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A Review and Mapping of Urban Sprawl in the Selected Zones along CPEC Corridor

Prof. Syed Ahmad Ali Shah
Director, CESTaC (Center for Environmentally Sustainable Development and Climate Change),
FJWU (Fatima Jinnah Women University)

Dr. Saleem Janjua
Head of Policy,
Centre of Excellence for CPEC

Adnan Khan
Research Associate,
Centre of Excellence for CPEC

Ministry of Planning, Development & Reform

Pakistan Institute of Development Economics

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A Review and Mapping of Urban Sprawl in the selected zones along CPEC Corridor

By

Prof. Syed AHMAD Ali Shah[1], Dr. Saleem Janjua[2], Adnan Khan[3]

ABSTRACT

CPEC would change Pakistan's socio-economic, environmental and geographic landscape, in addition to bringing economic growth and development through an enormous development of infrastructure, industrialization, huge employment opportunities, increased power generation and commercial amalgamation with the establishments of Special Economic Zones (SEZs). But this could pose serious challenges for ecosystems, public health, natural resources, traffic management and governance due to urban sprawl, if not planned and executed with care. The emergence of SEZs around the world in general and Pakistan in particular gained importance for attracting employment, foreign direct investment (FDI), mass migration and urbanization. Urban sprawl possesses a serious threat to a developing country like Pakistan due to the lack of good governance. Government authorities and institutions no longer address the essential problem of urbanization, which arise due to poor planning, execution and management of urban centers that generate problems of access to basic health and sanitation services, traffic congestion, air pollution, poor livelihoods and sustainability issues for the poor communities. The urban expansion has attracted the attention of ecologists, urban planners, civil engineers, sociologists, administrators, legislators and, finally, communities. This study would serve as baseline information for the formulation of strategies and plans relevant to the growth of urbanization and industrialization along the CPEC corridor and would generate policy advice by mapping and evaluating urban sprawl. This would serve as a basis for capacity building and strengthening the institutional framework and understanding to enable holistic development along the CPEC corridor by creating and understanding on the underpinning challenges and opportunities, which would eventually serve to exploit the potential benefits of this megaproject. The study is mainly based on the secondary source of data collected through published articles,

[1] Director, CESTaC (Center for Environmentally Sustainable Development and Climate Change), FJWU (Fatima Jinnah Women University)
[2] Head of Policy, Centre of Excellence for China-Pakistan Economic Corridor, Islamabad
[3] Research Associate, Centre of Excellence for China-Pakistan Economic Corridor, Islamabad

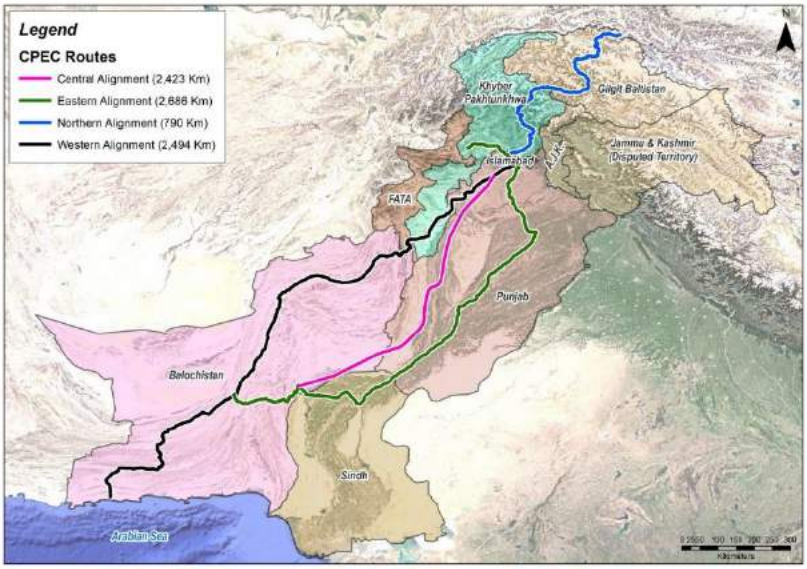
work documents and other documents presented with graphic and narrative analysis. The study also addresses the concerns or challenges and opportunities for sustainability in Pakistan's urban and technological development. The study concludes by creating an understanding of the expected urban sprawl of the CPEC along with the recommended strategies and a way forward, which would be particularly useful for policymakers and decision-makers in the development and implementation of infrastructure and development policies in Pakistan. One way to address these problems is to create new urban and economic centers / smart cities across the country along the CPEC routes to promote environmentally sustainable urban development and to facilitate trade between the interested parties. As the old Islamic philosophy says, ***"do not expand cities, rather develop new ones"****, which explains the understanding of limiting ourselves to the caring-capacity of nature, ensuring long-term environmentally sustainable development. The most important thing of all is that it can be done without any additional cost by capitalizing the enormous potential of CPEC's efficient development, which is based on the philosophy of an ancient Chinese proverb:* ***"If you want to be rich, build roads first"****. Pakistan can take it and utilize the enormous potential of its rugged terrains of less populated areas of Balochistan, Sindh and parts of Punjab.*

Keywords: Urban Sprawl; Sustainability; Trade Integration; Governance; Pakistan; China; China-Pakistan Economic Corridor – CPEC; Knowledge and Technology Spills; City; Road; Special Economic Zones; One-Belt, One-Road – OBOR; Smart cities;

1. INTRODUCTION

Urban Sprawl refers to the sudden increase in the percentage of the total population that resides around the urban / exclusive economic zones (G. W. Jones, 1991). Pakistan has experienced an extraordinary pace of urban growth, rapid urbanization has been encouraged by the variety of factors of economic necessity, the decrease in dependence on the agricultural sector and insecurity (G. M. Arif et al. 2009). Urban sprawl has increasingly become one of the leading forms of urban spatial expansion around the world since the Second World War, with differences in dates, sources and results (Ewing et al., 2003a) (Gill, 2008) (EEA, 2006) (Gómez-Antonio et al., 2014). In general, it suggests a growing shift from agriculture towards distributive occupation and industrial service (X. Li, 2004). These occupational opportunities and services act as attractive factors that promote rural-urban migration and react through the push factor, such as the inactive economy, poverty and natural disasters. These urbanization trends in developing countries are substantially different from US or European industrial urbanization (R. B. Mandal, 2000). Whereas, the overwhelming growth of the urban population is a complicated result of both 'push' and 'pull' factors (V. R. Savage, 2006). The China-Pakistan Economic Corridor (CPEC) is part of China's One-Belt, One-Road (OBOR) initiative, which aims to unite the region through better connectivity (Figure-1.1), with the initiation in 2013, CPEC has expanded to encompass cooperation in a large number of sectors under its short-term and long-term plans.

FIGURE 1: CPEC ALIGNMENT ROUTES



Source: Own Digitization

In addition to improving connectivity and surplus energy, the CPEC foresees the development of Special Economic Zones (SEZs) along with the growing urbanization throughout Pakistan.

The CPEC is expected to accelerate urbanization and attract local and foreign direct investment (FDI) in the country through greater competitiveness. The relocation of Chinese industries will generate a possible spill of knowledge and technological progress. In addition, it is expected to address the problem of poverty and provide hope and better standards of living to people throughout the region.
In addition, to maintain the partnership for progress and take it to the next level, the two parties have developed a long-term plan to cooperate in the areas of agriculture, industry, commerce, communication, water resources management, coastal tourism and development of financial links. Closer cooperation between Pakistan and China in the long term would ensure that the benefits accumulated under CPEC are passed on to future generations.

Urban sprawl in emerging cities of the developing world has been a bottleneck for economic growth and environmental security. This document aimed at highlighting the problems of urban sprawl and the main challenges of urban sustainability in Pakistan along CPEC routes especially in the SEZs and major existing cities. Taking into account the historical facts mentioned above, and to optimize the economic benefits of the SEZs under CPEC, collaborative participation and mutual understanding between interested and affected parties (IAPs) / stakeholders is a prerequisite for the environmentally sustainable urban development. All IAPs including governments, public bodies, private institutions, industries, communities and academia must coordinate and cooperate with each other so that affects could be minimalized, which would emerge otherwise with the establishment of industrial zones / SEZs thus would exert additional pressure on the already overburdened cities by urban sprawl and industrial developments around CPEC corridors.

After the 18th Amendment, the development of SEZs has become a provincial domain, however CPEC is a multimillion dollar project, the authorities of the Pakistani governments (federal, provincial and local) must reach a political consensus for the development of these zones. Successful urbanization of SEZs also depends on the efficient and responsive local management structures. The concerned authorities should be provided guidance and support in this regard for effectively, efficiently, economically and yet environmentally sustainably (by using 4Es)

managing these zones under CPEC. If planned and executed wisely these SEZs can serve as an effective tool to transform domestic economy into the global economy and by carefully identifying causes and effects, Pakistan can become future economic power of the region by efficiently harnessing knowledge and technology spill with the help of CPEC. SEZs can contribute significantly to the growth and productivity of the urban economy; however, this requires careful planning and strategic design in accordance with local needs and requirements. The Pakistani authorities (federal, provincial and local) should develop a framework of mutual agreement for SEZs and urban center's development and management across CPEC routes.

Now a revolution is taking place in developing countries in terms of weakening sustainability and livability, on the one hand, and scaling up modern technological opportunities on the other hand (J. D. Kasarda et al., 1990). The population is concentrated mainly in or around megacities (M. Haider et al., 2010). In addition, according to the report (UN-WUP, 2000), almost 90 percent of urban population growth would be in the emerging cities of Latin America, Africa and Asia. The estimate shows that developing countries will share 80 percent of the world's largest cities (R. B. Mandal, 2000). As a result, it seems to illustrate that more challenges created by megacities in the developing world are expected in the future and CPEC could accelerate the process in Pakistan.

Currently, cities are home and hope for more than 50 percent of the world's population (B. Cohen, 2006). United Nations forecasts indicate that the current proportion of the world's urban population is 54.5 percent and will increase to almost 60 percent by 2030, when six (6) of every ten (10) inhabitants will reside in urban centers (IRIN PlusNews, 2006). The experience of establishing industrial centers and major highways and motorways in Pakistan has demonstrated adequate residential and slum development, especially around motorway alignments, which requires a lot of pressure on the provision of basic services and natural resources. If not planned and executed with care, these CPEC and SEZ route alignments would pose serious challenges to the management and sustainability of these unplanned regions.

The basic factor in the urban growth is a result of rural immigration. According to the 1998 Census, 8 percent of the total population was migrants, numbering 10.8 million Pakistanis. Among them, 63.7 percent migrated to urban areas, while 25 percent of the population migrated to large emerging cities, such as Karachi, Lahore, Faisalabad and Rawalpindi. Only Karachi

expected 13 percent of the country's total migrant population. There is a 5 percent annual rate compared to the 3 percent growth in the urban population, usually as a result of rural to urban domestic migration. It is estimated that each month 45,000 workers go to the city from different parts of the country.

There are several reasons (financial, physical and social) for people to move from rural to urban regions. The push factor is associated with low agricultural performance, lack of land, subdivision of land, forced extra-agricultural labor, deficient economy, education and welfare openings, these factors force people to move from rural or less fortunate areas. Considering that the pull factor is the result of attraction of the socio-economic environment associated with better income, standard of living, availability of essential needs related to education, health, welfare, better infrastructure and urban services encourage more people to move to urban communities.

The key objectives of the study are given as follows:

- To review and map the selected zone on CPEC corridor alignment. The study of existing and planned urban areas along the CPEC corridor and the selected zone would serve as the baseline to envision the future strategies and plans to tackle with the growing issue of urban sprawl and industrialization and generating policy advice;
- To map and assess potential urban sprawl along the CPEC corridor; and
- To serve as basis for capacity building and strengthening of institutional framework to enable the holistic sustainable development along the CPEC corridor.

Many previous studies suggest that emerging cities in the developing world would face a great challenge due to an uncontrollable and unpredictable urbanization, which can generate massive suffering for the urban population. In the context of Pakistan, this state could be more perilous because it has poor governance, has a vast and uncontrollable rural-urban migration and while inequity in the distribution of resources is clearly visible. This study reviews and map the possible urban sprawl of existing and planned urban centers and SEZs along the CPEC corridors and different techniques were used to collect the data mainly through desk review from secondary sources including maps, literature, reports, books, papers, etc. The study started with background and went on to explore the urban sprawl: a global hovering challenge by understanding the dynamics and creating a perspective down to Pakistan’s urbanization at a

glance. The study further went on to exploring the current state of affairs in Pakistan.

The study explores the subject of urban sprawl in the perspective of historical background and analyzes challenges and opportunities with special reference to CPEC. Based on the information that will be collected from desk review as well as stakeholder meetings / informal interviews, potential urban sprawl along CPEC corridors would be reviewed. CAD / GIS based maps will be generated by plotting and projecting potential urban sprawl over the CPEC alignment routes for the easy understanding the significance of future planning, which can be sustainable and yet economically beneficial for Pakistan and China. Informal discussions and meeting will also be held with the experts and organizations to create common grounds of understanding. The study serve as the baseline to envision the future strategies and plans to tackle with the potential challenges and opportunities of urban sprawl, industrialization along SEZs, utilizing the knowledge and technological spill effect of CPEC operationalization and concluded on generating policy advice.

2. THEORETICAL BACKGROUND AND ANALYSIS

The China-Pakistan Economic Corridor (CPEC) is a large framework of transportation and trade infrastructure that includes major roads, feeder routes, power generation projects and special economic zones (SEZs), which are expected to be fully operational by 2030. The program of this magnitude could bring positive and negative impacts in Pakistan and China, as well as other countries in the region. CPEC is a part of China's One-Belt, One-Road (OBOR) massive initiative, which aims to unite the region through better connectivity among sixty (60) countries to improve economic integration between Asia, Europe and Africa; and forty (40) of them will be provided only by CPEC (Dawn, 2016). Nine (9) SEZs will be developed under CPEC to improve the industrial fabric through economic integration in Pakistan (Figure-2). SEZs contribute to two main types of rewards and advantages. The first type is known as "static" economic benefits. These include job creation, increased exports, government tax revenues and foreign exchange earnings; and the second type are the "dynamic" economic benefits, such as the improvement of skills, the flow of technology, the spill of knowledge, innovation, added value, economic diversification, the improvement of the productivity of local companies, etc. SEZs accelerate economic growth, backed by quality infrastructure, an enabling business environment and an attractive package of tax incentives with a single free space that also has constructive implications for Urban Development (G. W. Jones, 1991).

FIGURE: 2 LOCATION OF 9 SPECIAL ECONOMIC ZONES (SEZS) UNDER CPEC

Source: CoE-CPEC official website.

The process of growth in any country throughout its history gives rise to spatial economic structures. As Paul M. Romer's theory of endogenous growth holds that investment in human capital, innovation and knowledge contribute significantly to economic growth. The theory also focuses on the positive externalities and the indirect effects of a knowledge-based economy that will lead to economic development. The theory of endogenous growth mainly holds that the long-term growth rate of an economy depends on policy measures (Romer 1986, 1990). For example, subsidies for research and development or education increase the rate of growth in some models of endogenous growth by increasing the incentive for innovation. This theory is most likely to be true in the case of CPEC initiative. However, at the same time, other externalities also enter into force, such as the pooling of labor with similar skills and needs, the exchange of intermediate goods for a greater value addition, and the links of companies with suppliers of diverse inputs necessary for productive activity (Marshall 1920; Krugman 1991a). Pakistan can take the advantage of CPEC initiative and can plan and harness on the huge opportunities that is across the road for Pakistan by investing aggressively in technical education and capacity building initiatives of its people to meet the requirements of the competitive job markets and businesses.

Previous studies empirically found the link of knowledge spills that shape spatial structures in a geographic space (Audretsch et al. 1996) (Caniels et al. 2005). Whereas, Jaffe et al. (1993)

empirically found that knowledge spills are geographically limited, but the structure of economic activity restricts the overflow effect, while the impact of technology overflow is mainly due to factor mobility across regions. Spills of knowledge are not a fortuitous fact since the old ideas generally lead to the development of new technologies and the way of doing business (Weitzman, 1998). Pakistan has taken a step in the right direction and entrusted it with the task of One-Window-Service at all border entry and exit points to National Logistic Cell (NLC), which is the largest logistics organization in the government. This initiative would reduce the time consumed in paperwork for cargo and transport entering and leaving Pakistan with the possibility of physical tracking in real time through GPS.

Within the perspective of countries like Pakistan, the current state of urbanization has the double nature of challenges and opportunities. Therefore, cities consist of positive and negative magnitudes; positively it is the axis of the economic development of a country in terms of communication and modernization (E. Browne, 2014). Several scholars do not agree that urbanization does not reduce poverty, in some way it provides the opportunity for great challenges and other problems that directly affect the urban poor (I. N. Awan Masood Sarwar. 2010). In addition, cities are an agglomeration of industrial activities, economic opportunities, as well as modern technological advances, educational and health institutions that promote dynamic industries and rapid growth (M. Kugelman, 2013). On the other hand, cities in developing countries, particularly in Pakistan, are currently vulnerable places to enjoy and live with quality and safety of life due to environmental concerns, the rapid increase in crime / terrorism and the urban poor.

In addition to the existence of externalities in capital, knowledge and technologies, the individual factor cannot be ignored. The process of generating ideas and experimenting with new goods and services is the result of an intellectual effort. Entrepreneurs play their role in internalizing individual externalities for the overall efficiency of the company. This also has its impact on the decision of the company to agglomerate with other companies or not within the same geographical space due to the accumulation of a comparative advantage over others (Papageorgiou, 1978) (Papageorgiou et al. 1983). In addition to the bibliographical evidence presented above, it can be said that CPEC will bring competition with the outside world to Pakistan and the survival of local industries and entrepreneurs can only be so, if proper planning and good governance are achieved by creating an environment where New companies and

entrepreneurs are encouraged and supported by government policies and resources.

3. URBAN SPRAWL: A GLOBAL HOVERING CHALLENGE

There are several definitions of urban sprawl; researchers in the field recognize that the term lacks precision (G. M. Arif et al., 2009). Batty et al. (2003) defined expansion as "uncoordinated growth: the expansion of the community without concern for its consequences, in short, the unplanned incremental urban growth that is often considered unsustainable" (X. Li et al., 2004). Bhatta et al. (2010) wrote in that despite a dispute over the precise definition of dispersion there is a "general consensus that urban sprawl is characterized by an unplanned and irregular growth pattern, driven by a multitude of processes and leading to inefficient resources" (RB Mandal, 2000).

The majority of people in disadvantaged regions will reside in city centers by 2020 (Brockerhoff Martin P, 2000), in Africa and Asia (IRIN PlusNews, 2006). Table-5.1 clearly shows that in 2016, the 22.6 percent of the world population, which amounts to 1,670 million people, lives in cities with at least 1 million inhabitants. By 2030, 27.3 percent of the people projected around the world will be concentrated in cities with at least 1 million inhabitants. The population from 2016 to 2030 is projected to increase in all cities, sizes and classes, while the rural population is projected slightly to decrease, although currently the rural areas are home to 45.5 percent of the total world population. It expects this proportion to decrease to 40 percent. 2030. Currently, 6.8 percent of the world's population lives in mega cities with 500 million inhabitants. However, these emerging cities like Karachi, Lahore, Faisalabad, and Quetta will increase in number and size, and will become home to the growing population. It is projected that 730 million inhabitants will live in mega cities with a minimum of 10 million people, which represents 8.7 percent of the total population by 2030. According to the UN, the metropolitan area defines a minimum of 10 million inhabitants. The UN estimates that at the beginning of the 21st century there were 19 megacities (Brockerhoff Martin P, 2000). The UN data booklet "Cities of the World in 2016" reports that currently these cities are 31 in number and most of them exist in developing countries (Table-5.1).

TABLE 1: WORLD'S POPULATION BY SIZE CLASS OF SETTLEMENT, 2016 AND 2030

	2016			2030		
	Number of settlements	Population (millions)	Percentage of world population	Number of settlements	Population (millions)	Percentage of world population
Urban	..	4 034	54.5	..	5 058	60
10 million or more	31	500	6.8	41	730	8.7
5 to 10 million	45	308	4.2	63	434	5.2
1 to 5 million	436	861	11.6	558	1 128	13.4
500 000 to 1 million	551	380	5.1	731	509	6
Fewer than 500 000	..	1 985	26.8	..	2 257	26.8
Rural	..	3 371	45.5	..	3 367	40

Source: The World's Cities in 2016 (UN Data Booklet)

Other reports and literature suggest that in 1950 there were only eight (8) cities with more than one million inhabitants, of which 34 cities were located in developing countries. At the commencement of the 21st century, this number increased to 280 settlements with the same share of the population, and is anticipated to double by 2030. In addition, 28 cities existed in 2000 with a population of eight (8) million inhabitants, while 22 of them were located in developing countries. Although New York was only a city with more than 10 million inhabitants in 1950, it was estimated that 12 megacities would independently share more than 15 million inhabitants by 2015 (J. P. Rodrigue et al., 2006). Table-5.2 presents the 12 megacities of the world for the year 2015 and 2030.

TABLE 2: MEGACITIES OF WORLD BY CITY SIZE & RANK, 2016 AND 2030

City size rank	City	Population in 2016 (thousands)	City	Population in 2030 (thousands)
1	Tokyo	38 140	Tokyo	37 190
2	Delhi	26 454	Delhi	36 060
3	Shanghai	24 484	Shanghai	30 751
4	Mumbai (Bombay)	21 357	Mumbai	27 797
5	São Paulo	21 297	Beijing	27 706
6	Beijing	21 240	Dhaka	27 374
7	Mexico City	21 157	**Karachi**	**24 838**
8	Kinki M.M.A.	20 337	Al-Qahirah	24 502
9	Al-Qahirah (Cairo)	19 128	Lagos	24 239
10	New York-Newark	18 604	Mexico City	23 865
11	Dhaka	18 237	São Paulo	23 444
12	**Karachi**	**17 121**	Kinshasa	19 996

Source: The World's Cities in 2016 (UN Data Booklet)

The contribution of Asian cities and emerging megacities to the urban world population has greatly increased. As shown (Table-5.2), Karachi ranked twelfth among the world's largest cities in 2016, and will go to the seventh in 2030. At present, the cities of the world with 10 million or more inhabitants are 31, 24 of them are located in the "global south" or in the less developed regions. Only China has six of them, India has five and Pakistan shares one. It is

projected that 10 cities will become megacities by 2030, and all will be part of the developing countries, which includes Lahore, Pakistan; Hyderabad, India; Bogota, Colombia; Johannesburg, South Africa; Bangkok, Thailand; Dar us Salaam, Tanzania; Ahmadabad, India; and Luanda, Angola (Population Division of the UN, 2016). Therefore, developing countries, especially at this level, Lahore, will be the second in Pakistan by 2030, make the largest contribution, so a high rate of urban transformation in Pakistan is expected in the coming years, which could be triggered by CPEC. Suggested by Far Economic Review, Asia will have 10 hyper cities with a populace of 20 million or more by 2025, which would consist of Mumbai, Dehli, Dhaka, Jakarta, Karachi, Shanghai (M. Davis, 2006). Therefore, in the next twenty years, the enormous populace growth will then settle in several urban centers of the developing countries. CPEC needs more open to public strategy so that entrepreneurs, business and public at large can get maximum benefits out of CPEC initiative.

4. PAKISTAN'S URBANIZATION AT A GLANCE

A sizable percent of people reside in urban areas in Pakistan, as compared to other south Asian countries. Recent report on urbanization by the United Nations estimates that nearly 40 percent of Pakistan's population live in urban areas, as compared to 34 percent in Bangladesh, and 33 percent in India (A. W. Mekamu Kedir et al., 2016), however, urbanization estimates of Pakistan do not differentiate between "urban" area within tehsil/town boundaries, and "peri-urban" growth taking place outside the major urban centers and along the transportation corridors.

In several cases, cities exhibit informal spatial expansion due to range of various factors including topographical constraints, transportation infrastructure and biophysical characteristics that support growth of the city in a specific direction. Hence, areas that are not located within administrative boundaries of the city may still get advantage from economic density of nearest urban area. The development of infrastructure is an anguishing urban formation, the "peri-urban" areas that surround emerging cities with efficient infrastructure and services can provide a favorable environment for the manufacturing sector to flourish (A. W. Mekamu Kedir et al., 2016) around the CPEC corridor.

In Pakistan, importance of peri-urban vicinity is along transportation corridors as an important economic link between urban and rural areas (G. M. Arif et al., 2009). During 1960s, industries

developed along highways attracted labor migrants, which lead development in ribbon form as peri-urban areas (J. H. Abbasi et al., 1985). One of the major examples of such development in Pakistan is motorways. However, motorways are developed in the world to reduce the travel distance and time over the existing means but in case of Pakistan, motorways were developed through uninhabited or less inhabited and agricultural areas that has political considerations, which exceeded about 100 km from existing grand trunk (GT) road. Over time, this proved to be a major source of urban development around the motorway without investing any of the government's resources. This was mainly developed by the private sector to provide residential and business facilities for the advantaged elite, who are looking for a bit less crowded and peaceful environment. Later informal settlements were formed to cater the less privileged, poor and labor segment of the society, who found economic activities in the support and services sectors. Therefore, learning from the experience, Pakistan can utilize CPEC as an opportunity to establish new cities and towns instead of putting unbearable strain on the existing cities and emerging megacities.

4.1. CURRENT STATE OF AFFAIRS

Rampant increase in urban population of Pakistan from 1998 to 2014 is observed at 43.0 million in 1998 and 72.5 million in 2014 and is predicted to be almost urbanized by 2025. Currently almost 47 percent of urban population resides in ten major cities, each with the population of more than 1 million (GoP, 2015). Increase in rural-urban migration is the key factor in this conglomeration. Therefore, it is important to address the present challenges being faced in major cities during planning for unstoppable migration direct to cities. Presently 68.4 percent population in Pakistan is less than 30 years of age, so there is enormous potential to avail maximum benefits of 'demographic dividend' by the year 2045. Whereas female constitute a little bit less than 50 percent, therefore, urbanization has to accommodate necessities of this massive youth group. In addition, gender inequality among education is almost been vanished in urban centers (GoP, 2007). Provision of education facilities (especially for girls), health facilities and access to electricity in public sector plays a significant role while explaining the poverty level and its differences (A. Hasan, 2006) (I. N. Awan Masood Sarwar, 2010).

Major cities of Pakistan are experiencing both urban population growth, and urban sprawl (horizontal development). Such as, in 1965, both major cities Karachi and Lahore had more than 1 million urbanities within their fringes, but their expansion overwhelmed other adjoining towns and especially rural areas by the 1990s. Karachi expanded in all three directions north,

west, and east, with other small towns and villages, previously which were poorly connected to the city as well as port, and Lahore is expanded towards northwest and linked to Gujranwala as well as other small towns and villages too (A. W. Mekamu Kedir, 2016).

4.2. CHALLENGES AND OPPORTUNITIES

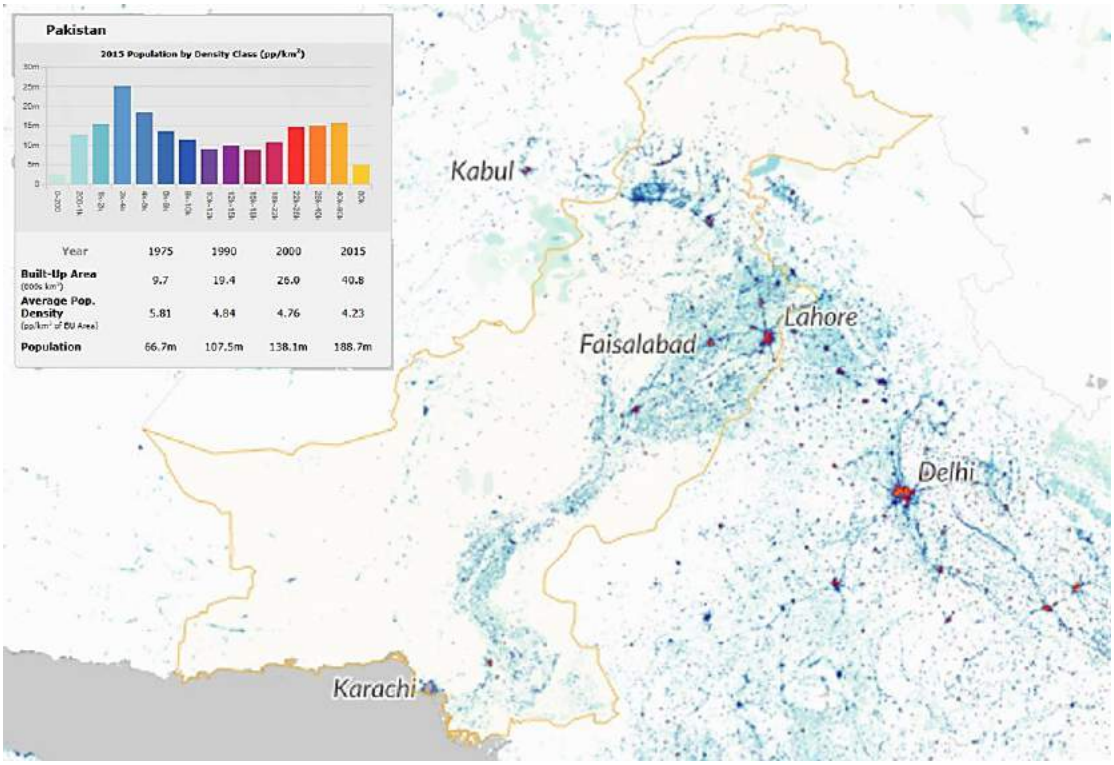
Urbanization in Pakistan has brought remarkable development in the country but rapid urbanization also brought with it challenges such as depleting nature's caring capacity, poor governance, political instability, violence, congestion, social issues, pollution, traffic, health, safety, efficiency and productivity of urban life centers, the degradation of urban ecology and urban poverty. It is necessary to face these challenges efficiently, effectively, economically and yet environmentally (using 4Es) sensitively to guarantee successful and healthy cities and urban areas.

Urban areas / cities, if planned and executed carefully, should become places where people can live in peace with prosperity, dignity, value of life and adequate income. Urban development, carried out in a coordinated manner that fulfills multiple objectives, such as providing a healthy environment in terms of access to potable water, sanitation, sewage, paved streets and roads, adequate waste disposal and other necessary services and infrastructure for a prosperous socio-economic foundation (J. E. Hardoy et al., 1995). In other words, sustainable cities are well planned to make it easier for the general public to meet needs, to improve well-being without harming nature or to affect the living conditions of other citizens, in the present or in the future (H. Girardet, 1999).

At present, Pakistan is one the most urbanized country in the region and the proportion of the urban population in the country increased from 32.5 percent in 1998 to 40 percent by 2014 (Figure-5.2). The current trend of rural to urban migration continues with the same pace, will exceed 50 percent by 2025 According to Pakistan vision 2025, during the last three decades the urban population increases more than 3 times, at present 75 cities have population within 0.1 to 1 million (GoP, 2015), Small cities comprise less than 0.1 million inhabitants, are around 448 in numbers (GoP, 2007). Karachi as the largest city in Pakistan and 12th city in the world shares about 20 percent of the total urban population alone, followed by Faisalabad and Lahore shares an additional 15 percent. Gujranwala, Hyderabad, Multan, Peshawar, Rawalpindi share another

12 percent with each other, while the remaining 46 percent of urban dwellers reside comparatively in small towns or villages. During the last years, the populations in most of the big cities increased with a growth rate of more than 3 percent per year, and for the current decade it is projected that the current growth rate will continue (GoP, 2015).

FIGURE 3: PAKISTAN POPULATION DENSITY MAP



Source: LuminoCity3D, Global Human Settlement Layer (GHSL), European Commission JRC and the CIESIN Columbia University, 2018

Despite the fact that the number of inhabitants in the main urban areas is expanding, there was also a rapid increase in the population of urban communities from 200,000 to 499,999, from 4.5 percent in 1981 to 9.1 percent in 1998, Most of these important cities and small urban areas are located in the zone of 1 million or more of population, especially along the CPEC corridor. The built-up area of Pakistan in 1975 was 9.7, which rose to 40.8% in 2015, whereas average population density declined from 5.81 in 1975 to 4.23 pp/km2 in 2015 of build-up area and the population was 66.7m in 1975 and increased to 188.7m in 2015 (Figure-5.2 and Table-5.3). It is recommended that federal and local governments now need to design new cities and independent towns outside the current city limits but not as agglomerations, clusters, urban districts and the extension of the current urban areas or towns.

Table 3: Growth of Pakistani cities with 1 million population or more (2000, 2016 and 2030)

City	Statistical Concept	City Population (thousands)			Average annual rate of change (percent)		City population as a proportion of the country or area's total or urban population in 2016 (percent)	
		2000	2016	2030	2000-2016	2016-2030	Total Population	Urban Population
Karachi	Urban Agglomeration	10,302	17,121	24,838	3.3	2.7	9	22.8
Lahore	Urban Agglomeration	5,452	8,990	13,033	3.1	2.7	4.7	12
Faisalabad	Urban Agglomeration	2,142	3,667	5,419	3.4	2.8	1.9	4.9
Rawalpindi	Urban Agglomeration	1,521	2,582	3,809	3.3	2.8	1.4	3.4
Gujranwala	Urban Agglomeration	1,226	2,193	3,274	3.6	2.9	1.1	2.9
Hyderabad	Urban Agglomeration	1,221	1,812	2,613	2.5	2.6	0.9	2.4
Multan	Urban Agglomeration	1,263	1,969	2,866	2.8	2.7	1	2.6
Peshawar	Urban Agglomeration	1,066	1,787	2,640	3.2	2.8	0.9	2.4
Quetta	Urban Agglomeration	615	1,148	1,740	3.9	3	0.6	1.5
Islamabad	City Proper	597	1,433	2,275	5.5	3.3	0.7	1.9

Source: The World's Cities in 2016 (UN Data Booklet)

On the other hand, environmental and ecological problems may not cause real difficulties, if urban expansion is adequately managed towards planned urban development (J. Rabinovitch, 1992). Whereas urban expansion in most underdeveloped nations, without satisfactory services and related services, does not justify a safe and prosperous environment (J. E. Hardoy et al., 1995). In developing countries, urbanization occurs rapidly, which often overloads the capacity of the local governments concerned to ensure adequate housing, foundations, services and basic services (L. S. Marina Alberti, 1996). If the urban expansion around the CPEC alignments is not handled with prudence, it could end up as a catastrophe for Pakistan, therefore, some of the potential difficulties are explained in the following discussion.

- **The Provision of housing, infrastructure and services** for the urban poor in the urban center is the main challenge in developing countries. In many developing countries, slums are overcrowded and face a high rate of disease due to lack of sanitation, poor hygiene and a shortage of essential health-related services (M. Davis, 2006). In 2030, it is estimated that the number of slum dwellers worldwide will reach 2 billion (UNFPA,

2007). However, also in Lahore 38% of the urban or 1.7 million live in slums, as well as in Karachi 45% of the population of the cities or 7.6 million live in Karachi, most of the slums lack essential infrastructure services, urban services, with a situation of private hygiene. Due to the lack of affordable housing for the urban poor, the inhabitants are forced to live in slums and informal settlements. Slums are mainly developed as illegal invasions that are built in low-lying areas, for example, next to watercourses, natural drains, near the workplace, on the fringe of low-cost housing (G. M. Arif et al., 2009). Additional population influx may also be expected from CPEC as new businesses would arrive outside of Pakistan and would require additional housing and infrastructure.

- **Water, environmental sanitation and hygiene** is a major concern since Pakistan social and living standards measurement (PSLM) survey (2010-11) suggests that even if Pakistan has met the MDG target for drinking water in quantitative terms, however, in qualitative terms, the problem is not completely fulfilled because water quality has not improved much due to several reasons, including contamination of water sources and old infrastructure (GoP, 2015). Sanitation is one of the essential needs that contribute to human pride, quality of life and sustainable sustenance. The inadequate sanitation system in "peri-urban", disadvantaged and rural areas is costing 3.9 percent of GDP, which is insufficient and CPEC and its associated facilities requirements are additional;
- **Environmental health** especially the mortality rate of children under 5 years of age, is high in Pakistan, that is, 72 children per 1,000 that ranks second in South Asia. Annually in Pakistan, 25 million children suffer from diarrhea and around 395 children die every day due to lack of sanitation in Pakistan (GoP, 2015). The disease related to sanitation is the main cause of high mortality and morbidity in children of Pakistan. CPEC would bring additional challenges for environmental health situation with the operationalization of SEZs and increased transportation activity;
- **The transport sector** is underperforming and is costing about 5 percent of Pakistan's GDP (GoP, 2015). The shortage of public transport in urban areas and the absence in less developed or disadvantaged areas make it a major problem for displacement. The frequency of road accidents is increasing due to careless driving, aging transport and non-maintenance, as well as poor infrastructure. CPEC will bring both, challenges and opportunities e.g. more advanced and better long-haul vehicles will be a challenge for Pakistani traffic and tough competition for local transporters to get entry in the system

with old and small vehicles that is also raising demand in this sector. Keeping in view the importance, National Logistics Cell (NLC), Pakistan has signed a memorandum of understanding (MoU) with German Daimler AG for local production of Mercedes-Benz trucks in Pakistan. It is expected that local assembly of Mercedes-Benz trucks by NLC will mark a major shift in the domestic logistics and transportation industry towards European manufacturers, which will start a healthy competition in the sector. Modern transportation networks built under CPEC will link seaports in Gwadar and Karachi with northern Pakistan, as well as China and Central Asia creating additional business avenues for local business;

- **The power generation and management** is one of the most urgent problems, since the demand for electricity in Pakistan will double in the next 10 years. Currently, the loss of cargo in Pakistan is terrible, although essentially energy boosts the country's economy, while energy shortages hamper Pakistan's economic growth "reflected with an estimated loss of 4 to 7 percent of Pakistan's GDP" and seriously affecting the livelihoods of citizens in general (GoP, 2015). In addition, the inefficient use of energy, the disorganized use of subsidies, poor governance, lack of public awareness, unimplemented or ineffective legislation and less developed infrastructure, exist, among other issues, in Pakistan's energy sector. There is another problem of neglecting substantial investments in the national energy distribution network over the past few years, resulting in the lack of capacity to use the additional energy, even if Pakistan manages to generate the electricity needed to close the deficit. Whereas, Pakistan would need additional power supply and efficient distribution system to cater the demanding SEZs and associated services besides residential needs;
- **Relocation of industries** because new industries are not being promoted, whereas existing industries are also moving to other neighboring countries. This has created a forced and artificial shortage of goods and services and places an additional burden on Pakistan's imports, thus spending more foreign exchange reserves. Pakistan need robust and encouraging policies, effective and efficient systems and enabling environment for existing and new local industries to flourish so that they can compete with the world through CPEC;
- **Deficiencies in infrastructure and basic urban services** are reducing economic growth and severely hamper the potential for the urban area to play a more important

role in the economic growth of the country. These deficiencies mainly affect the urban poor, leading to a significantly reduced quality of life, poor medical care and increased poverty (G. M. Arif et al., 2009). However, it is necessary to develop an effective mechanism to guarantee operations and regular maintenance of infrastructure, and basic urban services that are needed for CPEC and its allied developments;

- **Poverty and social problems** as suggested by UN-Habitat (2003) that "the focus of poverty is moving towards the cities and urban areas, this process is now recognized as urbanization of poverty" (IRIN PlusNews, 2006), as consequences of the inadequate basic amenities and services. The urban poor invest most of their income in health care and services, and are vulnerable to losing income with less job security, those that reduce their ability to survive and can potentially remain mobile families trapped within the cycle of poverty (IRIN PlusNews, 2006). Poverty is also considered as one of the main driving forces of crime and violence. Around one billion people of the world population live in slums (J. E. Cohen, 2003). A World Bank study on urban violence in urban centers in Latin America showed that the homicide rate was 6.4 per 0.1 million / year (M. M. P. Rana, 2011). Similarly, the slums / peri-urban areas (*katchi abadi*) are measured mainly as propaganda lands of unfriendly or antisocial elements in Pakistan. Most of the criminals, drug providers, kidnappers and murderers live in these informal settlements. Therefore, the increase of slum as well as behavior have become uncontrollable social problems for cities. Pakistan has a value of the Gender Inequality Index of 0.567, classifying it in 123 of 148 countries (GoP, 2015). The provision of educational facilities (especially for girls), health facilities and access to electricity in the public sector plays an important role while explaining the level of poverty and its differences (A. Hasan, 2006) (I. N. Awan Masood Sarwar, 2010). Considering that protecting the interests of different ethnic and religious minority communities is another issue. The situation may become a challenge, if not properly planned and executed to manage with due diligence under CPEC;
- **Lack of work and insecurity** is another result of urban sprawl that places additional demand in a restricted labor market, especially for low-income employment (M. Haider, 2010) (M. Kugelman, 2013) in Pakistan. Currently, the relationship between unemployment and violence is not well understood. While the literature on Pakistan suggests that severe socioeconomic inequality is the contributing factor to crime and violence in emerging urban centers, several characteristics include inequality in the

distribution of wealth, land ownership and unequal access to economic opportunities and social services. (Hinds R, 2014). This situation can be converted to opportunity under CPEC as Pakistani workforce may be trained on top most priority by government and other stakeholders, which would result ultimately in acquiring more jobs for our young generation in a very competitive market;

- **Rural-urban migration** has complicated the task of poverty reduction due to the rapid urban growth of the population. The importance of the informal sector cannot be ignored when explaining the facts of urban poverty; in developing countries, a large amount of urban population must be absorbed by the informal sectors;
- **Environmental problems** are caused with the widespread use of fossil fuels within industries, households and transportation sectors causes substantial pollution in the urban atmosphere, which includes pollution of air, noise, soil, water and waste generation in several urban centers are extremely serious (J. E. Hardoy et al., 1995) for example, much of the industrial waste is being generated by Bangkok, Dhaka, Mexico, Karachi and Lahore. Hazardous and toxic pollutants include arsenic, cadmium, carbon monoxide, chromium, cyanide, lead, mercury, nitrogen dioxide, nitrate, petroleum hydrocarbons, sulfur, and suspended particles. The situation get worse with deforestation eventually result in the effects of urban heat island, decrease in number of wetlands causing floods, waterlogging and loss of biodiversity. In addition, most hazardous and toxic waste is disposed of as liquid waste, which flows without any treatment in canals, such as canals, lakes and rivers, and is placed in the filling site with minimum protection for species in or near the source of water pollution, which is causing the frequency of water-related diseases, for example, cholera, typhoid, hepatitis, etc., (J. E. Hardoy et al., 1995) is increasing in all the major cities of Pakistan. Air pollution is a big challenge in the urban centers of Pakistan, including Islamabad, Karachi, Lahore, Peshawar and Quetta, which indicates a high concentration of SPM 2.5 microns (suspended particles), and reached a level that is 2 to 3 , 5 higher than (NEQS) National Environmental Quality Standards (GoP, 2015). Inadequate public transport and *car loans accessible through commercial banks* are leading to a large increase in private vehicles on the roads of Pakistan's major cities (Salman Qureshi, 2010). This is causing serious traffic congestion, environmental degradation and air pollution in cities. Though generally long-haul vehicles will be confined to CPEC routes but they will cause pollution too, which may overcome by extensive liner plantation and

development of green belts across CPEC corridors;

- **The conversion of agricultural lands into urban areas** is the result of the rapid pace of urbanization, which is mainly distinguished by urban expansion on the outskirts of a city. The current form of expansion is exploiting the main resources (M. D. K. Zaman, 2012). As mostly land for urban expansion is often taken from fertile agricultural land, which is often found immediately close to cities; the extension of modern expansion has consumed a large amount of the most productive agricultural land, (Population Division of the United Nations, 2016), as well as forests, deserts and other wilderness areas (M. Davis, 2006). CPEC routes are also planned through some agriculture lands as well as national parks and protected areas, therefore, it is highly recommended to conduct strategic environmental assessment (SEA) of CPEC and these areas may be avoided as much as possible;

- **Poor governance and political instability** as cities become the center of political activity and mostly lead to clashes and turmoil. Demographic change in Pakistani urban centers and cities has fueled ethno-political tensions and urban violence (L. Gayer, 2007) (H. Gazdar, 2013). The future of Pakistani cities will be determined by the quality of urban governance (30), however, municipal corporations and development authorities lack technical expertise and resources essential for good governance in line with the modern urban planning practices. Several experts point out that the lack of state capacity to enforce the law in urban centers is a factor that participates in the violence (Huma Yusuf, 2012). State failure lead some people to approach corrupt politicians or local criminals to resolve their disputes. Corruption and political favoritism are among the essential factors behind bad urban governance, as well as failure in planning and implementation. While political intervention also causes flaws in the application of the law, which leaves the guilty unpunished. Good governance, transparency and accountability has to be the priority, if Pakistan wish to get maximum utilization of this huge opportunity and has to ensure security and peace to attract more FDI and encourage and facilitate local entrepreneurs for investments; and
- **Knowledge and technology spill effect** due to the development and access of CPEC and exposure to Chinese and other international partners will be evident with the

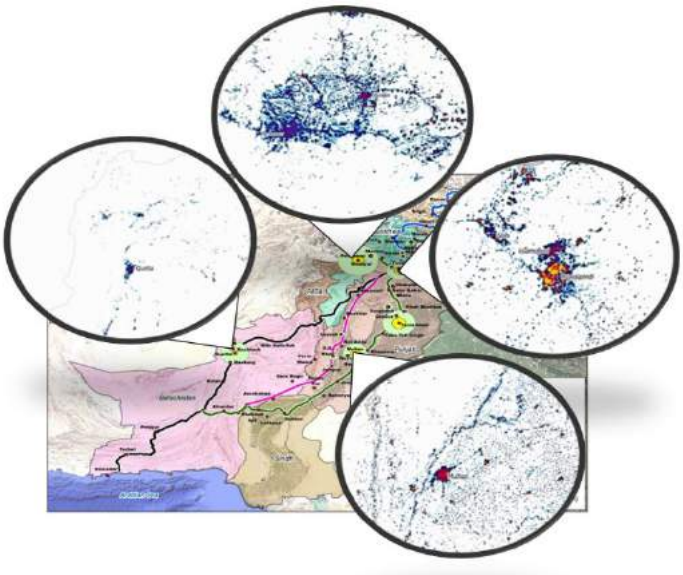
operation of these routes. Earlier Jaffe et al. (1993) empirically found that knowledge spills are geographically limited, but the structure of economic activity restricts the propagation effect, while the impact of the technology spill is mainly due to the mobility factor between the regions. Spills of knowledge are not a fortuitous fact since the old ideas generally lead to the development of new technologies and the way of doing business (Weitzman, 1998). Several other empirical evidences have found the link of indirect effects of knowledge that give shape to spatial structures in a geographical space (Audretsch et al. 1996 and Caniels et al. 2005). However, at the same time, other externalities such as the grooming of labor force with similar types of skills and needs, exchange of intermediate goods for a greater value addition and links of support companies for providing various inputs necessary for the production activity. Now, Pakistan has the opportunity to modernize with less investments, but this can happen by careful planning and execution to capitalize on this technological and knowledge spill to improve existing and encouraging the emergence of new companies, support industries and services around the CPEC corridors.

5. CONCLUSION

Poor urban governance and the weak implementation of the rule of law are centralizing the administrative and financial powers to the federal and provincial government despite the introduction of the 18th Constitutional Amendment in the Constitution of Pakistan. As a result, the third-tier of government is not yet functioning on the ground in any of the provinces. In addition, there are serious flaws in the implementation of government policies and regulations (GoP, 2015). There are several laws that overlap and others contradict, in addition to missing laws, with a clear distribution of power in a balanced manner, with fluid coordination and clear demarcation of functions and responsibilities between the federal, provincial and local governments, which ensure efficient local governance This can only happen when other important stakeholders such as non-governmental / non-profit organizations, informal sectors, the media and policy-makers work in close partnership and collaboration with all interested and affected parties (IAPs), including the end beneficiaries.

The illustration of the GIS / CAD-based map has been developed by the author with the urban centers / cities (in red circles) along the CPEC corridors with current population (in yellow circles) in the main cities and a population projection for the next 30 years (in green circles) to understand the importance of the situation. This illustration only provides the routine population expansion, but if we add the possible urban expansion in the result of fully developed and functional CPEC routes with access to communication and national and international exposure, the situation will change drastically and create planning, development challenges and management in a spectrum that Pakistan has never seen in history (Figure-4, and Figure-5)

FIGURE 4: POPULATION DENSITY AND POTENTIAL FOR NEW TOWN / CITIES DEVELOPMENT



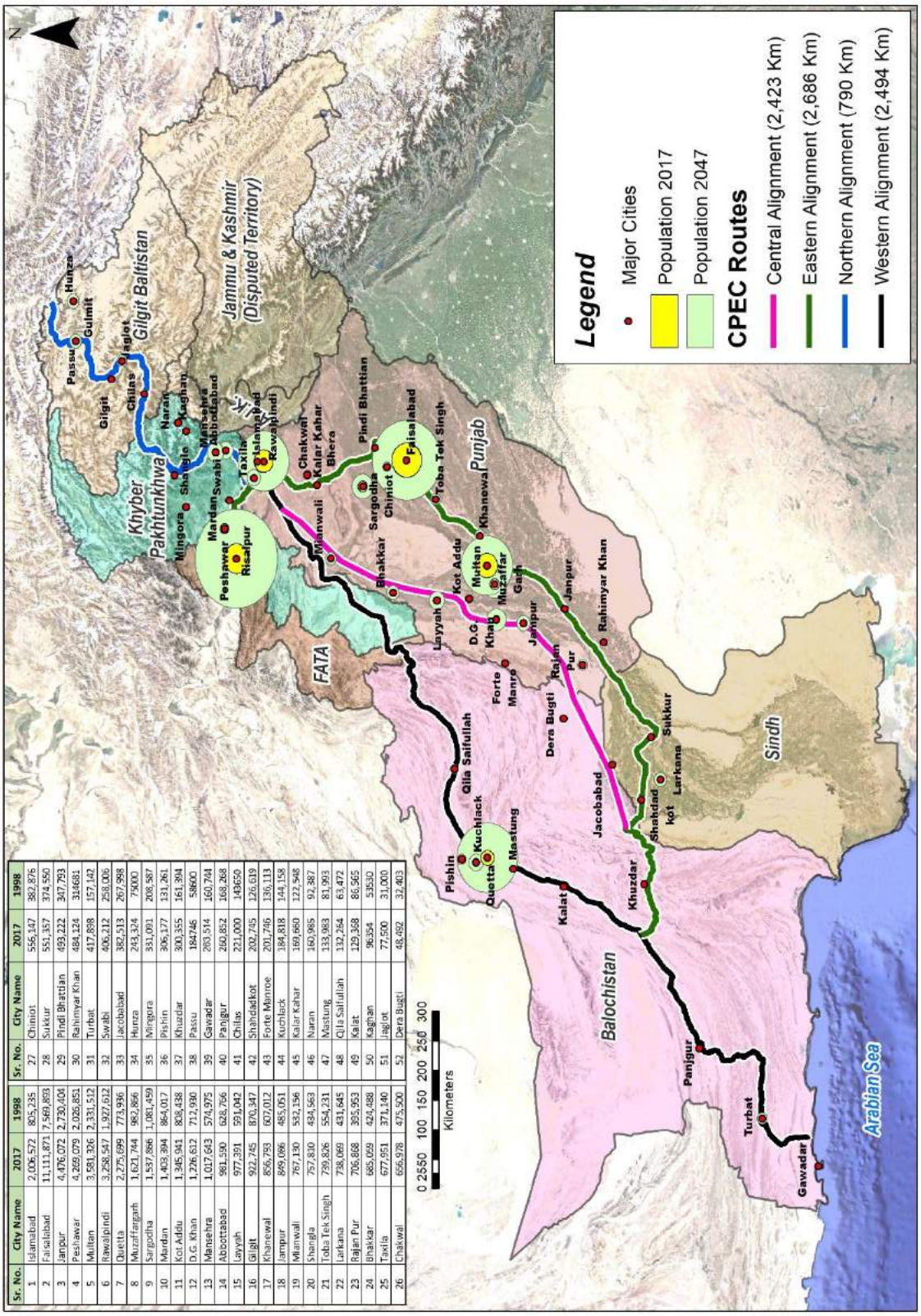
It can be observed from population density maps in Figure-6.1 that there is a potential and space available for the establishment of new model smart cities across CPEC routes instead of over populating the existing overwhelmed city centers of Pakistan.

Pakistan needs stronger measures to design policies, strategies and plans that are locally appropriate with a long-term vision and future requirements taking into account the enormous infrastructure and socio-economic development that will happen through the CPEC. This is only possible, if it is planned wisely, it can guarantee the environmentally sustainable development of urban areas and SEZs. Good governance and the rule of law require accountability, transparency, coordination, decentralization and effective participation along with the financial audit, which does not seem to currently effective in Pakistan. Political will is an important

component to achieve a significant change in governance. Current political government seems to have political will and the military administration is also determined for effective and smooth implementation of CPEC, but it cannot guarantee in isolation the maximum utilization of resources, opportunities and advantages of this megaproject without adequate professional planning and implementation in partnership with all the IAP beyond personal prejudice and gains.

Pakistan's history is evident that wherever political will was present, development and successful completion of megaprojects can be achievable in a very short span of time and the routine red-tap attitude is not experienced amongst the policy-makers, line departments and authorities with smooth coordination and cooperation, therefore, it can be recommended that strong and continues political-will would be required as top most priority by current and future governments to ensure Pakistan's prosperity and say in all through development and utilization thereafter.

FIGURE 5: PAKISTAN POPULATION WITH 30 YEARS PROJECTION



Sr. No.	City Name	2017	1998	Sr. No.	City Name	2017	1998
1	Islamabad	2,006,572	805,235	27	Chiniot	556,147	382,876
2	Faisalabad	11,111,871	7,569,893	28	Sukkur	551,357	374,560
3	Janpur	4,476,072	2,730,404	29	Pindi Bhattian	493,222	347,793
4	Peshawar	4,269,079	2,026,851	30	Rahimyar Khan	484,124	314681
5	Multan	3,581,306	2,331,512	31	Turbat	417,898	157,147
6	Rawalpindi	3,258,547	1,927,612	32	Swabi	406,212	258,006
7	Quetta	2,275,699	773,936	33	Jacobabad	382,513	267,998
8	Muzaffargarh	1,621,744	982,866	34	Hunza	243,324	75000
9	Sargodha	1,537,866	1,081,459	35	Mingora	331,091	208,387
10	Mardan	1,403,394	864,017	36	Pishin	306,177	131,261
11	Kot Addu	1,345,941	808,438	37	Khuzdar	300,355	161,394
12	D.G. Khan	1,226,612	712,930	38	Passu	184746	58600
13	Mansehra	1,017,643	574,975	39	Gawadar	283,514	160,744
14	Abbottabad	961,590	628,766	40	Panjgur	260,852	168,268
15	Layyah	977,391	591,042	41	Chilas	211,000	149650
16	Gilgit	922,745	870,347	42	Shahdadkot	202,745	126,619
17	Khanewal	856,793	607,012	43	Forte Manroe	201,746	136,113
18	Jampur	849,096	485,051	44	Kuchlack	184,818	144,158
19	Mianwali	767,130	532,156	45	Kalar Kahar	169,660	122,548
20	Shangla	757,830	494,563	46	Naran	160,965	92,387
21	Toba Tek Singh	739,826	554,231	47	Mastung	133,983	81,993
22	Larkana	738,069	431,645	48	Qila Saifullah	132,264	63,472
23	Rajan Pur	706,668	395,953	49	Kalat	129,368	86,565
24	Bhakkar	685,059	424,488	50	Kaghan	96,954	53630
25	Taxila	677,951	371,140	51	Jaglot	77,500	31,000
26	Chakwal	656,978	475,500	52	Dera Bugti	48,492	32,403

Source: Own projections

The government should encourage income support programs and technical education to generate a labor market for the urban poor with special incentives and priority for the interested people to live and serve in the newly development urban and SEZs around CPEC alignments.

Pakistan can take advantage of this opportunity to learn and expend on China's successful Kubuqi desertification control model of ecologically sustainable development (Figure-6.3) (UNEP, 2015) and experiences of ***'successfully turning its desert into an oasis of fruit growth'***. This can offer fundamental solutions to help the peaceful development of the desertification regions that globally affect more than 2 billion people whereas Pakistan has its vast affected areas of Balochistan, Sindh and parts of Punjab. The ecological development in Pakistan throughout the CPEC corridors would require China to become an experience and a technology exchange platform for this ecological solution for Pakistan.

FIGURE 6: TRANSITION IN GREENING AND STABILIZATION OF THE DESERT IN THE KUBUQI PROJECT, CHINA

Pakistan and China share the most similar areas with the same rugged terrains of mountains regions, but they can change the rules of the game with the use of existing experiences and technologies that can be further developed and benefit both countries in the fields of arid agriculture, industrialization, processing areas and huge warehouses, especially in the vast barren areas of Balochistan and Sindh. The development of model master plans to establish new smart cities and towns along the routes and around special economic zones (SEZs) across CPEC as China is already exploiting the potential of its largest and least populated western regions, which she is developing through the implementation of OBOR.

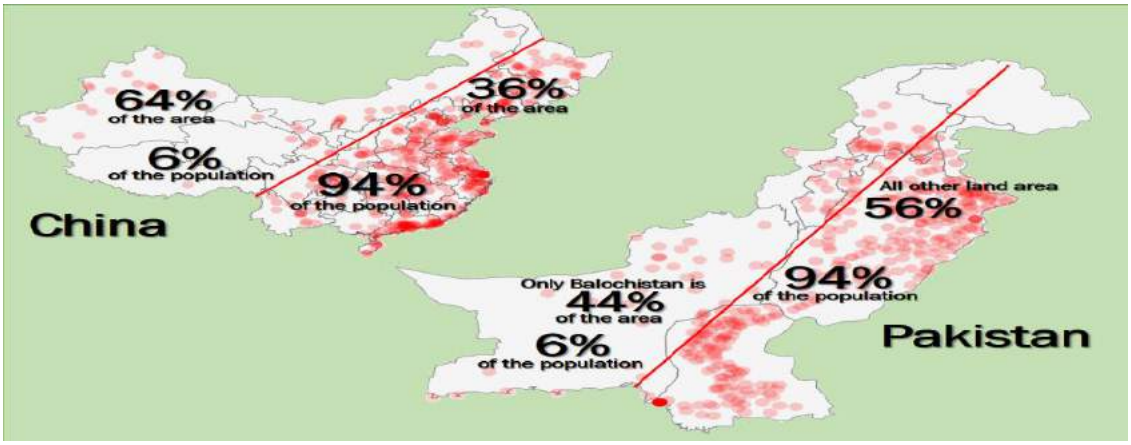
Pakistan must be more enthusiastic and dedicated to these challenges and opportunities of urban sprawl by understanding the dynamics and problems of urban areas and be attentive and creative to take advantage of the upcoming socio-economic, infrastructure, development and international trade opportunities associated with the corridors of CPEC. Since all these concerns overlap, they are interconnected or interdependent due to poor governance, therefore, they are

difficult to deal with in isolation, and so ensuring good governance would be a key tool to solve them under the same umbrella.

Finally, it is necessary to respond efficiently to the challenges of governance in order to improve urban legislation, guarantee the participation of local communities, including young people, minorities, special people, women and the effective application of current legislation on time. In addition, there is an urgent need to change the pattern of ***"centralization to decentralization"*** of powers and resources to local levels (provincial, city, tehsil and union councils) to efficiently meet the needs and expectations of people in new urban environments across CPEC corridors.

One way to address these problems is to create new urban and economic centers / smart cities across the country along the CPEC routes to promote environmentally sustainable urban development and to facilitate sustainable trade between the interested parties. As the old Islamic philosophy says, ***"do not expand cities, rather develop new ones"***, which explains the understanding of limiting ourselves to the caring-capacity of nature, ensuring long-term environmentally sustainable development. The most important thing of all is that it can be done without any additional cost by capitalizing the enormous potential of CPEC efficient development, which is based on the philosophy of an ancient Chinese proverb: ***"If you want to be rich, build roads first"***. Pakistan can learn and utilize the CPEC opportunity and can also establish its western region specially vast areas of Balochistan that comprises on 44% of total area and around 6% population of total country, which is largest and yet lest populated, if compared with China as she wants to develop its western region that represents 64% of China's total area with only 6% of population compared to mainland China under this massive OBOR / CPEC initiative (Figure-).

FIGURE 7: COMPARISION OF LEAST POPULATED AND POTENTIALLY VIABLE URBAN AND INDUSTRIAL AREAS OF PAKISTAN AND CHINA



Based on the above analysis, some of the policy recommendations are as follows:

- Pakistan should plan and develop new model smart-cities instead of expending existing cities and putting more burden thus compromising on effective and efficient management. Starting immediately CoE-CPEC may commission to develop such a master plan for smart-city to serve the nation as a case study and modelfor the future developments
- It is strongly recommended to design and develop a new model city by preparing a model master plan in the most potential location on any of the CPEC corridor alignment;
- Pakistan should harness the full potential of the vast and less inhabited areas, especially Balochistan, based on lessons learned from China's experiences and technologies in the field of industrialization and the development of small allied industries, services and arid agriculture;
- Pakistan and China should capitalize on the CPEC opportunity to encourage new local businesses, small startup enterprises and services sector initiatives to benefit from this knowledge and technology spill effect to ensure capacity building and long-term sustainability; and
- Establish and enhance technical skills, service provision and workplace ethics training centers for equipping Pakistani labor force with technologically advanced skills and needs to tab upcoming huge competitive labor market that is looming and the associated

opportunities to benefit from the spill effect of CPEC knowledge and technology. This could be complemented and supplemented by facilitation of establishing linkages of Pakistani firms to international firms and suppliers to capitalize on the enormous opportunities under CPEC.

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