

Available Online at EScience Press Journals

# International Journal of Agricultural Extension

ISSN: 2311-6110 (Online), 2311-8547 (Print)

<https://journals.esciencepress.net/IJAE>

## AN ANALYSIS OF URBAN SPRAWL IN PAKISTAN: CONSEQUENCES, CHALLENGES, AND THE WAY FORWARD

<sup>a,c</sup>Shabbir Ahmad, <sup>a</sup>Wu Huifang, <sup>b</sup>Saira Akhtar, <sup>c</sup>Shakeel Imran, <sup>d</sup>Gulfam Hassan, <sup>a</sup>Chunyu Wang

<sup>a</sup> College of Humanities and Development Studies, China Agricultural University, No. 17, Qinghua Donglu, Haidian District, Beijing P. R. China.

<sup>b</sup> Department of Rural Sociology, University of Agriculture, Faisalabad, Pakistan.

<sup>c</sup> University of Agriculture, Faisalabad, Sub Campus Burewala, Punjab, Pakistan.

<sup>d</sup> Department of Agricultural Extension, College of Agriculture, University of Sargodha, Punjab, Pakistan

### ARTICLE INFO

#### Article history

Received: August 18, 2020

Revised: October 12, 2020

Accepted: December 27, 2020

#### Keywords

Urban sprawl,  
Consequences and  
challenges  
Agricultural land  
conversion,  
Rural to urban migration,  
Pakistan

### ABSTRACT

Pakistan is urbanizing at a tremendous tempo in South Asia and is the world's 6<sup>th</sup> most populous country. The key objectives of this review paper were to evaluate the general situation of urban sprawl in Pakistan, investigate the methodological tactics used in the previously published literature, and identify the major geographical areas yet not been surveyed. This literature review was conducted to collect and synthesize pertinent data from the previously published research papers accessed through the utilization of different databases and search engines. The most recently published research papers (2010-2019) were incorporated in this review article. Those research papers were retrieved which contain data related to urban sprawl in Pakistan. Roundabout 26 research articles were comprehensively reviewed. It was scrutinized that in all these accessed research articles, almost similar methodologies (Case Studies) were utilized. Most of the researchers carried out cross-sectional qualitative and descriptive studies, through secondary data analysis to identify the causes, impact, influence, and consequences of urbanization on agricultural land conversion, migration, changing land ownership patterns, settlement issues, water scarcity, pollution, extinction of botanical species, etc. Migration, development of peri-urban areas around the outer rim of the cities, installation of industrial units, improved infrastructure, and population growth have been concluded as the prime reasons of the rapid urban sprawl in Pakistan. 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.

Corresponding Author: Wu Huifang

Email: wuhf@cau.edu.cn

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### INTRODUCTION

The expansion in the proportion of a populace living in the metropolitan area, and the further physical enlargement of already existing urban centers can be termed as urbanization (Grannis, 1998; Alaci, 2010; Buhaug and Urdal, 2013). The tremendous pace of

urbanization was witnessed in the 21<sup>st</sup> century around the globe. The global proportion of urban population soared from 13.0% in 1900 to 29.0% in 1950. Between 1950 to 2003, the world's urban population has increased quadrupled times and the world's rural population, on the other hand, increased more than

double from 1.8 billion to 3.2 billion between 1950 to 2000 (Cohen, 2006). It has reached to 49.0% in 2005. By the mid-21th century, it was expected that, every 3<sup>rd</sup> human being would be residing in the urban areas (Artuso, 2010; Buhaug and Urdal, 2013; He, et al., 2016). It has also been estimated that 60.0% of the global population is expected to live in cities by 2030. Moreover, 4.9 billion people are expected to be urban dwellers in 2030 as has been projected by United Nations Population Projections (United Nations / Department of Economic and Social Affairs, 2009). By the end of 2008, it has been estimated by the United Nations that half of the population of the world would be residing in the urban areas.

By 2050, it is predicted that 64.1% and 85.9% of the developing and developed world, respectively will be

urbanized (United Nations Development Programme, 2014). As far as Pakistan is concerned, it is urbanizing at the rate of 3.0 % annually which is the fastest pace of urban sprawl in the South Asian wing (Kim, 2012; Shuaib et al., 2018). This figure, however, will rise to nearly 50.0% by 2050 (Kim, 2012). The recent estimates reveal that 36.4% people in Pakistan are inhabiting in the urban areas. According to the estimates, the Punjab province is the most populated (36.7 million urban and 63.3 million rural) and Baluchistan is the least populated (3.5 million urban and 8.94 million rural) provinces of Pakistan. Underneath the percentage distribution of population from 1951-2017 (estimates are based on the census conducted from 1951-2017) is given below to have a clear idea about the successive pace of urbanization.

Table 1. Population and its Percentage Distribution by Urban and Rural Areas, Provinces and Pakistan: 1951-2017.

	1951		1961		1972		1981		1998		2017	
	Pop. Million	%										
Punjab												
Urban	3.57	17.4	5.48	21.5	9.18	24.4	13.05	27.6	23.02	31.3	40.39	36.7
Rural	16.97	82.6	19.99	78.5	28.42	75.6	34.24	72.4	50.60	68.7	69.63	63.3
Sindh												
Urban	1.77	29.2	3.17	37.9	5.73	40.4	8.24	43.3	14.84	48.8	24.91	52.0
Rural	4.28	70.8	5.20	62.1	8.43	59.6	10.79	56.7	15.60	51.2	22.98	48.0
KPK												
Urban	0.50	11.1	0.76	13.2	1.20	14.3	1.67	15.1	2.99	16.9	5.73	18.8
Rural	4.05	88.9	4.97	86.8	7.19	85.7	9.40	84.9	14.75	83.1	24.79	81.2
Baluchistan												
Urban	0.14	12.4	0.23	16.9	0.40	16.5	0.68	15.6	1.57	23.9	3.40	27.5
Rural	1.02	87.6	1.13	83.1	2.03	83.5	3.66	84.4	5.00	76.1	8.94	72.5
Pakistan*												
Urban	5.99	17.7	9.65	23.1	16.59	25.4	23.84	28.3	43.04	32.5	75.58	36.4
Rural	27.75	82.3	32.23	76.9	48.72	74.6	60.41	71.7	89.32	67.5	132.19	63.6

\* Population of Fata and Islamabad

Source: Pakistan Bureau of Statistics

The major contributing factors of urbanization in Pakistan are internal migration (-Uz-Zaman and Baloch, 2011; Farah, et al., 2012; He, et al., 2016; Ali Siyal, et al., 2018) real estate business without any approval from the concerned urban development authorities, conversion of fertile agricultural land to build housing colonies, motorways, and commercial enterprises

(Hasan, 2010; -Uz-Zaman and Baloch, 2011; Khan, et al., 2014; Mohsin and Jamal, 2014; Shuaib et al., 2018; Peerzado, et al., 2018), political, economic, and social factors (Kugelman, 2013), infrastructure development (Hu, et al., 2013; Sören, 2015; Sören, 2015), socio-economic problems (Xiao et al., 2006; Farah, et al., 2016), population growth (Opportunities, 2017), (UK

Department For International Development, 2001]], floods (which are very frequent in Pakistan during Monsoon) (He et al., 2016), and wars and relocation of people (IDPs) are some of the major factors which are contributing to the urban sprawl in Pakistan. The rapid urbanization has affected the agricultural sector of Pakistan to a great extent. The fertile agricultural land conversion has startled the agriculture sector because the arable land is declining rapidly, and the country may face the problems of food security soon (Yousaf et al., 2018). The swift urban sprawl is also a challenge for the urban development authorities and the agricultural extension department to convince the real estate developers about the implications of urbanization for agricultural sustainability and food security of the country. As we know that Pakistan is an agriculturally based country and the economy depend on the agriculture sector to a great extent that is why the conservation of fertile agricultural land is of vital importance for the safety of the diminishing agriculture sector which has assumed the status of the backbone of the economy of the country. The present study will review the research published from 2010-2019 related entirely about the ongoing process of urbanization in Pakistan to highlight the main issues which are emerging due to rapid urban sprawl such as the major themes, methodologies, and neglected geographical regions to direct the future studies related to urbanization.

### **Aims and objectives**

It is a fact that agriculture is the backbone of the economy of Pakistan. Directly or indirectly 45% people of Pakistan depend on agriculture for their sustenance, and 60% of the population reside in the rural areas (Ministry of Finance, 2018). Pakistan is on the road to urbanization at a tremendous speed endangering the sustainability of the succeeding generations by converting its fertile agricultural land into housing colonies and commercial enterprises. Most of the ongoing urbanization is unplanned and irregular and it entirely depends on the will of the real estate developers. The government of Pakistan seems entirely immune of this widespread issue and is intentionally overlooking it because most of the notable politicians and real estate tycoons are involved in it. To collect and synthesize the published data, and to grasp this grave problem is the uppermost aim of this narrative review. The scarcity of standard research studies on

urbanization in Pakistan has triggered the researcher to search and review the existing relevant literature.

The main objectives of this review are given below:

- To highlight the incipient themes emerging from literature on urbanization in Pakistan.
- To explore the variety of methodologies and methods to access urbanization in Pakistan.
- To identify the key geographical areas which have been neglected by the researchers.
- To stipulate commendations for future work.

### **MATERIALS AND METHODS**

Urbanization is a critical issue for the economy of Pakistan (if Pakistan is to depend on agriculture for its economy) from the governance perspectives (Jabeen, et al., 2017). Due to the fertile agricultural land conversion, the people from the rural areas (losing their land as well as jobs) are migrating to the urban areas owing to manifold reasons. These marginalized rural poor are settling down in the peri-urban areas in the outer-rim of the urban areas immersing themselves down into manifold problems such as unemployment, poor living, health issues, deviant behaviors etc. In this review article, an attempt has been made to grasp the widespread issue of urbanization in Pakistan from different angles which has been explored by the different scholars. Pakistan is consisted of four administrative units (Punjab, Sindh, KPK, and Baluchistan), two autonomous regions (AJK and Gilgit-Baltistan), and one federal territory (Islamabad) (Pakistan Bureau of Statistics, 2018). As the topic of this review is "Urbanization in Pakistan", various databases such as Ebsco, Elsevier, Emerald, John Willey, Oxford Journals Collection, Science Online, Springer Link, Taylor and Francis, Wiley Black-Well, and Cambridge Journals Online were comprehensively utilized. To locate the relevant literature, several key words and combination of key words Such as "urbanization, urban sprawl, urban expansion, integrated urban planning, population growth, loss of agricultural land, rural livelihood, land use and land cover, land policy, spatial analysis, and Pakistan were extensively utilized. The list of references was also critically reviewed to access for more relevant literature on Urbanization in Pakistan.

### **Exclusion and inclusion criteria**

In this review article, the most relevant and recent published research papers in between 2010-2019 were

included. Only those research papers were retrieved which contain data related to Pakistan. The review papers, letters to the editors, and newspaper articles were not entertained in this review. Through different key words, at the 1st stage, 100 papers were selected by the utilization of different databases and search engines using urban sprawl subject headings. Titles and abstracts were screened for enclosure in the current study at the 2nd stage, and irrelevant and duplicate papers (letters to editor, review papers, and opinionnaires) were cast-off. Resultantly, 69 papers were selected to review the titles of the papers at the 3rd stage. The whole abstracts of the selected papers were studied and screened at the 4th stage. The ultimate decision either to include or exclude a research was taken to have a through eye view of the whole article based on full text papers at the 5th stage. However, 26 papers were considered relevant and incorporated for consummating this study.

*"The method which was utilized to designate predispositions in the research field by calculating how many studies have used certain research methodologies, where they were carried out and what were the associated factors with problem under investigation is called a narrative review or unsystematic narrative reviews (oxman et al. 1994)."*

The statistical analysis is not possible, in a narrative review, because the previously published studies were diverse in their objectives and questions. Narrative reviews do connect information into themes. For statistical analysis, only the meta-analysis is quite suitable. When studies address the same question and administer the intervention in a similar manner or measure the same outcomes then Meta-analysis can only be undertaken. In the whole procedure of exclusion and inclusion of the papers in this study, there was no disagreement among the authors (Wong, 2007). The systematic method of selecting the relevant papers is presented in Figure 1.

### Coverage of the Geographical Areas

Figure 2 illustrates a map of the Islamic Republic of Pakistan, and the geographic regions under review in this study. On urbanization, most of the research studies conducted by different researchers, focused on the Punjab, KPK, and Sindh provinces, respectively. Most of the research studies, in the Punjab Province, were

conducted in the Upper Punjab (Lahore [10], Gujranwala [3], and Sialkot [1]), Central Punjab (Faisalabad [4]), and Lower Punjab (Bahawalpur [2], D. G. Khan [1]. In KPK most of the studies were conducted in Peshawar [2], Dir [1], and Mardan [1]. As far as Sindh is concerned, in Karachi [2], Sukkur [1], and Hyderabad [1] research studies were conducted. No study on urbanization has still been conducted in Baluchistan and Gilgit Baltistan. In AJK only one study on urbanization has been conducted in Muzaffarabad.

## RESULTS AND DISCUSSION

### Methodological Findings

It was investigated during the review that eight research papers (Table 1) used cross-sectional study (Quantitative research design), the author used the secondary data to give empirical support to their respective research studies.

Among these authors, Khan, et al., (2012) tried to access the possible impact of urban annoyance on mental health by conducting a comprehensive survey on 370 respondents (not clearly described the nature of his respondents); Farah, et al., (2012) has accomplished her study to know the influence of migration on the rapid urbanization utilizing an objective methodological approach by administering a comprehensive structured questionnaire on 150 respondents (not clearly described the nature of his respondents); Mohsin and Jamal, (2014) insisted in the collection of primary data and his sample size was consisted in seven study sites from where he took seven samples because he was trying to access urbanization and agricultural land transformation and obtained the results of the samples from the laboratory examination to know either the converted land was fertile or not; Farah et al., (2016) conducted another study to access the rapid urbanization on the changing land ownership patterns. She administered a well- constructed questionnaire on 180 households selected from six different villages; Shuaib et al., (2018) conducted a research study on the impact of urbanization and floral diversity. He selected four study cites for phytosociological investigation which was based on quadrat method; Peerzado et al., (2018) conducted a research study on the impact of urbanization and fertile agricultural land conversion. The author utilized a structured questionnaire on 100 respondents to access the problem; Ali et al., (2019) organized a research study on the impact of

urbanization and soil and plant species using the similar research methodology and approach. He selected four

study sites and utilized quadrat method to carry out his research investigations.

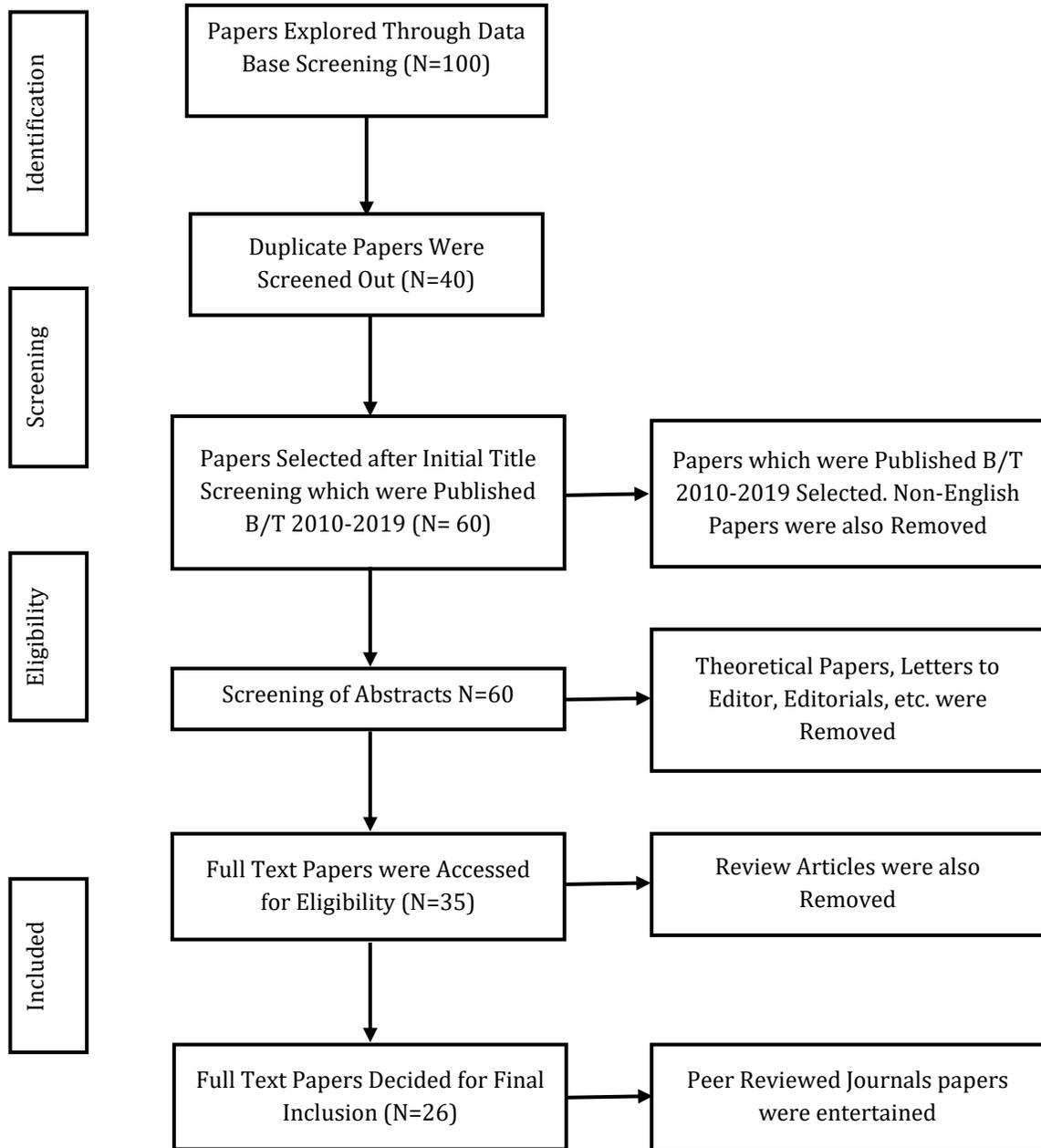


Figure 1. The Criteria for the Selection of Papers for Review Literature.

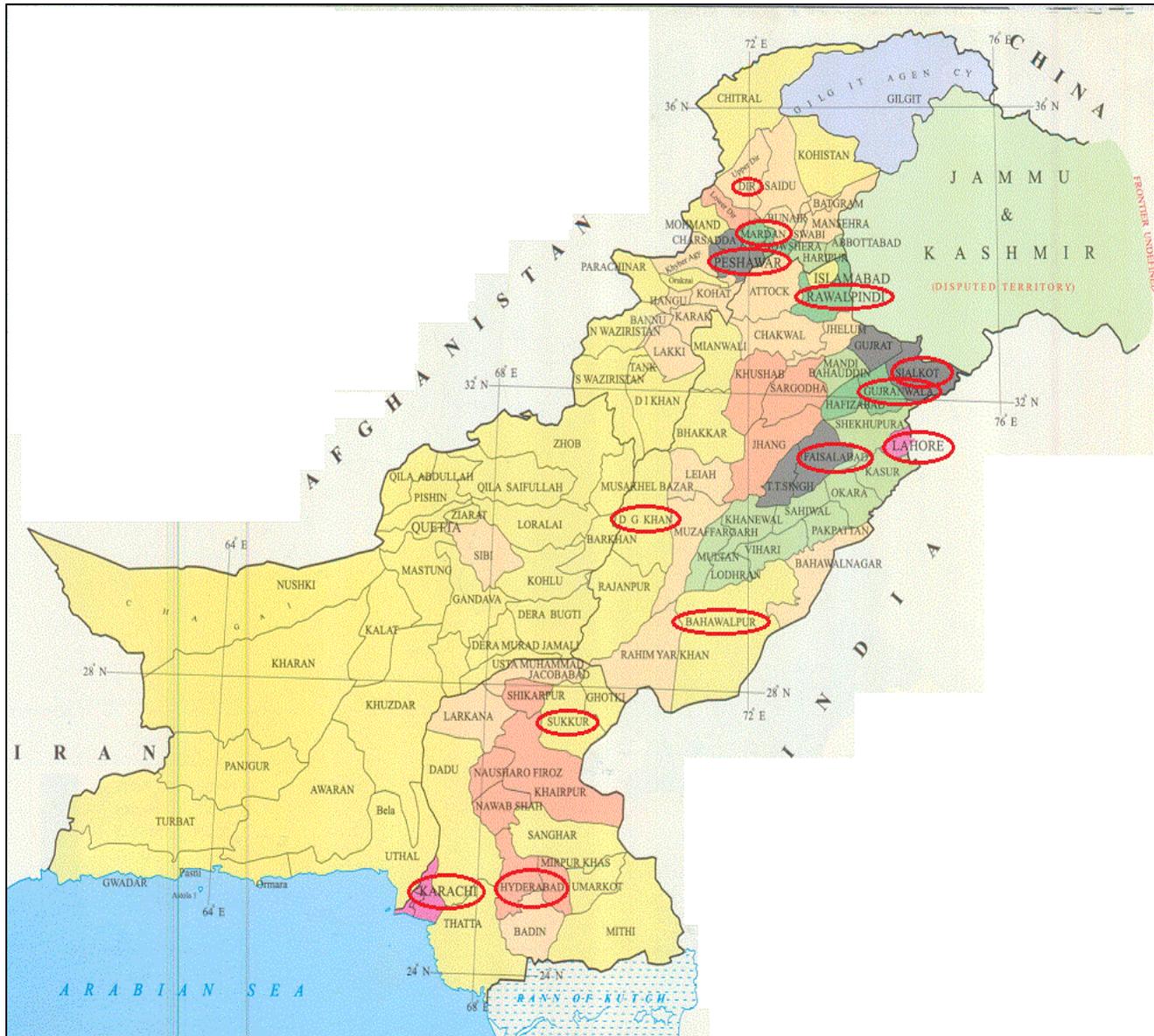


Figure 2. The coverage of the geographical areas in the reviewed studies. The total number does not equal the total number of studies as certain studies focused on more than one area. The map illustrates that a large portion of Pakistan still has not been explored.

Furthermore, 14 authors managed qualitative research designs and among the 14 authors nine authors utilized case study approach -Uz-Zaman and Baloch, (2011) [the methodology consisted in semi-structured interviews and focused group discussions]; Khan et al., (2014) [Secondary data from 150-2012 was analyzed]; Aziz, et al., (2014) [Secondary data analysis and focused group Aziz et al., (2014) [Secondary data analysis]; Malik and Ali, (2015) [Secondary data analysis]; Bhatti, et al., (2015) [Secondary data analysis]; (Mehmood, et al.,

(2017) [Secondary data analysis]; Ali Siyal et al., (2018) [Survey based approach; 45 migrants, 36 males and 9 females were exposed to in depth interview]; Hasan, (2015) utilized historical analysis [Secondary data analysis]; Arsalan et al., (2015) employed SWOT analysis [Secondary data analysis]; (Zia, et al., (2015); Farhat, et al., (2018) utilized temporal analysis [Secondary data analysis]; (Minallah, et al., (2016) applied geographical analysis [Secondary data analysis]; Afzal, et al., (2016) used cross-sectional research [Secondary data analysis];

Rana and Bhatti, (2018) used city profile method [Secondary data analysis]; and Rashid et al., (2018) used an exploratory analysis [24 in depth interviews]. Only one author Bhatti, et al., (2017) conducted a case study by utilizing mixed method research design. He administered a structured interview schedule on 208

respondents to investigate urbanization and demographic change. Furthermore, 16 papers were published in the different international peer-reviewed journals, out of the 26 reviewed papers, and 10 research papers were published national journals.

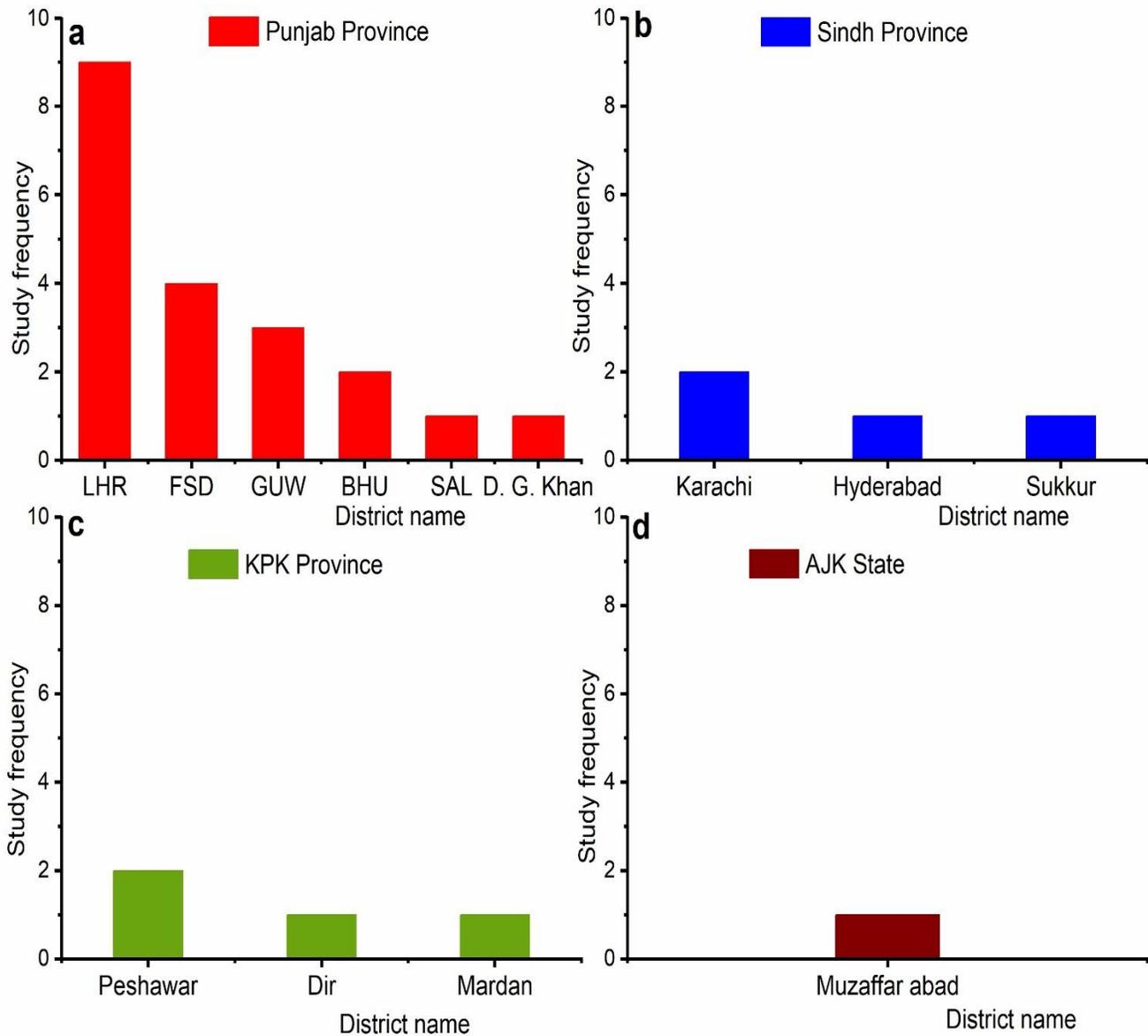


Figure 3. Graphical representation of the provinces and the districts (Locus of Urbanization).

Table 1. Description of the Studies Included in the Review.

Study and Year	Type	Study Design	Area of Study	Urbanization Assessment	Sample Size	Geographical Area
(Sajjad, <i>et al.</i> , 2010)	Case Study	Qualitative	Urbanization and Fossil Fuel Consumption and CO <sub>2</sub> Emission	Fossil Fuel Consumption and CO <sub>2</sub> Emission	Secondary Data Analysis	Karachi (Sindh)
(-Uz-Zaman & Baloch, 2011)	Case Study	Qualitative	Urbanization and Arable Land	Arable Land, Agricultural Land Transformation, Housing Colonies	Semi Structured Interviews, Focused Group Discussions	Lahore (Punjab)
(Khan <i>et al.</i> , 2012)	Cross-Sectional	Quantitative	Urbanization and Mental Health	Urban Annoyance, Mental Health	370 Respondents	Lahore (Punjab)
(Farah, <i>et al.</i> , 2012)	Cross-Sectional	Quantitative	Urbanization and Migration	Rural to Urban Migration	150 Respondents	Faisalabad (Punjab)
(Ahmad, <i>et al.</i> , 2013)	Case Study	Qualitative	Urbanization and Role of Development Authorities	Role of Development Authorities	Secondary Data Analysis	Lahore (Punjab)
(Khan <i>et al.</i> , 2014)	Case Study	Qualitative	Urbanization and Population Growth	Population Growth, Agricultural Land Transformation	Secondary Data Analysis	Bahawalpur (Punjab)
(Mohsin, <i>et al.</i> , 2014)	Cross-Sectional	Quantitative	Urbanization and Agricultural land Transformation	Agricultural Land Transformation	Seven Study Sites, and 14 Soil Samples	Bahawalpur (Punjab)
(Aziz <i>et al.</i> , 2014)	Case Study	Qualitative	Urbanization and sustainable Development		Secondary Data Analysis	Lahore (Punjab)
(Malik and Ali, 2015)	Case Study	Qualitative	Urbanization and Agriculture Sector	Arable Land, GDP per Capita Growth, Agriculture Value Added (% of GDP), Agriculture Value Added (Annual % of Growth), Cereal Production (Metric Tons)	Secondary Data Analysis	Peshawar (KPK)

(Hasan, 2015)	Historical Study	Qualitative	Urbanization and Agricultural Land Loss	Loss of Agricultural Land, Housing Issues, Land Contestation, Rural Urban Migration	Secondary Data Analysis	Karachi (Sindh)
(Arsalan et al., 2015)	SWOT Analysis	Qualitative	Urbanization and Development	Urbanization Development Strategy	Secondary Data Analysis	Sukkur (Sindh)
(Bhatti et al., 2015)	Case Study	Qualitative	Urbanization and Multi-scale Modeling approach	Urban Growth, Urban Planning Issues, Difference in Urban and Peri-Urban Growth, and Land Management Policies	Secondary Data Analysis	Lahore (Punjab)
(Zia et al., 2015)	Temporal Study	Qualitative	Urbanization and Temperature Rising	Impact on Mean Annual Temperature	Secondary Data Analysis	Lahore (Punjab)
(Farah et al., 2016)	Cross-Sectional	Quantitative	Urbanization and Land Changing Patterns	Changing Land Ownership Patterns	6 Villages and 180 Household	Faisalabad (Punjab)
(Minallah et al., 2016)	A Geographical Analysis	Qualitative	Urbanization and Population Trends	Urban Growth and Socio-Economic Development	Secondary Data Analysis	Gujranwala (Punjab)
(Afzal et al., 2016)	Cross-Sectional	Qualitative	Urbanization and Sedimentation in Rawal Lake	Impact of Sedimentation in Rawal Lake	Secondary Data Analysis	Rawalpindi (Punjab)
(Bhatti et al., 2017)	Case Study	Mixed Method	Urbanization and Demography	Spatial Interrelationships of Quality of Life with Land Use/Land Cover	208 Respondents	Lahore (Punjab)
(Rana & Bhatti, 2018)	City Profile	Qualitative	Urbanization	Challenges and Opportunities	Secondary Data Analysis	Lahore (Punjab)
(Mehmood et al., 2017)	Case Study	Qualitative	Urban Sprawl and Land Use	Spatio-Temporal Trends and Patterns of Urban Sprawl	Secondary Data Analysis	Gujranwala (Punjab)
(Rashid et al., 2018)	Exploratory Analysis	Qualitative	Urbanization and Water Resources	Scarcity of Water Resources and Environmental	24 In Depth Interviews	Muzaffar Abad (AJK)

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 Degradation
 

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(Shuaib et al., 2018)	Cross-Sectional	Quantitative	Urbanization and Floral diversity	Loss of Agriculture Lands, Biodiversity, Soil Erosions and Grazing	21 Plant Species	Dir (KPK)
(Mukhtar et al., 2018)	Cross-Sectional	Quantitative	Urbanization and Decreasing Farm Size	Rural to Urban Migration	504 Respondents	Faisalabad, Lahore, Gujranwala, Sialkot (Punjab)
(Ali Siyal et al., 2018)	Case Study	Qualitative	Urbanization and Migration	Internal Migration, Climate Change	45 Migrants 36 Males and 9 Females	Mardan (KPK D.G. Khan (Punjab Faisalabad (Punjab)
(Peerzado et al., 2018)	Cross-Sectional	Quantitative	Urbanization and Land Conversion	Agricultural Land Conversion	100 Respondents	Hyderabad (Sindh)
(Farhat et al., 2018)	Temporal Study	Qualitative	Urbanization and Migration	Rural Urban Migration	Secondary Data Analysis	Lahore (Punjab)
(Ali <i>et al.</i> , 2019)	Cross-Sectional	Quantitative	Urbanization and Soil and Plant Species	Land Cutting, Erosion, Overgrazing, Biodiversity Loss, and Climate Change.	Four Study Sites	Peshawar (KPK)

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### **Methodological issues in the reviewed research studies**

It has been observed during the critical examination of the past research studies conducted by the different authors on urbanization linking it to different fields of life most notably agricultural land conversion, removal of green places, inadequacy of houses, fossil fuel consumption, population growth, rural to urban migration etc. Nine authors (Sajjad et al., 2010; -Uz-Zaman and Baloch, 2011; Ahmad et al., 2013 ; Malik and Ali, 2015; Bhatti et al., 2015; Ali Siyal et al., 2018; Mehmood et al., 2017) used case study approach to understand the phenomena of urbanization. The case study method has always been a controversial issue in social science research for data collection; criticized for the lack of rigor; and provide very little base for scientific generalizations (Tight, et al., 2016; Hollweck, 2016). The case study methods, as revealed by the past researches, widely been utilized in the field of education, sociology (Grassel E1, 2006), law (Lovell, 2006), and medicine (Taylor & Berridge, 2006). Case study helps to explain both the process and outcome of a phenomenon through complete observation by including both quantitative and qualitative data (Mixed Method approach of data collection). Furthermore, mixed method approach helps reconstruction and analysis of the case under investigation (Runeson, et al., 2012). In the light of these arguments none of the researchers cited above utilized case study accompanied by both qualitative and quantitative research study design to strengthen their case studies. The researchers of all the above-mentioned research studies employed only qualitative approach to carry out their respective research studies. Moreover, most of the researchers (14 in total) utilized secondary data to enrich their respective studies with empirical evidence which is not immune to its own disadvantages.

The inaccuracies in the secondary data are not to be checked (Dale, 1988; Chava Frankfort-Nachmias, David Nachmias, 2007; Creswell, 2009), the researchers have lack of control while handling the secondary data (Dorothy G. Herron, 1989; Blumer, 2009; Saunders, 2009; Semester, 2011; Dunn, et al., 2015; Allen, 2017), irrelevancy and inappropriateness of the collected data (Heaton, 2008; Boslaugh and Boslaugh, 2009; Doolan and Froelicher, 2009; Denscombe, 2010; Allen, 2017), and the data become, with the passage of time, obsolete and very old.

### **Consequences and challenges**

The major consequences of urbanization which have been discussed in detail in the present study include fertile agricultural and transformation and rural to urban migration. The fertile agricultural land conversion has deprived the farming community from the arable land to cultivate crops. Moreover, the rural to urban migration has pressurized the urban areas to create more room for the people along with job provision. Though there are various other consequences of urbanization including food security, street crimes, issues of law and order, housing problems, etc. but the present study have only focused land conversion and internal migration because these two issues are influencing many the rural population. The unbridled urban sprawl is posing a serious challenge to the development authorities. They are struggling to control the expansion of the major cities. The real estate developers have acquired the shape of mafias, even the government has failed to defy them. This major challenge has been discussed in detail underneath.

### **Fertile agricultural land transformation**

The economy of Pakistan mainly depends on the agriculture sector. The contribution of the agricultural sector in the GDP of Pakistan is 18.9% with an annual growth of 3.81% (GOP, 2018). It absorbs 42.3% of the labor force (directly or indirectly) of the total 62.0% population which is living in the rural areas (Pakistan Economic Survey, 2017-2018). In Punjab, Sindh, KPK, and Baluchistan 49.2% (10143.4 hectares), 31.7% (4465.0 hectares), 8.4% (1174.1 hectares), and 2.4% (822.2 hectares) cultivable agricultural land is in use respectively (GOP, 2018). Therefore, the agricultural sector is playing a vital role in sustaining the economy of Pakistan by providing livelihood to the rural population. The unplanned urbanization in Pakistan particularly in Punjab and generally in other provinces of Pakistan is depriving the rural population from the fertile land which is being used for residential and commercial purposes. In the capital of the Punjab 557, in Faisalabad 73, in Gujranwala 87, in Hafizabad 53, in Sialkot 57, in Multan 215, and in Bahawalpur 27 residential colonies have been declared illegal by LDA, FDA, GDA, HDA, SDA, MDA, and CDA, respectively. The studies included in this review revealed that in Lahore, 11,4630 ha of arable land was converted for urban use out of which 18% converted land is under 252 housing schemes during the

last 40 years. It has also been estimated that in 49% schemes, 50% plots are those on which house have not been constructed and 75% of these plots are in the hands of professional speculators; these raised the cost of plots and house building reached beyond the low middle-income group (-Uz-Zaman & Baloch, 2011). Due to the conversion of agricultural land the land ownership status of the farmers is also changing. A considerable change in the size of landholding during the period 2006-2015 has taken place because of the unplanned urban sprawl which has been reported by FDA that 42 residential colonies have been declared illegal in Faisalabad and this trend is widely responsible for the land ownership patterns as majority of the farmers (48.9%) owned up to 5 acres, previously while now majority of farmers (53.9%) own less than 2 acres of land (Farah et al., 2016). This change was found mainly due to sale of land for housing schemes (56.9%) and division of land due to inheritance (17.8%). In Bahawalpur, the urban area that has reached from 590 acres in 1951 to 11500 acres in 2012. This happened due to rapid increase in population which reached from 41646 in 1951 to 560588 in 1912. More than 25 Katchi Abadies (slums) are also contributing in urban sprawl (Khan et al., 2014). From 1988 to 2008 (20 years) (Bahawalpur) an area of 256 acres of fertile agricultural land was transformed with an average of 12.8 acres per year into seven colonies (Allama Iqbal town, Baharia city H/S, Khayaban-e-Ali H/S, Royal city H/S, Rehman garden H/S, Gulshan Iqbal town and Madina town) in different directions of the city and resultantly price of the land is shoots up. The Bahawalpur agricultural land bearing fertile soil has been regarded suitable for the cultivation of various crops i.e. wheat, cotton, sugarcane etc. is rapidly being transformed into housing colonies. (Mohsin and Jamal, 2014). In Peshawar, KPK, the physiochemical and Phytochemical analysis of the soil samples collected from the three Zones (Khyber Field, Grid Station, and Amman Plots) has revealed that the soil (silty clay loam, loamy sand) was fertile enough for the cultivation of crops because it included all the major important elements (N, P, and K). Due to the urban sprawl, the species such as "Peganum Harmella" are near to extinction. Due to the construction of residential colonies, the vegetation and grazing area is reducing leaving the land under erosion (Ali et al., 2019). From 1990-2010, in Peshawar, a significant increase of 12.98% in urbanization and decrease of 12.98% in

vegetation has been observed (Khattak, et al., 2015). In Dir, KPK, due to the agricultural land conversion, the species such as *Salix alba* and *Populus alba* has almost been near to extinction (Shuaib et al., 2018). In Hyderabad, Sindh, in the last 20 years, 13,000 acres of pure land has been converted for the miscellaneous objectives (Peerzado et al., 2018). In Karachi, as reported by SBCA, that 310 housing schemes has been relegated as illegal which show the extent to which massive unplanned urbanization is going on in the country.

### **Rural to urban migration**

One of the major determinants of rapid urbanization in Pakistan is rural to urban migration (GOP, 2015; Malik, 2015; Hamid, 2010). It has been projected by a recent study conducted by Hasan (2015) that rural to-urban migration constitute 40.0% of the total internal migration in Pakistan. The studies included in this review revealed that in Faisalabad, both the push and pull factors play a vital role in shaping the migration behavior of majority of the respondents (Farooq, et al., 2005; Ali Siyal et al., 2018). The 74.0% (150) of the respondents were attracted to the urban settlements with a desire to achieve a better lifestyle (Farah, et al., 2012). The study conducted by (Farooq, et al., 2005) in Faisalabad concluded that for the 80.0% and 13.0% of the respondents, poor economic and educational opportunities, respectively were usually responsible for their migration from rural to urban settlements. Another study conducted in the four districts of Punjab (Faisalabad, Lahore, Gujranwala, and Sialkot) by Mukhtar et al. (2018) illustrated that educational and health facilities, family conflicts, small farm size for agricultural activities, unemployment, and larger family size were the main influencing factors affecting the migration decision of the people from rural to urban areas (Chiswik, 1978; Farooq et al., 2005; Mukhtar et al., 2018; Farhat et al., 2018). It was reported by Farhat et al. (2018) that due to rural-urban migration, the population of Lahore was continuously soaring since 1951. A similar study conducted in the three districts of Punjab and KPK (Mardan, D.G. Khan, and Faisalabad) by Ali Siyal et al. (2018) revealed that the common push factors such as lack of employment and business opportunities and minor push factors i.e., lack of telecommunication and transportation, and absence of effective drainage system, deaths of family/relatives,

conflict with other tribes, and lack of health facilities etc. in Faisalabad, Mardan, and D.G Khan, respectively were generally responsible for the issue of internal migration of the people to the urban settlements. Better employment opportunities, proximity to their village (hometown) and access to basic facilities (educational facilities, hospitals, road and transport facility, sanitation, etc. were some of the common pull factors which attracted the rural dwellers to the urban settlements (Ali Siyal et al., 2018; Mukhtar et al., 2018). In Karachi, Sindh, different studies concluded that the rural to urban migration play a vital role in the urban sprawl (Hasan, 2010).

Various other studies revealed that the people were migrating from the rural areas to the cities contributing in the escalating of urban sprawl because of the climate which is changing unexpectedly and causing floods, earthquakes, and extreme weather conditions (Mueller, et al., 2014; Hasan, 2015; Ali, et al, 2015; Qin and Liao, 2016; Wang, et al., 2017).

#### **Role of development authorities and urban sprawl**

The development authorities directly or indirectly play a vital role in the urban sprawl. Very few studies are available regarding the role of development authorities in controlling this phenomenon. The studies included in this review article reveal that development authorities often fail to ensure planned urban development because of the lack of coordination among the line departments and political influence of the politicians who are involved in real estate business (Ahmad, et al., 2013; Kugelman, 2013; Nadeem Ul Haque, 2015; Arsalan et al., 2015; Jabeen, et al., 2017; Rana and Bhatti, 2018). Due to the poor performance of the development authorities of the various districts of Pakistan, the studies reveal that

the rapid urban sprawl is broadly responsible for the environmental degradation (Dowall and Ellis, 2009; Khan et al., 2012; Bhatti et al., 2015; Mehmood et al., 2017), pollution in the big cities (Sajjad et al., 2010; Zia et al., 2015), water scarcity (Arsalan et al., 2015; Afzal et al., 2016; Rashid et al., 2018), housing issues (Zhang, et al., 2003; Dowall and Ellis, 2009; Chen, et al., 2011; Mukiibi, 2012; Hasan, 2015; Adetokunbo and Emeka, 2015; Minallah et al., 2016; Wang et al., 2017; Wang et al., 2017), and adverse effects on mental health (Phillips, 1993; Moore, et al., 2003; Trivedi, et al., 2008; Tan et al., 2010; Khan et al., 2011; Minallah et al., 2016). The urban development authorities have the jurisdiction to approve or disapprove the urban development plans submitted by the real estate developers.

Most of the housing colonies developed by the real estate developers adjacent to the outer rim of the cities (peri-urban areas) without the approval of the urban development authorities pose real danger to the environment because they (real estate developers) often did not care about the provision of basic facilities i.e., electricity, sewerage system, parks, green belts, mosques, schools, graveyard, and community centers. The urban development authorities often disapprove such type of housing colonies but cannot force the real estate developers to develop such type of illegal housing units. Generally, the poor people inhabit such type of housing colonies because of the low price of land (per square foot) as compared to the legal and approved housing colonies. The undue political influence renders the urban development authorities useless and the urban sprawl goes on unchecked. The people generally purchase land in the peri-urban areas on cheap rates hoping that someday there will be development and they can sell it on high prices.

Table 2. Major Findings of the Studies included in the Review.

Study and Year	Urbanization in Pakistan
(Sajjad et al., 2010)	The prime results of this research study are: (1) from 1947 to 2008, 1500 % expansion has been observed both in the urban population and area respectively, (2) the percentage growth of automobiles in the city has become doubled as compared to the populace expansion during 1990 to 2008. The utilization of petrol and oil, coal, and natural gas during 1980 to 2007 has increased to 219 %, 287%, and 365% respectively, and (3) Moreover, the emission of CO <sub>2</sub> has jumped from 39 million metric tons in 1980 to 151 million metric tons in 2007.
(-Uz-Zaman and Baloch, 2011)	“The major findings of this study unfolded that 11,4630 ha of the cultivable land was transformed during the last 40 years, out of which 18 % of the transformed land is under-

	utilization of the 252 residential schemes. In 49 % of the residential schemes, it has been estimated that, 50 % of the plots, houses have still not yet been constructed, and 75% of these plots are in the hands of professional real estate advisors. The real estate advisors have raised the price of the plots to the extent that it has become nearly impossible for the low-middle income group even to think about constructing their own house”.
(Khan <i>et al.</i> , 2012)	“The key finding of this research study is that the swift urbanization has badly degraded the urban environment. It was observed during the process of the study that rapid urbanization has caused low resilience, psychological stress, depression, and symptoms of low self-esteem in the urban settlers”.
(Farah, <i>et al.</i> , 2012)	“The principal findings of this research study unveiled that the “Pull Factors” play a vital role in shaping the migratory attitude of the respondents as 74 % (young adults) of them migrated to the urban areas to enjoy a better lifestyle, and consequently become responsible for the expansion of the cities, settling on the fertile agricultural land (peri-urban areas) sold by the real estate advisors without any approval of the respective development authorities”.
(Ahmad <i>et al.</i> , 2013)	“The crucial findings of this exploratory research study indicated that LDA badly failed in ensuring the regular expansion of the boundaries of the mega city and the city expanded in an irregular fashion. It was found during the investigation that a very weak coordination was observed between DAs and line agencies working in a city/town. In many areas, resultantly, the functions were generally overlapped, inflicting an irreparable damage to the development plans designed by the concerned urban development authorities”.
(Khan <i>et al.</i> , 2014)	This research study has revealed that due to the rapid urban expansion, the urban area of Bahawalpur has stretched from 590 acres in 1951 to 1500 acres in 2012. The population of the city reached 41,646 in 1951 to 560,588 in 1912. Moreover, around the outer rim of the city 25 Katchi Abadies (slums) has been developed. It has become difficult for the municipal authorities and local government to provide adequate services to the inhabitants.
(Mohsin & Jamal, 2014)	The prime findings of this research study are: (1) 256 acres of the cultivable land has been transformed into residential colonies from 1988 to 2008 (12.8 acres/year). (2) The laboratory analysis of the soil samples (14 in total) revealed that the soil of the residential colonies has loamy to moderate loamy texture which is highly suitable for cultivation all types of crops.
(Malik and Ali, 2015)	The major findings of this study are: (1) both “agriculture value added” % of GDP and “agricultural value added annual” % of growth had a negative relationship with the urban expansion. (2) It implies that with the rapid urban sprawl more and more fertile agricultural land would be converted to commercial utilization which consequently will result in the considerable reduction of the agricultural productivity.
(Hasan, 2015)	“The notable findings of this research study are: (1) There is a major share of the refugees from Bangladesh, Burma, and Afghanistan in the urban development of Karachi. (2) The land belongs to Board of Revenue (Karachi) is the prime locus of urban expansion both formally and informally. (3) The weak government writ also contributed to the illegal expansion of the city because the politically influential personnel grabbed precious land of the government agencies. (4) An attempt was made to regularize the “Katchi Abadis” (slums) which constitute the 55 % of the total population of the city (two million) in the late nineties.
(Arsalan <i>et al.</i> , 2015)	“The major findings of this study are: (1) due to population pressure, the administrative area of Sukkur Municipal Corporation was recently extended up to 14,500 acres in which half of the area was built-up and it was urban. (2) due to heavy load of population, the water demand of the inhabitants of the city which is around 22.1 MGD (Million Gallons per Day),

	hardly 50% fulfilled by the regular low-quality piped water. (3) healthcare facilities in Sukkur were highly scarce and dilapidated as all major health indicators were less than 50% including mother-child health and trauma management. (4) lack of interest on the part of the political authorities to develop the infrastructure of the city enabling it to become the economic hub due to its geographical location”.
(Zia et al., 2015)	The major findings of this research study are: (1) A trivial decline in mean maximum temperature and a significant rise in mean minimum temperature of Lahore was observed during the process of investigation. (2) Furthermore, the rapid urban sprawl was mainly held responsible for the linear progression towards decrement in the mean annual temperature. (3) Among the major contributors of the change in temperature are reduction in vegetation cover and increase in built-up area has been identified as the most pervasive one.
(Bhatti et al., 2015)	The prime findings of this study are: (1) The major land shifts varied in both the urban and semi-urban zones within the urbanite region was found after the critical examination of LULC maps of 1999 and 2011 at different scales. The reasons governing land changes, moreover, were dissimilar for the same land transitions in both the zones and the results are in conformity with Thapa and Murayama, 2010. (2) The MLPNN modeling accuracies and the AUC values of the prediction maps of 2013 derived at multiple scales (city district, urban and suburban) verified this inference. (3) After the cautious understanding of the factors of land change in different zones within an urbanite region, these findings imply that the developers need to develop separate land management tactics for urban and peri-urban areas.
(Farah et al., 2016)	The key findings of this study indicated that: (1) During the period of 2006 to 2015, a considerable change in the land holding has been taken place. 53.9 % of the farmers, now, own less than 2 acres of land. In the past 48.9 % of the farmers responded that they owned up to 5 acres. (2) Division of land by inheritance (17.8 %) and occupation of land by the housing colonies (56.9 %) are the prime factors behind land ownership patterns. (3) 88.4 % of the respondents despite the reduced farm size were still attached with the agriculture sector for their sustenance. (4) Moreover, it was also found that the crop patterns were the same, but the production was decreased due to the reduced farm size due to urbanization.
(Afzal et al., 2016)	The prime verdicts of this research study argue that: (1) At a growth rate of 5.7 %, the populace has increased up to 85 % in the last eleven years. While 9 % increase was found in the built-up land area. (2) Forest area, on the other hand, has reduced up to 10%. (3) Due to the rapid urban sprawl, it was found that the inflow to the lack have decreased, even though there was no major change in the trends of rainfall was recorded. (4) During high to low inflow seasons, the suspended sediment load was found to be varies from 16.5 tons/day to 1045 tones/day.
(Bhatti et al., 2017)	The key findings of this research article are as following: (1) No significant correlation was observed between QOL and the built-up density. (2) No significant relationship was observed between the QOL and the rest of the LULC (3) Between QOL and bare density, a positive relationship and between QOL and water density, a negative relationship was observed in Data Ganj Baksh and Samanabad respectively. (4) The rise in population density would negatively affect the QOL in this town as indicated by the results. To improve and sustain the QOL in urban Lahore, especially in the Shalimar town, appropriate measures need to be taken.
(Minallah et al., 2016)	The major findings of this research study are: (1) The urban development in Gujranwala, it was found that, offer better opportunities regarding housing, educational, health, and

	human development scenario. (2) A small proportion of population, noticeably, could have access to sanitation, safe drinking water etc.” (3) Natural increase and internal migration are mainly responsible for the expansion of the city to north, west, and east directions, respectively.
(Rana & Bhatti, 2018)	The major findings of this research study are: (1) Due to the unequal distribution of the resources among the districts of Punjab, Lahore is often criticized that it is devouring the major portion of the resources of the Punjab, (2) the infrastructural development in the district is not interconnected and it is poorly planned, (3) an integrated and consolidated administration is missing, (4) strict building regulation is missing, and (5) initiatives should be taken to resolve these challenges.
(Mehmood et al., 2017)	The major findings of this research study indicated that: (1) During 1990 to 2015, 97 % of built-up area was increased, while in the vegetation cover, there was 27 % decrease was observed during this period. (2) It was noticed that the city (Gujranwala) was mainly expanding towards north and south ward along the GT (Grand Trunk) Road and west of the core of the city, respectively.
(Rashid et al., 2018)	The major results of this enquiry indicated that: (1) Due to swift urbanization, the local inhabitants (Muzaffarabad) have viciously contaminated both the Jhelum and Neelum rivers resulting in the emergence of several viral diseases and the subsequent scarcity of the drinking water. (2) Underground and on ground, the water pollution, is a consistent source of the contravention of communicable diseases.
(Shuaib et al., 2018)	The prime findings of this research investigation are: (1) In Upper and Lower Dir (KPK), the rapid urbanization has created grave environmental problems such as climatic and ecological changes as well as environmental pollution. (2) Some of the species such as Salix alba and Populus alba, due to the loss of agricultural land, has almost been near to the extinction. (3) Owing to the effect of massive urbanization, soil erosion, loss of floral diversity, and lose of agricultural land is taking place. (4) The laboratory analysis of the soil samples obtained from different Zones further indicated that the transformed land was fertile enough to be cultivated.
(Mukhtar et al., 2018)	The chief findings of this research study revealed that: (1) In the range of the factors which are shaping the decision-making of the respondents regarding rural to urban migration, it was observed during the investigation, small farm size for agricultural activities, educational and health facilities, employment, unemployment are the most noteworthy. (2) Due to the rapid urbanization, the rural areas are under stressed and further it is creating implications regarding agricultural productivity.
(Peerzado et al., 2018)	The major findings of this study are: (1) In the last 20 years, according to Hyderabad Development Authority (HDA), 13,000 acres of the pure agricultural land was converted. (2) Behind the agricultural land conversion; urbanization, overpopulation, water shortage, housing demands and land valuation are the main reasons in this study area.
(Ali Siyal et al., 2018)	The common push factors such as the lack of employment and business opportunities and minor push factors like lack of telecommunication and transportation, and absence of effective drainage system, deaths of family/relatives, conflict with other tribes and lack of health facilities etc. in Faisalabad, Mardan, and D.G Khan respectively are widely responsible for the issue of internal migration of the people to the urban settlements. Better employment opportunities, proximity to their village (hometown) and access to basic facilities (educational facilities, hospitals, road and transport facility, sanitation, etc. are some of the common pull factors which attracts the rural dwellers to the urban settlements. The study concluded that unplanned urbanization is responsible for the raid urban sprawl

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	in the districts mentioned above. An effective urban policy can resolve the issue of urban sprawl in the country.
(Farhat et al., 2018)	Research findings revealed that population of Lahore is continuously rising since 1951 to date due to rural urban migration. The gradual population increase is enhancing civic population density and immense urban sprawl. The research in line with the above-mentioned factors gives the spatial presentation of urban land use land cover changes from 2000 to 2015.
(Ali et al., 2019)	The physiochemical and Phytochemical analysis of the soil samples collected from the three Zones (Khyber Field, Grid Station, and Amman Plots) has revealed that the soil (silty clay loam, loamy sand) was fertile enough for the cultivation of crops because it included all the major important elements (N, P, and K). Due to the urban sprawl, the species such as " <i>peganum harmella</i> " are near to extinction. Due to the construction of residential colonies, the vegetation and grazing area is reducing leaving the land under erosion.

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## CONCLUSION

In accessing the rapid urbanization in Pakistan, it is the very first study which is undertaken to review the range of methodologies, incipient themes of urban sprawl, types of data used, and the identification of the neglected geographical areas from the previously published research papers. It tries to encompass the whole country including the four provinces and the autonomous regions like AJK and Gilgit-Baltistan. The researchers who aspire to study urban sprawl in Pakistan, this review study is very feasible for them to design their methodology, selection of themes (dimensions) related to urban sprawl, and the neglected geographical areas where massive urbanization is going on. The issues such as agricultural land conversion, deforestation, migration, psychological problems, inadequacy of housing-resulting due to urban sprawl have been highlighted by the researchers through the utilization of mostly secondary data analysis. The future researchers can be helped by this article to select the most appropriate methodology (preferably mixed-method research design) and the neglected geographical areas which needs the prime attention of the researchers who are interested to study urban sprawl in Pakistan. As we know that the pace of urbanization is relatively higher in Pakistan as compared to other countries located in the South Asian region. It is quite alarming for a country like Pakistan which mostly depend on agriculture sector to sustain her economy. To understand the phenomenon of urban sprawl, there is still acute shortage of quantitative and mixed-method studies focusing on the areas of fertile agricultural land conversion, environmental degradation, water scarcity, changing land ownership patterns, food security, and deforestation. As for the coverage of the geographical

areas is concerned Baluchistan, Sindh, AJK, and Gilgit Baltistan, and Federally administered regions have partially or altogether been ignored by the researchers. The focus of the researchers was mostly on the Punjab and KPK provinces. Instead of conducting novel studies, most of the researchers have utilized secondary data analysis to provide empirical evidence to their studies. The urban development authorities and urban planning departments seem powerless in front of the land grabbers and the real estate developers. The government of Pakistan also seems immune to the rapid urbanization which is engulfing cultivable land and the mushroomy growth of the peri-urban (slums and ghettos) areas around the outer rims of the cities, giving rise to multiple environmental, social, economic, political, and health issues.

## RECOMMENDATIONS AND THE WAY FORWARD

During the review of the past research studies, it has been found that the major issues which are arising due to urban sprawl such as land conversion, changing land ownership patterns, inadequacy of housing, internal migration, deforestation, pollution, mental annoyance etc. have been tried to be explored by the researchers from 2010-2019. Furthermore, it is suggested that the future researchers should focus on the impact of rapid urbanization on the following issues such as: water supply and sanitation, solid waste management, food security, food sovereignty, implications for food and farming, environmental degradation, rural land use patterns, rural poverty, challenges of peri-urban areas, household livelihood strategies, traffic problems, issues related to the unavailability of parks and play grounds, street crimes, air pollution, and multiple issues related

to the health hazards posed by the high population density in the urban settlements. This study also recommends that the geographical areas which have been neglected till so far by the researchers such the Baluchistan province, Gilgit-Baltistan, and AJK should be investigated thoroughly keeping in mind the above-mentioned issues posed by rapid urban sprawl. The following districts from the Punjab province such as Multan (1,871,843, 2017 census), Sargodha (659,862, 2017 census), Sheikhpura (473,129, 2017 census), Rahim Yar Khan (420,419, 2017 census), Jhang (414,131, 2017 census), Kasur (358, 409, 2017 census), Okara (357, 935, 2017 census), Gujrat (390,533, 2017 census ) and Sahiwal (389,605, 2017 census); from Sindh province the following districts such as Karahi (14,916,456, 2017 census), Hyderabad (1,734,309, 2017 census), Larkana (490,508, 2017 census), Sukkur (499,900, Hyderabad (1,734,309, 2017 census), Nawab Shah (279,668, 2017 census), Shikarpur (195,437, 2017 census); from Baluchistan province the districts such as Quetta (1,001,205, 2017 census), Turbat (213,577, 2017 census), and Khuzdar (182,927, 2017 census); from KPK province the following districts such as Mingora (331,091, 2017 census), Kohat (228,779, 2017 census), Abbottabad (208,491, 2017 census), and Mansehra (127,623, 2017 census); and the capital city (1,009,832, 2017 census) have not yet been explored to access the severity of the fast pacing urbanization. There is an urgent need to conduct cross-sectional and longitudinal studies on the part of the researchers involving mixed-method approach of data collection (primary data) so that the impact of rapid pace of urban sprawl on the diversified issues can be judged and the attention of the concerned authorities should be diverted to this grave issue. It will help to promote sustainable development in the country by saving the fertile agricultural land for the succeeding generations because most of the rural population in Pakistan depend on the agriculture sector for their sustenance. This study recommends that there is a dire need of mixed-method (qualitative + quantitative) research studies so that the seriousness of the problem of rapid urbanization can be assessed in the true spirit, and under the recommendation of these studies new policy measures should be taken to snub this uncontrolled issue. Moreover, the department of agriculture extension can join hands with the urban development authorities to launch campaign against this rapid urban sprawl to save fertile agricultural land

conversion for the succeeding generations. They can plan research studies regarding this unplanned urbanization to ensure food security and conservation of natural resources.

#### ACKNOWLEDGEMENTS

This research article is the part of the PhD thesis entitled "Livelihood Diversification Strategies among the Smallholders and its Implications for Poverty Reduction: (A Case Study of the Punjab Province, Pakistan) of the first author.

#### CONFLICT OF INTEREST

It is hereby declared by the authors that there is no potential conflict of interest with respect to research, financial relationship, authorship, and/or publication of this article.

#### FUNDING

It is hereby declared by all the authors that "no funding" was received from any organization for the accomplishment of this review article.

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