Resources and Environment 2017, 7(3): 69-80
DOI: 10.5923/j.re.20170703.02

Nature and Trend of Urban Growth in Saudi Arabia: The Case of Al-Ahsa Province – Eastern Region

Hillo Abdelatti*, Yasin Elhadary, Abbas Altayeb Babiker

Faculty of Geographical and Environmental Science, University of Khartoum, Sudan

Abstract This paper focuses predominantly on the current urban growth in Saudi Arabia taking Al-Ahsa Province of the eastern region as a case study. The main objective of this study is to highlight the trend and causes behind the unprecedented growth that has taken place during the last few decades. To achieve such objective, the paper based mainly on the desk review of the current literature written on urban growth worldwide in general and on Arab Gulf States in particular. This likewise has been enhanced by the observation of the authors. Like other Arab Gulf States, Saudi Arabia has witnessed extraordinary urban growth due to the shift to an oil based economy system. This shift has improved the socio-economic life of the entire population of the Kingdom. Al-Ahsa Province in the eastern region, where oil was found, has witnessed massive urban development. The paper has come out with that, improving of the economy, easy access to fund and availability of the good infrastructure network are the main drivers behind such growth. Unlike the trend of urban growth worldwide, in Al-Ahsa Province some rural areas are creeping to urban and not the vice versa. Without sound planning, urban growth will continue causing negative implications on the environment and social life. Planners have to formulate rational policy aiming to control such growth and at the same time ensure land use sustainability. The paper contributes to the ongoing debate on urban growth and open rooms for further studies to uncover the especial nature of urban growth in the Arab Gulf States.

Keywords Urban growth, Urbanization, Saudi Arabia, Al-Ahsa Province

1. Introduction

Currently, urban growth has become an issue of concern among policy makers, planners, as well as researchers. This is due to the fact that more than half of the populations in the world are now living in an urban environment. Moreover, this phenomenon has occurred in both developed and underdeveloped countries with a bit faster in developing countries (Elhadary et al., 2013). Since 1950, the proportion of developing countries' population living in cities has roughly more than doubled from its initial 16 percent (Gilbert & Gugler, 1984). According to (UN, 2001), the urban population in developing countries has increased from 304 million in 1950 to 2 billion in 2001, and expected to double itself in 2030. This growth has impacted negatively on the structural morphology of cities, and effects socio-economic aspects.

According to the United Nations Human Settlements Program (UNHSP), 2001, in 1800, only 3% of the world populations were urban. By 1900, this had risen to approximately 10%, and reaching 47% in 2000; and is expected to reach 60% in the year 2030 (Foryth, 2011). Regarding world urban built-up areas, it consumed 400000 km² in 2000 (0.3%).

The built-up area of cities in developing countries will increase to more than 600,000 km² in the year 2030 (Angle et-al, 2005). The land taken up by cities amounted to 3% of arable land, estimated at 14 million km² in 2000. Cities are now expected to grow 2.5 times by 2030, consuming some 1million km², or 1.1 of the total land area of countries (Angle et al, 2005).

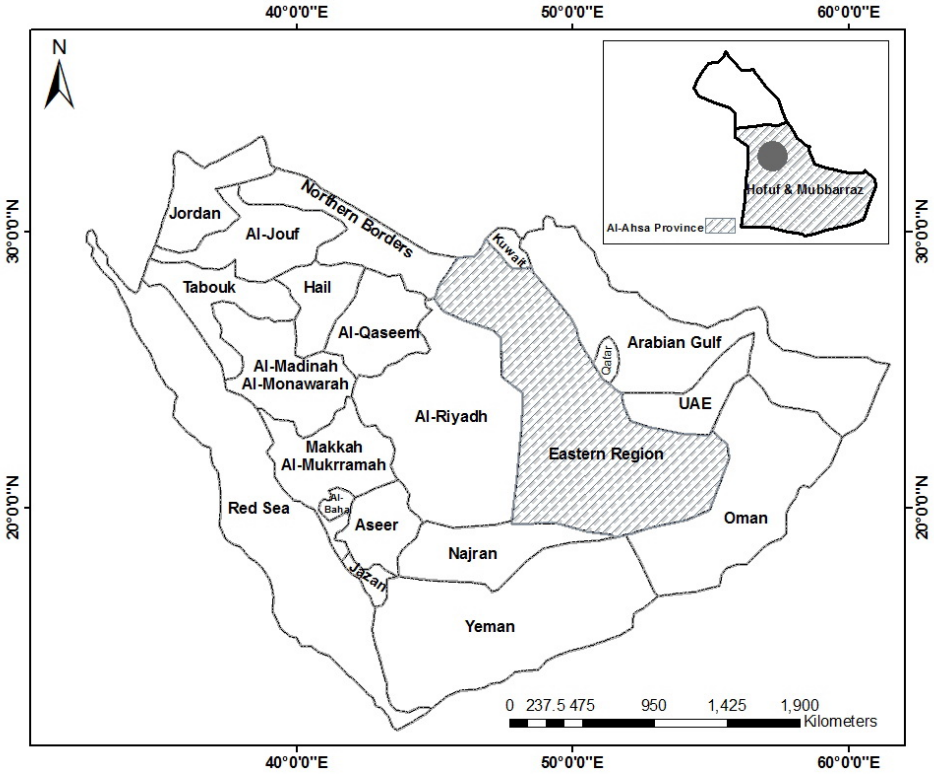
Several factors have been blamed behind the massive urban growth and unorganized expansion in developing countries. These include unequal development and regional disparities, unorganized migration from rural to urban and pre-urban areas, and irrational economic policies. In Sudan, for example, the rural mass exodus to urban centers is attributed mainly to geographically and socially uneven development, the long civil war and armed conflict, natural disasters like drought and famine, and the failure of economic policies (Eltayeb, 2003). In Malaysia, urban growth was owing to the rapid socio-economic development of the country (Elhadary and Samat, 2012). In Arab Gulf States like Qatar, where the urbanization reached 95.3% in 2004 (Al-Sadhan, 2010), the high growth rates are essentially due to massive foreign migration into the region and to extremely high natural increase rate — an abnormal condition in an urban process approaching saturation point (El-Arifi, 1986). In Kuwait, and due to successive migration

* Corresponding author:
hillo2002@yahoo.com (Hillo Abdelatti)
Published online at http://journal.sapub.org/re

from inside and outside, the urbanization rates have increased from 51% in 1950 to 98.3% in 2004 (Al-Sadhan, 2010). Whatever, rapid growth in urban areas is imposing high pressures to land and their resources. Also the deep and fast transformations that have been and are being made in different sectors, make evident the difficulties experienced by decision-makers in their management and control structures to detect and effectively quantify urban distortions (Discoli and Martini, 2012).

Saudi Arabia was not an exception, during the last few decades, and due to socio-economic development that prevailed throughout the Kingdom, many urban and pre-urban centers have seen a rapid population growth. According to United Nations Development Program (UNDP), 2003, the proportion of the population living in urban areas in Saudi Arabia was 58.4 % in 1975, reached 86.6 % in 2001 and 91% in 2016. This rapid growth has increased the size of built-up areas and made a change in land use, especially in pre-urban areas. Despite this rapid urbanization, still the real causes are not clear and not well addressed. This paper examines the trend and causes behind the rapid urban growth in Al-Ahsa Province. To have a clear idea the paper focuses on the major cities namely Hofuf & Mubarraz (the capital of the province). This is due to the fact that, around 91% of Al-Ahsa populations are living in such cities. Moreover, these centers have witnessed significant changes in its morphological structure due to the early discovery of oil in the eastern region. Since 1970, Hofuf & Mubarraz have seen rapid population growth due to socio-economic development and the significant expansion in the productive sectors. According to Al-Ahsa Municipality (2016), the population grew from 444,970 in 1992 to 768,000 in 2016. It is necessary to mention that, this growth has led to increase in built-up areas and caused many problems such as the problem of solid waste disposal, water supply, sewage, industrial pollution. More importantly, urban growth was the expense of agricultural lands. All of this has led to changes in the morphological structure of the area. The main objective of this paper is to trace the trend and mechanisms of urban growth and its implication on socio-economic aspects. To achieve such objective, the paper based mainly on the desk review of the current literature written on urban growth worldwide in general and on Arab Gulf States in particular. This also has been enhanced by the observation of the authors. The significance of this paper is its contribution to the ongoing debate regarding urban studies and opens the door for more researches. The paper is organized into five sections: the first is an introduction and the geographical setup of the study area, followed by conceptual framework and methodology. The third section is about the urban growth in Saudi Arabia. The fourth Section deals with the urban growth in the study area. Section five is about discussion and conclusion.

2. Al-Ahsa Province: Geographical Setup



Source: Saudi General Authority for Statistics, 2017.

Figure 1. The location of Al-Ahsa Province

Administratively, Saudi Arabia has been divided into 13 regions, and each region has several provinces. Al-Ahsa province is a part of the eastern region. It covered an area of about 530,000 km², 24% of the total area of Saudi Arabia, and 68% of the Eastern Region. The big major cities of the province are (Hofuf & Mubarraz) covering an area of about 22,898 km² (Al-Ahsa Municipality, 2016). The other small urban centers include Al-Oyoun, Al-Jafar, Al-Omran, and Juatha. Geologically, the sediments of the province are Quaternary (gravel and sand dunes), Neogene (conglomerates, sand stone, sandy limestone, marls and chale), and Eocene (marine, limestone, cherts, and chale). Hydrologically, there are three aquifers namely: Neogene, Dammam, and Umm- Er Radhma, which are the main source of ground water in the area. Topographically, the province lies in Saharan zone and it is surrounded by sand dunes. Climatically, the area is situated within the sub tropic arid zones, which characterized by very hot, dry summer and cool and relatively dry winter (Al-Jabr, 1984). The main soils are generally variants of sandy loams or clayey sandy loams together with windblown sands. The total population was 1,300,000 in 2012, about 91% settled in urban areas, and 9 % leave rural areas. The majority of the populations (27%) in the region are living in Al-Ahsa province (Saudi Ministry of Economy and Planning, 2009). Historically, the area is the oldest human settlements in the Arabian Peninsula, and contains many historical and archeological sites dating back to different periods of civilizations. Economically, the area is considered as a one of the main important agricultural areas in the Kingdoms. Several economic activities are found such as agriculture, commercial, tourist, and industry. The province location between Dammam (the capital of Eastern Region) and Riyadh (the capital of the kingdom), and between Riyadh and Arab Gulf States adds an extra value to the area in term of growth and development. During the last few decades, the area has witnessed rapid economic development. Recently, it is considered as a one of functional and reliable growth center in the eastern region on which the regional development based on.

3. Conceptual Framework

Several concepts like urban growth, urban expansion, and urbanization have been widely used in the urban literature. Each concept has its own definition in term of urban centers' growth. Urban expansion or urban sprawl is a process of large real estate development resulting in low density, scattered, discontinuous car-dependent construction, usually on the periphery of declining order suburbs and shrinking city centers (Bani, 2014). Urban growth is the rate of growth of an urban population, or the increase in the number of people who live in towns and cities. On the other hand, urbanization refers to "the increasing concentration of people (relative to base population) in urban style settlements at densities that are higher than in the areas surrounding them" (Gregory et al, 2009).

Systematic thinking and scientific research about urban phenomenon is not a new matter. Since the mid of the last century, a lot of work has been accomplished. The most important trait of this work is the establishment of a systematic and scientific analysis of urban phenomenon based on theories and models. Due to variations in academic interest and professional disciplines, the systematic work about urban phenomenon has pursued several and different ways of thinking, which in turn reflected in the definition, interpretation and analysis of the urban phenomenon including urban growth. For example, in developed countries, urban growth is viewed as a matter of performance, in contrast in developing countries, is viewed as a result of necessity (Bekle, 2005). In the first half of the 20th century, urban expansion has taken two main tracks: the first in the economic-oriented fields such as urban and regional economics and the relevant sub fields of regional science, geography and urban regional planning. The second draws from the sociology-oriented fields like urban and rural sociology and sub fields of regional science, geography, and urban and regional planning. In the economic oriented field, central concepts and theories appeared. In 1933, Christaller formulate the central place theory to offer a theoretical account of the size and distribution of retail establishment within an urban area. In 1954, August Losch used the conceptual framework of a central place to offer a more general account of patterns of "central place" in a continuous space that accounted for the urban function in addition to retailing (Briassoulis, 2002). Burgess (1967) also explained the process of urban changes and expansion in term of the invasion and succession of one zone (predominant land use) into the next outer zone adjacent to it, with physical expansion of the city the result (Gregory et al, 2009). So for Burgess, urban expansion was seen to be both a stimulus to urban growth and the source of instability, especially in lower-income and immigrant communities. In the sociology-oriented field, the development of school of "human ecology" by sociologists of the Chicago School in the 1920s has had the greatest impact on the analysis of urban change (Briassoulis, 2002), and from the 1910 through to the 1930, the scholars of Chicago School set out to study the city as "a product of human nature" (Gregory et al, 2009). It is important to note that these theoretical efforts have provided answers to many questions, the question of whether urban growth should be resisted, accepted or welcomed (Angle et al, 2005). Generally, population growth, rise in household income, subsidization of infrastructure investment, ineffective land use, excessive growth, social problems in central cities and poor land policies are taken to be the main causes of expansion (Bekle, 2005). Available literature in many parts of the world takes the urban growth phenomenon as a manifestation phenomenon of a change in land use, regardless the complications of this change. During the past fifty years, many parts have experienced rapid urban transformation represented by significant changes in its large-scale expansion of urban and rural areas. This paper believes that urban expansion is a complicated phenomenon

and it cannot be viewed from one point of view, so it needs an integrated model that takes into account all points of view, especially those related to the social sciences.

4. Methodology

This paper is based mainly on a desk review of recent and comprehensive literature written on urban growth. These sources include mainly: reports, periodicals, and current statistical data. Also the paper relies heavily on the report of structural plans made by the Saudi General Authority for Statistics, Saudi Ministry of Economy and Planning, Al-Ahsa Municipality, Saudi Real Estate Fund, the Saudi Ministry of Agriculture, Saudi Geological Survey. Moreover, the paper used several maps of Al-Ahsa area such as the administrative maps, land-use pattern maps, so as to analyze and follow the urban growth changes and directions. This has been enhanced by the observation of the three authors who stayed several years in Al-Ahsa witnessing changes that have taken place during the last two decades.

5. Urban growth in Saudi Arabia

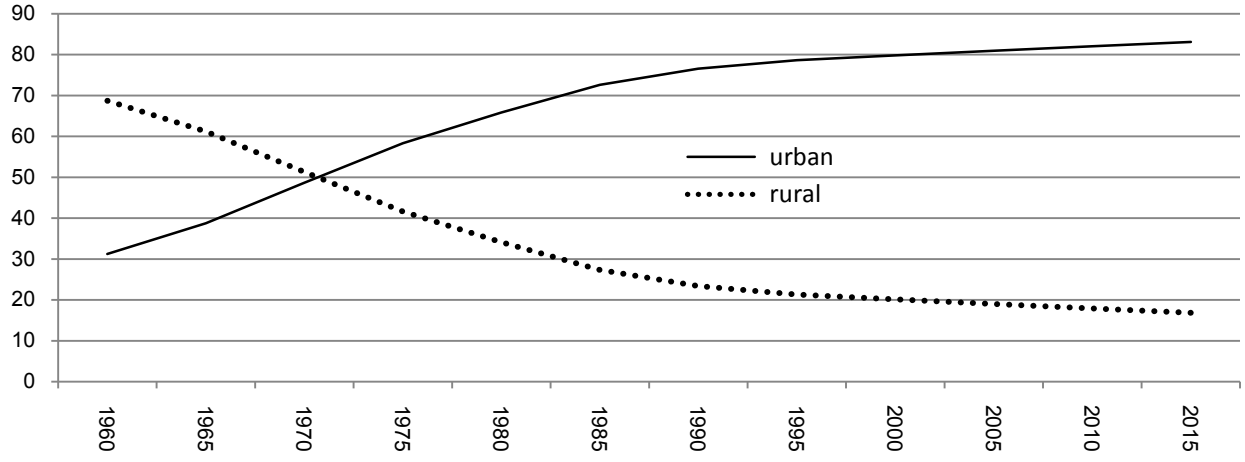
Since 1970, Saudi Arabia has experienced rapid urban growth. According to Saudi Ministry of Economy and Planning, 2009, the proportion of the population living in urban centers increased from 49% in 1974 to 74% in 1992 and to 80% in 2004. This figure is in line with the World Bank indicates that urban population in Saudi Arabia has reached 25,612,976 in 2014, with annual growth rate 2.5 %, and the proportion of the people living in largest city has reached 24.2, while the total population of cities of more than one million has reached 14,226,609 (table 1).

Table 1. Urban population growth in Saudi Arabia: 1990-2014

Urban population indicators	1990	2000	2010	2014
Population in largest city	2,325,243	3,567,444	5,227,076	6,195,198
Population in the largest city (% of urban population)	18.6	20.9	22.7	24.2
Population in urban agglomerations of more than 1 million	5,861,986	8,677,397	12,237,551	14,226,609
Population in urban agglomerations of more than 1 million (% of total population)	35.8	40.7	43.6	46.1
Rural population	3,831,361	4,310,971	5,032,720	5,273,569
Rural population growth (annual %)	0.7	1.5	1.3	1.0
Rural population (% of total population)	23.4	20.2	17.9	17.1
Urban population growth (annual %)	4.3	2.8	2.7	2.5
Urban population	12,530,992	17,081,302	23,057,927	25,612,976

Source: World Bank, 2016.

The above table showed clearly the continuous increase in urban population, which has reached 25,612,976 in 2014. Moreover, it reflects the decrease of proportion of rural population to the total population. Generally, the retraction of rural population proportion in favor of urban population can be expressed by the following.



Source: World Bank, 2016.

Figure 2. The proportion of urban and rural population in Saudi Arabia (1960-2015)

As the case of Saudi Arabia, other Arab Gulf States have witnessed rapid urban growth due to the adoption of oil-based economy, and the outward-oriented policy (table 2). The table shows that urbanization is very fast phenomenon in Gulf States shifted from one third in 1950s to more than 85% in 2015.

Table 2. Urban Population in Arab Gulf States (% of total population)

State	1950	1975	2004	2015
Saudi Arabia	9	58.4	80.8	83.2
United Arab Emirates	25	83.6	76.7	77.4
Kuwait	51	89.4	98.3	98.5
Bahrain	71	85	96.2	98.2
Qatar	50	88.9	95.3	96.2
Oman	3	34.1	71.7	72.3
Arab Gulf States	34.8	73.2	86.5	87.6

Source: Al-Sadhan, 2010.

The above figures reflect the continuous rise of urban population in the Arab Gulf States compared with the total population. In 1950, only 34.8% of the Arab Gulf States populations were live in urban centers. This percentage increased to 73.2 in 1975, and to 86.5 in 2004, and almost 87.6 in 2015, and it is estimated to be 90% by the end of 2016.

Due to natural population growth and to internal and external migration, the urban population in Saudi Arabia cities has increased, and the urban-rural ratio has changed. In early 1970, the Saudi urban-rural ratio was 1:3, and by the end of the nineties had become 3:1. This indicates that in each 3 urban people there is one in a rural area. Regarding Riyadh, the capital of Saudi Arabia, the figure is even higher. In 1965, there were only 227,000 inhabitants, while in 1975 it reached 710,000, and it had become more than doubled in 1985 (1.5 million), and more than four times (3.5 million) in 1995 (United Nations Human Settlements Program, 2004). According to Saudi General Authority for Statistics, 2010, the population of Riyadh was 5,188,286 inhabitants in 2010. Now is estimated to be more than 5.5 million.

Generally, there are several cities in Saudi Arabia exceeded its population one million. These include Riyadh, Makkah, and Al-Madinah Al-Monawarah (table 3).

Table (3) shows that some provinces have the highest number in term of urban people's concentration in their regions. Riyadh has come first with 76%, which amounted to 6,777,146 in 2010. Tabouk was ranked second with 71% of the total population of its region, which amounted to 791,535 in 2010, then ranked Hail, Al-Madinah Al-Monawarah, Najran with 68%, 66%, 63% respectively. Hofuf & Mubarraz ranked first in the Eastern Region with 27% of the total population, although it is not the first in term of socio-economic development.

The increase in urban population in Saudi Arabia has led to a rapid increase in built-up area (table 4).

The figures reflected the huge increase in built-up area in Saudi cities, of which the average increase rate was 121.5 % during the period 1992-2004. This rate is considered very high compared to the time. The increase in built-up area has led to increase in size of urban areas. Several cities such as Jeddah, Makkah Al-Mukrramah, Buraydah, Khamis Mushayt, AL-Gubeil, and Jazan have doubled its size in just 14 years. This unprecedented increase in built-up areas has impacted negatively on the urban environment and generated several challenges for urban planners particularly in the Eastern district. Due to the dry climate and high increase in temperature, the increase in building up area makes Al-Ahsa vulnerable to urban heat island. Nowadays, Saudi cities are facing challenges accompanied by urban growth, especially the increase demand for housing and the other infrastructures (table 5).

Table 3. The proportion of population concentration in the two largest provinces in each region in Saudi Arabia 2008

Region	NO. of provinces	The first province	% *	The second province	% *	% of other provinces
Al-Riyadh	19	Riyadh	76	Al-kharaj	6	18
Makkah Al-Mukrramah	11	Jeddah	50	Makkah Al-Mukrramah	23	27
Al-Madinah Al-Monawarah	6	Al-Madinah Al-Monawarah	66	Yanbu Albahar	17	17
Al-Qaseem	10	Buraydah	50	Unayzah	14	36
Eastern Region	10	Al-Ahsa	27	Dammam	22	51
Aseer	11	Khamis Mushayt	26	Abha	21	53
Tabouk	5	Tabouk	71	Umluj	8	21
Hail	3	Hail	68	Alghazalah	18	14
Northern Borders	2	Arar	60	Rafha	26	14
Jazan	13	Jazan	21	Sabya	17	62
Najran	7	Najran	63	Sharura	17	20
Al-Baha	6	Albaha	24	Biljurashi	16	60
Al-Jouf	2	Sakaka	54	Alquryyat	35	11

Source: Saudi ministry of Economy and Planning (2009)* (%) the proportion of population concentration

Table 4. Increase in built-up area in Saudi Cities from 1992-2004

City	Increase in built-up area %	Increase in total area of the city %
Al-Riyadh	94.2	59.97
Jeddah	317.8	389.72
Makkah Al-Mukrramah	126.8	0.07
Al-Madinah Al-Monawarah	69.3	64.13
Dammam	80.3	66.11
Hofof & Mubarraz	91.9	18.9
Tabouk	41.6	8.78
Buraydah	1190	1811.25
Khamis Mushayt	300	422.03
Hail	53.2	31.71
Najran	16.6	30.76
Hafr Albatin	81.8	1.57
AL-Gubeil	591	611.27
Abha	8.8	4.37
Al-Kharaj	33	35.68
Yanbu	63.1	63.13
Arar	63.7	90.19
Unayzah	59.6	175.4
Sakaka	2.3	7.38
Jazan	213.3	2.1
Alquryyat	12.8	0.60
Rate	121.5	139.71

Source: Al-Gikheidb, 2009.

Table 5. The demand for housing and land 2010-2014 by region

Region	NO. Housing (1000 units)	Residential land area (million m²)
Al-Riyadh	325	91
Makkah Al-Mukrramah	370	103
Al-Madinah Al-Monawarah	81.2	22.6
Al-Qaseem	51	14.27
Eastern Region	166.3	46.5
Aseer	83.1	23.7
Tabouk	38.9	10.89
Hail	20.5	5.74
Northern Borders	11.5	3.22
Jazan	50.1	14.04
Najran	21.6	6.86
Al-Baha	17.3	4.83
Al-JOUF	13.5	3.78
Total	1250	350

Source: Saudi Ministry of Economy and Planning (2009)

Table (5) reflects that the demand for housing is one of the main challenges facing planners and decision makers. From 2010 to 2014 the total demand for housing was 1,250,000 units, and then it has risen to 1,537,020 in 2016s and estimated to be 1,233,479 during 2017-2022 (table 6).

Table 6. The expected supply and demand for housing in Saudi Arabia 2017-2022

Year	Demand	Supply	Shortage
2017	160640	126459	34181
2018	172157	132645	39512
2019	183846	139133	44713
2020	210477	145939	64537
2021	238467	153078	85389
2022	267892	160566	107325
Total	1761083	1307370	453713

Source: Alegtisadiah, 2013.

6. Urban Growth in Al-Ahsa Province

Al-Ahsa Province is considered as one of the oldest human settlements in the Arabian Peninsula. It was known as Bahrain, then called Hajar, and lately Al-Ahsa. It has gained historical and religious significances since early history, and still played a pivotal role in the region. Based on several studies, settlements in the area can be dated back to more than five thousand years (Al-Omair & Babiker, 2014). The availability of resources, mainly fertile soil and ground water is considered as an essential factor behind the early settlement. However, the form and structure of settlement have been influenced by both physical and human factors represented in the region. These relevant factors include geology, geomorphology, climate, type of soils, water resources, and the division of the inhabitants (urban & rural) (Al-Abdullah Al-Elawy, 1976).

Four stages need to be highlighted to trace the trend of urban growth in Al-Ahsa. The first stage was the nuclear stage (before 1963); the second was the growth stage (1963-1973). The third is the developmental stage (1973-1994). And lately the current stage, which began in 1995 up to the present. This division is mainly associated with the essential changes in urban mass during each period. Regarding the first stage, urban growth was concomitant with the availability of water resources, mainly wells and springs which were spread all over the area. The settlement at this stage was in a form of a small number of people surrounding water resources. It is very important to note that they depend heavily on traditional material in building their houses. The second stage associated with the discovery of oil and the flourishing of the economy. This stage was synchronized with the adoption of the Saudi Arabia kingdom of the five – year development plans. These plans played a significant role in improving socio-economic situations not only in the study area, but also throughout the kingdom. Accordingly, the economic situation in the area has improved, land use pattern has changed and the built-up area has increased rapidly. The most important issue which associated with this stage is the change of building material from mud and palm fronds to concrete. The third stage associated with the rapid population growth and increase demand for housing. Therefore, the authorities embarked on

the establishment of residential schemes. This has been enhanced by better services and better infrastructure such as roads, water, electricity, and communication networks. Consequently, most of the residents in the old districts have moved to new neighborhoods on the outskirts of the area (Al-Ahsa Municipality, 1998). It is worth mentioning that in this stage, Hofuf city merged with Mubarraz city (figure 2). Regarding the fourth stage, most of infrastructure projects have been completed, the total area has increased to more than 228.69 km², and the built-up area reached 152.20 km². It is necessary to highlight that the urban growth development in the area has not been confined to the horizontal expansion, but exceeded to the vertical one. According to the Saudi General Authority for Statistics, 85.8% of the built-up area consists of two floors and more, with knowing that all or most of built-up area before this stage consisted of one floor (Al-Ahsa Municipality, 2015).

Since the early sixties, the area has witnessed a significant increase in the total area which has reached approximately 228.69 km² in 2011s, compared to 184.43 km² in 1992 and less than those in the previous periods. This increase was accompanied by an increase in built-up area which has reached approximately 91.92 in 2011s (table 7).

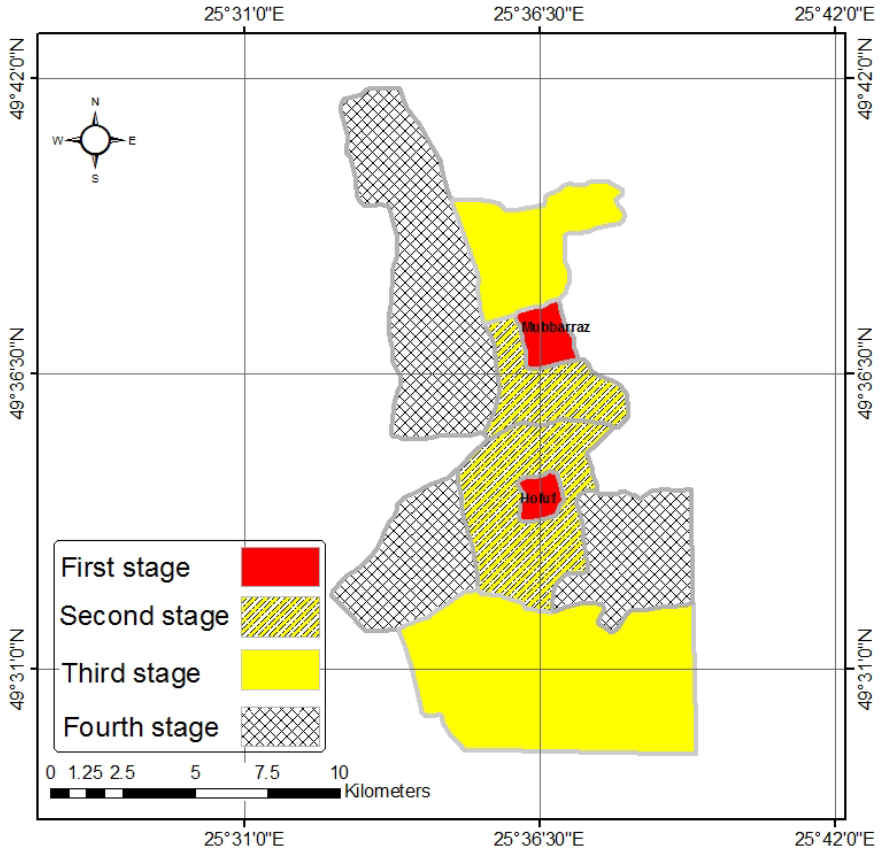
Figures in table 7 showed the huge increase in the built-up area was from 1957 to 2011s, also reflect clearly the large increase proportion in built-up area from 1970 to 1985 (365.6%) and from 1985 to 1994 (172.85).

Table 7. Increase in built-up area in the study area 1957-2011

year	Hofuf city		Mubarraz city		Hofuf & Mubarraz	
	Area km²	% increase	Area km²	% increase	Area km²	% increase
1957	2.52	-	1.08	-	3.60	-
1970	4.44	192	1.58	50	6.02	67.2
1985	15.84	1140	12.19	1061	28.03	365.6
1994	37.30	2146.5	39.19	2700	76.49	172.8
2011	50.41	35.16	41.20	5.15	91.62	19.78

Source: Al-Ahsa Municipality, 1998, 2016.

The enormous increase in built-up area during these periods was due to rapid population growth, improvement of per capita income, road construction and the influence of neighboring areas. Moreover, the intensification activity of the Real Estate Development fund (R.E.D.F) which had had a prominent role in urban growth through financing of housing and construction projects. Also, these periods have seen wide migrations of labors from inside and outside the Kingdom for contributing in physical and urban development.



Source: Al-Ahsa Municipality, 2016.

Figure 2. Urban growth in the study area 1957-2011

Regarding the urban expansion directions in the study area, the paper found that the direction of growth is almost in all directions, but with the high speed to the north. This is due to the presence of palm farms in the East, and the constructions of the Saudi Arabian National Guard, Arabian-American Oil Company(ARAMCO), construction of railway line, and the occurrence of Hofuf airport in the West (table 8).

Table 8. Urban growth directions in Hofuf & Mubarraz 1994-2011

Direction	Hofuf city		Mubarraz city		Hofuf & Mubarraz	
	km	%	km	%	km	%
N	1.75	2.9	4.75	9.9	6.5	6.4
N.N.E	2.25	3.7	6.25	13	8.5	8.35
N.E	2.5	4.1	1	2.1	3.5	3.1
E.N.E	1.5	2.5	1	2.1	2.5	2.3
E	2.75	4.5	1	2.1	3.75	3.3
E.S.E	5.5	9.1	1	2.1	6.5	5.6
S.E	3.25	5.4	2.25	4.7	5.5	5.0
S.S.E	8.5	14	2.25	4.7	10.75	9.35
S	8	13.2	2	4.2	10.0	8.7
S.S.W	5	8.3	2.25	4.7	7.25	6.5
S.W	5.25	8.8	4	8.3	9.25	8.55
W.E.W	5.25	8.8	3.25	6.8	8.5	7.8
W	3	4.9	6.5	13.5	9.5	9.2
W.N.W	2	3.3	2	4.2	4.0	3.75
N.W	2	3.3	3.25	6.8	5.25	5.0
N.N.W	2	3.3	5.25	10.9	7.25	7.1
Total	60.5	100	48	100	108.5	100

Source: Al-Ahsa Municipality, 2016.

It is very important to note that the traditional house (public house) which was the dominant type is no longer valid (Elhadary and Al-Omair, 2014). People in in the study area prefer to live in a modern house (villa, apartment) with more than one floor (table 9).

Table 9. Change in building heights percentage in Hofuf & Mubarraz 1994- 2011

	One floor	Two floors	Three floors and above
1994	33.8	63.5	2.70
2011	14.2	80.1	5.7

Source: Al-Ahsa Municipality, 1998, 2016

Historically, Al-Ahsa urban center was characterized by flat buildings known as public houses. According to Al-Ahsa Municipality (1998), 63.5% of the buildings were consisted of two floors, and 97.3% were consisted of two floors and less. Table (9) shows the change that occurred in building heights during the subsequent periods. The figures indicate clearly the increase in proportion of high-rise buildings (two floors and above). From 1994 to 2011, the proportion of the high-rise buildings (which were consisting of two floors and above) increased from 66.2% to 85.8%. In turn, the proportion of buildings consisting of one floor decreased from 33.8% to 14.2%. In addition, the figures indicate the rise of the proportion of buildings which consisting of three floors and above.

Change in building heights has been extended to rural areas. According to Elhadary & Al-Omair, 2014, 72% of housing in rural areas has changed from traditional type to villas and apartments.

The shift to high buildings has led to changes in building materials. The old materials such as mud, wood and palm fronds have been replaced by modern and concrete type. This shift is due to the increase in per capita income, and the development of cement and steel industry in the kingdom. For example, in 1994, 65% of the buildings were built of concrete structures, 29.8% were built of bricks, and only 4.4% were built of mud and wood. Later on, the proportion of buildings that were built of concrete structures increased to 75.8%. In contrast, the proportion of buildings using metal structures and bricks decreased to 0.5% and 23.7% respectively. Therefore, it is hard to find traditional houses except those used for tourist purposes. More importantly is the disappearance of mud, wood, and palm fronds that had been used as a building material during the early stages (table 10).

Table 10. Change in building materials 1994-2011

Year	Concrete structures	Metal structures	Bricks	Mud & wood
1994	65	0.8	29.8	4.4
2011	75.8	0.5	23.7	0.0

Source: Al-Ahsa Municipality, 1998, 2016.

As a result of rapid urban development that took place during the last decades, land use patterns in the area have changed either by invasion or replacement. For example, the development of economic activities and the provision of better services have pushed some activities to the outskirts of the area. Then a new land use pattern such as commercial activity has emerged. Also the establishment of University of King Faisal in 1975 and Al-Ahsa Airport in the southeast of the area has its role in speed up the process of urban growth in the area. The rapid urban expansion that became a hallmark of the area had led to the emergence of commercial centers to serve the new neighborhoods. It has been observed that several Malls prefer to be in the outskirt of the cities and along the major roads far from the centers. This might be due to the congestion in the urban center, the noise pollution caused by it, and the rising of land rent and prices, which prevents the expansion of these industries, especially stores and warehouses. For commercial activities, lack of parking, the traffic congestion, and the inability to expand due to lack of lands seem to be the main reasons that hindered and pushed these activities to the outskirts. The increase in urban population coupled with the provision of better services has led some people to invest their houses either by lease or change the pattern of use for commercial purposes.

7. Drivers of Urban Growth in Al-Ahsa Province

There is a positive correlation between urban growth in Al-Ahsa province and the discovery of oil in 1930. Since the shift to oil based economy in Saudi Arabia, the authority has embarked on construction of basic infrastructure. This had attracted a large number of labors from inside and outside the kingdom. Accordingly, the number of people living in the cities has increased very rapidly and some new residential areas have emerged. Al-Ahsa province is a one of the most attractive areas to labors due to its location near oil extraction areas. Waves of migrants were coming to the province especially after the prosperity of the socio-economic life. Consequently, the number of people inhabiting the area has increased. According to Saudi General Authority for Statistics, the total population of the Hofuf and Mubarraz in 2010 was 660,788, which constitutes 61.9 % of the total province population (Saudi General Authority for Statistics, 2010). This number is estimated to be 768,000 by the end of 2016 (table 11).

Table 11. Population growth in Hofuf and Mubarraz 1992-2016

Year	Total population	% increase
1992	444,970	-
2004	572,908	28.8
2010	660,788	14.8
2016	768,000	16.2

Source: Saudi General Authority for Statistics, 2010. Al-Ahsa Municipality, 2016.

Table 11 reflects clearly the rise in population during the period 1992-2016. It grew from 444,977 in 1992 to 572,908 in 2004, and to 660,788 in 2010, and almost 768,000 in 2016. Figures also show the high proportion of population increase during the period 1992-2016 (72.6%). This rapid increase has sped up the demand for housing units and services. This led local authorities to plan several new housing projects to meet the imperative and urgent demand for housing. Then, many housing projects were emerged in the outskirts of the area.

Another factor contributed to the urban growth in the area is the outstanding role made by government to make balanced development among regions. In this context, Al-Ahsa Province was chosen as a one of the national growth centers that the development strategy of the kingdom based on. The main objective of these centers is to transfer the development efforts to the less developed areas (Al-Ogaili, 2009). According to the national development plans, these national growth centers have a priority in developmental support, improvement of social services and strengthen of infrastructure, especially transport network. Consequently, the area has grown, and several activities such as recreation, entertainment, tourism have emerged and others like industries and commercial have extended. Therefore, the area which was occupied by commercial and industrial activity increased from 1.93, 1.19 km² in 1994 to 3.81, 1.31 km² in 2011 respectively. Also the area which covered by roads and parking increased from 36.55 km² in 1994 to 48.06 km² in 2011s. It is worth mentioning that, the development of the industrial sector is a one of the most prominent official efforts in achieving socio-economic development. In 1980, a major industrial city was established in an area of 1.5 million m²; about 20 km to the north. The State provides several facilities to attract such sector. These include easy access to land and energy at subsidized and affordable prices, tariff protection for domestic productions and provide loans through Saudi Industrial Development Fund. All these efforts have attracted official and private sector in and outside the region to invest in industry.

It is important to highlight the role of the State in facilitating easy access to housing. This is always clear in the objective of the various state plans. It is obviously documented that, the State is helping the low-income residents to get adequate houses. Accordingly, and throughout the kingdom, about 4 million housing units were built during the seventh development plan (2000-2005) and about 600,000 housing units during the eighth development plan (2006-2010). In Hofuf & Mubarraz, the authority intends to establish three residential complexes. The first consists of 328 housing units. The second consists of 172 housing units in an area of 272 m², and the third consists of 1,600 housing units in a total area of 1.4 million m², and nowadays, A-Ahsa Municipality allocated about 12 million m² for physical development. In addition to, the Saudi Real Estate Fund (SREF) - which was established in 1974s - plays a substantial role in the physical development through providing Saudis, long term loans (25 years) without interest (to a maximum 10 million SR (2.7 million $) for building housing units. It is necessary to mention that the role and impacts of the Real Estate Fund have spread over all parts of the kingdom. During the last five years, the contracts signed amounted to 199,258 throughout the kingdom's regions. In the study area, until the end of 2009, 400 villas were built by Real Estate Fund in an area of 0.7 km² (Al-Ahsa Municipality, 2016). Besides, there are charity efforts as is the case of King Abdulla Ibn Abdel-Aziza Institution for Housing Development, which provides more than 348 housing units, and Al-Jabr Charity Institution, with 234 housing units.

Table 12. Saudi Arabia GNI per capita 1990-2015 in dollar

Year	GNI per capita	Year	GNI per capita
1990	24,400	2004	32,260
1992	26,950	2006	37,430
1994	26,120	2008	42,590
1996	26,850	2010	43,930
1998	27,830	2012	50,470
2000	28,080	2014	53,340
2002	27,610	2015	54,730

Source: World Bank, 2016.

One of the main factors behind the urban rapid growth is the improvement in socio-economic life. During the last two decades, the GNI per capita has risen from 24,400 dollars in 1990 to 54730 dollars in 2015 (World Bank, 2016).

The above figures show the rapid growth in GNI per capita as it shifted from only 24,400 dollars in 1990 to 54,730 dollars in 2015. This reflected positively on per capita income which increased from 21,000 dollars in 2011 to 23,000 dollars in 2012 and to 25,700 dollars in 2013 (Arab News, 2017). The evolution of economic situation has generated a new reality and raising the ceiling of ambitions in regarding housing and social services. Therefore, a large number of people prefer to live in the outskirts of the area at the new residential neighborhoods.

8. Discussion

From what it has been said, it seems that the nature and trend of urban growth phenomenon in Al-Ahsa Province is very complicated as several direct and indirect factors have contributed to the current growth. These include the shift to an oil based economy, massive in and out migration, natural increase of population, Saudi Government efforts regarding housing, the official efforts in achieving the balanced development between regions, and the improvement of socio-economic life. Our findings show that the growth that has taken place in Al-Ahsa Province is very fast compared to the time and comes at the expense of other essential activities such as agriculture. So, the question that needs to be answered: is the urban growth inevitable phenomenon or planned? In another way: is the urban growth a matter of performance or a result of necessity. Despite rapid population growth and other factor, the economic factor seems to be the main driver of urban growth in the area. Whatever the case, Al-Ahsa area is facing many challenges regarding both, population growth and urban expansion. Rounded road that surrounded the area, the dependence of most of lands outside the urban cluster to Arabian-American Oil Company (ARAMCO) on the west, surrounding of urban cluster by palm farms on the east, the storage activities are the most obstacles that hinder urban expansion. The presence of these challenges further urban expansion will impact negatively. The question that should be asked what is the future of the urban growth in the current condition. Answering this question leads to some significant aspects namely the negative impacts of urban growth which include the problems of waste disposal, water supply, the sewage, industrial pollution and eroding in green spaces. It can be said that, until recently, many neighborhoods were interposed with farms and green spaces, and now urban expansion invade agricultural land on the east, it has been observed that several farms have been converted to residential or commercial purposes. The decline of the revenue coming from agriculture and lack of water are some factors raised behind such conversion. It seems that further studies are needed to investigate that.

The paper is not against the urban growth if it is well managed and within the planning process. Our observation has shown that the growth is always comes at the expense of other essential activities mainly agriculture. Several agriculture areas have been converted to settlement and other uses such as a creation places. Statistics indicate that, the agriculture area has decreased to 33% of the total area in 2009 and to 25% in 2011 (Al-Arfaj, 2012). Moreover, urban growth in the area has caused many problems include the problem of solid waste disposal (housing, industrial, agricultural, demolition and construction), estimated at 2000 tons/day, the problem of water supply with a deficit of 120 m^3, the increase of energy consumption, air pollution due to cement factory located to the north and small industries distributed in the area. In addition to that, there is also a problem of sewage due to the insufficient treatment stations.

Generally, urban growth in Al-Ahsa Province can be described as a condition imposed by the socio-economic development, and will continue unless it will be controlled. The economic growth and the socio-economic development that prevail the area reflects the successful of the five-year development plans, which were adopted by Saudi Government especially in term of regional balance and rural development.

9. Conclusions

This paper highlighted the urban growth in Al-Ahsa province, which was considered as a one of the oldest human settlements and best oasis of agriculture in the Arab Peninsula. The adoption of oil based economy (1970) and regional balanced development have contributed to the current urban growth. The study showed that, urban growth in Al-Ahsa area was different in terms of rates, mechanisms and trends. Urban growth followed by an increase in built-up area and change in the structure and morphology of the cities. The built-up area has increased from 76.49 km^2 in 1992 to 91.62 km^2 in 2011. This usually comes at the expense of other land uses like agriculture. It has been documented that the area under agriculture represents one third 33% in the year 2009 and currently is 25%. Add to this, the current urban growth has become one of the major threats to the local environment. The continuous decrease in the agricultural areas and green spaces in favor of concrete buildings and dark surfaces, beside the air pollution and the blocking of wind is definitely leads to increase in temperatures and seep up the process of climatic changes. These negative consequences in the area characterized by a fragile arid climate will definitely lead to increase the phenomenon of urban heat island. This will impacted negatively on agricultural production and food security in the area, at time of increasing population and increasing demand for food. In consequence, this deep and fast transformation definitely will lead to urban distortion and make difficult for decision-makers to control urban growth unless the authorities formulate clear plan that take into account the

balance between concreting and non-concreting surface areas, conserving ecosystems especially agriculture, and strengthening infrastructure. The control of urban growth can be only through the sustainable urban planning that creates sustainable communities – including physical, economic, social, and environmental aspects. As we mentioned before, the study area is a one of the most productive areas in Saudi Arabia, so it needs special attention in term of physical planning. Urban growth is very complicated and multifaceted in terms of causes and consequences, and it needs new approaches that take into account all the relevant aspects that may help in analyzing and addressing it, especially in areas like Hofuf and Mubarraz, where the socio-economic and environmental changes have taken place.

REFERENCES

[1] Al-Abdullah Al-Elawy, I. S. (1976). The Influence of Oil upon Settlement in AL-Hasa Oasis, Saudi Arabia. Doctoral thesis, Durham University.

[2] Al-Ahsa Municipality. (1998). Al-Ahsa Structural Plan (Hofuf & Mubarraz): A Study of Current Situation. Al-Ahsa, Saudi Arabia.

[3] Al-Ahsa Municipality. (2016). Al-Ahsa Structural Plan (Hofuf & Mubarraz). Al-Ahsa, Saudi Arabia.

[4] Al-Arfaj, A. M. (2012). The Recreational Utilities and its impact on Agricultural Sustainability in Al-Ahsa Oasis. A Paper Presented on the Sustainable Agriculture Forum in Al -Ahsa Oasis, December, 2012, Al-Ahsa Chamber, Al-Ahsa Province, Saudi Arabia.

[5] Alegtisadiah. 2013. 450,000 housing units are the shortage in Saudi Arabia by 2022. Retrieved 10 April, 2017, from: http://www.aleqt.com/2013/05/11/article_754873.html.

[6] Al-Gikheidb, M. A. (2009). Balance between Built-up and Available Area in Saudi Arabian Cities. Kuwait Geographical Society, Kuwait.

[7] Al-Jabr, Mohammed A. (1984). Agriculture in Al-Hasa Oasis, Saudi Arabia: A review of Development, Durham theses, Durham University.

[8] Al-Ogaili, M. S. (2009). Growth Centers and its Role in Rural Development in kingdom of Saudi Arabia. Al-Imam Muhammad Ibn Saud Islamic University, Saudi Arabia.

[9] Al-Omair, A. A., Babiker, A. E. (2014). Tourism Investment Opportunities for Architectural Heritage in Al-Ahsa province, A Study in Architectural Heritage: Researches and Heritage 4, Saudi commission for Tourism and National Heritage.

[10] Al-Sadhan, A. N. (2010). The Social Impacts of Urban Expansion: A case study of Gulf City. Al-Omma Book, Center of Research and Studies, Qatar.

[11] Angle, S., et al. (2005). The Dynamic of Global Expansion: Study Report, Transport and Urban Development Department, World Bank.

[12] Arab News. (2017). Saudi per capita income estimated to reach SR96, 375. Retrieved 9 April 2017, from: http://www.arabnews.com/news/463668.

[13] Bani, R. (2014). Urban Sprawl: Definitions, Data, Methods of Measurement, and Environmental Consequences. Journal of Sustainability Education, vol. 7, December 2014.

[14] Bekele, H. (2005). Urbanization and Urban Sprawl. M.Sc. Thesis, Department of Infrastructure, Royal Institute of Technology, Stockholm, Sweden.

[15] Briassoulis, H. (2000). Analysis of Land Use Change: Theoretical and Modeling Approaches. Regional Research Institute, West Virginia University, USA.

[16] Discoli, C., Martini, I. (2012). Unplanned Urban Growth and its Effect on the Sustainability. Journal of Resources and Environment, 2012; 2(3): 107-115, doi: 10.5923/j.re.20120203.05.

[17] El-Arifi, S.A. (1986). The Nature of Urbanization in the Gulf Countries, GeoJournal 13: 223. Doi: 10.1007/BF00704813.

[18] Elhadary, y and Samat, N. (2012). Political Economy and Urban Poverty in the Developing Countries: Lessons Learned from Sudan and Malaysia. Journal of geography and geology, Vol 4 issue 1.

[19] Elhadary, Y.A., Al-Omair, A. A. (2014). Indicators and Causes of Rural Settlement Changes in Saudi Arabia: Alhasa Province in the Eastern District as Case Study. Journal of the Gulf and Arabian Peninsula Studies, No 155 - Vol 40, Academic Publication Council, University of Kuwait.

[20] Elhadary, Y.A.E., et al. (2013). Development at the Peri-Urban Area and Its Impact on Agricultural Activities: An Example from the Seberang Perai Region. Penang State, Malaysia. Agroecology and Sustainable Food Systems 37, 834-856.

[21] Eltayeb, G. (2003). The Case of Khartoum, Sudan. Case Study Prepared for the Challenge of Slums. UN Habitat Global Report on Human Settlements, 2003.

[22] Forsyth, T. (Ed). (2011). Encyclopedia of International Development. Rutledge, London and New York.

[23] Gilbert, A., Gugler, J. (1984). Cities, Poverty, and Development: Urbanization in the Third World. Oxford University Press, London, New York, and Toronto.

[24] Gregory, D. et al. (2009). The Dictionary of Human Geography. 5th edition, Blackwell Publishing Ltd, UK.

[25] Saudi General Authority for Statistics. (2010). Populations in Cities of more than 5000. Retrieved 10 April 2017, from: https://www.stats.gov.sa/sites/default/files/census31-prim-05.pdf.

[26] Saudi General Authority for Statistics. (2017). Atlas of Population and Housing: Maps Distributions of Preliminary Results 2010. Retrieved 11 April 2017, from https://www.stats.gov.sa/sites/default/files/en-dmaps2010_0_0.pdf.

[27] Saudi Ministry of Economy and Planning. (2009). Ninth Development Plan, Riyadh, Saudi Arabia.

[28] United Nations Development Program. (2003). Human

Development Report: Millennium Development Goals: A Compact among Nations to End Human Poverty. New York, USA.

[29] United Nations Human Settlements Program. (2001). The State of the World's Cities Report 2001, Nairobi: UNCSH.

[30] United Nations Human Settlements Program. (2004). The State of The World's Cities 2004/2005: Globalization and Urban Culture. Nairobi, Kenya.

[31] United Nations. (2001). The Components of Urban Growth in Developing Countries, Report Prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, New York, USA.

[32] World Bank. (2016). Saudi Arabia: GNI per capita, PPP (current international $) 1990-2015. Retrieved10April 2017, from: http://data.albankaldawli.org/indicator/NY.GNP.PCAP.PP.CD?locations=SA.

[33] World Bank. (2016). Saudi Arabia: Population in largest city 1960 – 2015. Retrieved 10 April 2017, from: http://data.worldbank.org/indicator/EN.URB.LCTY?end=2015&locations=SA&start=1960&view=chart.

[34] World Bank. (2016). Saudi Arabia: Population in urban agglomerations of more than 1 million (% of total population) 1960 – 2015. 2015. Retrieved 10 April, 2017, from: http://data.worldbank.org/indicator/EN.URB.MCTY.TL.ZS?end=2015&locations=SA&start=1960&view=chart.

[35] World Bank. (2016). Saudi Arabia: Rural population 1960-2015. Retrieved 10 April, 2017, from: http://data.worldbank.org/indicator/SP.RUR.TOTL?end=2015&locations=SA&start=1960&view=chart.

[36] World Bank. (2016). Saudi Arabia: Urban population (% of total population) 1960-2015. Retrieved 10 April, 2017, from: http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=SA.

[37] World Bank. (2016). Saudi Arabia: Urban population 1960 – 2015. Retrieved 10 April, 2017, from: http://data.worldbank.org/indicator/SP.URB.TOTL?end=2015&locations=SA&start=1960&view=chart.