ISSN (Print): 2959-4391 ISSN (Online): 2959-4405

JOURNAL OF SOCIAL SCIENCES DEVELOPMENT

www.jssd.org.pk editor@jssd.org.pk

ANALYSIS OF UNPLANNED URBAN SPRAWL IN PESHAWAR & ITS IMPACT ON THE LOSS OF AGRICULTURAL LAND AND GREEN SPACES

Javed Iqbal[1], Irfan Ullah[2] & Muhammad Kaleem[3]

[1]Provincial Management Officer, Government of Khyber Pakhtunkhwa (KP), Pakistan
[2]Special Education Department, Government of Khyber Pakhtunkhwa (KP), Pakistan
[3]Assisstant Professor, Department of Sociology, Bacha Khan University Charsadda, Pakistan

KEYWORDS

Urban Sprawl, Land Use Change, Agricultural Land, Green Spaces, Peshawar, Pakistan, Sustainable Urban Planning

ARTICLE HISTORY

Date of Submission: 10-02-2025
Date of Acceptance: 15-03-2025
Date of Publication: 17-03-2025

ABSTRACT

This study examines unplanned urban growth in Peshawar and its impact on the loss of agricultural land and green spaces. Rapid population expansion and inadequate urban planning have transformed agricultural land into urban areas, resulting in fewer farming the options and the deterioration of fertile soil. Furthermore, encroachment on green spaces has hindered access to vital ecological resources, affecting air quality, temperature regulation, and recreational areas. The study is exploratory and descriptive, relying on secondary data includes sequential pictorial presentations and diagrams. It found that the consequences of Peshawar's unplanned urbanization extend beyond environmental concerns. The loss of the agricultural land threatens local livelihoods, mainly for farmers who depend on agricultural activities for their income. To address these issues, the study proposes that effective land management practices & inclusive urban planning strategies are vital. It recommends strict implementation of sustainable development policies that prioritize conservation of agricultural land and green spaces. Engaging residents in decision-making processes & supporting sustainable practices can further enhance the city's livability and resilience in the face of ongoing climate change.

Corresponding Author Irfan Ullah

Email: irfanullah70@gmail.com

DOI https://doi.org/10.53664/JSSD/04-01-2025-10-126-137

INTRODUCTION

Urbanization is rapidly reshaping Pakistan's socio-spatial landscape. The share of national urban population increased from 32% in 1998 to an estimated 38% in 2023, driven by natural population growth, rural-to-urban migration and shift due to regional conflicts (EnvPK, 2024). Peshawar, the provincial capital of Khyber Pakhtunkhwa, symbolizes these dynamics. Migration waves following

1947, the influx of Afghan refugees in the 1980s and 1990s, and ongoing security-related movement have spurred peri-urban expansion. However, institutional responses have not kept pace, resulting in unplanned sprawl that jeopardizes the agricultural productivity and urban livability (Hamidi, Wang, Guo & Zeng, 2020). This rapid growth, in the absence of the strategic urban planning and effective governance, has resulted in scattered, unregulated developments at the periphery of city. Pakistan's economic growth, job creation, and overall standard of living are all directly influenced by expansion of its urban areas. However, cities in Pakistan are growing rapidly and sometimes in an unplanned manner.

To transform "lethargic" settlements into the vibrant centers of innovation and trade, the Planning Commission has called for changes to planning systems and the integration of urban management into national development in its framework for economic growth 2011 (Quak, 2025). The unchecked growth of populated areas is eroding fertile farmland. Although more than half of the workforce is employed in agriculture, which still constitutes over 20% of GDP, the capacity to produce food and support rural livelihoods is being undermined by the ongoing conversion of fertile land (Coulibaly & Li, 2020). This transformation is primarily driven by increased rural-to-urban migration, rising housing demands, and speculative real estate activities. As a result, the ecological balance and food security potential of the region are under serious threat. This article examines (i) how unregulated sprawl has reshaped land use in Peshawar and (ii) its effects on agricultural land and urban green spaces. By synthesizing spatial evidence and institutional analysis, we contribute to the growing literature on the secondary cities in South Asia facing food, land, as well as energy stresses amid climate uncertainty.

Objectives of Study

1. Quantify land use change in Peshawar District (Khyber Pakhtunkhwa), from 2007 to 2019.
2. Analyze the socio-economic and environmental impacts of farmland and green space loss.
3. Identify institutional difficulties in land use governance in region (Khyber Pakhtunkhwa).
4. To suggest policies for sustainable urban growth in specific context (Khyber Pakhtunkhwa).

LITERATURE REVIEW

International scholarship has linked urban sprawl to the loss of farmland, ecosystem degradation, and increased carbon emissions (Seto & Reenberg, 2014). In Pakistan, studies primarily focus on Karachi and Lahore, while the Khyber Pakhtunkhwa (KP) region remains understudied. Rehman and Khan (2022) mapped lowland encroachment across the province but called for city-specific diagnostics. This study addresses that gap for Peshawar by integrating socio-institutional drivers with spatial metrics. Urbanization is often seen as a sign of development and progress. However, in developing countries like Pakistan, rapid and unplanned urban growth has led to the significant environmental, economic, and social consequences. The urban population in Pakistan has surged dramatically from 17% in 1951 to a projected 50% by 2030, making it one of the fastest urbanizing countries in South Asia (Cohen, 2003). This trend is linked to considerable challenges, including the urban encroachment, land degradation, and pressure on the urban infrastructure and services (World Bank, 2011).

According to planning commission's framework for economic growth, following are primary causes of urbanization in Pakistan: (Kugelman, 2014).

1. Overpopulation: Rapid natural population growth intensifies pressure toward urban areas.
2. Rural-to-Urban Migration: The pursuit of improved living standards and services attracts individuals to cities.
3. Industrialization: The clustering of industries near urban cores promotes labor migration and sprawl. Social and Health Services: Healthcare, education, and cultural amenities are focused in urban centers. Cities offer range of job opportunities & higher wages, which can attract unemployed individuals.
4. Conflict and Displacement: Partition (1947), Indo-Pak wars (1965, 1971), Afghan insurgency (1980s–1990s), militancy in FATA (post-2001), and climate-related disasters (such as 2010 floods) resulted in displaced populations being concentrated in the major cities, especially Peshawar and Quetta.

Planning Commission of Pakistan, over its 2011 Framework for Economic Growth (FEG), recognized the importance of restructuring urban planning to foster sustainable and creative cities. However, these efforts have largely failed to translate into action, mainly in secondary cities like Peshawar, which has undergone unchecked urban expansion over the past several decades. Factors such as overpopulation, internal migration, industrialization, and improved access to the social and health services have accelerated this trend, driving a significant increase in urban sprawl and informal settlements (Planning Commission of Pakistan, 2011). Peshawar, the capital of KP and a significant historical & economic center, exemplifies negative consequences of poorly managed urbanization. Originally walled city with limited urban boundaries, Peshawar developed area has dramatically expanded from 2,000 hectares at independence to over 17,000 hectares by 2019. Much of growth has occurred on prime agricultural land, resulting in the conversion of over 3,000 acres of farmland within just a decade.

These changes in land use are not merely spatial; they undermine local food security, reduce the agricultural employment and donate to decline in environmental quality (UNDP, 2020). Various drivers of unplanned urban sprawl in Peshawar are identified in the historical and current studies. These factors include the influx of Afghan refugees following the Soviet invasion of Afghanistan and subsequent regional conflicts, internally displaced populations due to militancy and floods, and speculative land sales driven by rising real estate prices. Areas that were previously on the city's outskirts, including villages such as Tehkal Bala, Hazar Khwani, and Chughalpura, have now become part of expanded urban core (Government of KP & UN-Habitat, 2015). While, PDA has made numerous attempts to implement the structural plans (1986–2001 and 2001–2020), these initiatives have largely fallen short of their objectives. The institutional inefficiency, overlapping mandates, political interference, and insufficient enforcement have allowed unregulated growth to persist unchecked.

The similar issues are evident across related departments, including the Environmental Protection Agency (EPA), the Planning and Development Department, Agriculture Department, and District Government. The environmental regulations, such as requirement for IEE/EIA reports under KP

Environmental Protection Act (2014), are seldom enforced effectively, particularly for housing schemes sprawling across fertile agricultural land (KP Environmental Protection Agency, 2014). Moreover, rapid urbanization in Peshawar has placed immense pressure on the city's infrastructure, including water supply, sanitation, and waste management systems. Agencies like the Water and Sanitation Services Peshawar (WSSP) have struggled to meet the increasing demand, leading to the degradation of natural water sources and the loss of green spaces (WSSP, 2018). While global literature highlights impact of urban sprawl on agricultural land and environmental degradation, there remains a deficiency in localized, empirical research that examines the specific temporal and spatial dynamics of land-use change in Peshawar. The most existing studies either focus on general urban issues or address broader policy frameworks without providing city-specific analyses and concrete case evidence.

Research Gap

Despite the growing recognition of challenges posed by urban sprawl in Pakistan, several critical gaps remain in both scholarly literature and policy frameworks, particularly in case of Peshawar. Firstly, there is a lack of spatial-temporal analysis that quantitatively tracks urban expansion and agricultural land loss over time by utilizing tools such as GIS and remote sensing. Secondly, while institutional shortcomings are acknowledged, few studies offer thorough appraisal of coordination failures and regulatory inefficiencies amid key urban planning agencies. Thirdly, existing research emphasizes demographic and economic factors, often neglecting environmental consequences such as ecological degradation, biodiversity loss, and depletion of green spaces. Moreover, community-centered perspectives are largely absent; the voices of farmers, displaced populations, and local planners are seldom integrated into urban development strategies. Lastly, most urban studies in Pakistan disproportionately focus on megacities like Karachi and Lahore, leaving mid-sized cities like Peshawar relatively underexplored in terms of the urban governance, land use planning, and sustainable development.

Study Area

The capital and largest city of KP Province is Peshawar, which is the sixth-largest city in Pakistan. It is located in the central-western part of KP and borders Nowshera District to the east, Charsadda District to the north, Mohmand Tribal District to northwest, and Khyber Tribal District to the west and south. The western border with Afghanistan is roughly 40 km away. Peshawar lies between latitudes 33°44′ and 34°15′ North, longitudes 71°22′ and 71°42′ East, positioned directly at entrance to famous Khyber Pass. The district spans 1,216.17 square kilometers and includes four towns, each divided into 346 village and neighborhood councils, along with 92 union councils. The Kabul River and slopes of Hindu Kush border 1,257 km^2 Peshawar District. While green belts help to reduce extreme summer temperature, alluvial soils support peri-urban farming, mainly wheat, vegetables, as well as orchards.

RESEARCH METHODOLOGY

The study is exploratory and descriptive, and data was collected and analyzed based on secondary sources, including sequential pictorial presentations and visual diagrams in order to extract the

desired outcomes. In this connection, this exploratory descriptive study depends solely upon the secondary sources:

- ✓ Satellite imagery and land use/land cover (LULC) maps from DAWN GIS portal and World Bank datasets for the years 2007, 2012, and 2019.
- ✓ Population data from the Pakistan Bureau of Statistics.
- ✓ Institutional documents include the PDA Structure Plans (1986–2001; 2001–2020), KP EPA guidelines, and departmental reports.
- ✓ The peer-reviewed existing literature (Rehman & Khan, 2022; Ullah & Takaaki, 2016).

The built-up area was digitized and cross-validated used in current study. The descriptive statistics trace spatial–temporal trends, while qualitative content analysis highlights governance gaps to reach the conclusion.

FINDINGS OF STUDY

The study found that Peshawar's unplanned urbanization has effects beyond environmental issues. Losing farmland impacts local livelihood, especially for farmers who depend on farming for income. The decrease in green spaces lowers residents' quality of life by reducing leisure activities adding to environmental harm.

Pre-Independence Era

The renowned Fort Bala Hisar was part of the wall that surrounded Peshawar city before the British conquest of the subcontinent in 1858. The British colonial authorities did not alter the city's original layout; they only expanded a few roads. The city had sixteen gates in its fortified walls. The Military Cantonment was established in 1866 during British rule. The city experienced significant growth and expansion with the establishment of the cantonment, causing the urban area to extend beyond its walls into the surrounding open spaces of the district. Peshawar University was founded after the establishment of Islamia College in 1913, which contributed to city's westward growth. This marked the beginning of the incursion. Over time, the city continued to expand in multiple directions. The following explains the District Peshawar's unplanned urbanization and its encroachment upon the agricultural land.

Urbanization (1947-1981)

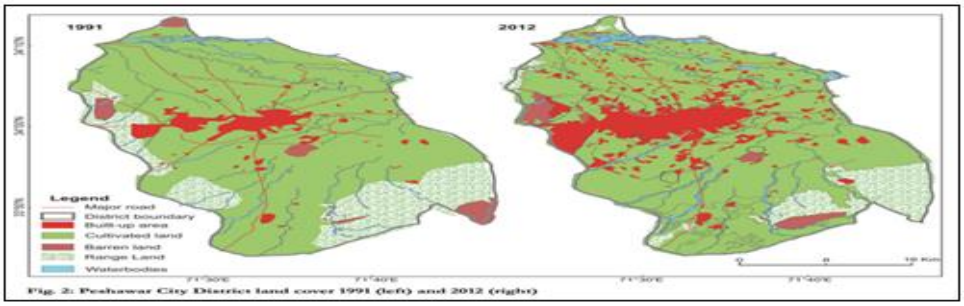
Peshawar became capital of North West Frontier Province (now KPK) when Pakistan was founded in 1947. As the city's urban area expanded, it became more financially as well as administratively developed. By 1981, the built-up areas had nearly doubled from about 2000 hectares at the time of the independence.

Urbanization (from 1981 to 2019)

The Peshawar District saw significant physical growth between 1981 and 2019, increasing from the 4365 hectares towards 17,330.49 hectares, according to the Khyber Pakhtunkhwa Planning and Development Department. This period stands out from the previous one due to the well-known influx of Afghan refugees into Pakistan, especially in the Peshawar District. Besides residing in the city center, refugees were also dispersed to outskirts. In 1981, the population exceeded 0.5 million, based on data from the statistics department. By the censuses of 1998 and 2017, this number had

doubled. Factors contributing to this included militancy in FATA (Federally Administered Tribal Areas) since 2001, unrest in Malakand in 2009, and natural disasters such as the 2010 flood in the Kabul River, which displaced many people and forced them to seek the shelter and other services/ areas in Peshawar.

Figure 1 Loss of Agricultural Land



Most agricultural land has been converted into urban areas to support the expanding population driven by the rapid urbanization. In just ten years, Peshawar lost 3,307 acres of farmland due to unchecked development and swift urban growth. The cultivated area in the city decreased from 109,883 acres in 2001–02 to 106,576 acres in 2013–14. The land prices increased significantly with urbanization, prompting landowners to sell at higher prices. As the population grew, land in District Peshawar transitioned from agricultural to developed use. The figures show built-up areas for 2007, 2012, and 2019.

Figure 2 Built-up area of Peshawar in 2007.

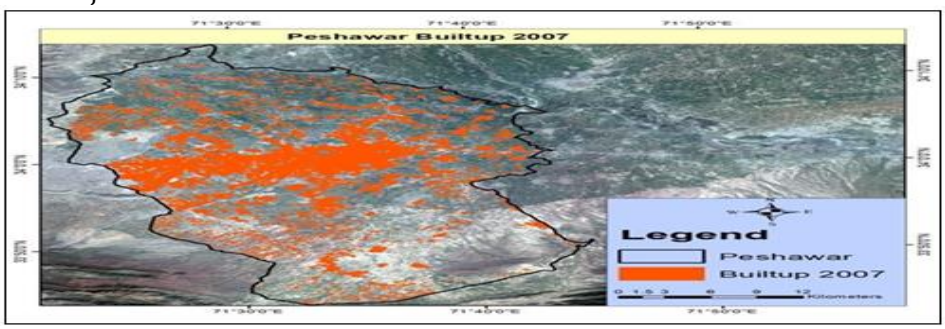


Figure 3 Built-up area of Peshawar in 2012.

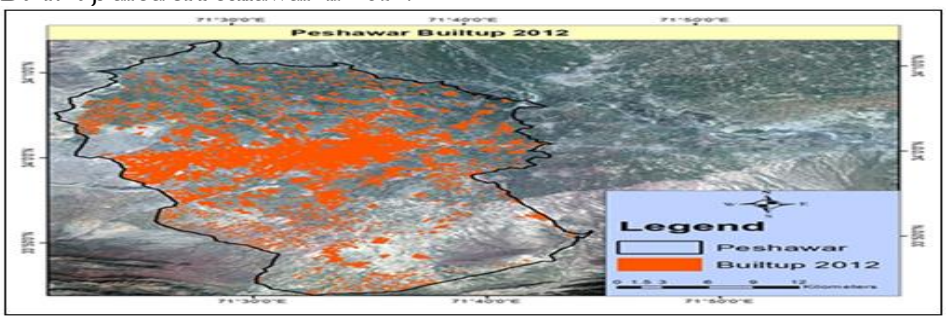
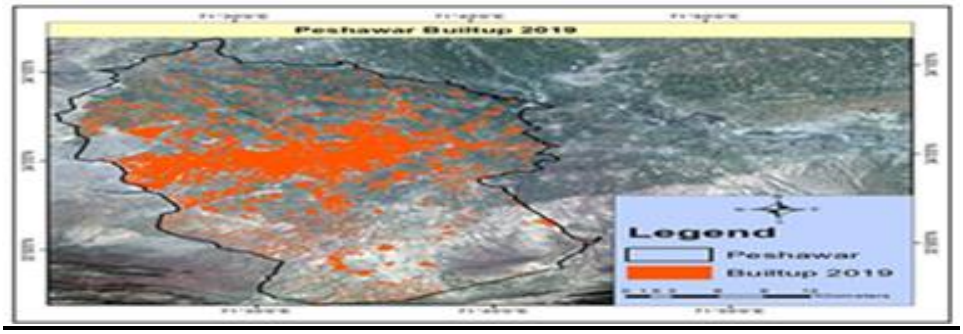


Figure 4 Built-up area of Peshawar in 2019



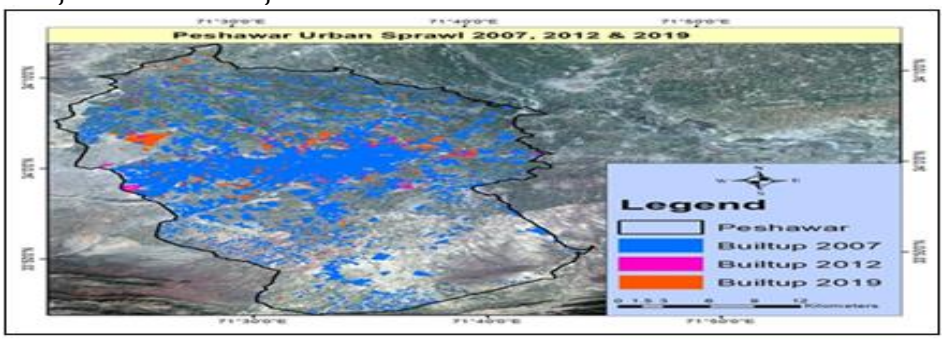
In 2007, only 10.5% of the Peshawar district's total area was covered by built-up land (132.2981 sq. km), as shown in the figures above. By 2019, land encroachment had risen to 13.78 percent. The data indicates that several towns have merged into older areas. Outlying villages such as Tehkal Bala, Tehkal Payan, Hazar Khwani, Nauthia, Landi Arbab Chughalpura, Sardar Garhi, Babu Garhi, Pahari Pura, Deh Bahadur, Malakander, and Pakha Ghulam have become part of the city core due to urbanization. The old city is becoming crowded. New residential communities, like Nishtar Abad, Gul Bahar Colony, Sheikh Abad, Zaryab Colony, Faqir Abad, Gulberg, Danish Abad, Shaheen Town, and Nauthia Jadeed, have expanded significantly in the size and development. The primary reason for growth of these new communities is the influx of people from other areas seeking access to social facilities.

Table 1 showing built-up areas of District Peshawar.

Year	Area in sq km	Percentage
2007	132.2981	10.52
2012	136.3469	10.8
2019	173.3049	13.78

Total area: 1257 sq km.

Figure 5 Comparison of built-up areas in Peshawar



District Peshawar's population grew from about 0.51 million in 1981 to 1.39 million in 2007, and then to 2.13 million in 2019. Over these years, this population increase has also led to the expansion of the built-up area.

Table 2 Urban Encroachment Areas with Population, in Millions

Year	Urban Population in Millions	Urban Area in Percentage
1981	0.51	3.68
1991	0.79	5.9
2007	1.39	10.52
2012	1.66	10.82
2019	2.13	13.78

Regardless of the reason for conversion like housing, transportation, recreation, or other urban uses urbanization endures to result in ongoing loss of fertile land. Land ownership scenarios in Peshawar are shown in table.

Table 3 Landholdings in Peshawar

Size in Kanals	Town I	Town II	Town III	Town IV
1-5	12.5	25	25	25
6 – 10	75	31.3	25	16.7
11 – 15	12.5	6.3	0	16.7
16 – 20	0	0	0	0
21 – 25	0	6.3	0	16.7
26-30	0	6.3	0	16.7
30-35	0	0	0	0
36-40	0	6.3	0	8.2
40+	0	18.5	0	0
Total	100	100	100	100

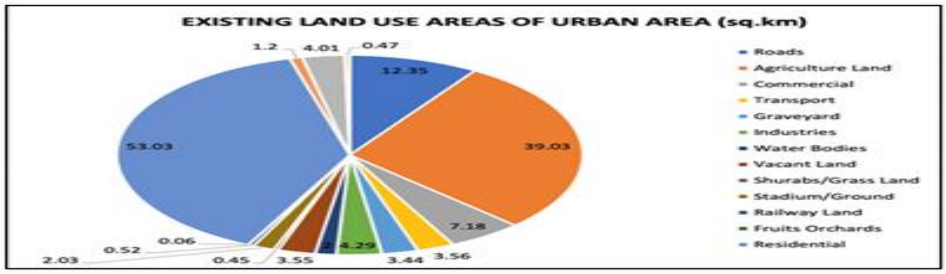
Existing Land Uses of Peshawar

Land is a vital natural resource essential for human survival and success. Over thousands of years, people have optimized their use of land to meet their personal needs. Since, the human demands on limited resources are unlimited, these resources are being pushed to limits. Decreasing agricultural productivity, land degradation, and competition for land all signal increasing pressure on land resources. Agriculture is primary land use. Urbanization and industrial expansion are impacting agricultural land, resulting in shortages, particularly in areas near cities. This shift influences both environment and socioeconomic conditions. Key concerns include current land use and land cover patterns, the changes in these patterns, and the relationship between population growth and food security. The overexploitation and conversion of land into other uses threaten agriculture the most, causing land deterioration and depletion. Large areas of prime farmland are no longer used for farming, and urban growth is a significant contributor to land degradation. Infrastructure, such as roads, while promoting economic growth, can lead to deforestation. The environmental impacts of land transportation have significant impact on society and thus is connected to the expansion of the transportation networks.

Similarly, during the industrial revolution, road transport evolved rapidly. As towns and cities grew to support businesses and industries, cultivable land was increasingly converted to accommodate a growing population. The urban population has increased significantly over the last thirty years, primarily due to internal migration driven by individuals seeking better services, education, and

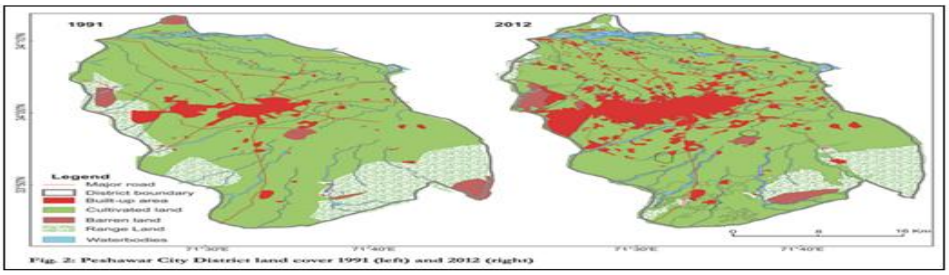
job opportunities. Even though Peshawar is spreading outward in all directions, some areas have seen a notable shift, especially along the G.T. road to Nowshera and the motorway connection road. To help the implementing agency rationalize all land uses and ensure the objective planning and formulation based on the land resource's potential and needs, a fair and effective land use plan must be created at the district level. To maximize land resource conservation, the District Land Use Plan encourages prudent land use. There is no known example of a comparable district-level land use distribution in Peshawar. The proportions of land uses vary greatly, even within urban area. Still, diversity of land uses is clear when comparing Peshawar's patterns to those of other metropolitan regions. Thus, the following outlines the current land use in Peshawar District: Existing Land Use Area of Peshawar.

Figure 6 Existing Land Use Area of Peshawar



The figure shows Pakistan's urban population profile in comparison with other countries in region. Source: SARSU, 2011, World Bank)

Figure 7 Pakistan Urban Population Profile Comparison



Source: https://www.dawn.com/news/1140287

Figure 8 Built-up area of Peshawar in 2007

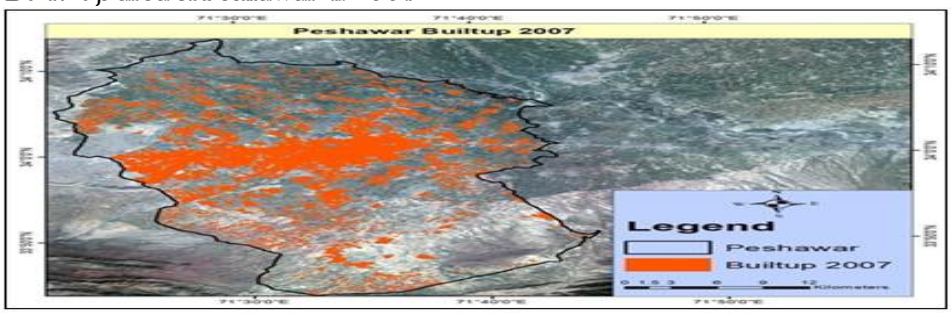
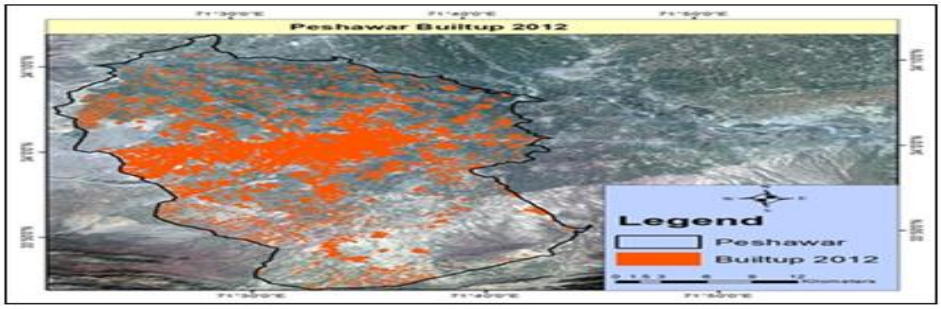
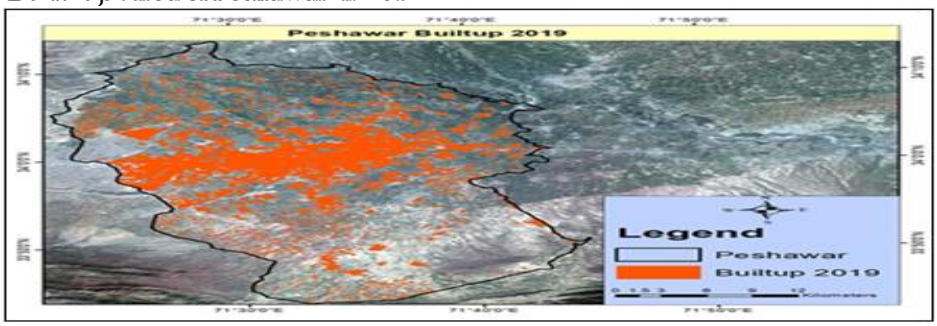


Figure 9 Built-up Area of Peshawar in 2012



Source: https://www.dawn.com/news/1140287

Figure 10 Built-up Area of Peshawar in 2012



DISCUSSION

Founded in 1978, PDA developed structure plans for periods 1986–2001 and 2001–2020 However, overlapping mandates with municipalities and weak legal frameworks hindered implementation, allowing sprawl to spread over fertile farmland. Charged with enforcing the KP EPA 2014, housing schemes of 50 Kanals or more require Initial Environmental Examination, while schemes exceeding these thresholds need a full EIA. Although compliance fees are in place, only a small percentage of developers seek approval. Thus, the responsible for integrated development but has encountered challenges in regulating private housing schemes and coordinating with line departments. The Lax enforcement allows informal settlements and unregulated construction, exacerbating congestion and encroachment.

The Agriculture, Forest, and WSSP departments have limited power to protect farmland and green buffers in face of rapid urban development pressures. Peshawar expansion shows how demographic pressures meet weak city governance. The PDA's plans included agricultural protection zones, but overlapping authority with municipal agencies and the Planning and Development Department hindered enforcement. EPA's IEE/EIA requirements are underused; only 15% of housing schemes (2015–2022) submitted assessments. Compared to Lahore's 47% built-up share in 2020, Peshawar appears less developed, but its prime soils and limited area increase its vulnerability. Lessons from Curitiba's green belt policy and Melbourne's urban growth boundary highlight standing of legally binding zoning.

1. Statutory Urban Growth Boundary (UGB).
2. Transferable Development Rights (TDR).
3. Mandatory ≥ 10 % On-site Green Ratio.
4. Unified Metropolitan Land-Use Authority.
5. Participatory Digital Planning Platforms.

CONCLUSION

The unplanned urban sprawl in Peshawar is quickly consuming fertile farmland and green areas, threatening the city's environment and food supply. This unchecked development stems from weak planning, poor coordination among agencies, and lack of proper land-use policies. If these issues are not fixed with timely reforms, Peshawar could face serious problems, including lower agricultural production, more traffic congestion, and increased vulnerability to climate risks. There's an urgent need for evidence-based planning and coordinated action to steer the city toward more balanced and sustainable growth. To address these issues, first, government should establish a legal boundary for city expansion to protect rural and agricultural land. Second, a strong land-use authority must be created to streamline planning, prevent overlapping roles among agencies. Third, new housing projects be required to preserve at least 10% green space and undergo environmental assessments before approval. Lastly, planning should become more transparent and inclusive by utilizing online platforms and involving the citizens especially local farmers and planners in the decision-making process. Together, these measures can help Peshawar grow in a planned, eco-friendly, and people-centered manner.

REFERENCES

Ahmed, Z. (2013). *Disaster risks and disaster management policies and practices in Pakistan: A critical analysis of the Disaster Management Act 2010. International Journal of Disaster Risk Reduction, 4*, 15–20.

Ahmed, W., Tan, Q., Shaikh, G. M., ... (2020). Assessing and prioritizing the climate change policy objectives for sustainable development in Pakistan. *Symmetry,* 12 (8), 1203.

Cohen, J. E. (2003). The Human population: the next half century. *science*, 302 (5648), 1172-1175.

Coulibaly, B., & Li, S. (2020). Impact of agricultural land loss on rural livelihoods in peri-urban areas: Empirical evidence from Sebougou, Mali. *Land*, 9 (12), 470.

EnvPK (2024). Urbanization: causes, effects, and solutions. https://www.envpk.com/urbanization-causes-effects-and-solutions.

Government of Khyber Pakhtunkhwa & UN-Habitat. (2015). *Peshawar: The City Profile*. United Nations Human Settlements Program (UN-Habitat). Retrieved from https://unhabitat.org

Khyber Pakhtunkhwa Environmental Protection Agency (EPA). (2014). *Khyber Pakhtunkhwa Environmental Protection Act, 2014*. Government of Khyber Pakhtunkhwa. Retrieved from http://epakp.gov.pk.

Kugelman, M. (2014). Understanding Pakistan's unstoppable urbanization. *Pakistan's runaway urbanization: What can be done*, *1*.

Hamidi, A. R., Wang, J., Guo, S., & Zeng, Z. (2020). Flood vulnerability assessment using MOVE framework: A case study of the northern part of district Peshawar, Pakistan. *Natural Hazards*, 101, 385–408.

Quak, E. J. E. (2025). The Pakistan's Potential Value-Added Exports for Economic Transformation.

Planning Commission of Pakistan. (2011). *The Framework for Economic Growth*. Government of Pakistan. Retrieved from https://www.pc.gov.pk/uploads/report/FEG-2011.pdf

Rehman, F., & Khan, A. (2022). Environmental Impacts of Urbanization Encroachment in the Lowlands of Khyber Pakhtunkhwa, Pakistan. *Sustainability, 14*(19), 11959.

Rasul, G., & Ahmad, B. (2012). *Climate change in Pakistan*. Pakistan Meteorological Department.

Seto, K. C., & Reenberg, A. (2014). *The Rethinking about global land use in an urban era*. MIT Press.

Shahid, Z., & Piracha, A. (2016). Awareness of climate change impacts and adaptation at the local level in Punjab, Pakistan. In *Balanced Urban Development* (pp. 409–428).

Ullah, W., & Takaaki, N. (2016). Climate Change Vulnerability of Pakistan to Natural Disasters: A Review. *International Journal of Environmental Protection and Policy,* 4(5), 126.

United Nations Development Programme (UNDP) & Urban Policy Unit, Government of Khyber Pakhtunkhwa. (2020). *Urbanization Trends and Land Use Change in Peshawar*.

Water and Sanitation Services Peshawar (WSSP). (2018). *Annual Report 2017–2018*. Government of Khyber Pakhtunkhwa. Retrieved from https://wssp.gkp.pk

World Bank (2011). *The South Asia Regional Strategy Update*. The Washington, DC.