. Based on the district–wise allocation, the district administration shall prepare a Management Plan incorporating the proposed activities of tree plantation to be carried out by the concerned department or autonomous body in the district. Similarly, the district administration shall prepare annual progress report of urban and peri – urban forest policy.

For the successful implementation of urban forest efforts, Forest Ecosystem Restoration Plan shall be developed. It is proposed that these plans are prepared at tehsils level, and will be aggregated at the district and subsequently the provincial level. A crucial step towards policy implementation shall be establishment of baseline data.

Baseline Data Development

Following steps along with images depict the process for baseline data collection:

- Jurisdiction land mapping of departments functional within cities

- Mapping and assessment of urban tree count and canopy cover by using high resolution satellite image. The database will be stored as geo-database with detailed classification level at Site, Locality, Society, UC, Tehsil level etc.
  As per definition of Clean Development Mechanism, "Forest" is a minimum area of land of 0.05-1.0 hectares with tree canopy cover (or equivalent stocking level) of more than 10-30% with trees with the potential to reach a minimum height of 2-5 metres at maturity in situ.[13]

Figure 11: Tree count sample map – a pilot study area of Lahore

[13] The IPCC Good Practice Guidance stipulates selecting in addition a minimum strip width for "linear forests". (IPCC, 2003). FAO defines a threshold of 20 m. However, since the Marrakech Accords only list crown cover, tree height and area, the UNFCCC records only these parameters.

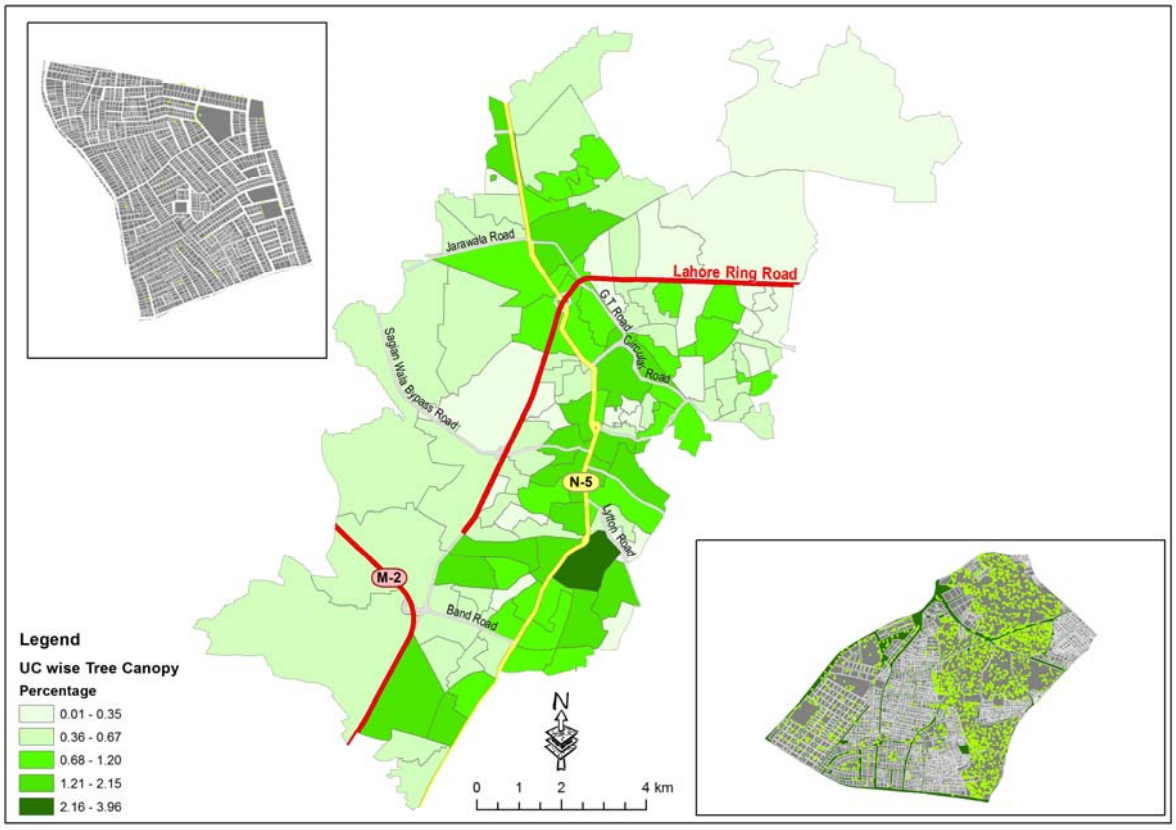


Figure 12: Union Council Level Tree Canopy Map – Lahore City Tehsil

- Temporal mapping of tree cover by using historic satellite image to identify trends of tree cover change

Figure 13: Tree count change – Main boulevard Garden Town

- Identification of potential plantation/restoration sites and suitable tree species for tree plantation

- Tree count, density, positive and negative hotspot will be identified by using ground and space borne data sources. Calculation of existing tree density for cities ranking on the basis of green-ness index. This will help for benchmarking and encourage competition to increase greenery within cities.

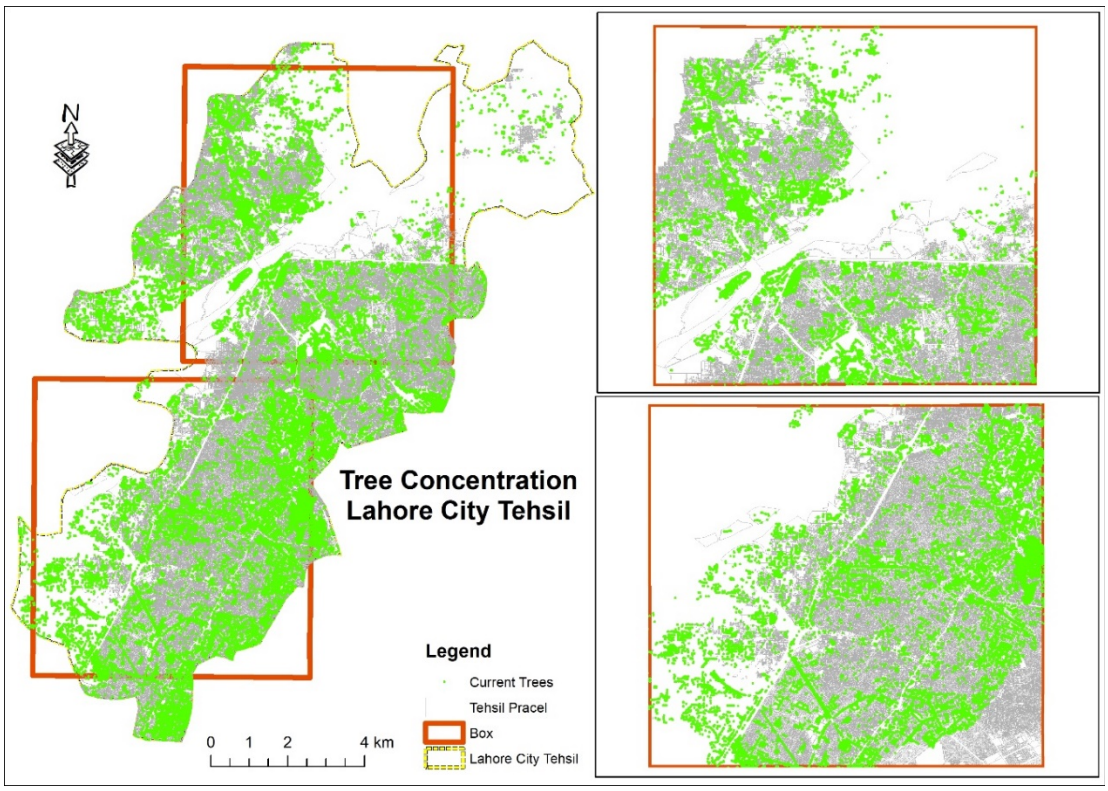


Figure 14: Sample Tree Map – Lahore City Tehsil

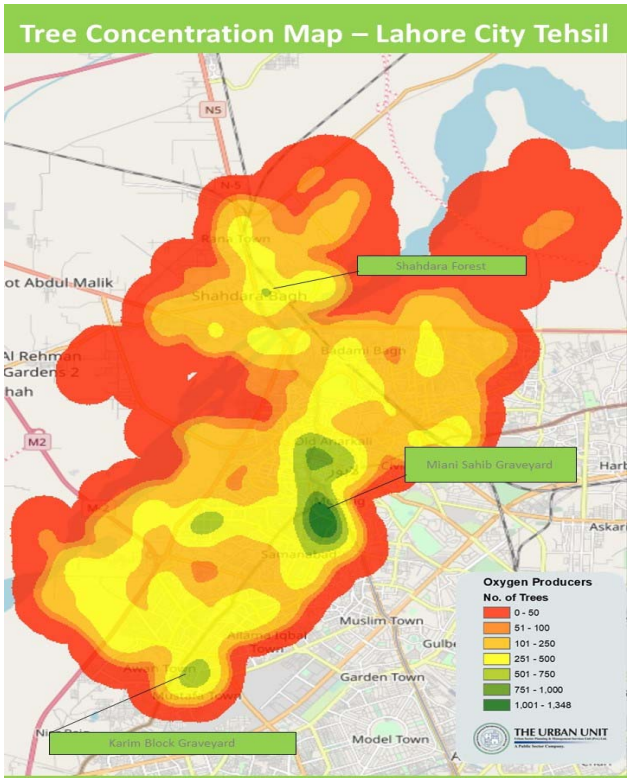


Figure 15: Sample Tree concentration map – a pilot study area of Lahore

- Urban tree inventory to be developed and maintained. The maps and information from the societies, authorities and departments to be digitized. Random sampling survey will be conducted to check and ensure completeness and accuracy of information.

Figure 16: Urban Tree Inventory GIS

- Support in Execution of the Project

a) Identification of restoration sites and their prioritisation with timelines
b) Repeated terrestrial photography of the plantation sites to ensure the survival of the saplings/plants ; Quarterly
c) Geo-tagging of each plantation activity area
d) Tree count and species records on the plantation sites
e) Satellite /drone image based monitoring of plantation sites; Biannual

5.2 Policy Monitoring

Monitoring and Evaluation (M&E) is a key component of this policy. The primary purpose of M&E is to measure the degree to which a policy design is implemented as planned and how successfully it achieves its intended results. The overall monitoring shall be carried out by the Spatial Planning Authority Punjab (SPAP) of Planning & Development Department. SPAP shall carry out an internal assessment to identify those functional areas which are regarded as strong, and those that require improvement – both classifications require reasons, and where improvement is required, a ranking of the needed improvement should be done in order of priority. An example of M&E matrix that is built upon principles of result based M&E framework is presented;

Policy Aspects	Objectively verifiable indicators	Means of verification	Responsible entities
Baseline	• Percent Forest cover • Competency Level • Provision in legal mandate	• GIS and field verification • Organizational capacities • Existing laws/ Acts/ Rules/ Regulations	• Spatial Planning Authority Punjab • Urban Unit • Forest Department • Parks and Horticulture Authorities • Other relevant dept.
Goal	• Improve wellbeing of citizens through Urban and peri-urban forest • Sustain and expand forest • Target for tree canopy;	• State of Environment • GIS and field verification • Increase tree canopy	• Spatial Planning Council Punjab • Spatial Planning Authority Punjab • Urban Unit • Forest Department

Policy Aspects	Objectively verifiable indicators	Means of verification	Responsible entities
	o Streets : 5% o Urban Area : 10% o Peri-Urban : 15%		• Other relevant dept.
Objectives	• Quality & quantity of Urban Forest • Integrated planning • Improve knowledge & understanding • Community focus	• GIS and field verification • Regional & master plans/ planned development • Public awareness • Community participation	• Spatial Planning Authority Punjab • Forest Department • Parks and Horticulture Authorities • Other relevant dept.
Interventions	• Punjab Urban & Peri-Urban Forest Act • 1 acre out of every 12 acre or for small land owners, 10 tree per acre • 2.5% area of housing societies • Urban Tree Plantation in Public Buildings. • Urban vegetation & Rooftop on High-rise buildings • Enabling environment for nurseries and seed bank • prioritize **tree planting** and **landscaping** in street and freeway rights-of-way. • Adopt a road/school/industries programs under CSR • Capacity building programs for Urban forestry • Public Awareness and environmental education to encourage citizenship action	• Establishment of Spatial Planning Authority Punjab and implementation of Act. • GIS and field verification • Implementation of other provisions • Increase tree canopy • Environmental education program implementation • Improved availability of tree saplings and seeds. • Third Party Validation	• Spatial Planning Council Punjab • Spatial Planning Authority Punjab • Forest Department • Urban Unit • Parks and Horticulture Authorities • Other relevant dept.
Output	• Increase in Forest Cover as per targets • Improve urban ecology	• GIS and field verification • Increase in biodiversity of urban areas	• Spatial Planning Authority Punjab • Urban Unit • Forest Department • Parks and Horticulture Authorities • Other relevant dept.

Reviewing and analyzing is about adapting policy to a changing world so as to create and maintain success. Punjab Urban and Peri-Urban Forest Policy have various external factors over which it has little or no control that are of particular importance. SPAP shall consider the analysis of the political, economic, and social context of Punjab with a special emphasis on areas of interventions of the policy.

SPAP will prepare ICT based monitoring module that can be used by their respective agencies/ authorities to provide regular monitoring of plant protection, regeneration, health of plants and work progress and thereby improve accountability and transparency.

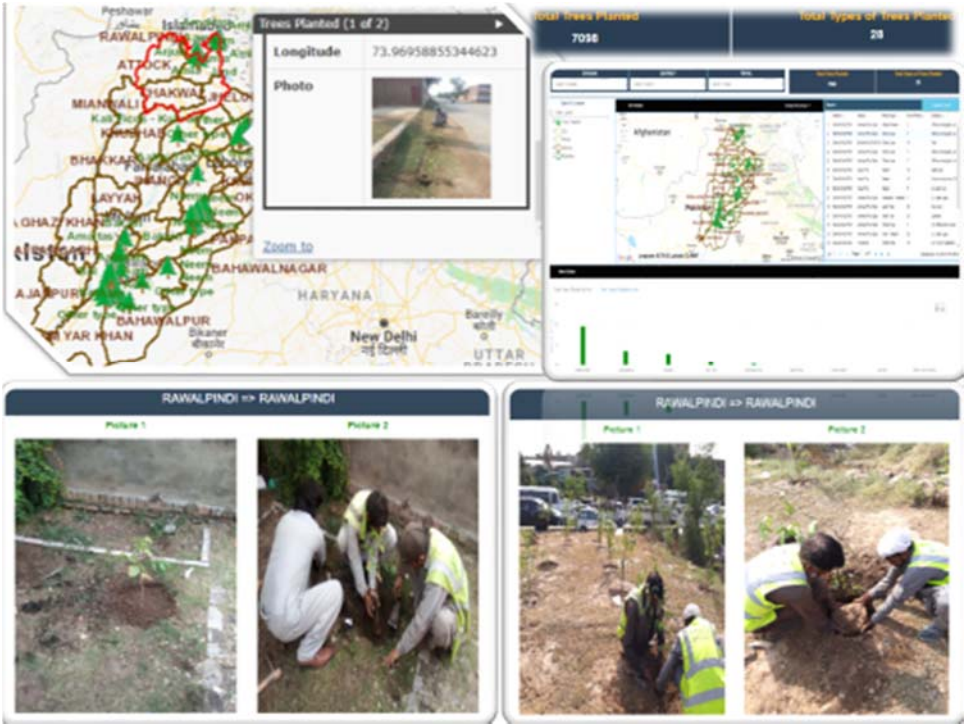


Figure 17: ICT based monitoring dashboard for Urban Forest

5.3 Urban Forest MIS

In the recent past there have been several initiatives to achieve denser green cover all over Pakistan. In this respect several initiatives have been undertaken by the Government. One such initiative was Clean Green Pakistan, for which a Tree Plantation dashboard (Figure 17) was developed for LG&CD.

After analyzing the available information and data, it becomes apparent that there is a strong need to complement the ongoing activities with the support of information and communication technologies. Therefore, it is of utmost importance to develop a Management Information System (MIS) that can track the available plants/trees inventory, allows to monitor the tree plantation driver and follows up on the growth and well-being of the new plantations. Such a system is more urgently needed in the urban areas of the country since in densely populated areas it becomes extremely difficult to perform correct estimations of green cover using conventional satellite imagery. Therefore, an MIS system which complements with the satellite imagery-based estimations is needed in the urban areas. Such as system will enable the government to take evidence based decisions based on the up-to date data. It will also provide

support regarding forests management and will function as a main tool to visualize and retrieve forest related information easily. Such information may contain details about the health of the forest, number of trees, tree types and their geographical distribution, etc.

This system will be in-line with the government policies to preserve and systematically extend the forestation in the urban areas of the country. Such a system substantially aids the monitoring of the growth of the trees/plants and will contribute to a significant number of benefits. It also addresses many of the most pressing sustainable development challenges.

Through UFIS a new MIS supported by the GIS technologies will be developed. This system will include functionality related to the existing forest covers and temporal mapping, identification of new sites for forest resources, management of forest assets and protected areas (and rangelands to boost production), promote forestry in private lands, provide education for public and private departments for tree plantation, conduct research and training in various disciplines of forestry, perform identification of problems, formulate training modules, conservation of natural resources and many other objectives.

We envision the system to contain the following main module along with mobile application

1- Forest Inventory/Asset control and management module
2- Complaint Management system
3- GIS mapping of existing and newly planted trees/plants
4- Monitoring and follow up of new and existing plantations
5- Geographical analysis of different type of trees/plants

Such an exploratory software supported with spatial data (UFIS) will produce databases which will enable immediate access and visualization by filtering required information in response to a specific query, which can be attribute or spatial based. The resultant Forest Management Information System (FMIS) will ensure the conservation, restoration and sustainable use of forest land, soil, including land affected by desertification, drought and floods, identification of new plantation sites especially indigenous species and strive to achieve a land degradation-neutral world. All types of forest land information will be available simply by press of a click. Moreover any forestation campaigns by different departments with the help of forest department and government will provide aid in monitoring and planning of existing plantation, tree cuttings, and for new plantations.

Proper integrated management of our urban forest requires basic information to be collected and readily available, such as quantity of canopy cover, condition and health of the forest, diversity of species, etc. Collecting data on the urban forest will help to reduce risks, identify and target priority planting areas, map current and desired canopy cover, and quantify benefits provided by the urban forest.

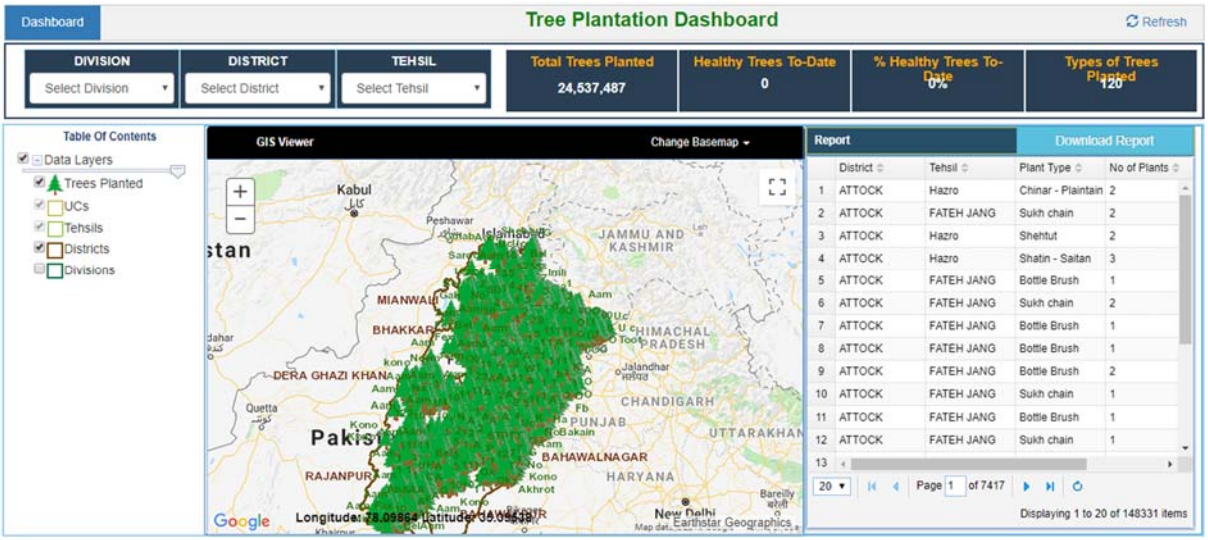


Figure 18: Tree Plantation dashboard developed for Clean Green Pakistan

5.4 Fiscal framework: Green Development Fund

All the stakeholder departments shall be funded through development and non–development in order to execute their assigned functions. The activities proposed in policy mainly involves raising of nurseries, land development and planting, maintenance of planting through protection weeding, and irrigation and development of green grounds. Usually, these activities are not adequately funded except in case of Forest Department, horticulture and other development authorities.

The provincial government shall, immediately after formation of the Spatial Planning Authority Punjab (SPAP), establish for the purposes of this policy a Fund, to be called the Green Development Fund (GDF). This Fund shall be financed from the following sources:

i. Grants made by the provincial government;
ii. Loans, aid and donations from the national, provincial or international agencies, provided in accordance with prescribed procedure
iii. Any fees which the SPAP may prescribe under Rules formulated to implement this policy
iv. The provincial government shall, in its annual budget, make provisions for this fund at 1% of the total Annual Development Program ADP budget, for the purposes of carrying out the activities and programs set out in the policy

The GDF shall be kept in one or more non-lapsable accounts maintained by the SPAP, in local or foreign currency, in any scheduled bank in Pakistan, and shall be operated by the Director General SPAP in accordance with the directions of the SPAP.

The further mechanism of distribution of funds to different stakeholder departments in each district shall be developed by P&D & SPAP, based on the Management Plan prepared by the respective district administrations and departments. The GDF shall primarily be used for the purposes of:

- Plantation
- Monitoring & Evaluation
- Citizen participatory items given in Section 7 (Education, R&D, Innovation, Partnerships with the aim to promote urban forestry, etc.)

One third or 33% of funds in GDF will be provided to Urban Unit for monitoring, system development, R&D & Educational activities in entire project from the Green Development Fund. The remaining funds may be given to districts or departments directly, based on their Forest Plantation Plan and progress shall be verified by Urban Unit and P&D.

In addition to the GDF, all the private housing authorities, EIA projects, Industries and private sector entities, after approval of their Plantation Plan by respective competent forums, shall pay fees for monitoring and compliance reports to Urban Unit for their monitoring and data base management of trees and any advice required for implementation of plantation plan. The amount of fee or of any deposit work to be charged by Urban Unit shall be formulated in Rules, to be approved by the Spatial Planning Authority Punjab, and periodically reviewed by the Spatial Planning Council.

Respective departments and authorities shall also earmark exclusive budget for carrying out tree plantation in their areas of jurisdiction.

5.5 Green Climate Fund

Green Climate Fund (GCF) is a unique global platform to respond to climate change by investing in low-emission and climate-resilient development. GCF helps developing countries limit or reduce their greenhouse gas (GHG) emissions and adapt to climate change. It seeks to promote a paradigm shift to low-emission and climate-resilient development, taking into account the needs of nations that are particularly vulnerable to climate change impacts. In Paris Agreement 2015, the Green Climate Fund was given an important role in serving the agreement and supporting the goal of keeping climate change well below the 2 degrees Celsius expected increase in global temperature (in Business as Usual scenario). GCF has recently funded a project “Scaling-up of Glacier Lake outburst Flood (GLOF) risk reduction in Northern Pakistan”. The project will build 250 engineering structures including damns, ponds, spill ways, tree plantation and drainage to reduce risk. At the same time, the development of disaster management policies and the introduction of weather monitoring stations, flood gauges, hydrological modelling and early warning systems will increase the ability to respond rapidly to flood scenarios. GCF can also be used to develop projects related to urban forest in Punjab. Urban Unit would be encouraged to apply for GCF in conjunction with other private and non-governmental organizations.

CHAPTER 6: INSTITUTIONAL REFORMS

6.1 Proposed institutional arrangement

Punjab Spatial Strategy 2019, as prepared by the Government of Punjab with technical assistance of Urban Unit, is the overall guiding document which integrates the Punjab Urban & Peri-Urban Forest Policy 2019. The following overarching institutional design and arrangements is also valid and proposed for the Policy:

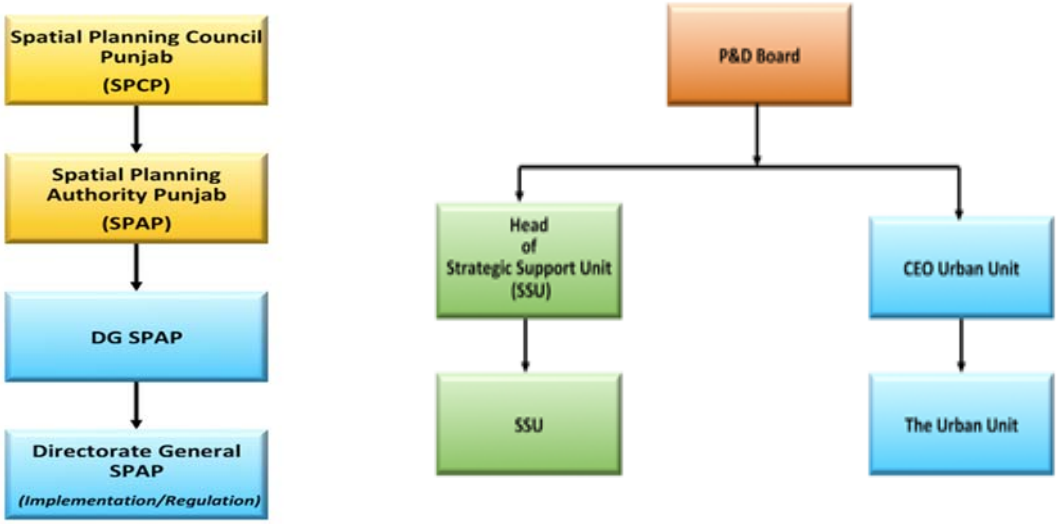


Figure 19: Institutional Arrangement for Punjab Urban Forest Policy

6.2 Spatial Planning Council Punjab (SPCP)

Proposed membership of the said Council is as follows, with the private/elected members to be notified by the Government, and the Chair having authority to co-opt further members:

i. Chief Minister Punjab (Chair)
ii. Minister Planning (Vice Chair)
iii. Minister Finance
iv. Minister Law
v. Minister Agriculture
vi. Minister Communication & Works
vii. Minister Environment
viii. Minister Housing
ix. Minister Industries
x. Minister Irrigation
xi. Minister Local Government
xii. Minister Tourism
xiii. Chief Secretary Punjab
xiv. Chairman Planning and Development Board
xv. Senior Member, Board of Revenue
xvi. Inspector General Police
xvii. Finance Secretary
xviii. Director General SPAP (Secretary)

xix. CEO Urban Unit
xx. Two Spatial Planning Experts, as may be prescribed by the Chair
xxi. Three Members of the Provincial Assembly Punjab
xxii. Three Members of NGOs/ Civil Society
xxiii. Two Research Representatives from Academia or Research Institutes

In case of busy schedule of the Chair, or absence of the Chair for any reasons, the Vice Chair shall periodically hold the meetings and submit approved minutes to the Chair. The Spatial Planning Council Punjab shall approve a policy review mechanism, while complementing any updates needed as per provisions under *Continuing Mandamus* by the Honorable High Court.

The SPCP will perform the following functions related to Urban Forestry in addition to its other functions given in the Punjab Spatial Strategy or the proposed Punjab Spatial Planning Act 2019:

a) Review the policies and plans pertaining to urban forestation, or any other related environmental and climate change aspect on regularly basis.
b) Review and coordinate implementation of the measures taken under Punjab Urban and Peri-Urban Forest Policy and periodic updating of the same;
c) Ensure implementation of legislation, strategies and guidelines for Urban Forest development and management;
d) Planning and coordination for Urban Forest development and management activities among concerned organizations as well as provincial departments to achieve objectives of Urban and Peri-Urban Forest Policy;
e) Create an enabling environment that shall promote broader multi-stakeholders' participation and integrated urban forest management with due consideration for environment and ecology;
f) Review, in consultation with concerned organizations, the progress on Urban Forest Policy

In case the Council fails to meet over a six month period, the Spatial Planning Authority Punjab shall be allowed to undertake any or all of the above functions, and seek post facto approval whenever the Council next meets.

6.3 Spatial Planning Authority Punjab (SPAP)

The SPAP shall comprise of the following:

i. Chairman P&D (Chair)
ii. Secretary Finance Department
iii. Secretary FW&F Department
iv. Secretary Agriculture Department
v. Secretary C&W Department
vi. Secretary Environment Protection Department

vii. Secretary HUD&PHE Department
viii. Secretary IC&I Department
ix. Secretary Irrigation Department
x. Secretary LG&CD Department
xi. Secretary YASAT Department
xii. Secretary Food Department
xiii. Secretary Livestock & DD Department
xiv. Secretary Cooperatives Department
xv. Secretary Labour & HR Department
xvi. Representative of Senior Member, BOR
xvii. Additional IG Police (Operations)
xviii. Director General SPAP (Secretary)
xix. Director General Provincial Disaster Management Authority
xx. Director General Lahore Development Authority
xxi. Director General Parks and Horticulture Authority (PHA) Lahore
xxii. Director General Civil Defence
xxiii. Director General Punjab Emergency Services (Rescue 1122)
xxiv. Director General Punjab Social Protection Authority
xxv. CEO Infrastructure Development Authority of Punjab
xxvi. CEO Urban Unit
xxvii. Representatives of the Federal Government institutions, co-opted by the Chair
xxviii. Any other person co-opted by the Chair

For implementing this policy and any consequent legislation on it under this policy or under the Punjab Spatial Strategy, the SPAP shall have the following functions.

i. To lay down policies on urban forestation or any other related environmental and climate change aspect
ii. Approve the National Plan for Urban Forestation, and the plans prepared by the Departments of the provincial government
iii. Direct any provincial department or private entity to take any actions pertaining to the implementation of the Policy, or of rules thereof, related to forestation, climate change or environment
iv. Lay down guidelines to be followed by the provincial departments
v. To approve any Regional or Zonal plans for urban forestation, or any other related environmental and climate change aspect
vi. To make policies or rules for utilization of the Fund maintained by the DG
vii. To act as the implementing, coordinating and monitory body for urban forestation, or any other related environmental and climate change aspect
viii. Promote general education and awareness in urban forestation

The provincial government shall make appropriate provisions for financing the measures to be carried out under this policy.

6.4 Director General SPAP

The post of DG SPAP shall be created along with the Strategic Support Unit (SSU) through an SNE submitted to the Finance Department, under this Policy. The DG shall be responsible for the following functions, and additional Regulatory functions may be assigned to the DG through the proposed Spatial Planning Act 2019 of the Provincial Assembly. Until this post is created, the CEO of the Urban Unit shall perform all these functions, and assume all the responsibilities and powers of the DG.

i. To implement any or all of the functions assigned to the SPAP
ii. Arrange for, and oversee, the provision of funds for the purpose of this policy, and to maintain the Fund's bank account (in a non-lapsable assignment account)
iii. Provide such other support to other departments or institutions, whether they be public or private, to implement this policy
iv. Formulate the policies and plan for urban forestation, or any other related environmental and climate change aspect
v. Lay down guidelines for preparation of the plans by different departments
vi. Provide necessary technical assistance to the departments for preparing their forestation plans
vii. To monitor the execution of the plans of the departments and private entities, and to direct them in case of non-compliance or for improving their efficiency
viii. Take any other measures for the prevention of deforestation, or for the implementation of this policy and the preparedness and capacity building for enforcing it, as it may consider necessary
ix. Direct any provincial department or private entity to take any actions pertaining to the implementation of the Policy, or of rules thereof, related to forestation, climate change or environment
x. Give directions to any provincial department or private institute regarding actions to be taken for fulfillment of the policy objectives, or for responding to any violations of the same
xi. Coordinate between all departments and private entities for any measure pertaining to this policy
xii. For any specific purpose or for general assistance, requisition the services of any person from other departments
xiii. Perform such other functions as the SPAP may assign to it

6.5 Urban Unit /Strategic Support Unit (SSU)

As a part of these institutional and functional arrangements, it would be paramount to establish planning and implementing bodies for Urban and Peri-Urban Forest Policy with strict yet expeditious regulation mechanism and regimes to ensure sustainability, transparency, efficiency, safety and affordability. At the Provincial Level, Spatial Planning Authority Punjab (SPAP) on behalf of Planning and Development Department will play a major role in the implementation of Urban and Peri-Urban Forest Policy through Urban Unit which will act as a Strategic Support Unit (SSU) of SPAP. This SSU will be newly created through an SNE submitted to the Finance Department, under this Policy, including but not limited to the following wings, and priority will be given to existing Urban Unit employees to shift to SSU permanently if they meet the required qualifications.

a) Admin & Human Capital Management
b) Legal
c) Coordination
d) Communication
e) Finance & Accounts
f) Audit
g) Technical
h) MIS
i) GIS
j) Urban Planning
k) Architecture
l) Environment and Urban Forestry
m) Water conservancy
n) Botanical Economics
o) Citizens Advisory Committee management
p) Horticulture and Agriculture

SPAP will submit periodical reviews to the Spatial Planning Council Punjab on the implementation of Punjab Urban and Peri-Urban Forest Policy to ensure inter-alia, that the policy objectives are achieved in a timely and cost-effective manner. SPAP shall have functions and powers to perform the following:

a) Spatial Planning of Urban Forest
b) Land use planning as per requirements
c) Establish GIS & ICT based Monitoring and Asset management system for Green infrastructure
d) Endorse Regional Plans of Urban Forestry submitted by Divisional Urban Forest Committee to Council
e) Prepare Annual Report on Urban Forestry for submission to Government and Punjab Assembly

f) Prepare guidelines and SOPs for Urban Forestry and departments including biodiversity species
g) Advice on ADP formulation and recommendation to department on Urban Forest
h) Annual audit of Urban Forest
i) Capacity Building and establishment of Urban Forest Training Institute in Punjab

Related Line and Staff Departments and Entities

The related line and staff departments will be required to liaise with the Urban Unit/SSU:

a) Respective departments will perform the following functions as per their existing legal mandate and mandate given in the Urban Forest Policy;
b) Prepare Urban and peri-urban forest plans
c) Get approval of Urban forest plans from competent authority
d) Implementation of the Urban Forest Plan
e) Monitoring of progress of plan at departmental level
f) Data gathering and submission on MIS/ GIS system
g) Preparation of compliance report and quarterly progress report
h) Submission of monitoring report.
i) Department wise activities proposed in the Annex - C.

6.6 Citizen Advisory Council

A Citizen Advisory Council shall be established with the primary aim to enable a platform for exchange platform and informed decision making. Feedback and views from citizens shall be encouraged to be shared through this forum. Urban Unit shall be responsible for the coordination in this regard.

The said council, to be notified by the Chairman of the SPAP, will consist of, at least the following members, and shall include the three citizens representatives included in the Spatial Planning Council Punjab:

- Representatives from Conservation Agencies/ conservation experts
- Representatives from Civil Societies/NGOs
- Architects and Urban Planners
- Concerned citizens
- Environmental Journalists
- Environmental Lawyers
- Any other stakeholders

CHAPTER 7: PARTICIPATORY INCLUSIVE APPROACH

No policy can sustain unless its owned by the citizens. In particular, this policy requires participation at all levels of community to plant and nurture trees. The following measures shall be undertaken towards involving community.

7.1 Corporate Social Responsibility (CSR)

Great potential for tree cultivation exists on land owned by industries and large companies, both as a means of creating a successful corporate image and as a means of screening industrial sites. Offices surrounded by landscaped greenspace generally create a more favorable impression than mere tarmac and concrete. Trees may also be used to rehabilitate spoil heaps and other former industrial sites. In many of the larger cities large national and multi-national companies own substantial blocks of land. The extent to which tree cultivation possibilities have been fully utilized on such land is uncertain. The policy focuses on establishing a public private model whereby the industries and large business entities will be required to adopt a piece of land, or green belts of adjacent/nearby roads, to establish urban forest as part of their corporate social responsibility (CSR), following the lines of "adopt a Road/School/Factory programs."

Industries that cannot comply with the existing regulations on maintenance of green area or recommendations made in this policy due to constraint of space (of which there should be official confirmation by a concerned department), may sponsor creation of required forests on public land areas identified by Urban Unit.

Departmental Role: Concerned departments (Industries department, Forest department, PHAs, EPD, LG&CD) must support and provide enabling environment for such initiatives. Especially EPD shall play a key role by adding provision of development and maintenance of Urban Forestation against any violation as mitigation measure.

Urban Unit/SSU Role: Urban Unit/SSU will provide technical support in identifying open spaces for corporate entities/industries/companies that may be potential sites for Urban forestation. Urban Unit will also use the satellite imagery to certify that the adopted area meets the minimum standards such as those of number of trees and the canopy area.

7.2 Stewardship and partnerships[14]

Focus shall be given to increasing the awareness of the benefits of street trees, urban forests, and the threats to their health, through stewardship and partnerships. Strong community stewardship increases the likelihood of meeting urban forestry goals, increasing community leadership, civic pride and engagement, improved natural systems and a greater understanding by the community. Programs shall be developed partnering government entities, community, non-profits organizations, private sector and others in education and outreach efforts. Similarly, the concept of alliances shall be introduced as well.

[14] Urban Forest Policy Element – City of Tacoma Comprehensive Plan; Adopted 6/15/10, Amended Ordinance No. 27892

7.3 Research & Development, and Innovation[15]

Presence of an active R&D structure is vital to sustain and continually improve the state. Punjab's urban forest research priorities shall be determined based on local needs and demand. As a first step, a framework shall be established for research, focusing on three major components:

i. Biological aspects of urban forests;
ii. Links between urban forests and other natural and human-made attributes of urban and peri-urban environments; and
iii. Interactions between people and urban forest ecosystems.

Building feedback loops between researchers and urban forest stakeholders and to promote collaboration and partnerships would be crucial to ensure that research meets ongoing needs. Innovation & entrepreneurship shall be promoted in this regard. Active linkages shall be developed between academia and organizations working in the domain of urban forests. Universities already working in closely linked disciplines such as Government College University (GCU), Lahore and University of Agriculture Faisalabad (UAF) shall be a good starting point and research projects related to urban forests can be funded to further adopt latest research trends and Innovation for sustainable development and Urban Forestry. PHA Lahore shall also be given funding to develop its research and innovation center. In particular, research is needed on any imported plant species, on how it may adversely affect the local ecosystem. National College of Arts (NCA) and other interested institutes shall be given innovation grants for Landscaping projects.

7.4 Capacity Building

Capacity building inputs through technical assistance, financial assistance, and education are vital to accomplish a putative greater good. Urban forests are dynamic systems that change over time in association with people who exert tremendous influence on the urban forest ecosystems. Capacity building programs shall be a key step in order to properly manage the urban forests. This strategic step deals with broad-scale knowledge enhancement and skill development of stakeholders, especially from public sector departments. Part of the revenue from government shall be earmarked for such programs.

7.5 Education and Awareness

Public awareness, education and outreach are essential parts of this policy to improve and facilitate Punjab's urban forests to encourage citizenship action within the framework of environmental education that is IN FOR and ABOUT the Environment. Education and outreach will expand public awareness of the importance of the urban forest and environmental conservation and citizenship to take action such as plantation and its conservation, the benefits offered by this asset, and proper management techniques of this unique infrastructure and therefore increase community stewardship of the urban forest. Media (electronic, print, social etc.) will have to play a key role in this regard and can utilize the air time allocated (10 percent) for Public Service Messages by PEMRA. Youth Affairs department would also be involved for launching campaigns, effectively training the next generation.

[15] FAO. 2016. *Guidelines on urban and peri-urban forestry,* by F. Salbitano, S. Borelli, M. Conigliaro and Y. Chen. FAO Forestry Paper No._178. Rome, Food and Agriculture Organization of the United Nations.

Environmental education will be infused in the school's curriculum, text books and teacher education program. It shall be mandatory for the public and private school & entities to take children/pupils on outdoor trips to take citizenship action for plantation and environmental conservation activities periodically. In schools and universities, voluntary societies/Green clubs shall be encouraged to develop and support environmental education in their respective institutes. As the concept of urban forestry is gradually mainstreamed, introducing formal degrees on urban forestry shall be targeted.

Allocating appropriate resources, advice, and educational materials to communicate policies, incentives, standards, and regulations in relation to the management of urban forest shall be vital in this regard. Increasing awareness of urban forest ecosystem issues such as proper plant selection, planting practices, and maintenance, invasive species, insects and diseases, and appropriate use of native species shall be given due weightage. Financial resources obtained from government or other private streams shall be targeted towards these.

7.6 Nursery and Plantation Service Providers

The policy shall specify rules for certification of Service Providers who may be used to provide sufficient stock of saplings of each of the species notified in the Rules. A successful Urban Forest was recently developed at the Dreamland Gardens Housing society, using 5,500 saplings per acre of 30 different native species. The concept was taken from Japanese scientists, who found that once such a dense forest assumes a critical mass (which is normally in 18 months), it becomes self sustainable by absorbing moisture from air, and does not require any water or other maintenance. Obviously, the end users, such as the housing societies, would not have the time to purchase and transplant saplings from multiple vendors. In such cases they may seek assistance from certified service providers. Such a venture would also create jobs in the economy. The Service Providers would also be required to offer a two year maintenance package until the forest reaches its critical mass. For green belts and road side plantation, the Service Providers would be required to provide 4-5 feet tall fenced ring-cages for the saplings.

ANNEX A: HISTORY

The Indus Valley Civilization (3,300 - 1,300 BCE) is the largest of the four Bronze Age civilizations, the other three being the Egyptian, Mesopotamia and Chinese civilizations. In fact, its earliest city at Mehrgarh (in modern Balochistan) is traced back to 7,000 BCE. It extends from northeast Afghanistan to northwest India (Uttar Pradesh), and down to the coast of Arabian sea from the border of Iran-Pakistan to Maharashtra in India (see maps). It's headquarters are believed to have toggled between Harappa and Mohenjo-Daro, with 1,056 smaller cities all around, some of which, such as Dholaviar at Rann of Kutch in Indian state of Gujarat, having been excavated as late as the 1990. The ancient Greeks and Alexander the Great called Indus "Indos" and its people "Indoi" from which the name India was derived. "Indos" was derived from the old Persian word "Hindus" which was derived from the Sanskrit word "Sindhu" which gives Indus its local name of River Sindh.

The geography of the civilization reveals that it expanded around the Indus Basin area, starting from the Kalabagh where the mighty Indus emerges out of the mountains into the vast plains of the modern day border of Punjab and Khyber Pakhtunkhawa. Hence the area of civilization is on planes, surrounded by highlands, desserts and sea. The inhabitants had mastered irrigation techniques for channeling the river water for agriculture use, harvesting rain water, and made massive Citadels to divert the flood water.

Modern day Pakistan's economy is still very much driven by the same Indus basin. It's economy is dependent upon agriculture, and has one of the World's largest irrigation systems. Most of its industry is also related to agriculture. Hence it is important to study the life in the Indus basin ecosystem. This book portrays the various facets of life at the Indus basin, from an insider's perspective, showing personal images never revealed before.

As a paradox of nature, it's the same fertile river Indus which sustained the largest civilization of its time, that rolled it back. Deep floods had devastated Mohenjo-Daro multiple times, making its houses shoddy, and bringing in an economic and social decline. There are theories suggesting that climate change, east-ward migration of monsoons, change of river course, and even drought and deforestation, could have led to collapse of the civilization. Eventually, the Aryans invaded and ran-sacked Mohenjo-Daro around 1500 BCE, abruptly terminating the civilization, and leaving a gap of several centuries before a new urban populace would erupt again. If we have to learn from history, we must understand that no matter how advanced a civilization may be, it has to show resilience to natural disasters and climate change.

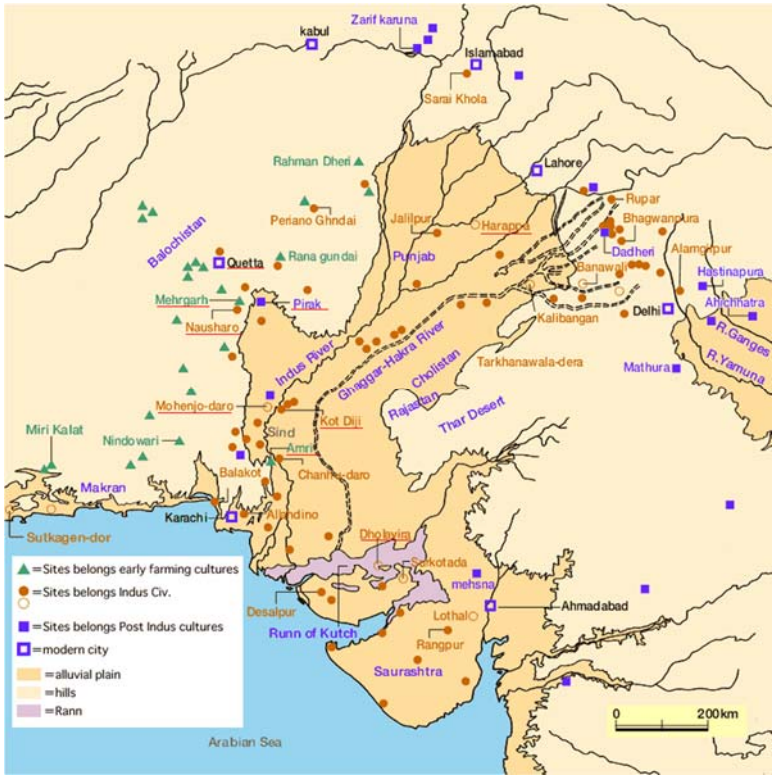


Figure A1: Map of Indus Valley Civilization[16]

Roots of the Indus Valley people can be traced back to 7000 BCE (Before Common Era) at Mehrgarh, in the present day Balochistan near Kacchi plains under Bolan pass, just an hour away from Quetta where this book is written. Indus Valley civilization was the largest civilization of the world during the transition from Stone Age to Bronze Age. The heart of the area of Indus Valley is now the modern era Pakistan, and its most populous area, or the nucleus, is the Punjab, which means land of the five rivers. As we trace the history of the Indus Valley people, we find that Climate Changes and natural disasters, such as floods or droughts, changed the course of history. The ancient capital of the Indus Valley civilization in 3300 BCE, Mohenjo-Daro, is believed to have retrogressed as the Monsoons shifted to the East, making the weather cooler and the water scarce. This is a phenomenon which we are witnessing even now, since scientists believe that monsoons have shifted 200 km to the West. Since Climate Change is a slow motion phenomenon, results of whose impact will be seen in decades, its immediate effects include abrupt flash flooding and disasters. In 2010, we saw such a disaster in form of the Super Floods, which had no parallel ever since the historical floods data has been recorded. On April 30, 2018, Pakistan faced the hottest day ever for March and April, with temperature at Nawabshah going to 122 degrees Fahrenheit, or 50 degrees Celsius. The 2015 heat wave killed over 1,200 persons. By end of century, three quarters of the world will experience extreme heat, with Pakistan being one of the hottest countries in the world by 2050.

Table AI[17] shows that over the past decade, there have been 215.5 million victims of natural disasters alone, with damages running into $156.7 billion (Guha-Sapir, Hoyois, & Below, 2013). But a UN's twenty-year research (1995-2015) estimates that actual figures may be

[16] Source http://www.crystalinks.com/induscivilization.html
[17] CRED, http://cred.be/sites/default/files/ADSR_2012.pdf accessed on 13 July 2015

much higher,18 to the tune of $250-300 billion per year (CRED & UNISDR, 2015). Indeed the disasters are a by-product of the global phenomenon of climate change, which can have consequences on almost everything in the world.

Table AI: Data on one decade of Disasters, 2001-12

2003-12	Frequency	Victims (mill)	Damages ($ bn)
Climatological	60	68.8	12.5
Geophysical	34	8.3	49.5
Hydrological	194	107.7	28.0
Meteorological	100	30.7	66.7
Total	**388**	**215.5**	**156.7**

The second type is the *Natural Disasters* which are caused by natural phenomenon. In 2010 alone, natural disasters killed over a quarter of a million people, which is more than the aggregate deaths of past 40 years due to terrorism[19]. According to Centre for Research on the Epidemiology of Disasters (CRED),[20] natural disasters can be categorized as following[21]:[22]

a) Climatological: caused by long-lived (meso to macro scale) processes, ranging from intra-seasonal to multi-decadal climatic variability. This is associated with the global phenomenon of climate change. This category includes disasters by extreme weather (cold/heat waves), drought, forest & wild non-arsonist fires, etc.
b) Geophysical: These are events originating from solid earth. Examples include earthquake, dry mass movement (landslide, rockfall, etc.), volcanic eruption, etc. But mining disasters, which are so prevalent in West Virginia or China, fall in the man-made disasters category
c) Hydrological: These are caused by deviations in the normal water cycle. This includes floods, flash floods, wet mass movement (avalanche), etc.
d) Meteorological: These are events caused by short-lived (small to meso scale) atmospheric processes, ranging from minutes to days. These include local windstorm (orographic storm), storm, tropical cyclone (hurricane, typhoon, etc.), tornado, etc.
e) Biological: caused by exposure to germs and toxic substances, leading to epidemic, pandemic, insect-infestation, etc.

[18] Since only 35% of data is typically accompanied with economic loss figures, the UN obtained data from various national sources and extrapolated results
19 Wassell, A., Rubin, S. H., & Frost, E. G. (2011, 3-5 Aug. 2011). Integrated social information engineering. Paper presented at the Information Reuse and Integration (IRI), 2011 IEEE International Conference on.
[20] http://www.cred.be/ accessed 25 June 2015
[21] Guha-Sapir, D., Hoyois, P., & Below, R. (2014). Annual Disaster Statistical Review 2013: The Numbers and Trends. Brussels: Ciaco Imprimerie, Louvain-la-Neuve Retrieved from http://cred.be/sites/default/files/ADSR_2013.pdf
[22] Annual Disaster Statistical Review 2013, CRED, http://cred.be/sites/default/files/ADSR_2013.pdf accessed 13 July 2015

Climatological and Hydrological categories combined may also be termed as 'weather-related' disasters, which comprise 90% of all disasters, almost half (47%) of which are due to flooding. In the last two decades (1995-2015), there have been 6,457 weather-related disasters claiming 606,000 lives and 4.1 billion victims (CRED & UNISDR, 2015). The most deadly type of disasters are storms, which though less frequent, have killed 242,000 persons in this period. Disaster prevention and mitigation obviously affects this data. Hence whereas lower-income countries faced only 26% of storms, they faced 89% of the damages.

ANNEX B: LIST OF FIFTY MAJOR CITIES OF PUNJAB

1. Ahamedpur East
2. Attock
3. Bahawalpur
4. Bahawalpur
5. Bhakkar
6. Burewala
7. Chakwal
8. Chiniot
9. Chistian
10. Daska
11. Dera Ghazi Khan
12. Faisalabad
13. Gojra
14. Gujranwala
15. Gujrat
16. Hafizabad
17. Jaranwala
18. Jhang
19. Jhelum
20. Kamalia
21. Kamoki
22. Kasur
23. Khanewal
24. Khanpur
25. Khushab
26. Kot Addu
27. Lahore
28. Layyah
29. Lodhran
30. Mandi Bahauddin
31. Mianwali
32. Multan
33. Muridke
34. Muzaffargarh
35. Nankana Sahib
36. Narowal
37. Okara
38. Pakpattan
39. Rahim Yar Khan
40. Rajapur
41. Rawalpindi – Islamabad
42. Sadiqabad
43. Sahiwal
44. Sargodha
45. Sheikhupura
46. Sialkot
47. Taxila
48. Toba Tek Singh
49. Vehari
50. Wazirabad

ANNEX C: FUNCTIONS & POLICY STATEMENT FOR STAKEHOLDER DEPARTMENTS

The following are the main functions of stakeholder provincial departments and autonomous bodies: -

C.1 Forest Department

I. Preparation and implementation of policies and programmes in forestry sector. Implementation of Forestry Laws and rules
II. Protection, conservation, development and management of renewable natural resources, particularly forests and range lands in the province
III. Sustainable management of forest for production of timber, firewood and other non-timber produce and services
IV. Demarcation and protection of Forest lands against encroachment
V. Raising of nurseries and plantations
VI. Provide extension services for mass awareness and conduct research and training for capacity building

C.1.1 Scope of Work

The activities of Forest Department are mainly confined to forest areas. However, the Department can play role in the implementation of the policy described as below.

C.1.2 Policy Statement

The department shall:

- Provide plants to education, health and defence institutions free of cost.
- Provide plants to all government departments on a subsidized rates.
- Establish nurseries for sale of plants to general public.

C.2 Local Government & Community Development Department

The major functions and responsibilities of Local Government & Community Development Department are: -

I. Policy Formulation

Formulation of public policy and its promulgation; updating of laws, rules and providing guidelines for the working of local government department. Besides, LG&CD Department issues policy guidelines on salient issues, in the best interest of citizens.

II. Coordination

The Department coordinates with Federal/Provincial Government Departments and allied agencies as well as all the three tiers of local governments on the issues pertaining to the new local government system.

III. Administration

The department is responsible for the recruitments and administration of service personnel working in its attached departments.

IV. Our other functions include:

- Provide, manage, operate, maintain and improve the municipal infrastructure and services
- Manage properties and assets vested in local governments
- Enforcement of municipal laws and regulations
- Levy local taxes / fees to generate income
- Frame bye-laws to regulate municipal services
- Take cognizance of municipal offences and enforcement
- Exercise general powers and procedures as are enumerated in Eighth Schedule
- Perform functions within the Provincial framework

C.2.1 Scope of Work

The Punjab Local Government Act, 2013, provide guideline and legal provision for the management of state land in the district.

C.2.2 Policy Statement

The department shall:

- Carry out tree plantation in all the available areas under Section – 17 of the Act.
- Restrain the felling, lopping and trimming of trees under Section – 21 of the Act.
- Develop green spaces for establishment of parks, public gardens, playgrounds under Section – 77 of the Act.
- Ensure implementation of environmental & social gardens under Section – 84 (d) of the Act.
- Earmark special funds for activities described above in the annual budget for each district.
- Prepare plan for ecological balances and beautification of urban areas under Section – 87 (a) (d).
- Establish parks and playground under Section – 87 (k) (ix).

C.3 Cooperative Department

I. Facilitate the people in formation of the Cooperative Societies
II. Guide the members about the Cooperative principles
III. Introduce/promote thrift among members
IV. Provide training to the employees, members of the Cooperative Institutions
V. Provide/arrange credit to the members
VI. Ensure compulsory savings amongst women
VII. Supervise/monitor the working of the Cooperatives
VIII. Conduct/arrange audit
IX. Inquiries/inspections
X. Recovery of loans
XI. Arbitration of disputes
XII. Liquidation of societies

C.3.1 Scope of Work

The major function of the Department is to organize registrar and regulate various types of cooperative societies in Punjab, which are 32,799 in agriculture, housing, women and industries sector, out of there are 253 Cooperative Housing Societies. According to model bye – law No. 34 (3) provides the legal provision of tree plantation and entertainment park.

C.3.2 Policy Statement

The department shall:

- Shall ensure the establishment of green spaces and tree plantation as per approval by the development authorities or local government.
- Ensure the participation of all housing societies in plantation campaign for planting trees on available spaces.
- Shall monitor and prepare annual progress report of tree planting in housing societies throughout the province.

C.4 Environment Protection Department

I. Administer and implement the provisions of Environment Protection Act and the rules and regulations made there under
II. Prepare and establish the Punjab Environmental Quality Standards with approval of the Council and Enforcement
III. Take measures to promote research and development of science and technology which may contribute to the prevention of pollution, protection of the environment and sustainable development
IV. Identify the needs for, and initiate legislation in various sectors of the environment
V. Provide information and guidance to the public on environmental matters
VI. Specify safeguards for the prevention of accidents and disasters which may cause pollution
VII. Encourage the formation and working of non-government, community and village organizations to prevent and control pollution and promote sustainable development
VIII. Take all necessary measures for protection, conservation, rehabilitation and improvement of the environment, and for prevention and control of pollution
IX. Promotion of sustainable development

C.4.1 Scope of Work

The Environment Department issues Environmental Impact Assessment (EIA) reports for all types of infrastructural development including industrial and other related entrepreneurs.

C.4.2 Policy Statement

The department shall:

- Ensure the implementation of mandatory conditions contained in the EIAs, regarding tree plantation.
- Evaluate all the major EIAs issued in the past to examine the compliance of the above conditions.
- Get assistance of Forest Department in implementation of the conditions of tree plantations.
- Give priority to urban and peri – urban area, while getting the plantation done by the organization to whom EIAs has been issued.

C.5 Public Health Engineering & Housing & Urban Development

A. Public Health Engineering Department

I. Strives to enhance the quality of life of the people of Punjab by providing safe drinking water in Brackish, Barani and areas where ground water is contaminated or otherwise unsuitable for drinking purposes.
II. Provides pollution free environment by executing sewerage/ drainage Societies and construction of sewage treatment plants to meet the Sustainable Development Goals (SDGs) for the Sector (Executional Role).

B. Urban Development Department

The prime function of Housing and Urban Development (HUD) is to work as an administrative department and supervise the following organizations: -

I. Punjab Housing & Town Planning Agency
II. Development Authorities
III. Water Supply and Sanitation Agencies (WASAs)
IV. Parks & Horticulture Authorities
V. Public Health Engineering Department (PHED)

C.5.1 Scope of Work

All the development authorities including Parks & Horticulture Authorities are established under the administrative control of the Department.

C.5.2 Policy Statement

The department shall:

- Ensure that issue of tree planting is adequately addressed in all the Acts notified for different development authorities in the province.
- Ensure that condition of minimum number of trees are included in the plans approved for housing Societies by the development authorities.
- Ensure provision of tree planting and establishment of green spaces under the Punjab Housing & Town Planning Agency.

C.6 Board of Revenue

I. It is the controlling authority in all matters connected with the administration of land, land taxation, land revenue, preparation, updating and maintenance of records
II. It is the highest Revenue Court and custodian of the rights in land of all the right-holders
III. It exercises general superintendence and control over the Revenue Officers and Revenue Courts in the province and has suo-moto jurisdiction

Organization

The Board consists of the following departments/functional units: -

- Revenue Department
- Colonies Department
- Consolidation Department
- Relief Department

C.6.1 Scope of Work

The state land in the province belongs to provincial department whether under the control of provincial government, district government and tehsil municipal authorities etc.

C.6.2 Policy Statement

The Revenue Department of Board of Revenue in each district through district administration shall: -

- ensure the utilization of blank and wasteland to put under green spaces & tree plantation.
- Coordinate with all the stakeholder department in the implementation of the policy statement.
- Act as a focal point for preparation of Management Plan for conducting urban and peri – urban forestry activities by all the stakeholder departments.

C.7 Agriculture Department

The main functions of agriculture department are as follows: -

- Legislation, policy formulation and sectoral planning regarding: -
  - Agriculture Education, Training and Research including Agricultural University, Faisalabad and Pir Mehr Ali Shah University of Arid Agriculture Rawalpindi and pre-service/in-service training at Agriculture Training institutes
  - Adaptive Research and Research Farms
  - Improvement of agricultural and water management methods
  - Protection against insects, pests, prevention of plants diseases and quality control of pesticides
  - Soil Fertility and Soil Conservation
  - Mechanization, reclamation of land, use of agriculture machinery ploughing, tube-wells and installation and research Agricultural Engineering (Agricultural Machinery and Implements), Water Management Training and Research Institute, Lahore
  - Agricultural Information and publications/training
  - Agricultural Statistics
  - Preparation and review of agricultural production strategy in coordination with district agriculture extension
  - Arboricultural Operations

C.7.1 Scope of Work

The Extension Wing of Agriculture Department is present at each district, tehsil, union council and markaz level. The primary function of the wing is dissemination of agriculture related information and motivate to adopt best agriculture practices in the province.

C.7.2 Policy Statement

The Agriculture Department shall: -

- Assist Forest Department in the implementation at its various initiative related to agro – forestry.
- Monitor the farmers for tree planting around their agriculture field and along water channels.
- Facilitate farmers to obtain planting stock from the nurseries of Forest Department.
- Prepare district – wise annual report of tree planting on agriculture land.

C.8 School Education Department

The functions performed by the School Education Department are: -

a. Legislation, Policy Formulation and Planning

The following are the legislation, policy formulation and planning areas of the School Education Department:

- Primary education
- Elementary education
- Secondary and Higher Secondary education

b. Maintaining Standards of Education

This maintenance includes: -

- Formulating the curricula and syllabi up to class XII.
- Production and publication of text books for class I to XII.

c. Monitoring and Evaluation System

This system includes: -

- Distribution of free textbooks
- Development Societies
- Presence of teaching and non-teaching staff
- Updation of online-access information
- Redressal of public complaints

d. Promotion of Quality Education

Quality education is ensured through: -

- Punjab education assessment system
- Student assessment and terminal examination of Grade-V and VIII elementary education through Punjab Examination Commission.
- Grant of scholarships
- Production and distribution of educational and scientific films

C.8.1 Scope of Work

All the schools in the province under public sector are under the administrative control of the Department.

C.8.2 Policy Statement

The department shall:

- Prepare a comprehensive plan by identifying the blank area available in the school premises in each district.
- Ensure planting of trees and their maintenance through committees formulated at district level.
- Obtain planting stock from the concerned Divisional Forest Officer through an application free of cost.
- Prepare district – wise annual progress report of tree planting carried out in different schools.

C.9 Irrigation Department

The functions of the Irrigation, as enunciated in the Punjab Government Rules of Business, are given below: -

- Rivers and riverain Surveys
- Barrages: construction work and all matters connected therewith
- Construction and maintenance of canals.
- Tubewells and other water utilization Societies.
- Flood control and flood protection Societies.
- Drainage Societies.
- Basic and applied research in irrigation, hydraulics, groundwater and land reclamation.
- Administration of the Canal and Drainage Act, 1873.
- Administration of the Soil Reclamation Act, 1952.
- Administration of the Land Improvement Tax Act, 1975.
- Assessment of water rates.
- Distribution of canal waters.

C.9.1 Scope of Work

The management of canalside plantation has been transferred to Irrigation Department from the Forest Department with effect from 31st January, 2019.

C.9.2 Policy Statement

The department shall:

- Plant up blank reaches of canals, branches and distributaries passing through the urban and peri – urban areas.
- Earmark annual budget for plantation of blank reaches mentioned above.

C.10 List of Parks & Horticulture Authorities

1. Parks & Horticulture Authority Lahore
2. Parks & Horticulture Authority Rawalpindi
3. Parks & Horticulture Authority Gujranwala
4. Parks & Horticulture Authority Sargodha

5. Parks & Horticulture Authority Faisalabad
6. Parks & Horticulture Authority Multan
7. Parks & Horticulture Authority Sahiwal
8. Parks & Horticulture Authority Bahawalpur
9. Parks & Horticulture Authority D.G. Khan

Major Functions

These authorities are responsible for the following functions: -

I. To streamline and bring about uniformity and integrated horticulture development approach for beautification of city
II. Development and maintenance of new parks, roundabouts, triangles, green belts, green verges, central medians, play grounds and open spaces
III. Preservation of places of cultural and recreational importance
IV. Face lifting, landscaping, illumination and beautification of assigned areas
V. Environmental improvements
VI. Establishment of food streets and recreational spots
VII. Organizing annual Jashan-e-Baharan in collaboration with private sponsors
VIII. Organizing festivals etc., for recreation and promotion of culture
IX. Organizing community tree plantation campaign during spring and monsoon season
X. To regulate outdoor advertisement activity in city
XI. Matters connected therewith and incidental thereto and such other functions as the government may assign to it from time to time

C.10.1 Scope of Work

All the Parks Horticulture Authorities established in Punjab have the primary responsibility of increasing tree cover in the urban areas, besides beautification and landscaping.

C.10.2 Policy Statement

The parks horticulture authorities shall:

- Promote indigenous tree species instead of exotic ornamental plants to increase tree cover in the urban areas.
- Implement the mandatory condition of tree planting as incorporated in the approval of design of housing Societies by the respective development authorities.
- Implement the condition of planting trees in front of the residences by the citizen.
- Impose restriction on removal or trimming of trees present on private or public land without their approval.
- Utilize the available blank areas through tree plantation instead of expensive landscape.

C.11 List of Development Authorities

1. Lahore Development Authority
2. Rawalpindi Development Authority
3. Gujranwala Development Authority
4. Faisalabad Development Authority
5. Multan Development Authority
6. Bahawalpur Development Authority
7. Fort Munro Development Authority

Major Functions

Following are the functions performed by the authorities: -

I. Initiate and maintain a continuous process of comprehensive development planning for the area with the objective of preparing a Metropolitan Development Plan
II. Periodically update such Metropolitan Development Plan and coordinate its implementation by the Authority and other Government Agencies within the area
III. Develop, operate and maintain water supply, sewerage and drainage systems within the service area of the Water and Sanitation Agency to be established under section of the act
IV. Prepare annual development programme for the area, ensure compliance of the Annual Development Programme with priorities established in the Metropolitan Development Plan after its preparation, and evaluate performance under the Annual Development Programme at the end of each year
V. Establish, maintain and periodically revise as necessary, planning, controls and building regulations for the area to:-
VI. Provide appropriate urban design and protect public safety;
VII. Ensure compliance with the Metropolitan Development Plan after its preparation; and
VIII. Take all steps and measures necessary for the implementation and enforcement of the provisions of clause (i) to (v) above.

C.11.1 Scope of Work

The development authorities conduct developing planning for Metropolitan Development Plan and periodically update and revise this Plan.

C.11.2 Policy Statement

The development authorities shall:

- Ensure the inclusion of tree planting and establishment of green spaces, while preparing the Metropolitan Development Plan.
- Ensure the implementation of conditions of tree planting while approving the design of housing societies.
- Take Cooperative Department on board for execution of tree planting in case of Cooperative Housing Societies.
- Impose legal restriction on cutting of trees in area of jurisdiction without their prior approval
- Earmark annual funds for tree planting in their areas of jurisdiction.
- Prepare bye – laws for mandatory tree planting by the organizations responsible for creating environmental hazards.

ANNEX D: MINUTES OF STAKEHOLDERS MEETING

Meeting/Project name:	Stakeholder consultation regarding preparation of Urban Tree Plantation Policy		
Date of Meeting:	February 14, 2019	**Time:**	1 pm – 3 pm
Participants	**Chaired by CEO Urban Unit:** Mr. Khalid Sherdil Representatives from **Go Green Lahore, Zafar Iqbal & Co., Izhar Monnoo developers, AG Office, PHA, Punjab Forest Deptt., Dream Garden Lahore, Agriculture Deptt, High Court, Supreme Court, Attorney Office** **Urban Unit:** Mr. Abid Hussainy (Chief Operating Officer), Ms. Urooj Saeed (Sr. Specialist GIS), Ms. Nadia (Sr. Specialist Urban Planning), Mr. Hassan Ilyas (Sr. Research Analyst – Environment), Mr. Abdul Moiz Sohail (Sr. Research Analyst- Environment)		
Location:	CR 503, Urban Unit		

A meeting was conducted by Urban Unit regarding the Honourable Court's order for preparation of Urban Tree Plantation Policy (reference Writ Petition No. 192069 of 2018, Sheikh Asim Farooq V/S Federation of Pakistan). The meeting kicked off with a brief background of the Urban Tree Policy. The following were the highlights of this meeting;

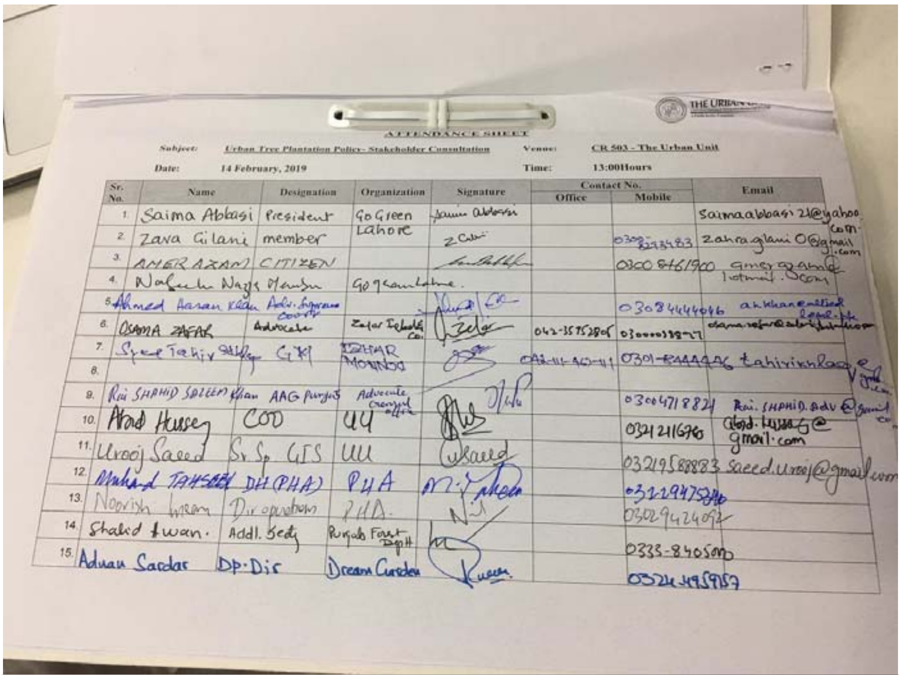
1. In the R&D section of policy, the participants and CEO Urban Unit suggested that innovation be included and horizons of partnership with potential universities like Government College University Lahore and University of Agriculture Faisalabad be explored for further research related to urban forestry. Funding may also be arranged for students working on such projects accordingly and eventually undergraduate/graduate level degrees can be introduced in urban forestry.
2. Representatives from Go Green Lahore insisted that policy must not be focused on over-regulation or too much penalties. Moreover, instead of fines as penalties, the option of making the violator plant certain number of trees for violation must be considered. They also stated that there was already plenty of land available around major highways in Punjab that can be utilized for urban forestry.
3. Potential revenue from streams like transplantation and other indirect benefits from trees were suggested by a participant.
4. Instead of a separate and new Urban forestry council, CEO Urban Unit stated that a common council, consisting of representatives from various departments be established that will meet regularly to discuss wide-ranging issues e.g. Tourism, Ecological zones, Urban development, transboundary pollution etc. This council shall be a province wise planning authority bringing departments from different focus areas at a single platform.
5. Mr. Shahid Awan (AS Technical, FWFD) stated that the current policy should be at a higher level rather than stating specific interventions, limitations and requirements as these shall be formulated later. Likewise, the policy must utilize the existing legislations rather than a brand-new legislative basis.
6. Urban Unit will eventually also develop an online dashboard where such reports will be submitted electronically for further monitoring. Satellite imagery will play a key role in verification/monitoring of tree plantation. The role of Urban Unit for monitoring was agreed by the attendees.

7. Mr. Tahir from Izhar Monnoo developers suggested that Cooperative department can start ensuring implementation of Urban forests and their designated areas in existing housing societies right away in addition to ensuring in the upcoming societies. He also proposed that specific requirement can be set for urban forests in the current requirement of 7% green spaces for societies.
8. Citizen liaison must be ensured, and Citizen Advisory groups be a part of the common council to be established in place of Urban Forest Council
9. Concept of alliance and reward to community was suggested to be incorporated in the stewardship section of policy.
10. Mr. Ahmed Hasan (Advocate Supreme court) proposed that the concept of urban forestry must also be incorporated in school curriculums and periodic visits can be scheduled in schools to develop a culture and awareness. Local public can also play a key role in plantation by developing an online application where they can upload pictures of their plantation and potentially receive points that they can claim at restaurants/shopping centres.

Key decisions:

1. Urban Unit will submit updated Urban and peri Urban forest policy to court as per stakeholder comments.
2. With reference to court order, Urban Unit will write letter to all departments/entities for Tree plantation Plans. As also suggested by Mr. Rafay Alam, it was decided that the respective departments/entities shall identify areas in their mandate immediately for urban tree plantation. They shall submit all details along with implementation plan to Urban Unit.
3. Urban Unit will share draft policy with key stakeholders before submission.
4. A new law will be enacted to support the policy and its implementation.
5. Punjab Spatial Planning Authority will ensure the policy's implementation with support of Urban Unit and Planning and Development Department.
6. 1% of ADP share is vital for financial sustainability of initiatives for implementation & monitoring of Urban Forest Policy.

Meeting ended with a vote of Thanks.



THE URBAN UNIT

ATTENDANCE SHEET

Subject: Urban Tree Plantation Policy- Stakeholder Consultation Venue: CR 503 - The Urban Unit

Date: 14 February, 2019 Time: 13:00Hours

Sr. No.	Name	Designation	Organization	Signature	Contact No. Office	Contact No. Mobile	Email
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7.	Syed Tahir [illegible]	GKI	IZHAR MONNOO		042-111-40-41	0301-8444446	tahirizhar[illegible]
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13.	Noorish Imran	Dir operations	PHA.			03029424097	
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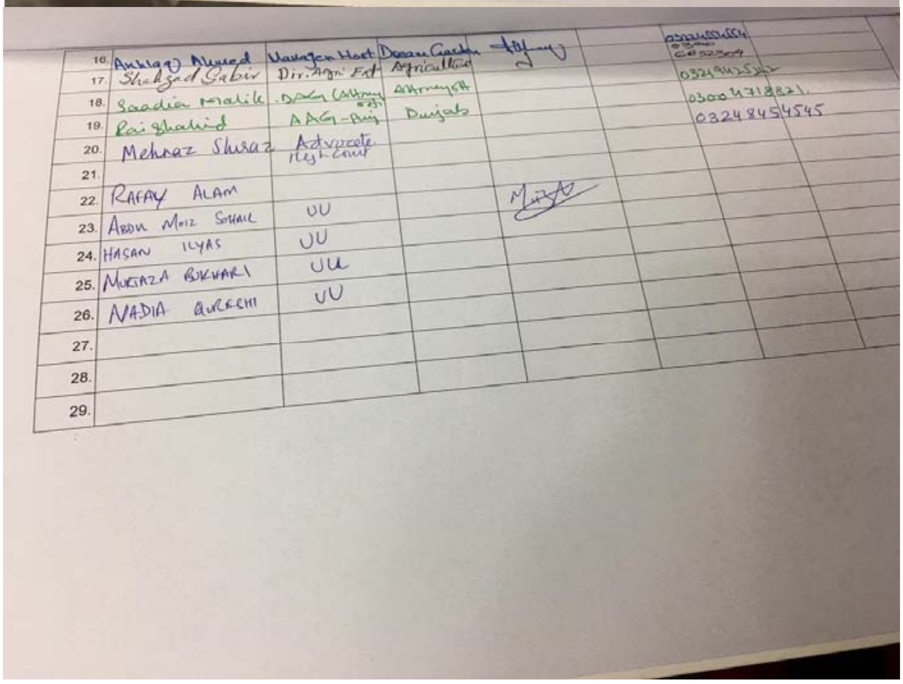
15.	Adnan Sardar	DP-Dir	Dream Garden			03244959157	



Sr. No.	Name	Designation	Organization	Signature	Contact No. Office	Contact No. Mobile	Email
16.	Ashfaq Ahmed	Manager Hort	Dream Garden			[illegible]	
17.	Shahzad Sabir	Dir. Agri Ext	Agriculture			0324942[illegible]	
18.	Saadia Malik	DAG (Attorney Gen.)	Attorney Gen.			03004718821.	
19.	Rai Shahid	AAG-Punj	Punjab			03248454545	
20.	Mehnaz Shiraz	Advocate High Court					
21.							
22.	RAFAY ALAM						
23.	ABDUL MOIZ SOHAIL	UU					
24.	HASAN ILYAS	UU					
25.	MURTAZA BUKHARI	UU					
26.	NADIA QURESHI	UU					
27.							
28.							
29.							

ANNEX E: REFERENCES

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6. City Trees – Sustainability guidelines & Best Practices, Tree Trust USA
7. Urban Forest Policy, Randwick,NSW Australia
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10. Site visit : Dream gardens Urban forest
11. Urban Forest Policy Element, City of Tacoma USA
12. Urban forest strategy, City of Sydney Australia
13. Role of MEAs in achieving the SDGs, UNEP
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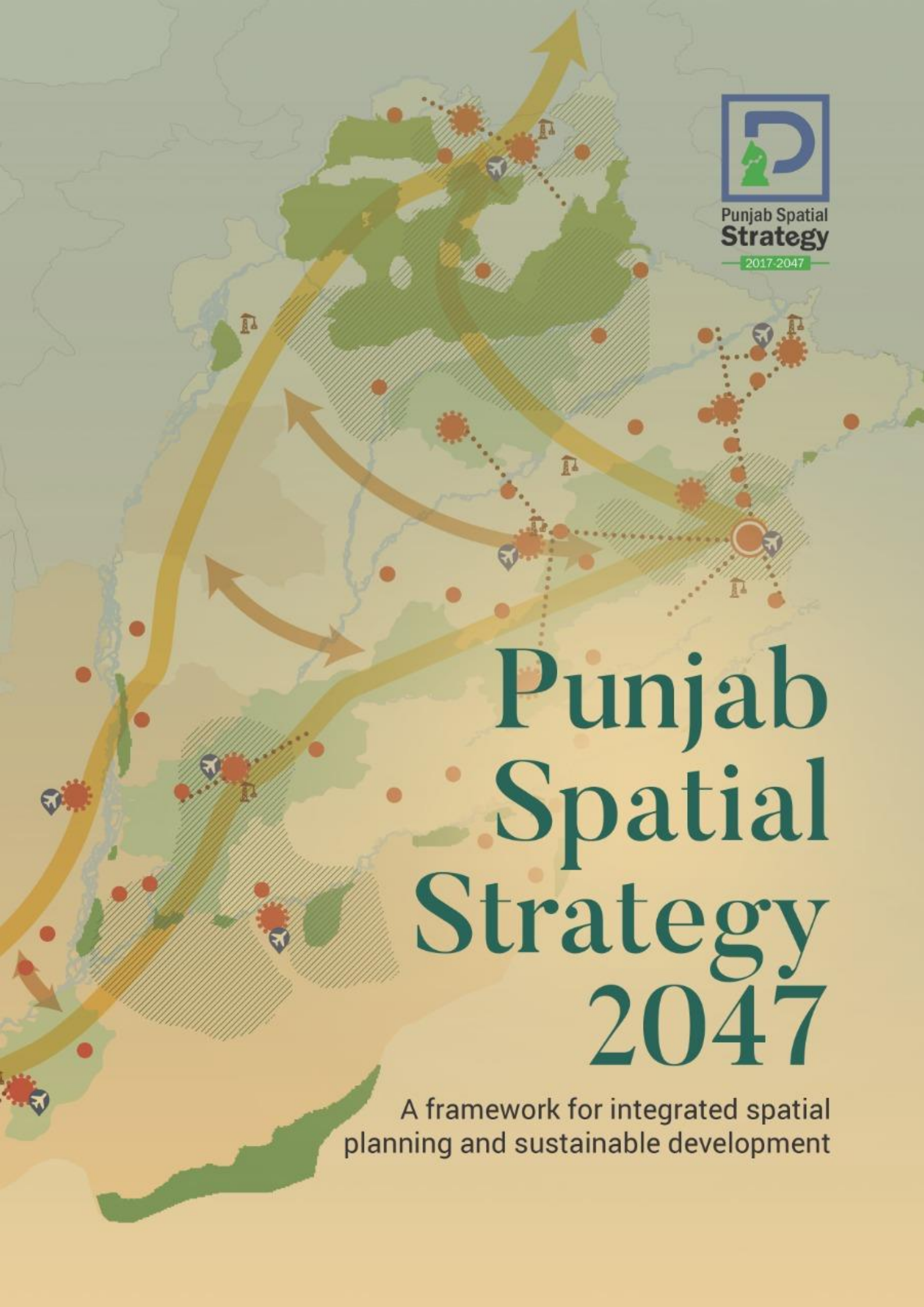
ANNEX F: ACTS & RULES

1. The Punjab Plantation and Maintenance of Trees Act, 1974
2. Punjab Forestry Sector (forests, watershed, rangelands and wildlife) Policy, 1999
3. Cutting of Trees (Prohibition) Act 1992
4. Punjab Forest Act 1927 (Amended 2016)
5. Punjab Land Preservation Act
6. Lahore Development Authority Act, 1975
7. Punjab Development of Cities Act, 1975
8. Parks and Horticulture Authority Act
9. Lahore Canal Urban Heritage Park Act, 2013
10. Local Government Act, 2013
11. Punjab Private Housing Schemes and Land Sub-division Rules, 2010
12. Punjab Government Rules of Business, 2011

ANNEX G: PUNJAB SPATIAL STRATEGY



Punjab Spatial Strategy
2017-2047

Punjab Spatial Strategy 2047

A framework for integrated spatial planning and sustainable development

Punjab Spatial Strategy

"Punjab as a healthy, educated, prosperous, equitable and environmentally sustainable federating unit of a dynamic Pakistan emerging as a member of "Upper-Middle Income Group of Countries"

SO:1

Improve the global position of Punjab in terms of attractiveness & competitiveness

- Global hub for trade & investment
- Enabling environment for research & innovation
- Value addition & Hi tech exports
- Emerging global tourist destination

SO:2

Develop regions based on their comparative advantages

- Leveraging CPEC opportunities
- Enhancing regional connectivity
- Developing potentiol growth corridors

SO:3

Transform cities into smart, competitive & livable cities

- Guiding urban growth through coordinated regional planning
- Promoting mixed land use & transit oriented development
- Affordable housing for all
- Provison of urban services for all
- Improving mobility through efficient public transport connections
- Embedding ICT infrastructure in cities

SO:4

Sustainable natural resource allocation & management

- Productivity & efficiency principles for efficient resource use
- Sustainable management of water & energy
- Integrated development of agro zones

SO:5

Enhance the quality of life for all segments of society

- Social inclusivity
- Balanced access to healthcare & education services

SO:6

Enhance environment protection & management

- Tackling climate change
- Improving livability & quality of life
- Focus on biodiversity & conservation
- Improving ground water quality & management
- Improving air quality & management

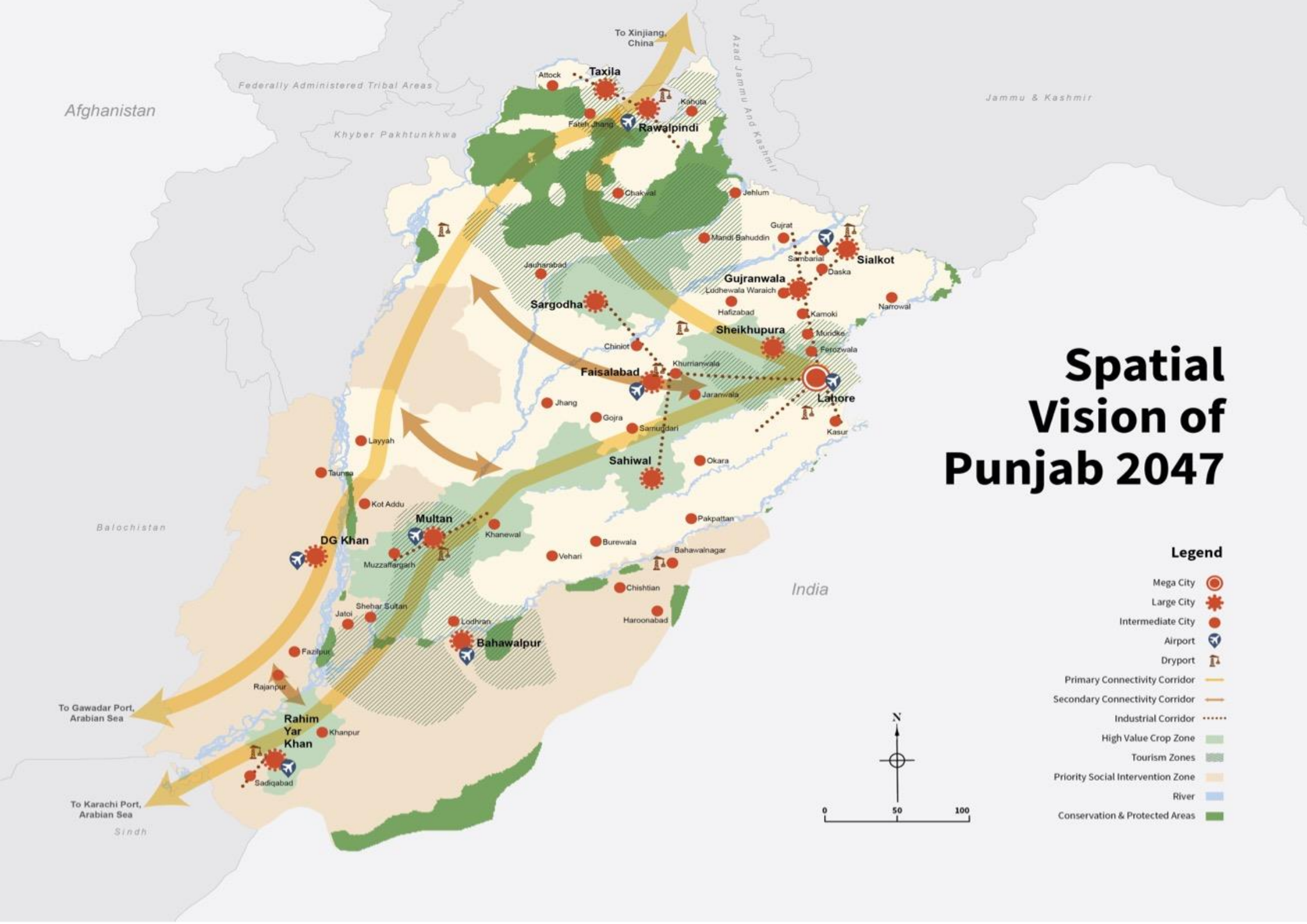
SO:7

Implementation of integrated spatial planning system

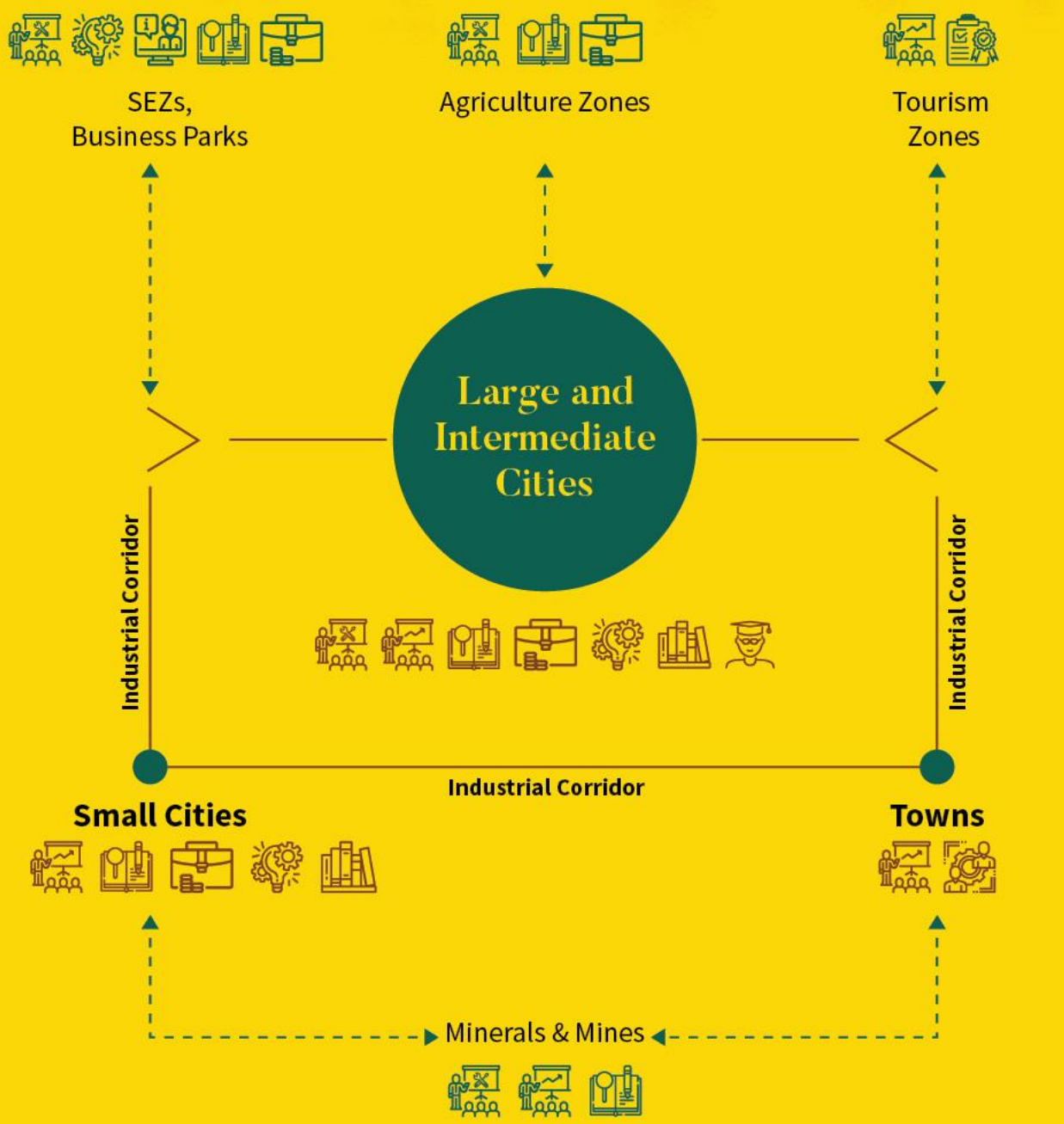
- Institutional capacity building
- Evidence based integrated planning
- Robust implementation & monitoring

Alignment with SDGs

Figure 1.2: Areas of transformation


Spatial Vision of Punjab 2047
To Xinjiang, China
Afghanistan
Federally Administered Tribal Areas
Khyber Pakhtunkhwa
Azad Jammu And Kashmir
Jammu & Kashmir
India
Balochistan
Sindh
To Gawadar Port, Arabian Sea
To Karachi Port, Arabian Sea
Attock
Taxila
Kahuta
Fateh Jhang
Rawalpindi
Chakwal
Jehlum
Gujrat
Mandi Bahuddin
Sambarial
Sialkot
Daska
Jauharabad
Sargodha
Gujranwala
Lodhewala Waraich
Narrowal
Hafizabad
Kamoki
Sheikhupura
Muridke
Ferozwala
Chiniot
Khurrianwala
Faisalabad
Jaranwala
Lahore
Kasur
Jhang
Gojra
Samundari
Layyah
Sahiwal
Okara
Taunsa
Kot Addu
Multan
Pakpattan
DG Khan
Khanewal
Burewala
Muzzaffargarh
Vehari
Bahawalnagar
Chishtian
Shehar Sultan
Jatoi
Haroonabad
Lodhran
Bahawalpur
Fazilpur
Rajanpur
Rahim Yar Khan
Khanpur
Sadiqabad
Legend
Mega City
Large City
Intermediate City
Airport
Dryport
Primary Connectivity Corridor
Secondary Connectivity Corridor
Industrial Corridor
High Value Crop Zone
Tourism Zones
Priority Social Intervention Zone
River
Conservation & Protected Areas
N
0
50
100

Human Capital Development Spatial Framework



LEGENDS

- Technial Training Centres
- Vocational Training Centres
- R & D Centres/Labs
- Business Centres
- Innovation Centres
- Incubation Centres
- Applied Universities
- General Universities
- One Window Cell
- Resource Centre
- Service Standard Maintenance Centre
- Knowledge & Skills Transfer

PS 3.1: Guide spatial development of cities through coordinated urban and regional planning

PS 3.2: Manage and guide growth in cities by prioritising mixed use development and adjusting densities

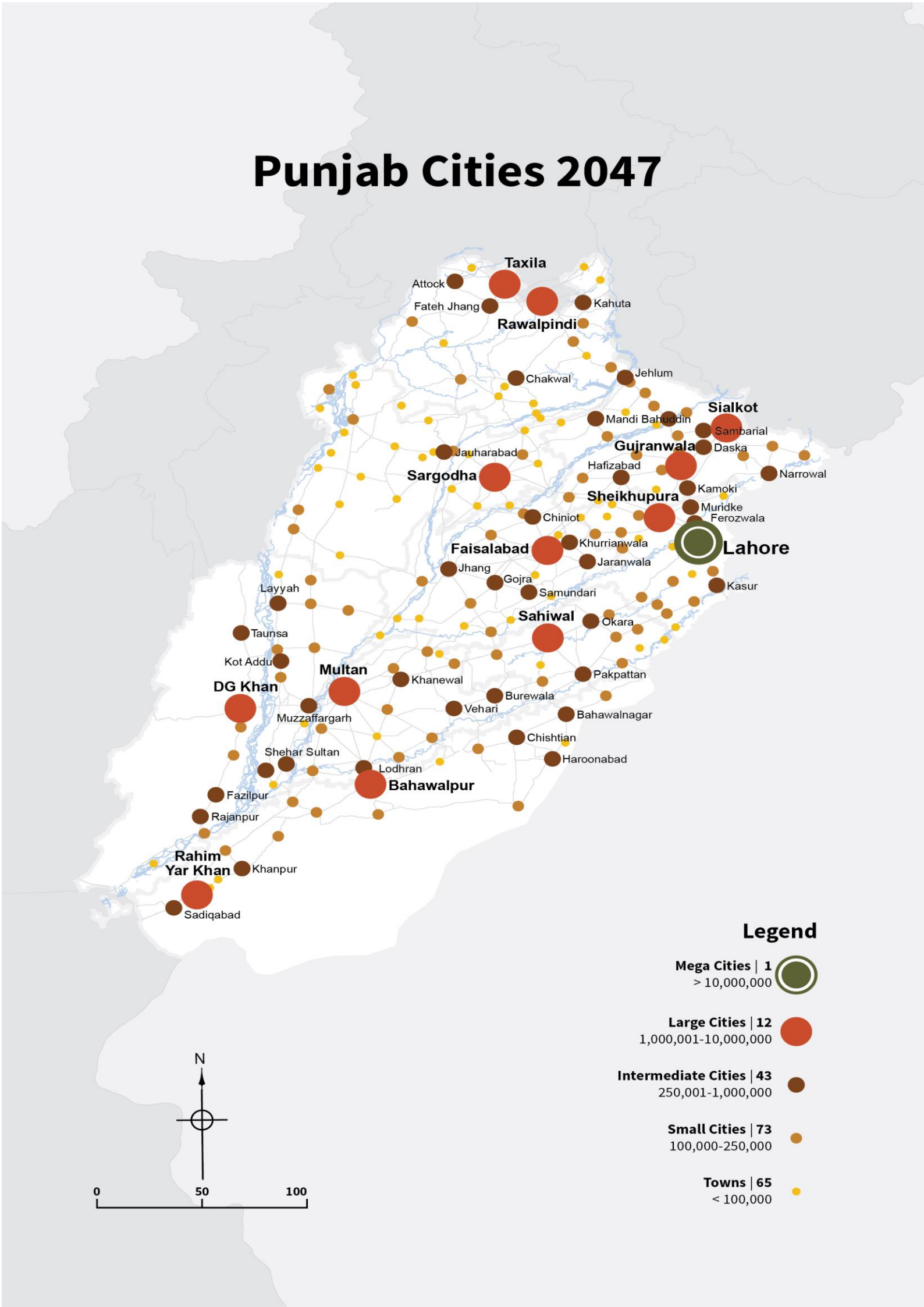
PS 3.3: Develop and extend options in land supply and housing for multiple target groups

PS 3.4: Inclusive and balanced access to WASH services

PS 3.5: Accommodate emerging urban population moibility needs through availability of efficient transportation

PS 3.6: Incorporate ICT infrastructure in urban systems to enhance efficiency, public safety and convenience in services delivery

Punjab Cities 2047



PS 3.2. MANAGE AND GUIDE GROWTH IN CITIES BY PRIORITISING MIXED USE DEVELOPMENT AND ADJUSTING DENSITIES

Policy Background

The average population density of cities in Punjab is over 12,000 people/km². In city centers in Lahore, Rawalpindi and Multan, the population density is over 40,000 people/km². However, the population density in many residential locations and neighborhoods is less than 18,000 people/km². Several interventions are required: by devising urban design mechanisms and tools, the low densities can be enhanced; by regulating congestion and overcrowding, the pressure on locations with very high densities can be eased by shifts to areas capable of more absorption - thus a balanced population distribution can be achieved. Encouraging mixed-use developments, promoting Transit Oriented Developments (TOD), instituting time bound urban growth boundaries, and retrofitting planning and designs of existing neighborhoods can be effective and helpful tools. A framework aiming to regulate these developments through evidence-based indicators can facilitate and uphold efficiency in infrastructural components, and a decent life style for a more diverse range of users.

Relevance to National Visions and Strategies

Punjab Growth Strategy 2018: Building regulations and land use planning. Government will seek to revise zoning and land use rules by encouraging mixed land use classification and high-density transportation nodes**.**

Relevance to Sustainable Development Goals

Goal 9: Industry, Innovation and Infrastructure **Target 9.1:** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
Goal 11: Sustainable Cities and Communities **Target 11.3** By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
No. Of cities with spatial density data	Updating the cities atlas every five years	None	1 mega city and 5 large cities	1 mega city, 6 large cities, and 10 intermediate cities	1 mega city, 12 larg cities and 15 intermediate cities
No. Of cities implementing by laws to regulate density	Notified by laws, regulations & manuals	Lahore	5 large cities	6 large cities, and 10 intermediate cities	12 large cities and 15 intermediate cities
No. Of TOD projects in cities	Preparation of ToD projects	None	One project each in 1 mega city and 5 large cities	04 projects each in 1 mega city and 6 large cities 01 project each in 10 intermediate cities	8 projects each in 1 mega city and 13 large cities 2 projects each in 1 intermediate cities
No. Of cities with time bound growth rings	Prepare time bound growth rings of cities with determination of city boundaries	None	1 mega city and 5 large cities	1 mega city, 6 large cities, and 10 intermediate cities	1 mega city, 12 larg cities and 15 intermediate cities
No. Of cities applying urban design guidelines	Preparation of neighbourhood and sub-neighbourhood level manuals	None	1 mega city and 5 large cities	1 mega city, 6 large cities, and 10 intermediate cities	1 mega city, 12 larg cities and 15 intermediate cities

Key Actions Required

- Assessments of density status of areas within cities and identification of locations in need of interventions, such as creating retail and cafe streets leading to station entrances along main pedestrian connections.
- Preparation of urban design schemes in follow-up of proposed policy statements.
- Mobilizing and facilitating stakeholder consultations around the development scheme.
- Developing and enforcing urban design guidelines to dictate provision of setbacks, shop fronts, street furniture & fixtures, pedestrian & bicycle infrastructure.
- Initiating detailed designing and implementation of development schemes in a sequential manner.
- Monitoring and oversight by concerned regulatory bodies in consultation with the stakeholders.
- Integrate TOD zones in land use rules to allow for dense mixed-use development within the zone.
- Introducing new transit stations in locations with highest ridership potential and development opportunities.
- Enhancing multi-modal connections, making transfers easy and direct.

Expected Outcome

- Guided evolution of density adjustment in cities through project initiation and policies
- Clear demarcation of city boundaries and service areas for social and physical infrastructure.
- Visible decongestion from city cores and gradual densification in relatively distant neighborhoods facilitated.
- Model TOD projects in designated locations implemented.

Key Stakeholders

- **Federal:** Federal agencies with land ownership in identified cities
- **Provincial:** Punjab Board of Revenue, Development Authorities of Municipal Bodies, Local Government & Community Development Department

Key Agency

- Housing, Urban Development & Public Health Engineering Department

Transit Oriented Development

High density zones

Existing development:
Average no. of stories: 3-4
Land use: Residential and commercial

Medium density zones

Existing development:
Average no. of stories: 2-3
Land use: Residential and small markets

Low density zones

Existing development:
Average no. of stories: 1-2
Land use: Residential and public buildings

Shahdara
Niazi Chowk
Timber Market
Azadi Chowk
Bhatti Chowk
City District Courts
Civil Secretariat
GPO
Lakshami
Lahore Railway Station
Sultanpura
UET
Baghbanpura
Shalamar Garden
Pakistan Mint
Mahmood Booti
Salamat Pura
Islam Park
Dera Gujaran Terminal
MAO College
Janazgah
Chauburji
Qartaba Chowk
Gulshan-e-Ravi
Samanabad
Shama
Ichara
Bund Road
Salahudin Road
Shahnoor
Sabzazar
Awan Town
Wahdat Road
Hanjarwal
Canal View
Thoker Niaz Baig
Ali Town Terminal
Canal
Qaddafi Stadium
Kalma Chowk
Model Town
Naseerabad
Ittefaq Hospital
Qainchi
Ghazi Chowk
Chungi Amar Sidhu
Kamahan
Atari Saroba
Nishtar Colony
Youhanabad
Dulu Khurd
Gajjumata

Legend

Transit Oriented Development Zones

- High Density
- Medium Density
- Low Density

400 m is the radius of each zone

- Future development Potential
- Existing development

- Orange line (Metro)
- Green line (BRT)
- Future transit lines

N

0 50 100

PS 3.3: DEVELOP AND EXTEND OPTIONS IN LAND SUPPLY AND HOUSING FOR MULTIPLE TARGET GROUPS

Policy Background

Access to housing is a basic need. The existing average household size in Punjab is 6.4 people per household, with a total of 6.3 million urban households in Punjab. By 2047, an additional 11.3 million urban households are expected in Punjab, for whom housing is not currently available.

Some of the key issues include availability of suitable state land for housing, high prices of private land, low percentages of housing mortgage options, higher demand for housing owing to population increase and migrations and rising prices of construction materials. In addition, options in rental housing are also limited. Lack of trust between landlord and tenants, long process of conflict / dispute resolutions between tenants and landowners and a general preference of people to become house owners are key issues in this. In many cases, unauthorized sub-division of land for housing- particularly in peri-urban agricultural locations – puts a heavy strain on infrastructural agencies to stretch services outside prescribed service zones. Housing options for the more than one third low-income population are limited. The changing sociological dynamics in urban areas directly cause an increase in housing needs. The joint family structure in cities is changing and nucleus families are growing. It is expected that by 2047, the household size will decrease to 5.8 people per household. The demand for housing, apartments in large cities such as Lahore and single unit houses in other urban locations for instance, is growing. Social needs cause movements towards the cities, especially large urban centers: Lahore hosts over 140 migrants/km2. The demand for housing is also affected by migration to cities for better healthcare, educational, employment and entrepreneurial opportunities as well as due to security concerns. In the past, land was considered a social asset. Increasingly, it is traded as a saleable commodity. Urban land has become a product, attracting huge capital investment. This leads to the lower and middle-income strata being priced out of affordable housing. The large metropolitan centers suffer from encroachments on public lands- this further limits housing choices for the citizenry. At a more macro level, the fundamental mismatch is between political interests in land supply and distribution, and the social and development need for housing.

Relevance to National Visions and Strategies

Pakistan Vision 2025: Private sector will be encouraged to provide housing facilities & katchi abadis and unapproved land sub-divisions will be upgraded to low income residential buildings with adequate provision of basic utilities

Urban Development Sector Plan 2014 – 2018: Affordable housing for all and a stronger legal & institutional framework

Naya Pakistan Housing Project: Build 5 million Houses in the next 5 years

Relevance to Sustainable Development Goals.

Goal 11: Sustainable Cities and Communities **Target 11.1** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums **Target 11.3** By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries

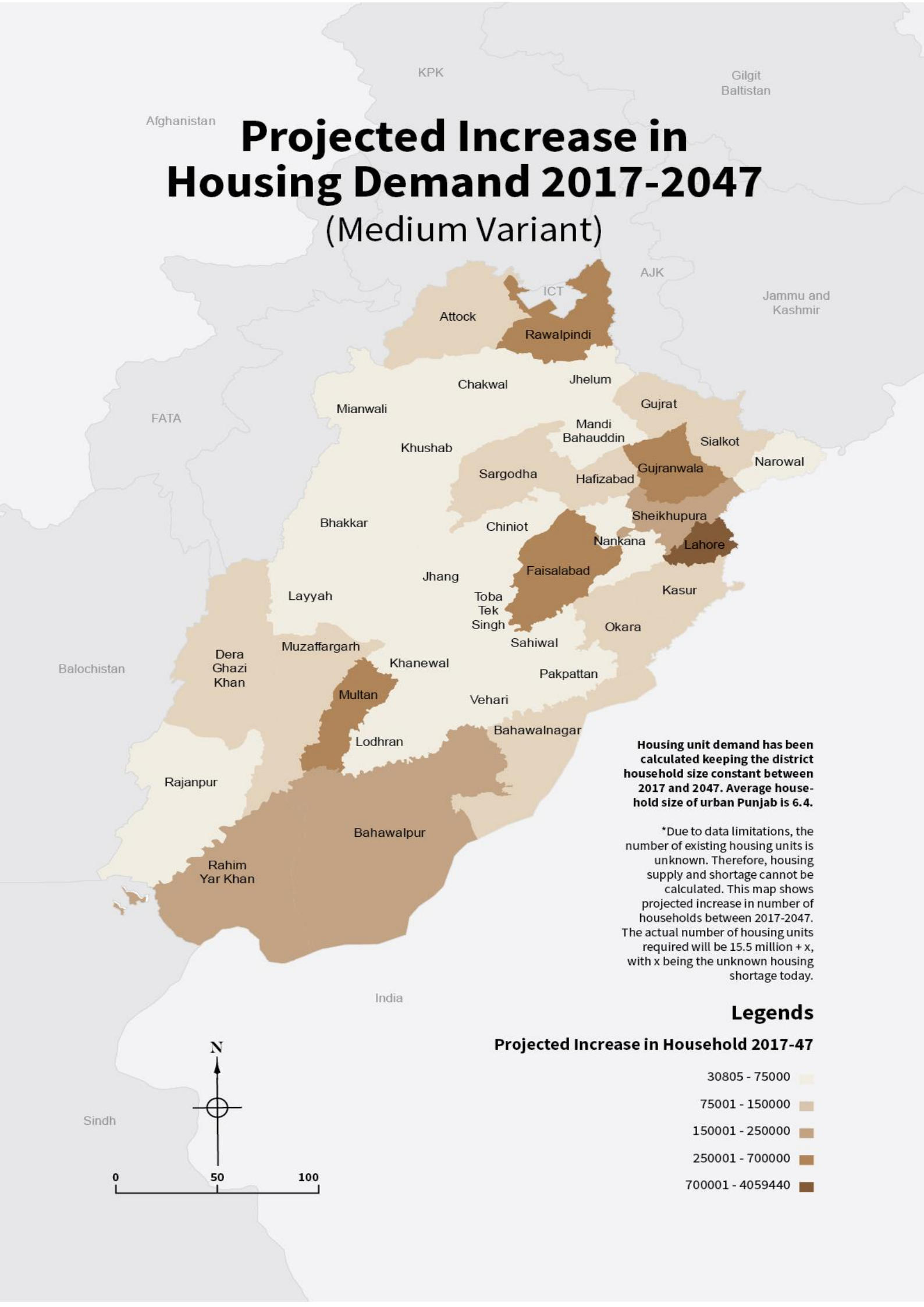
Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Population growth in need of a house	Additional housing units to be provided between 2017 and 2047, considering decrease in average household size from 6.4 to 5.8. This does not include existing housing shortage.	By 2047, it is predicted that an additional 11.3 million housing units will be required	2.5 million housing units	6.1 million housing units	11.3 million housing unit
Proportion of urban population living in slums, informal settlements or inadequate housing	SDG indicator 11.1.1	No data	40% reduction from baseline	65% reduction from baseline	85% reduction from baselin

Key Actions Required

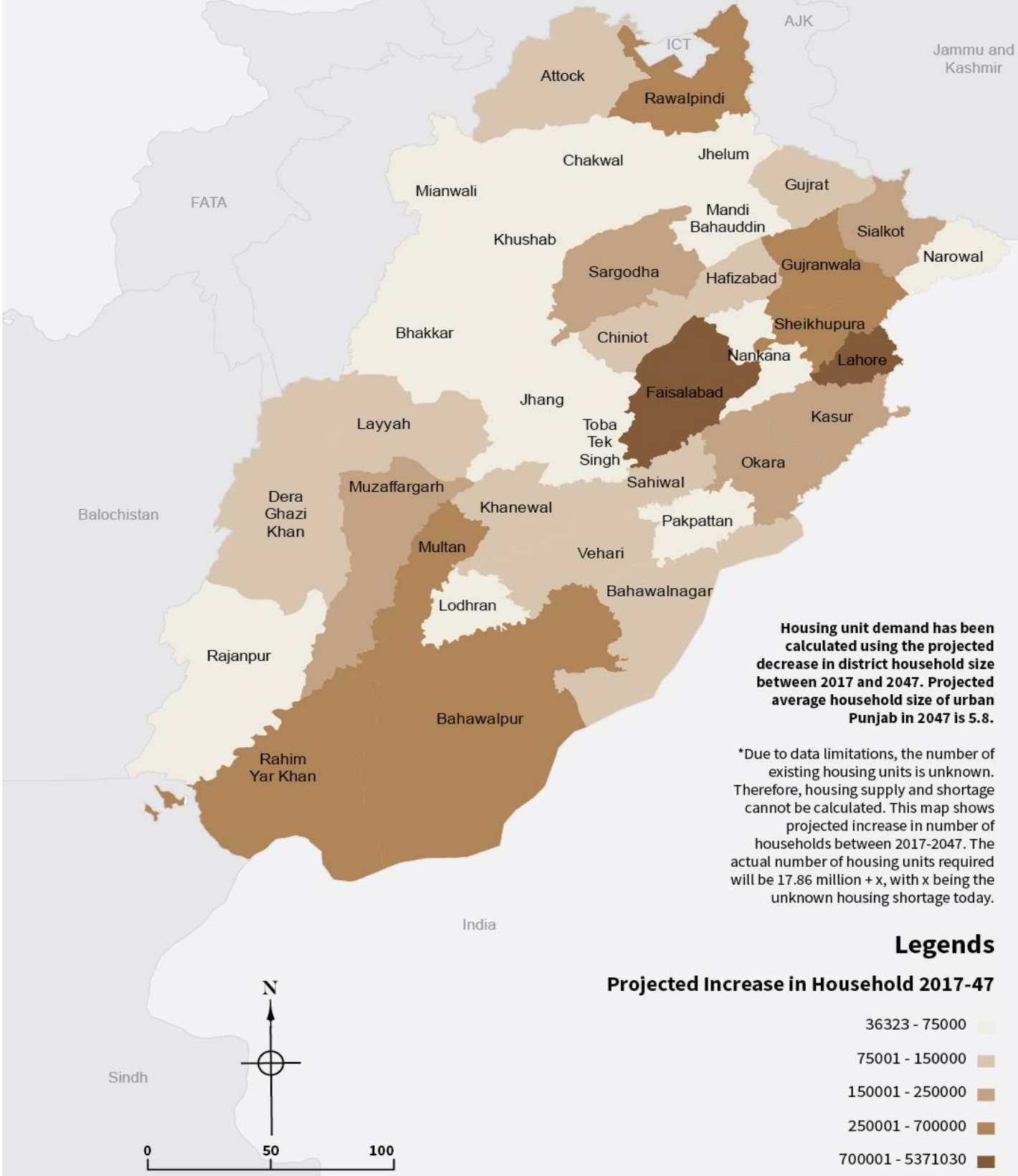
- Identification of government land for development to effectively manage unused land.
- Provision of strategic land subsidies from government in urban centers for low cost and affordable housing.
- Redevelopment of inadequate housing areas to provide quality, safe and affordable housing within cities.
- Update land use, building and zoning regulations to encourage development of low- and middle-income units in developments.
- Ensure infrastructure has the capacity to support dense residential zones.
- Update private housing scheme regulations; specify percentage of affordable units (not plots) in all residential schemes.
- Develop multiple typologies of buildings and housing units to increase housing units supply and quality.
- Reform apartment design to local lifestyles to encourage apartment living.
- Promote rental housing by enforcing rental laws and providing tax incentives on rental incomes.
- Efficient implementation a foreclosure law to protect banks, lenders, and land owners.
- Land titling reform through computerization of urban land records by one single authority for ease of residential landownership.
- Enact and implement Condominium Act that caters to multiple ownership of one land parcel in vertical structures, and binding builder accountability for maintenance and repair of shared areas.
- Policy framework to discourage land hoarding and speculation, and tax vacant plots after a period of time.
- PPP interventions for housing construction and finance.

• Data to be published regarding quantity and quality of housing units and inadequate housing based on Population Census 2017 to accurately assess the housing needs.
Expected Outcome • Low income and affordable housing provision in urban centers near sources of employment. • Public-Private Partnerships (PPPs) explored in construction and financing, and grant of government subsidies of land. • Prominence of apartment buildings increased housing supply of units and better utilization of land within cities. • Priority interventions undertaken to tackle housing shortage in high priority areas. • Improvement of living conditions and quality of life in cities.
Key Stakeholders • **Federal:** Naya Pakistan Housing Authority & Pakistan Bureau of Statistics • **Provincial:** Punjab Land Development Company, Punjab Housing and Town Planning Agency & private housing buildings, real estate developers and scheme owners
Key Agency • Housing, Urban Development and Public Health Engineering Department


KPK
Gilgit Baltistan
Afghanistan
Projected Increase in Housing Demand 2017-2047
(Medium Variant)
AJK
ICT
Jammu and Kashmir
Attock
Rawalpindi
Chakwal
Jhelum
Gujrat
Mianwali
FATA
Mandi Bahauddin
Sialkot
Khushab
Narowal
Sargodha
Gujranwala
Hafizabad
Sheikhupura
Bhakkar
Chiniot
Nankana
Lahore
Faisalabad
Jhang
Kasur
Layyah
Toba Tek Singh
Okara
Sahiwal
Muzaffargarh
Dera Ghazi Khan
Khanewal
Pakpattan
Balochistan
Multan
Vehari
Bahawalnagar
Lodhran
Rajanpur
Bahawalpur
Rahim Yar Khan
India
Sindh
N
0
50
100
Housing unit demand has been calculated keeping the district household size constant between 2017 and 2047. Average household size of urban Punjab is 6.4.
*Due to data limitations, the number of existing housing units is unknown. Therefore, housing supply and shortage cannot be calculated. This map shows projected increase in number of households between 2017-2047. The actual number of housing units required will be 15.5 million + x, with x being the unknown housing shortage today.
Legends
Projected Increase in Household 2017-47
30805 - 75000
75001 - 150000
150001 - 250000
250001 - 700000
700001 - 4059440

Projected Increase in Housing Demand 2017-2047

(High Variant)



Housing unit demand has been calculated using the projected decrease in district household size between 2017 and 2047. Projected average household size of urban Punjab in 2047 is 5.8.

*Due to data limitations, the number of existing housing units is unknown. Therefore, housing supply and shortage cannot be calculated. This map shows projected increase in number of households between 2017-2047. The actual number of housing units required will be 17.86 million + x, with x being the unknown housing shortage today.

Legends

Projected Increase in Household 2017-47

- 36323 - 75000
- 75001 - 150000
- 150001 - 250000
- 250001 - 700000
- 700001 - 5371030

PS 3.4: INCLUSIVE AND BALANCED ACCESS TO WASH SERVICES

Policy Background

To augment inclusive socioeconomic development, access to safe drinking water and improved sanitation facilities remain critical. Rapid urbanization and population growth have stressed water resources, adversely impacting safe drinking water and sanitation facilities. Municipal services – primarily, Water Supply and Sanitation (WSS), and Solid Waste Management (SWM) – are dependent on provincial transfers. The five largest cities of the Punjab generate Own Source Revenues (OSRs) that are less than 5% of total city receipts. Enabling quality access to municipal services is one of the primary drivers for making cities competitive. The provision of safe drinking water and sanitation services through improved physical infrastructure needs to be developed in light of existing spatial deprivations.

Relevance to National Visions and Strategies

Punjab Growth Strategy 2018: Provision of sustainable and safe water and adequate sanitation services to the entire population.

Provide healthy and clean environment through improved solid waste management services.

Relevance to Sustainable Development Goals.

Goal 6: Clean Water and Sanitation **Target 6.1**. By 2030, achieve universal and equitable access to safe & affordable drinking water for all. **Target 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation

Goal 11: Sustainable Cities and Communities **Target 11.6**. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 204
Water Supply Coverage	PCGIP Reports and Pakistan Water Operator Network (PWON)	68% (Large cities)	80%	85%	90%
Sewerage Coverage	PCGIP Reports	67% (Large cities)	75%	80%	85%
SWM Coverage	Waste Management Companies & Local Governments	69%	85%	95%	95%

Key Actions Required

- Development of improved governance model for service delivery:
  - Good governance with clarity in institutional jurisdiction over services, improved development planning, linking public officials promotion with training and performance, improved financial planning, incorporation of PPP mode and outsourcing model
  - Technical assistance in all areas of planning and execution to entities responsible for service provision
- Development of efficient service delivery model:
  - Special interventions to increase operational efficiency, such as by reducing Non-Revenue Water (NRW) through new targets in the ADP
  - Addressing operational inefficiencies by increasing customer base and energy conservation practices
  - Allocation of resources for deprived areas and provision of physical infrastructure for safe drinking water, sanitation and SWM
  - 'Awareness for all' to improve household practices for improved sanitation and hygiene
- Development of revenue generation model to ensure sustainability of service delivery:
  - Critical review of revenue & receipts of entities and implementation of revenue improvement actions like tariff structuring on SWM, volumetric charge for WSS, customer database, revamping UIPT system for additional revenue base, harnessing potential of unused land of local governments, and notification of municipal taxes and user charges
- Development of integrated revenue billing & collection system of all property based taxes, fees and user charges

Expected Outcome

- The above actions are expected to have an impact on cities/areas for provision of quality and sustainable municipal service infrastructure based on priority.
- Intra-regional disparities to be reduced, where the districts like Bahawalpur, Bahawalnagar D.G Khan, Rajanpur, Muzaffargarh and Rahim Yar Khan are prioritized.

Key Stakeholders

- **Provincial:** Water & Sanitation Agencies, Punjab Housing & Town Planning Agency, Al Jazzari Water & Sanitation Academy, Local Governments and Development Authorities

Key Agency

- Housing, Urban Development and Public Health Engineering Department

PS 3.5: ACCOMMODATE EMERGING URBAN POPULATION MOBILITY NEEDS THROUGH AVAILABILITY OF EFFICIENT TRANSPORTATION

Policy Background

Inadequacies in public transport provision create barriers, limit individual participation in economic activities. In Punjab rapid population and economic growth has increased traffic on the existing road network. For instance, more than 1,600 buses are currently providing intra-city public transport services in seven cities of Punjab, while the required number is above 3,800 buses. The challenge here therefore is a wide gap between demand and supply. Exacerbating this, there does not exist any sub-urban or regional train service. At the moment, various modes of intra-city transport operate in isolation. Further, inter-city public transport is not strictly regulated in the province. An unreliable and inefficient public transport system has led to a high dependency on private transport modes, in particular bikes. Motor vehicle registration statistics from the last ten years show a more than 300% increase in the number of two wheelers plying the roads. Similarly, there was an increase of more than 90% in motorcar use over the last decade.

Relevance to National Visions and Strategies

Pakistan Vision 2025: Pillar 7; Modernize infrastructure and strengthen regional connectivity
National Transport Policy 2018; Foster sustainable urban development
Pakistan Railway Strategic Plan (2017); Sets the overall direction for the future development of Pakistan Railway
Integrated Bus Operation Studies; For different cities of Punjab

Relevance to Sustainable Development Goals.

Goal 9: Industry, Innovation and Infrastructure Target **9.1:** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
Goal 11: Sustainable Cities and Communities Target **11.2:** By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Number of cities with intra-city Public Transportation	Transport Department, Punjab	6	12	16	20
% Population with access to intra-city public transport in twenty cities	Transport Department, Punjab Land Scan population database	75	>82	>88	>95
Number of cities with Mass Transit System	Transport Department, Punjab Punjab Mass Transit Authority	3 Cities (Single Line)	3 Cities (Corridors) 3 Cities (Priority Lines)	5 Cities (Corridors) 5 Cities (Priority Lines)	7 Cities (Corridors) 7 Cities (Priori Lines)
Number of cities with Sub-Urban Rail Connections	Pakistan Railways Transport Department, Punjab	0	25	40	50
Improvements in % Intra-city Bus Stops w.r.t multi-modal facilities	Transport Department, Punjab Punjab Mass Transit Authority	0	>33	>66	>99
Improvements in % Intercity Bus Terminals w.r.t multi-modal facilities	Transport Department, Punjab	0	>33	>66	>99

Key Actions Required

- Developing urban transport plans with a focus on promoting public transport
- Transit Oriented Developments by integrating land use and transport Planning
- Prioritizing pedestrians and non-motorized modes within local area plans
- Facilitating multi-modal intra-city transport services through spatial and temporal integration of various modes
- Upgrading existing and developing new intercity bus terminal for facilitating multi-modal operations
- Spatially informed decision making for developing new or upgrading existing bus stops allowing multi-modal operations
- Upgrade existing and constructing new high speed rail links for sub-urban commuters
- Establishment of district-level transport planning entities to ensure application of provincial strategy at the district level

Expected Outcome

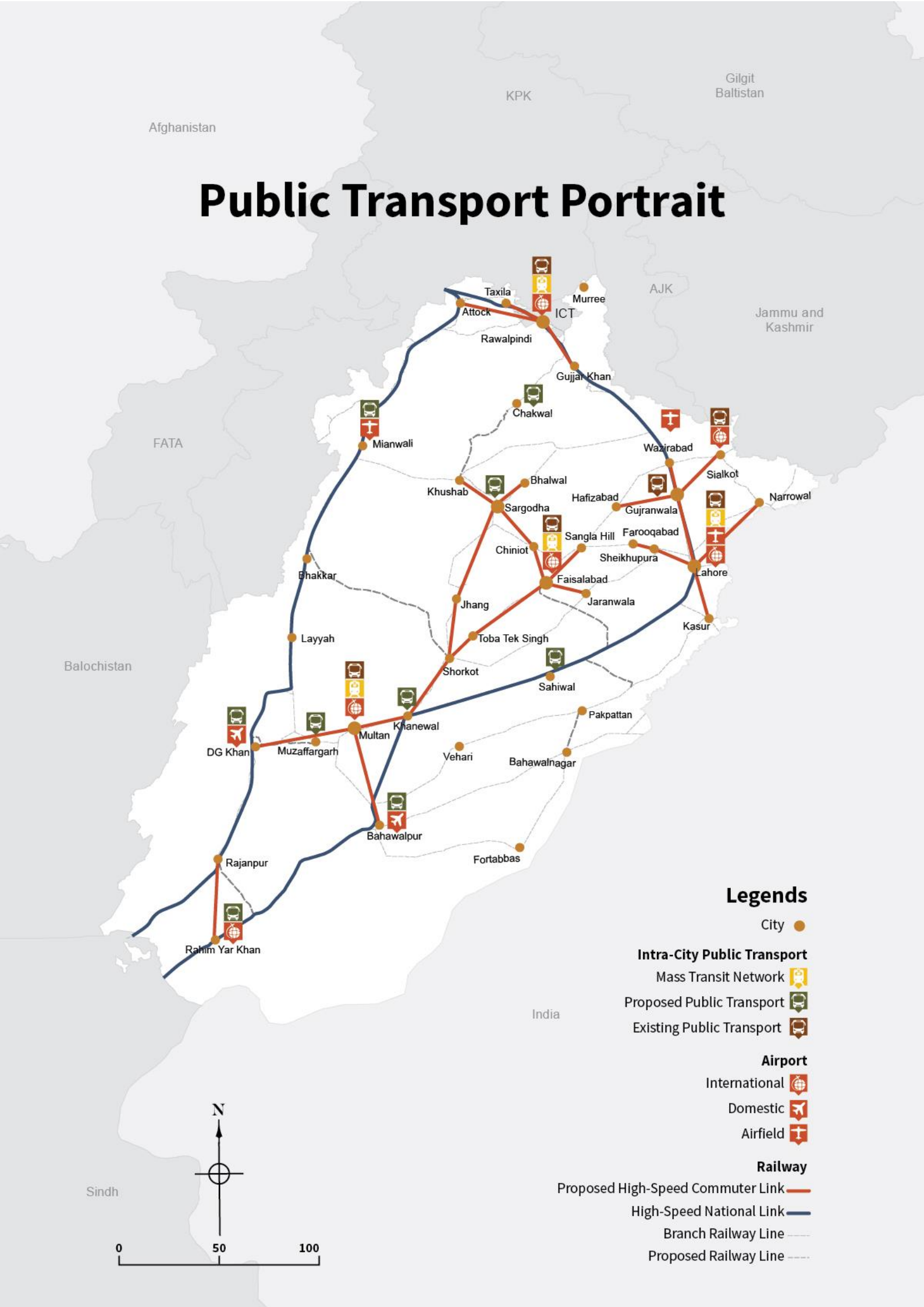
- Spatial planning enhancing people mobility to desired activities
- Land use efficiency optimization through transit oriented development
- Improved accessibility to all parts of the cities through availability of multiple modes
- Reduced traffic congestion through improved local urban transport plans
- Spatial integration, social cohesion and inclusive growth due to availability of alternate affordable modes

Key Stakeholders

- **Federal:** Ministry of Communications, National Highway Authority, Pakistan Railways & National Transport Research Centre
- **Provincial:** Provincial Transport Authority, Punjab Mass Transit Authority & Lahore Transport Company

Key Agency

- Transport Department


Public Transport Portrait
Afghanistan
KPK
Gilgit Baltistan
AJK
Jammu and Kashmir
FATA
Balochistan
Sindh
India
Taxila
Attock
ICT
Murree
Rawalpindi
Gujjar Khan
Chakwal
Mianwali
Wazirabad
Sialkot
Narrowal
Khushab
Bhalwal
Sargodha
Hafizabad
Gujranwala
Sangla Hill
Farooqabad
Chiniot
Sheikhupura
Lahore
Bhakkar
Faisalabad
Jaranwala
Jhang
Kasur
Layyah
Toba Tek Singh
Shorkot
Sahiwal
Pakpattan
Khanewal
Multan
DG Khan
Muzaffargarh
Vehari
Bahawalnagar
Bahawalpur
Fortabbas
Rajanpur
Rahim Yar Khan
Legends
City
Intra-City Public Transport
Mass Transit Network
Proposed Public Transport
Existing Public Transport
Airport
International
Domestic
Airfield
Railway
Proposed High-Speed Commuter Link
High-Speed National Link
Branch Railway Line
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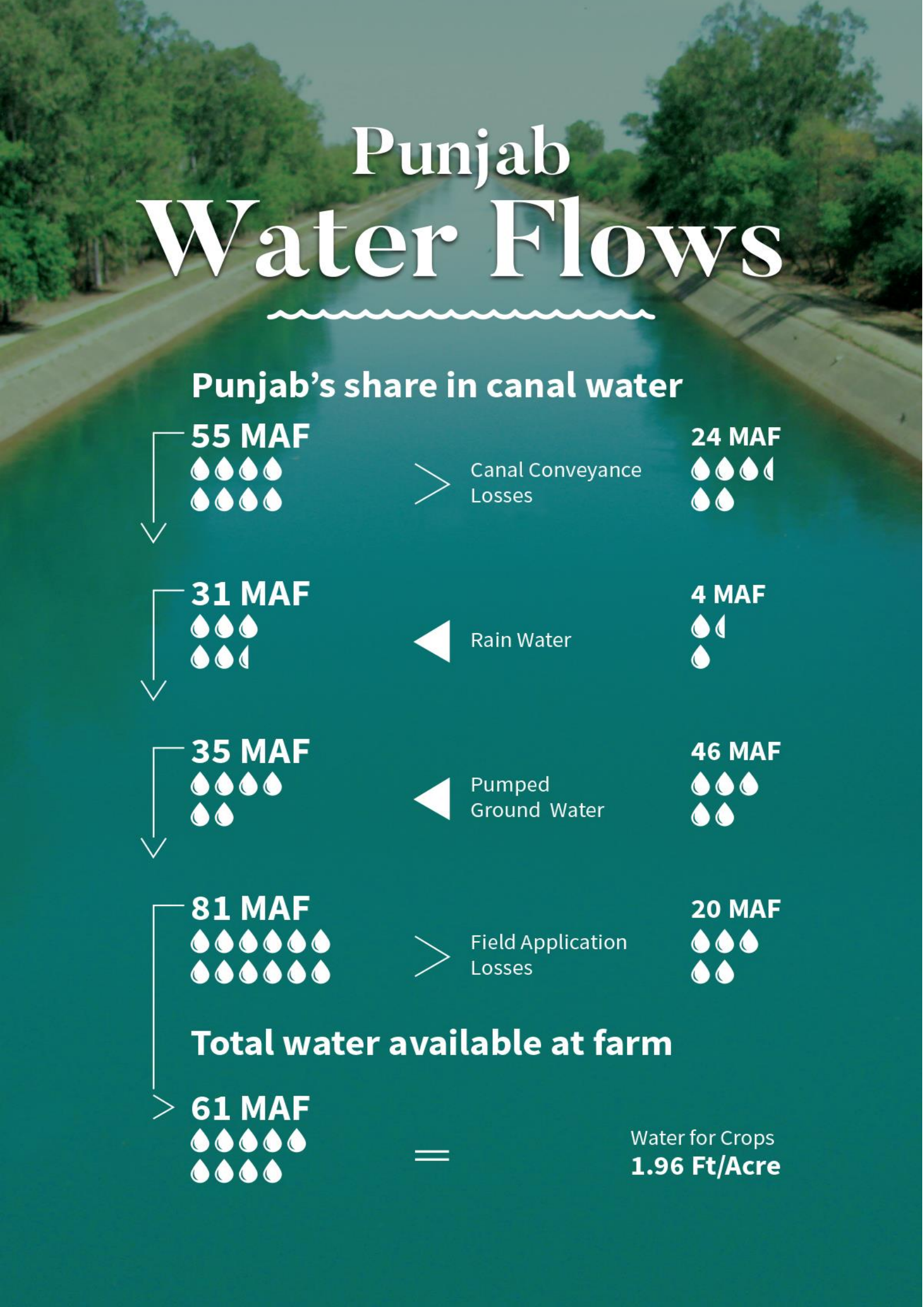

Punjab
Water Flows
Punjab's share in canal water
55 MAF
Canal Conveyance Losses
24 MAF
31 MAF
Rain Water
4 MAF
35 MAF
Pumped Ground Water
46 MAF
81 MAF
Field Application Losses
20 MAF
Total water available at farm
61 MAF
=
Water for Crops
1.96 Ft/Acre

PS: 4.3 PROMOTE USE OF SUSTAINABLE ENERGY SOURCES TO MEET THE EVER GROWING DEMAND

Policy Background

In 2011, the United Nations initiated the Sustainable Energy for All, which serves as a global forum for countries to make a joint effort towards achieving 3 key objectives: universal access to energy; doubling the rates of energy efficiency and conservation; and doubling the share of renewable energy in the overall energy mix. Pakistan joined this global initiative in the 2013. From 2012 – 2017, the energy consumption of Punjab has risen by 30%, at an average rate of 6% per annum. To keep up with such high demand, it is necessary that renewable energy solutions be tapped into. Further, fossil fuel exploitation has negative consequences for the environment. Punjab can tap into the following alternate resources: its biomass potential is around 61,000 Gwh, the solar energy potential is 4.5 - 5 kWh/m2/day in southern Punjab, and the micro hydel potential is ~7,000 MW.

Relevance to National Visions and Strategies

Pakistan vision 2025: Pillar IV on sufficient, reliable, clean and cost-effective availability of Energy
Punjab Growth Strategy: Resolving electricity shortage
Punjab Power Generation Policy: To provide adequate power generation capacity at the least cost & to protect the environment

Relevance to Sustainable Development Goals

Goal 7 Affordable and Clean Energy **Target 7.2:** By 2030, increase substantially the share of renewable energy in the global energy mix

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Renewable share in energy mix (Hydro, Thermal & Wind)	Energy Year Book	34%	40%	45%	50%
Energy savings across sectors		No Baseline	15% network energy saved through conservation and technology shifts	10% network energy saved through conservation and technology shifts	5% network energ saved through conservation and technology shifts

Key Actions Required

- Enhance public awareness about energy conservation in domestic and commercial sectors
- Leveraging spatial and geological advantages, develop renewable energy corridors to support future energy demands
- Promote and incentivize investment in renewable energy resources in the domestic to commercial spheres through mechanisms such as Public-Private Partnerships
- Introduce the mandatory use of energy efficiency labeling framework
- Use smart technology for streetlights and public buildings
- Generate on-site power for industrial sectors to reduce transmission losses
- Declare South Punjab as priority solar zone to support on/off grid renewable energy projects
- Develop necessary collection and transfer mechanisms in agricultural zones to provide easy access to raw materials
- Pioneer net metering at government offices and expand to urban centers
- Develop energy management plans for all utilities and conduct energy audits of utilities
- Promote reliance of rural villages & settlements on renewable resources to ensure self sufficiency

Expected Outcome

- South Punjab as a solar energy zone with less reliance on the national grid
- Powering large cities to produce a domestic consumer shift to self-generated and municipal solid waste
- Cost-effective generation of power through effective utilization of residuals from zones of rice, wheat and other crops

Key Stakeholders

- **Federal:** National Electric Power Regulatory Authority
- **Provincial:** Punjab Power Development Board, Housing, Urban Development and Public Health Engineering, Agriculture Department, and Local Governments

Key Agency

- Energy Department

SO-6

Enhance Environment Protection & Management

PS 6.1: Conserve and enhance biodiversity and environmental value

PS 6.2: Greening of regions for improving livability

PS 6.3: Align development to climate change resilience

Strategic Objective 6: Enhance Environment Protection & Management

The province of Punjab, especially its urban areas present a dire need for environment protection & management owing to various issues that can be widely linked to uncontrolled urbanization, haphazard industrialization, air quality deterioration, declining water quality & quantity, improper waste disposal and mismanagement of natural resources. This has seriously impacted the public health and livability of its inhabitants.

Being the most populous province of Pakistan and its dependence on the natural resources, there is certainly no doubt on how improvement in the province's environment can contribute to economic development at the macro level. This strategic objective complements the PSS environmental objectives of conservation of natural resources through sustainable development, protection & improvement of environment. Implementing the policy statements that broadly target climate change, livability and forest cover will make Punjab as environmentally sustainable province.

Pakistan is among top 10 countries most affected by Climate Change as per the 2017 Global Climate Risk index. According to the Food and Agriculture Organization (FAO, 2012), the forest degradation rate in Pakistan is the highest in Asia and the country is ranked at 110^{th} in respect of forest cover of the world. Environment Protection Department, the prime authority responsible for protection, conservation and improvement of the environment along with promotion of sustainable development has unfortunately been unable to perform its mandated functions efficiently. Issues like limited capacity and insufficient human resource as compared to the demand, inappropriate monitoring, and limited funds and over 2,500 pending assessment cases are other testimonies to the poor state of environmental governance in Punjab.

It is expected that the overarching impacts of interventions under these policy statements shall trickle down and eventually improve the province's current state of environment. It is required that environmental considerations are mainstreamed at macro and micro level in Punjab. With the identified key actions and strategic management tools under PSS, it is envisaged that environmental governance and monitoring along with the environmental quality shall be improved and thereby lead to a clean, green, climate resilient & livable Punjab.

PS 6.1: CONSERVE AND ENHANCE BIODIVERSITY AND ENVIROMENTAL VALUE

Policy Background

Pakistan is home to over 2,000 species including mammals, birds, reptiles, fish, amphibians and invertebrates under varying IUCN categories of threat: critically endangered, endangered, vulnerable, near threatened. Some of the world's rarest animals like the Indus River Dolphin and snow leopard are local to Pakistan. Forest cover in Pakistan is 2% of its total area, while Punjab's forest cover is 3.2%. Out of the 80 mammal varieties found in Punjab, 6 are threatened according to the IUCN red list; out of the 670 bird species, 21 have IUCN status demanding conservation. The total area of high conservation priority in Punjab is approximately 63,695 km^2 (29.72%). There are 120,788 km^2 (56.35%) with moderate conservation value, and 29,870 km^2 (13.93%) of area with low conservation priority. The protected area of Punjab constitutes only 1.03% of the total area. According to the Punjab Protection Preservation Conservation and Management Act, special permission will be required for development in Wildlife Sanctuaries and National Parks.

Relevance to National Vision and Strategies

Pakistan Vision 2025: Promote long-term sustainability, conservation and protection of natural resources**.**

Punjab Growth Strategy 2018: Improving land resources and environment, by tackling water logging and improving soil quality, and mitigating the impact of climate change.

Biodiversity Action Plan of Pakistan, 2000: Mainstreaming of biodiversity into policies and plans for sustainable development

Convention on Biological Diversity (CBD): Develop national strategies, plans or programmes, or adapt existing plans, to address the provisions of the convention; and to integrate biodiversity work into sectoral and cross-sectoral plans, programmes and policies

Relevance to Sustainable Development Goals

Goal 15 Life on Land **Target 15.1:** By 2020, ensure conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements **Target 15.5:** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

Expected Targets

Indicator	Details & Source	Baseline		Target 2027	Target 2037	Target 2047
Forest area	Forest, Wildlife & Fisheries Department and the World Bank	Punjab's forest cover is 3.2%		Increase Punjab's forest cover to 6%	Increase Punjab's forest cover to 10%	Increase Punjab's forest cover to 15%
High value conservation areas transformation into protected areas	Forest, Wildlife & Fisheries department, International Union for the Conservation of Nature	National Parks	5	The protected areas network will be expanded through at least 2 new areas so as to cover at least 18% of Punjab's terrestrial area	The protected areas network will be expanded through at least 3 new areas so as to cover at least 20% of Punjab's terrestrial area	The protected area network will be expanded through least 4 new areas s as to cover at least 22% of Punjab's terrestrial area
		Wildlife Sanctuary	36			
		Game Reserves	23			
		Total land covered by Punjab's protected areas is 3,315,803 ha (16.14%) classified as above.				

Key Actions Required

- Development and implementation of Biodiversity Strategy & Action Plan with creation of biodiversity inventory for Punjab
- Expand and improve the information base on biodiversity by appointing provincial center to coordinate biodiversity identification and monitoring activities e.g. through introduction of Forest Management Information System
- Promoting factors contributing to biodiversity richness, and restoration of protected sites
- Regular monitoring by agencies responsible for conservation & sustainable use of natural resources
- Developing an effective legal framework for implementation of the Convention on Biological Diversity, along with a provincial linking mechanism with federal entities such as the Ministry of Climate Change

Expected Outcome

- Improved conservation of existing protected areas and their habitat e.g. Murree (leopard), Attock (Kala Chitta National Park)
- High conservation value areas promoted and new protected areas developed – Chakwal & Rawalpindi (Urial), Khushab (Indian Pangolin), Narowal (Hog Deer), Cholistan (Houbara Buster)

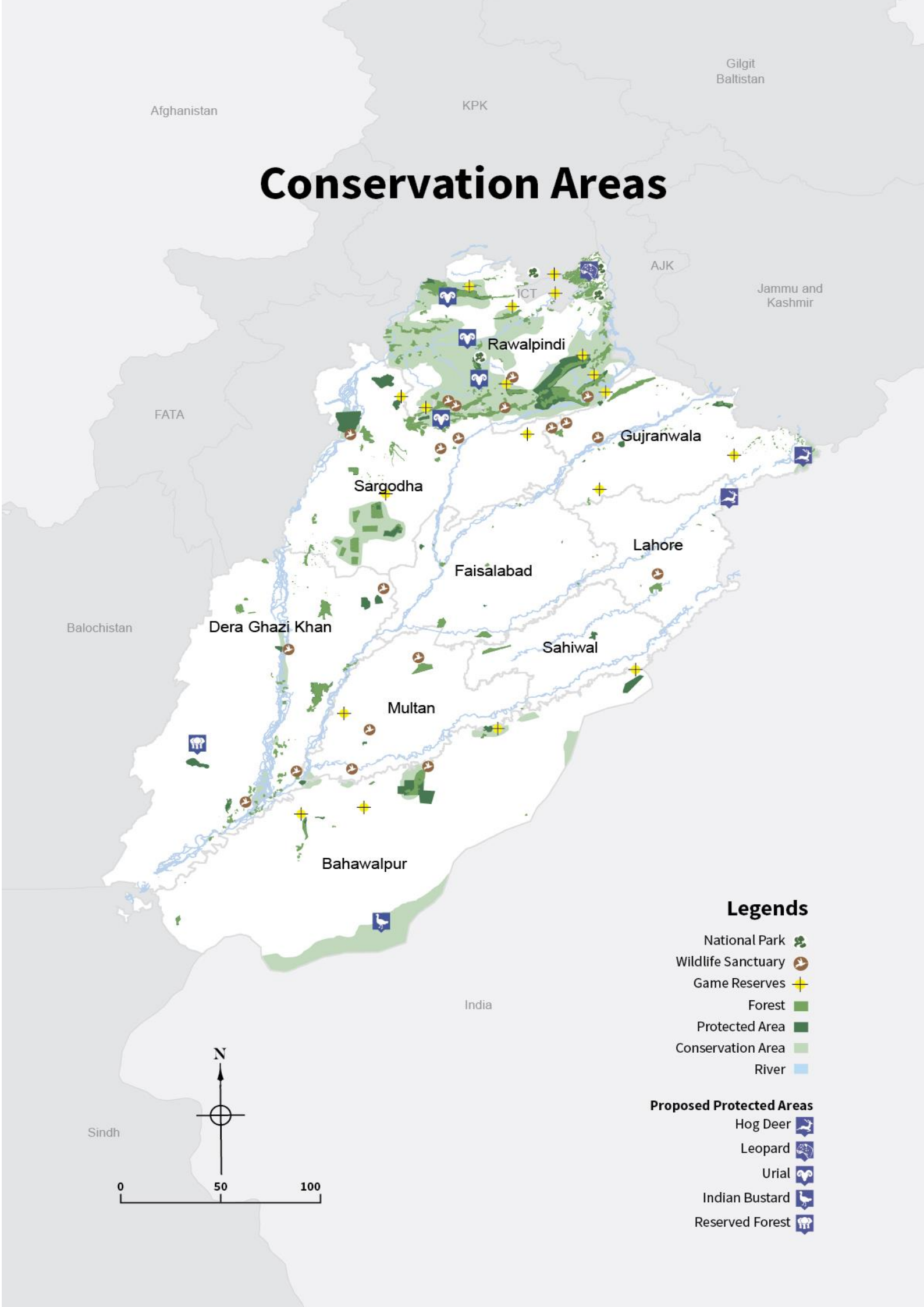
Key Stakeholders

- **Federal:** Ministry of Climate Change
- **Provincial:** Environment Protection Department

Key Agency

- Forest, Wildlife and Fisheries Department

Conservation Areas



PS 6.2 GREENING OF REGIONS FOR IMPROVING LIVABAILITY

Policy Background

Clean environment including breathable air and safe water with regard to accessibility, availability and quality impacts the liveability and public health of the community. A reduced amount of public space impacts negatively on life in the cities. Concentration of PM2.5 is alarmingly high in Punjab over PEQS and specifically, 6 times greater than the WHO standard. 68% of the polluting industries lie within city boundaries in Punjab that have caused serious externalities in the form of poor air quality and depleting water quality and quantity. High levels of Total Dissolved Solids, Arsenic, Nitrate and Fluoride have contributed to poor water quality index in the region. Wastewater is discharged untreated into water bodies due to lack of proper facilities for waste disposal in Punjab, thereby polluting and making water unsuitable for drinking, industrial, agricultural and recreational purposes. According to World Cities Culture Forum, the lowest quartile of cities reported with percentage of public green space includes Dubai (2%), Istanbul (2.2%), Mumbai (2.5%) and Shanghai (2.8%). Cities in Punjab are expected to match at least these values. Uncontrolled urbanization, haphazard industrialization, improper waste management, out-dated technologies and rapid increase in transportation have deteriorated the environmental quality of Punjab. It is a need of time that liveability of Punjab's population is improved through greening.

Relevance to National Visions and Strategies

Pakistan Vision 2025: Development of an integrated energy development model and ppromote long-term sustainability, conservation and protection of natural resources

Punjab Growth Strategy 2018: Punjab's growth has to be private sector-led, employment-intensive and export-oriented while being regionally balanced and environmentally sound & improving land resources and environment, by tackling water logging and improving soil quality, and mitigating the impact of climate change;

Smog Policy 2017: Identify reasons behind formation of dense smog and on the onset of winters each year and provide plan including measures for protection of school going children; minimizing road accidents and creating mass awareness on precautionary measures for citizens at large.

Relevance to Sustainable Development Goals

Goal 6 Clean Water and Sanitation **Target 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

Goal 9 Industry, Innovation and Infrastructure **Target 9.4** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

Goal 11 Sustainable Cities and Communities **Target 11.6** By 2030 reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Air Quality Index	Environment Protection Department	$PM_{2.5}$ levels are above PEQS in entire Punjab	Bring AQI to the value of 51-100 for 10 large cities	Bring AQI to the value of 0-50 for all cities	Bring AQI to the value of 0-30 for all cities
Water Quality Index	Environment Protection Department	Poor Water Quality index shows that poor quality is affecting 16 million people	Bring WQI to the value of 26-50 for 10 large cities	Bring WQI to the value of 26-50 for all cities	Bring WQI to the value of 0-25 for all cities
Urban forest	Forest, Wildlife and Fisheries Department and Local Governments	To be determined	Increase urban forest cover by 6%	Increase urban forest cover by 10%	Increase urban forest cover by 15%
PEQS compliant urban industries	Environment Protection Department	To be determined	20% of the urban industries to comply to PEQS	40% of the urban industries to comply to PEQS	70% of the urban industries to compl to PEQS
Health and safety related incidents and accidents	International Labor organization Labour and Human Resource Department	To be determined	Development and notification of EHS act, 20% reduction in EHS related incidents	40% reduction in EHS related incidents	70% reduction in EHS related incidents
Percentage of public green space	World Cities Culture forum	To be determined	Increase percentage of public green space to 3% in 5 large cities of Punjab	Increase percentage of public green space to 4% in 10 large cities of Punjab	Increase percentag of public green space to 5% in 25 large cities of Punja

Key Actions Required

- Restructuring of Environment Protection Department and revision of Environment Protection Act for improved environmental governance
- Regular monitoring of industries (especially those within cities) to comply with Punjab Environmental Quality Standards (PEQS)
- Digital mapping of pollution sources e.g. industrial zones and demarcation of high-risk zones based on pollution loads and peak pollution timings of the year
- Implementation of intervention measures in identified priority areas (as shown in maps)
- Prepare and implement plantation projects with special focus on greening cities
- Install air quality monitor to verify air quality baseline
- Develop and implement Health, Safety and Environmental Policy in large and medium size industries
- Introduce Best Available Techniques (BAT) and Market Based Instruments (MBIs) for industrial pollution control
- Make approval of new industrial estates subject to the development of Combined Effluent Treatment Plants (CETP) and current industrial estates bound to develop in their boundaries

Expected Outcome

- Increase compliance of PEQS for air and water quality by greening industries in four major concentrations: Faisalabad, Golden Triangle, Lahore and Multan
- Improve aesthetic value, environmental condition and public health of the province through provision of adequate green spaces and afforestation
- Reduce industrial and municipal pollution loads into rivers and other tributaries and thus, improve quality and aesthetic value of water bodies

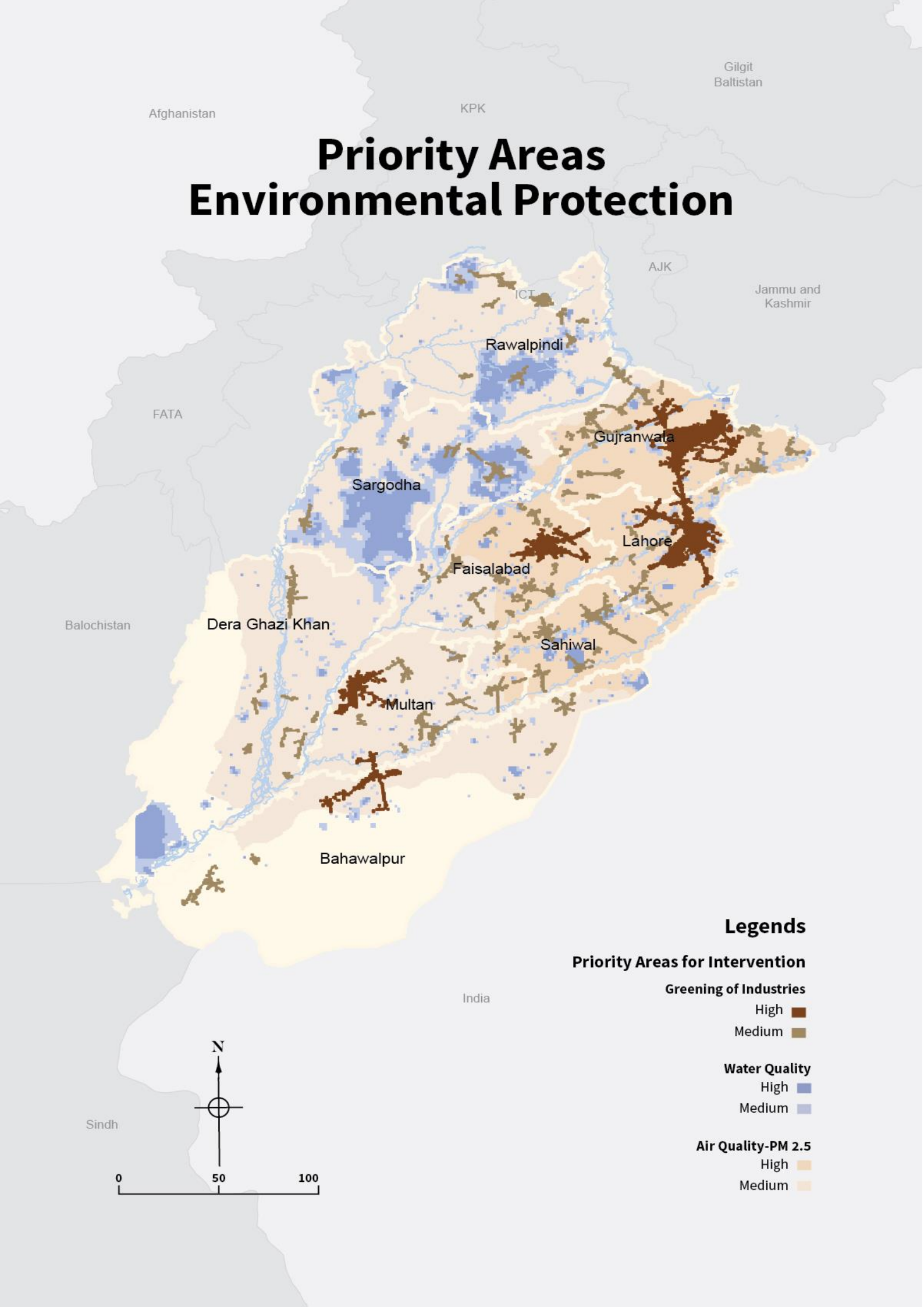
Key Stakeholders

- **Provincial:** Industries, Commerce and Investment Department, Parks and Horticulture Authorities, Water & Sanitation Agencies, Local Governments and Development Authorities

Key Agency

- Environmental Protection Department

Priority Areas Environmental Protection



PS 6.3: ALIGN DEVELOPMENT TO CLIMATE CHANGE RESILIENCE

Policy Background

Pakistan lies in the high-risk extreme category according to Climate Change Vulnerability Index. The negative effect of floods alone is estimated to be $6 billion/year. Road traffic is a main source of fine air pollutant (PM2.5 and CO) in Pakistan. Pakistan's urban air pollution is among the highest in South Asia and the resulting damage already exceeds several high-profile causes of mortality and morbidity in the region. Such variability has led to considerable increase in frequency and intensity of extreme weather events, erratic monsoon rain and floods that pose a threat to water, food, energy and even national security. With the focus being given to climate change action increasing globally, there is a dire need to address climate change in the planning and implementation of development projects in Punjab

Relevance to National Visions and Strategies

Pakistan Vision 2025: Design water, food and energy security policies and plans of the country with specific reference to the profound challenges posed by climate change & explicit recognition of the relevant risks associated economic and social costs and implementation of well-defined mitigation and adaptation strategies/measures & protecting natural resources and addressing climate change

National Climate Change Policy: Mainstreaming of climate change into economically and socially vulnerable sectors of the economy and to steer Pakistan towards climate resilient development.

Punjab Growth Strategy 2018: Improving land resources and environment and mitigating the impact of Climate Change

Smog Policy 2017: Identify reasons behind formation of dense smog and on the onset of winters each year and provide plan including measures for protection of school going children; minimizing road accidents and creating mass awareness on precautionary measures for citizens at large

United Nations Framework Convention on Climate Change (UNFCCC): Pakistan's Nationally Determined Contribution (NDC) to the Paris Agreement= 20% reduction of 2030 projected Green House Gas (GHG) emissions

Relevance to Sustainable Development Goals

Goal 13 Climate Action **Targets 13.1**: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries **Target 13.2:** Integrate climate change measures into policies, strategies and planning

Expected Targets

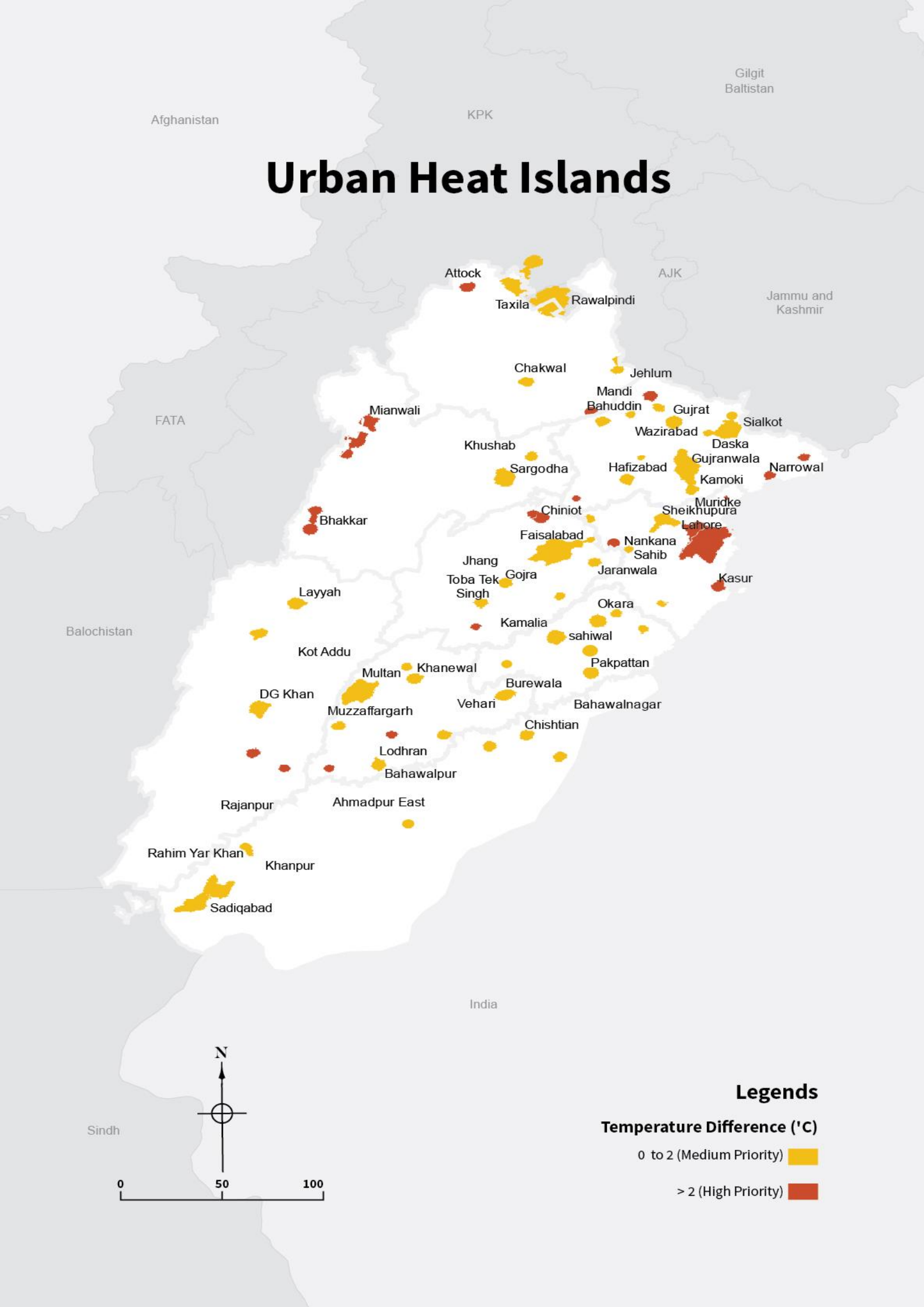
Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
GHG emissions	Intergovernmental Panel on Climate Change (IPCC)	Pakistan ranked 7th amongst the most adversely affected countries by Climate Change	18% reduction in the provincial GHG emissions	25% reduction in the provincial GHG emissions	35% reduction in the Provincial GHG emissions
Urban heat island	Environment Protection Department and Transport Department	60-70% of the urban air quality degradation is related to vehicular emissions in Pakistan	Reduce temperature difference in affected areas by 2 degree *(identified as High priority areas in Map)*	Reduce Temperature difference in affected areas by 1 degree *(identified as Medium priority areas)*	Reduce Temperature difference in affected areas by 1 degrees *(identified as low priority areas)*
Urban forest	Forest, Wildlife and Fisheries Department and Local Governments	To be determined	Increase urban forest cover by 6%	Increase urban forest cover by 10%	Increase urban forest cover by 15%
% Urban population with access to intra-city public transport *(also listed in PS 3.6)*	Transportation Department Punjab, Land Scan population database	75	>82	>88	>95

Key Actions Required

- Improve environmental governance through development of Climate Change Act, Climate Change Resilient Infrastructure Codes and Rules
- Development of an active GHG inventory at provincial level starting with ten large cities
- Best Available Techniques (BAT) to be introduced in the system of obtaining environmental permits for industries
- Development of future climate change scenarios with quantification and mapping of risk to urban service delivery sectors (water storage, transport, health, solid waste, energy systems); with the help of impact assessment models, identification

of adaptation strategies that could enhance the resilience of the climate sensitive development projects' components at design and construction phases • Afforestation to help more forests act as carbon sinks
Expected Outcome • Reduced impacts of climate change in large and intermediate cities for 2047 through climate resilient infrastructure and greening • Reduced impacts of urban heat island and smog in 10 large and intermediate cities for 2047
Key Stakeholders • **Federal:** Ministry of Climate Change • **Provincial:** Forest, Wildlife and Fisheries Department
Key Agency • Environmental Protection Department

Urban Heat Islands



SO-7

Implementation of integrated spatial planning system

PS 7.1: Implement geographically disaggregared data driven decision support system and tools

PS 7.2: Institutional capacity building to plan and implement Punjab Spatial Strategy

PS 7.3: Implement policies and align institutions through integrated development planning frameworks

Strategic Objective 7: Implementation of Integrated Spatial Planning System

An essential component of the successful implementation is strong governance. Overlapping mandates of multiple institutions in urban sector, disintegrated developments and lack of spatial focus in planning system has aggravated policy ineffectiveness in Punjab. When some institutions operate in silos then this results in disconnection of individual schemes with the larger developmental vision. Key aim of the PSS is to enhance sustainable development by the year 2047 through targeted policy actions, reforms, and mechanisms; by ensuring an integrated mechanism for planning with evidence based spatial lens in Punjab. Implementation of this system will require development of strong foundations in spatial data & analysis, capacity building of departments & agencies, and ensuring vertical & horizontal integration of planning system.

Lack of updated spatial data and evidence-based decision-making remains a barrier in effective policy solutions. Using new technologies & strategies for geospatial data, Punjab can exploit alternative information sources such as remotely sensed data in addition to conventional survey technology. The aim is not only to build foundations of geospatial data but also to maintain it for sharing and utilizing in policymaking. Standardization will be a prerequisite to build and share geospatial data, information, and services efficiently. Standards for interoperability of spatial data come up as priority area as well. Organizations, local, foreign, public and private, would also require some of this spatial data for decision-making that may lead to direct investments in priority areas of the government.

Due to lack of appropriate human resources with technological understanding, strategies for capacity building are also of high importance to execute this framework. Existing technical and institutional gaps in the governance system can only be addressed through capacity building and training programs for public officials by identifying the departments in need of such services, as well as thematic areas under which specialized focused is required. Capacity building of the Bureau of Statistics at the provincial and local level, as well as establishment of city level support services offices can ensure efficient data collection and dissemination. Additional institutions such as an economic development department in cities, and regulatory bodies to manage these institutions can facilitate cities to emerge as efficient economic entities.

Another significant issue is the lack of technical know-how and spatial planning at the regional and city level. In addition, overlapping mandates of multiple institutions propagate inefficiency and delays in service provision. Spatial data provision, regional spatial planning, and integrated planning system from provincial to local government bodies are the first steps in reducing these inefficiencies. Effective governance requires that there be both horizontal and vertical integration at all levels. PSS proposes policies that through support of federal and provincial level institutions create a conducive environment for sustainable economic development in Punjab.

PS 7.1: IMPLEMENT GEOGRAPHICALLY DISAGGREGATED DATA-DRIVEN DECISION SUPPORT SYSTEMS & TOOLS

Policy Background

Many advanced and developing countries are engaged in spatial data development, which involves the development of geospatial services that support policy making and public service delivery, ultimately to promote economic development, stimulate better government, and foster environmental sustainability. Public sector investment decisions across Punjab, especially in growth-related infrastructure projects, have been implemented without spatial sensitivity resulting in imbalanced and inequitable development. Such sub-optimal selection of infrastructure projects affects the outcomes in many ways: for instance, the government policy of developing an industrial estate in every district coupled with absence of location selection mechanism has cost the exchequer significantly and impacts are yet to be translated into industrial development. Similarly, agriculture-related infrastructure is not always optimally positioned and lacks integration with existing infrastructure leading to wasted potential of specific areas.

Relevance to National Visions and Strategies

Pakistan Vision 2025 Pillar 2 – Informed decision-making
Pakistan Growth Strategy 2018 Identification of areas to be earmarked as Special Economic Zones
Textiles Policy 2014-19: Clusters would be systematically developed and existing clusters will be strengthened

Relevance to Sustainable Development Goals

Goal 10: Reduce inequalities **Target 10.1:** Ensure equal opportunity and reduced inequalities of income

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Annual Development Plans (ADPs) are aligned with PSS to support integrated development	Planning and Development Board	N/A	90%	95%	100%
Data-driven Spatial Decision Support System	Technical House (The Urban Unit)	Tools for industries, roads, WSS, health and schools	All major data sets are in geographically disaggregated forms to support policy decisions	Developed and widely used for decision making in all key	AI supported decision makir

Key Actions Required

- Develop and implement enabling instruments and guiding frameworks aligned with PSS to ensure evidence-based decision making
- Prioritize and align public sector investments based on localized competitiveness, needs and priorities with a set principals and criteria using ICT
- Establish a central repository of data with special focus on geospatial data to support policy making
- Enact necessary spatial data policies through legal instruments to ensure collection and usage of standardized spatial data for policies at provincial, regional and local level
- Develop a provincial data eco-system that integrates national statistical data and also covers departments, agencies and private sector
- Introduce a district and city level GDP measurement mechanisms starting with annual monitoring

Expected Outcomes

With informed decision-making, the strategy will offer a framework to support and promote investments in highly feasible projects with spatial and regional linkages. All departments and agencies shall be supported and trained to align their development initiatives and projects for a spatially integrated, equitable and prosperous Punjab

Key Stakeholders

- **Federal:** Ministry of Planning, Development and Reforms & Pakistan Bureau of Statistics
- **Provincial:** All other Government Departments and Agencies and the Urban Unit as Technical Home of PSS

Key Agency

- Planning and Development Board

Data-driven Spatial Decision Support System

Theoretical Framework
Deploy a fully integrated system displaying all data and information covering socio-economic fabrics of Punjab on a single platform which offer evidence-driven spatial planning tools.

Multi-data Archives
A centralized data warehouse enlisting geographical datasets

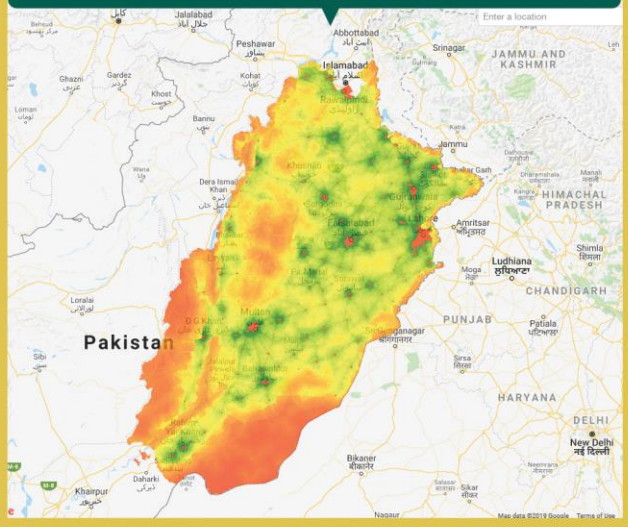
Analytical Framework

Integration into GIS data portal
Geographical data will be transformed into GIS layers for spatial analysis

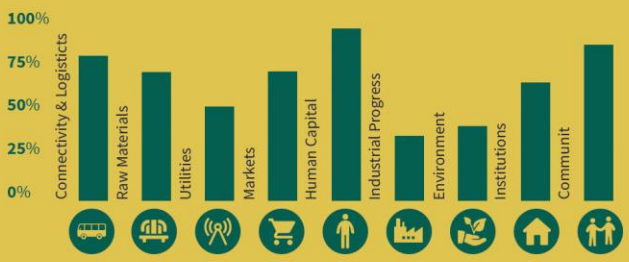
Selection Criteria
Suitability of the site is evaluated against the specific requirements

Decision-makers/ Users
Spatial decision support tool available to all stakeholders align public sector investments

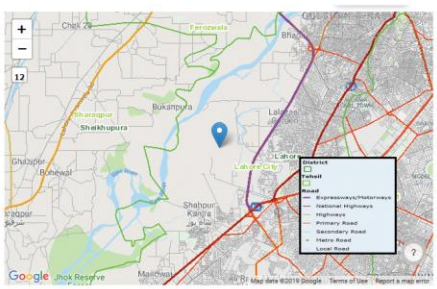
SITE SUITABILITY



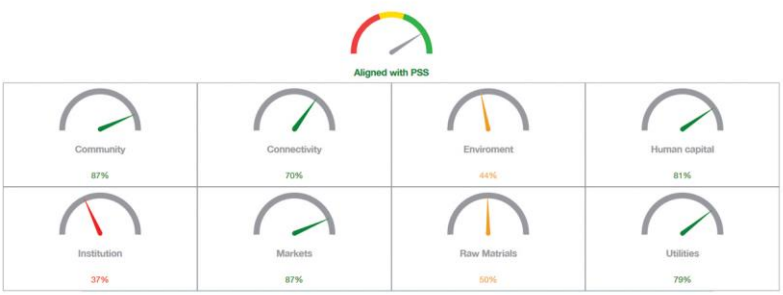
DISTRICT RANKING ACROSS INDICATORS



TOOLS FOR SITE ALLIGNMENT TO SUPPORT POLICY & DECISION MAKING



SITE READINESS GAUGES



PS 7.2: INSTITUTIONAL CAPACITY BUILDING TO PLAN AND IMPLEMENT PUNJAB SPATIAL STRATEGY

Policy Background

Capacity building is integral to building strong and effective institutions. At present, the government departments are not fully equipped for spatial data and evidence-based decision making owing to data constraints, analytical assessment frameworks and tools. In order to successfully integrate the PSS into department plans, there is a need to enhance institutional capacity. Capacity enhancement will be required at all levels—provincial, sectoral, regional and local – including at relevant departments and regional and local stakeholders. This will equip them to utilize spatial data and tools for project alignment with the PSS's strategic objectives and policy views. Existing resources within Punjab can utilize the infrastructure to achieve the aims of PSS. Institutions like Al-Jazzari Water and Sanitation Academy (AJWA), Management & Planning Development Department (MPDD), Punjab Local Government Academy in Lala Musa (PLGA) can be leveraged to make these important interventions by curriculum enrichment, training design and implementation of training programs.

Relevance to National Visions and Strategies

Pakistan Vision 2025: Focuses on technical and vocational training of public and private officials. Capacity building programs include but not limited to areas of alternative service delivery, project management, public private partnership, tourism, and entrepreneurship.

Punjab Growth Strategy 2018: Focuses on demand driven good quality skills training opportunities

Relevance to Sustainable Development Goals

Goal 17 Partnership for the Goals **Target 17.9:** Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the sustainable development goals, including through North-South, South-South and triangular cooperation

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Deployment of Curriculum	Technical Home of PSS (Urban Unit)	Nil	Provincial, Department and Regional level	Local Governments	Private Sector Stakeholders
Trained Human Resources	MPDD, AJWA, PLGA	Nil	+3,000 officials trained	+6,000 officials trained	+10,000 officials trained

Key Actions Required

- Curriculum renewal and improvement in areas of service delivery, PSS checklists, environmental assessment, spatial planning, GIS, governance, monitoring, and impact assessment
- Training programs in agriculture, industries, urban development, municipal services, environment – core areas of reform under the PSS
- Capacity building for training of trainers & public servants in collaboration with international partners
- Notification of AJWA & PLGA as training centers for capacity building of municipal services and a renewed rewards system built into performance appraisal
- Establish MPDD and AJWA in South Punjab and a Solid Waste Management (SWM) training center in Sahiwal

Expected Outcomes

- Developed capacities in relation to PSS policies at the provincial, regional and local level
- Spatial Strategy Nodes to be developed in key departments that are fully trained to support departments
- Improved capacity of departments will result in successful implementation and institutionalization of PSS

Key Stakeholders

- **Provincial:** Al-Jazzari Water & Sanitation Academy, Management & Professional Development Department, Punjab Local Government Academy, and the Urban Unit

Key Agency

- Planning and Development Board

Capacity Building Framework

ORGANIZATIONAL ASSESSMENT

Departments and Agencies

PSS REQUIREMENTS

Strategic Objectives, Policy statements
Actions, Spatial Data

TRAINING NEED ASSESSMENT

Knowledge, Skills & Attitude Model

TARGET MANAGEMENT

Integrated plan of Capacity building with M&E framework

CURRICULUM DEVELOPMENT

Training modules and courses for officials and resources within training plan

PERFORMANCE MANAGEMENT

Integrated with Performance Appraisal & promotion

Ongoing Monitoring and evaluation

TRAININGS

Spatial planning, GIS, SDGs, Environment Assessment, Data analytics, Project cycle

Performance Assessment of staff

TRAINING EVALUATION

PS 7.3 IMPLEMENT POLICIES AND ALIGN INSTITUTIONS THROUGH INTEGRATED DEVELOPMENT PLANNING FRAMEWORKS

Policy Background

At present there is an absence of spatial and evidence-based planning in Punjab. Different departments of the provincial government prepare development schemes for addressing sectoral needs identified by various stakeholders. After assessment and due review, these schemes inform the Annual Development Plans. In addition, the federal government also undertakes development projects in different sectors in coordination with relevant provincial departments. At the local level, municipal institutions also prepare and launch schemes and projects of smaller scale and magnitude in their jurisdictions according to local needs and requirements. All these initiatives, though essential and important, respond to sectoral demands with very limited attention to the need for integration across sectors for their maximum spatial benefits and impacts. There is an essential need to integrate the sectoral development initiatives with the urban and regional planning process through a spatial lens. Assessment of environmental impacts in different territories, calculation of demographic variations in the implementation of development projects, prioritization of land utilization for different competing demands, and examining the possibilities of migration of under privileged communities, value addition and economic gains from sectoral investments are some key elements to be addressed through integrated planning. Possible intervention instruments include regional and urban coordination frameworks.

Relevance to National Visions and Strategies

Pakistan Vision 2025: Institutional reform & modernization of public sector

Punjab Growth Strategy 2018: Propose institutional reforms and capacity building.

Relevance to Sustainable Development Goals

Goal 17 Partnership for goals **Target 17.14** Enhance policy coherence for sustainable development

Goal 11 Sustainable Cities and Communities **Target 11.a** Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

Expected Targets

Indicator	Details & Source	Baseline	Target 2027	Target 2037	Target 2047
Integrated Development Planning	Nil	Punjab Spatial Strategy & Regional Strategies by 2020	Development of district plans and City master plan of 50 cities	Development of town plans of all cities in Punjab	Local Development planning till UC level

Key Actions Required

- Adoption of the Local Development Framework by local governments for spatial planning.
- Formation of Regional Planning Entities to develop and coordinate regional & local plans with provincial strategy.
- Addition of a Member PSS to P&D Board, supported by PSS Wing, to oversee inter-regional coordination and give effect to spatial policies at provincial and regional level.
- Spatial Strategy Nodes at key departments and regions for PSS that are responsible for providing technical assistance and support in development of spatial plans and evidence based projects.
- Capacity building of departments and local governments for systemized data collection and survey activities to ensure timely provision of data for development planning
- Development of information systems for managing, consolidating and sharing of data for the region

Expected Outcomes

- Under a regional vision and marketing plan, public and private investments will be better directed and sustained in areas of comparative and competitive advantages
- Improved coordination of sectoral investments shall be ensured thanks to accurate assessment of its spatial dimensions

Key Stakeholders

- **Provincial:** Housing, Urban Development & Public Health Engineering Department, Local Governments, Development Authorities & Local Government & Community Development Department

Key Agency

- Planning and Development Board

Integration of Regional & Local Development Frameworks

PLANNING HIERARCHY

PLANNING FOCUS

REGIONAL DEVELOPMENT FRAMEWORK

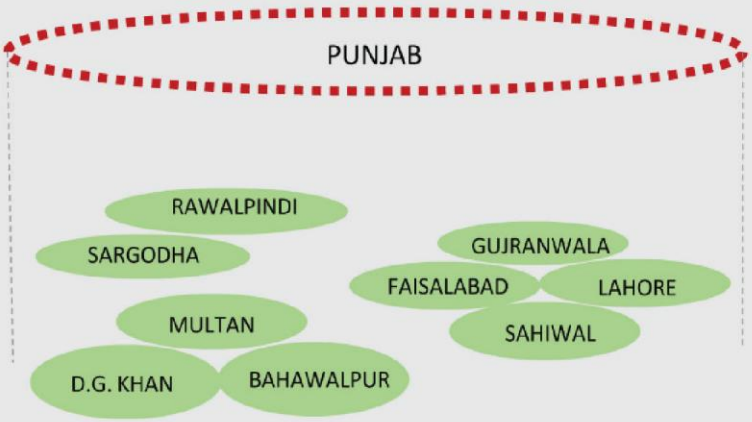
Regional tiers allow for strategic planning and coordination mechanisms for local government (i.e. groups of districts) for long term coordinated development under a unified vision & direction

PROVINCE

The province provides the overall direction for development and legislative support

REGIONS (DIVISIONS)

Divisions form the basic economic units to be informed by a regional vision and development plans



CORE STRATEGY

REGIONAL STRATEGY

District Plans made as part of Regional Plans

LOCAL DEVELOPMENT FRAMEWORK

LDFs lay down which documents & plans are to be made by who and when for integrated city development. The focus remains on aligning local priorities with the provincial and regional vision.

DISTRICTS

Districts form the basic administrative tier of government and focus on land/resource strategies and administration in conformity with regional strategy

CITIES

Metropolitan & Municipal Corporations oversee the land use & development of cities in collaboration with development authorities

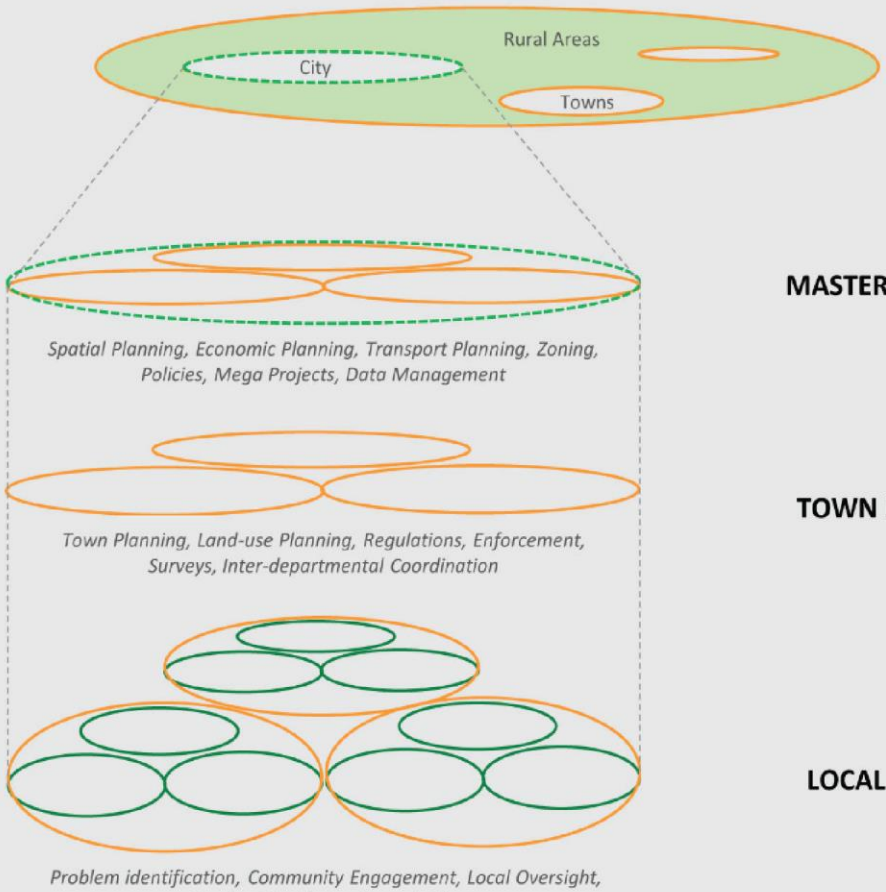
TEHSILS/TOWNS

Headed by either Municipal Corporations in larger cities or Municipal Committees in towns

UNION COUNCILS

Lowest tier of local government responsible for safeguarding the needs of people

DISTRICT PLANS



MASTER PLANNING

TOWN PLANNING

LOCAL ACTIONS