

An Analysis of Urban Sprawl in Pakistan: Causes, Consequences, And Policies Analysis

Nooreen Mujahid

Chairman

Department of Economics, University of Karachi

Email: nooreenmujahid111@yahoo.com

noreen@uok.edu.pk

Azeema Begum

Senior Executive Research Analyst

Saviours

Email: azeema@saviours.co

azeemausman@hotmail.com

Abstract

Urban sprawl is stressed on urban growth which is not suitable either for urban growth or rural environment in real sense. It is carried out in an uncontrolled and disorganized way which hinders regional sustainable development can be deprived of infrastructure services, basic facilities such as health, education. There are main cities in Pakistan that are highly urbanised cities such as Karachi, Lahore, Islamabad, Lahore Unplanned urbanisation has posed critical issues and challenges due to institutional inefficient and the failure of government. The main goal of this study is to analyse the increasing urban sprawl, its causes, and consequences on urban development and infrastructure and the growing urban divide. This stud identifies the urban sprawl issues and their links with policy failures due to which service delivery of institutions has been badly compromised. This stud is exploratory and causal-comparative in nature with extensive review of the literature and scholarly investigations using secondary data. Migration, development of pre-urban areas around the outer rim of the installation of industrial units, improved infrastructure and population growth are major reasons behind urban sprawl in Pakistan. This study provides several essential guidelines to policymakers for recent and futuristic requirements of the city. The government should naive the urban vision and work in tandem with all relevant stakeholders for setting the objectives of sustainable urban development. On the other hand, the development of it should also ensure the contribution of marginalised communities in order to reduce the economic gap between rich and poor. There is a dire need for quantitative and mixed-method research to understand and have an insight into the underlying factors of Urbanization in Pakistan.

Keywords: Urban Sprawl, Urban Development, Pakistan

1. Introduction

Urban sprawl is one of the important issues in the cities for developed and developing countries. In the last few decades, cities have defined and specific boundaries, however; they have missed their realms by disproportionate growth today (Hamidi, Ewing, Preuss, and Dodds, 2015). The concept of "Urban Sprawl" defines more growth than the traditional and what makes it different from urban growth (Holcombe, and Williams, 2010). Cities tend to grow however; if the growth is planned then there is a suitable share between urban growth and urban organism. If urban growth is more than normal it gives strong pressure on the boundaries of the city and causes the main problem. Commonly it is considered as unplanned, uncontrolled growth of the inner city towards its periphery resulted in a pressure on the development around the boundary and contributed to negative impact (Seto, Guneralp, and Hutyrá, 2012; d'Amour et al., 2017; Ewing, Pendall, and Chen, 2003; Sudhira, et al., 2007; Verbeek, Boussauw, and Pisman, 2014).

Angel (2007) defines sprawl as "the formation of extensive and infinite borders of metropolitan areas". Ewing et al. (2003) define urban sprawl as low-density development with segregation of land uses, such as residential, commercial and office use, which lacks dynamic activity centers and gives people little options to choose their access ways. According to Maier, et al. (2006) "urban sprawl is a type of land use in an urban area that has low levels of density, continuity, concentration, clustering, centrality, nuclearity, mixed-use and proximity". Zebardast and Habibi (2009) define urban sprawl as "expansion of the city and its suburbs on rural and agricultural land". They believe that residents of sprawled neighborhoods tend to live in nearby single-family homes and commute by car. The low density is one of the main indicators of this type of urban expansion. Residents of sprawled neighborhoods tend to avoid pollution and prefer to live in a low-density region (Zebardast, and Habibi, 2009).

It is said that urban sprawl is highly related to urban development because urban growth is one of the processes of urban development irrespective of urbanisation however; its features of its occurrence are quite common causing its implications to be so widespread (Sajjad and Iqbal 2012). Urban development is regarded as complicated physical and spatial change that impacts other dimensions such as social, economic, demography, politics, and the environment. According to Barnes et al., (2001), irrespective of urban development, urban sprawl is a response to frequent incomprehensible sets of "economic, social, political, and physical forces". These forces are major "municipal fragmentation", "the patterns of infrastructure investments", "subsidisation of infrastructure from cities". Several studies have also highlighted that it is very crucial to explore its numerous dimensions in the wider contexts in order to control, and prevent its negative effects (Sudhira, et al., 2004; Arribas-Bel, Nijkamp, and Scholten, 2011; Hamidi and Ewing, 2014; Nechyba, and Walsh, 2004; Terzi and Kaya, 2008). In developing countries, cities are experiencing urban sprawl due to the rapid urbanisation process and horizontal urban expansion (Liu et al., 2018). It is very challenging for sustainable usage of urban land (Hennig et al., 2015). Hence; it emphasizes on necessity and significance of giving attention to sprawl in Pakistani cities particularly Karachi. There is a need to understand that urban sprawl is not considered as a level of development but it threatens the presence of natural resources through extensive use of lands in the major cities of developing countries (Terzi and Bolen, 2009). On the other hand, few researchers have also highlighted the positive impact of urban sprawl in terms of provision of quality and affordable housing, or provision of housing for racial minorities, observance to the free economy, market rules and consumer preferences, (Nechyba and Walsh, 2004;

Patacchini, et al., 2009; Borgart, 2006), however; the majority of urban development thinkers have pointed out the negative impact of urban sprawl and suggested solutions to deal with this issue (Wassmer, 2008; Squires, 2002; Habibi, and Asadi, 2011).

The increasing urbanisation has brought numerous opportunities however; it has posed serious challenges if it is not handled with proper planning (Ahmed, et al., 2021). If the rate of land expansion in urban areas is higher than the population growth rate, it may cause to decline in population density in urban areas and the phenomenon of urban sprawl will occur (Hussain 2016). The major factors behind urbanisation in major cities of Pakistan are the proximity of location due to seaport, employment opportunities due to the financial hub and major industrial base, adequate education and health facilities. Without proper urban planning or strategy, the cities are experiencing sprawling which leads to challenges of development of informal and unauthorised settlement, housing shortage, poorly or “illegal designed residential and commercial areas”, “excessive pressure on the availability of services”, “issues of sanitation, pollution”, “lack of access to water”, “over-crowding and other social problems”. Due to institutional inefficiency and governance failure, rural lands have been transformed into industrial, commercial and residential areas without the implementation of any urban planning schemes in Pakistan. The extensive conversion of rural lands for urbanisation has resulted in the sprawl phenomenon since 2000, that led to the loss of agricultural lands, rising commuting costs and flooding. Due to unplanned urban sprawl, several social issues have also been raised such as lack of education and health care facilities, infrastructural issues, raise in criminal incidents and socio-cultural imbalance (Hussain 2016). Furthermore; due to ineffective institutions, lack of vision and dynamism of the leadership and political intervention have also weakened the capacity of the institution. Furthermore; the deteriorating socio-economic issues, stability conditions, deprived living criteria in rural sub-urbs have also resulted in disorganised urbanization attached with insufficient infrastructure that produced economic disparities (Hasan 2016). The major causes of urban sprawl in Pakistan are internal migration, real estate business, conversion of agricultural land, to develop housing colonies, and commercial buildings, development of infrastructure and population growth (Farah, et al., 2012; He, et al., 2016; Ali Siyal, et al., 2018; Hasan, 2010; Khan, et al., 2014; Peerzado, et al., 2018; Farah, et al., 2016). It has also affected the agricultural sector due to a decline in arable land rapidly with leads to the issue of food security soon (Yousaf et al., 2018). Thus, the rapid urban sprawl has also brought challenges for the “urban development authorities” and the “agricultural extension department” for convincing real estate developers related to agricultural sustainability and food security.

1.1 Objective of the Study

This study aims to explore the theoretical literature related to causes, consequences, and policies of urban sprawl in the context of Pakistan. Although, urban sprawl is a highly discussed topic, however; there are limited studies that explored its causes, consequences and policies focusing on cities of Pakistan. Hence this study will fill the gap in the literature related to urban sprawl and in the context of the largest cities of Pakistan

1.2 Research question

This study will try to answer the two main research questions:

- What are the major causes and consequences/ challenges of urban sprawl in Pakistan?
- What are major effective policies to control and prevent urban sprawl in the context of Pakistan?

2. Review of Literature

2.1 Concept of Urban Sprawl

Studies related to urban sprawl have been conducted by urban planners who explored this phenomenon from a "multidisciplinary perspective". Urban sprawl is considered as It is understood that urban sprawl is not only "a physical phenomenon of the dispersion of buildings and expansion of the space occupied by the city that encompasses different disciplines: geography, urban planning, environmental analysis, economics, sociology and even policy science" (Torrens, 2008) Due to consideration of these factors, several definitions have been presented by many scholars and researcher which include the intricacy and multidiscipline aspect of urban sprawl portent. According to Galster et al., (2001), "a pattern of land-use in an urban area that exhibits low levels of some combination of eight district dimensions: density, continuity, concentration, clustering, centrality, nuclearity, mixed-used and proximity". Similarly, Squires (2000), defined that "pattern of urban and metropolitan growth that reflects low density, automobiles-dependent, exclusionary new development of the fringe of settled areas often surrounding a deteriorating city is called urban sprawl". On the other hand Burchell (2003) also defined the phenomenon of urban sprawl as "low-density occupation, leapfrog development characterized by unlimited expanses". It has some characteristics in terms of dispersion of urban land, which affected rural areas and fit chiefly due to low population density that expanded outside of joined city centres.

2.2 Characteristics of Urban Sprawl

Several studies have discussed the major characteristics of urban sprawl. For instance, the characteristics of urban sprawl have been explained by Gordon and Richardson (2001) which related several issues in terms of inequality, rising costs of housing, environmental degradation, long-distance, agricultural loss, health and mental problems. Among those characteristics, Ewing et al (2002) highlighted that urban sprawl pushed more distance and increased the number of the car, polluted the air, and *increase* the traffic risk. Carbonell and Yaro, (2005) have highlighted proximities of perimeter roads which is a phenomenon that has been observed in small cities which impacted both rich and poor income populations. Low density has also been defined as major characteristic by Aurand (2007), which predominantly explain living in buildings that are located far from commercial areas such as shopping centre or markets. Moreover; the diffusion of boundaries of urban expansion is also a major characteristic of urban sprawl which is a phenomenon of extension of per—urban areas towards its outside boundaries (Ojima, and Hogan, 2008). Slaev and Nikivorof (2013) have also described the major characteristic of urban sprawl in terms of low density in new expansion areas, sparse and scattered forms, with incoherence inclinations; absence of modifications in use of urban land and activity, growth of city centres, public service and trade centres. Furthermore, they also highlighted the major element which is the lack of balance between trends of markets, and policies that permit market participation for determining the use of land in suburban areas, however; it ignores the context of public interests and sustainability aspect. Furthermore, Polidoro, et al., (2012) have also explained some features of urban sprawl in terms of land use, poor accessibility between nearby land use, lack of operational open place, presence of brownfields in unrestrained urban areas, high dependency on automobiles, weak public transportation, land conversion of agricultural land, condensed compact settlement procedures, increasing burden of tax and high cost in facilitating public service. Rubiera-Morollón, and Garrido-Yserte, (2020), low density, unrestricted outer expansion, spatial segregation of various use of land, leapfrog development decentralised holding of land, advantages of transports, destruction of land-use authorities, and differences in local administration fiscal capability.

2.3 Urban Sprawl in Pakistan

Many South Asian countries such as Bangladesh, Sri Lanka, and Pakistan use administrative rules to assess whether the settlement is urban or not the areas are considered as urban if they come under the jurisdiction of "metropolitan corporation", "municipal corporation", "municipality", "town

committee”, “urban council and cantonment”. However; the size of the population, population density, and non-agriculture labors are also considered along with administrative evaluation of criteria related to an urban area (United Nations 2006). The procedure of urbanisation pushed agricultural labor to migrate from agricultural employment to manufacturing employment which increases the demand for basic services (Farah et al., 2012). hence the increasing urban population requires support through strong institutional governance to address the issues through rules and regulations (Glaeser, et al., 2004; Rodrik, Subramanian, and Trebbi, 2004). According to Bhatti, et al., (2015), the prosperous cities centres require to have the provision of employment, better health and education facilities, a safe environment, clean neighbourhoods, proper transportation and convivial room for all residents (Inman, 2009) Although, cities of developing countries are a major hub of economic and cultural activities however; they are not ecologically sustainable. Hussain (2016), has also highlighted that unplanned urbanisation has posed severe issues in Pakistan due to institutional inefficiency, failure of governance and ineffective urban development authorities failure. It has been identified that urban issues have been linked with policy failure hence, delivery of service of the institutions has been affected which resulted in the economic divide in the cities. It has been advised that government should adopt an urban vision and work in tandem along with all stakeholders in order to set an objective for sustainable development of cities. On the other hand, there is also a need to ensure the contribution of marginalised groups and minimise the economic gap. It has been concluded that urban experience in major cities is moving towards real disgrace due to infrastructure, low quality of delivery of service, and uneven sharing of economic assistance.

Furthermore; several studies have also highlighted that the main factors of urbanisation in Pakistan are internal migration (Farah, et al., 2012; He, et al., 2016; Ali Siyal, et al., 2018). Illegal real estate development that impacted conversion of agricultural land to developing housing colonies, and commercial building (Hasan, 2010; Khan, et al., 2014; Shuaib et al., 2018; Peerzado, et al., 2018), several economic, political and social factors, (Kugelman, 2013), population growth and infrastructure development (Shuaib, et al., 2018; Sören, 2015), socio-economic issues (Farah et al., 2016).

According to Yousaf et al., (2018), rapid urban sprawl has affected agricultural land conversion which resulted into declining of arable land and Pakistan might face the issue of security in the upcoming time. Furthermore, it has also been highlighted that urban sprawl has also posed challenges for urban development and agriculture departments to persuade real estate developers related to agricultural sustainability and food security. Ahmed et al., (2020), have also stated that Pakistan is facing a higher rate of urbanisation in the South Asian region. The study explored the common situation of urban sprawl in Pakistan using literature analysis. This study has explored several causes, consequences, and impacts of urban sprawl on migration, conversion of agricultural land, patterns of land ownership, pollution, water issues etc. It has been found that internal migration, expansion of peri-urban location near boundaries of the cities, industrial zone development, population growth and better infrastructure are major causes of the fastest urban sprawl in major cities of Pakistan.

3. Research Methodology

In this section, we have explained the research methodology that has been followed in this study to answer the research questions. According to Higgins and Green (2011), “a systematic review is a literature review that identifies, critically evaluates and integrates the available research findings of sufficient quality concerning a specific research question or subject, with the ultimate aim of providing informative and evidence-based insights” In order to avoid the ostensible feebleness of narrative review, this stud has used a systematic literature-based approach, which is based on five stages that have been proposed by Denyer and Tranfield (2009). Figure 1 shows the five steps of conducting a systematic review of the literature.

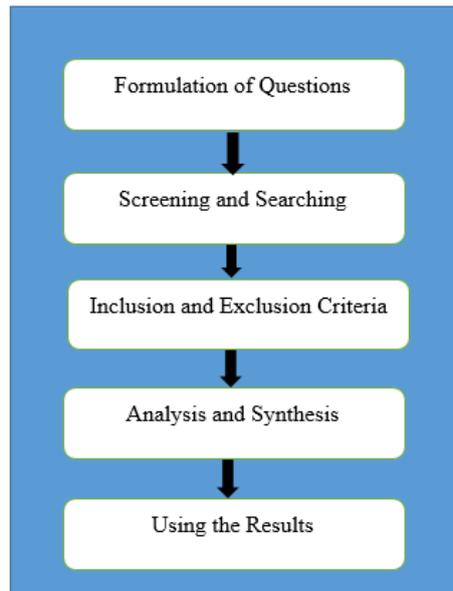


Figure 1: Systematic Literature Review (adapted from Denyer and Tranfield, 2009).

3.1. Formulation of Question

Given the fragmentation related to urban sprawl studies, this study aims to explore the major causes, consequences and policies in the context of Karachi cities. Using a systematic literature review (SLR). Hence; the review questions are “What are major causes and consequences/ challenges of urban sprawl in the Karachi city?” and “What are major effective policies to control and prevent urban sprawl in the context of Karachi city?”

3.2. Screening and Searching the Studies

After the formulation of the research question, online sources have been used to find the relevant studies using an electronic database such as "Research Gate", "Google scholar", "Emerald", and "Wiley Online". In order to find the most relevant literature related to “urban sprawl”, “causes or factor of Urban sprawl”, “challenges of Urban Sprawl”, etc. Although the urban sprawl is relatively new in the context of national studies, hence it is a lack of distinguished research area. In this stud, articles were chosen that were published after 2011. The selected number of studies was six from google scholar, three from research gate and 1 from Emerald.

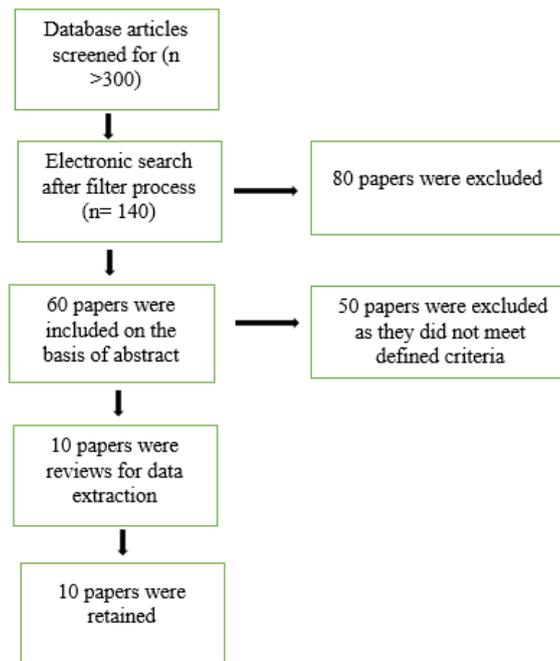


Figure 2: *Screening Process*

Figure 2 provides the screening process for searching the most relevant articles for the study. Initial more than 300 papers were explored using keywords. On the basis of title and abstracts related to the subject matter, 140 papers were selected. In order to take the most relevant studies, a duplicate removal process and an abstract-based screening of the review of findings were performed and 60 papers were excluded. During this process, 50 articles were excluded if they do not fulfil inclusion criteria. The major reasons for excluding the articles are that these articles were not reflecting or addressing the research subject, the full-text was not available in the English language, or articles addressed urban sprawl that were not related to the objective of the study. Furthermore; on the basis of full-text screening of studies, 10 studies were finalised.

3.3 Inclusion and Exclusion Criteria

At the initial stage, the titles, abstracts, summaries, and full-text of the studies have been reviewed for selecting relevant materials. In the next step, inclusion and exclusion criteria were determined for the screening process of articles. On the basis of inclusion criteria, all studies that explored the concepts of urban sprawl in the context of developing countries have been taken. The criteria were linked to the research questions study's discussion, concepts and definition of the urban sprawl. On the other hand, all studies that were related to urban sprawl in the context of Pakistan have been taken. Several studies that have been also related to exploring major factors and challenges, have also been considered in the literature review. The studies that were based on GIS and remote sensing or any another techniques, have not been taken in the study due to the main objectives which mainly focus on exploring causes and consequences of urban sprawl. Studies related to urbanisation or urban growth have also been not considered because. Furthermore, all studies that have been published after 2000 have been considered, whereas; screening and search of articles were limited from scholarly, peer-reviewed journals in the English language.

3.4 Analysis and Synthesis

The particular literature has been examined descriptive and thematic content using two reviewers who revised a considerable sample of the studies' earlier discussion of findings and separated studies. The descriptive analysis part was focused on categorising the studies by years and journals and key findings of each study. On the other hand, thematic analysis has been used to explore and understand the causes and consequences of urban sprawl and policies and strategies to prevent and control the issue of urban sprawl in Karachi.

3.5. Using the Results.

In the final step, all selected studies were critically evaluated and reviewed in relation to the topic and main objective of the study. Thus, literature was explored, analysed and reported as the final tomes using thematic analysis that was derived inductively from selected studies.

4. Findings and Analysis

Ten studies have been analysed in this section in terms of publication years, journal and overview of the selected study.

4.1 Descriptive Analysis

4.1.1 Years of Publication

All selected studies have been published from 2011. It can be seen that two papers were published in 2013, and 2020 whereas one paper was published in 2016, 2017, 2018 and 2019 respectively. With time, it is expected that publication will rise in the context of exploring causes, consequences, and policies in Pakistan.

Table 1: Years of Publication

Years of Publication	Number of Articles
2011	1
2013	2
2015	1
2016	1
2017	1
2018	1
2019	1
2020	2
Total	Ten (10)

Source: Compiled by Author

4.1.2 Name of Journals

These selected studies were published in different journals, such as “*International Journal of Agricultural Extension*”, “*Procedia Engineering*”, “*Sindh University Research Journal-SURJ*”, “*Sci.Int*”, “*and Environment and urbanization*”, “*Journal of the Saudi Society of Agricultural Sciences*”, “*Urban Science, Pakistan. J Civil Environ Eng*”, “*Journal of Geography and Regional Planning*”, whereas; one paper was published as “*working paper for the International Growth Centre, London School of Economics, London UK*”. All journals are related to subject matter that linked to the exploration of urban sprawl in the

context of Pakistan and what are major causes and consequences. Furthermore; several other dimensions of urban sprawl have also been covered by these journals that have significantly contributed to literature for further analysis.

4.1.3 Overview of the Selected Studies

In this study, ten studies have been selected for literature review analysis, A brief overview of the selected studies have been presented in term of Author name, objective, research method and data collection and analysis techniques.

Table 2: Overview of the Selected Studies

	Author	Objective	Research method	Data collection and analysis
1	Qureshi (2013)	The study aims to highlight the issues of urbanisation such as “urbanization trend”, “environmental quality”, “socio-cultural imbalance”, and urban planning.	Qualitative	Literature analysis through Secondary source
2	Habibia and Asadi (2011)	This study aims to explore the urban sprawl characteristics, causes and consequences while exploring the suitable policies to deal with this issue.	Qualitative	Literature analysis through Secondary source
3	Hasan (2015)	This study has described the complicated process by which land is made available for housing, industrial and commercial purposes.	Qualitative	Literature analysis through Secondary source
4	Akhtar, and Dhanani (2013)	This stud has explored the phenomenon of urban sprawl in Karachi.	Quantitative	Primary data through the stratified random method from 1000 respondents
5	Mangi et al., 2019	This stud aims to comparatively investigate the trend of urban development of two metropolitan cities Beijing and Karachi in the context of urban sustainability.	Qualitative	Secondary source
6	Hussain (2016)	The study aims to analyse the growing trend of urban sprawl and its effect on urban infrastructure and economic divide in the city	Qualitative	Literature analysis through Secondary source
7	Ahmed et al., (2020)	The study aims to review the studies to explore the existing condition of urban sprawl in Pakistan.	Qualitative	Literature analysis through Secondary source
8	Peerzado et al., (2018)	.the stud objective is to find the nexus between urbanisation and conversion of agricultural land in the Hyderabad	Quantitative	Primary source through open-ended and close-

				ended questionnaire from 192 respondents and secondary sources from Hyderabad Development Authority (HDA)
9	Abdul and Yu (2020)	The main aim of the stud is to identify the challenges of urbanisation particular for developing countries like Pakistan	Qualitative	Literature analysis through Secondary source
10	Yar, S.A., 2017	The paper aims to address the issue of urban sprawl expansion in the context of Hyderabad city	Quantitative	Primary data 480 respondents

Source: Compiled by Author

The above table presents an overview of 10 studies. It has been identified that articles aim to explore the causes and consequences of urban sprawl in Pakistan while exploring major cities like Karachi, Hyderabad and Lahore. The majority of the studies have a focus on exploring the major causes and consequences of urban sprawl in the context of Pakistan. Several studies have particularly focused on causes, and challenges related to the issue of urban sprawl in Pakistan. In terms of research methods, eight studies were based on the Qualitative research method that provided textual material related to the subject matter whereas; two studies were based on the quantitative research method. In terms of data collection, both primary and secondary data have been used through published literature and survey

4.1.4 Main Findings of the Study

In this section, major findings have been presented that provide insights regarding major outcomes related to urban sprawl.

Table 3: Main Findings of the Study

	Author	Kei Findings
1	Qureshi (3013)	The study stated that authorities have faced severe challenges in implementing development plans for cities due to the rejection of particular governmental policies by some ethnic groups. The development of major cities in Pakistan has remained fragmented there has been lacking coordination among various agencies who are responsible for developing and formulating plans and schemes.
2	Habibia and Asadi (2011)	The finding of the study identified major causes of urban sprawl such as population and income growth, price of lands, access to suitable and low-cost housing, infrastructure and transportation. However; it may also bring negative impact in cities in terms of decline in the inner city, traffic, long travels, increasing transportation and infrastructure cost, the decline in environmental quality and other social issues.
3	Hasan 2015	The findings highlighted that there is a need to implement policies for better use of land that is owned by the government, for political agreement to address security issues that led to a loss of investment and for political

		effectiveness of big cities' civil society organisations.
4	Akhtar, and Dhanani 2013	It has been found that due to urban dispersal policies, urban sprawl has occurred. Due to ineffective control of laws of conversion or rural land into urban land, corruption, malpractices of government officials, and political mafias are some serious factors that accelerated sprawling in big cities like Karachi. Due to sprawling, massive agricultural land has been urbanised now. Furthermore; due to improper transport system, and dependent on personal vehicles for commuting has raised which resulted into issues of traffic jam, pollution and high commuting cost.
5	Mangi et al., 2019	Through comparative analysis between two cities such as Beijing and Karachi, it has been found that Karachi is worse in terms of socio-economic and environmental development which needs significant development for accomplishing the high level of the "Urban Sustainability Index".
6	Ahmed et al., 2020	The stud has identified the main reason for rapid urban sprawl in Pakistan such as migration, expansion of peri-urban areas around the outer border of cities, industrial zones development, population growth and improved infrastructure.
7	Hussain 2016	The findings highlighted that due to inadequate planned policies, the concentration of people may lead to a mess. The incessant arrival of people will increase the demand and supply gap related to the provision of infrastructure, health and education facilities and other basic services
8	Peerzado et al., 2018	It has been explored that urban sprawl has resulted in agricultural land conversion into urban land, which has also raised several issues related to economic, social and environmental instability. It has increased the scarcity of resources because now more individuals demand more things.
9	Abdul and Yu (2020)	With time, the majority of the population will migrate towards cities that may cause rapid urban sprawl hence, without efficient, effective and functional systems, cities will face several economic and environmental challenges. Policymakers must take into consideration urban development for sustainable growth.
10	Yar 2017	The findings show that urban sprawl is a serious issue nowadays which requires to solution before it reaches the point to severity where it cannot be fixed. If urban sprawl is stopped it means that it will also prevent the expansion of barren lands around city areas.

Source: Compiled by Author

The above table presents the major findings of the studies. Qureshi (3013) identified that urban development authorise are facing severe challenges to implementing development plans for the city due to the rejection of particular governmental policies by some ethnic groups. Akhtar, and Dhanani (2013) have also reported that due to urban dispersal policies, urban sprawl has occurred. Ineffective control of laws of conversion or rural land into urban land, corruption, malpractices of government officials, and political mafias are some serious factors that accelerated sprawling in big cities like Karachi. Due to sprawling, massive agricultural land has been urbanised now. Furthermore; due to improper transport system, and depending on personal vehicles for commenting has raised which resulted into issues of traffic jam, pollution and high commuting cost. Habibia and Asadi (2011) have emphasised that population growth and income growth are the major reason behind urban sprawl in Pakistan. Ahmed et al., (2020) also identified that migration, expansion of peri-urban areas around the outer border of cities, industrial zones development, population growth and

improved infrastructure. Hasan (2015) also stresses implementing the implementation policies for better use of land otherwise; there ineffective policies and weak institutional framework. Urban sprawl has resulted in agricultural land conversion into urban land, which has also raised several issues to relate to economic, social and environmental instability (Peerzado et al., 2018). Hussain (2016) highlighted that due to inadequate planned policies, the concentration of people may lead to a mess and will increase demand and supply gap related to the provision of infrastructure, health and education facilities and other basic services. Abdul and Yu (2020) pointed out that the population will migrate towards cities with the time that may cause rapid urban sprawl. Even, Yar (2017), stressed that urban sprawl is a serious issue nowadays which requires to solution before it reaches the point to severity where it cannot be fixed. Mangi et al., (2019), found that Karachi is worse in terms of socio-economic and environmental development which needs significant development for accomplishing the high level of the “Urban Sustainability Index”.

4.2 Thematic analysis

4.2.2 Theme one causes of Urban Sprawl

The majority of the studies have identified, internal migration, rapid population growth, better employment opportunities and conversion of agricultural land as major Causes of urban sprawl in Pakistan (Habibia and Asadi, 2011; Hasan 2015, Ahmed et al., 2020; Yar 2017). It has been stated by the stud of Hasan (2017) that rural-to-urban migration found 40.0% of total migration. On the other hand Habibia and Asadi (2011), Ahmed et al., (2020) and Yar (2017), have also illustrated that education and health facilities, employment opportunities and income are the major factor that influences the migration of people from rural to urban areas. Availability of low price land, transportation, land value, industrial settlement and development, and access to fundamental facilities (educational and health facilities) are some of the major elements which influenced rural inhabitants to the urban settlements that led to urban sprawl in Pakistan (Habibia and Asadi, 2011; Yar 2017). The development of big housing and real estate project adherent to the outside border of the cities without any permission from concerned authorities is also the major issue of urban sprawl in big cities like Lahore, Islamabad and Karachi. Furthermore; people also purchase land in the peri-urban areas at a low rate with the hope that someday there will be development and they may sell it at higher prices (Ahmed et al., 2020). Unplanned urbanisation is also a major cause of rapid urban sprawl in Pakistan due to strong planning intervention at the local and province level led to urban sprawl. Akhtar, and Dhanani (2013) also pointed out that government spatial planning policies major cause of urban sprawl. It has been also proved that without proper planning, unplanned, and decentralised development lead to sprawl in a mechanistic way.

Table 4: Causes of Urban Sprawl

1	Author	Causes of urban sprawl
	Habibia and Asadi (2011)	Income growth, population growth, infrastructures, numbers of educational centers, fiscalization of land use" low price of land, access to appropriate housing; low price of transportation systems, promotion of commuting network, new centers for the job in suburbs public services.
	Hasan (2015)	Migration
	Akhtar, and Dhanani (2013)	Massive conversion of rural lands; rapid population growth; eventual areal growth; Government policies, and horizontal

	growth.
Abdul and Yu (2020)	Ineffective building by-laws
Ahmed et al., (2020)	Migration, development of peri-urban areas; improved infrastructure; population growth; industrial development; political influence
Yar (2017)	Agricultural land conversion, education facilities, Land value, and population growth

Source: Compiled by Author

4.2.3 Theme Two Consequences of Urban Sprawl

Urban sprawl has brought negative consequences for residents and the environment of the big cities such as water and air pollution, traffic jam, loss of agricultural land, increased car dependency. Due to the expansion of city boundaries, it increases more difficulties to reach central densities (Ahmed et al., 2020). According to the studies of Habibia and Asadi (2011); Akhtar, and Dhanani (2013), Hussain (2016), and Ahmed et al., (2020) poverty, loss of agricultural land, storage of resources, commuting cost, long travels, and more congestion are the major consequences of urban sprawl. It has increased the several issues that the majority of the cities are facing now such as climate issues; housing issues, long-distance; and provision of new jobs. Now, people are passing more long distances to get better housing, educational centers and jobs in major cities like Karachi, Lahore, and Faisalabad. It has also pressurised the urban areas for creating space for the people along with the provision of jobs that may also raise the issues of employment in the cities. Ahmed et al., (2020) also pointed out due to land conversion, farming communities have perceived from their land that has also increased the risk of food security. There are some other issues of urban sprawl that have been identified by studies such as increasing crime, law and order, housing issues. Akhtar, and Dhanani (2013) have examined the negative consequences of urban sprawl in terms of degradation of old cities and social impartiality. Yar (2017) has also proved the negative impacts of urban sprawl on physical and functional activities, basic infrastructure, energy, use and economic development. This uncontrolled and unchecked urban sprawl has also posed a challenge to the development authorities.

Table 5: Consequences of Urban Sprawl

1	Author
	Habibia and Asadi (2011) poverty, low quality of educational centers, shortage of resources
	Akhtar, and Dhanani (2013) loss of agricultural lands, increasing in commuting cost, an increasing number of personal vehicles, increase in surface runoff, flooding, dispersal; degradation of the old city and social detachment
	Hussain (2016) urban transportation, housing, health and education facilities, law and order situation
	Ahmed et al., (2020) agricultural land conversion, deforestation, migration, psychological problems, the inadequacy of housing
	Abdul and Yu (2020) climate change, unregulated urbanization, housing shortage, diminishing social capital, inadequate spatial planning
	Yar (2017). Negative impacts on physical and functional activities, basic infrastructure, energy, use and economic development.

Source: Compiled by Author

4.2.4 Theme Three: Suggested Policies to Control Urban Sprawl

Exploring the policies related to controlling urban sprawl, all studies have suggested several policies the below table has highlighted some key suggestions.

Table 6: Suggested Policies to Control Urban Sprawl

1	Author	Suggestion
1	Qureshi (3013)	Sustainable initiatives are need of time hence; there is a need to plan and develop works that require more ecological and environmentally sustainable development plans
2	Habibia and Asadi (2011)	The authors have suggested defining urban boundaries and redevelopment of the inner-core region through smart growth strategies. furthermore; there is a need to increase the density and create a compact city while empowering the role of local authorise for better planning and policy-making can be employed as suitable policies for the stated issue. As urban sprawl has got more costs which is more than normal growth due to new paths, schools, housing and other public facilities. Thus, increasing the “share of costs” will also play a significant role in controlling sprawl. On the other hand, there is a need to improve the living condition of low-income households who migrate for a better life, thus, providing financial credits, affordable housing and subsidies to suburbs are also some solutions for improving living conditions and controlling urban sprawl
		Furthermore, revitalization of inner-core areas will also increase the land price whereas; open spaces have a high-value tax determination for changing land uses which may cause in reducing the rate of land changes.
		Urban consolidation is also an approximate solution for suitable usage of lands and infrastructure in the but-up area of the cities which restricts using urban lands and reduces infrastructure costs and use of more public transport. Efficient urban development management is also a need of time to present creative urban policies.
3	Akhtar, and Dhanani 2013	Authors stressed effective control and implementation of laws related to rural land conversions, corruption, and derelictions of government administration in order to break the nexus between land occupiers, private builders and land mafias.
4	Hasan (2016)	The author focuses on the establishment of an effective governance system and appropriate vision for the cities in order to control issues of housing, transport and environment. The issues of crime, law and order and other security issues can also be improved through the establishment of an effective local government.
5	Mangi et al., 2019	According to the authors, administrators of cities need to give priorities towards urbanisation trends, population growth, and low density.
6	Hussain 2016	It has been suggested by the author that a decentralised and authorised local government is very effective to address the issue of urban dwellers. Furthermore; there is a need to revisit the policies and need to work on Urban development policies, and work together with all stakeholders for prosperous and inclusive cities.
7	Peerzado et	Author to author, there is not a single policy elated to land for controlling

	al., 2018	the conflicts land use in the needed direction. Hence, there is a requirement for a land use policy for regulating the issues of superposition of lands for different uses while considering all stakeholders on board. Hence, there is always room for the 'land use protection act' and 'land preservation act' in Pakistan. However; it requires an immediate need for a defined 'land-use protection policy' and 'land rent act', along with of execution process in order to protect the land use in its economic, social and ethical way. Furthermore; there is also a need to implement and enforce such policies by the government through taking action.
8	Abdul and Yu (2020)	The authors suggested some adaptive planning and innovative solutions, improving urban security, providing additional water and electric supply capacities. armament and synchronisation of prevailing resources, reforestation, controlling pupation growth and internal migration and dynamic and strong urban institutions as the major areas of considering policy initiatives for considering urbanisation
9	Yar 2017	There is a need to raise awareness related to the issues while advertising the problems in order to make people notice that how it is harmful to develop such large areas of animals and another natural habitat. Moreover; there is a need to enforce population control in such areas as the author highlighted that the major cause of urban sprawl is the large population. Another way to slow urban sprawl is to restrict construction in the inner-core of cities hence urban size will not expand further.
10	Ahmed et al., (2020)	The authors stressed the direct and indirect role of development authorize which plays a Vitol role in urban sprawl. Due to a lack of proficiencies and political influence, development authorities are failed to control illegal housing colonies. The unnecessary political sway has made urban development authorities impractical thus resulted in the expansion of illegal housing units around the boundaries of the cities like Karachi, Lahore. Furthermore; the impact of prompt urban sprawl on diversified concerns can be resolved and the consideration should be averted to this serious issue.

Source: Compiled by Author

4.2.1 Theme Four: Urban Sprawl in Pakistan

The studies on sprawl urban have been conducted by several literatures that have explored the phenomenon of urban sprawl from the perspective of developing countries like Pakistan. It is understood that urban sprawl is not only the physical phenomenon of dispersion of building and development of space that is occupied by the city however; it also includes diverse disciplines such as urban planning, environmental analysis, and socio-economic aspect. According to Ahmed et al., (2020), urban sprawl is a very severe concern for megacities like Karachi, Lahore, Islamabad, Faisalabad, Hyderabad, in the absence of proper planning related to urban infrastructures such as water supply, sewerage system or mass transit etc. The rapid conversion of rural land into urban land for planned or unplanned housing, industries and squatter settlements have raised the issue of urban sprawl in Pakistan. Globally, the average density of population is 25 perplex per kilometre however; there is a large difference in the case of Pakistan. The population density of Pakistan is 287 people per Km² whereas; the province of Punjab is the most densely populated area. It has been estimated by “United Nation Development Program(UNDP)”, that Pakistan is experiencing the highest rate of urbanisation in the South Asian region with 36.4 percent of the urban population. It has been estimated that around half of the country’s residents will be living in

cities by 2025. Due to population growth and migration from rural to urban areas for better employment and facilities that offer enormous opportunities, however; due to worse urban planning and management, it is an increasingly serious challenge. According to World Bank, (2014), urbanisation is quite disordered from low-density sprawl as cities have grown beyond administrative boundaries to include “ruralopolises”, which are densely populated rural areas. It is estimated that “ruralopolises” are up to 60 percent of urban Pakistan. Without proper planning to deal with rapid growth, cities may become sources of dissatisfaction and turbulence rather than growth and innovation. Due to messy urbanisation, there is a drastic increase in urban slums, poverty, housing sprawls, environmental issues and mobility problems. On the other hand, due to horizontal expansion of urban areas has also impacted the fertile land of agriculture. The gap for providing service to residents, disorganized neighbourhoods and affluent urban communities have been raised which lead to intensified crime and other social issues (Malik, and Wahid, 2014). On the other hand, there is also a lack of enough public investment for developing infrastructure and facilitate mobility of transports. Furthermore; due to the absence of local government, ineffective urban management, lack of planning, and fragmentation of public service have hampered the implementation of proper urban planning. With time unplanned urban sprawl are being unchecked because housing schemes have been built beyond the limit of cities which has used an approximation of 60,000 acres of major agricultural land. Biggest cities like Lahore and Karachi have also experienced large real estate development by private and military developers along the highways which are redefining urban limits. The development authorities directly or indirectly play a vital role in the urban sprawl. Several studies have also emphasised on the significant contribution of urban development authorities in order to control sprawl phenomenon. Urban development authorities had the authority to give approval or disapproval to any urban development plans that were submitted by private real estate developers. Studies addressed that development authorities have failed to implement planned development due to lack of integration among major departments, and political influences who are engaged in real estate. (Kugelman, 2013; Arsalan et al., 2015; Rana and Bhatti, 2018). Furthermore; due to worse performance of these development authorities, urban sprawl is mainly responsible of environmental issues, pollution in major big cities, housing problem, water shortage, and adverse mental health. (Khan et al., 2012; Bhatti et al., 2015; Mehmood et al., 2017; Sajjad et al., 2010; Hasan 2015; Wang et al., 2017; Zia et al., 2015; Ahmed et al., 2020).

5 Conclusion and Recommendations

As we know that the speed of urbanisation is quite higher in Pakistan as compared to other economies of South Asia. It is a very distressing situation for Pakistan which depends on the agriculture sector. The study aims to explore the major causes, consequences and policy analysis using a systematic review of the literature. During the review of studies, it has been found that major causes of urban sprawl are Income, population growth, infrastructures, numbers of educational centres, “fiscalization of land use”, “low price of land”, “access to appropriate housing”, “low price of transportation systems”, “promotion of commuting network”, “new centres for jobs”, migration, “ineffective building by-laws”, “government policies”, “horizontal growth”, “development of peri-urban areas”, “improved infrastructure”, “population growth”, “industrial development” and “political influence” in Pakistan. on the other hand, it has brought negative impact on cities in terms of loss of agricultural lands, increasing in commuting cost, increasing number of personal vehicles, increase in surface runoff, flooding, dispersal; degradation of the old city and social detachment, poverty, deforestation, housing storage, security, , psychological problems etc. This stud has also explored several policies that provide valuable suggestions to control and

reduce urban sprawl in Pakistan. Regardless of the proposed policies, there is no inimitable explanation for this issue and it requires more research in different dimensions. Furthermore; policy-making should be based on province and city characteristics and apply suitable solutions to prevent and control urban sprawl. Furthermore; the agriculture department should join hands with urban development to initiate awareness against urban sprawl issues and save conversion of fertile agriculture land. Research studies can be conducted to investigate unplanned urbanisation in order to ensure food security and natural resources. It has also been found that urban authorities and planning departments seem ineffective in front of real estate developers and land occupiers. The government also looks invincible to the rapid urbanisation which is a whelming agricultural land expansion of peri-urban around the outer boundaries of the cities have also raised multiple environmental, social, economic and health problems. Selected studies have not focused on the role of the private sector and urban authorities in this trend therefore, it needs to be furthered explored. To understand the occurrence of urban sprawl because there are limited studies in terms of mixed-method, or quantitative that focused on land conversion, environmental degradation, changing ownership of land, food insecurity and deforestation.

6. References

- Abdul, L. and Yu, T.F., 2020. Resilient urbanization: A systematic review on urban discourse in Pakistan. *Urban Science*, 4(4), p.76.
- Ahmed, S., Huifang, W., Akhtar, S., Imran, S., Hassan, G. and Wang, C., 2021. An analysis of urban sprawl in Pakistan: consequences, challenges, and the way forward. *International Journal of Agricultural Extension*, 8(3), pp.257-278.
- Akhtar, S. and Dhanani, M.R., 2013. Urban sprawl in Karachi. *Sindh University Research Journal-SURJ (Science Series)*, 45(3).
- Ali Siyal, G. E., Khalid, I., and Qaisrani, A. 2018. Internal Migration and Urbanization: A Case Study from Semi-arid Regions of Pakistan. A publication of the Sustainable Development Policy Institute (SDPI). pp.1-17
- Arribas-Bel, D., Nijkamp, P. and Scholten, H., 2011. Multidimensional urban sprawl in Europe: A self-organizing map approach. *Computers, environment and urban systems*, 35(4), pp.263-275.
- Arsalan, M. H., Ahmad, I., Aziz, A., Hussain, M., Osmani, A. I., and Perveen, S. 2015. Urban Development Strategy for Sukkur City, Sindh, Pakistan: A Step Towards Visionary Planning and Development. *Pakistan Journal of Science*, 67(1):120-126
- Aurand, A.G., 2007. *Is smart growth smart for low-income households: A study of the impact of four smart growth principles on the supply of affordable housing*. The University of Pittsburgh.
- Barnes, K.B., Morgan III, J.M., Roberge, M.C. and Lowe, S., 2001. Sprawl development: its patterns, consequences, and measurement. *Towson University, Towson*, 1, p.24.
- Bhatti, S. S., Tripathi, N. K., Nitivattananon, V., Rana, I. A., and Mozumder, C. 2015. A multi-scale modeling approach for simulating urbanization in a metropolitan region. *Habitat International*, 50:354-365
- Bogart, W.T., 2006. *Don't Call it Sprawl: Metropolitan Structure in the 21st century*. Cambridge University Press.

- Carbonell, A. and Yaro, R.D., 2005. American spatial development and the new megalopolis. *Land Lines*, 17(2), pp.1-4.
- d'Amour, C.B., Reitsma, F., Baiocchi, G., Barthel, S., Güneralp, B., Erb, K.H., Haberl, H., Creutzig, F. and Seto, K.C., 2017. Future urban land expansion and implications for global croplands. *Proceedings of the National Academy of Sciences*, 114(34), pp.8939-8944
- Denyer, D. and Tranfield, D., 2009. Producing a systematic review.
- Ewing, R., Pendall, R. and Chen, D., 2003. Measuring sprawl and its transportation impacts. *Transportation research record*, 1831(1), pp.175-183.
- Ewing, R.H., Pendall, R. and Chen, D.D., 2002. *Measuring sprawl and its impact* (Vol. 1, p. 55). Washington, DC: Smart Growth America.
- Farah, N., Khan, I.A., Manzoor, A. and Shahbaz, B., 2016. Changing Land Ownership Patterns and Agricultural Activities in the Context of Urban Expansion in Faisalabad, Pakistan. *Pakistan Journal of Life & Social Sciences*, 14(3).
- Farah, N., Zafar, M.I., and Nawaz. N. 2012. Pakistan Journal of Life and Social Sciences Socio-Economic and Cultural Factors Affecting Migration Behavior in. *Pakistan Journal of Life and Social Sciences*, 10:28-32
- Galster, G.; Ratcliffe, M.R.; Wolman, H.; Coleman, S.; Freihage, J. Wrestling sprawl to the ground: Defining and measuring an elusive concept. *Hous. Policy Debate* 2001, 12, 681–717. [CrossRef] 6.
- Glaeser, E.L., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A., 2004. Do institutions cause growth?. *Journal of economic Growth*, 9(3), pp.271-303.
- Gordon, P. and Richardson, H.W., 2001. The sprawl debate: Let markets plan. *Publius: The Journal of Federalism*, 31(3), pp.131-149.
- Habibi, S. and Asadi, N., 2011. Causes, results and methods of controlling urban sprawl. *Procedia Engineering*, 21, pp.133-141
- Habibi, S. and Asadi, N., 2011. Causes, results and methods of controlling urban sprawl. *Procedia Engineering*, 21, pp.133-141.
- Hamidi, S. and Ewing, R., 2014. A longitudinal study of changes in urban sprawl between 2000 and 2010 in the United States. *Landscape and urban planning*, 128, pp.72-82.
- Hamidi, S., Ewing, R., Preuss, I. and Dodds, A., 2015. Measuring sprawl and its impacts: An update. *Journal of Planning Education and Research*, 35(1), pp.35-50.
- Hasan, A., 2010. Migration, small towns and social transformations in Pakistan. *Environment and Urbanization*, 22(1), pp.33-50.
- Hasan, A., 2015. Land contestation in Karachi and the impact on housing and urban development. *Environment and urbanization*, 27(1), pp.217-230.
- Hasan, A., 2016. Emerging urbanisation trends: The case of Karachi. *ref. number C-37319-PAK-1, working paper for the International Growth Center, London School of Economics, London UK.*
- He, Z., Zhai, G., Asami, Y. and Tsuchida, S., 2016. Migration intentions and their determinants: Comparison of college students in China and Japan. *Asian and Pacific Migration Journal*, 25(1), pp.62-84.

- Hennig, E.I., Schwick, C., Soukup, T., Orlitová, E., Kienast, F. and Jaeger, J.A., 2015. Multi-scale analysis of urban sprawl in Europe: Towards a European de-sprawling strategy. *Land use policy*, 49, pp.483-498.
- Higgins, J.P. and Green, S., 2008. Guide to the contents of a Cochrane protocol and review. *Cochrane Handbook for Systematic Reviews of Interventions: Cochrane Book Series*, pp.51-79.
- Holcombe, R.G. and Williams, D.W., 2010. Urban sprawl and transportation externalities. *Review of Regional Studies*, 40(3), pp.257-273.
- Hussain, A. 2016. Urban sprawl, infrastructure deficiency and economic inequalities in karachi, *Sci.Int.(Lahore)*,28(2),1689-1696.2016
- Inman, R. P. (Ed.). 2009. Making cities work: Prospects and policies for urban America. Princeton University Press
- Khan, A.A., Arshad, S. and Mohsin, M., 2014. Population growth and its impact on urban expansion: A case study of Bahawalpur, Pakistan. *Universal Journal of Geoscience*, 2(8), pp.229-241.
- Kugelman, M. 2013. Urbanisation in Pakistan: causes and consequences. NOREF Expert Analysis, pp.1-7
- Liu, Z., Liu, S., Qi, W. and Jin, H., 2018. Urban sprawl among Chinese cities of different population sizes. *Habitat International*, 79, pp.89-98..
- Maier, G., Franz, G. and Schrock, P., 2006. Urban Sprawl. How Useful Is This Concept?.
- Malik, S. and Wahid, J., 2014. Rapid urbanization: Problems and challenges for adequate housing in Pakistan.
- O. Nechyba, T.J. and Walsh, R.P., 2004. Urban sprawl. *Journal of economic perspectives*, 18(4), pp.177-200.
- Ojima, R. and Hogan, D.J., 2008. População, urbanização e ambiente no cenário das mudanças ambientais globais: debates e desafios para a demografia brasileira. *Proc. XVI Encontro Nacional de Estudos Populacionais*.
- Patacchini, E., Zenou, Y., Henderson, J.V. and Epple, D., 2009. Urban sprawl in Europe. *Brookings-Wharton Papers on Urban Affairs*, pp.125-149.
- Peerzado, M.B., Magsi, H. and 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), pp.423-428.
- Polidoro, M., De Lollo, J.A. and Barros, M.V.F., 2012. Urban sprawl and the challenges for urban planning. *Journal of Environmental Protection*, 3(09), pp.1010-1019.
- Qureshi, S., 2010. The fast growing megacity Karachi as a frontier of environmental challenges: Urbanization and contemporary urbanism issues. *Journal of Geography and Regional Planning*, 3(11), pp.306-321.
- Richardson, H.W.; Chang-Hee, C.B. Urban Sprawl in Western Europe and the United States; Ashgate: London, UK, 2004

- Rodrik, D., Subramanian, A. and Trebbi, F., 2004. Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, 9(2), pp.131-165.
- Rubiera-Morollón, F. and Garrido-Yserte, R., 2020. Recent literature about urban sprawl: A renewed relevance of the phenomenon from the perspective of environmental sustainability. *Sustainability*, 12(16), p.6551.
- Rana, I. A., and Bhatti, S.S. 2018. Lahore, Pakistan– Urbanization challenges and opportunities. *Cities*, 72:348–355
- Sajjad, H. and Iqbal, M., 2012. Impact of urbanization on land use/land cover of Dudhganga watershed of Kashmir Valley, India. *International Journal of Urban Sciences*, 16(3), pp.321-339.
- Sajjad, S. H., Blond, N., Clappier, A., and Raza, A. 2010. The preliminary study of urbanization, fossil fuels consumptions and CO2 emission in Karachi. *African Journal of Biotechnology*, 9(13):1941- 1948
- Seto, K.C., Güneralp, B. and Hutyrá, L.R., 2012. Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences*, 109(40), pp.16083-16088.
- Shuaib, M., Ali, K., Ahmed, S., Hussain, F., Ilyas, M., Hassan, N., Khan, I. and Hussain, F., 2018. Impact of rapid urbanization on the floral diversity and agriculture land of district Dir, Pakistan. *Acta Ecologica Sinica*, 38(6), pp.394-400.
- Slaev, A.D. and Nikiforov, I., 2013. Factors of urban sprawl in Bulgaria. *Spatium*, (29), pp.22-29.
- Sören, G. 2015. Meet the Need for Inclusive Urbanization in China: Migrants ' Urban Housing Demand along their Socio-Economic Transition. PE Working Papers 47/2015.
- Squires, G.D. ed., 2002. *Urban sprawl: Causes, consequences, & policy responses*. The Urban Institute.
- Squires, G.D. *Sprawl: Causes and Consequences and Policy Responses*; The Urban Institute Press: Washington, DC, USA, 2002.
- Sudhira, H.S. and Ramachandra, T.V., 2007, July. Characterising urban sprawl from remote sensing data and using landscape metrics. In *Proceedings of 10th international conference on computers in urban planning and urban management* (pp. 11-13).
- Sudhira, H.S., Ramachandra, T.V. and Jagadish, K.S., 2004. Urban sprawl: metrics, dynamics and modelling using GIS. *International Journal of Applied Earth Observation and Geoinformation*, 5(1), pp.29-39.
- Terzi, F. and Bolen, F., 2009. Urban sprawl measurement of Istanbul. *European Planning Studies*, 17(10), pp.1559-1570.
- Terzi, F. and Kaya, H.S., 2008. Analyzing urban sprawl patterns through fractal geometry: The case of Istanbul metropolitan area.
- Torrens, P. A toolkit for measuring sprawl. *Appl. Spat. Anal. Policy* 2008, 1, 5–36.
- United Nations (2006). *World Urbanization Prospects: Source: Household Integrated Economic Survey 2013*, Population Division, Department of Economic and Social Affairs

- Uz-Zaman, K., and Baloch, A. A. 2011. Urbanization of Arable Land in Lahore City in Pakistan: A Case Study. *Canadian Social Science*, 7(4): 58-66.
- Verbeek, T., Boussauw, K. and Pisman, A., 2014. Presence and trends of linear sprawl: Explaining ribbon development in the north of Belgium. *Landscape and urban planning*, 128, pp.48-59.
- Wang, X.R., Hui, E.C.M. and Sun, J.X., 2017. Population migration, urbanization and housing prices: Evidence from the cities in China. *Habitat International*, 66, pp.49-56.
- Wassmer, R.W., 2008. Causes of urban sprawl in the United States: auto reliance as compared to natural evolution, flight from blight, and local revenue reliance. *Journal of Policy Analysis and Management: The Journal of the Association for Public Policy Analysis and Management*, 27(3), pp.536-555.
- World Bank .2014 Pakistan Urban Sector Assessment: Leveraging the Growth Dividend. Background paper
- Yar, S.A., 2017. Study of Urban Sprawl and its Social and Environmental Impacts on Urban Society in Latifabad Town, Hyderabad. *Pakistan. J Civil Environ Eng*7, 290(10.4172).
- Yousaf, H., Zafar, M.U., Zafar, M.O., Ahmad, S. and Raza, Q.A., 2018. Regional distribution of food security and its determinants across regions of the Punjab, Pakistan. *Pakistan Journal of Agricultural Sciences*, 55(3).
- Zia, S., Shirazi, S.A., Bhalli, M.N. and Kausar, S., 2015. The impact of urbanization on mean annual temperature of lahore metropolitan area, pakistan. *Pakistan Journal of Science*, 67(3), p.301.