



# Pakistan Journal of Economic Studies

ISSN (E) 2708-1486 (P) 2708-1478

Volume 8: Issue 4 October-December 2025

Journal homepage: <https://journals.iub.edu.pk/index.php/pjes/index>

## Integrated Land Use Planning and Optimization for Sustainable Urban Growth and Agricultural Preservation in Pakistan

<sup>a</sup>Nabel Akram, <sup>b</sup>Chen Wen, <sup>c</sup>Komal Tariq,

<sup>a</sup> PhD Scholar, School of Government and School of Media and Communication, Shenzhen University, Guangdong, China. [nabeelakram100@gmail.com](mailto:nabeelakram100@gmail.com)

<sup>b</sup> Professor in the School of Government, Shenzhen University, Guangdong, China. [chenwen1122@163.com](mailto:chenwen1122@163.com)

<sup>c</sup> PhD Scholar, School of Government. Shenzhen University, Shenzhen, Guangdong, China. [komaltariq107@gmail.com](mailto:komaltariq107@gmail.com)

### ARTICLE DETAILS

#### History:

Accepted: 24-11-2025

Available Online: 10-12-2025

#### Keywords:

Urban Expansion,  
Pakistan,  
Economy,  
Impacts,  
Agriculture,

#### JEL Codes:

3-5 JEL Codes as per Keywords

JEL Code 1

JEL Code 2

JEL Code 3

### ABSTRACT

**Objective:** This research aims to assess the effects of urbanization on the use of Agricultural Land and Food Security in Pakistan with specific reference to the forces of urban growth in large cities like Lahore and Karachi. The topic chosen for this research is the socio-economic and environmental impacts of transforming arable farmland into urban territories addressing the problems of shortage of housing and resource misuse.

**Research Gap:** This research aims to fill the gap in the literature on the effects of urbanization on agriculture and food security in the case of Pakistan. Despite the availability of many papers that address the issue of urban sprawl, only a few of them provide a detailed account of examining the equilibrium between urbanization and food production in populated areas.

**Design/Methodology/Approach:** The research employs a qualitative research approach, namely a Systematic Literature Review (SLR), to analyze the impact of urbanization on agriculture and food security in Pakistan. Secondary data was sourced from Google Scholar, which yielded articles in JSTOR from 2008 to 2020.

**The Main Findings:** From the result analysis of this study, it can be seen that rapid urbanization in Pakistan, especially in cities such as Lahore and Karachi, poses severe threats to agricultural land, which rapidly threatens food security and triggers environmental problems. Population increase in the urban area is leading to high demand for arable land to provide housing and infrastructure erection, hence low availability of land for farming, which is like a recipe for exacerbating food security problems. Furthermore, the study notes that there is a failure to meet the requirements of planning and a shortage of policies aimed at the protection of the spreading agricultural land, pointing to the need to set urban Conservational policies to address the need to accommodate the ever-growing population and housing, while at the same time ensuring that agriculture land is protected.

**Originality/Value:** As can be observed from the abstracts, it shows the potential of a research that has hardly been conducted before.

© 2023 The authors. Published by PJES, IUB. This is an open-access research paper under the Creative Commons Attribution-Non-Commercial 4.0



### Recommended Citation:

Akram, N., Wen, C., & Tariq, K., (2025). *Integrated land use planning and optimization for sustainable urban growth and agricultural preservation in Pakistan*. *Pakistan Journal of Economic Studies*, 8(4), 314-326. Available at: <https://journals.iub.edu.pk/index.php/pjes/article/view/3703>

Corresponding Author's email address: [nabeelakram100@gmail.com](mailto:nabeelakram100@gmail.com)

## 1. Introduction

Global urbanism and the development of cities offer excellent opportunities but also great difficulties. The population relies on these areas to provide most economic and social amenities (Zhang, 2016). Our precious fertile agricultural land is utilized for homes, buildings, businesses, etc., and for other purposes to meet the people's demands. Well-suited arable land is now being developed to enhance the living standards of society. The land alone provides food to people. Concrete urban centers are experiencing issues and challenges in dealing with the fastest growth rate of population in the developing world. They are accepted as the causes of economic and social development, as the diversity and vitality of people's activities are seen (Kelley, 1988).

It also provides entertainment, employment, possible productivity, and much more. The agricultural sector plays a large role in the nation's sustainable economy. On the one hand, population growth within cities is the main cause of food insecurity; on the other hand, agricultural growth is a food security booster. Pakistan has officially been acclaimed as the most urbanized country in South Asia. Currently, 36.77% of the population lives in cities, which is projected to rise to half by 2025 (Ahmad & Farooq, 2010).

Like other emergent countries of the region, the ones in Pakistan has experienced strong growth of urbanization, which brought significant changes in the population structure and urban population in particular. The infrastructure of major cities and urban spaces is overburdened. For example, out of 6320000 inhabitants of the Lahore area, 1030000 were migrants, which is only 16.4% of the total population. Aside from other socio-economic issues, new squatter colonies set up to accommodate these migrants have created problems with the availability and distribution of water and sanitation, education, and the conversion of Agricultural lands to urban structures (Rana & Bhatti, 2018).

Along the line, there is growing concern as to how productive agriculture neighbors are feeling the heat from metro centers (Abdul & Yu, 2020). Lahore is the second most urbanized city in Pakistan; 84% of its citizens live in the metropolitan area, being 36% of Pakistan's population living in urban areas. Lahore is still growing and expanding now, it is affecting the country by converting productive agricultural fields to build structures to support its ever-increasing population by producing food in equal measure to the population growth (Hashmi, 2011).

There is a major challenge to sustainable management since the Pakistani government is not active enough in protecting farmlands from housing development that encompasses big towns (N. H. Chandio & S. A. J. P. S. S. R. Shirazi, 2022). Now, they are making efforts to probe into two policy tools: need-based allocation and affordable housing. Lahore is in the process of urbanization, however; it is doing so at a slower pace as compared to the previous census rounds. Nonetheless, the present faster-than-average growth rate of 4 percent per year is expected to remain for several decades; by 2025, Lahore alone is projected to be ninety percent urban and fifty-four percent of Pakistan as a whole (Dulal, 2019).

This replacement became a growing commitment towards urbanization and has now led toward the creation of a housing backlog which became 30% of the dwelling units against the demand and toward the economic welfare of Lahore over 40 years It will always be found that a large number of plots with quick service will be unoccupied in the colonies and this brings out the need for policy recommendations (Malik, 2014).

Urbanization offers improvement in lifestyle, livelihood, health care, transport, schooling, and technological civilization. This implies that the flow of employment from rural to urban areas is achieved by enhancing transit. But a major disadvantage associated with this kind of development is that it is done on arable and fertile land, which is our source of food. Most of the land today has been turned into urban development, which has left little or no land available for cultivation; this poses a problem in taking more land to the metropolitan areas to expand more land to suit the population boost.

This conversion of the land process has now become unavoidable. In any country, it is big cities that form the economy. Cities are now realizing a critical growth of population through both, migration and natural increase. It has become almost more common in the third world and poor countries only (Cohen, 2006).

For the absorption of this expanding population, new houses, hospitals, constructions, buildings factories, and roads are developed. Thus, for an opportunity to provide all these things we are utilizing our productive and fertile land. After the agricultural land has been developed and utilized in the urban space, it becomes almost impossible to reverse the division and allow arable use again. On the other side, Resource depletion and Pollution have emerged due to an increasing population. Another factor that has led to the decline in the agriculture sector is the quality of the natural nutrients, since pollution is escalating. Cities are established as a cause of depletion of the ozone layer, global warming, and the cutting down of trees (Craswell, 2021).

Right after its independence, Pakistan has played the role of a migration hub. These people coming from Afghanistan and then from India have contributed much to the population rate of the country. Pakistan was already suffering from a scarcity of food, which made it necessary to save that land. Monitoring of land is crucial in the management of every country for sustainability. The growth in the population and urbanization in Pakistan has taken its toll on us and impacted our agricultural domain by eradicating large areas of arable land at a very fast pace. This has added very serious concerns for food security. Shortly, we have to give our attention to the alarming transformation of fertile and productive land of the country (Tripathi & Rani, 2018).

Department of Agricultural Extension and the Urban welfare authorities are trying hard to convince the actual real estate developers about food security and agriculture, and the welfare of the country is affected by the pace at which the urban regions are growing. Preserving a vast area of the agricultural land is very essential in the country because it is an agricultural nation that relies on agricultural produce to regulate the economy. This is very important for sustaining this wealth, as the agriculture sector is soon becoming our economy's backbone. The main purpose of the study is to provide a focus for future research on urbanization and to show the main and essential issues that are emerging because of the transformation of a country. These problems include the major methodologies, themes, and neglected regions and areas. The research articles published since 2002 and up to 2023 are being considered to provide a modern picture of urbanization in Pakistan (Binswanger-Mkhize & McCalla, 2010).

Attractiveness and increasing rate of urbanization in the concerned cities, such as Lahore, Karachi, Rawalpindi, Peshawar, Quetta, Faisalabad, Multan, and Hyderabad are presented in the following figure. It is also possible to identify the emergence of urban structure. As far as this matter is concerned, attention is required to be paid. Agriculture is the raw form of our state construction, Pakistan being an agrarian country. Sustainable Farming and agriculture are most important for our economy. Urbanization is being. A significant challenge to the economy of Pakistan, and hence constrains it. As a result, they have created an alarming situation. The main aim of this research was to inform the government of this problem.

Agriculture has a major role in enhancing the GDP of countries like Pakistan, which contributes 19.8 percent. As estimated, 41.3% of the population depends on agriculture and agricultural products for their livelihood. If agriculture is 70% and may be directly or indirectly involved the labor force of the country is heavily linked to this sector (Cameron, 2021). In addition, to welfare, a greater proportion of the aggregate exportation of the country stems from agriculture. There is a remarkable change in the flow of the population of the nation and a rising urban-centric decrease in rural areas. This increased number of people who are moving to the urban areas is a major concern because most of the cities are built on agricultural lands, thus a clash between the growth of food and land use.

The aim of my study is quite simple: it will reveal possible outcomes of changing land use, and it will touch upon the paramount importance of planning. Since Pakistan is already experiencing food crises now the

immediate agenda is to prevent our land from being taken anymore. It is for this reason that a sustainable agriculture sector improves a nation's dependency, food security, and future sustainability. In addition, deforestation is always associated with the clearance of land to accommodate a city or a home all of which causes the loss of species and alters the climate of the region. Describing all of these challenges earnestly is beneficial for advocating the cause of sustainable agriculture. This research also seeks to ask about the development of city regions and housing stock in our Pakistani cities, as well as to stress the importance of agricultural produce.

## **2. Literature Review**

While these gains are important, the arable land is now becoming very scarce and unproductive as most people now move to cities in search of better resources. From the different articles that we have read on this topic, we have understood how the expansion of cities impacts farming and agricultural lands. After closely looking at the literature, we were able to notice that there existed two very opposite theories. Some thought this as having an opinion that cities are very advantageous to farming and agriculture since they provide us with an opportunity to use modern techniques in production (Khan et al., 2022).

In Pakistan, various cities continue to expand for the following reasons, migration from rural areas, growth of industry, and finally job opportunities in large cities. Cities like Karachi, Islamabad, and Lahore are expanding even further with more construction, and people are being added to them. This fast expansion has resulted in these problems, there are not enough houses, transport is crowded, and there are not enough basic amenities. Besides, how people live and how the changing communities function are attributed to city life. To know this ongoing conversion more in detail, one must turn to the latest available research on how cities are now being built and how people are living through them (Hussain et al., 2025).

At this stage, we are not able to overcome the situation as the population is increasing rapidly and the agricultural industry of our state is compelled to a most miserable condition. There is an inadequate food supply, which means that the populace cannot afford to put food on their table. The majority of the population lives in these cities in the country. These are the facts about Karachi: Karachi is one of the fastest-growing cities in the world. However, Lahore, Rawalpindi, Hyderabad, and Rawalpindi cities also have a high-density population. Large Cities are places where services and businesses happen, and people work in various jobs, unlike in Large Rural Areas, whose main source of income is from fishing, forestry, and agriculture. Therefore, the general development of a country is linked to agriculture, and that is why policymakers and the government should concern themselves with this problem (Weldesemayat Sileshi et al., 2025).

Literature on land use planning in Pakistan is also drawing more attention to the conflict between the fast urbanization process and the need to conserve farmland. Several studies carefully outlined the principle dynamics of land conversion because of urbanization and the associated ecological impact in 2023. The detailed examination of urbanization-induced changes in the land cover by (Mehmood et al., 2023) shows exponential expansion of built-up lands and a significant drop in carbon reservoirs, thus exemplifying how the spontaneous expansion of cities alters land resources and damages environmental sustainability. The current research highlights the urgent necessity to incorporate the spatial planning instruments, which can foresee the land-system transformations especially in the metropolitan peripheries where fertile agricultural fields are most exposed (Loucif, 2023).

They developed on the theoretical bases, the empirical studies of 2024 were focused on the quantification of certain land-use changes and their implications on sustainable development. Specifically, Saqib examined how green fields are transformed to residential estates where a rational land-use approach should consider the urgency of development against agrarian needs to reduce the susceptibility of food security (Saqib et al., 2024). As evidenced by empirical research conducted in the Bahawalnagar District, agricultural production has been reduced due to the transformation of agricultural land into urban development projects. These findings highlight the fact that land-use and land-cover (LULC) modification do not only impact spatial

patterns but also have a negative effect on agricultural output and soil quality, which remain critical in the development of optimization mechanisms that would enable the maintenance of livelihoods with simultaneous growth (Raza et al., 2024). Still more advanced GIS and remote sensing analyses helped to explain the land-use and land-cover dynamics of a region: Rafique used these methods to record a decrease in the agricultural and open land in Lahore in 1993-2023 with reference to population growth and infrastructure development, and recommended sustainable land-management policies (Rafique et al., 2024). The available literature has collectively highlighted the great urgency of integrating spatial analytical tools in the frameworks of planning governance to enable evidence-based decision-making processes that can rationalize the different land-use demands.

Predictive modelling became part of scholarship in the year 2025, largely combined with holistic planning outlooks. Duan and colleagues (2025) use a hybrid Cellular Automata Markov model to analyze the past and future dynamics of land-use and land-cover of the Okara District and find that there has been a sharp increase in built-up areas, accompanied by a corresponding decrease in vegetated areas. Their results support the use of scenario modelling as a useful tool for planners to predict spatial results to formulate the interventions meant to protect ecological assets. (Duan et al., 2025). As in the case of (Khan et al., 2022). CA -Markov and GIS analyses were used by the authors to evaluate land-use/ land-cover changes in Lahore between 1994 and 2024 and to forecast the future developments; their results highlight a strong trend of urban sprawl to the detriment of vegetated and bare lands, thus supporting the need to implement combined optimization solutions to the land-use planning models (Tahir et al., 2025). Second, larger methodological innovations in remote sensing, such as machine learning and high-resolution data combination, also became instrumental in enabling monitoring of land dynamics at the spatial and temporal resolution of sustainable planning practice (Gadal & Mozgeris, 2025).

Over the last few decades, the academic narrative has remained centred on the urgent necessity to incorporate spatial modelling, predictive analytics, and policy-oriented planning in the fast-growing urban environment in Pakistan. Based on empirical data obtained by remote sensing and GIS studies, it is clear that the loss of productive farmland and the related socio-ecological consequences will continue to increase unless there are organized land-use policies with an express aim to maximize urbanization growth without sacrificing agricultural lands.

### **3. Methodology**

My research follows the qualitative method. The type of research used by the author in the paper is called a Systematic literature review (SLR) (Okoli, 2015). It mainly narrows down to the systematization of such components of the samples of literature review gathered as identification, evaluation, and summarization. Tool: The approach applied to conduct the enquiring of literature is called the systematic literature review (SLR). This is the process of researching to get facts without any prejudice, I used the quantitative method while carrying out my research. In a bid to develop comprehension of the study, I utilized secondary data from the papers that I sourced from the recently published manuscript. It basically involves the systematic identification, evaluation, and summarization of topics of the gathered samples of literature review. Tool: The process used for enquiring the literature is known as the systematic literature review (SLR). This paper adopts a qualitative research method as a form of research to uncover arbitrary data. In realizing the scope of the study, secondary data has been taken from a recently published paper. Literature on OHS is reviewed using Google Scholar and J Store databases. In selecting articles for review, the following criteria were used: relevance of the research area under study, quality of the article, and the most recent study done. This paper is developed through a systematic literature analysis of twenty recent articles published between 2008 and 2020. To determine the causes, results, impacts, and consequences of urbanization, this data was collected, compiled, and analyzed.

The following are the articles that are being reviewed for writing this article.

| Articles  | Year of publication | Author                                |
|---|---------------------|---------------------------------------|
| The impact of urbanization on the agriculture sector: A case study of Peshawar, Pakistan.   | 2015                | (Malik & Ali, 2015)                   |
| Land use conflicts and urban sprawl: Conversion of agricultural lands into urbanization in Hyderabad, Pakistan.                           | 2019                | (Peerzado et al., 2019)               |
| Impact of rapid urbanization on the floral diversity and Agricultural land of the district Dir, Pakistan                                  | 2018                | (Shuaib et al., 2018)                 |
| Implications of urbanization on agricultural land:  | 2022                | (N. H. Chandio & S. A. Shirazi, 2022) |
| Urbanization in Pakistan. In the Keynote address delivered at South Asia Cities conference and Pakistan urban forum                       | 2014                | (Hussain, 2014)                       |
| How Urbanization Affects Agriculture Output from the Perspective of Pakistan. International Journal of Social Science & Entrepreneurship, | 2022                | (Arif & Gill, 2022)                   |
| Determining the role of agriculture towards urbanization: testing the hypothesis. International Journal of Agricultural Extension         | 2022                | (Riaz et al., 2022)                   |
| An analysis of urban sprawl in Pakistan: consequences, challenges, and the way forward.   | 2021                | (Ahmed et al., 2020)                  |

#### 4. Discussions and Findings

From the literature analysis, I understood that there is a decrease in agricultural land because there is so much development going on, and everybody is shifting their houses into buildings. A very large portion of the land, which in the past was dedicated to farming has been consumed by the structures. It is a great loss for the agricultural state. The youth of our state is highly dependent on agriculture for job employment, our economy, and exports. Therefore, all of us are in danger because of the [shrinking of the] cultivated land. It is about time that government officials as well as policymakers paid particular attention to this issue given its ramifications. It means that urban planning has to be done correctly. Consequently, all these products are vulnerable because of the shrinking land for agriculture. It is high time that the Officers of the government and policymakers pay attention to the issue by looking at the effects. There is, therefore, a high appraisal and demand for the planning of urban areas to be done correctly. To physically house such an immense population, towers have to be put in place. That will make some sort of space that we can transform into a fodder-growing ground or any other productive work. A large body of research points to the fact that urbanization is an increase in the rate through population growth, industry, and movement from rural areas to urban areas. Increasing Urbanization Trends: Available literature suggests that rapid urbanization is a phenomenon that is observed and evidenced by increased population growth rates, industrialization, and the movement from rural areas to urban centers. Mass comes to cities for better opportunities they get there, like employment, health, education, and transportation, so that they can live better lives. The problems occur because small places cannot contain such populations. Conclusions that stand out in the study are as follows: Contrary to requirements, 41 percent of the total cultivated land available during the previous 40 years was metamorphosed, occupying 11,4630 acres; further, out of this transformed area, colonies took 18 percent.

Urbanization and the resultant shrinkage of agricultural lands are burning issues that should receive careful and evidence-based policy responses. The following are the policy recommendations that I outline based on the recent scholarly literature, with the specific focus on the works published within 2024 and 2025, which form the basis of each of these recommendations.

#### Promote Integrated Land Use Planning and Zoning Regulations

To achieve sustainable urban growth without compromising arable lands, urban planners should also follow integrative land-use strategies that will simultaneously deal with ecological resilience and food security demands. The empirical study by Saqib (2024) highlights the instrumental importance of GIS-based zoning

and predictive modelling in balancing between urban growth and agricultural land preservation. Further, the paper has argued that the policies that include strict zoning measures can be effective in protecting agricultural land areas against unnecessary conversion, especially in peri-urban milieus where the exposure to land-use transition is magnified (Saqib et al., 2024).

### **Encourage Urban Agriculture through Modern Techniques**

Due to the decreasing supply of arable land, urban agriculture, and most particularly, vertical farming and hydroponic systems need to be considered as part and parcel in the quest to augment food security. These technologically-oriented methodologies have proven to be effective in satisfying the rising demand for food whilst significantly decreasing land use, as shown by the recent research. Policy frameworks should therefore focus on incentives that will contribute to the adoption of such innovations to facilitate the provision of both financial resources and technical skills to ensure the successful implementation of these innovations in the metropolitan settings (Gadal & Mozgeris, 2025).

### **Strengthen Water Resource Management for Agriculture**

Urbanization usually worsens the issue of water scarcity, thus having a negative effect on agricultural output. Rafique, in a recent critical appraisal, stresses the need to have integrated water-management policies that will maximize the efficient use of water in the agricultural sector. It, therefore, behooves policymakers to require the use of irrigation methods that are water-efficient and to lead the adoption of rainwater harvesting systems to reduce the negative effects of urban growth on the water resources (Rafique et al., 2024).

### **Develop Urban-Rural Integration Models**

A policy framework that focuses on rural-urban integration must be promoted in order to curb the loss of agricultural land, and, at the same time, ensure proper urbanization. Empirical research shows that this encroachment by growing urban centres into arable lands interferes with settled livelihoods and community formation. Tahir et al. propose solutions that can be used to maintain the sustainability of rural-urban connections like agro-tourism projects and localized food production, to maintain the cultural and economic ties with the land (Tahir et al., 2025).

### **Implement Climate-Smart Agricultural Practices**

The high rate of urban growth and the growing climate change effects are all the more undermining the agricultural productivity in the world. Therefore, there has been a need to embrace agricultural methods that are resistant to weather changes. (Gravador et al., 2024) recommends that both scientists and policy-makers should prefer the implementation of climate-sensitive technologies as a practical way of responding to changing climatic conditions, with examples being the use of drought-resistant crops and precision-farming equipment. These measures will protect the remaining arable lands and will help in securing the food supply in the long term. The state and federal agencies should thus not only provide the training programs but also financial incentives to the farmers who adopt these sustainable practices.

### **Enhance Public Awareness and Community Engagement**

It is vital to sensitize people on the value of conserving agricultural lands and adopting sustainable land-use development strategies. According to (Saqib et al., 2024). and spatial results to formulate the interventions meant to protect ecological assets. (Duan et al., 2025) Community-based interventions are required to

promote the local involvement of people in urban planning. To promote collective action towards sustainable urbanization, policymakers need to arrange awareness campaigns and involve the local communities in the formulation of land-use policies.

To conclude, the policy recommendations based on academic research highlight the importance of comprehensive, sustainable, and future-oriented ideas on urbanization. These are necessary measures not only for the preservation of arable land but also for the long-term food security and environmental integrity of the growing population of Pakistan.

**Land Use Transformation:** As has been observed from research, there has been a drastic shift in land use, and as a result, agricultural land is rapidly being developed for use as urban land. About 50 years ago, people went to the farms for jobs, and the major livelihood was farming. While it is a food source as well as several export goods and a source of employment for many people, the fertile farmland is gradually being developed for residential and commercial use. Lab analysis of the 14 samples of soil showed that the soil in the residential colonies is slightly loamy to loamy in texture, and it is suitable for the cultivation of numerous crops (Greer, 2012).

**Impact on Agricultural production:** Research over the years also indicates how urbanization reduces farming and, for example, the Ministry identifies factors like competition for water resources, degrading soil, and fragmented land as a result of urbanization. For a country like Pakistan, in which agriculture forms a constituent part of the economic strength of the country, several agricultural products were shipped out of the country. However, due to decreasing agricultural lands, we lack these products. **Population Pressure on Land:** Population pressure is increasingly shown to increase pressure on agricultural land resources, therefore showing the need for proper and sustainable land use management practices to satisfy rising food demands. The population explosion is now putting huge pressure on land to be used for different purposes. This has become very difficult to allocate such a vast population in small micro-regions of the city and still afford them all the necessary amenities. This is followed by the infected conversion of land, which has made it hard to ensure they feed all the people. **Technological Solutions:** According to the various works, increased utilization of modern methods of farming, such as vertical farming and precision agriculture can reduce the impacts of urbanization on the availability of arable land. In this world, which is developing in the area of technology then we should harness it to enhance food production. Therefore, hydroponic culture should be implemented to grow more food, with no soil. We cannot contain the population explosion right now, but we can feed the growing population utilizing modern technology.

**Policy Challenges:** This study reveals that many current land use policies often fail to provide adequate provisions to satisfy the increasing trend of urbanization, which leads to the expansion of urban areas through the encroachment of agricultural fields. The policymakers should be very concerned about this matter. It called for measures that would help contain the population in such areas. Further, the available arable land for agriculture needs to be protected by going forward with policies and laws. **Community Perspectives:** The survey conducted indicates several perceptions concerning the impacts of increasing urban encroachment: people from rural contexts have utilized erosion of traditional and cultural ways of life, and the cultural landscapes. People in concentrated areas come from different regions meaning that everybody leads a very different lifestyle. Culture in agricultural societies differs from that practiced in the urban areas of the country. The lifestyles and the diffusion process are the primary causes of the elimination of traditional values among people within urban areas. **Water Scarcity Issues:** Research conducted in the past has time and again established the link between urbanization and water and the scarcity of water in the high areas for agriculture with many having called for integrated approaches to the management the water resources. Water shortage, therefore, emerges as a critical problem for agriculture. It lowers the water levels for the irrigation of crops, lowers production of food production, and is a barrier to our food security. **Successful Case Studies:** There exists a chance to improve agriculture through collaboration. Together, we can come and install these policies, and then we can all try to work harder for better outcomes. Several case studies highlighted how the

communities have organized themselves, and have put into practice several policies and a style of strategic planning to deal with the challenges that are associated with urbanization coupled with low land availability for agriculture. Now has come the time to perform our responsibility.

**Environmental Consequences:** Such findings underscore the fact that urbanization simply impacts the environment in modern agriculture. Some of these impacts may include reduced biological variety, an appropriate in pollutants, and alterations in the services from the ecosystem that are crucial for farming. Migration to urban areas also has a very large pressure on some areas. People begin using resources and exacerbating pollution, the felling of trees, and human beings change the climate, and the climatic conditions of given regions. **Climate Change Impacts:** Several surveys revealed a relationship between new agricultural land supply, transformation, and impacts of climate change, especially the need to adopt climate-shock-proof agricultural practices in urban and rural settings. Climate change, which is a result of human activities disrupts agricultural productivity, and in addition to this, we must find ways of addressing all these challenges. **Sustainable Land Use Practices:** Scholars reveal how imperative it is to move forward with the sustainable practices of land use, to pay for the loss of valuable arable land. Thus, all the above-mentioned finding has a very significant place in determining the relationship between urbanization and agricultural land and at the same time provide a clear direction to policymakers to ensure the proper management and development of sustainable land use.

## **5. Conclusion**

Developing the sector will not only help in uplifting the general economic growth of the country but also help provide food security. But as it is clear that the population grows, urbanization and the process of environmental degradation in turn pose a long-term impact on the productivity of agricultural products. The simplest research question of my study is: How does urbanization affect a country's agricultural production? To meet this purpose, the study found that the production of a country's agriculture is skewed by the rate of population growth in urban areas. This was realized that an increase in the level of urbanization has a very negative impact on the productivity of agriculture, i.e., as implied by the estimated coefficient of the variable, showing a negative effect of -8.2391 units in agricultural production due to the enhancement of the level of urbanization.

Similarly, the positive change in the level of urbanization appears to be a positive thing for the nation's production of crops. The coefficient value points to the increase in agricultural production with a 1.9750 increase for a unit decrease in the growth rate of the urban centers. On the other side, the study concludes that the Gross fixed capital formation (GFCF) as well as the participation of the labor force rate in general have a very positive and healthy effect on the country's crop output. Besides all these things, foreign debt and Direct Foreign Investment affect agricultural output very drastically. Environmental degradation is established as being instrumental in contributing a minor negative impact, which is virtually insignificant to the agricultural productivity of a country. These findings of my study are highly relevant to the policy implications, which affirm that urbanization must be balanced by providing adequate compensation for the loss of agricultural production, which the TMB benefits and saves the agricultural land of Pakistan. Policymakers are instructed to reorient their efforts to ensure that fertile soils are not converted to urban use.

Thus, ultimate policymakers should also ensure that the external debt is well directed towards the agricultural sector for the better enhancement of farm infrastructure. In the same way, the leaders of the state of Pakistan should offer farmers the ability to get loans and subsidies for raising Pakistan's agricultural yield. To use better seed varieties along with the application of current technologies, more research should be done. This investigation, as it is at the current stage, is very basic or plain and very small in scale. To many people, the economy is a sector in which the agricultural industry dominates. The agriculture industry includes products from crops, livestock, forestry, and fishing industries. Therefore, we have to keep our attention on them, and

we are also going to continue our focus on them.

The aspect of unfair play that I found in my study is urbanization. As is very vivid in the effects of growing urbanization it has on agriculture, further research on the subject might reveal the correlation between Pakistan's particular subsectors of agriculture and urbanization. However, due to the limitation of time series data, the sustainability of the impacts of urbanization on the availability of groundwater levels is not analyzed. More such studies may also look at the correlation between urbanization within a country and the levels of underground water. One of the well-identified factors influencing agricultural areas is urbanization. This paper posits that this agricultural output has value bearing on food security and the enhancement of economic growth. Development, deforestation, pollution, and climate change have been a result of population expansion, mainly within urban areas. There is hence a need for policymakers to nurture legislation that would help protect the valuable fertile, and arable land. Clear and concise laws governing action, as well as rules serving as a guideline to those actions are crucial to ensure the correct development of urbanization by protecting the agricultural land. The few recommendations that were based on the review of the literature are as follows:

**5.1 Integrated Planning:** Efforts to advocate comprehensive city planning are the best bet to achieve the right measure of shielding agricultural land while addressing the need for city growth. To ensure the sustainable utilization of land, we have to encourage such cooperative settings between cities and rural planning.

**5.2 Technology Adoption:** Encourage the consumption of the relatively new Cuisine technology that is Agriculture i, e Vertical farming techniques and precision farming enable the generation of high yields in small spaces. Emphasizing smart approaches in farming may be useful in reducing the impact of urbanization on the existing areas fit for farming.

**5.3 Policy Reforms:** Providing recommendations for the policy changes that address the problems of land destruction and the segmentation created by urbanization. Providing suggestions for the legislation's creation to protect the important agricultural lands, and the bonuses for the stable management of the soil.

**5.4 Community Engagement:** It highlights why and how the neighborhood groups must be engaged while making decisions that relate to change in the use of land. Promote Instructions and Consciousness. Promote programs that create consciousness and learning, which will help societies receive benefits and adapt to urbanization.

**5.5 Water Resource Management:** Support system management of water in the urban and agricultural sectors to achieve the goals of the water shortages. Problems with laws that support sustainable water usage to help agriculture and urban development.

**5.6 Global Collaboration:** To introduce such global problems as urbanization and limited availability of land for agriculture, and to enhance understanding of such international concepts as cooperation and exchange of information. Exhibit the efficiency of encouraging the sharing of the right approaches and the solutions that are employed in different places.

**5.7 Climate-Resilient Agriculture:** Encouraging the practice of climate-smart agriculture to make up for some of the effects of climate change on both rural and urban areas. Highlight sustainable farming from the aspect of global warming.

**5.8 Sustainable landscaping:** Promote green space in the metropolitan areas to improve the environmental quality and, further, to provide them with recreation. Promote legislation that leads to the formation of

sustainable landscaping as well as urban green spaces.

**5.9 Monitoring and Evaluation:** To evaluate the effectiveness of land use policies, underline the importance of supplementing ongoing assessment and control. Please make a full proposal for the development of indicators for how urbanization impacts the sustainability of the environment, as well as agricultural productivity.

**5.10 Public-Private Partnerships:** Encourage partnerships in the public as well as in the private sectors for the implementation of enduring decisions. Discuss the possibilities of cooperation with public and private entities that support the goals of agriculture and cities' development. Through sustainability and the assurance of the full method, all of these endeavors try to address the concerns evoked by urbanization and the shortage of arable land.

## 6. References

- Abdul, L., & Yu, T.-F. J. U. S. (2020). Resilient urbanization: a systematic review on urban discourse in Pakistan. *4*(4), 76.
- Ahmad, M., & Farooq, U. (2010). The state of food security in Pakistan: Future challenges and coping strategies. *The Pakistan Development Review*, 903-923.
- Ahmed, S., Wu, H.-f., Akhtar, S., Imran, S., Hassan, G., & Wang, C.-y. (2020). An analysis of urban sprawl in Pakistan: consequences, challenges, and the way forward.
- Arif, M., & Gill, A. (2022). How Urbanization Effect Agriculture Output in Perspective of Pakistan. *International Journal of Social Science & Entrepreneurship*, 2(2), 398-413.
- Binswanger-Mkhize, H., & McCalla, A. F. (2010). The changing context and prospects for agricultural and rural development in Africa. *Handbook of agricultural economics*, 4, 3571-3712.
- Cameron, J. (2021). Labour force analysis as a means to understand the livelihood dimension of sustainability. In *Approaches to Sustainable Development* (pp. 50-82). Routledge.
- Chandio, N. H., & Shirazi, S. A. (2022). Implications of urbanization on agricultural land: A case study of khairpur district, Pakistan. *Pakistan Social Sciences Review*, 6(2), 232-240.
- Chandio, N. H., & Shirazi, S. A. J. P. S. S. R. (2022). Implications of urbanization on agricultural land: A case study of khairpur district, Pakistan. 6(2), 232-240.
- Cohen, B. J. T. i. s. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. 28(1-2), 63-80.
- Craswell, E. J. S. A. S. (2021). Fertilizers and nitrate pollution of surface and ground water: an increasingly pervasive global problem. 3(4), 518.
- Duan, X., Haseeb, M., Tahir, Z., Mahmood, S. A., & Tariq, A. (2025). Analyzing and predicting land use and land cover dynamics using multispectral high-resolution imagery and hybrid CA-Markov modeling. *Land Use Policy*, 157, 107655.
- Dulal, H. B. (2019). Cities in Asia: how are they adapting to climate change? *Journal of Environmental Studies and Sciences*, 9(1), 13-24.
- Gadal, S., & Mozgeris, G. (2025). Advances of Remote Sensing in Land Cover and Land Use Mapping. *Remote Sensing*, 17(1980), 2-7.
- Gravador, R. S., Haughey, S., Meneely, J., Greer, B., Nugent, A., Daniel, C. S., & Elliott, C. (2024). Reports of tropane alkaloid poisonings and analytical techniques for their determination in food crops and products from 2013 to 2023. *Comprehensive Reviews in Food Science and Food Safety*, 23(6), e70047.
- Greer, A. J. T. A. H. R. (2012). Commons and enclosure in the colonization of North America. 117(2), 365-386.
- Hashmi, M. S. J. M. (2011). Land distribution, technological changes and productivity in Pakistan's agriculture: Some explanations and policy options. 1(1), 51-74.

- Hussain, I. (2014). Urbanization in Pakistan. Keynote address delivered at South Asia Cities conference and Pakistan urban forum,
- Hussain, Z., Naz, N., Zulfiqar, N., Tahir, M. I., & Yousaf, M. (2025). The Role of Sustainable Migration in Pakistan's Socioeconomic Development: A Comprehensive Analysis of Patterns, Impacts, and Policy Frameworks. *Journal of Media Horizons*, 6(1), 122-138.
- Kelley, A. C. J. J. o. e. l. (1988). Economic consequences of population change in the Third World. 26(4), 1685-1728.
- Khan, I., Akram, A., Fatima, S., Ahmad, B., Rehman, Z., Arshad, N.,...Ahmad, Z. (2022). Problems of agriculture in Pakistan: an insight into their solution. *Pakistan Journal of Biotechnology*, 19(02), 73-83.
- Loucif, A. (2023). Accelerating Digital Transformation to Achieve Sustainable Development in Algeria. *Agathos*, 14(2), 225-240.
- Malik, H. B. (2014). *Enabling and inhibiting urban development: a case study of Lahore Improvement Trust as a late colonial institution* [Massachusetts Institute of Technology].
- Malik, R., & Ali, M. (2015). The impact of urbanization on agriculture sector: A case study of Peshawar, Pakistan. *Journal of resources development and management*, 8, 79-85.
- Mehmood, M. S., Rehman, A., Sajjad, M., Song, J., Zafar, Z., Shiyan, Z., & Yaochen, Q. (2023). Evaluating land use/cover change associations with urban surface temperature via machine learning and spatial modeling: Past trends and future simulations in Dera Ghazi Khan, Pakistan. *Frontiers in Ecology and Evolution*, 11, 1115074.
- Okoli, C. J. C. o. t. A. f. I. S. (2015). A guide to conducting a standalone systematic literature review. 37.
- Peerzado, M. B., Magsi, H., & Sheikh, M. J. (2019). Land use conflicts and urban sprawl: Conversion of agriculture lands into urbanization in Hyderabad, Pakistan. *Journal of the Saudi Society of Agricultural Sciences*, 18(4), 423-428.
- Rafique, M., Majeed, M., Shakeel, A., Iqbal, T., & Raza, Z. (2024). Land use land cover change detection of district Lahore using GIS and remote sensing (1993-2023). *Pakistan Journal of Forestry*, 74(1), 24-31.
- Rana, I. A., & Bhatti, S. S. J. C. (2018). Lahore, Pakistan—Urbanization challenges and opportunities. 72, 348-355.
- Raza, A., Shahid, M. A., Safdar, M., Zaman, M., Sabir, R. M., Muzammal, H., & Ahmed, M. M. (2024). Impact of Land Use and Land Cover Change on Agricultural Production in District Bahawalnagar, Pakistan. *Environmental Sciences Proceedings*, 29(1), 46.
- Riaz, N., Akram, W., & Javed, I. (2022). Determining the role of agriculture towards urbanization: testing the hypothesis.
- Saqib, S. E., Kaleem, M., Yaseen, M., Yang, S.-H., & Visetnoi, S. (2024). From green fields to housing societies: Unraveling the mysteries behind agricultural land conversion in Pakistan. *Land Use Policy*, 144, 107256.
- Shuaib, M., Ali, K., Ahmed, S., Hussain, F., Ilyas, M., Hassan, N.,...Hussain, F. (2018). Impact of rapid urbanization on the floral diversity and agriculture land of district Dir, Pakistan. *Acta Ecologica Sinica*, 38(6), 394-400.
- Tahir, Z., Haseeb, M., Mahmood, S. A., Batool, S., Abdullah-Al-Wadud, M., Ullah, S., & Tariq, A. (2025). Predicting land use and land cover changes for sustainable land management using CA-Markov modelling and GIS techniques. *Scientific Reports*, 15(1), 3271.
- Tripathi, S., & Rani, C. J. I. J. o. U. S. (2018). The impact of agricultural activities on urbanization: Evidence and implications for India. 22(1), 123-144.
- Weldesemayat Sileshi, G., Barrios, E., Lehmann, J., & Tubiello, F. N. (2025). An organic matter database (OMD): consolidating global residue data from agriculture, fisheries, forestry and related industries. *Earth System Science Data*, 17(2), 369-391.
- Zhang, X. Q. J. H. i. (2016). The trends, promises and challenges of urbanisation in the world. 54, 241-252.

### **7. Disclosure Statement**

Regarding the authors' affiliations, interests, wishes, and opinions, the authors say that they have no conflict of interest and declare it in this statement.

### **8. Acknowledgments**

First and foremost, I would like to deeply thank Chen Wen for their supervision and suggestions on this research. They contributed immensely throughout this paper through their technical knowledge and constructive criticism. Additionally, I appreciate the resources provided by the key National Social Science Fund project: Research on Modernization of Governance System and Governance Capacity in megacities (22AZD141).

National Social Science Foundation General Project, Research on the Development of Western Urban Politics. (20BZZ055).

### **9. Disclaimer**

The work presented in this paper is the personal opinion of the author and does not represent the views or opinions of any organization.