Saudi Cities Report 2019

مستقبل المدن السعودية
FUTURE SAUDI CITIES

وزارة الشـــؤون البلدية و القروية
Ministry of Municipal & Rural Affairs

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Saudi Cities Report 2019

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Ministry of Municipal and Rural Affairs
P.O. Box : 935 - King Fahd, Riyadh, 11136
Tel: 00966114569999
www.momra.gov.sa

United Nations Human Settlements Programme (UN-Habitat)
P.O. Box 30030, 00100 Nairobi GPO KENYA
Tel: 254-020-7623120 (Central Office)
www.unhabitat.org

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FUTURE SAUDI CITIES

UN HABITAT
FOR A BETTER URBAN FUTURE

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Authors: UN-Habitat Core Team and Contributors
Eduardo Moreno (Branch Coordinator); Ben C. Arimah (Task Manager); Udo Mbeche-Smith (Co Task Manager); Robert Ndugwa; Raymond Otieno Otieno; Robert Lewis-Lettingtion; Anne Klen-Amin; Ololade Ogunsanya; Caroline Kieha; Natalia Ayala; Marco Kamiya; Shipra Narang Suri; Giuseppe Tesoriere; Costanza La Mantia; Rama Nimri; Ulrich Graute; Samuel Njuguna; Ayman Elhefnawi
Authors: External
Francois Vigier; Tahir Husain; Antar A. Aboukorin; Shaibu Bala Garba
Statistical Annex
Robert Ndugwa; Donatien Beguy; Julius Majale; Antony Abilla; Dennis Mwaniki; Esther Njiru; Dennis Koech
Editorial Consultant
Olu Sarr
Publishing Production Manager
Victor Mgendi
Design and Layout
Peter Cheseret

Cover Photo
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The Future Saudi Cities Programme is a jointly implemented project managed by the Deputyship of Town Planning of the Ministry of Municipality and Rural Affairs of the Government of the Kingdom of Saudi Arabia and the United Nations Human Settlements Programme (UN-Habitat).

For UN-Habitat:
Mr. Robert Lewis-Lettington
Mr. Ayman El-Hefnawi
Ms. Manka Bajaj

The report has been prepared based on statistics and information up to 2018,in addition developments in 2019 have been incorporated.

Saudi Cities Report 2019

The Kingdom of Saudi Arabia is one of the most urbanized countries in the world with eight out of every ten people living in urban areas. When well-planned and managed, urbanization can serve as a transformative force that can be leveraged for the sustainable and inclusive development of cities in Saudi Arabia. Over the last three decades, rapid urbanization, infrastructure development, and the transformation of the Saudi society have brought about remarkable improvement in the quality of life of Saudi citizens. Nonetheless, urbanization in Saudi Arabia faces several challenges and has been largely dependent on oil. There are significant regional and territorial imbalances, with some cities, especially the large ones better placed to take advantage of the positive nature of urbanization.

To address these and other urban challenges, In 2013, the government agreed to implement the Future of Saudi Cities program through the Ministry of Municipal and Rural Affairs in collaboration with UN-Habitat. FSCP seeks to achieve sustainable urban development in Saudi cities through effective planning and management, including the enhancing and support of economically productive cities, and improve urban legislation and institutional framework. This Program is fully in line with the 2030 Saudi Arabia's vision and the Municipal Transformation Program, and it responds to the global urban development agenda that the Saudi Government has committed to implement.

This report shows with compelling evidence the current state of Saudi cities. It presents the key challenges that urban areas in Saudi Arabia contend with, as well as the opportunities they have in contributing to national and sustainable development. Saudi cities need to be more economically diversified and productive; it is also important to strengthen the institutional and legislative frameworks of Saudi cities as a basis of implementing a reinvigorated notion urban planning that can respond to current and emerging urban challenges in the Kingdom.

The Kingdom of Saudi Arabia is determined to make qualitative and quantitative leaps in this regard, not sparing human and financial resources. The Government understands that this requires an inclusive approach involving every facet of the society, including civil society and community based organizations. Working collaboratively, it will be possible to advance the national and international development agenda toward sustainable development. The implementation of the New Urban Agenda and the adequate response to SDGs – Goal 11 and other urban targets -, is paramount to maker Saudi cities and human settlements safe, inclusive, resilient and sustainable.

This report has benefitted from the collaborative effort of researchers, economists, environmental experts, urban planners and legal experts, all of them working closely with MoMRA, Government officials and other professionals. I commend these efforts that provide a solid base from which necessary institutional, legal and programmatic changes and adaptations can be undertaken to ensure that a prosperous future of Saudi .cities is reality for all.

Foreword by UN-Habitat Executive Director

This report provides an overview of the progress made by the Kingdom of Saudi Arabia in the field of urban transformation and lessons learned as well as future strategies and policies aimed at achieving a prosperous economy, a vibrant community, and sustainable cities attractive to living and working.

The report, in its comprehensive monitoring and analysis of the current status of the state of Saudi cities and the growth and urbanization trends prevailing therein, is based on data collected over the past two years from a number of cities as part of the Saudi Cities Future project, whereas the report discusses opportunities and challenges for these cities in the context of the current urban growth and transformation, which the Kingdom of Saudi Arabia is witnessing. Today, more than ever, urbanization issues need a comprehensive systematic review from the perspective of research, analysis and innovation in urban transformation policies to contribute to the implementation of the Kingdom's Vision 2030 and the new urban agenda as well as to establish a baseline to follow the progress made in achieving the sustainable development goals during the next ten years.

However, this report was prepared in an innovative and participatory manner in close cooperation between the Ministry of Municipal and Rural Affairs and UN-Habitat. It included a wide range of consultations with urban development partners including the private sector, civil society organizations, experts from various disciplines from UN-Habitat, and youth groups whose opinions have enriched the content of this report. Therefore, this report is the result of concerted efforts and contributions from a wide range of specialized expertise.The Saudi cities profiles report (2019) contains six chapters with recommendations dealing with quality of life, good governance, economics, urban planning, the role of women, environmental sustainability and social inclusion to improve the prosperity of Saudi cities.

The first chapter deals with the dynamics andemerging urbanization trends in the Kingdom, and highlights population trends as well as urban growth and how to manage the accelerated urbanization through a set of strategies, studies, specialized programs and operational policies. The second chapter examines the current state of the urban transport situation in Saudi cities and the most important challenges at the environmental, social and economic levels. It also sets a road map towards a sustainable and effective urban transport system with a positive impact on urban development in Saudi cities.

The third chapter looks at how to achieve environmental sustainability and the development of green cities, including new concepts of sustainability and what progress has been made towards environmental sustainability in urban areas. The chapter also reviews the most important challenges and opportunities for achieving environmentally sustainable urban development.

The fourth chapter reviews the economic development and diversity in Saudi cities in terms of economic productivity, with a focus on their potentials as a driving force for achieving comprehensive and sustainable social and economic growth, and on the challenges they face in providing equal opportunities and an urban environment attractive to living, working and stability and how to finance urban development in these cities.

The fifth chapter focuses on the importance of urban governance and transformation management to align with the Kingdom's 2030 vision and Municipal Transformation programs. The report also focuses on the need to pay attention to legislative frameworks and establish an effective urban planning system in Saudi cities.

The sixth chapter examines the strategy for implementing the new urban agenda and what are the most important policies and implementation programs to achieve the best results that are in line with the goals of sustainable development and the Kingdom's 2030 vision.Such a report has been produced for many developed countries such as Australia and some European Union countries. It is considered the first of its kind at the level of Arab countries. In conclusion, we thank all those who participated in preparing this report including the various government agencies, civil society organizations, universities and the United Nations Human Settlements Program. We also thank the specialists of the Deputy Ministry for Town Planning for their efforts in preparing this report.

Ministry of Municipal & Rural Affairs
Deputyship Ministry for Town Planning

About the Future Saudi Cities Programme

The Future Saudi Cities Programme is a joint programme developed by the Saudi Ministry of Munic-ipal and Rural Affairs (MoMRA) and UN-Habitat, implemented in close cooperation with the munici-palities of 17 major Saudi cities. The cities have been selected based on their different population sizes, geographic distribution, and a range of criteria based on capacities and economic potential to create a more balanced urban development among the cities of Saudi Arabia. The chosen cities in-clude Riyadh, Makkah, Jeddah, Taif, Madinah, Tabuk, Dammam, Qatif, Al-Ahsa, Abha, Najran, Jazan, Hael, Arar, Al Baha, Buraidah, and Skaka.

FSCP was advocating for the inclusive approach as one of the drivers of the program where multi stakeholders were informing the planning process and recommendations. Two Saudi Urban Forums were organized as a platform for engagement. Also the program gave the gender and youth a very special and central focus through various initiatives, workshops and campaigns. The program was shown as national successful story in several regional and global events.

The program undertook city-level reviews in the 17 cities, five cities were chosen as a representa-tive cross-section, for in- depth analysis. The city-level profiles considered the linkages between urban and territorial planning by examining the city within the relational context of its sub-region and exploring specific issues at the neighborhood level. These profiles, when referenced with City Prosperity Index reports and validation processes in the Rapid Planning Studio workshops, were used to extrapolate strong, evidence-based conclusions that relate to the planning system. Applied research, with a strong focus on action-oriented conclusions, was used to collect evidence to diag-nose the strengths and weaknesses of the planning system and local planning practices in each city. The methodology utilized design tests and demonstration projects as avenues to apply and analyses potential solutions, before concluding on policy recommendations that guided for the future of urban planning process of Saudi cities.

The Programme has applied several capacity building methods targeting MOMRA, Amanat National Ministries and Agencies as well as Academia and NGOs on many topics related to the planning re-forms to achieve New Urban Agenda, SDG's Goal 11 as well as urban dimensions of both Saudi Vi-sion 2030 and National Transformation Program.

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List of acronyms and abbreviations

BRT	Bus Rapid Transit
CEDA	Council of Economic and Development Affairs
CO	Carbon Monoxide
CO2	Carbon Dioxide
CPI	City Prosperity Index
DMA	Dammam Metropolitan Area
GAMEP	General Authority of Meteorology and Environmental Protection
GASTAT	General Authority of Statistics
GASTAT	General Authority of Statistics
GCC	Gulf Cooperation Council
GHG	Greenhouse Gas
ICZM	Integrated Coastal Zone Management
INDC	Intended Nationally Determined Contribution
ITS	Intelligent Transport System
IWRM	Integrated Water Resources Management
KACST	King Abdulaziz City for Science and Technology
LRT	Light Rail Transit
MEIMR	Ministry of Energy Industry and Mineral Resources
MENA	Middle East and North Africa
MEWA	Ministry of Environment, Water and Agriculture
MoCI	Ministry of Commerce and Industry
MoEP	Ministry of Economy and Planning
MoF	Ministry of Finance
MoH	Ministry of Housing
MoI	Ministry of Interior
MoMRA	Ministry of Municipal and Rural Affairs
MoT	Ministry of Transport
$MtCO_2e$	Million Tonnes 0f CO_2-Equvalent
NOX	Nitrogen Oxides
NSS	National Spatial Strategy
NTP	National Transformation Program
NUA	New Urban Agenda
NWC	National Water Company
OECD	Organisation for Economic Co-operation and Development
PM_{10}	Particulate Matter 10 Micrometers or Less in Diameter
$PM_{2.5}$	Particulate Matter 2.5 Micrometers or Less in Diameter
PME	Presidency of Metrology and Environment
PPP	Public-Private Partnership
RCJY	Royal Commission for Jubail and Yanbu
REITs	Real Estate Investment Funds
RERC	Real Estate Refinance Company
ROPME	Regional Organization for the Protection of the Marine Environment
SABIC	Saudi Basic Industries Corporation
SAGIA	Saudi Arabian Ministry of Investment
SAMA	Saudi Arabian Monetary Authority
SAPTCO	Saudi Arabian Public Transport Company
SAR	Saudi Arabian Riyal
SDGs	Sustainable Development Goals
SO2	Sulphur Dioxide
SWCC	Saline Water Conversion Corporation
UNFCCC	United Nation Framework Convention on Climate Change
US$	US Dollar
WHO	World Health Organization

View of the Corniche area, Dammam, Saudi Arabia

CHAPTER 1

Emerging urban trends in Saudi Arabia

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Today, more than half of humanity–3.5 billion people–lives in cities. By 2030, almost 60 per cent of the world's population will be urban dwellers. About 95 per cent of future urban growth will take place in the developing world.[1] This rapid urbanization poses environmental, social and economic challenges and adversely affects rural-urban interactions. The adoption by the international community of the Sustainable Development Goals—especially Goal 11: to make cities and human settlements safe, inclusive, resilient, and sustainable—and the New Urban Agenda (NUA) in October 2016 is a clear indication of the need to tackle current and emerging urban challenges, and to place urbanization at the forefront of international development policy.

This recognition goes beyond viewing urbanization simply as a demographic phenomenon; rather it is seen as a transformative process capable of galvanizing momentum for many aspects of global development.[2] The endorsement of the urban goal and NUA is an appreciation of the role that cities can play in achieving sustainable development. Very often, we are reminded that the battle for sustainable development will be won or lost in cities.[3] Cities are perceived to embody a framework—that is flexible, creative, and operational—to deal pragmatically and efficiently with regional and global challenges.[4] The NUA, which is in response to the persistent and emerging challenges of urbanization, seeks to chart the course and provide an action-oriented roadmap to guide sustainable urban development globally over the next 20 years.

In many respects, the NUA represents a paradigm shift[5] that will:

i. Readdress the way cities and human settlements are planned, financed, developed, governed and managed, while recognizing sustainable urban and territorial development as essential to the achievement of sustainable development and prosperity for all.

ii. Recognize the leading role of national governments, as appropriate, in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the equally important contributions of subnational and local administrations, as well as civil society and other relevant stakeholders, in a transparent and accountable manner.

iii. Adopt sustainable, people-centred, age- and gender-responsive and integrated approaches to urban and territorial development by implementing policies, strategies, capacity development and actions at all levels.

Saudi Arabia has witnessed remarkable urban growth during the last 50 years, moving from a nomad rural society towards one that is urban one. Saudi urban growth has been unprecedented, in scale and speed, since the unification of the kingdom in 1932. The nation's level of urbanization has increased from only 21 per cent in 1950 to 83 per cent in 2015; and is expected to reach 90 per cent in 2050. Correspondingly, its urban population has increased from 665,000 to 26 million during the same period.[6]

Saudi's level of urbanization has increased from 21 per cent in 1950 to 83 per cent in 2015

Being cognizant of the transformative nature and benefits of planned urbanization, an overarching goal of the *Saudi Vision 2030* is to have three Saudi cities within the top-ranked 100 cities in the world.[7] This in part will be achieved by providing a good quality of life and an attractive living environment, by developing the cities and achieving environmental sustainability. Box 1.1 provides an overview of the perspective of cities in Vision 2030. To build the institutional capacity and capabilities needed to achieve this Vision and its other ambitious goals, the *National Transformation Program 2020* was launched across 24 government bodies operating in the economic and development sectors in its first year.[8]

This chapter examines the nature of the emerging urban trends in Saudi Arabia and their associated challenges. The chapter is in two parts; the emerging trends of urban change in Saudi Arabia are examined in the first, while the impacts, challenges and opportunities of these urban trends are explored in the second.

CHAPTER 1

Part One Urban trends in Saudi Arabia

In this section, emerging trends of urban change are classified into demographic and urban change trend categories. The nature, extent, and possible impacts of these emerging urban change trends will be examined.

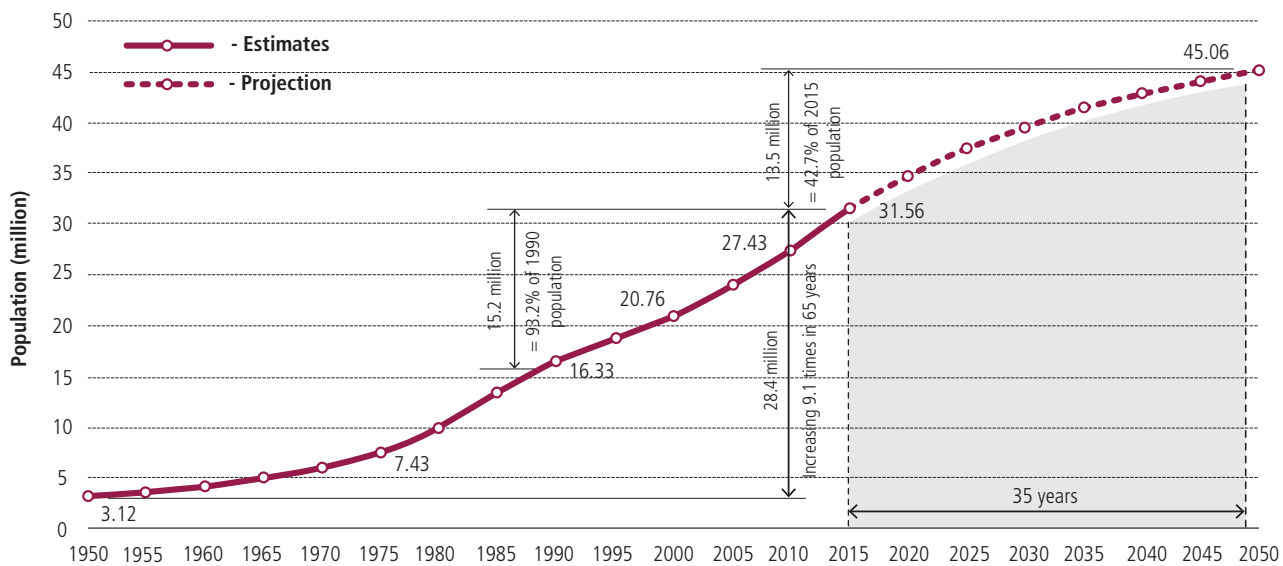
1.1 Demographic trends

During the last 50 years, Saudi Arabia has undergone significant demographic changes that have had a considerable impact on its urban development. Three main demographic trends of change have been identified: (1) a rapid and massive population growth; (2) an aging population and the increasing ratio of youth and working-age populations; and (3) an imbalanced regional distribution of the population.

1.1.1 Rapid and massive population growth

Saudi Arabia is among countries with the highest population growth rates in the world.[9] Annual population growth in Saudi Arabia was 2.5 per cent in 2015. Its total population has doubled over the last two and a half decades; increasing from 16 million people in 1990 to about 32 million (see Figure 1.1). At the current growth rate, it is projected that the population will reach 45 million by 2050; implying a population increase of about 13.5 million from the 2015 levels.[10]

Figure 1.1: Population growth in Saudi Arabia, 1950–2050



Source: United Nations, 2017a.

The Saudi population is expected to peak in 2065 at 46.2 million. Thereafter, it is expected to decline to 44 million in 2100.[11] Population growth in Saudi Arabia is driven mainly by the rapid economic growth from oil revenue, which has facilitated massive investment in health, education and infrastructure leading to greater access to improved water sanitation and quality of life. These improvements led to a decline in death rates from 20.3 per 1,000 in 1960 to 3.5 in 2015. Infant mortality also declined from 70.7 per 1,000 in 1980 to 11.4 in 2015. Similarly, life expectancy increased from 45.6 years in 1960 to 74.4 years in 2015.[12] This has also led to the massive inflow of international migrants. The number of international migrants in Saudi Arabia has increased from 63,300 in 1960[13] to 12.14 million in 2017, which is 192 times its value in 1960.[14]

A key challenge is that the kingdom must provide sufficient infrastructure, jobs, housing and basic services for about half of its current population in the next 35 years. Vision 2030 responds to these and other challenges. The vision is built around three themes: a vibrant society; a thriving economy; and an ambitious nation.[15] This first theme is crucial for laying a strong foundation for economic prosperity. The second provides opportunities for all by building an education system aligned with market needs and creating economic opportunities for all. The third is built on an effective, transparent, accountable, enabling and high-performing government. The vision's outlook for Saudi cities is indicated in Box 1.1. The National Spatial Strategy 2030 is a critical tool for implementing the spatial aspects of Vision 2030.

Box 1.1: Perspective of Saudi Cities in Vision 2030

Our cities have grown significantly in recent decades; a growth which has been accompanied by the steady development of their infrastructure. To ensure we can continue to enhance the quality of life for all and meet the needs and requirements of our citizens, we will continue to ensure high quality services such as water, electricity, public transport and roads are properly provided. Open and landscaped areas will also be developed further, to meet the recreational needs of individuals and families. Our aim is for these cities to contribute in the development of the economy and to attract quality investments as well as local and international talent, all kept in line with our national priorities.

We will partner with the private sector to develop the telecommunications and information technology infrastructure, especially high-speed broadband, expanding its coverage and capacity within and around cities and improving its quality. Our specific goal is to exceed 90 percent housing coverage in densely populated cities and 66 percent in other urban zones.

Our cities already enjoy high levels of security and development. Our cities are among the safest in the world with annual crime rates that are less than 0.8 per 100,000 people, far below the international rate of 7.6. We will maintain our safety and security by supporting ongoing efforts to fight crime, as well as by adopting further measures to ensure traffic safety, reduce traffic accidents and minimize their tragic consequences.

Source: Council of Economic and Development Affairs, KSA, 2016a.

A view of Jeddah Corniche at the edge of the Red Sea, Jeddah, Saudi Arabia © Shutterstock

1.1.2 Changing demographic trends

Saudi Arabia is facing two important demographic trends with considerable urban impacts: the rapidly increasing ratio of the elderly population (65+), coupled with the declining *ratio* of children (0–14 years); and declining ratio of youth (15–24) and working-age population (15–64). The elderly population increased from 2.6 per cent in 1985 to 3.1 per cent in 2015, and it is further expected to increase to 6.6 per cent in 2030 to 16.7 per cent in 2050.[16] This increase in the aging population implies that Saudi cities must meet the needs of the elderly in terms of health, transport and recreation.

Although the proportion of youth population aged between 15 and 24 is relatively high compared with some developed countries, this is declining in Saudi Arabia: from 18.4 per cent in 1950 to 15.5 per cent in 2015 and projected at 11.7 per cent by 2050.[17] This notwithstanding, the youth still represents a large proportion of the Saudi population. The perspectives of Saudi youth on employment are captured in Box 1.2. If well harnessed, the youth population represents a potential force to spur social and economic development.[18] This implies that urban job creation and engaging the youth must feature prominently in the kingdom's youth policy.

There has been an increase in the proportion of the working age population (15-64) especially during the economic boom of the 1970s; from 52 per cent in 1970 to 71 per cent in 2015. This is expected to reach 72 per cent in 2020.[19] However, over time, the share of this working-age group is expected to decline to 67 per cent by 2050 and to 57 per cent by 2100 (see Figure 1.2). This situation is expected to affect growth and sustainability adversely as the country will increasingly be dependent on a foreign workforce. Currently, Saudis account for two-thirds of the total population, but less than half of the labour force.[20] The projected influx of foreign labour in the face of a declining workforce portends opportunities as well as challenges that policy must address.

The trend towards the declining child, youth, and working-age population in Saudi Arabia is due to decreasing fertility rates brought about by sociocultural changes, modernization and education, especially regarding and the role of women. The transition from an agrarian to an urbanized society has meant a reduction in the number of children. Greater access to education and employment have resulted in a decline in fertility and a delay in the onset at which women begin having children. The last three decades has witnessed a remarkable increase in the number of Saudi women with university education. While the Saudi female population increased by 71 per cent from 8.11 million in 1994 to 13.84 million in 2017, the number of women with university education increased from 77,100 in 1994 to 809,100 in 2017 thereby displaying an increase of 950 per cent.[21]

Box 1.2: Youth and employment in Saudi Arabia

Approximately, 400,000 Saudis enter the labour market every year. In 2016, The unemployment rate in the Kingdom was 12.9%, and the global female unemployment rate was 22% in 2015, compared to 33% for Saudi women. Among the 9 million Saudi women who could legally work, only 20 per cent of them were involved in economic activity compared with 78 per cent of Saudi men.

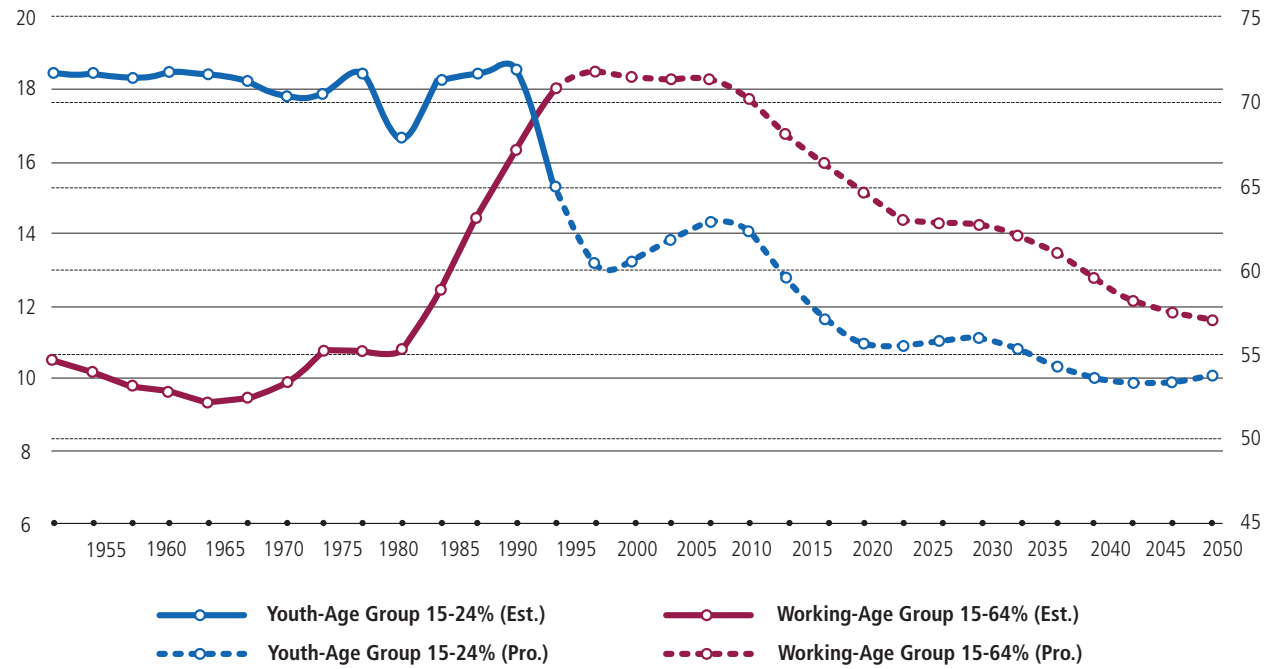
The King Salman Center for Local Governance Social Media survey showed that more than 60 per cent of the respondents believe that it was hard, or even impossible for women to find jobs. Additionally, 13 per cent of women stated that they needed a better transport system to realize their professional goals. Less than 40 per cent of youth and women considered themselves satisfied with their job and about 60 per cent stated that their current income levels made it difficult for them to attain the quality of life they desired.

The Social Media survey, which also examined the public discourse on life in Saudi cities on Twitter, found that 30 per cent of the tweets were from people looking for employment, while 18 per cent complained about the rising unemployment rates, with 11 per cent of the tweets on reasons for unemployment.

An analysis conducted by the International Labor Organization revealed that the percentage of women working in the Kingdom in 1990 was 14.1% and icnreased by the end of 2018 to 22.3%, with an increase of 8.2%, as this percentage represents women who are over the age of 15 years. This increase aligns with the vision of the Kingdom, which It is targeting to increase the percentage of women in the labor market to 30% by 2030. An ongoing efforts to localize jobs was through replacing foreign employees with Saudi employees.

Source: UN-Habitat, 2017a.

Figure 1.2: Percentage of Saudi Arabia's population in youth-age group (15-24) and working-age group (15-64), 1950-2100



Source: United Nations, 2017a.

1.1.3 Regional concentration of population

The regional concentration of population has been a major policy thrust for the government for the past 40 years. Special attention has been given to integrated regional development since the Fifth National Development Plan (1985-1990). The National Spatial Strategy also sought to promote a spatially balanced pattern of population distribution. More recently, the Saudi Vision 2030 and the National Transformation Program 2030 has identified sustainable and integrated development as one of its main objectives.[22] In examining imbalances in the spatial distribution of population in Saudi Arabia, the change in demographic weight of the regions (1992-2017) and increasing population concentration in the Jeddah-Riyadh-Dammam corridor will be addressed.

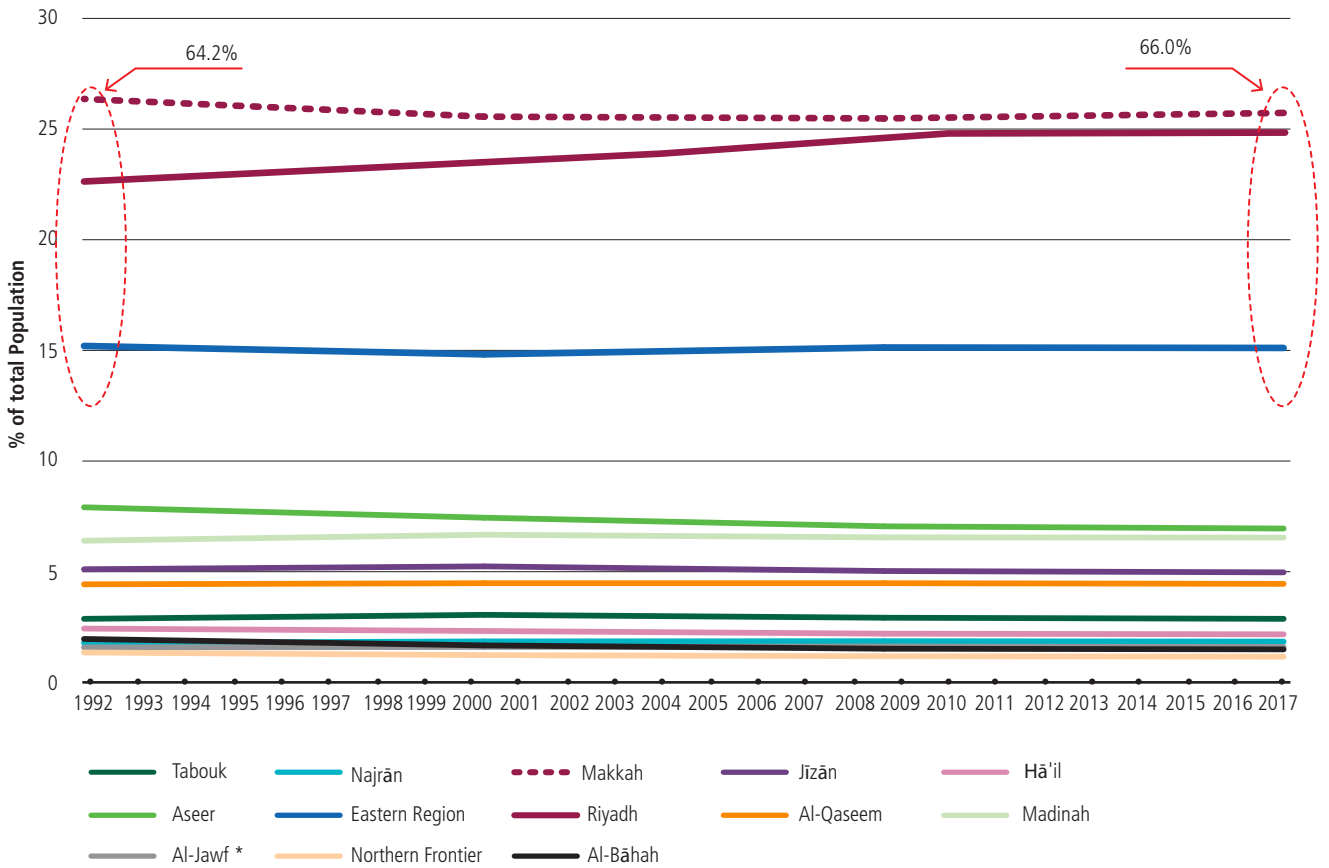
Demographic weight of Saudi regions (1992–2017)

The change in population size and regional share of the total population for the country's 13 regions over the last 25 years (1992–2017) are presented in Table 1.2 and Figure 1.3. Despite the efforts to achieve a more balanced development in the country over the last 25 years, regional population concentration persists. In 1992, there was a high level of population concentration with 26 per cent of total population in Makkah, 23 per cent in Riyadh, and 15 per cent in Eastern Province— accounting for 64 per cent of population. And in 2017, it formed these three regions account for 66% of the Kingdom's population (26% in Makkah, 25% in Riyadh, and 15% in the Eastern Province.

In 2017, three regions accounted for 66 per cent of the kingdom's population (26% in Makkah, 25% in Riyadh, and 15% in Eastern Province)

Most of the increase in population size between 1992 and 2017 has been in the regions of Riyadh, Makkah and Eastern Province. Figure 1.4 shows that these regions have the fastest growing population in Saudi Arabia. Changes in the population of the regions can be primarily attributed to rural-urban migration and international migration, as movement is primarily to the large urban centres owing to higher job opportunities and better services and infrastructure.

Figure 1.3: Change in the demographic weight of Saudi regions, 1992-2017



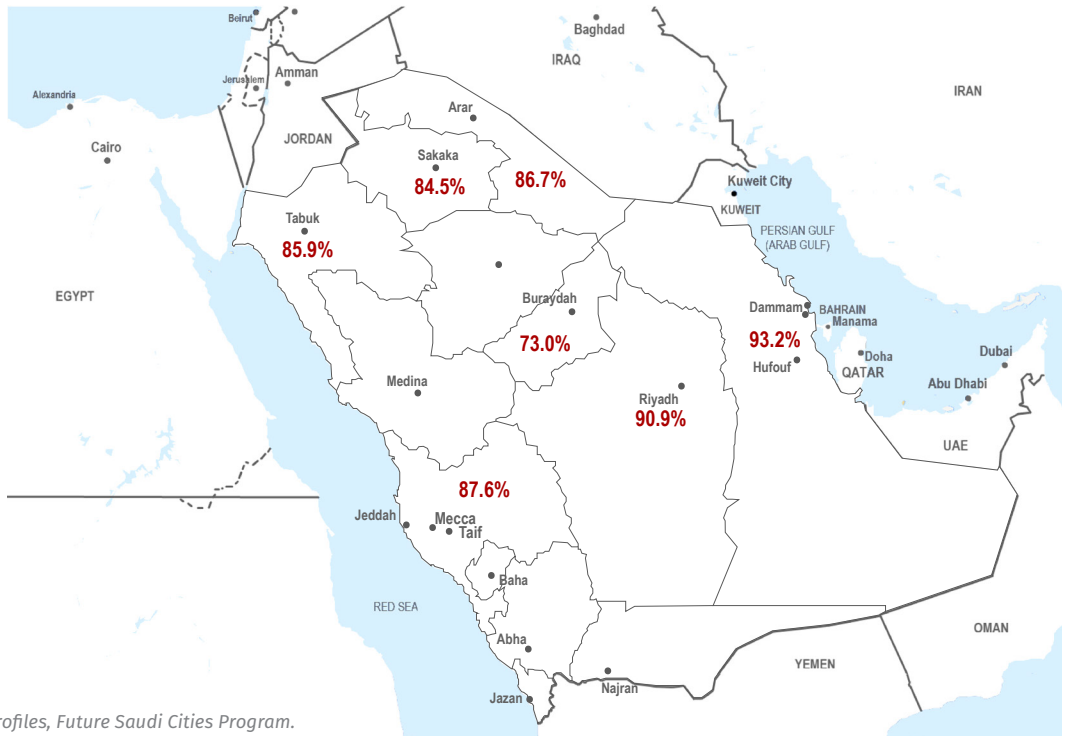
Source: GASTAT, 1992; GASTAT, 2004; GASTAT, 2010.

Between 1992 and 2017, only Riyadh Region witnessed an increase in its regional share of total population (2.5 per cent). The share of the total population in eight regions including Makkah and Eastern province have declined. This in part can be attributed to national and regional development plans that aimed at achieving integrated regional development and provided services and infrastructure in less developed regions.

The regional imbalance in Saudi Arabia is well reflected in the level of urbanization of the various regions as shown in Figure 1.4. The most urbanized regions are Jeddah, Riyadh and Eastern Region with urbanization levels of 88 per cent, 91 per cent and 93 per cent, respectively. On the other hand, Buraydah, the rural centre of Al Qassim Region, is 73 per cent urbanized; and the frontier regions of Tabuk, Al-Jouf and the Northern Region have urbanization levels of between 84 per cent and 86 per cent.

Pepople Passing by the Prophet's Mosque in Medina

Figure 1.4: Regional levels of urbanization in some Saudi Arabia regions



Source: City Profiles, Future Saudi Cities Program.

Jeddah–RiyadhDammam Corridor: Increasing population concentration

Population concentration along the Jeddah-Riyadh–Dammam corridor (the primary road that crosses the country from east to west and includes the cities of Jeddah, Makkah, Riyadh, and Dammam) has been increasing since 1950. The total population along this corridor has increased from 400,000 in 1950 to over 13 million in 2015 (Table 1.1). This corridor's share of the country's population has increased from 12.7 per cent in 1950 to 42 per cent in 2015, thereby growing threefold in the last 65 years. In contrast, the rest of the country's share of the total population declined from 87 per cent in 1950 to 58 per cent in 2015.[23]

The regional concentration of population in Saudi Arabia can be attributed to two main historical economic factors and contextual factors: the nature and evolution of the Saudi urban system; and the highly centralized nature of development policies adopted during the early stages of modern development plans. During the pre-national unification period, most of the population was nomadic; few settlements existed along the early trade and pilgrim routes. Most present-day cities sprang up along these trade and pilgrim routes.[24] Almost all development efforts prior to 1970, were concentrated in the Central, Eastern and Western Regions. In 1970, Saudi Arabia started adopting five-year economic development plans. However, the first two development plans did not have a distinctive regional dimension. Consequently, the Central, Eastern and Western Regions continued gaining the highest shares of development investments.[25]

The regional concentration of population can hinder efforts to achieve integrated regional development, as it increases development disparities among regions. This situation would exacerbate migration and marginalization of the rural and frontier regions. The extant population concentration will make the country less capable of utilizing its huge natural resources in rural and frontier regions.

1.2 Saudi Arabia: A rapidly urbanizing kingdom

With about 83 per cent of its population living in urban areas (Table 1.1), Saudi Arabia is among the most urbanized countries in the world. The high degree of urbanization is no doubt an asset given that vibrant cities constitute a transformative force and a precondition for improving access to services, economic and social opportunities, and a better quality of life for all. While the physical development of

Saudi Arabia has been guided by a spatial strategy, which seeks to achieve integrated development among the regions and promote a spatially balanced distribution of population within the country, the dynamics of urbanization have clearly favoured a few major urban agglomerations that were the prime beneficiaries of the prosperity brought about by oil revenue and economic growth.

The findings from the analysis of the share and volume of urban and rural population in Saudi Arabia since 1950 and their projections till 2050 have implications for achieving sustainable urbanization. Rural population was much higher than urban population in Saudi until 1970. In 1950, the urban population accounted for only one fifth of the total population (see Figure 1.5)

Table 1.1: Saudi Arabia urbanization trends 2015–2035

	2015	2020	2025	2030	2035
Total population	31,557	34,710	37,290	39,480	41,317
Urban population	26,249	29,256	31,843	34,143	36,170
Level of urbanization (%)	83.2	84.3	85.4	86.5	87.5
Five largest urban Agglomerations					
Riyadh	6,218	7,231	7,953	8,547	9,058
Jeddah	4,035	4,610	5,022	5,388	5,710
Makkah	1,796	2,042	2,219	2,379	2,521
Al-Madinah	1,299	1,489	1,625	1,744	1,848
Dammam	1,080	1,253	1,376	1,478	1,566
Total population of the five largest agglomerations	14,428	16,625	18,195	19,536	20,703
Five largest agglomerations as % of urban population	54.97	56.82	57.14	57.22	57.24
Five largest agglomerations as % of total population	45.72	47.90	48.79	49.48	50.12

Source: United Nations, 2018a.

Table 1.2: Saudi Regions: Change in population size and share of total population (1992–-2017)

Saudi Provinces (13)	1992		2004		2010		2017		1992–2017		
	Population	%	Population	%	Population	%	Population	%	Population Increase	Regional Share of Pop. Increase %	Change in Reg. Share of Total Pop. %
Al-Bāḥah	332,157	1.96	377,900	1.67	411,888	1.52	491,900	1.49	159,743	1.00	-0.47
Northern Frontier	229,060	1.35	279,971	1.23	320,524	1.18	383,100	1.16	154,040	0.96	-0.19
Al-Jawf *	268,228	1.58	361,738	1.60	440,009	1.62	528,400	1.60	260,172	1.63	0.02
Madinah	1,084,947	6.40	1,512,724	6.67	1,777,933	6.55	2,154,100	6.54	1,069,153	6.68	0.14
Al-Qaseem	750,979	4.43	1,015,972	4.48	1,215,858	4.48	1,464,800	4.45	713,821	4.46	0.02
Riyadh	3,834,986	22.63	5,458,273	24.07	6,777,146	24.97	8,276,700	25.12	4,441,714	27.76	2.49
Eastern Region	2,575,820	15.20	3,360,031	14.82	4,105,780	15.13	4,977,500	15.11	2,401,680	15.01	-0.09
Aseer	1,340,168	7.91	1,687,939	7.44	1,913,392	7.05	2,288,500	6.95	948,332	5.93	-0.96
Ḥā'il	411,284	2.43	526,882	2.32	597,144	2.20	715,400	2.17	304,116	1.90	-0.26
Jīzān	865,961	5.11	1,187,587	5.24	1,365,110	5.03	1,636,600	4.97	770,639	4.82	-0.14
Makkah	4,467,670	26.36	5,797,184	25.56	6,915,006	25.48	8,479,400	25.73	4,011,730	25.07	-0.63
Najrān	300,994	1.78	420,345	1.85	505,652	1.86	607,100	1.84	306,106	1.91	0.06
Tabouk	486,134	2.87	691,716	3.05	791,535	2.92	946,300	2.87	460,166	2.88	-0.47
Saudi Arabia	16,948,388	100.0	22,678,262	100.0	27,136,977	100.0	32,949,700	100.0	16,001,312	100.00	0.00

** incl. Al-Qura. Note: Population for years 1992, 2004, 2010 census; for 2017, estimate*
Source: GASTAT, 1992; GASTAT, 2004; GASTAT, 2010.

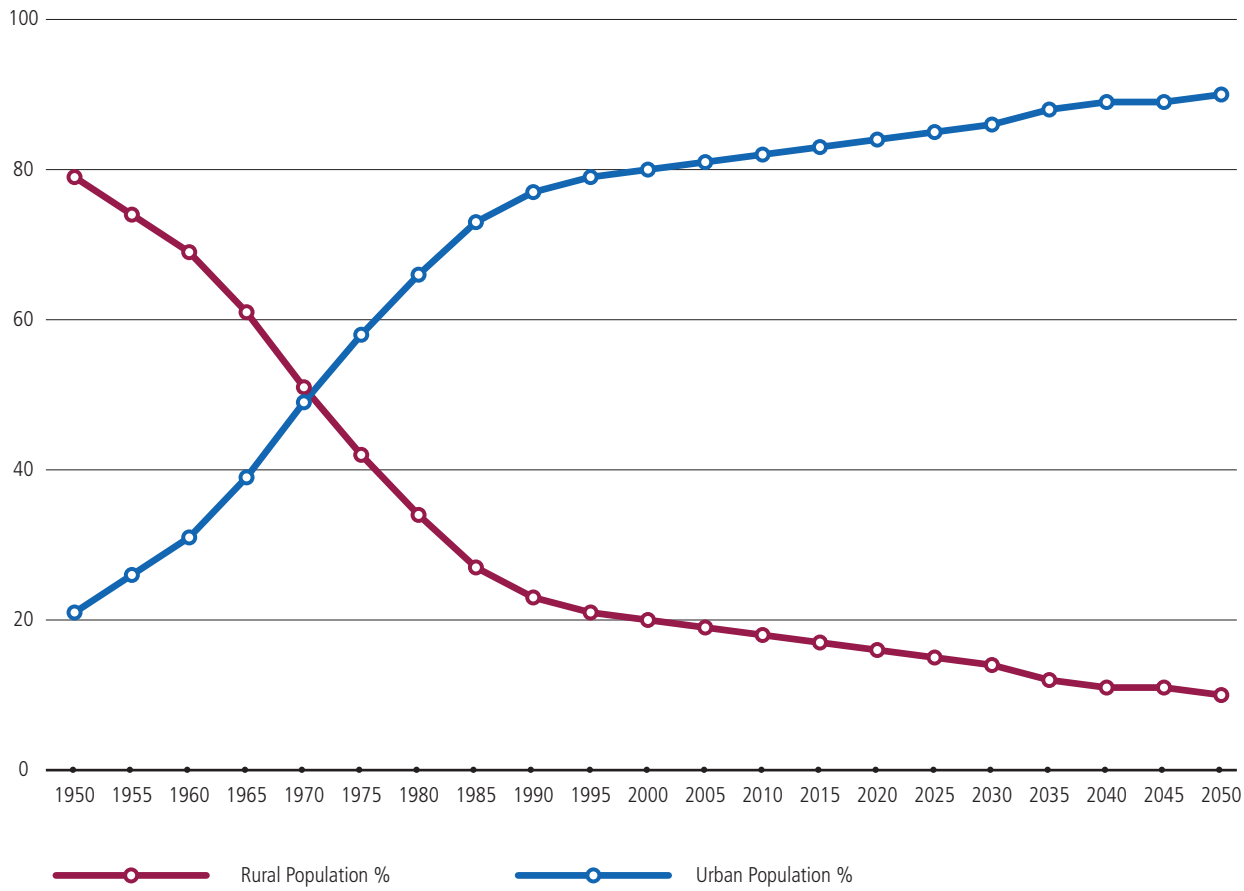
In 1970, Saudi Arabia's urban and rural populations were approximately equal and this marked the tipping point, leading to a transition from being predominantly rural to urban. By 2015, the share of urban and rural population that was prevailing in 1950 has been completely reversed with 83 per cent urban and 17 per cent rural. This trend is expected to continue, with nine out of ten people living in urban areas by 2050 (Figure 1.5).

Between 1950 and 2015, the urban population in Saudi Arabia increased by 25.5 million, which is nearly 40 times its urban population in 1950.[26] By 2050, this is expected to increase by about 14.5 million, which is about half of the country's current urban population. The country's urban transformation over the past 80 years has resulted in an increased number of cities from 58 in 1936 to 285 in 2015. Without effective urban planning, the rapid increase in urbanization would put immense pressure on the urban environment in all cities especially those that are large (see Chapter 3).

Between 1950 and 2015, the urban population in Saudi Arabia increased by 25.5 million, which is nearly 40 times its urban population in 1950

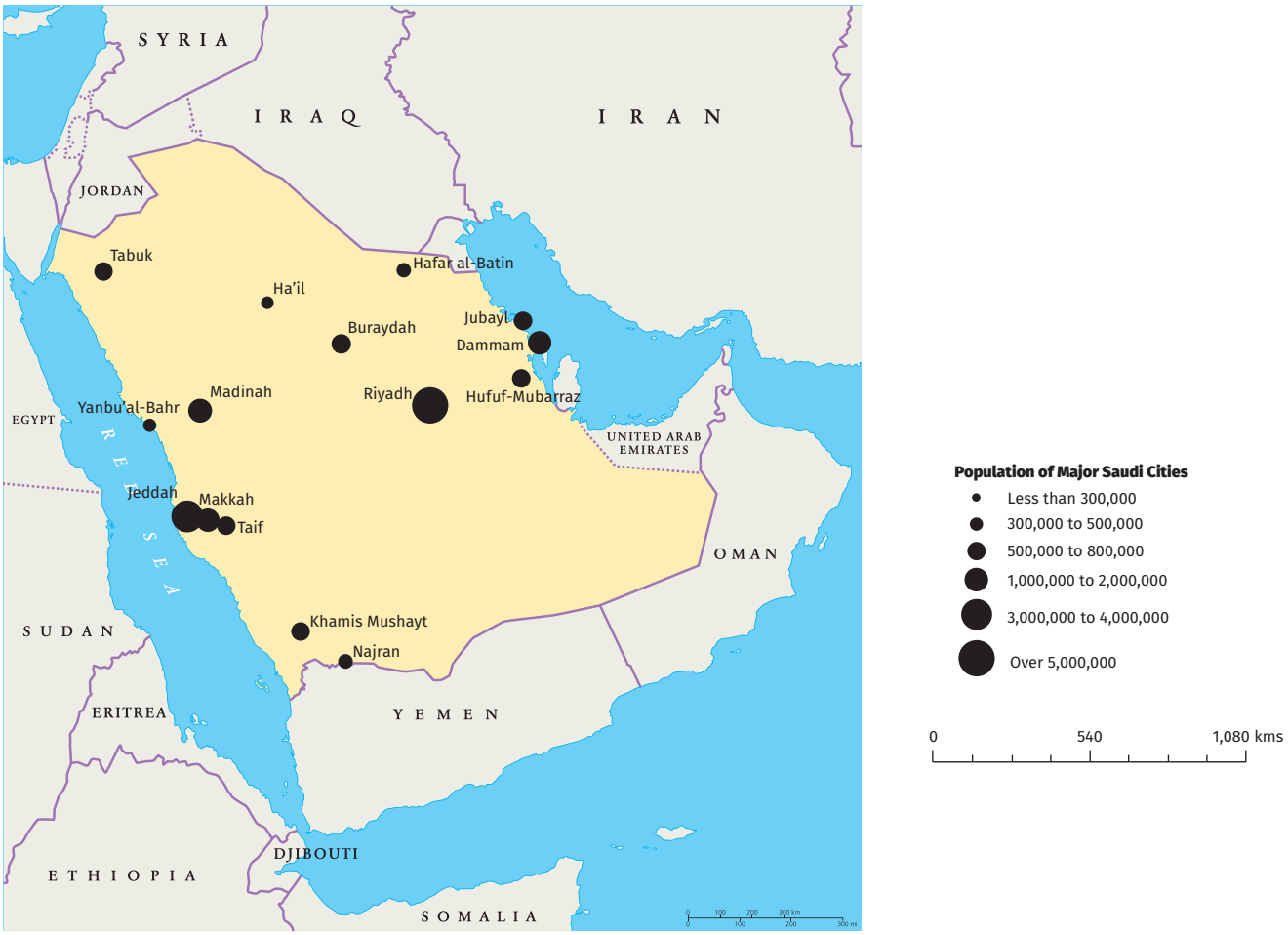
The relevant Saudi authorities must respond proactively to the high levels of urbanization. Effective urban planning within the context of rapid urbanization is a necessity.[27] Rapid urban growth in the absence of adequate planning can result in the proliferation of slums and informal settlements, inadequate water and power supply, exacerbated poverty and degrading environmental conditions, among others.

Figure 1.5: Growth of urban and rural populations in Saudi Arabia during, 1950–2050



Source: United Nations, 2018a.

Figure 1.6: Saudi Arabia: Major urban agglomerations, 2017



Source: United Nations, 2018a.

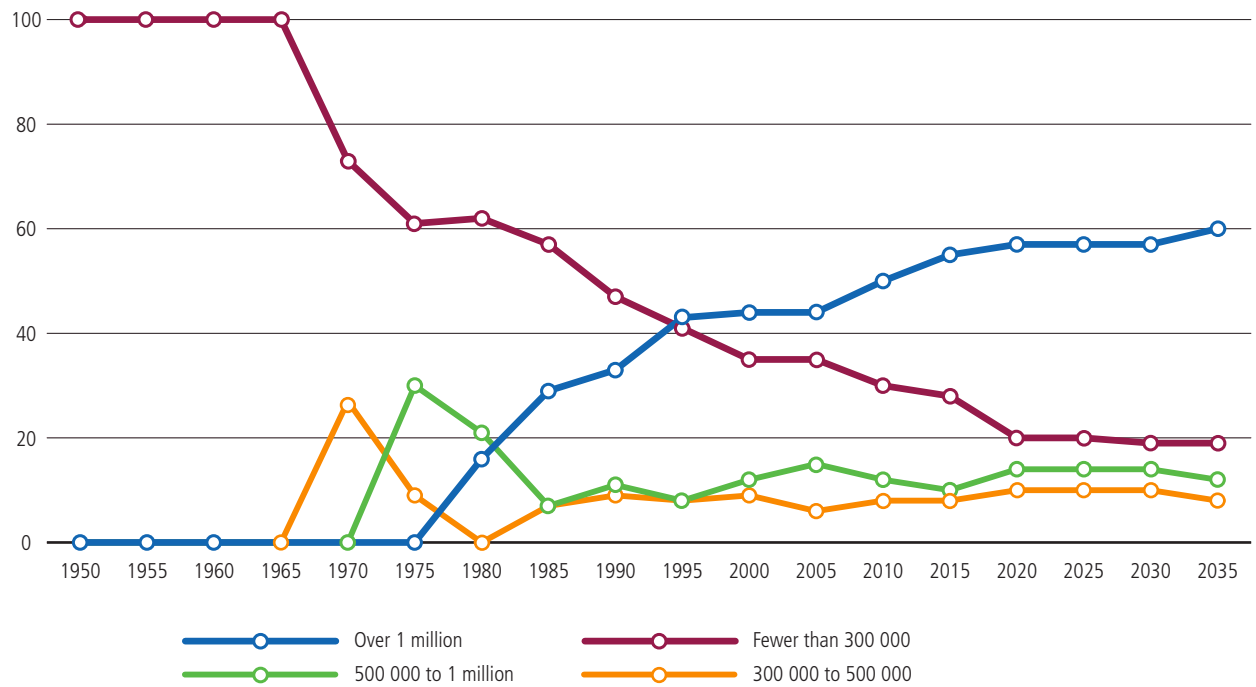
1.2.1 Population concentration in large cities

A distinctive trend in Saudi Arabia urbanization is the concentration of population in large urban agglomerations such as Riyadh, Jeddah, Makkah, Madinah and Dammam (Figure 1.6), which accounts for 55 per cent and 46 per cent of the urban and total population, respectively. Large cities became evident in 1970, when urban populations started exceeding those rural. A greater proportion of the country's urban population continues to be in cities with inhabitants surpassing one million. In 1975, the country did not have any city with more than one million residents; by 2015 more than half of the urban population resided in such cities.

Conversely, there has been a dramatic decline in the proportion of urban population living in cities of fewer than 300,000 inhabitants. In 1965, the entire urban population lived in small-size cities; by 2015 this declined to only one in every four urban dwellers residing in such cities —thus, implying a diminishing role of small-size cities—with a further decline envisaged that will see the less than one-fifth of the urban population dwell in such cities by 2030 (see Figure 1.7).

Another feature of urbanization in Saudi Arabia is the linear distribution of urban settlements along three corridors— the middle Dammam. Passing through Riyadh–Jeddah corridor, the west and east coasts. At least 90 per cent of the of the country's urban population live along these corridors. Recent urban development activities have been along these corridors. The concentration of the urban population along specific corridors and the increase in the size of large cities in the absence of adequate planning will put immense pressure on the provision of adequate of housing, water, sanitation, transport and other key infrastructure necessary for the smooth functioning of cities.

Figure 1.7: Change in urban population shares of different urban settlement size-classes in Saudi Arabia, 1950–2035



Source: United Nations, 2018a.

1.2.2 Urban primacy

Urban primacy is a feature of urbanization in Saudi Arabia, as most of the urban population is concentrated in the capital, Riyadh; the secondary cities of Jeddah and Dammam; and the holy cities of Makkah and Madinah.[28] Urban primacy is an indication of lopsided development and poses complex planning challenges, particularly because of its tendency to contribute to problems such as urban sprawl, congestion and environmental degradation.[29]

Change in the share of urban population of different classes of cities

The change in the share of urban population in different settlement sizes between 1950 and 2015 is presented in Figure 1.8. In 1965, all Saudi cities had fewer than 300,000 inhabitants; by 2015, this class of cities declined to 28 per cent, implying that many cities had increased beyond this threshold. Meanwhile, in 1975, none of the cities had a population greater than one million, but this increased to 55 per cent in 2015. This has been driven mainly by population increase and migration, economic growth, political forces and government policy.[30] Although intermediate or medium-size cities (300,000 to one million residents) experienced rapid increase between 1965 and 1975, their share of total urban population declined from 39 per cent in 1975 to 18 per cent in 2015. This points towards increasing urban primacy and the diminishing role small and intermediate towns and cities.

Population change of different classes of cities

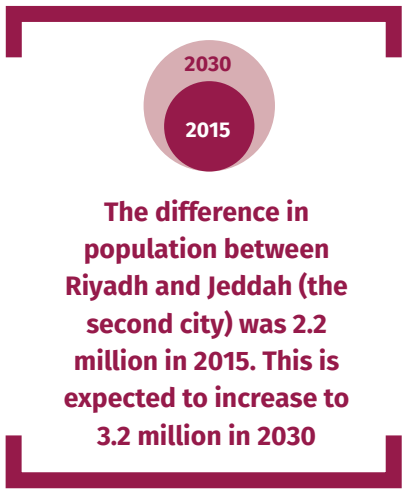
The change in urban population for different settlement size classes in Saudi Arabia between 1950 and 2035 as presented in Figure 1.8 summarizes the following:

- Large cities of more than one million inhabitants are experiencing exceptionally high population increase, from none in 1975 to about 14.4 million in 2015, a span of 40 years. By 2030, 5.1 million inhabitants are expected to be added in this category of cities. Those in this category are Riyadh, Jeddah and Dammam. They have benefitted immensely from the kingdom's oil revenue and provide jobs in the secondary and tertiary sectors, thus, serving as magnets for migration from rural and smaller urban areas, as well as from abroad.

- Medium cities (that is from 300,000 to one million inhabitants) are experiencing an increase in their population, but at a rate considerably lower than that of large cities. By 2030, an additional 3.4 million inhabitants are expected to be added to this class of cities. The The National Spatial Strategy (NSS 2030) clearly recognizes

the importance to the country of its intermediate cities, small towns and village clusters as the building blocks for the development of the regions.[31] Cities in this class include Hufuf-Mubarraz, Taif, Tabuk and Buraydah. The extent to which intermediate cities thrive is essential for the country's strength. The NSS 2030 further notes that regional capitals and intermediate cities will be the main enabler for local development.

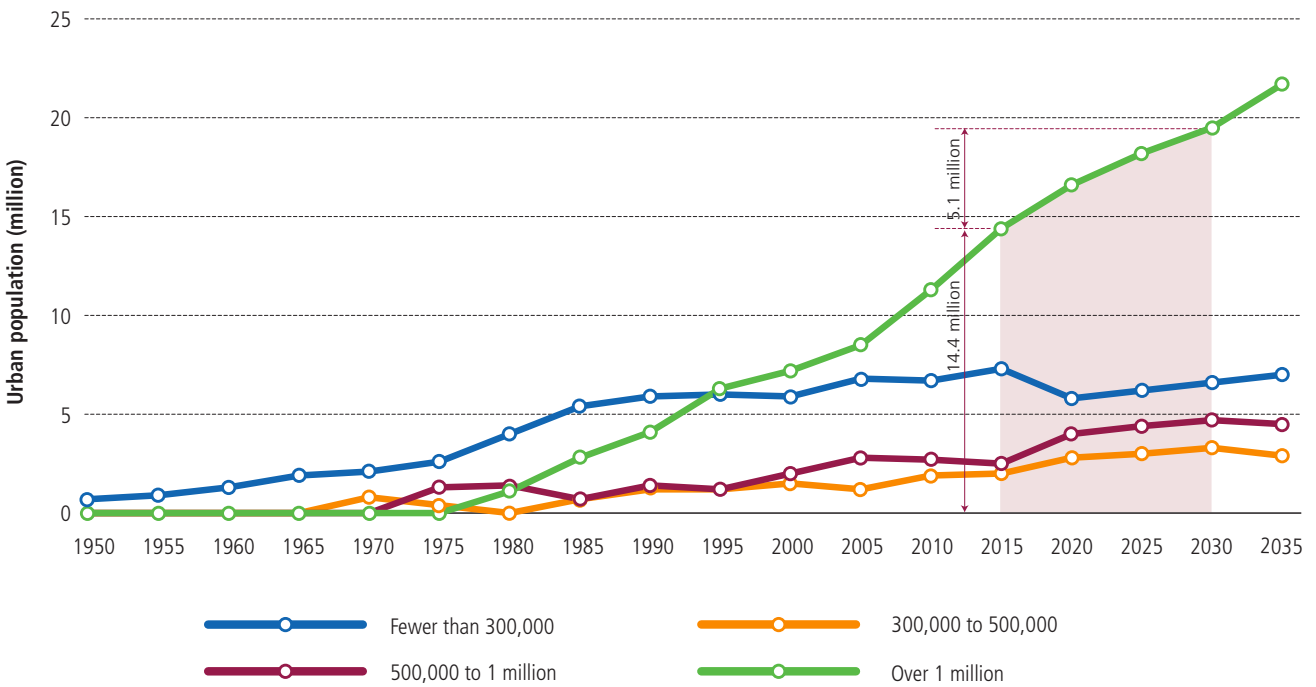
- Small cities (considered as fewer than 300,000 inhabitants) are the only ones that have been declining population since 2005. By 2030, these cities are expected to lose about 642,000 of their 2015 population. Towns in this group include Al Qunfudhah, Ar Rass, Gurayat, Sharurah, Unaizah. To ensure that these town are not left behind in developent, NSS 2030 seeks mobilize investment and establish regional development plans especially in regions with large clusters of small cities and towns such as Al Qasim and Assir.[32] Such development plans will be crucial in fostering economic diversification and competitiveness in small towns and rural areas.



Share of population of the largest city

Another way of examining urban primacy is by the share of the population of the largest city in relation to total urban population. The share of population in the Riyadh Metropolitan Area, which is the largest in Saudi Arabia, increased from 12 per cent in 1960 to 24 per cent in 2015.[33] As the size of Riyadh increases, the difference between its population and that of the smaller cities also increases. The difference in population between of Riyadh and Jeddah (the second city) was 2.2 million in 2015 (see Figure 1.9). This is expected to increase to 3.2 million in 2030. Similarly, the population gap between Jeddah and Makkah (the third city) that was 2.4 million in 2015 is expected to increase to 3 million in 2030.

Figure 1.8: Change in population of different settlement size classes, 1950–2035



Source: United Nations, 2018a.

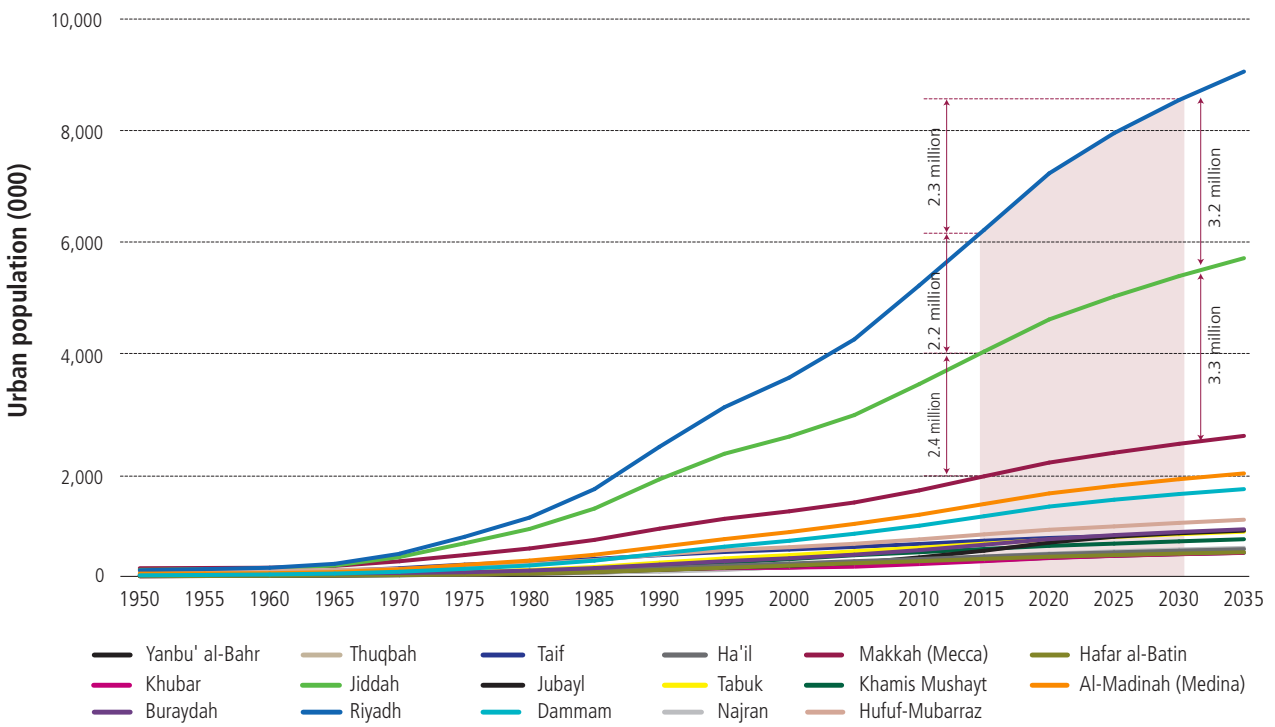
Urban primacy in Saudi Arabia offers a large range of positive externalities in terms better infrastructure and other facilities leading to higher productivity, greater employment opportunities and improved quality of life. However, the primacy has also led to the neglect of its frontier regions, and the failure to take advantage of, and harness the natural resources of these regions.[34] This has resulted in remarkable regional imbalance in country's development, with a disproportionate concentration of resources and urban population in large urban centres, especially Riyadh and Jeddah. Increasing regional disparities further increases migration to these large cities, which results in further deterioration of the frontier cities.[35]

Riyadh owes its prominence to its status as the capital city and has, therefore, received considerable local and foreign direct investment, high quality infrastructure, urban planning and development projects, and the influx of foreign labour. All of these factors have contributed to reinforcing Riyadh's dominant position in Saudi Arabia's system of settlements (see Table 1.3), making it The fifth largest city in the Middle East in terms of area.[36]

Increasing levels of urban primacy further marginalizes intermediate and small-size cities in the national development process, perpetuates inequality and weakens the stability of national urban systems.[37] In Saudi Arabia, urban primacy is the outcome of increasing volumes of urban population and the spatial concentration of such increase; economic growth; the lopsided policy of investing in specific urban areas at the expense of those that are intermediate cities, small towns and frontier regions; rural-urban transformation; international migration; population growth from rural-urban migration.

The foregoing clearly reveals that the large cities in Saudi Arabia are growing larger and faster. This raises the concern about the impacts of such unsustainable growth, especially within the context of ineffective urban planning. Among such impacts are the imbalance in regional and national urban systems, which hinder efforts in achieving integrated development. The increase in the size of large cities engenders low-density suburbanization, which is facilitated by dependence on private car ownership (see Chapter 2) that is energy-intensive and contributes dangerously to climate change and accompanied by environmental pollution (see Chapter 3). Furthermore, managing large cities is often beyond the capacity of local authorities (Chapter 5).

Figure 1.9: Change in population of Saudi cities of over 300,000 inhabitants, 1950–2035



Source: United Nations, 2018a.

View of the city of Riyadh

Table 1.3: Ranking of urban agglomerations in Saudi Arabia

Urban Agglomeration (000)	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Riyadh (1)	6,218	6,440	6,669	6,907	7,071	7,231	7,388	7,538	7,682	7,821	7,953
Jeddah (2)	4,035	4,163	4,296	4,433	4,522	4,610	4,697	4,781	4,863	4,943	5,022
Makkah (3)	1,796	1,851	1,908	1,967	2,005	2,042	2,079	2,115	2,150	2,185	2,219
Madinah (4)	1,299	1,341	1,385	1,430	1,459	1,489	1,518	1,545	1,573	1,599	1,625
Dammam (5)	1,080	1,118	1,157	1,197	1,225	1,253	1,279	1,305	1,329	1,353	1,376
Hufuf-Mubarraz (6)	754	773	793	813	825	837	848	860	872	885	897
Taif (7)	640	652	665	677	683	689	695	702	709	717	726
Tabuk (8)	588	604	621	637	647	657	667	677	687	697	707
Buraydah (9)	568	590	612	636	652	669	685	700	714	728	741
Khamis Mushayt (10)	492	505	518	532	540	548	556	564	572	580	588
Jubayl (11)	461	490	520	552	579	606	631	655	676	695	712
Ha'il (12)	358	368	378	388	394	400	407	413	419	425	431
Najran (13)	355	367	380	393	402	410	419	427	435	442	450
Hafar al-Batin (14)	314	323	332	342	348	353	359	365	370	376	382
Thuqbah (15)	290	302	314	326	335	344	352	360	367	375	381
Yanbu' al-Bahr (16)	284	295	306	318	327	335	343	351	358	365	371
Khubar (17)	273	285	297	310	320	329	338	347	355	362	369

Source: United Nations, 2018a.

CHAPTER 1

Challenges of emerging urban trends in Saudi Arabia

The challenges arising from the urban trends identified earlier are discussed in this section. These challenges can be classified into four groups: imbalanced development; unsustainable consumption patterns; urban growth management; and urban governance. Though discussed individually, these challenges are often interrelated. The scale and impacts of these challenges will be examined at national, regional, and local levels and the recommendations for meeting these challenges will be highlighted.

1.3 Imbalanced development challenges

Development challenges discussed here emanate mainly from imbalanced distribution total and urban population. They include declining development reach and the declining role of the rural economy.

1.3.1 Declining development reach

Development reach measures the degree to which progressive human activities arrive at urban and rural locales or at target areas. Spreading development is a major goal of Saudi Arabia. However, the rate at which this is being attained in the most isolated parts of the country has been declining even with the high population growth of the last 50 years.

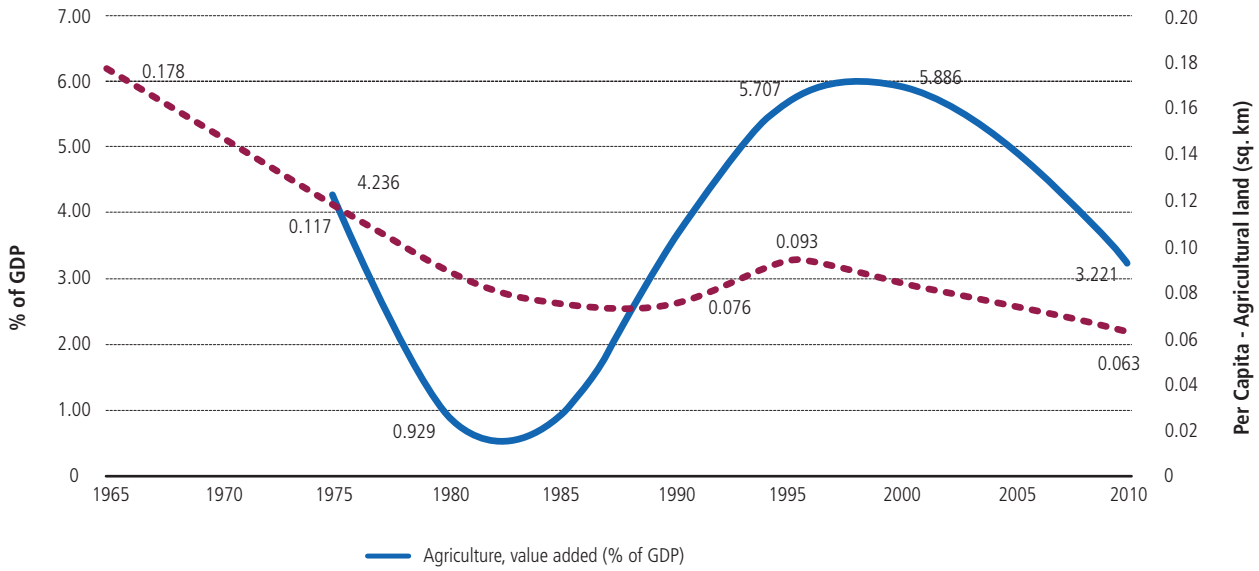
Development reach is measured by the per capita share of the total urban and rural developed areas. Saudi Arabia's Decreasing level of this reach is due to reduction of the rural population, and the concentration of urban ones in a few large cities. The per capita share of total development area, urban and rural, is declining: from 11.9 ha in 1990 to 7.1 in 2010; losing more than 40 per cent of its share in 1990.[38]

Regarding declining development reach due to the increasing concentration of urban population in a few large cities, over half of the Kingdom's urban population (14.4 million population) in 2015 was concentrated in only five cities— each of over -one-million inhabitants— referred to as Growth Centres in the NSS[39] (see Table 1.1). One of the reasons for the inefficiency of the Growth Centre approach lies in the convergence between functional and administrative classification of cities.[40] In this regard, small towns are more effective than large cities in spreading development over wider areas of rural surroundings and in minimizing regional disparities. Indeed, the NSS 2030 views small towns are the main enablers of local development.[41]

1.3.2 Declining role of rural economy

Rapid urbanization is attributed mainly to drift of rural populations. Correspondingly, the national share of rural economy has declined significantly. This has led to many adverse impacts, such as the decline in per capita of agricultural area and a reduction in the contribution of agriculture to the Saudi gross domestic product. Agricultural area per capita has declined from 0.18km^2 in 1965 to 0.063 km^2 in 2010. Despite the rapid increase in the share of agriculture to the national economy between 1985 and 2000, this declined sharply from 5.9 per cent in 2000 to 2.6 per cent in 2015 (Figure 1.10). Arable land reduced by almost 15 per cent between 2003 and 2013:

Figure 1.10: Declining role of rural economy in Saudi Arabia, 1960--2015



dropping from 3.6 million to 3 million hectares. In 2012, arable land represented just 1.5 per cent of the total land of Saudi Arabia.[42]

Another attribute of the declining rural economy is the reduction in the per capita production of commodities such as cereals and fisheries. While the total production of both commodities increased during last 50 years, their per capita share has declined in recent times. Cereal production per capita increased from 27.3 kg in 1980 to 253.4 kg in 1990 but has declined sharply to 57.1kg in 2010.[43] Similarly, and despite having 2,640 km of the kingdom's coast on the Arabian Gulf and the Red Sea, the per capita share of fisheries production in Saudi Arabia declined from 3.8 kg in 1965 to 3.1 kg in 2015.[44] The declining role of the rural economy widens the development gap between rural and urban regions, and further aggravates urban concentration.

1.4 The need for "new" urban areas

Saudi Arabia's urban population is expected to reach 45 million by 2050. To respond to this increase in a sustainable manner, densification of vacant lands rather than city extensions should be given the highest priority. Innovative urban planning solutions in the form of urban consolidation and compact development will be required given the existence of vast vacant land in many cities. Expanding the urban limits of cities is the main urban growth management policy adopted in virtually all large Saudi cities. City expansion of this nature produces large contiguous urban masses, which are unsustainable in many respects and present a major challenge to urban planning.

Table 1.4 shows that the proportion of vacant land within the boundaries of Saudi cities varies between 46 per cent in Dammam and 90 per cent in Ha'il. In the case of Riyadh, vacant land accounts for between 46 per cent and 60 per cent of the city's entire land plots.[45] Such vacant land exists in the form of white land urban plots (see Chapter 4) often complete with roads, water supply and street lights that lie vacant because their owners have no incentive to develop them or for speculative purposes.[46]

...planned city infills which feature prominently in the NUA offer useful tools for implementing urban consolidation and densification programmes...

A crucial question relates to ways in which the relevant authorities plan to deal with the expected increase in urbanization within the context of the country's huge swaths of vacant city land. Findings from the Saudi city profiles provide valuable insights. For instance, analysis for the Ha'il City Area shows

that developing its vacant land in line with UN-Habitat density standards of 150 persons per hectare (pp/ha), will allow the city to accommodate an additional 682,800 inhabitants.[47] In the case of Dammam, with 46 per cent vacant land, and growth rate of 3 per cent, it will take more than 60 years to fill the metropolitan boundary at the recommended density of 150 pp/ha. In the case of Buraydah, approximately 81 per cent of its total area is vacant. The city profile analysis shows that it will take more than 100 years to fill it up at its current growth rate of 3.4 per cent using the recommended UN-Habitat density.[48]

Table 1.4: Vacant land in selected Saudi cities

City	Vacant land (%)	
	Within Urban Growth Boundaries	Within the built-up area
Arar	65	31
Buraydah	68	37
Dammam	46	48
Ha'il	90	55
Jeddah	61	N/A
Madinah	41	12
Sakaka	64	N/A
Tabuk	71	36

Source: City Profiles, Future Saudi Cities Program.

From the foregoing, planned city infills which feature prominently in the NUA offer useful tools for implementing urban consolidation and densification programmes for the sustainable utilization of the vacant land in Saudi cities (see Chapter 6). This is particularly important in a context where urban growth in Saudi Arabia has occurred in the context of ineffective urban planning.[49] Planned city infills can respond to future urban growth in an orderly manner; if not, cities will continue to expand through inefficient land use patterns and longer commuting with correspondingly higher energy consumption. Planned city infills can prevent the leap-frogging over vast areas that generate wasteful and speculative areas, as is currently the case with the white lands in Saudi cities (see Chapter 4). Planned city infills can serve as effective remedies in cities with fragmented spaces with an urban fabric that is made of disconnected patches. Infills also work well for large areas of vacant land, especially in cities with low densities, poor connectivity and inefficient use of existing infrastructure.

1.5 Unsustainable Patterns of Urban Consumption

Rapid urbanization in Saudi Arabia, especially within the context of ineffective or poor urban planning has created many challenges for government departments. At the local level, the challenges relate to extensive sprawl, the unsustainable consumption of natural resources, and rising demand for infrastructure and services.

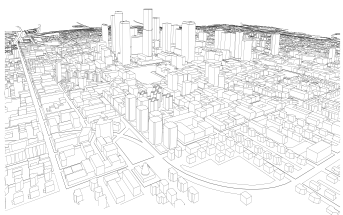
1.5.1 Unsustainable consumption of urban land — urban sprawl

In addition to the numerous problems of urban sprawl, consumption of urban land in the form of sprawl is one of the most common and severe problems in all Saudi urban areas. Despite the rapid population growth rate in these cities, the physical extent of urban areas is expanding at a faster rate; thereby, implying faster consumption of urban and surrounding land within the nation. Table 1.5 provides an indication of the extent of the spatial expansion of Saudi cities for different periods.

Table 1.5: City and population growth in Saudi Arabia

City	Duration	Number of years	Increase in building mass	Increase in population
Arar	2000 - 2015	15	1.9 x	1.5x
Buraydah	1995 -2015	20	2.2x	2.2x
Dammam	2004 - 2017	13	4.1x	1.9x
Ha'il	2004 -2014	10	3.7x	1.3x
Jeddah	2007 -2017	10	1.6x	1.3x
Madinah	2002 - 2015	13	1.5x	1.2x
Makkah	2003 - 2017	14	1.6x	1.5x
Riyadh*	1990-2014	24	3.2x	2.5x
Sakaka	2001 - 2017	16	1.3x	1.7x
Tabuk	2006 - 2017	11	1.9x	1.5x
Taif	1977 - 2012	35	1.7x	2.8x

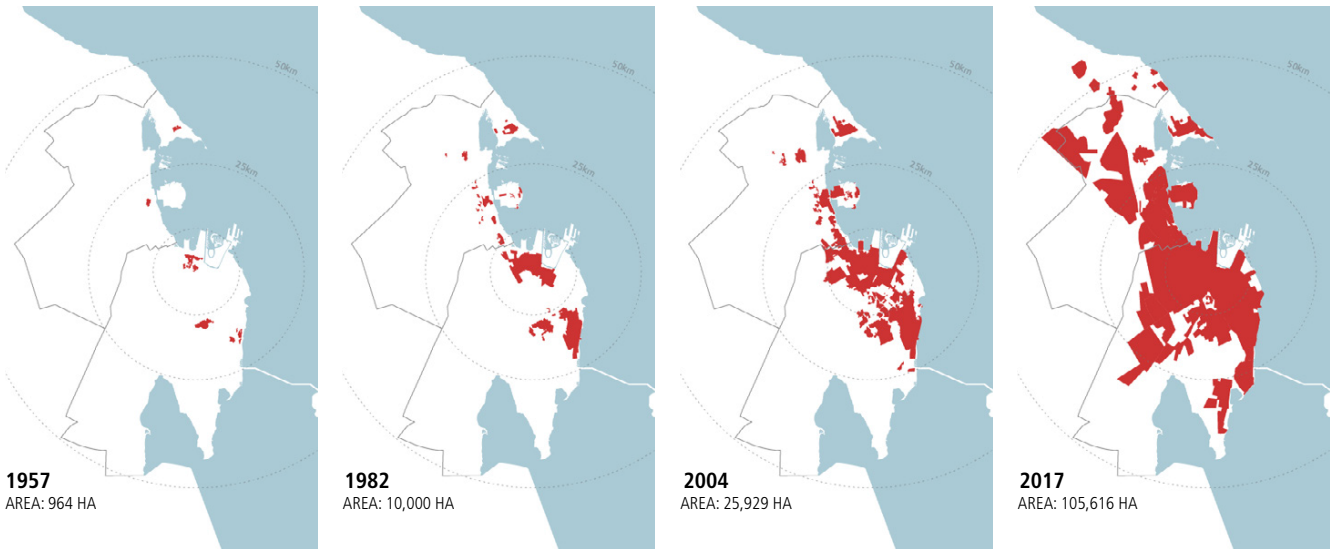
*Source: Estimated from Saudi City Profiles; *Figures for Riyadh refer to built-up area and are derived from urban expansion database of UN-Habitat. Example: Arar, the city's inhabited mass area has increased by 1.9 and a population increase of 1.5*



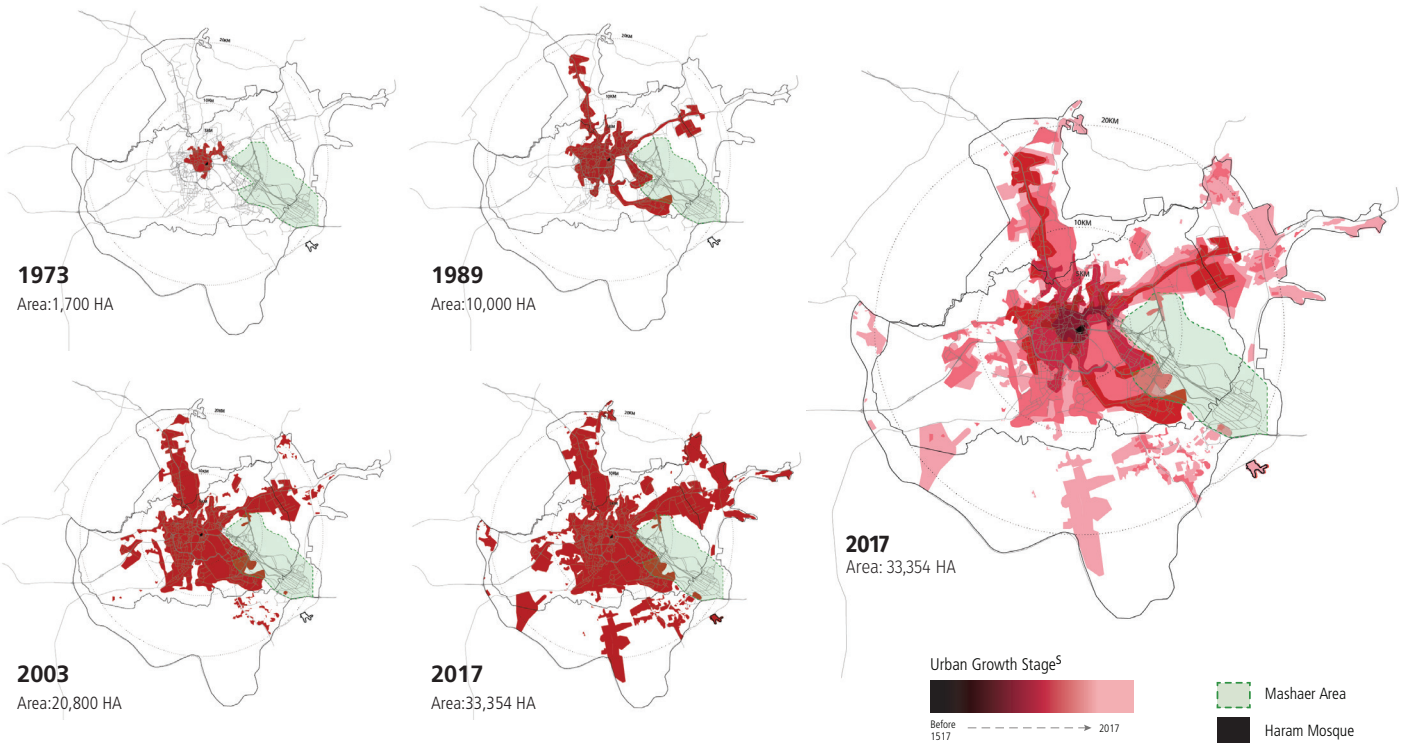
...the physical extent of urban areas is expanding at a faster rate; implying faster consumption of urban and surrounding land within the nation

Figure 1.11: Spatial expansion in selected cities

Dammam

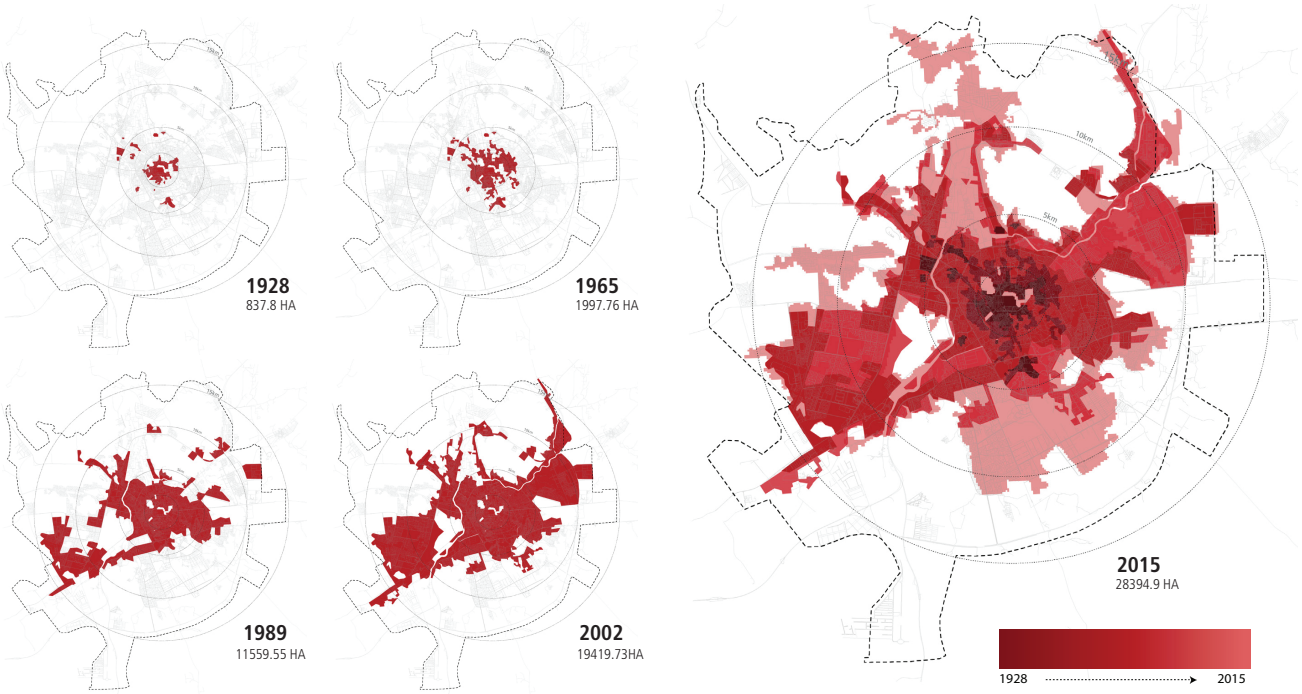


Makkah

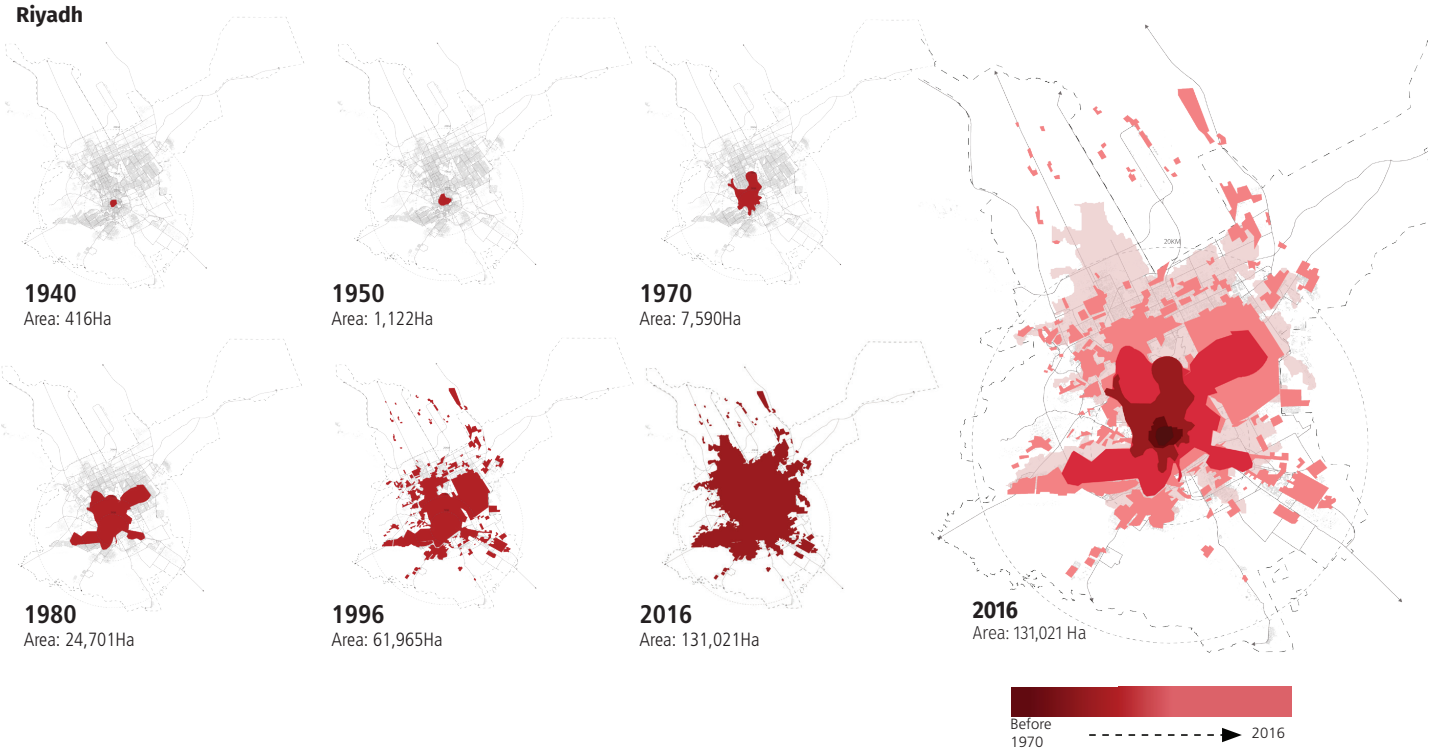


Source: City Profiles, Future Saudi Cities Program.

Madinah

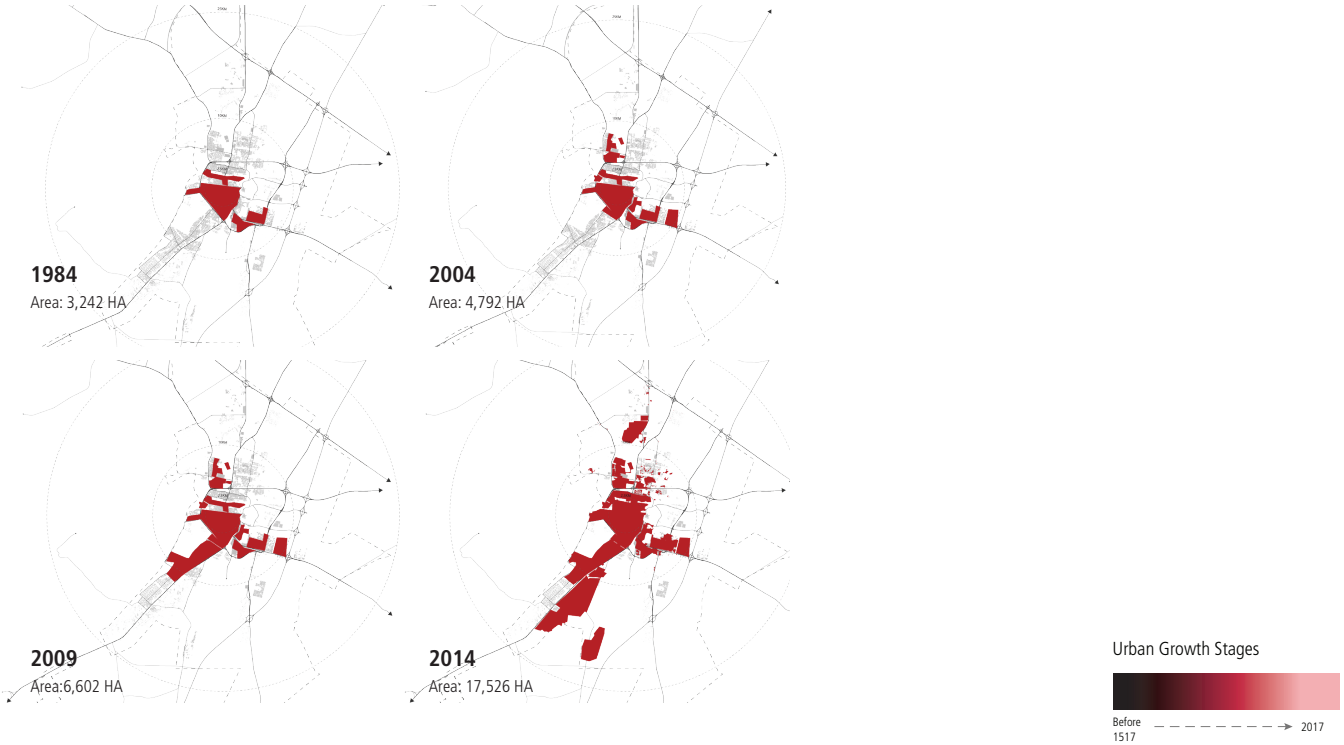


Riyadh



Source: City Profiles, Future Saudi Cities Program.

Ha'il



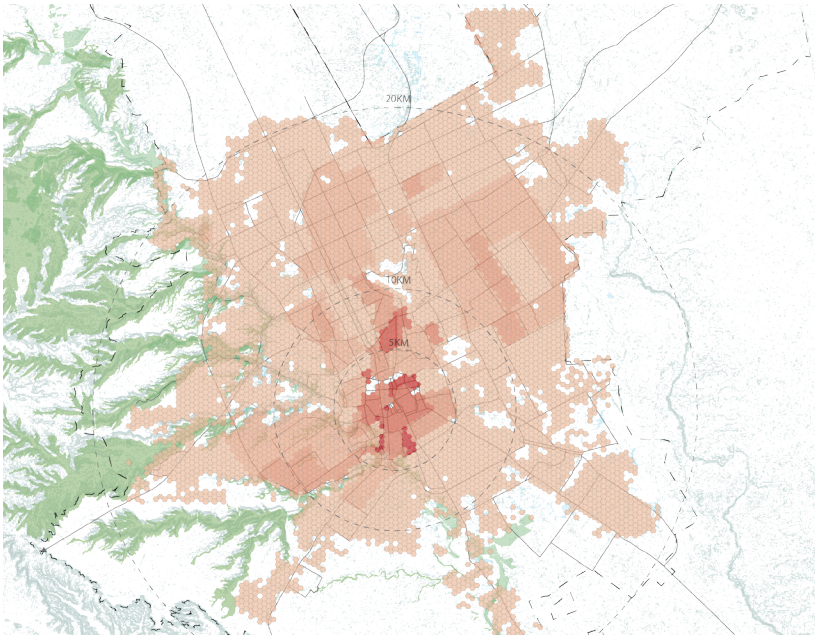
Source: City Profiles, Future Saudi Cities Program.

The most remarkable case is Dammam, which shows that over a period of 13 years from 2004 to 2017, the physical extent of the city grew over four times, while its population grew less than twice. In the case of Riyadh, between 1990 and 2014, its spatial extent grew more than thrice, while its population increased two and a half times. Over the period -1990-2014, Riyadh's built-up area f grew at an average annual rate of 9.4 per cent from 30,305 hectares to 95,861 hectares.[50] Between the periods 1990-2000 and 2000-2013 the city's built-up area increased by 5.0 per cent and 8.5 per cent, respectively.[51] This is a clear indication that Riyadh is sprawling rapidly. The sprawl of Saudi cities also applies to those that are medium and small in size. For instance, Ha'il which has a population of fewer than 400,000 increased its physical extent over three and a half times over the 10-year period beginning from 2004.

Closely related to the rapid expansion of Saudi cities is low-density development. Overall densities are declining in the major cities (see Figure 1.13). The most recent information on densities for the major Saudi cities are the following: 54.6 p/ha in Jeddah; 70.0 p/ha in Dammam; 47.7 p/ha in Riyadh; 45.9 p/ha in Makkah; and 25.0 p/ha in Madinah. These densities are quite low compared with the that recommended by UN-Habitat (residential density of at least 150 p/ha).[52] In Makkah, population density declined by 50 per cent between 1983 and 2010; in Madinah the density declined by 38 per cent between 2002 and 2012; in Riyadh, the decline was 13 per cent between 1970 and 2015; and in Dammam, it was by 26 per cent between 1972 and 2014.

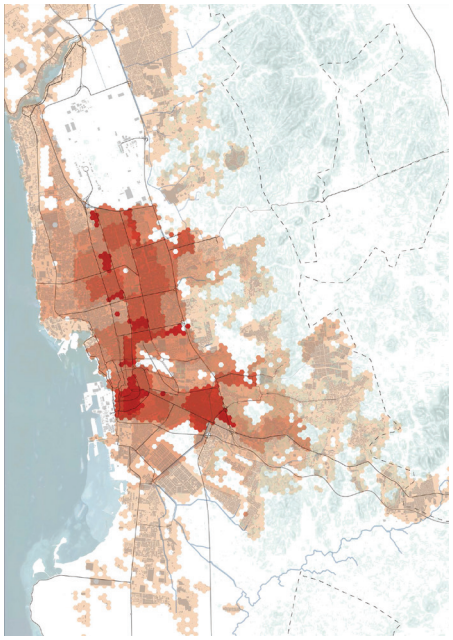
Figure 1.12: Population densities on the built-up areas

Riyadh



1 - 50 inhabit./ha
51 - 100 inhabit./ha
101 - 150 inhabit./ha
151 - 200 inhabit./ha
201 - 250 inhabit./ha
251 - 300 inhabit./ha
301 - 350 inhabit./ha
351 - 400 inhabit./ha
401 - 450 inhabit./ha

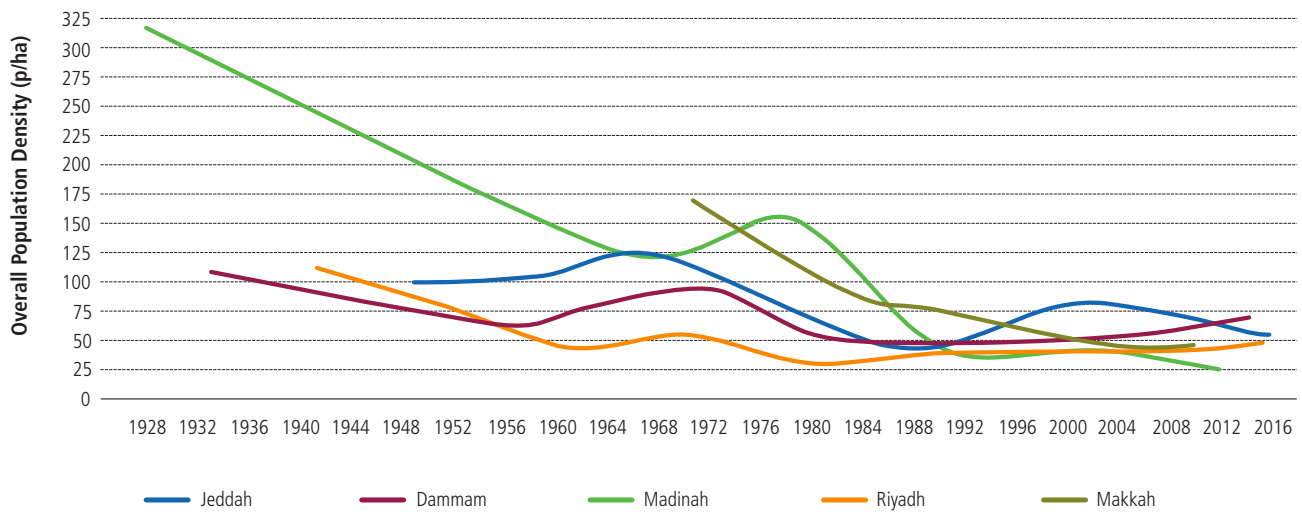
Jeddah



1 - 28 inhabit./ha
29 - 43 inhabit./ha
44 - 70 inhabit./ha
71 - 100 inhabit./ha
101 - 131 inhabit./ha
132 - 191 inhabit./ha
192 - 313 inhabit./ha
314 - 427 inhabit./ha

Source: City Profiles, Future Saudi Cities Program.

Figure 1.13: Urban sprawl and declining overall population density in Saudi metropolitans



Note: Urban areas are calculated based on city plans provided from the urban planning directorates

In Riyadh, expansion of the built-up area occurs through extension, infill and inclusion. Extension that entail the contiguous physical growth at the periphery accounts for 66 per cent of the 50,365 hectares of built-up area was added to the Riyadh urban extent between 2000 and 2013 (see Table 1.6). Infill which consists of development in urbanized open space within the urban extent, on unbuilt parcels adjacent to existing developments, is the second main type of urban expansion in Riyadh. This accounts for 36 per cent and 25 percent, respectively, of the built-up area added to the Riyadh urban extent between 1990-2000 and 2000-2013. Additionally, inclusion consisting of the annexation of rural or urban settlements outside the urban extent, then reclassifying them from rural to urban use accounts for 21 per cent and 9 per cent of the urban expansion occurring in Riyadh in the two periods under consideration (see Table 1.6). Between 1990 and 2013, Riyadh has witnessed a decline in infill as a means of urban expansion and an increase in the expansion of the contiguous physical growth at the periphery. This has resulted in sprawl becoming increasingly prevalent, and often resulting in declining density, more wasteful, less efficient and unsustainable land use patterns.

...Demand for water by households is growing by 7.5 per cent annually, or three times the Saudi population rate of growth...

Table 1.6: Composition of added area in Riyadh

Forms of urban expansion (%)	1990-2000	2000-2013
Extension	43	66
Infill	36	25
Inclusion	21	9
Leapfrog	0	0

Source: UN-Habitat Urban Expansion Database

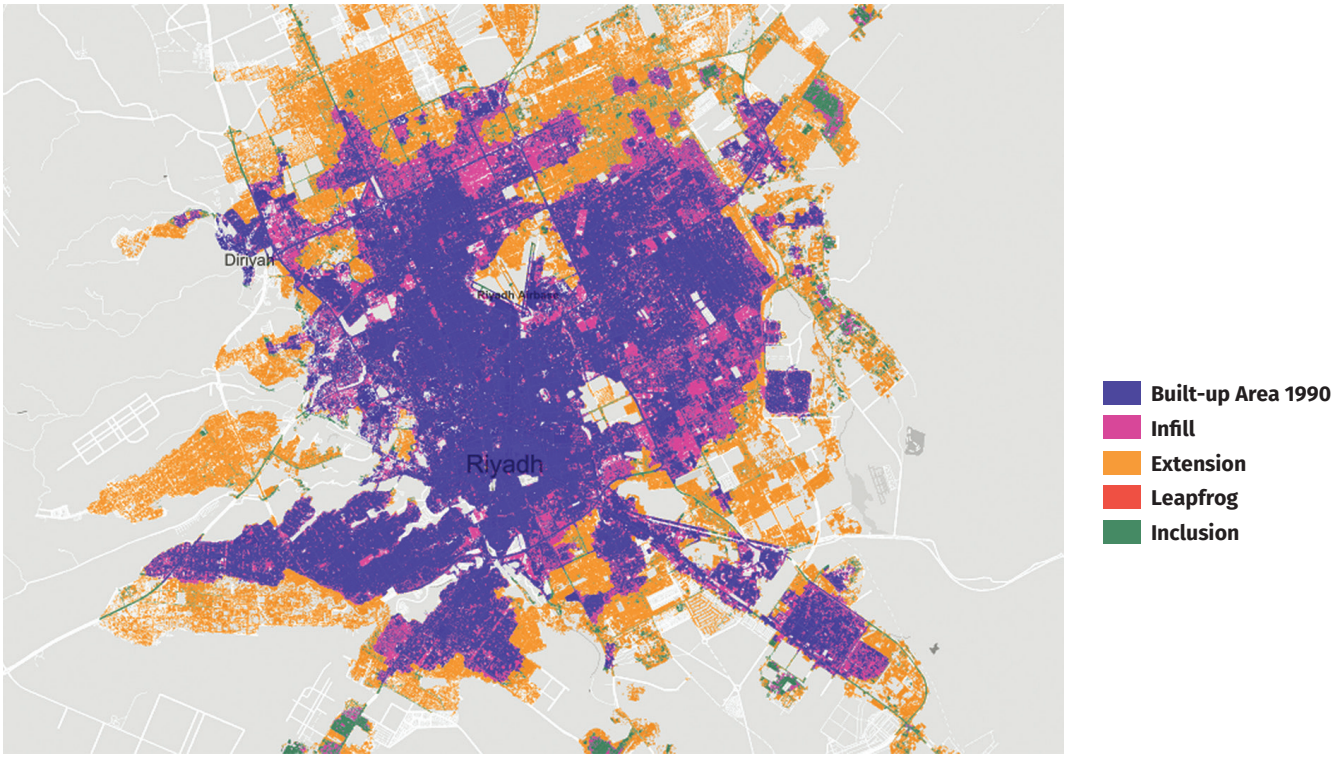
Several factors have contributed to sprawl and low-density development in Saudi Arabia. Permissive zoning regulations tend to favour sprawl and low-density development;[53] for instance, new housing developments often occur in peripheral locations rather than as infill development within existing neighbourhoods. Similarly, real estate firms have contributed to sprawl development by locating housing projects in peripheral locations.[54] A good example is the Dammam Metropolitan Area where developers have successfully expanded huge swaths of urban areas into the Arabian Gulf through landfilling.[55] The ineffectiveness of planning and institutional frameworks has also resulted in the proliferation of settlements all over the fringe of cities; and disconnection between land use and transport.[56] The highly dispersed nature of these settlements places severe constraints in terms of cost, time, and energy on commuting. The heavy dependence on private car ownership largely facilitated by economic prosperity and cheap fuel (see Chapter 2) has also promoted the emergence of low-density urban sprawl.

The decline in density has profound repercussions for environmental sustainability at local and regional levels. Excessive urban expansion and declining density are wasteful in many respects, and they increase demand for mobility and energy consumption; contribute to environmental degradation; increase the cost of providing basic services, managing public space and infrastructure; reduce the economies of agglomeration and decrease urban productivity. Urban sprawl contributes to high numbers of cars, distances travelled, length of paved roads, fuel consumption, alteration of ecological structures and the conversion of rural land into urban uses – all of which are environmentally unsustainable (see Chapter 3). This necessitates the adoption of a more sustainable urban growth management policies.

1.5.2 Unsustainable increase in water consumption

Access to safe drinking water is one of the most critical challenges facing Saudi Arabia. This is because the largest share of water consumed comes from non-renewable sources. This situation is compounded by the country's steadily growing population. Despite the water scarcity that is prevalent in the kingdom, Saudis are consuming water in large quantity. The national average of water consumption in 2013 was 265 liters/ per person/day, which is twice the world average. Demand for water by households is growing by 7.5 per cent annually, or three times the Saudi population rate of growth.[57] Consumption is exceptionally high in metropolitan areas; in the Riyadh Metropolitan Area consumption increased 2.5 times between 1987 and 2014, reaching 370 liters a day.[58] The high levels of consumption can be attributed to the nation's growing population, improved standards of living and the government's highly subsidized water tariff where households pay less than 5 per cent of the water production cost.[59] The current tariff has been described as unsustainable and incapable of supporting water conservation.

Figure 1.14: Components of urban expansion in Riyadh, 2000–2013



Source: www.atlasofurbanexpansion.org/cities/view/Riyadh

The increased demand for water has created the need for desalination plants, which accounts for 30 per cent of potable water in Saudi Arabia.[60] Water desalination is a costly, capital and energy-intensive process, and unsustainable. It costs about US$1 per cubic metre to produce and consumes eight times more energy than groundwater projects. Currently, Saudi Arabia is the world's largest producer of desalinated water and plans to build nine plants on the Red Sea coast at a cost of some SAR2 billion (US$530 million).[61]

Water desalination accounts for 10–20 per cent of energy consumption in Saudi Arabia[62] and therefore has adverse environmental effects (see Chapter 3). This gloomy picture becomes critical given that about 60 per cent of water consumed by households comes from desalination. This calls for more sustainable water management approaches such as diversification of water sources, water allocation priorities among development activities, and water conservation and recycling to prevent further environmental damage.

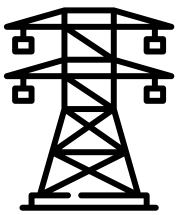
1.5.3 Unsustainable increase in energy consumption

Saudi Arabia has continued to experience rapid growth in energy consumption. Since 1990, the demand for electricity has increased at an annual rate of 6 per cent.[63] In comparison to 2008, primary energy consumption is expected to increase by 50 per cent in 2020.[64] Currently, consumption stands at 9,444 kilowatt hours per capita.[65] The increase in electricity consumption can be attributed to rising income and affluence, which allows for the purchase of various energy-intensive appliances, air conditioning for homes, increasing levels of urbanization, population growth, economic activities and increase in number of houses, among others.

This high consumption of electricity exhibits two dimensions of unsustainability. First, the residential sector is the biggest consumer in that it accounts for 52 per cent of the total national electricity consumption; while industry and agriculture account for 18 per cent and 3 per cent, respectively.[66] The residential demand for electricity is expected to double by 2025.[67] Second, about 60 per cent of the electricity consumed in summer is accounted for by home air conditioning.[68] The intensive use of air conditioning has accounted for 35 per cent of the increase in electricity consumption over the last two decades.[69]

Another dimension of the unsustainable use of energy is the consumption of oil in transport, which rapidly increased from 30,000 barrels a day in 1971 to 1.3 million barrels a day in 2013;[70] growing ten times faster than population growth.

It is, therefore, crucial for Saudi Arabia to adopt more sustainable and energy efficient forms of energy consumption for in residential buildings. This calls for greater use of renewable energy resources of which the country has vast quantities (see Chapter 3). For saving water and energy, high-density residential development is highly recommended.



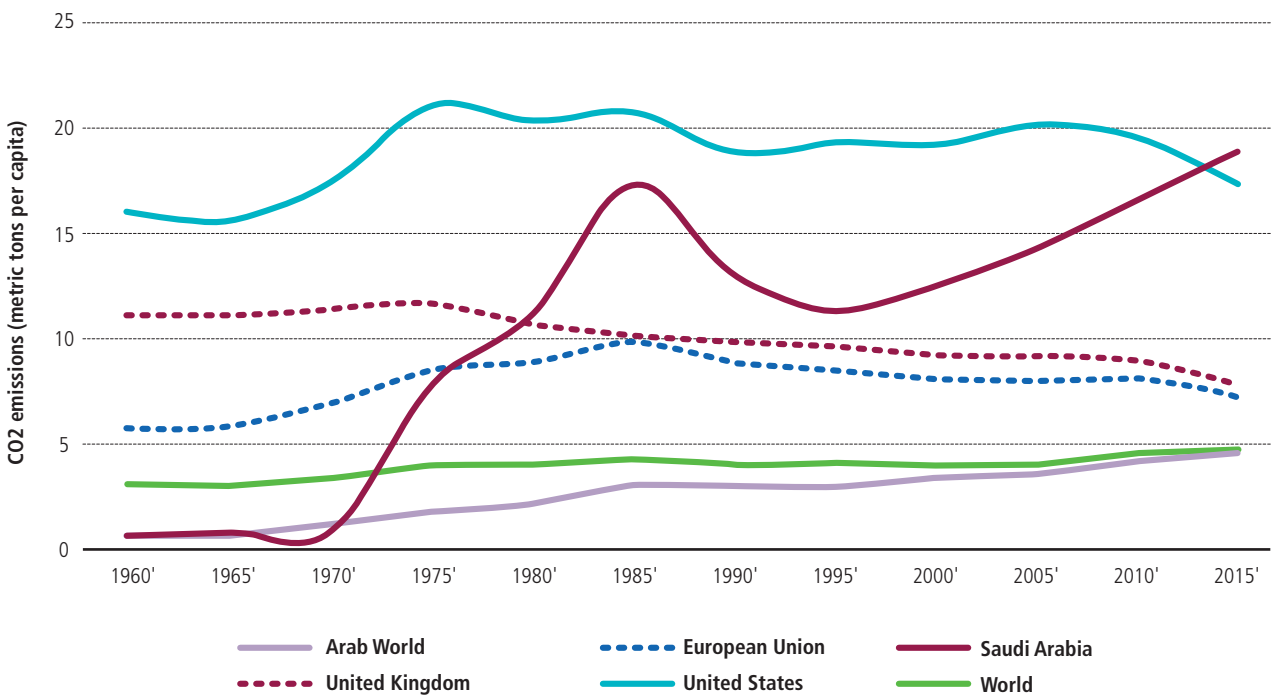
Electricity consumption stands at 9,444 kilowatt hours per capita

Water recycling and the use of "grey water", especially for irrigation of green areas is necessary. In addition, public awareness campaigns would be helpful in this regard. Apart from combating urban sprawl and saving urban land, compact and high-density residential development is necessary for minimizing energy consumption in transport.

1.5.4 Urban greenhouse gas emissions

Greenhouse gas emissions are rapidly increasing in Saudi Arabia. Figure 1.15 shows that carbon dioxide (CO_2) emissions per capita increased from only 0.7 metric tons in 1960 to about 19 metric tons in 2015, representing an increase of 2,786 per cent. Such increase is astonishingly high given that the per capita increase was only 9 per cent in United States, 27.6 per cent in European Union, and was declining in the United Kingdom at 30 per cent.[71] The increase in greenhouse emissions in Saudi Arabia, especially in urban areas, is associated with increasing levels of income, energy production and consumption, private car ownership, increase in economic activities and rapid urbanization. This high level of CO_2 emissions and their negative environmental impacts are concentrated in urban areas.

Figure 1.15: Comparison of per capita CO2 emissions in Saudi Arabia and other countries



Source: World Bank, 2017a [Compiled from http://databank.worldbank.org/data/source/world-development-indicators]

Transport is heavily dependent on fossil fuels, with vehicles consuming 41 per cent of total oil consumption.[72] Carbon dioxide emissions from transportation has increased from 3.3 million tons in 1971 (0.55 tons per capita) to 123 million tons (4.1 tons per capita) in 2013. In the process, pollution levels have been increasing especially in the main urban areas.

Traffic congestion is a major problem in Riyadh, Jeddah and Dammam due to a large increase in private vehicle ownership. Vehicle ownership in Saudi Arabia exceeds 200 per 1000 persons.[73] Besides, Saudi Arabia is the largest importer vehicles in the Middle East, accounting 40 per cent of all vehicles sold to the region.[74] Subsidized petrol prices, low utilization or the absence of effective public transport contribute to higher levels of energy consumption and traffic congestion, which exacerbate problems of air pollution (see Chapters 2 and 3). All these calls for urgent adoption of sustainable transport policies. In this regard, the scaling up of mass transit systems for Saudi cities, such as the Jeddah Metro project envisaged to reduce vehicular flow by 30 per cent,[75] is highly recommended.

1.6 Providing affordable housing

The housing problem in Saudi Arabia relates mainly to the shortage of affordable housing. While there is a surplus of high-rental housing in most cities, there is a persistent shortage of affordable housing for lower- and middle-income households. Housing that is affordable and in line with the socioeconomic characteristics of the people and that meets the principles of residential sustainability and the Saudi Vision 2030, are needed urgently throughout the nation. The economic importance of housing is discussed in Chapter 4.

In the Dammam Metropolitan Area (DMA), building regulations stipulate that two- and three-floor semi-attached villas should be the main housing types in the built-up and vacant residential areas. These housing types which account for over 88 per cent the houses in the built-up and vacant residential areas of DMA,[76] are incompatible with the socioeconomic characteristics of the residents. With an average rent of SAR 10,000 (approx. US$2700) only 29 per cent of the local population can afford this type of housing.[77] Saudi households, on average, spend 22 per cent of their income on housing and utilities; this could reach 50 per cent for low-income households.[78]

The houses do not conform to the principle of residential sustainability. While the UN-Habitat's five principles of sustainable neighborhood planning recommend a high density of 150 people/ha;[79] the current population density in the DMA is 70 people/ha. The reasons are, first, very often, real estate developers focus on providing housing in peripheral locations, which further contributes to urban sprawl in the major cities.[80]The unsustainable impacts of low-density development have been identified earlier. Second, these houses do not conform to the principle of social mixing as almost all residential districts have single family single housing types. Third, these housing types have not brought about the much-expected increase in homeownership as envisioned in Saudi Arabia's Vision 2030 that aims to increase ownership from 47 per cent in 2016 to 52 per cent by 2020.[81]

Urban planning regulations in Saudi metropolitan areas should be revised to be in harmony with the socioeconomic characteristics of the population, sustainability principles, and Vision 2030 which aims to increase Saudi homeownership. To achieve this, urban and building regulations should be revised to ensure the homes are affordable.

1.7 Urban growth management challenges

Urban growth management challenges in Saudi Arabia are at three levels. At the national and regional levels, the policy on growth centres has resulted in increasing population concentration and regional development disparities. At local level, the urban growth boundaries approach has resulted in unsustainable and contagious expansion of urban areas.

1.7.1 Growth centres policy: Challenges of population concentration and regional disparities

Promoting spatially integrated development is one of the key goals of the National Spatial Strategy. However, after 17 years of adopting the strategy and the growth center or growth pole policy, this goal is needs more time. Although such policy has been successful in developing these cities, it has subsequently resulted in an imbalanced distribution and concentration of population in urban regions and large metropolitan areas. It has also increased development disparities between urban and rural areas, and among large and small cities.[82]

The main idea of the growth pole approach is to achieve more balanced development by building in underdeveloped regions new large-scale urban areas capable of attracting population and economic growth away from congested and more developed rural or urban regions. This has not been the case in Saudi Arabia, where the largest and most developed centres (the five metropolitan areas) were among those designated as growth poles. These centres were already more developed

than their surroundings at the time, and thus rapidly growing by further marginalizing surrounding regions and other small settlements designated as growth poles.

To overcome these challenges and ensure a more balanced and integrated development throughout the country, NSS 2030 proposes spatial structure for the country consisting of logistic corridors, gateways, metropolitan areas, regional capitals and settlement clusters (as illustrated in Chapter 4). This system of logistics corridors seeks to support intermediate cities, small towns and village as the building blocks of the regions.

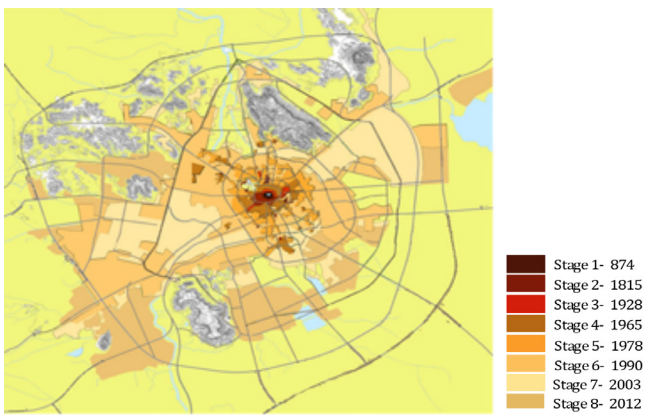
1.7.2 Urban growth boundaries approach: Challenge of contiguous agglomeration

The management of urban growth, especially in large metropolitan areas, has been implemented through the expansion of growth boundaries. This has neglected other urban growth management policies such as appropriate densification policies, satellite towns and new cities. As noted earlier, 66 per cent of the increase in the built-up area of Riyadh between 2000 and 2013 is attributed to expansion of the urban growth boundaries while the infills or densification account 25 per cent (see Table 1.6). Expanding the urban limit has ended up creating large contiguous urban mass in Madinah, Riyadh, Jeddah; very long urban fingers in Makkah; and very fragmented and sprawled urban patterns in Dammam (see Figure 1.16). Size increase of these cities and urban sprawl have become the main challenges of urban growth management at the local level. Furthermore, given the dispersed nature of cities with the urban fingers growth pattern, residents experience long commuting distances from the outskirts to the city centre, and its associated traffic and service provision problems.

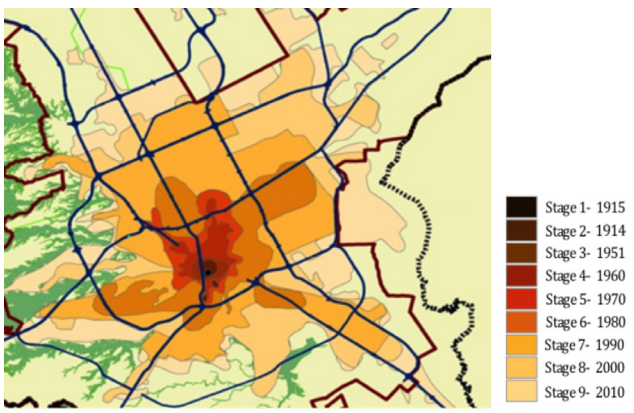
Figure 1.16: Patterns of urban growth in Saudi metropolises[83]

a. Contiguous urban growth pattern

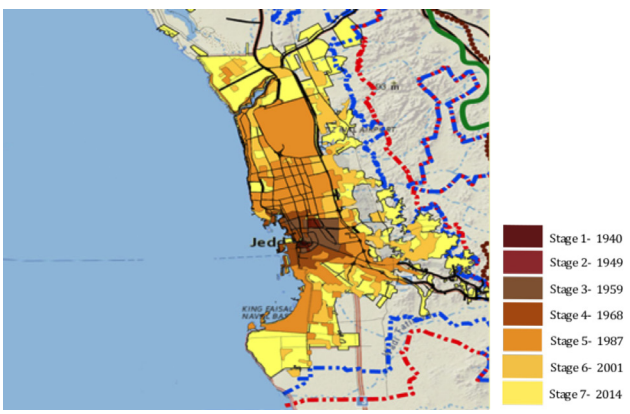
Madinah (874-2012)



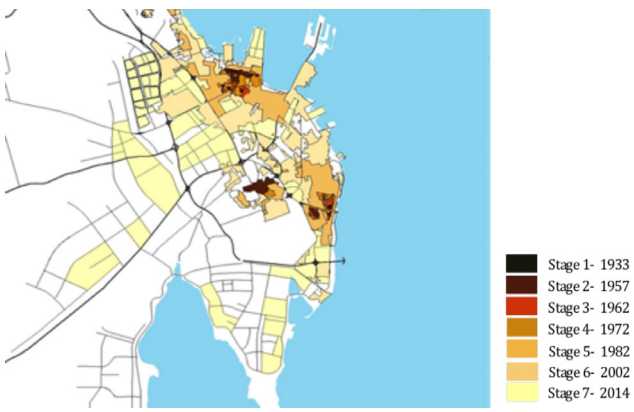
Riyadh (874-2012)



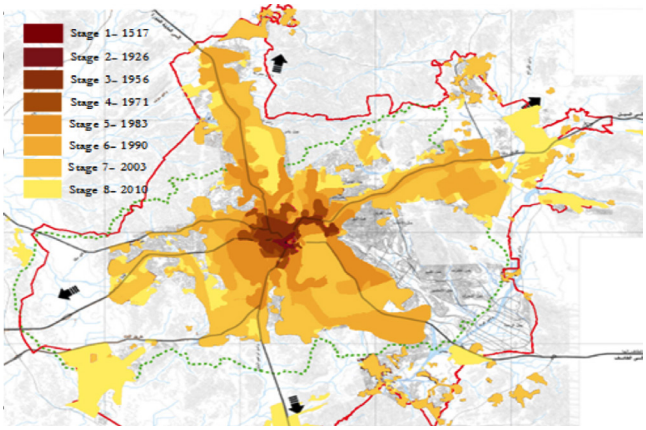
Jeddah (874-2012)



Dammam (1923-2014)



b. Urban fingers pattern



These challenges call for more appropriate policies for managing urban growth in Saudi Arabia (see Chapter 5). It is expected that the proposals outlined in the National Urban Strategy 2030 will tackle these challenges. These policies should effectively deal with the expected increase in urban population, the problems of regional concentration of population, and minimize regional disparities through integrated development.

1.8 Urban governance challenges

Urban planning and management in Saudi Arabia remain largely centralized. Despite efforts to transfer more powers to municipalities, the central government has significant control over local governance, including the right to dissolve local administrations, remove members of local councils and set local tax rates.[84] Chapter 5 examines urban governance in greater details and shows there is minimal framework for the participation of non-state actors in governance activities, even at the level of feedback. Electing municipal council members is relatively new in Saudi Arabia and citizen participation in public affairs remains a challenge. Chapter 5 further notes that the current governance structure has in some cases led to the creation of a multiplicity of agencies managing growth and development in Saudi Cities.

The *State of Saudi Cities Report 2016* used the urban governance and legislation dimension in the City Prosperity Index to evaluate the efficiency of urban governance in Saudi Arabia. This prosperity dimension aims at ensuring that local legislation and urban governance effectively controls the functioning of other prosperity dimensions to achieve the desired societal norms and practices. This dimension and other prosperity dimensions have been examined for the largest 17 cities in Saudi Arabia. Findings show that values for the urban governance dimension for the various cities were among the lowest, thus reaffirming that urban governance remains a key challenge in Saudi Arabia.

The results for the urban governance and legislation component for the various Saudi cities are summarized as follows:

- Major Saudi cities show poor performance in terms of Community participation. This is counter-intuitive, since larger cities tend to have greater levels of citizen participation in Raising the general quality of life.
- The results of institutional capacity for the holy cities show that they are highly efficient when compared with major and medium-sized cities.
- Small cities have the best performance in terms of accountability and transparency; thus, reflecting a closer relationship between policymakers and decision-makers. However, the scores remain low on the global scale of city prosperity.
- The subdimensions of participation, accountability and transparency score low on the global scale. Municipal councils' system introduced in 2005 have significantly improved citizen participation. In 2015, cities had 285 active councils. Their total number of members was 1,212, two-thirds of them selected by election.[85]

In response, Vision 2030 notes that building deeper "communication channels between government agencies on one hand, and citizens and the private sector on the other" constitutes a main challenge for governance. In this regard, Vision 2030 proposes that the government "shall facilitate interactive, online and smart engagement methods and ways to listen to citizens' views, and to hear all insights and perspectives... encourage government agencies to improve the quality of their services, and to meet the needs of every citizen. We want to give everyone the opportunity to have their say so that the government can serve them better and meet their aspirations."[86]

In response to these directives, the approval of the High Commissioner No. 28119 dated 07/22/1434 has been issued for the Ministry of Municipal and Rural Affairs, in cooperation with UN-Habitat to implement the Future Saudi Cities Programme to focus on institutional performance-related shortcomings in urban areas. This collaborative effort is meant to strengthen the ability of Saudi cities, their institutions as well as their policy, technical, managerial and administrative capacities to guide the process of sustainable urbanization in the country.[87]

Downtown "Al-balad" in Jeddah

Conclusion and recommendations

This chapter has identified several demographic and urban trends in Saudi Arabia. The extant urban trends include an increase in the size and share of urban population; the regional concentration of the urban population, urban primacy and diminishing role of small and intermediate cities; and the differential growth in urban settlements with cities growing ever bigger.

The main challenges associated with these trends include: lopsided or imbalanced development—mainly the declining development reach and decline in the rural economy; development of "new areas" within cities, unsustainable patterns of urban consumption or outcomes, providing affordable housing; manging urban growth; and ineffective urban governance structure.

The recommendations for surmounting these challenges can be highlighted at three levels:

At the national level: It is important to correct the imbalances in regional distribution of total and urban population, to increase development reach, to support the rural economy, and to minimize the expected high increase in urban population. In doing so, it is recommended that future development plans direct and spread development activities, mainly mining and tourism, to rural and frontier regions of high development potentials. This requires revising national development plans and the National Spatial Strategy to minimize regional development disparities together with the need to link the strategy to a national planning system.[88]

It is along these lines that the country announced in 2017 several megaprojects that are expected to achieve a more balanced and integrated economic and regional development, which is a major objective of Vision 2030. These projects are expected to diversify the economy by attracting investments in tourism and industry. These projects will seek to increase total investments in tourism to 171.5 billion SAR (approx. US$45.7 billion) and create 1.2 million jobs in tourism and national heritage. The projects are expected to reduce rural-urban migration.

The most important of these projects are: NEOM, the Red Sea Project, Al-Ula, Diriyah, Al-Gidya, Jeddah Downtown, Al Faisaliyah Project, and New Taif Project. The three largest of these megaprojects—NEOM, Red Sea and Al-Gidya— are described in Box 1.3.These megaprojects are expected to redirect population concentration and migration away from traditional destinations; the large metropolitan areas. More projects of this scale are needed in Northern and Southern regions.

Box 1.3: Major development projects in the Kingdom of Saudi Arabia

The NEOM project is planned to be the world's first transnational city and economic zone. NEOM is located in north-western Saudi Arabia, comprise a total area of 26,500 km^2. The project is planned to focus on industries including energy and water, biotechnology, food, advanced manufacturing and entertainment. The expected cost of the project is about US$500 billion to come from the Saudi Public Investment Fund.

The Red Sea project is planned as an international tourism project. The project will be established across 50 untouched natural islands in a lagoon that stretches along 200 kilometres of the western coast between the cities of *Umluj* and *Al Wajh*. The Red Sea project will have a strong impact for the integration of the Kingdom at the global level and remote areas at the national level.

Al-Gidya project is a large-scale entertainment project, stretching over 334 km2 to the south-west on Riyadh, and only 40 km from its centre. The project provides variety of entertainment activities. The project is expected to spread economic development to neighbouring rural areas. Collectively, these three megaprojects will help to put Saudi Arabia on the world tourist map.

Source: Saudi Gazette, 2017; Public Investment Fund, 2017; Kingdom of Saudi Arabia 2018a.

At the regional level: It is important to correct the concentration of population within regions, and to minimize urban primacy levels through investment in medium cities, small towns and village clusters as articulated in NSS 2030.

Small- and medium-size cities can be made more attractive for their inhabitants and investors by improving transport, communication and other forms of infrastructure, as well as improving municipal governance, including decentralization and strengthening of local democracy and civil society. Improving the economic base and existing infrastructure of rural settlements is crucial to make them more attractive and enhance their linkages with urban areas.

At the local level: The recommendations at this level are made on the bases of the size of these settlements. For large metropolitan areas, further population increase should be accommodated within the spatial extent of these cities by means of densification and planned city infills, with no further expansion in urban area. For small- and medium-size settlements, their population accommodation capacity can be increased through densification or planned city infills and planned city expansion programmes.

In terms of curbing the unsustainable consumption patterns, the kingdom should adopt a sustainable urban development policy that advocates and charts the course for more sustainable consumption patterns. The sustainable use of urban land, water and energy, combating urban sprawl through urban densification is crucial for sustainable development. For conservation of water, diversification of water sources, setting water allocation priorities among development activities, and recycling of grey water are highly recommended. Sustainable public transport that is safe, efficient convenient, affordable is recommended, as this will go a long way to minimizing fuel consumption, CO_2 emissions, and traffic congestion in the major cities.

To overcome urban growth management challenges, minimize regional concentration of urban population, as well as urban primacy, the proposed urban growth management policies differ with respect to current and future development needs. Between now, and the next 20-30 years, urban densification is most appropriate urban growth management approach. This will allow for the efficient utilization of existing infrastructure and services.

To meet the challenge of providing affordable housing in Saudi metropolitan areas, building regulations should be revised to conform with the socioeconomic characteristics of the population; sustainability principles; and Saudi Vision 2030, that aims to increase homeownership among Saudis from 47 per cent to 52 per cent by 2020.

The challenge of urban governance could in part be addressed by increasing community participation, accountability and transparency, and enhancing the institutional capacity of Saudi cities. In doing so, it is recommended that urban observatories, established in almost all Saudi provinces, to encourage citizen participation in the urban planning process. This is important in surveying citizens' needs, setting development objectives, and in formulating alternative courses of action.

Endnotes

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13 World Bank, 2017a.
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34 Al Bassam, 2011.
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36 Abubakar and Aina
37 Aboukorin and Al-Shihri, 2010
38 World Bank, 2017a.
39 The Saudi NSS sets “Objective 6: Supporting selected settlements to act as growth centers capable of transmitting and coordinating development impulses toward surrounding areas” (UN-Habitat, 2016b).
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Riyadh Metro
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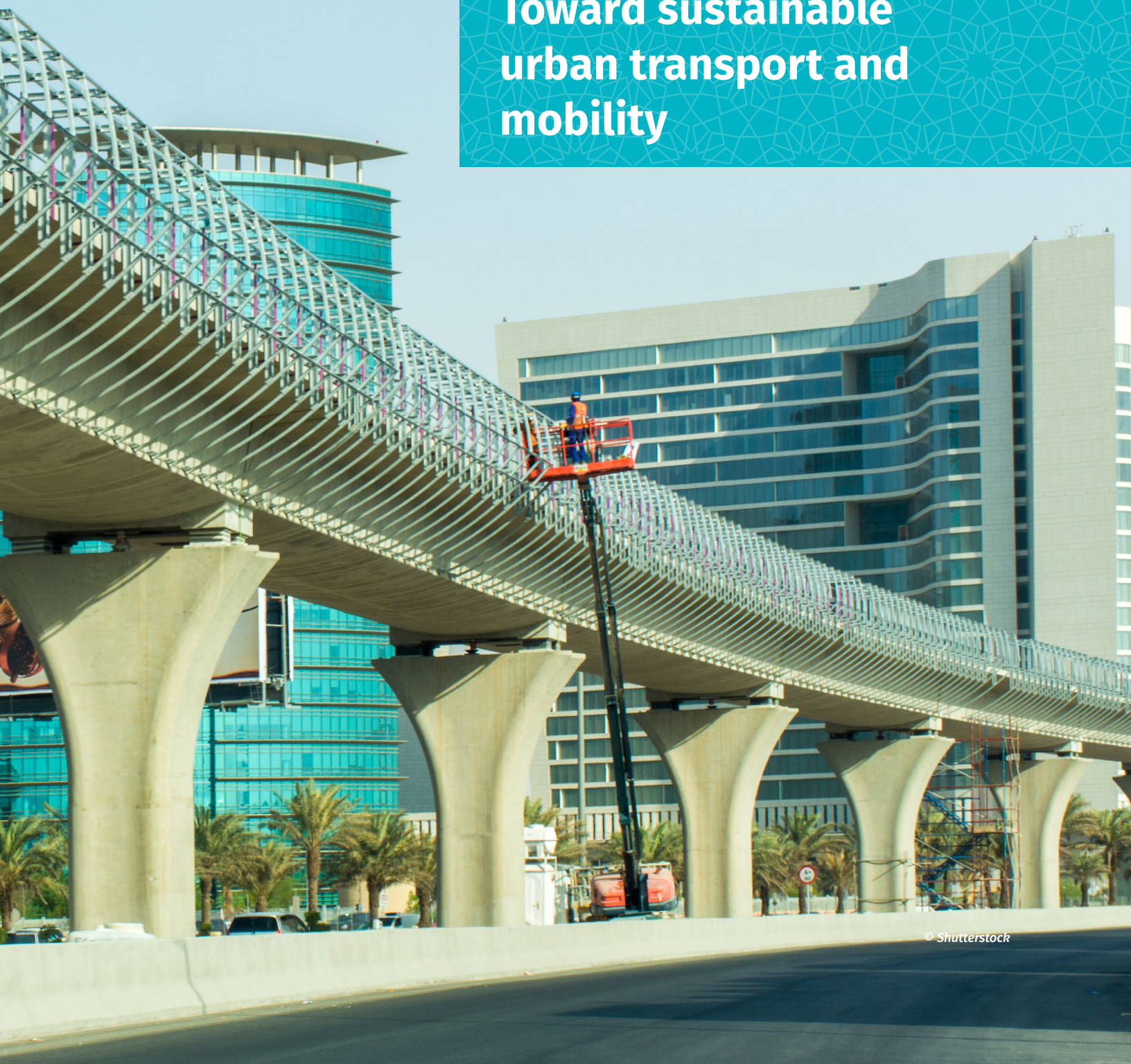
CHAPTER 2

Toward sustainable urban transport and mobility



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Rethinking sustainable transport and mobility is fundamental to achieving the Sustainable Development Goals (SDGs) in Saudi Arabia.[1] In this respect, two SDG targets are directly transport related: Target 11.2 by 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons; and Target 3.6 by 2020, halve the number of global deaths and injuries from road traffic accidents.[2]

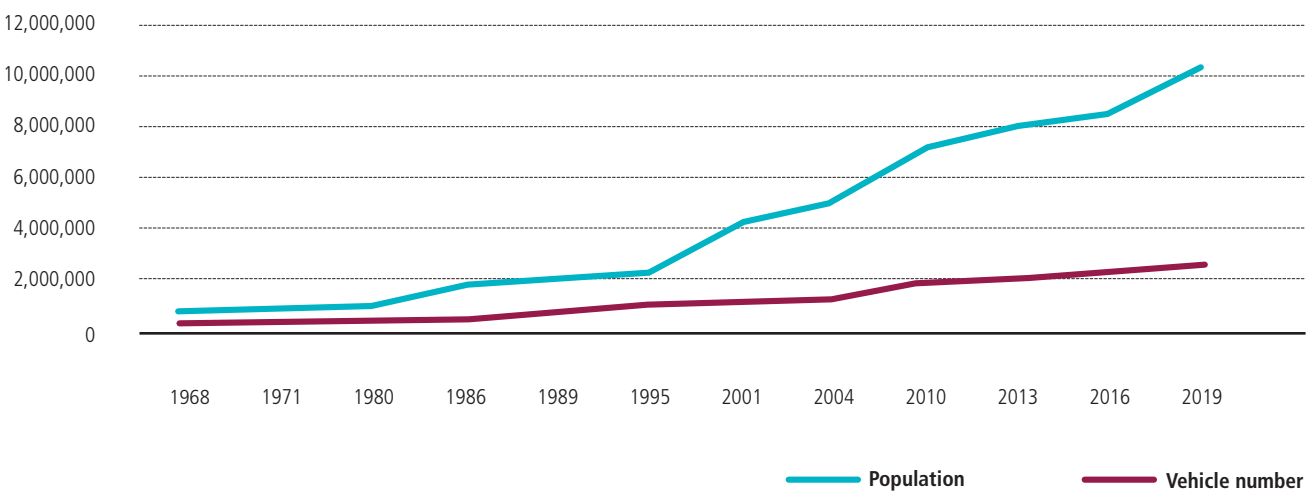
The Kingdom recognizes that the SDGs need to be pursued actively, not only meeting their transport-related targets but also by ensuring that the kingdom's transport sector can contribute to the climate objectives and decarbonization that will mitigate further change (see Chapter 3).[3] Notably, more compact, better connected cities with low-carbon transport could save in urban infrastructure spending over the next 15 years.[4] Besides, a shared vision of the New Urban Agenda is to "promote age- and gender-responsive planning and investment for sustainable, safe and accessible urban mobility for all, and resource-efficient transport systems for passengers and freight, effectively linking people, places, goods, services and economic opportunities."[5]

As illustrated in Chapter 1, approximately 83 per cent of the country's population reside in urban areas. This, alone, places huge demands on its transport system. When this is combined with the millions who embark on annual *Hajj* pilgrimages to the holy city of Makkah,[6] it makes efforts to improve mass transit and manage peak flows become far more onerous. For visitors and locals alike, the transport and mobile infrastructure form essential parts of any city. Yet public transport systems are a relatively new trend in the region,[7] where most people rely almost exclusively on private vehicles. Increasingly, Saudi Arabia's cities and their policymakers face enormous pressures as they seek to meet the increasing demand for mobility and investment in passenger and freight transport.

Efficient urban mobility defines the access of city dwellers to an improved quality of life and well-being.[8] When cities are not conducive to mobility, commerce and productivity are disrupted, city competitiveness is reduced, and on a human level urban existence becomes stressful and overwhelming.[9] In order to ensure that development is sustainable and inclusive, the challenge lies in tackling congestion— a negative externality that is associated with increasing levels of air pollution, carbon dioxide (CO_2) emissions and road fatalities. The main cause of these problems has been the amplified auto-dependency (Figure 2.1), which has led to urban sprawl and an even higher demand for motorized travel, with a range of environmental, social and economic consequences.

The high densities in urban areas highlighted in Chapter 1 and road congestion, coupled with the inability of public transport to satisfy the mobility needs of citizens, call for the establishment of mass transport systems in the country. In recent years, cities such as Jeddah and Riyadh have sought to provide alternative transport due to increasing private car ownership and traffic congestion, especially after allowing women to drive. Meeting future transport needs of residents is a vital requirement for Saudi cities.

Figure 2.1: Population and car ownership in Riyadh, 1968–2019



Source: Aldalbahi and Walker, 2016.

Saudi Arabia's tremendous population and economic growth in the late 20th century led to increased mobility, which in turn led to the massive construction of arterial roads and expressways. However, demand still exceeds road capacity. High mobility coupled with continued increase in private car ownership presents a key challenge as more land is used for transport systems. In Riyadh, roads account for 40 per cent of the city's construction costs.[10] Meanwhile, inner areas of the city are constrained by their inability to accommodate further expansion of highway infrastructures. All these impediments to mobility call for an appropriate national public transport system.

Accounting for 21 per cent of total domestic energy consumption, the entire transport sector is the third largest in this regard. Within the sector, road transport accounts for about 90 per cent of energy consumption.[11] In this regard, the Paris Agreement on Climate Change provides great opportunities for the transport sector to mitigate carbon dioxide emissions. An imperative for sustainable urban living is to design and retrofit Saudi Arabia's cities to minimize the need for personal cars, and shift to collective door-to-door public transport and different forms of non-motorized mobility. Achieving effective urban mobility systems would improve their functioning for all stakeholders (including all levels of government, transport providers and operators, the private sector, civil society and transport users),[12] while facilitating economic opportunity without compromising environmental concerns.[13] Policymakers must ensure that the immediate needs of Saudis are met without compromising those of tomorrow; their actions will be critical for shaping the kingdom's urban future.[14]

This chapter provides a comprehensive assessment of the state of urban transport in Saudi Arabia, focusing on formal private motorized transport, as well as formal public transport. The chapter also considers key factors that have shaped the transport network and discusses the implications of rapid motorization on economic performance and social equity in Saudi cities. It outlines trends and conditions, and reviews a range of policy responses to urban transport challenges as part of the solution and subsequent implementation of the New Urban Agenda (NUA). The chapter concludes by providing recommendations on how national and local governments and other stakeholders can develop a more sustainable urban future in Saudi Arabia through the improved planning and design of urban transport systems.

2.1 A Sustainable Approach

Given the widespread effects of transport on energy consumption and carbon emissions, the Kingdom recognizes that sustainable transport systems will be an essential element for cities to prosper. Chapter 3 conceptualizes sustainability as a phrase that embodies social, environmental, economic and institutional considerations.[15] A sustainable transport solution takes account of all these considerations and the social gains, for instance, of reducing road traffic-related injuries, amongst longstanding economic development goals.

> **...sustainable urban transport "provides efficient access to goods, services, job markets, and social connections while limiting short- and long-term adverse consequences for environmental, social, and economic services and systems."**

According to the Institute for Transportation and Development Policy, sustainable urban transport "provides efficient access to goods, services, job markets, and social connections while limiting short- and long-term adverse consequences for environmental, social, and economic services and systems."[16] The ultimate goal of the country's urban mobility systems is to enhance access to destinations, activities, services and goods,[17] and make a long-term strategy for economic growth and environmental protection.[18] The following legislations were developed with the intent to guide the transformation of urban mobility in Saudi Arabia:

- **National Spatial Strategy**. This specifies transport as a prerequisite for any development corridor, as it provides mobility and connects people, goods and services, which are necessary for the integration and development of Saudi's cities.[19]

- **National Transformation Program 2020.** This was developed with the intent to realize the medium-term goals of Saudi Arabia's Vision 2030. Part of its objectives include to minimize the rate of road traffic fatalities; improve the legislative environment of the urban transport sector; improve efficiency of transport infrastructure; increase use of public transport; and increase reliance of self-funding for the Ministry of Transport.[20]

- **National Transport Strategy**. The strategy emphasizes several areas: (1) improving the efficiency and effectiveness of the transport sector; (2) enhancing transport for *Hajj* pilgrims; (3) improving national security during natural and man-made disasters; (4) environmental protection from motorization and increasing environmental awareness; (5) enhancing road safety to lessen traffic fatalities; and (6) promoting economic growth and social development by making transport services inclusive for all.[21]

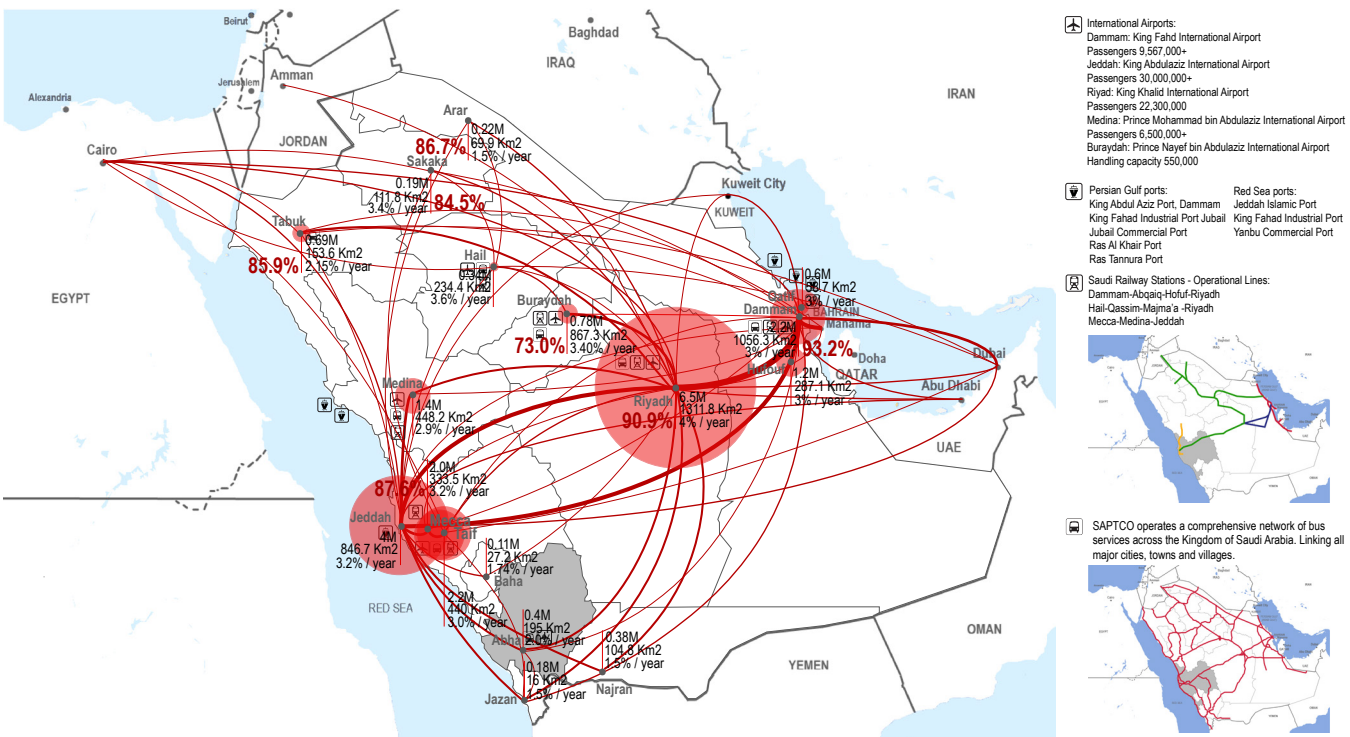
2.2 State of urban passenger transport

The current state of interconnectivity across Saudi Arabia, presented in Figure 2.2, shows very strong linkages between the major urban areas in terms of air, rail and road transport infrastructure. This reflects the huge investment in transport over the past few decades, as well the importance of Riyadh and Jeddah as economic powerhouses, as well as Makkah and Madinah as holy cities. Yet the existing level of infrastructure might not be able to accommodate the demands of the country's continuing, rapid urbanization in a nation already beset with record levels of road traffic congestion and frequent flight delays.[22]

In Riyadh, as with other Saudi cities, the absence of a viable mass transit system implies that the existing road infrastructure cannot sufficiently absorb the expected increase in vehicular traffic that is likely to accompany rapid urbanization. Solely expanding existing capacity or building new roads will also not suffice.[23] Besides, the increase brought about by urbanization, the arrival of Muslims worldwide to perform the *Hajj* and *Umrah* in Makkah multiplies the city's population threefold every year.[24] By 2029, the city's resident population is expected to reach 2.2 million; *Hajj* pilgrims will be 6.5 million and *Umrah* visitors 10.8 million.[25] Led by the Ministry of Hajj, urgent attention is needed to manage the regular flow of millions of people, descending on well-defined yet limited spaces in the *Haram* and *Haj* zones.[26]

When cities fail to provide safe walking and cycling spaces urban dwellers increasingly turn to cars, the most energy-consuming form of transport.[27] The increase in the number of Saudi women participating in the economy further adds to the demand for public and private transport. In seeking to provide sustainable, efficient and safe transport infrastructure, and one that contributes to guiding urban development, the kingdom has made massive investments in transport, an example of which is the King Abdulaziz Project for Public Transport shown in Box 2.1. [28]

Figure 2.2: Intercity connectivity in Saudi Arabia



Source: City Profiles, Future Saudi Cities Program.

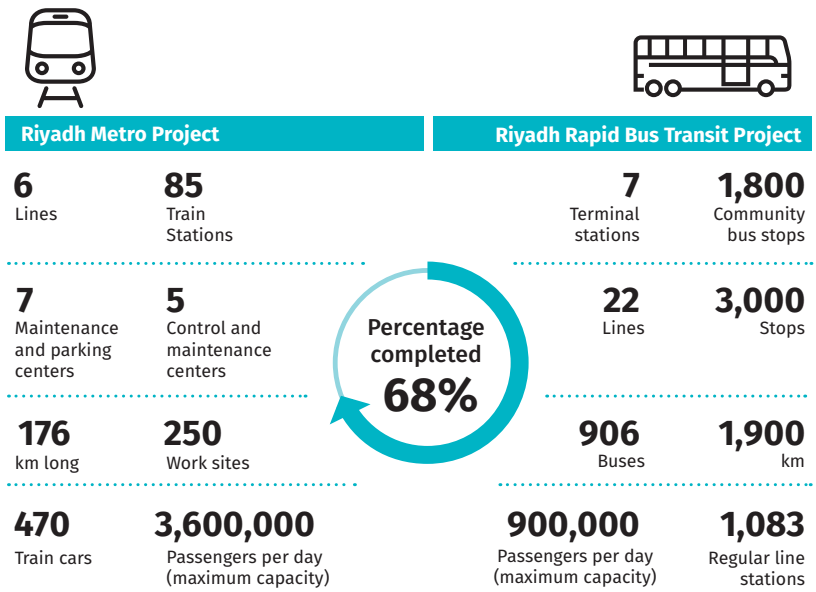
Box 2.1: Recent investment in transport infrastructure in Saudi Arabia

Saudi Arabia is keen on developing and upgrading its infrastructure and transportation system, with over US$14.4 billion (SAR 54 billion) allocated for this purpose in the 2018 state budget. Over the past decade, more than US$106 billion (SAR 400 billion) have been spent on transport infrastructure, resulting in the construction of a robust transport network, covering all parts of the Kingdom.

Work is underway for construction of expressways of over 14,000 km in length, at a total cost of about US$12.27 billion (SAR 46 billion) (2017). The **King Abdulaziz Project for Public Transport in Riyadh** which is due to be completed by the end of 2020, is one of the largest infrastructure projects worldwide. Designed for a maximum capacity of 4.5 million passengers per day, the project includes a network of trains along six lines with a total length of 179 km, along with a bus network of 22 lines with a total length of 1,900 km.

At the national scale, major investments in transportation have been made to improve inter-urban access. Major cities are now connected by an international standard road network and air links. More recently the development of inter-city rail links has been

When operational, these transport modes would have the capacity to shift a considerable number of car owners to use these mass transit forms thereby decongesting the city's roads, slashing energy consumption within the transport sector and possibly improving the city's air quality



prioritized in the infrastructure investment budget, including a 946-km cross-country line linking Jeddah, Riyadh and Dammam, a Medina-Jeddah-Mecca high capacity link that will facilitate the movement of pilgrims during the Hajj, and an Eastern Region link between Dammam and Jubail Industrial City. (2016 Saudi Cities Report)

Saudi Arabia has introduced a new integrated transportation infrastructure master plan to improve the quality, safety, and efficiency of its transport. The plan calls for the development of several major assets, including the Saudi Landbridge railway to connect the east and west coasts of Saudi, and two new rail corridors, the GCC Railway Mainline in the east and Yanbu-Jeddah railway in the west (passing through King Abdullah Port and King Abdullah Economic City). Next on the agenda could be a construction of new multimodal logistics terminals to fill the growing demand for sea-to-air and rail-to-road connectivity.

Source: Kingdom of Saudi Arabia, 2018c; UN-Habitati,2016a; Ministry of Transport, 2017

Currently, none of Saudi Arabia's cities provide public transport beyond basic bus networks, with the partial exception of the recently completed railway in Makkah. Additionally, the country's rail density is at 0.05 km per 1,000 population, compared with 0.72 km per 1,000 for the United States.[29] Rail, with its high upfront capital costs and economies of scale, needs to attain a threshold density of trips in order to cost less than accommodating the same trips by car or bus.[30]

2.2.1 Transport and economic development

The transport, storage and communication sector of Saudi Arabia has emerged as a driving force for economic and social development. Since 2010, the sector's contribution has injected more than SAR100 billion (US$26.7 billion) into the total national economy,[31] generating about 6.3 per cent of gross domestic product in 2015.[32] Accordingly, growth in per capita income levels has had a positive effect on the ownership

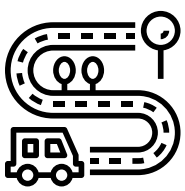
Table 2.1: Some Saudi Arabia's major inter-city highways

Highway	Length
Dammam to Abu Hadriya to Ras Tanura Highway	257 km
Khaybar to Al Ola Highway	175 km
Mecca to Madinah Al Munawarah Highway	421 km
Riyadh to Dammam Highway	383 km
Riyadh to Sudair to Al Qasim Highway	317 km
Riyadh to Taif Highway 750 km	470 km
Taif to Abha to Jizan Highway	750 km
Medina to Tabuk Highway	680 km
Jeddah to Al Leith to Jizan Highway	725 km
Jeddah to Makkah Highway	70 km

Source: Riyadh Chamber of Commerce, 2005.

and use of private vehicles, tending to increase reliance on them to meet mobility demand in cities. Enabling public movement within urban agglomerations through transport networks is central to the country's economic growth. When attended to effectively, the impacts of public transport are substantial: higher economic productivity, potential for new revenue streams and services, including a measurable benefit in reduced healthcare costs.[33]

Oil revenue has facilitated huge investment in extensive road networks, with high capacity highways and arterials encircling the major cities of Dammam, Madinah, Jeddah, Makkah and Riyadh (see Chapter 4).[34] As at the end of 2017, the total length of paved roads was 68,525 km (single carriage: 49,713 km; dual carriage: 13,155 km; expressway: 5,393 km; Aqabat roads: 264 km). [35] At the onset of 2018, 45 per cent of the goal to lay 5,000 km of new roads between 2016 and 2020 had been accomplished.[36] Table 2.1 summarizes Saudi's major interurban expressways. Maintained by the Ministry of Municipal and Rural Affairs, urban roads range from eight to two lanes; rural roads are two-lane. [37] However, the character and provision of this infrastructure needs to be tailored to the nature and density of planned and anticipated developments.[38] It is particularly important for secondary cities to use transport infrastructure to structure urban growth.[39]



As at the end of 2017, the total length of paved roads was 68,525 km (single carriage: 49,713 km; dual carriage: 13,155 km; expressway: 5,393 km; Aqabat roads: 264 km)

The climate and terrain of Saudi Arabia's large and sparsely-populated landscape present a major challenge to road construction. To this end, the development plans (including the National Spatial Strategy and Vison 2030), focused on improving the kingdom's transport infrastructure,[40] though some of the country's previously inaccessible regions can now be reached by new roads. For instance, the first highway tunnel worldwide to use solar photovoltaic technology–converting solar energy into electricity–was built in the hilly Abha region of Asir Region.[41] The overall objective was to connect all of the country's settlements to the principal urban areas, thereby opening channels for the Government to provide vital services for the entire population.[42] This requires close coordination between the Ministry of Transport (MoT) and Ministry of Municipal and Rural Affairs (MoMRA).[43]

As part of its Vision 2030 and NTP 2020, Saudi Arabia plans to leverage its geographical advantage by developing into a key hub connecting Asia, Europe and Africa.[44] However, the poor linkage between land use and transport planning has encouraged the tendency towards increased transport system investments (for example, roads, ports and railways).[45] This alone highlights the compelling need for the Government to identify innovative financing mechanisms for sustainable transport infrastructure and operations, examples of which include parking levies, fuel pricing and road user charging. [46] [47]

More importantly, this need calls for better solutions on how to move from current unsustainable trends in urban form and transport towards a more sustainable and equitable future for Saudi Arabia's cities.[48] Still, crafting reliable and equitable funding programmes for transport infrastructure that reward efficient and sustainable behaviour remains a formidable

Table 2.2: Major road and rail projects in Saudi Arabia

Project Name	Status	Client	Value (US$ Million)
Makkah-Madinah Railway Link (MMRL) – *Haramain*	Done/ Operating	Saudi Railways Organization (SRO)	13,743
Riyadh Light Rail Network Phases 1&2	Construction	Royal Commission for Riyadh	9,000
Riyadh Light Rail Network – Phases 4,5 & 6	Construction	Royal Commission for Riyadh	7,820
Landbridge Project	Design	Royal Commission for Jubail and Yanbu (RCJY)	2,980
King *Abdulaziz* Road Project (KAAR) – South of *Makkah*	Construction	Saudi Arabia, *Umm Al Qura* for Development and Construction Company, *Jeddah* Municipality	1,786.6

Source: GCC Transportation construction Market- Gulf Traffic, 2017.

task.[49] Thus, public-private partnerships (PPPs) are being pursued to fund several key schemes, while a number of the country's publicly operated facilities, such as airports, are being readied for full privatization.[50] This entails that regional and municipal authorities be provided with enhanced powers to manage their complex land markets, as land is a major factor in establishing PPPs.[51] Still, PPP agreements are Complicated in Saudi's rail sector due to the large risks and uncertainties of market demand.[52]

Nonetheless, given their potential to reconfigure trade corridors and dramatically improve public transport, rail and metro projects represent a growing priority for the Saudi Government, in support of plans to drive economic development and diversification, as discussed in Chapter 4. In 2016, Saudi's cabinet appointed the Saudi Railway Company as the owner of railway infrastructure projects linking major cities and important economic zones with the kingdom's hub container ports.[53] Operated by the Saudi Railway Organization (SRO), the country's railway network covers 1,380 km;[54] extending from King Abdul Aziz Port in Dammam and the city of Dammam to Riyadh, passing by Abqaiq, Hofuf, Haradh and Al-Kharj.[55] The railroads consist of the 449-km Dammam-Riyadh passenger line from the Arabian Gulf port to Riyadh that includes stops in Hofuf and Abqaiq. A second, 556-km Dammam-Riyadh cargo line runs through Haradh, at the edge of the Empty Quarter.[56]

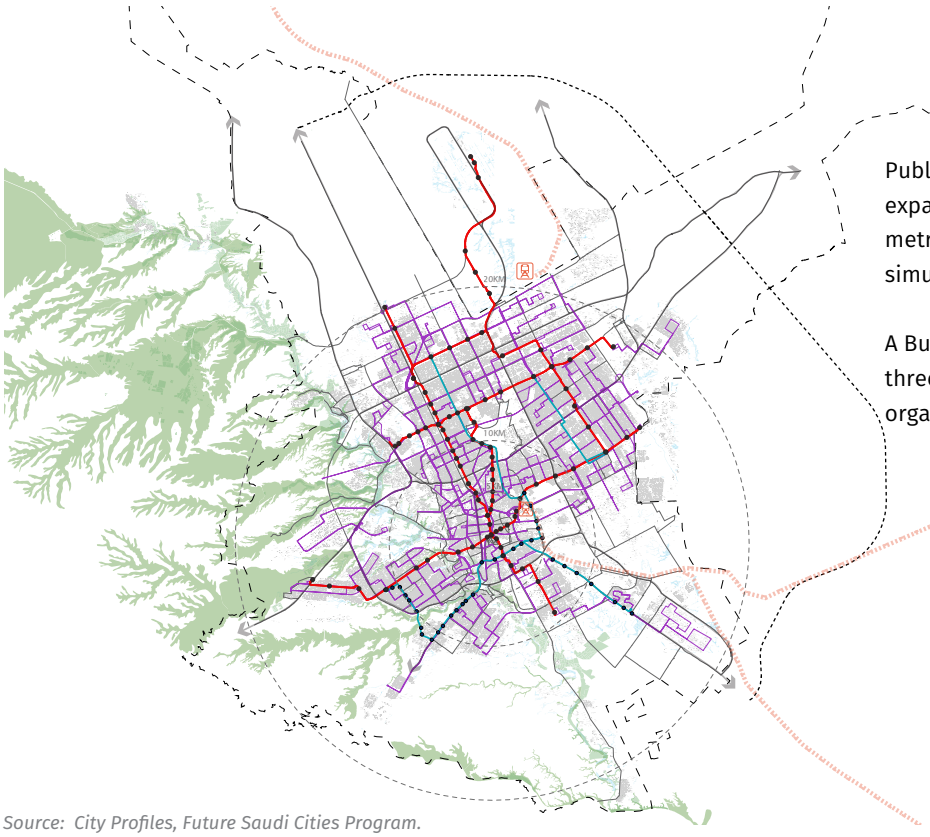
To tackle the need for expanded, more effective and safe urban transport systems, the Ministry of Transport has been tasked with nine strategic objectives under the National Transformation Program, each with its own key performance indicators outlining 16 initiatives to be completed by 2020.[57] Some key initiatives include the Riyadh Light Rail Transit system; public transport projects under the Jeddah Strategic Development Plan; and the 450-km Haramain High-Speed Rail in Makkah, Madinah, Jeddah and King Abdullah Economic City (see Table 2.2, Figure 2.6 and Figure 2.7).[58] This planned expansion will complement existing transport corridors within Saudi Arabia and across the entire region. Besides developing light and heavy rail, the critical importance of intermodal integration between maritime, bus, rail and air services under a coordinated leadership has also been recognized.

The Government has pressed forward with key projects, including an ongoing US$22.5 billion metro project in Riyadh (see Figure 2.3). Serving a ridership expected to exceed one million commuters daily, the metro's construction will generate an estimated 15,000 jobs in the near term.[59] Further, a modern, efficient transport system will spur the development of light industrial districts, new real estate projects and other entrepreneurial initiatives along the railroad— thus stimulating more economic activity and creating even more jobs.[60] The NTP outlines US$1.5 billion (or SAR 5.6 billion) in transport initiatives and sets a goal of increasing the number of cities benefiting from public transport projects from 11 to 16 by 2020.[61] As dense cities make public transport more efficient, targeted land-use policies can reduce the transport infrastructure needed, and improve equitable access in Saudi Arabia's cities.[62]

Vision 2030 emphasizes the importance of collaborating with the Gulf Cooperation Council countries, to create a common market; a customs union with shared laws and economic policies; and shared road and rail networks.[63] Under consideration is a 21km causeway worth US$4 billion that will link Saudi Arabia and Egypt.[64]

Notably, the considerable achievements described in this section are the result of various studies and programmes undertaken in coordination with several ministries and Government agencies, with regard to the perceived need for roads in the region.[65] Experience shows that the presence of supportive and nurturing governance, including sound institutional and regulatory structures, is essential for translating into reality, visions and plans for sustainable mobility.[66]

Figure 2.3: New public transport system in Riyadh



Public transit is currently under rapid expansion across the city. There are six metro lines currently under construction, simultaneously.

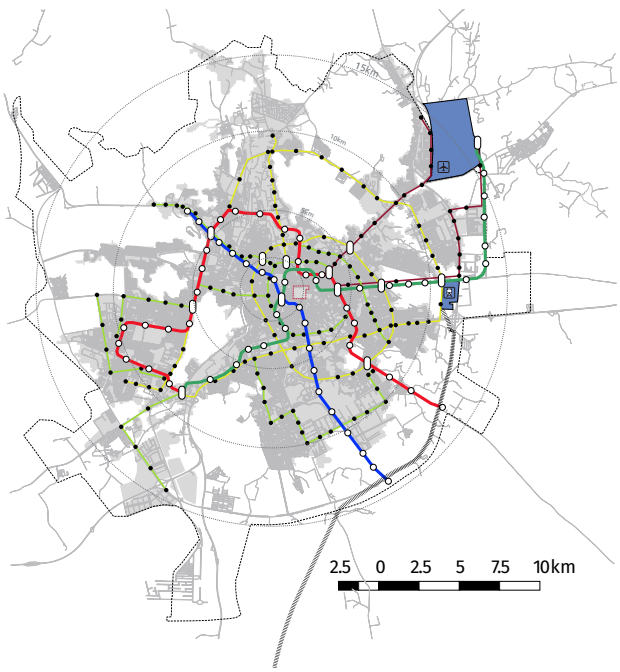
A Bus Rapid Transit (BRT) network with three lines as well as a revamped and organized bus network.

LEGEND

- Existing Major Roads
- Bus Feeder Route
- Bus Communty Route
- Metro Lines Design
- Metro Stations
- Existing Ring Roads
- Proposed Ring Road

Source: City Profiles, Future Saudi Cities Program.

Figure 2.4: Proposed transport network for Madinah



Madinah to build a smart mass transport system by 2021

Total length of 95 km, including 25 km underground and 48 km overhead

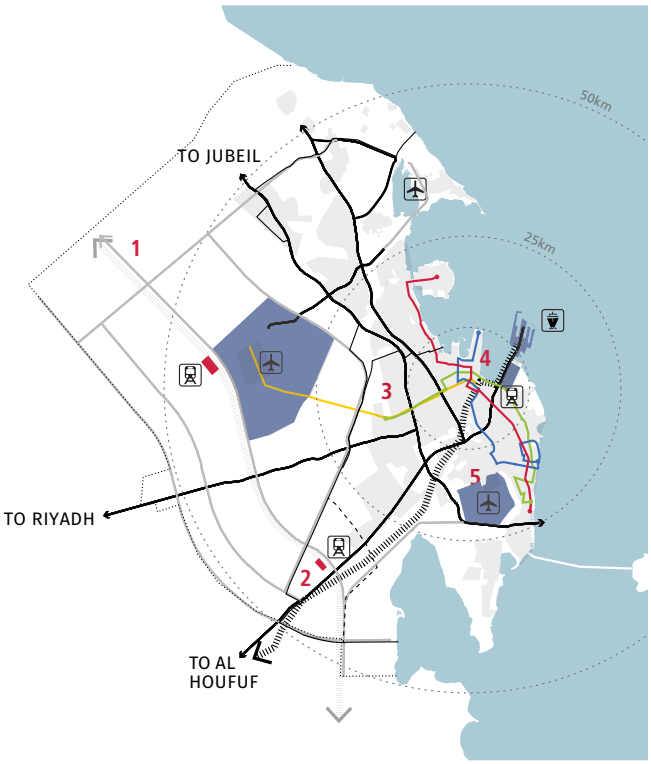
The proposal includes:

- 3 metro lines
- 2 bus rapid transit (BRT) lines
- 4 express bus routes
- 7 Feeder Bus Routes

- Metro Blue Line
- Metro Red Line
- Metro Green Line
- Rapid Train
- Feeder Bus
- BRT Line
- Express Bus

Source: City Profiles, Future Saudi Cities Program.

Figure 2.5: Transport network in Dammam



1. PROPOSED HIGH-SPEED RAIL - Linking the GCC countries including the UAE and Kuwait

2. PROPOSED HIGH SPEED RAIL STATION - On the proposed high speed rail, the closest station is more than 30km from the centre of the city

3 PROPOSED LIGHT RAIL - Connecting the airport with the city centre

4 PROPOSED PUBLIC TRANSIT - The proposed BRT and LRT lines have been planned to connect the city in a north-south manner with little transversal connectivity

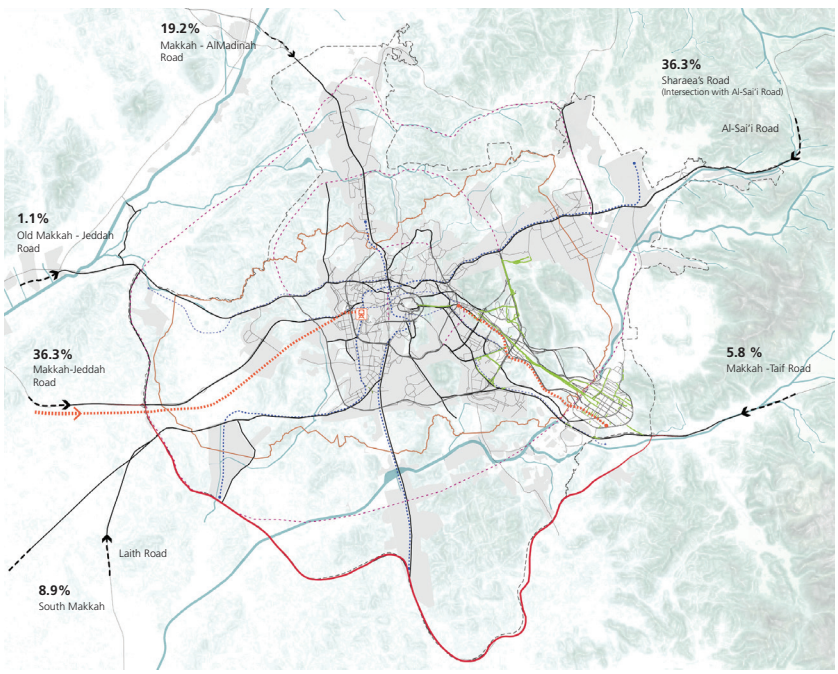
5 EXISTING MILITARY BASE - The existing military base occupies a large area between urban areas of Dhahran and Al Khobar

Train Station
Sea Port
Airport

Main Roads
Public Transport
Existing Railway
Proposed Railway

Source: City Profiles, Future Saudi Cities Program.

Figure 2.6: Transport network in Makkah

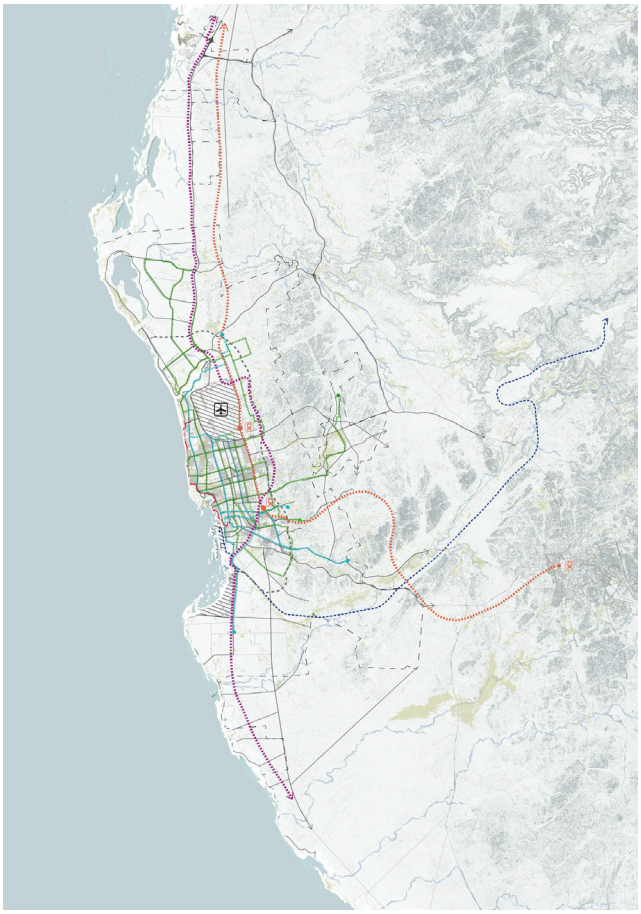


Existing Major Roads
Existing Ring Roads
Proposed Ring Roads
Existing Railways
Proposed Railways
Non-Muslim Bypass
Pedestrian Roads & Bridges
Makkah Sacred Boundary
Al Haramain Train Station
% Domestic Pilgrims Arrival to Makkah by road

Kilometers
0 2.5 5 10 15 20

Source: City Profiles, Future Saudi Cities Program.

Figure 2.7: Transport network in Jeddah



Source: City Profiles, Future Saudi Cities Program.

Box 2.2: E-hailing: Technological advances in Saudi Arabia

Uber and Careem are examples of e-hailing mobile apps that connect passengers with drivers of vehicles for hire. Progressively, it is anticipated that these companies will create employment for approximately 200,000 local men in the next two years, in support of the Vision 2030's economic reform plan. Most Uber users in the Kingdom are women, as in 2016 they accounted for 80% of users. As for Careem, the percentage reached 70%, but in 2018 the Saudi government allowed women to drive, which led to a significant decrease in their percentage. these cars offer women an alternative from being driven by chauffeurs, male relatives or the sometimes-chaotic taxi system. Presently, at least 800,000 low-wage male workers, mostly from South Asian countries, work as drivers for Saudi families.

Long waits for taxis, over-pricing, uncomfortable old vehicles and safety concerns, are the shortcomings of some of the traditional taxis, hence the prosperity of e-hailing mobile apps. .

Taught by existing female employees of Careem, the session educates attendees on national road laws, customer service techniques, and how to use the application's platform.

Source: Hassan, 2018.

2.2.2 Changing consumer preferences and behaviour

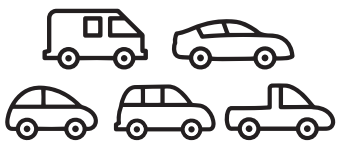
Alongside urbanization, other trends shaping Saudi Arabia's transport system are changing consumer preferences and behaviour. There is much hope that digital innovation will lead to mobility as a service, where the traveler is provided with time-responsive, multimodal information, on the best way to make trips, including planning and payment.[67] Thus, it is possible that Saudis, particularly women and youth, will reduce private car trips in favour of services like car sharing and e-hailing (Box 2.2).

The sharing economy is having an impact in Saudi Arabia and is expected to develop further. Much of this rising growth is driven by favourable conditions that include a ready labour force, a young population, high levels of urbanization, high technology adoption rates, national digitization plans, and available investment capital.[68] Accordingly, Saudi Arabia's NTP highlights 29 essential digital initiatives for key sectors, including funding for national assets.[69] To this end, the Saudi Public Investment Fund invested US$3.5 billion in Uber in 2016, as it sought to diversify its portfolio.[70]

Conversely, evidence confirms that the country's rural communities are particularly vulnerable to digital exclusion and, therefore, cannot benefit from the many digital technologies that streamline transport.[71] Other barriers to a flourishing sharing economy are the limited need and lack of a sharing culture.[72] Nonetheless, the potential gains from digitalization are huge and some are already being realized across the country.

The kingdom enjoys smartphone penetration rates above 70 per cent, and more than 50 per cent of e-commerce is done via this device.[73] Experience shows that high technology rates enhance the uptake of sharing economy platforms, which is attributed to the availability of low-cost smartphones.[74] More than half of the nation's population is younger than 25 years of age,[75] accounting for 73 per cent of the kingdom's smartphone subscribers. This has driven a sharp increase in e-hailing usage; the local Uber service announced an increase of 50 per cent in the number of trips taken in 2016.[76]

Notably, new shared mobility solutions are likely to change travel patterns particularly in the major cities. Several of these innovations provide opportunities to diminish, substantially, the carbon dioxide (CO_2) footprint of transport and improve inclusive and equitable access.[77] Led by the Ministry of Labour, the Telework Program is a national initiative aimed at enabling women and people with disabilities flextime work schedules away from the traditional office.[78] As the region's economies grow, digital commerce companies are turning into major employers and providing much needed employment opportunities for young people.[79] The sharing economy can also make additional transport and accommodation capacity available when needed. On the margin, and in the context of tourism sector development, this can help absorb visitor influxes during holidays or major events like the *Hajj*. [80] Arguably, policy and planning need to account for these changes to avoid building expensive infrastructure that may fast become obsolete or lock in inequitable development pathways.[81]



The nation is the prime importer of vehicles and auto parts in the Middle East, accounting for an estimated 40 per cent of all vehicle sales in the region

2.3 Private Motorized Transport

Despite political will and technological progress, transport demand in Saudi Arabia still responds largely to the economic environment. The nation is the prime importer of vehicles and auto parts in the Middle East, accounting for an estimated 40 per cent of all vehicle sales in the region.[82] At the focus of an industrial diversification strategy, are plans to develop a domestic automotive industry.[83] This is encouraged by the growth in trade flows and per capita income levels, and the entrenched social perception of the private car as a status symbol.[84] Moreover, there are no fiscal measures such as road tax, and vehicle excise duty in place to constrain car use. Owing to an already ageing vehicle fleet, however, the demand for automotive parts and services is likely to accelerate.[85] The discussion below summarizes the effects of the increased dependency on private motorized transport in Saudi Arabia.

2.3.1 Impacts of private motorized transport

The key factor influencing the growth of private motorized transport is the heavily subsidized fuel prices, insurance and maintenance at a cost that is becoming affordable for a growing number of Saudis. In 2013, Saudi Arabia imported more than one million vehicles for the first time resulting in a 2.5 per cent increase from the number imported the previous year.[86] Further, approximately 6.6 million vehicles were registered by early 2015.[87] Presently, the price of a litre of gasoline in Saudi Arabia is around US$0.54, compared with the global average of US$1.16 per litre.[88] Developments in this space generate numerous economic benefits, including direct employment in manufacturing, indirect employment in infrastructure and services, and major investments in urban areas. Conversely, a considerable range of negative externalities arise from increased motorization in Saudi cities, which dwarf the potential economic and social benefits (for example, facilitating productivity and promoting healthy lifestyles) of today's transport.

Among the reasons for using cars in cities are the Kingdom's climate, the lack of afforestation, and the urban design that is suitable for hot climates. With summer temperatures in Riyadh soaring to 48 degrees Celsius, a low proportion of trips are made by walking or cycling.[89] Poorly maintained sidewalks and uneven surfaces cause pedestrians to walk along road edges, thus exposing them to traffic accidents. This is especially so in high-traffic urban areas. Similarly, cycle routes, already sparse, are isolated and rarely connected, partly because cycle lanes are often difficult and costly to implement if they were not part of initial planning and traffic management.[90]

The Kingdom of Saudi Arabia is heavily dependent on oil, and suffers from major economic challenges related to traffic congestion, accidents and air pollution, as climate changes are a negative factor for cities, as excessive use of cars increases the rate of global warming. Urbanization and unregulated land uses led to urban development that is serving use of car, which caused sprawling and functionally separated cities, which consequently led to an increase in traffic flow and high rate of pollutio. Without a coherent and ambitious programme of actions and financing, these losses and imbalances will increase as the nation's automobile market grows, urban areas expand, and land use remains poorly regulated.[91] The car-oriented development has produced spatially diffused and functionally segregated settlements in belts around cities and towns. This continuing trend causes more traffic growth, resulting in increased pressures on the environment.

2.3.2 Traffic congestion

Traffic congestion is an undesirable by-product of widespread mobility in cities worldwide, and a major factor in restricting access in cities.[93] The dominance of motorization is demonstrated by the 12 million cars on Saudi roads and that fuel consumption is at 910,000 barrels per day.[94] In part, this explains the increased energy use and greenhouse emissions of Saudi cities as highlighted in Chapter 3. Further, the surge in vehicles has led to delays in travel time. In 2016, motorists in Saudi Arabia spent approximately 39 hours yearly stuck in traffic during peak hours, with a congestion rate of 16 per cent.[95]

Compounding this situation are outdated and poorly synchronized traffic signals in Jeddah.[96] For the most part, traffic congestion is responsible for significant social, economic and productivity costs for commuters and transporters nationwide. Seemingly, travel speeds are decreasing and the travel environment for pedestrians and people-powered vehicles is deteriorating.[97] As a result, the Ministry of Transport has commissioned extensive road construction to increase capacity and improve safety. For example, the upgrade to King Abdullah Road in Riyadh has resulted in enlarged capacity from 190,000 to 520,000 vehicles per day. The upgrade was done by increasing the road width and improving the layout design of junctions and intersections.[98]

A number of influential converging factors such as economic policies that maintain fuel subsidies and low car registration fees, and planning practices that encourage low urban population density all play a role in increasing motorization.[99] For instance, Riyadh, where on average households have 1.7 cars, saw the number of daily vehicular trips increase from 1 million in 1987 to 5 million in 2006 and 6 million in 2007.[100] Conversely, the share of daily public transport trips in Jeddah decreased from 19 per cent in 1970 to 2.3 per cent in 2007, due to poor public transport coverage and services.[101] Likewise, trends suggest that the trip share of other modes, including cycling and walking, also declined from 31 per cent in 1970 to 4.6 per cent in 2007.[102] Evidently, more options are needed for reliable, efficient and affordable ways to get to and from work, particularly around commuting routes that are underserved by public transport.

Roads in Makkah

It is perhaps not too surprising that car park availability leads to more car trips and encourages car ownership. In the capital city of Riyadh, there is an average of 2.1 metres of road per person, including 1,883 parking spots for every 1,000 person in the Central Business District.[103] Research posits that the control over available spaces, the length and availability and the costs of parking can prove effective in restricting private motor vehicle use, if incorporated in the overall National Transport Strategy.[104] Complementary traffic enforcement policies may be needed to ensure informal parking does not take place.[105]

2.3.3 Carbon dioxide emissions

Along with the congestion found on road networks throughout the Saudi Arabia is a significant degradation of environmental quality. The basic types of transport externalities attributed to the environment fall within air pollution, climate change, noise, impacts on nature and landscape, smog and acid rain.[106] Saudi Arabia emits 535 million tons of carbon dioxide (CO_2) a year, of which 131.3 million tons was from the transport sector as of 2014. [107] The bulk of this is accounted for by passenger transport, while the rest comes from freight transport. Included in Saudi Arabia's Intended Nationally Determined Contribution —to reduce national emissions and adapt to the impacts of climate change as per the Paris Agreement— is a commitment to an annual reduction of 130 million tons of CO_2 emissions by 2030.[108] Achieving this goal is not restricted to international financial support but rather to the continuation of economic growth, and "a robust contribution from oil export revenues to the national economy."[109]

From another dimension, oil consumption from the transport sector is forecast to reach SAR 371.8 billion (US$ 99.3 billion) by 2030, equivalent to 10.4 per cent of Government revenues and 4.8 per cent of GDP.[110] Given the considerable growth in urban travel demand in Saudi Arabia, mitigation technologies and practices are urgently required to achieve a significant national reduction in carbon-based energy use for carbon transport.[111] Still, the most harmful impact of the nation's transport sector comes from the daily use of vehicles in cities, most of which are over 15 years old and irregularly maintained.[112] Adopting and enforcing environmental standards and regulations is subject to sounder traffic management operations. Environmental specifications are furthermore limited to the ability to license vehicles and conduct inspections, led by the Ministry of Interior's Traffic Department.[113]

Whereas the nation does not have specific targets for the transport sector, recently it has started to expand public transport and rail infrastructure as pointed out in preceding sections. Research posits that using buses instead of passenger cars decreases emissions per passenger kilometre of carbon dioxide, nitrogen oxides (NO_X), carbon monoxide (CO), and hydrocarbon (HC) by 3.6, 3.0, 19.2, and 10.2 times, respectively.[114] The use of rail transport or ships instead of trucks to move freight, magnifies those benefits. As part of its National Spatial Strategy 2030, the kingdom aims to protect the environment, reduce urban sprawl and promote spatially balanced development, with one key goal being to encourage the use of integrated public transport in major cities.[115] Led by the Saudi Standards, Metrology and Quality Organization (SASO), the Government has also implemented a fuel efficiency standard for light duty vehicles.[116] Few measures have been enacted to support a modal shift or low-carbon vehicles. The encouragement of non-motorized modes is another approach towards reducing emissions of local projects.

Chapter 3 contains a more elaborate discussion on resilience planning. This is important in ensuring that passenger and freight transport infrastructure, services and operations are able to adapt well to the kingdom's climate change-related events. To protect the existing infrastructure from the impacts of climate change, the Government established the *Sustainable Planning Guidelines for Urban Growth* to prohibit the development of new projects in areas at risk to flooding, seismic activity, or environmental pollution.[117] Added investments may be necessitated, however, for drainage, erosion control and protective engineering structures.[118] Having a diversified transport system can also help Saudi cities build resilience to a range of shocks.

2.3.4 Air pollution

The transport sector represents a major consumer of energy in the region and significant contributor to CO_2 emissions accounting for 23 per cent, of which 85 per cent is attributed to inland transport.[119] In addition to CO_2 and other greenhouse gas emissions, the sector is the main source of carbon monoxide discharge and volatile organic compound (VOC) effluents. Evidence confirms that Saudi Arabia's per capita production of carbon dioxide reached 19.4 tonnes per person according to the statistics of the World Bank in 2011, while the country's total emission of this gas stood at around 601 thousand kilotons, according to World Bank metric statistics, in the same year.[120] Research suggests that developing transport in a way that mitigates these emissions is possible and can make a tremendous impact on Earth's climate.[121]

In parallel with this trend, the impacts of transport-related air pollution on air quality and human health are gaining increasing attention from residents and local Departments.[122] The economic burden of this poor air quality is estimated to be between SAR 6.4 billion (US$1.7 billion) and SAR 16.8 billion (US$ 4.5 billion).[123] Evidently, the impacts of transport-related

Table 2.3: Applicable air quality standards

Criteria Pollutants	Averaging Period	Royal Commission Standards (µg/m3)[128]	PME Standards (µg/m3)[129]	World Health Organization Standards (µg/m3)[130]		USEPA Standards (µg/m3)	
NO_x (as NO_2)	1-hour	$660_{(1)}$	$660_{(1)}$	1-hour	200	1-hour	
	Annual	100	100	Annual	40	Annual	100
SO_2	1-hour	$730_{(1)}$	$730_{(3)}$	10-minute	500	1-hour	197 (75ppb)
	24-hour	$365_{(2)}$	$365_{(2)}$	24-hour	20	3-hour	$1,300_{(5)}$
	Annual	80	80				
PM_{10}	24-hour	150	340	24-hour	50	24-hour	$150_{(6)}$
	Annual	50	80	Annual	20		
$PM_{2.5}$	24-hour	35	35	24-hour	25	24-hour	35
	Annual	15	15	Annual	10	Annual	12
O_3	1-hour	240	295	8-hour	100	8-hour	140 (70ppb)
CO	1-hour	$40,000_{(2)}$	$40,000_{(1)}$			1-hour	$40,000_{(2)}$
	8-hour	$10,000_{(2)}$	$10,000_{(1)}$				10,000+

Notes: (1) This standard is not to be exceeded more than twice per month; (2) This standard is not to be exceeded more than once per year. (3) This standard is not to be exceeded more than twice per year; (4) 99th Percentile of 1-hour daily maximum concentrations, averaged over 3 years. (5) Not to be exceeded more than once per year; (6) Not to be exceeded more than once per year on average over 3 years.

air pollution affect all urban residents. However, there is substantial evidence that it affects the poor, children and the elderly more than others. In fact, the social groups that are most seriously impacted are often not those that cause the pollution.[124] Chapter 3 describes the main groups of transport pollutants, including NOx, VOC, CO and particulate matter (PM), including other pollutants.

While air pollution is undoubtedly a global problem, the highest concentrations of one of the most damaging pollutants, $PM_{2.5}$, have been found in the region. They are known to penetrate deep into lungs, causing deadly diseases like cancer and heart disease. Falling within the 20 most polluted cities in the world, the annual average mean value of PM_{10} concentration in Riyadh reached 368 µg/m,^{3} on a scale where 300 is considered hazardous; the World Health Organization (WHO) recommends a daily level of no more than 20 µg/m^3.[125] Similar elevated levels of NOx, O_3, and sulphur dioxide (SO_2) have also been reported in Dhahran, Jeddah and Riyadh, which must be reduced by careful strategic planning in the cities.[126]

Led by the Presidency of Metrology and Environment (PME), the kingdom prescribes values for ambient quality parameters to prevent or reduce harmful effects on human health and the environment (Table 2.3). It is expected, however, that measures including wide street provision; reasonably fast-flowing traffic; well-developed traffic plans and automated traffic control; and the introduction of unleaded gasoline will help reduce the impact of vehicle-generated pollution.[127]

2.3.5 Transport safety and security

Transport safety and security is also diminishing in Saudi cities. Some of the impacts of this can be valued monetarily. Saudi Arabia is among the top 10 countries with the highest traffic fatality rates in the world, with road crashes costing up to 6 per cent of the national GDP.[131] Evidence confirms that as of 2015, the average road fatality rate had reached 27.4 deaths per 100,000 population, outstripping those of Europe (5 deaths per 100,000 population) and the United States (10 deaths per 100,000 population).[132] In 2016, about 9,031 people died as a result of road traffic accidents, a quarter of these fatalities were in Makkah Region.[133] It is currently estimated that an average of 20 deaths per day on Saudi roads.[134]

There is strong evidence that road traffic injuries are the single largest cause of mortality and long-term disability among Saudi's 16-30 years old, the prime working age.[135] Arguably, reducing the number of injuries would result in long-term national income growth as measured through GDP.[136] Child pedestrians are the most vulnerable road users, accounting for nearly half of all road traffic injury patients and, therefore, should be given special attention in road safety policy.[137] This is an eminently preventable problem that is critical to the nation's development agenda, if transport policy truly prioritizes moving people over moving cars.[138]

The predominance of vulnerable road-user casualties can be attributed to speeding vehicles, driver error and violation of traffic signals at intersections. Road traffic accidents cost the country approximately SAR 21 billion (US$5.6 billion) annually, with tailgating (driving too closely behind another

Box 2.3: Saudi Arabia invests in road safety

Commissioned by the Saudi Ministry of Transport, Telvent recently completed the company's first Intelligent Transport System (ITS), Smart Mobility Road Suite, on a 6km stretch of King Abdullah Road in Riyadh. The system manages four tunnels along the urban expressway, and since its installation, there has been a marked reduction in road accidents, including fuel consumption and the travel times within the city. Subsequently, pollutant emissions by automobiles have been lowered, which in turn improves both air quality and the environment for Saudi citizens.

To yield best benefits of smart traffic management techniques ITS need high levels of integration to service traffic and transportation information for the entire transport network users. This allows for a more rapid response to accidents, and allows drivers to choose optimum routes, devoid of traffic. Additionally, an automated traffic control system has been introduced across the Kingdom, to deter aggressive driving. This ensures that drivers who are speeding or run red lights can be identified and fined. Also included is a web-based system that geolocates rental cars and pinpoints those being carelessly driven.

Progressively, Telvent collaborates with the *Arriyadh* Development Authority, MoT, and the Municipality of Riyadh (AMANA) in the development, design and implementation of ITS applications on road infrastructure. Numerous development efforts by different agencies calls for coordination to avoid fragmentation, since the transportation system shall serve Riyadh's residents across jurisdictional lines.

Source: Woof, 2018; Telvent USA, 2012.

vehicle) identified as another major cause.[139] This exposes the limitation of a transport-oriented bias to mobility, including the efficiency of land-use systems in a given city.[140]

Under NTP 2020, US$ 800,000 was allocated for the improvement of road safety.[141] A significant part of this budget has been devoted to sophisticated traffic management and Intelligent Transport System technologies to improve traffic flow and security for travelers (see Box 2.3).[142] The responsibility for traffic safety is jointly shared by the Ministry of Interior (MoI), which is overseeing and regulating the vehicle fleet and traffic regulations, the Ministry of Transport (MoT) and Ministry of Municipal and Rural Affairs (MoMRA), which are building and maintaining the road infrastructure with all its traffic engineering elements such as road signs and signals.[143]

The Ministry of Interior has developed an automatic traffic management system (Saher), and this system has contributed to raising the level of traffic safety on the main and branch roads, as traffic violations have limited the high speed, which is the main cause of accidents in the Kingdom, and this system has contributed to reducing traffic accident deaths by 38%

2.4 Formal Public Transport

Collective public transport systems are an important contributing factor to urban sustainability. Effective transport networks that incorporate public transit help lower a city's per capita carbon footprint, and make cities more livable by easing commute and transport needs, thus increasing urban accessibility.[144] With an expanding population like that of Saudi Arabia, and a high auto-dependency culture, high-capacity public transport systems that focus on commute for the masses will make a great impact towards sustainable urban mobility (Table 2.4). However, the mere presence of public transport— the number of formal buses and rail— does not paint a complete picture. A well-designed integrated transport network should be accessible, affordable, safe, reliable, secure, low carbon, comfortable, efficient, and convenient to use.

Table 2.4: Public transport network being planned in five major cities in Saudi Arabia

City	Number & Lengths of LRT Routes (Km)	Lengths of BRT Routes (Km)	Lengths of Standard Buses Routes (Km)
Makkah	(# 4) 182	95	765
Madinah	(# 5) 61	145	360
Riyadh	(# 6) 176	85	1133
Jeddah	(# 3) 108	-	750
Dammam	(# 2) 86	70	354

Source: Ministry of Transport, 2011.

Increasingly, there are indications that the establishment of rail and BRT solutions in Saudi's major cities are bound to generate significant land use changes, plus rapid growth, and rising incomes. This of course presumes there is supportive planning and zoning; public-sector leveraging and risk sharing; a commitment to travel-demand management to remove any built-in incentives to car use; and the capacity to manage the land-use shifts that are put into motion by transport infrastructure investments.[145] Suitably, Saudi planners must take into account how people (or goods) travel between transport hubs and their final destinations, which is termed as the "first and last mile" of any trip.[146]

In Saudi Arabia, public transport is typically operated by the formalized Saudi Arabian Public Transport Company (SAPTCO) and unregulated buses managed by a growing number of entrepreneurial individuals. Established in 1979, SAPTCO offers an extensive transport system that connects more than 282 cities and villages all over the country. The company's intracity services covers main cities: Makkah, Madinah, Riyadh, Jeddah and Dammam.[147] Besides providing intercity and intracity connectivity, the company renders transport for tourism, pilgrimage to the holy cities, educational, corporate, luxury and cargo services.[148] Serving more than 6 million passengers, according to the annual report of SAPTCO. SAPTCO operates around 4,500 vehicles and makes up to 800 daily trips across the Middle East.[149] A major equity issue confronting the region involves the marginalization of lower-income groups and unskilled expatriate workers, throughout contemporary transport planning.[150]

In recent years, public transport's downward spiral in the kingdom has been attributed to poor performance, low bus loading and limited accessibility to bus services in urban areas.[151] Not surprisingly, traveling by car is perceived as the quickest and most comfortable option, due to the lack of coordination and integration between the various transport modes.[152] Yet despite the granted monopoly on transit services within and between Saudi cities, SAPTCO is underutilized, and faces uncontrolled competition from unregulated bus services known as *jitneys*.[153] These vehicles operate on major roads and have a distinctive design; the chassis is white, with an orange line in the middle and a blue, green or maroon lower half. Nevertheless, the use of informal motorized transport in Saudi Arabia is lower than other parts of the region, as private taxi services are regulated nationally and there is more stringent enforcement against those operating illegally.[154]

As a region characterized by cultural restrictions on the involvement of women in public life, gender-based inequality

Box 2.4: Analyzing public transport use trends among Saudi youth

A social media analysis conducted on Twitter by the King Salman Center for Local Governance (KSLG), examined the public discourse on the quality of life in Saudi cities. It explored the crisis of sustainability in urban transport, from the perspective of young adults. Around 24 per cent of the tweets underscored chronic traffic congestion and poor road infrastructure as constraints to the mobility and accessibility of young travellers. Further, 20 per cent of the tweets highlighted road carnage, while 12 per cent stated the driving ban on women as additional mobility limitations.

Findings from a youth survey, which integrated the social media analysis revealed that 95 per cent of Saudi young male adults drive their own cars. However, 36 per cent of Saudi young women have personal drivers; 36 per cent rely on male relative drivers; 19 per cent use e-hailing apps; and 7 per cent use regular taxis. These signal a compelling need to transition citizens from car dependency to public transportation reliance. With less human capital (work experience and education) and correspondingly lower incomes than older adults, younger travellers stand to benefit from road and rail networks, which offer a cost-effective and accessible means of getting around Saudi's cities. Seemingly, 81 per cent of the young male and 78 per cent of the young female respondents preferred to use public transport, if it was made available.

Beyond affordability, Saudi youth may see other personal and societal benefits to using public transport, including the ability to engage with digital socializing while traveling, working en route, and reducing the environmental impact of their travel. Relatively few urban transportation policies or plans (i.e. road or public transport) take any of this into account when planning infrastructure, routes, levels of service, or fare structures, or include children and youth in planning.

A general indicator of this neglect is the lack of data from urban areas on children and youth travel behaviour by travel mode, trip purpose, age and gender. The opportunity is ripe for Saudi Arabia to shape the next generation of urban transport users by collecting data and developing policies and plans that are more inclusive. This will promote safe and sustainable travel behaviour, and a diversified transport infrastructure that provide opportunities for employment, education, and equality; reduce conflicts; and promote health, leisure; globalization and participatory planning.

Source: UN-Habitat, 2017; APTA, 2013; Blumenberg et.al., 2012; McMillan, 2013.

in access to transport is also endemic.[155] Evidence confirms that women constitute less than 9 per cent of the total SAPTCO ridership due to poor service coverage and the lack of regard for privacy.[156] One promising approach is Riyadh's metro trains, for example, which will feature designated family sections for female passengers.[157]

Interestingly, the nation has a stated policy goal to "minimize the level of transport using private cars and enhance the public transport regardless of age, sex, income and ability" by 2025.[158] Still, there is considerable stigma attached to the use of public transport in Saudi Arabia (Box 2.4). For the youth, if availed, public transport offers a cost-effective means of traveling independently, and in some cases, it can delay the need to drive private motorized vehicles.[159] There is, therefore, need to enhance the public image and acceptance of public transport systems. More should be done to ensure that such transport is more efficient, door-to-door oriented, attractive and universally accessible, thereby driving up demand.[160]

In 2012, the Government established the Public Transport Authority (PTA) and allocated SAR 200 billion (US$53.3 billion) for public transport projects and for regulating the public transport services within and between cities.[161] To support the policy shift towards public transport, SAPTCO has redefined its goals and objectives.[162] Under its new strategy, the critical importance of a seamless and holistic multimodal integration to enable accessible mobility in Saudi's cities is recognized. Urban planning and land-use policies, together with transport demand and fiscal measures, can encourage a shift in preference for public rather than private transport.[163]

...the development of six metro lines across Riyadh supported by a 1,150-kilometre BRT network will generate an estimated 15,000

Although the private sector plays an important role in the economy, it contributes less than 40 per cent of GDP.[164] Arguably, a new business model for funding public transport needs to be forged.[165] Currently, SAPTCO is exploring new sources of long-term financing at significantly lower costs, for ongoing and proposed urban transport projects.[166] Notably, however, alternative and sustainable funding options should include cost-cutting through reprioritizing networks, optimizing the choice of transport mode for corridors, and improving the operational speed of vehicles in service. To increase revenue, SAPTCO is promoting the use of public transport and its benefits through media and community awareness campaigns.[167] An important precursor to increasing such ridership is the provision of high quality services, such as connectivity and coordination of services, including flexibility and trip chaining, particularly for women.[168]

2.4.1 Impact of formal public transport

Public transport systems considerably shape the economic, environmental and social foundation of urban life in positive ways, establishing a central prerequisite for sustainable cities.[169] Seamless movement within and between Saudi's cities through efficient mass transit systems is essential to the nation's urban functionality and prosperity.[170] Significant among positive environmental impacts are lower emissions of airborne pollutants and greenhouse gases.

A well-integrated public transport system can also boost economic efficiency, while providing jobs and bringing business to otherwise underserved communities. While spectacular in its own right, the development of six metro lines across Riyadh supported by a 1,150-kilometre BRT network will generate an estimated 15,000 skilled and non-skilled jobs..[171] Led by the Ministry of Labour, the 'Saudization' of the workforce aims to attract and train Saudi engineers, technicians and other skilled talent to manage and maintain road and rail infrastructure.[172] Furthermore, it is anticipated that public transport development will indirectly support manufacturing, new real estate projects and other economic activities along rail lines.[173]

Public transport often faces serious fiscal challenges; some are the initial investments and sustainable financing for the long term. The first problem involves budgeting and sourcing funds to pay for public transport and infrastructure for non-motorized transport modes (sidewalks, cycle paths, sheds to store bicycles, among others). Second, is the challenge of financing the operation and maintenance of this infrastructure. Accordingly, the 9th Development Plan encouraged the establishment of modest fees for municipal services to shore up their own local revenues.[174] As such, the nation's road sector revenues are largely generated by user fees from vehicle registration and licenses, including import duties on vehicles and spare parts.[175]

It has been estimated that the total road-related revenues through toll is only SAR 300 million (US$80 million) per year. This is grossly inadequate compared to the Government's

annual budget of approximately SAR 1.5 to SAR 2.0 billion (US$400 million to US$533 million), devoted to expansion and maintenance of the road network.[176] Given the limitations of public funds to finance public transport, the authorities must innovate and embrace some of the funding tools successfully used in cities worldwide, such as value capture, transit-oriented developments, congestion charging and fuel taxes. The public transportation system can become practically sustainable in the long run when sufficient investments are made in the system to cover revenues and expenditures. It is worth noting that the costs borne by society due to the lack of investment in the urban transport sector, specifically public transportation, will be high because the quality of the system is closely related to the direct investment in this system.[177]

Whereas public transport must always remain affordable,[178] SAPTCO is obliged to charge fares that do not cover its costs. Additionally, due to low municipal budgets, the company is frequently uncompensated for the shortfall. This leaves little funding to maintain or improve the existing infrastructure and equipment. By providing an initial subsidy, public transport operators will be encouraged to undertake capital-intensive, high-risk mass-transit projects.[179] Not only will the subsidy cover part of the costs, it will help keep public transport fares low thereby increasing affordability for commuters.[180]

Well-functioning institutions and high levels of political support are indispensable for establishing and maintaining quality infrastructure and services for urban mobility.[181] However, decision-making in Saudi Arabia's transport sector is fragmented between the Ministry of Interior's Traffic Department and the ministries of Municipalities and Rural Affairs (MoMRA), of Transport (MoT), and of Commerce and Industry (MoCI). This is due to overlapping institutional responsibilities. Only a few cities in the Gulf Cooperation Council countries, have a history of operating urban public transport, thus they lack an appropriate and coordinated transport policy. To address the institutional, regulatory and governance concerns, the identification of a lead authority to provide strategic direction in decision-making is thus a pre-requisite of coordinated action.[182]

It is essential that all stakeholders in urban transport participate in the governance and development of urban mobility systems in Saudi cities.[183] These stakeholders include all levels of Government, transport providers and operators, the private sector and civil society. At a minimum, the Government can set and implement an enduring vision for what sustainability and urban mobility means.[184] This must include specific desired public outcomes such as reducing carbon emissions, limiting natural land conversion, slowing car-ownership rates and preventing air pollution. Without a clear vision, action will remain uncoordinated and devoid of direction, translating into high opportunity costs.[185]

2.4.2 Measuring public transport performance: The City Prosperity Index

As discussed above, a lot of emphasis has been placed on new and expensive infrastructure development to meet the supply gaps in Saudi Arabia's public transport. Consequently, cost-effective measures like improving service quality, urban accessibility, and considering passengers' perceptions have often been overlooked.[186] Correcting this oversight calls for the assessment of the available transport modes to ensure

Al Hada Road from Makkah to Taif

Table 2.5: CPI dimensions, sub-dimensions and indicators related to urban mobility, street connectivity and air quality

CPI	Sub-dimension	Indicators
02 Infrastructure Development	Urban Mobility	• Use of Public Transport • Average Daily Travel Time • Length of Mass Transport Network • Affordability of Transport
	Street Connectivity	• Intersection Density • Street Density • Land Allocated to Streets
05 Environmental Sustainability	Air Quality	• Number of Monitoring Stations • PM_{10} Concentrations • CO_2 Emissions

Source: Adapted from UN-Habitat, 2016a.

that they are fulfilling their expected roles and meeting various standards regarding the environment, safety, equity and comfort.[187]

To make public transport services attractive, and in so doing increase their modal shares, public services in the major cities must be well-planned, well-operated and well-marketed.[188] Furthermore, they should be measured and monitored on a continual basis. Multiple actors, must work together to create environmentally and financially sustainable urban transport systems.[189] A system that enhances the protection of natural resources, improves public health, strengthens energy security, expands the economy, and provides mobility to disadvantaged people.

As earlier indicated, Saudi Arabia's policymakers have consistently made targeted investments in transport and communications infrastructure, which is a major factor underlying urban prosperity. This implies success, wealth, thriving conditions, well-being, confidence in the future and opportunities for all. Furthermore, prosperous cities offer a profusion of public goods, allowing for equitable access to "commons" and the development of sustainable policies.[190] Urban transport, because it facilitates access, is fundamentally a public good.[191]

The adoption of a more "people-centred" urban prosperity in the UN-Habitat's City Prosperity Index (CPI) has already led to a more holistic approach to integrating six key dimensions (productivity; infrastructure; quality of life; equity, environmental sustainability; and urban governance and legislation) into a coherent framework.[192] Based on city-level data, the Index applied in Saudi Arabia identifies issues related to urban mobility, street connectivity and air quality in 17 cities across the county (i.e. Riyadh, Makkah, Jeddah, Taif, Medina, Tabuk, Dammam, Qatif, Al-Hasa, Abha, Najran, Jazan, Ha'il, Arar, Al-Baha, Buraydah and Sakaka). The indicators used in the Saudi Arabia case are outlined in Table 2.5.

Built as an incremental approach, the Index attempts to respond to cities' contextual needs, and to adapt creatively to their challenges and opportunities.[193] It provides a measure of the state of city prosperity based on the strength or weakness of the results of each dimension, sub-dimension, sub-index and indicator. The scale goes from 0 to 100 index points and it is divided in seven groups (see Figure 2.8 and Table 2.6), ranging from *extremely weak* to *very strong*, defining in each case the recommended type of intervention.[194]

Four typologies were defined based on selected cities, which varied in terms of size and geographical locations. The selected cities the two Holy Cities (Makkah and Madinah); major cities (Riyadh, Jeddah, Dammam, Al-Ahsa and Taif); medium size cities (Buraydah, Tabuk and Ha'il); and minor cities (Qatif, Abha, Najran, Sakakah, Arar, Jazan, and Al-Baha).[195] Figure 2.8 summarizes the CPI of Saudi Arabia's 17 selected cities in terms of the urban mobility, street connectivity and air quality sub-dimensions and indices.

Urban mobility sub-dimensions and indices

All the selected cities displayed relatively weak performance in the urban mobility sub-dimension, with the low values indicating they are far from achieving sustainable urban transport systems, unless efforts are escalated. The major cities of Riyadh, Jeddah, Dammam, Al-Hasa and Taif also performed weakly, scoring 49.6 points in the indicators of urban prosperity, reflecting the poor availability of collective public transport, most likely due to infrastructure that has not kept pace with urban growth. Yet it is important to note that the development of a sustainable transport system starts with

Figure 2.8: CPI for 17 Saudi cities (urban mobility, street connectivity and air quality)

**(1) Extremely weak (0-9); (2) Very weak (10-39); (3) Weak (40-49); (4) Moderately weak (50-59); (5) Moderately strong (60-69); (6) Strong (70-79); and (7) Very strong (80-100)*

Source: Adapted from UN-Habitat, 2016a.

the organization of space. This is aimed at reducing the need for mobility by decreasing the number of trips and length of travel distance. Consequently, urban density is optimized and functionality of urban places enhanced.[196]

Weak connection between land use and mobility has created the urban sprawl evident in Saudi cities. Hence, an extremely weak performance from the use of public transport indicator was obtained; a score of 1.5 points in the indicators of urban prosperity, confirming that the service is underutilized (see Table 2.6). This implies that more needs to be done to establish good performance evaluation systems for public transport in Saudi Arabia, as in addition to the increasing urban mobility demand mobility needs are evolving.

Whilst most Saudi's city dwellers still rely on private cars, there is a steady change to travel habits that embraces public transport services. There is also an attendant demand that the services improve convenience, affordability, speed and predictability. Seemingly, there is a need to provide local authorities both incentives and management tools to implement sustainable transport policies and encourage a shift towards a more sustainable urban mobility culture, particularly in the minor cities whose performance score was very weak. Systematic collaboration between all of Saudi Arabia's urban mobility stakeholders is vital for developing innovative and integrated business models.[197]

Street connectivity sub-dimension and indices

Improved street connectivity is a key element of urban transport; it redistributes traffic along an entire street network.[198] The percentage of urban land allocated to streets is another factor that influences the level of connectivity between urban areas. The holy cities scored the highest points, with 78.4 points in the indicators of urban prosperity in the street connectivity sub-dimension. due to infrastructure projects to ensure timely, efficient and safe pilgrim mobility.[199] There is enhanced non-motorized travel when the number of street connections is increased, thus improving livability in cities. This is demonstrated by the very strong performance of the indicator on intersection density, with a score of 88.5 points as shown in Table 2.6. Key considerations for sustainable mobility include the pattern of street arrangement, the length of blocks and the relationship of buildings to pathways, stations and central places.[200]

Air quality sub-dimension and indices

In terms of air quality and monitoring, Saudi cities have experienced a heightened increase in the size of vehicular fleets and polluting activities, recording a weak overall CPI of 45.1 points in the indicators of urban prosperity, as indicated in Table 2.6. Madinah and Makkah are extremely weak in the air quality sub-dimension, with a score of 8.1 points in the indicators of urban prosperity, due to high levels of PM_{10} concentrations and CO_2 which severely impair health

of residents.[201] Regrettably, the progressive functioning of national-level policies that impact air quality is impeded due to lack of data.[202] Table 2.6 outlines the performance measure of indicators for the urban mobility, street connectivity and air quality sub-dimensions and sub-indices.

The traffic fatalities indicator scored a moderately weak value of 53.7 points in the indicators of urban prosperity, with injuries being recognized as the main cause of mortality and mobility in Saudi Arabia. To curb the high rates of road fatality, the country has adopted a range of national road safety strategies These include strict legislations on vehicular speeds, motorcycles, and the use of seat belts.[203] Surveillance cameras have also been installed at all major road segments.

2.5. Revisiting urban mobility: Concluding remarks

Sustainable transport is fundamental to progress. It supports inclusive growth and job creation, access to markets, the empowerment of women, and the well-being of persons with disabilities and other vulnerable groups. It is also essential to any credible efforts to fight climate change, reduce air pollution and improve road safety.[204] Yet, despite relatively successful urban development, this chapter demonstrates that Saudi Arabia's patterns of settlement, urban infrastructure and social organization are vulnerable to rapid urbanization, changing demographics, diminishing resources, climate change and the growing frequency of extreme weather events. Against this backdrop, Saudi's cities are facing an unprecedented accessibility crisis. Access to places, activities and services has become increasingly difficult, despite high levels of urban mobility.

Given the increased individual car-ownership in cities, travel options are limited. This is compounded by the stigmatization of collective transport modes. Besides, road traffic accidents are among the main causes of premature deaths in the country. Similarly, the health effects of air pollution caused by motorized urban transport is a cause for concern.

To manage the growing urban population and maintain economic growth, the country's transport systems need to be sustainable and offer multiple ways of moving about in cities, not just facilitating the flow of traffic. This approach differs from the business-as-usual transport planning that tends to focus on road-capacity expansion and maximizing the distance and speed of vehicle movement. Unfortunately, this creates a self-reinforcing cycle of automobile dependency and urban sprawl, and fails to serve such demands as rural transport infrastructure and service needs.

Although the construction of more roads is paramount to create the conditions to design effective transport systems, urban planning and design for Saudi cities is crucial to reduce distances, and increase accessibility to enhance sustainable urban transport solutions. This chapter determines that city residents can achieve access through telecommuting and car-sharing, or travelling short distances, which contributes to reducing some of the challenges currently posed by urban transport.

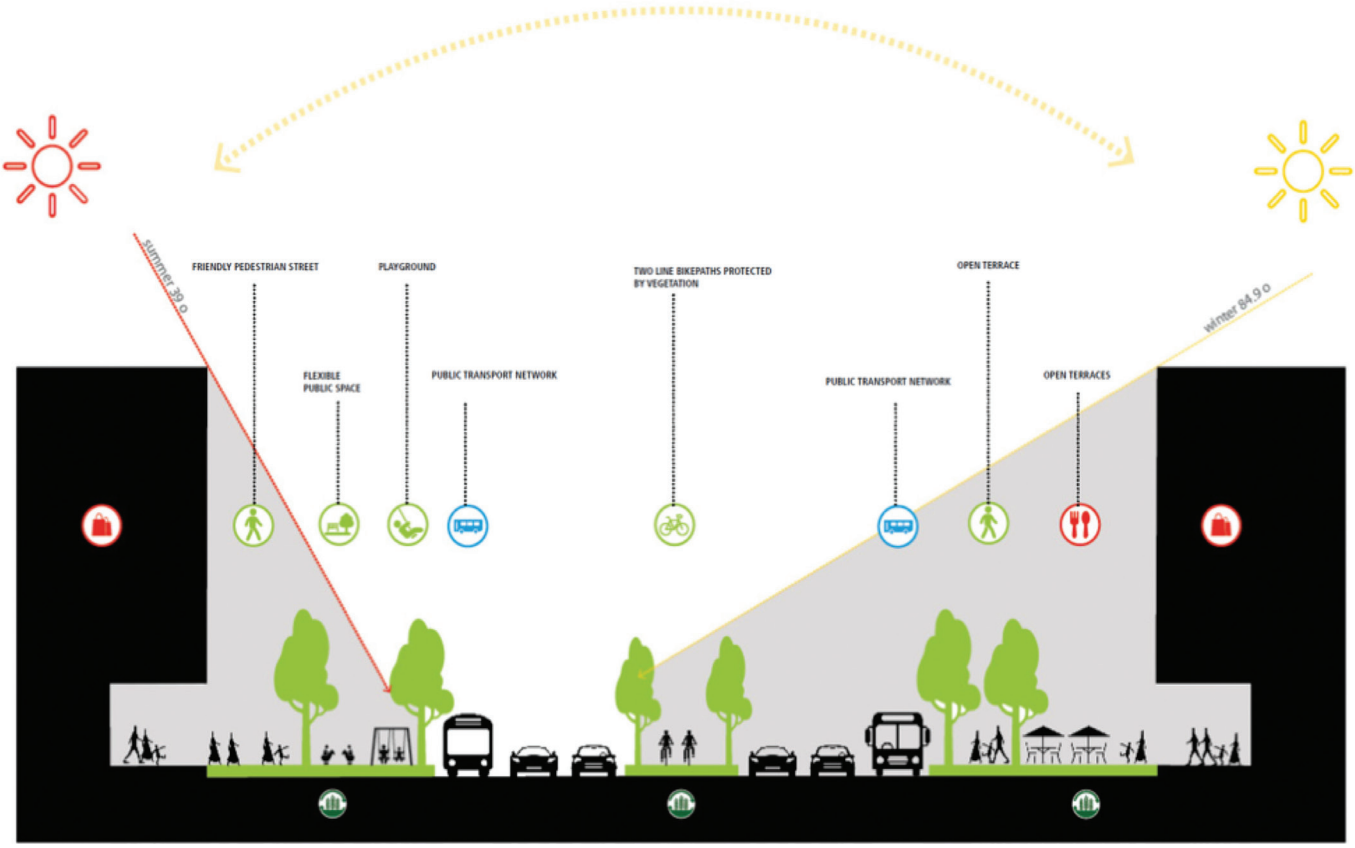
Table 2.6: Performance measure of indicators for urban mobility, street connectivity and air quality sub-dimension and indices

Urban mobility sub-indices*		Street connectivity sub-indices*		Air quality sub-indices*	
Indicators	CPI KSA-17cities	Indicators	CPI KSA-17 cities	Indicators	CPI KSA-17 Cities
Use of Public Transport	1.5	Intersection Density	88.5	Number of Monitoring Stations	60.3
Average Daily Travel Time	100	Street Density	37.7	PM_{10} Concentration	18.8
Length of Mass Transport Network	0.0	Land Allocated to Streets	74.2	CO_2 Emission	1.4
Traffic Fatalities	53.7				
Affordability of Transport	86.9				55
City Average	48.9	City Average	48.9	City Average	45.1

**(1) Extremely weak (0-9); (2) Very weak (10-39); (3) Weak (40-49); (4) Moderately weak (50-59); (5) Moderately strong (60-69); (6) Strong (70-79); and (7) Very strong (80-100)*

Source: Adapted from UN-Habitat, 2016a.

Figure 2.9: An example of "complete street" typical section detailed for Dammam City Profile



Source: City Profiles, Future Saudi Cities Program.

A three-pronged strategy can help ensure a sustainable approach to urban mobility in Saudi Arabia. The first priority entails avoiding carbon-intensive mobility systems, such as private vehicle use through compact city planning, mixed land use and transit-oriented development standards.[205] At the micro level, an opportunity exists for transport planners and policymakers to build cities around the concept of "complete streets", thus fostering liveable communities.[206] One example is multiway boulevards that provide spaces for cars, buses, pedestrians (and sometimes even tramways) packaged with good designs that emphasize high-quality spaces and safety[207]. Consequently, the consideration of the regional cultural, social and economic realities, including the requirements of city residents and the behavioural patterns of commuters travelling to it, is essential.[208]

Shifting to more environmentally friendly modes of transport, such as public transport and non-motorized transport modes (walking and cycling), constitutes the second priority, while the third involves improving the energy efficiency of transport modes and vehicle technology.[209] This strategic approach enhances performance by targeting the supply of and demand for transport. It allows cities to build on existing infrastructure and offers them more mobility options when selecting specific technology in which to invest. This requires leadership and concerted, coordinated action from public authorities at all levels, including private sector actors, civil society and academics from all localities.

Effective transport planning combines the need for short-term deliverables with a long-term view.[210] For instance, the ever-increasing energy consumption in Saudi Arabia has spurred Saudi researchers to explore alternative fuels and new powertrains for vehicles, high-speed data transmission, digital sensors and data analytics. Similarly, there are enormous opportunities presented by sustainable transport, such as saving thousands of lives annually through improved road safety and reduced air pollution, provided policy development is nimble enough to take advantage.

This chapter recommends the following strategies towards accessibility-based sustainable mobility, the transformation of which requires a redirection rather than any substantial increase in infrastructure:[211]

Advance equitable access as the guiding principle for transport planning and policy, and for investments in infrastructure, and elevate the linkage between land use and transport in the following ways:

- Ensure that city resilience to climatic changes is central to planning and building new transport infrastructure as well as developing transport networks.
- Adopt social equity as a planning and design criterion for the development and implementation of transport initiatives.
- Transport networks shall be improved to enhance connectivity and mobility along regional economic corridors, through improving access to a greater range of transport options.
- Revitalize urban planning and transport engineering designs. Density can be optimized through zoning laws and application of locational incentives, such as infrastructural investments, and through design interventions. A related attribute is the need to ensure diversity and mixed neighbourhoods, which promotes non-motorized transport by increasing proximity and reducing the need to travel.
- Promote the use of collective public transport, tailored to the local political, cultural, geographic and climatic conditions. Alongside health, safety and personal security, the focus should be customer satisfaction and ease of use.
- Promote diversified funding sources and coherent fiscal frameworks to advance sustainable transport systems, initiatives and projects.
- Reinforce efforts toward preventing road traffic deaths and injuries.
- Promote the monitoring of the health impacts of transport emissions and noise, in major cities with high traffic concentrations, and build capacity to deal with data and statistics.
- Diversify towards more sustainable transport fuels and technologies; for example, vehicles operating on electricity generated from renewable sources, hybrid technologies and natural gas.
- Adopt intelligent transport systems, such as electronic fare and road user charging systems, transport control centres, and real-time user information, when applicable.
- Foster an informed, engaged public as a crucial partner in advancing sustainable transport solutions.

A view of the city of Makkah

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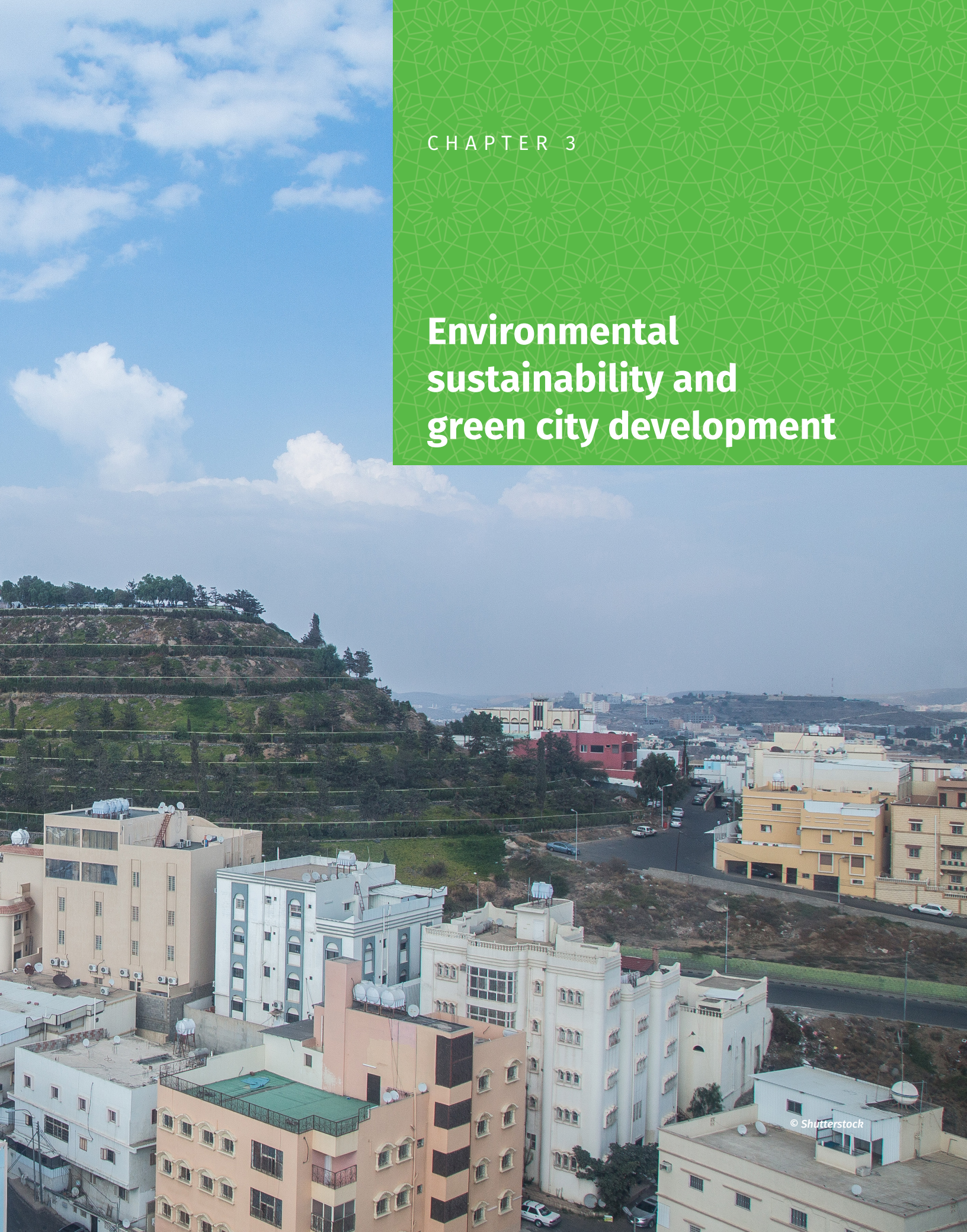
A view of Abha

CHAPTER 3

Environmental sustainability and green city development



Today, environmental-related challenges such as climate change are some of the greatest threats to the prosperity of many cities, including a large set of Saudi cities. To achieve the global commitments related to the "leave no one behind" principle around the environmental nexus as outlined under the 2030 Agenda for Sustainable Development (the 2030 Agenda), the Saudi government will need to apply several strategies. These include attending to the specific environmental needs of people in vulnerable situations and engaging them in decisions that impact their lives. Dealing with the environmental challenges of Saudi Arabia's cities is underpinned in several global and local frameworks, and largely integrated in all levels of the Government's plans and strategies.

In view of Saudi Arabia's large hydrocarbon reserves, the rationale to achieve environmentally friendly and sustainable growth is apparent, initiating several opportunities for investments towards green city development. While there is no universal definition of *green cities*, Saudi Arabia recognizes several key themes that help shape the concept: reducing the reliance on non-renewable energy sources; developing sustainable and low-carbon transport systems; green and resilient infrastructure; waste reduction and management; increased green areas; water cycle; and integrated planning.[1] Initiatives in these thematic areas have been outlined in the nation's envisaged National Spatial Planning Act. This law works as a critical inter-governmental tool for the implementation of the Saudi Vision 2030, and as a key enabler for the coordination and integration required for the delivery of the kingdom 's spatial programme of economic, social and environmental transformation.

Notably, regulatory changes and the inherent need to enhance industrial efficiency in Saudi Arabia have also produced a demand for green and environmentally friendly business solutions. The principal catalyst for this trend, collectively, are the global treaties linked to the United Nation Framework Convention on Climate Change (UNFCCC), and more recently the 2030 Agenda, the New Urban Agenda, as well the Government's policies reflected in the new Spatial Planning Act. This has been complemented with a series of five-year national development plans targeted towards reducing greenhouse gas emissions, improving water management, fostering a sustainable use of resources, facilitating job creation, enhancing technological advancement, and boosting public and private sector expenditure.

As noted in Chapter 1, the newly adopted 2030 Agenda presents 17 Sustainable Development Goals (SDGs) and 169 targets to be achieved by 2030. While cities were not covered directly under its forerunner, the Millennium Development Goals, the SDGs under Goal 11 focusses on cities and human settlements. This is in recognition of the transformative role of urbanization towards building environmental sustainability in the post-2015 development agendas.[2] There are 10 targets within SDG 11 that cover a wide-ranging set of global urban challenges, including several touching on environmental sustainability. The essential elements of Goal 11 that are connected to environmental sustainability include meeting housing needs in an environmentally friendly way that comprises the use of local materials; building smart and efficient transport systems that are accessible and affordable; managing solid waste in cities; developing and financing disaster risk reduction strategies; managing the growing and alarming levels of urban air pollution; creating and protecting open public spaces; and, most of all, anchoring all this in the relevant national and regional development plans and policies.

The Ministry of Municipal and Rural Affairs (MoMRA) has taken an active role in initiating sustainable development within the context of Saudi Vision 2030, including the associated strategic objectives outlined in the *National Spatial Strategy* (NSS).[3] Notably, the country has made considerable progress in several areas including socioeconomic development, gender equity, health, education and in setting and updating environmental legislation. All these elements are in line with the aspirations articulated in the Spatial Strategy and support the charter that upholds the essential pillars of the Saudi Vision 2030.

Some potential areas where research and development programmes can make contributions to environmental management in Saudi Arabia include air quality management; climate change mitigation; renewable energy; sustainable water resources planning; and waste management.[4] Maintaining this momentum requires substantive efforts and investments, through science, policy, and enhancing capacities of national and local authorities, as well as providing an elaborate framework for a planning system as envisioned by the revised Spatial Planning Act.

It largely covers the priority areas identified in SDG 11 targets. These efforts are in line with ensuring a coordinated approach for all urban sustainable efforts among all levels of government and stakeholders.[5]

Through this coordinated approach, investments are earmarked for building recycling projects, supporting efficient waste management, optimal use of water resources, and scaling up strategies for reducing various types of pollution in many Saudi cities, which is consistent with the environmental goals included in Vision 2030. The public's understanding and knowledge regarding sustainability, and its application, is

crucial to ensure successful implementation.[6] With the aim of improving livability of the ever-expanding cities, MoMRA emphasizes the adoption of human value-based planning approaches to safeguard Saudi Arabia's environment and sustainable development, which are at the fore of its national strategic vision.[7]

This chapter considers the concept of sustainability for cities in Saudi Arabia, with emphasis on water security, waste management, air quality, climate mitigation and adaptation, energy consumption, along with compact and resource-efficient cities, as it examines the potential for success of all strategic projects and plans that have been outlined, in terms of the country's sustainable and integrated development strategy. The chapter outlines Saudi Arabia's environment-related challenges and the unrealized opportunities for sustainable development by integrating environment, economy and society.[8] This is followed by a review of the recent progress the Government has made with respect to ensuring environmental sustainability in urban areas. The review also examines the roles of relevant agencies and non-state actors in supporting and prioritizing environmental sustainability. The chapter concludes by providing policy measures and responses that can help Saudi Arabia accelerate the achievements of the environmental targets and achieve green growth objectives.

Sustainable development is about minimizing the negative impacts whilst improving the environment to ensure a better quality of life for current and future generations.

3.1 Understanding sustainability

The concept of sustainability for cities and its links with sustainable development has been discussed since the early 1990s.[9] Sustainability is largely understood as meeting the needs of present populations without compromising those of future generations.[10] Linked to urbanization, the concept of sustainable urbanization or sustainable development simply refers to urban development that considers and assures tomorrow's urban needs. The concept requires integration and a balance among environmental, economic and social objectives.

Balancing of the above objectives does not limit the scope of sustainability. Rather, it emphasizes the importance of intergenerational equity; that is the concept of conserving resources for future generations, which also seeks to internalize the externalities of environmental degradation. Hence, the overall goal of sustainable development is the long-term stability of the economy and the environment; this is only achievable through the integration and acknowledgement of economic, environmental, and social concerns throughout the decision-making process. Sustainable development is thus about minimizing the negative impacts whilst improving the environment to ensure a better quality of life for current and future generations. Whether directly or indirectly, in the Saudi Arabia's context, these definitions imply undertaking a paradigm shift that include, for instance, using non-renewable natural resources at a rate slow enough to ensure an orderly societal transition to new alternatives.

Through Vision 2030 and the ongoing National Transformation Program (NTP), the Government has summarized the development goals for the subsequent two decades; goals that encompass sustainable development and environmentally informed ideals. At all levels of implementing programmes and interventions, a well-defined understanding of potential synergies among these goals is critical to achieving sustainable growth. This is contingent on developing the tools to measure progress, which requires a multidisciplinary research focus, sound policies, political leadership, and empowering regulatory bodies to implement environmentally friendly policies and strategies. These tools need to be combined with a move towards a green economy, including a need for a smart, flexible, coordinated and integrated policy framework to make the plans proactive, basing them on a simple process and procedure that enables the coordination of all government entities, sectors, regions and local authorities.[11]

3.2 Roles and progress towards environmental sustainability in urban areas

In the last decade, the Kingdom has embarked on the conservation and sustainable use of natural resources as the strategic option for enhancing prosperity, securing human rights, livelihoods and a decent standard of living. In order to achieve the SDGs, the Government is undertaking several investments and efforts to achieve the objectives of Vision 2030, which calls for "raising the value added of natural resources in

the national economy, diversifying their sources and ensuring their sustainability along with protecting the environment and conserving the wildlife."[12] This translates to creating incentives and developing regulations to combat desertification and pollution, promote efficient waste management, and protect and enhance biodiversity.

Many goals laid out in the plan relate to encouraging reuse in the water industry, and remedial measures towards conservation of non-renewable water resources. The plan's strategy for oil and mineral resources outlines the nation's commitment towards developing renewable energy for the production of electricity and desalinated water. In the new planning act, additional objectives have also been included to help with the adoption of the green economy principles for further sustainable environmental development.

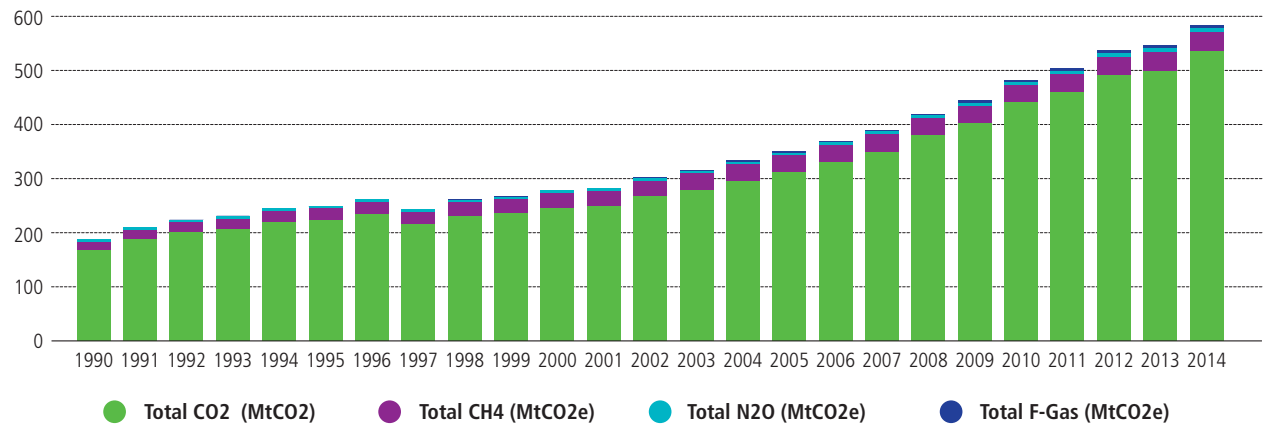
In this respect, several regulations and policies have been enacted by agencies that share the Ministry of Environment, Water and Agriculture broad environmental agenda, playing key roles in achieving sustainability principles (see Table 3.1). Furthermore, few Saudi institutions and enterprises are committed to reducing their environmental footprint through resource conservation campaigns and greener company operations. For instance, the King Abdullah Petroleum Studies and Research Center (KAPSARC) contributes towards building the knowledge platform on climate change, investing in research and development in energy studies.[13]

Table 3.1: Agencies associated with environmental planning and management

Agency	Responsibility
General Authority of Meteorology & Environmental Protection (GAMEP)	Protecting the environment and enforcing rules on pollution (e.g. emissions legislation), waste management and responsible development at the national level.
Ministry of Municipal and Rural Urban Affairs (MoMRA)	Providing urban services with respect to environmental health, waste management, traffic strategy, cleaning of cities and landscaping. This includes planning and building regulations, some of which may have a direct bearing on environmental issues.
Ministry of Environment, Water and Agriculture (MEWA)	Managing and sustaining water resources, the sewage system and power generation. Diversification of agriculture to include maintaining pasture, forestry, animal resources and fisheries, and the establishment of national parks.
Saudi Wildlife Authority (SWA)	Preserving terrestrial and marine wildlife, along with maintaining ecological balance and biodiversity. Also, responsible for the conservation of environmental and natural resources.
Ministry of Energy Industry and Mineral Resources (MEIMR)	Managing and sustaining mineral and oil industries.
The Ministry of Interior (MoI)	Responsible for emergency planning and response. Department of Traffic regulates periodic vehicle inspections and sets limits for the emission of exhaust fumes to control air pollution.
The Ministry of Health	Managing and eliminating medical waste.
The Ministry of Culture and Information (MoCI)	Raising environmental issues by conducting campaigns.
Saudi Standards, Quality and Meteorology Organization	Setting standards and specifications for environmental protection and pollution reduction.
The Royal Commission for Jubail and Yanbu	Environmental policies to achieve a sustainable city without pollution
King Abdulaziz City for Science and Technology (KACST)	Sharing some specific environmental concerns with other agencies.
Saudi Aramco	Environmental performance program
Saudi Arabia Basic Industry Company (SABIC)	Environmental protection initiatives

Source: Adapted from FSCP (2018) and Al-Yami and Price (2006).

Figure 3.1: Total greenhouse gas (GHG) emissions, Saudi Arabia

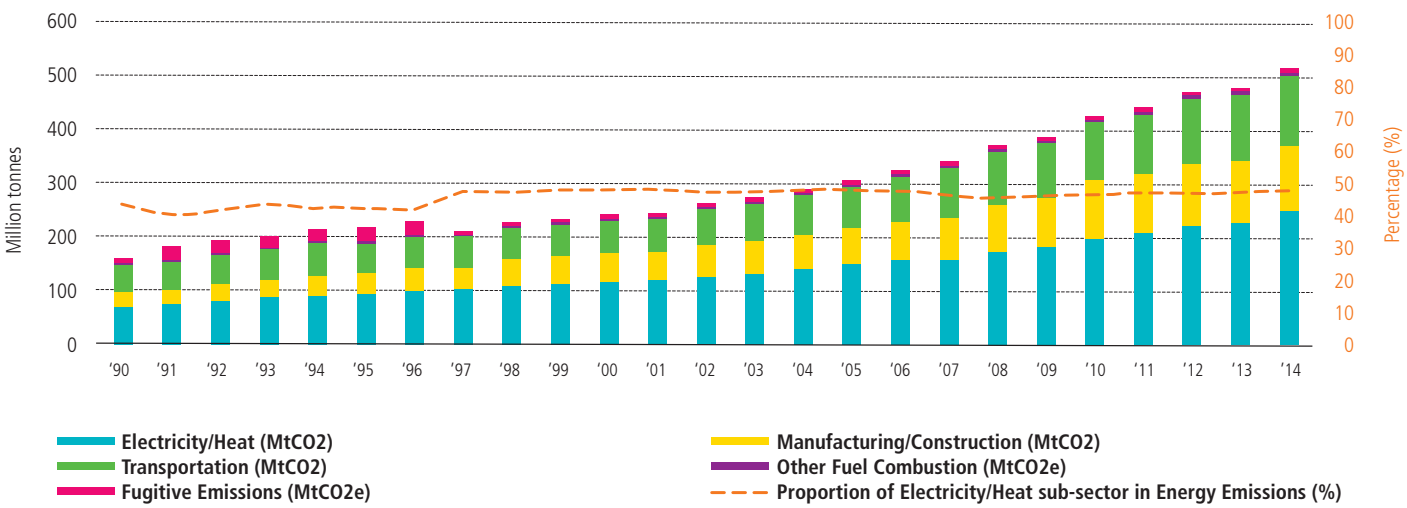


Source: World Resources Institute, CAIT Climate Data Explorer, 2017.

Since the adoption of Agenda 21 at the 1992 Earth Summit in Rio, many environmental targets have been accomplished such as controlling desertification, creating an environmental information network, adopting a coastal management plan, and conserving national wildlife. However, as with many countries whose economic growth has been propelled by the oil industry, environmental pollution increased in concomitance to rising economic prosperity. For example, studies show that environmental pollution from greenhouse gas emissions and waste by-products in Saudi Arabia have increased over the years with per capita income, energy production and energy consumption.[14] This means that, unless appropriate measures are put in place to tackle environmental degradation associated with production and consumption patterns in the country, Saudi Arabia will continue to face environmental challenges with grave implications for the welfare of future generations.

Data shows that total greenhouse gas (GHG) emissions in 2014 was 583 million tonnes of CO_2-equvalent ($MtCO_2e$), up from 188 million tonnes in 1990 (see Figure 3.1). CO_2 emissions comprised 91per cent (or 535 million tonnes) of GHG emissions in 2014. About 88 per cent emissions (or 516 MtCO2e) were from the energy sector. Within the energy sector, power and electricity generation (Electricity/Heat sub-sector) accounted for nearly half of the sectors emissions, followed by those of transport as well as manufacturing and construction sub-sectors (Figure 3.2).

Figure 3.2: Energy sector GHG emissions (sub-sectors)



Source: World Resources Institute, CAIT Climate Data Explorer, 2017.

3.3 Global environmental agreements

Saudi Arabia is a signatory to several treaties and protocols covering environmental sustainability and management. In 1994, Saudi Arabia ratified the United Nations Framework Convention on Climate Change (UNFCCC) to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.[15] It also acceded to the Kyoto Protocol on 31 January 2005 and ratified the Paris Agreement on 3 November 2016. These agreements that aim is to strengthen the global response to the threat of climate change and commits its Parties by setting internationally binding emission reduction targets. General Authority of Meteorology and Environmental Protection (GAMEP) coordinates with related agencies, which implement and follow up some of the global and regional multilateral environmental agreements, and their related obligations.[16] Some of these include:[17]

- The Basel Convention on Transboundary Movement of Hazardous Waste;
- The Kuwait Regional Agreement for Cooperation on Protection of Marine Environment from Pollution;
- The Montreal Convention on Substances that Deplete the Ozone Layer Agreement (a protocol to the Vienna Convention on the Protection of Ozone Layer;
- The International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties;
- The 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention);
- The 1989 Kuwait Protocol Concerning Marine Pollution due to Exploration and Exploitation of the Continental Shelf;
- The 1990 Kuwait Protocol on Protection of Marine Environment from Land-based Sources (Arabian Gulf); and
- Convention on Conservation of Migratory Species of Wildlife (CMS).

3.4 Water scarcity in Saudi Arabia

Water scarcity presents one of the major challenges that impedes quality of life and overall progress towards sustainable development in Saudi Arabia. Climate change further contributes to water scarcity through increased temperature and prolonged droughts, which strain existing water resources and exacerbates the situation further. Fueled by urbanization and population growth, demand for water services in the country is high (as highlighted in Chapter 1). Water demands in the kingdom are satisfied through nonrenewable and renewable means: groundwater sources, desalinated sea water and treated wastewater.

Saudi Arabia's non-renewable sources of water are the sedimentary and deep rock aquifers that hold fossil water.[18] Estimates show that the kingdom's groundwater reserves total 500 billion cubic metres from principal deep aquifers (*Saq, Wajid, Tabuk, Minjur, Dhruma, Biyadh, Wasia, Dammam, Umm Er Radhuma* and *Neogene*).[19] Secondary aquifers include: *Al-Jauf, Al-Khuff, Al-Jilh*, the upper *Jurassic, Sakaka*, the lower *Cretaceous, Aruma, Basalts* and *Wadi* Sediments.[20] As the kingdom pumps more water than can be replaced, studies show that the depletion of water from these groundwater sources is imminent. [21] Estimates contained in researches show that at, current rates of consumption, groundwater sources will be depleted in about 120 years. [22]

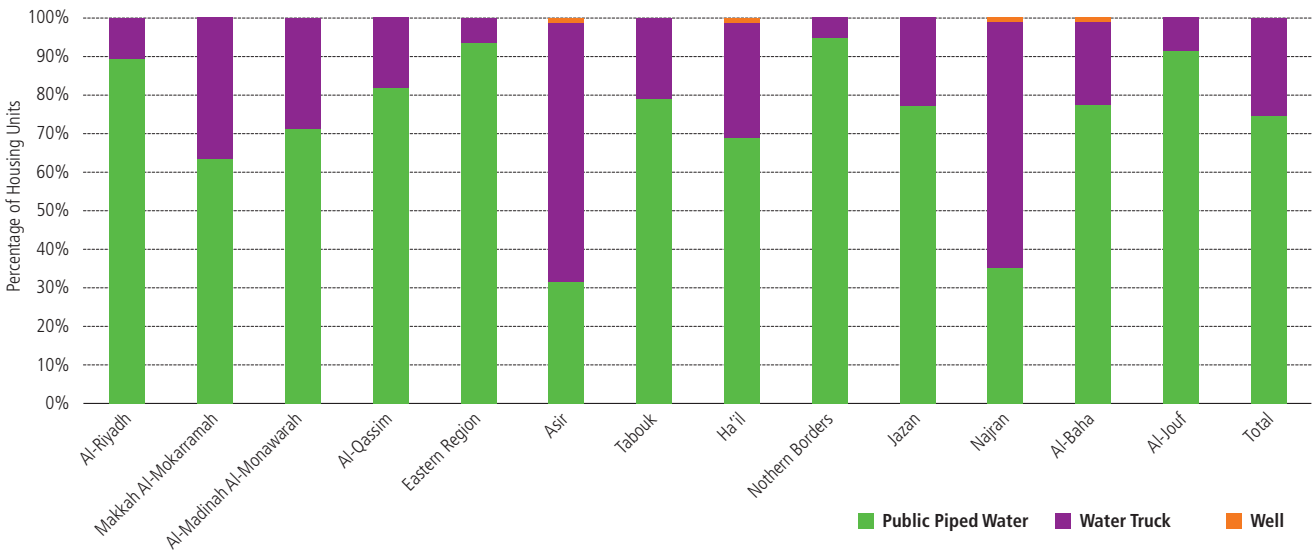
Since, a relatively large share (59 per cent) of the water consumed in the kingdom comes from non-renewable groundwater, increasing supply from renewable sources is needed to aid sustainable urbanization.[23] With no permanent lakes or rivers and seasonal rainfall, renewable water sources are largely captured during rainfalls and account for about 34 per cent of the water consumed. However, studies point to a decline in rainfall—especially in the northern part of the country where it is projected to decrease by an annual average of 10 millimetres. Climate change as well as increased evapotranspiration are expected to limit surface water. Moreover, rain events will be increasingly short-lived and severe causing flash floods and run-offs which can carry contaminants into existing water reservoirs, thereby jeopardizing its quality and compromising food safety.[24] This can lead to health challenges as Saudi Arabia shifts towards utilizing treated wastewater as one of the national "water taps" for agricultural irrigation and other purposes (such as landscaping and in industries).[25]

Although agricultural demand for water has reduced since the abandonment of the strategy to achieve wheat self-sufficiency— which was attributed to 35 per cent of water consumption— and the country began outsourcing food production to Sudan, Brazil, Argentina, India, and Bangladesh, heightened urban sprawl has surpassed this decline (see Box 3.1). The consumption of the industrial sector has reached 4%, while the municipal sector has reached 12%, and for the agricultural sector, water consumption has reached 84%.

Currently, agriculture accounts for 85 per cent (approximately 16.7 Billion cubic metres) of annual water. Only 10 per cent is derived from renewable water resources, rest is derived from non-renewable fossil water that is pumped from deep aquifers. Excessive pumping from all aquifer sources in Al-Kharj, Wadi ad-Dawasir, Jazan, Makkah, Al-Ahsa, Al Qasim and Ha'il, resulting in unacceptable changes in groundwater conditions. [26]

The liberal use of water, its ineffective management, and pressure on other water-intensive foods, have led to high water consumption practices. In addition, the low tariffs structure in the kingdom ($0.03 per cubic metre) fails to incentivize Saudis to conserve water. Domestic water demand and consumption is increasing at an annual growth rate of 9 per cent, and industry's demand is expected to grow by 50 per cent within the next 15 years.[27] The growing demand poses the danger that without an orderly transition to more sustainable supplies, considerable sections of the rural economy could collapse from lack of water.[28] Whilst a great number of households in the kingdom (74 per cent) have access to public piped water, this is not so in Asir and Najran where water in most of the housing units (about two-thirds) is supplied by trucks (see Figure 3.3).

Figure 3.3: Source of water supply in Saudi Arabia's administrative areas



Source: General Authority for Statistics, Housing Survey 2017.

Box 3.1: Water resources and management in Al Madinah

Al Madinah region occupies a vast geographical area of approximately 153.8 thousand square kilometres, estimated at about 6.72 per cent of the total area of the Kingdom. The region is an important region for agriculture for the kingdom, particularly the farming of wheat or dates. Al Madinah is characterized by much fluctuation in rainfall, with an annual average between (40-110 mm). The region's main water sources include:

- Groundwater: This is derived from Abyar Almashi's well field, , Alawali, Beir Othman, Al-khulail and the now abandoned Quba well field). Most of the extracted groundwater is mainly utilized for agricultural purposes.
- Surface Runoff and Wadis: these include Wadi Alaqiq, Wadi Alaqoul (known as Wadi Qanat or Wadi Sayedna Hamzah), Wadi Bat-han, Wadi Mahzoor, and Wadi Ranounaa.
- Treated Wastewater: Wastewater treatment plant located in Alkhalail area in the northwestern part of the city
- Desalinated water: The increasing water demand of the City of Madinah has made dependent on the water supplied by Yanbu desalination plant

To manage water demand and supply Madinah has recently increased the numbers of its water services centers (in Bi'r Al Mashi, Yatma, Al Mulaylih and Al Furaysh). These are expected to enhance efficiency in the delivery and provision of water services water distribution.

Source: Gutub, 2013; Saudi Arabia National Spatial Strategy,2016; National Water Company (NWC), 2017.

The national transformation frameworks emphasize the use of drip irrigation for agriculture. This is in view of the complexity of the rapidly fluctuating water sources (quantity and quality), which remains a major concern for the Ministry of Environment, Water and Agriculture. Its response has been tariff reform and the sponsoring of water conservation educational programmes,[29] as well as the distribution of water saving devices to curb demand.[30]

3.4.1 Coping with water scarcity

Desalination

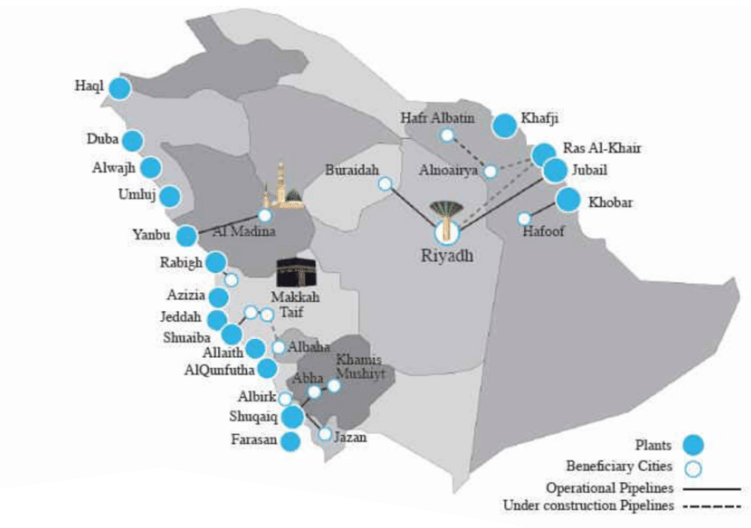
Saudi Arabia leads the world in the production and consumption of desalinated water, having reached the capacity of 5 million cubic metres per day.[31] The state-owned Saline Water Conversion Corporation (SWCC) is responsible for some 60 per cent of municipal water supply,[32] and is also the kingdom's second largest supplier of electricity. In 2011, the volume of water supplied by the country's 27 desalination plants in 17 locations was 3.3 million m3/day (1.2 billion m3/year). This volume has grown to five million cubic metres per day at the onset of 2018.[33] Six plants are located on the East Coast and 21 on the Red Sea Coast,[34] with 64 per cent of desalination capacity relying on the multistage flash process (MSF), while 20 per cent uses reverse osmosis (RO) and 16 per cent is produced using multi-effect distillation (MED).[35] Figure 3.4 and Figure 3.5 illustrate Saudi Arabia's major desalination plants, beneficiary cities, outputs and desalination processes.

Supplying much of the municipal water, these desalination plants are linked to urban centres by 5,684 kilometres of pipelines, as at the end of 2014.[36] Oftentimes, water transmission along these pipelines is affected by leaks, with leakage rates ranging from 20 per cent to 35 per cent.[37] As part of its Vision 2030 and NTP 2020, Saudi Arabia seeks promote the optimal use of the country's water resources as well as improve service quality reduce by monitoring the water pipeline system to reduce leaks. The country looks to reduce the levels of water loss through distribution from 25 per cent to 15 per cent by 2020.[38]

The significant amount of capital and energy required by the plants and major transmission lines to transport water to cities increases concerns about desalination technologies. Oftentimes, the desalination process impacts negatively on coastal waters, biodiversity, ecosystems and propagates unsustainable use of natural resources, reducing the value added for the kingdom. This calls for the continual increase of the capacity SWCC's Desalination Technologies Research Institute (DTRI) in developing the industry so as to reduce production cost; the assessment environmental impacts; and the creation of safeguards to help mitigate the adverse effects of desalination.

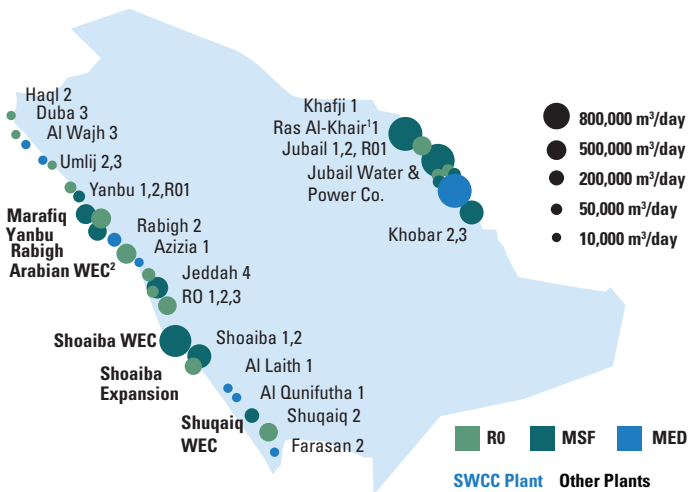
Box 3.2: Power for desalination plants; from fossil fuels to solar energy

Figure 3.4: Desalination plants and beneficiary cities



Source: Saline Water Conversion Corporation, 2015.

Figure 3.5: Desalination plants output and processes



Source: Water Investment Forum, 2016.

Although, Saudi Arabia has made great strides in technology related to water management and conservation, a new paradigm is necessary, one which considers the utilization of more energy-efficient and lower carbon-footprint desalination techniques. The electricity used desalination plants in Saudi Arabia is largely produced from fossil fuels, yet great potential exists for renewable energy application.

Solar desalination, that employs renewable combustion-free solar power to run a desalination plant, is an increasingly attractive option. The kingdom needs to wean off the use of fossil fuels and convert existing plants to solar power. Although this may be expensive in the short term, the long-term benefits to the environment and potential increase in the income from fossil fuels for the kingdom makes this, in fact, a cheaper choice. In this regard, Saudi Arabia recently announced its plans to build a full size solar powered desalination plant that has a potential of producing 60,000 cubic meters of water per day.

Sources: Tlili, 2014; Saudi Gazette, 2018.

Water recycling and reuse

Overall, water reuse from treated wastewater is at 30 to 40 per cent. The country is currently making massive investments in wastewater treatment infrastructure with the aim of raising this rate to more than 65 per cent by 2020 and even exceed the 90 per cent by 2040. Saudi Arabia aims to provide 100 per cent coverage regarding sewage collection and treatment in cities whose populations exceed 5000 by 2025, where wastewater will be used. [39] Besides plans to increase wastewater collection, the National Water Company (NWC)—the entity responsible for wastewater treatment services—has created the Treated Sewage Effluent Business Unit (TSE BU) to educate on the uses, as well as commercially market the Treated Sewage Effluent (TSE). Additionally, the National Water Company marked progress with its first privatization project by awarding a contract to a consortium to develop three wastewater schemes; one each in Jeddah, Dammam and the Northern Border region. [40]

Reclaimed or recycled water is gaining favour in Saudi Arabia as an efficient approach to balance water resource conservation and food security. Accordingly, the kingdom has adopted a national policy strictly enforcing the use of treated effluent, particularly for agriculture. Empirical evidence confirms that the treated effluent increased an average of 4.6 per cent per annum between 2004 and 2009, growth from 260 million cubic metres to 325 million cubic metres.[41] However, significant fractions of the untreated effluent are discharged into the Arabian Gulf, the Red Sea, sand dunes and *wadis*.[42] These discharges are associated with human health and ecological risks due to the handling and ingestion of crops, and the direct or indirect inhalation of water and airborne particles.[43] Thus, action to incorporate antimicrobial resistance into risk assessment and reuse planning is critical to mitigate health risks to farmers and consumers.[44] Whereas the Royal Commission of Jubail and Yanbu have adopted strict quality standards and guidelines before effluent disposal and water reuse, certain parameters can be relaxed to use, fully, the ever-increasing volume of secondary treated effluent.[45]

Still, ensuring the social acceptance of treated wastewater is a major task. Emerging in the 1970s, a Saudi *fatwa* (legal ruling on issue of religious importance) encouraged the acceptability of treated wastewater for drinking.[46] To this end, ablution water is recycled for toilet flushing at the two holy mosques in Makkah and Medina, thus conserving costly desalinized water.[47] Nevertheless, available evidence suggests that the country's free wastewater services, coupled with its low block-rate water tariffs, are a deterrent to wastewater reuse. This situation is compounded by variability in crude oil prices, obliging the Government to consider its capacity to earmark the capital required for wastewater services.[48]

The potential role of treated wastewater as an alternative source of water supply is now well acknowledged and embedded within international, regional and national strategies. The United Nation's Sustainable Development Goal on water (SDG 6) specifically targets a substantial increase in recycling and safe reuse globally by 2050.[49] In its implementation of Vison 2030 and NTP 2030, Saudi Arabia has placed a great emphasis on conserving, recycling and reuse of all available freshwater. [50]

Whilst the country recognises treated wastewater's significant environmental, social and economic benefits, more field investigations are required. These should include evaluation of a wide spectrum of technical and health challenges through pilot projects.[51] Often, incomplete analysis of wastewater treatment serves as a deterrent for reuse of such water in many parts of the world. Microbial contamination is the main concern, especially for irrigation. Thus, a microbial risk assessment methodology should be integrated. This will ensure an assessment the economic and technical implications

of water reuse, whilst ensuring the protection of environment and human health.

Treated wastewater offers many advantages for arid countries. Led by MEWA, reclaimed water in Saudi is being utilized as a non-potable supply and aquifer recharger. It is also used to irrigate landscapes, urban green spaces and municipal parks in Dhahran, Jeddah, Jubail, Riyadh and Taif.[52] Another conservation initiative is the recycling of treated industrial wastewater, implemented by petrochemical giants like Saudi Basic Industries Corporation (SABIC), to reduce water demand across its international operations.[53] Municipalities can provide economic incentives in favour of efficient resource use and minimal waste as an alternative to environmental or "green" levies, which effectively enforce the "polluter pays" principle.[54]

Guidelines for centralized infrastructure and wastewater reuse should be also be developed with a component of risk assessment.[55] Currently, only 22 of 106 municipal areas in Saudi Arabia have sewerage infrastructure, and it is estimated that only one third of these systems treat wastewater to the tertiary standards required for reuse.[56] Thus achieving the target above will be difficult if the nation fails to overcome social and technical obstacles, as well as institutional and political constraints.

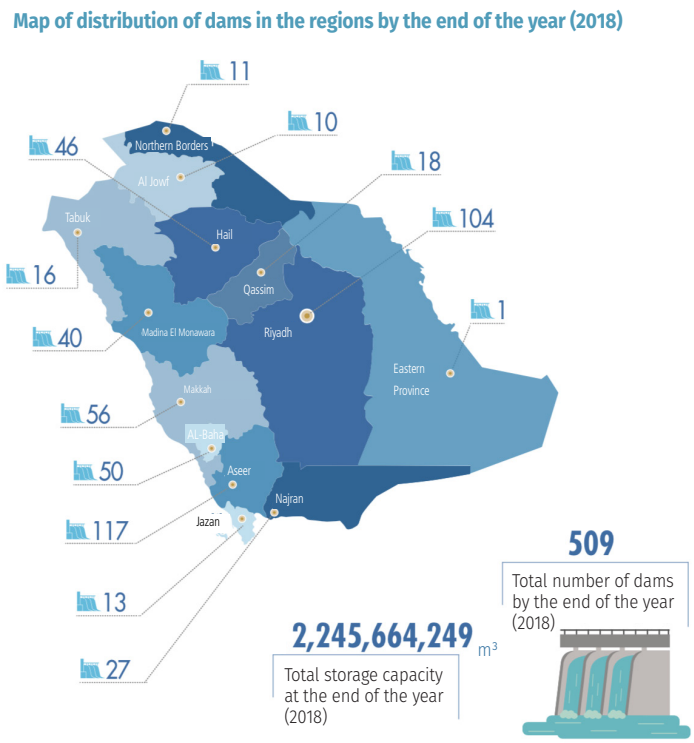
The utilization of full-aquifer recharge and recovery systems can be designed for high capacity within *wadi* aquifer systems to treat, store and recover reclaimed water to cover peaks of water demands. This approach has been fostered by the findings and recommendations from the 17 city profiles. In all cities, recommendations have stressed the need to consider the wadis as natural infrastructure and maximize their contribution towards water resource management. This was noted to be particularly impactful for medium and small cities such as Taif and Arar. In both cities, the urban fabric is crossed by several large *wadis*, often neglected and treated as dumpsites while they could contribute substantially to the management of the water needs. At the same time, they could provide green and leisure spaces that also decreases flood risk and increases water retention capacity by harvesting rainwater.

Rainwater harvesting

To help meet higher consumption demand, several dams are under construction to capture rainwater in support of sea water desalination plants. Currently, Saudi Arabia boasts 302 dams of different sizes, collecting about 1.4 billion cubic metres of runoff. [57](See Figure 3.6*)*. Dams with the largest capacities include King Fahd Dam in Bisha, Wadi Hali Dam in Makkah Al-Mukarramah Region, Wadi Rabigh Dam in Makkah Al-Mukarramah Region, Wadi Bish Dam in Jazan Region, Al-Laith Dam in Makkah Al-Mukarramah Region, Al-Madeek Dam in

Figure 3.6: Major dams in Saudi Arabia

King Fahd Dam in Bisha



Dam map from the Ministry of Agriculture report

Najran. Some of these are multiple purpose dams ensuring potable water supply, irrigation, groundwater recharge and flood control.[58] Presently, there are measures that have been put in place to enhance Government's efficiency in the provision and use of sustainable water resources. These include plans to designate areas for groundwater and water catchment protection zones, designation of areas such as *wadis* that require environmental rehabilitation, and additional plans to take into account water availability for urban and industrial development as a key criterion such that limits are imposed where water is not readily available[59].

Climatic changes are going to lead to greater rainfall variations with longer drought periods and intense rainfalls causing flash floods. To help meet the demand for water and mitigate against water scarcity, there is a greater need for the construction of more dams to harvest rainwater from the flash floods. Developing a rainwater harvesting system with greater capacity will be an option for Saudi Arabia, especially in the south-western region where 60 per cent of the rainfall occurs.

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Another potential strategy is managed aquifer recharge (MAR), a technique that uses depleted aquifers to store excess surface water, desalinated water and treated wastewater.[60] First, the technique can be used to increase the supply of drinking water due to the potential to treat water and attenuate undesired substances. Second, MAR acts as a buffer for drinking water during dry seasons for non-potable and indirect potable reuse. Third, due to the high evaporation rates, sub-storage of water is a great alternative for Saudi as the method will help to increase soil moisture and reduce soil erosion, thereby improving agricultural opportunities in the region, especially as the traditional irrigation method consumes the highest yields of water yearly.[61]

An integrated approach to water management

The implementation of an Integrated Water Resources Management (IWRM) plays an important role in Saudi Arabia, where water resources are scarce and where climatic changes may cause significant changes in water availability, quality and demand satisfaction.[62] Indeed, there is no one solution to the water equation. Rather, a multi-faceted approach that entails a combined effort from national and local administrations, educational institutions and civil society is required. Success will require good governance, smart pricing, smart technology, encouraging conservation by authorities, and the promotion of new and better approaches to agriculture. Ultimately, Saudi Arabia needs to continually challenge itself to make better use of water in its homes and cities leading towards efforts to create a better water story for the kingdom.

The above-mentioned recommendations notwithstanding, there is need to raise public awareness using Islamic conservation concepts and increase stakeholder participation without which the success of sustainable water resource management will be lessened.[63] A multi-criteria decision-making approach, which integrates various technical information and stakeholders' values, may be useful and appropriate to municipalities and planning specialists.[64] The multi-criteria decision-making methodology is a particularly effective integrative framework used in urban water sustainability assessment, which focuses on utilizing participation from various stakeholders like municipal authorities, experts, civil society and affected communities or beneficiaries.[65] When combined with other planning tools, the methodology can help local authorities alleviate difficulties in accommodating diverse opinions, and handling large amounts of complex problems related to water resource management in Saudi Arabia.[66]

As a conclusion to this sub-section on water scarcity, Saudi Arabia highlights an example of the impact severe water scarcity can have on a nation as well as ways of coping with this challenge. In the same vein, the kingdom has the potential to serve as an exemplar of water scarcity management. The nation's financial potential coupled with the development of solar powered desalination plants, a move away from an extensive use of fossil fuels, expanding water recycling processes and infrastructure can ensure the accessibility and availability of domestic water resources for its population. Whilst some of these strategies may encounter a few challenges and concerns, for instance, the implication on public health if desalinated plants are not properly maintained or harvested rainwater is not adequately treated. The protection of human health should continually be a priority for the nation when considering adaptation strategies, ensuring adequate sanitation and safe drinking water for all.

The current policy transformations are likely to address this challenge. If adequately empowered, local authorities can achieve sustainability through various modes of governance,

including improved services and appropriate regulations, with partnerships supporting and enabling private or civil society initiatives.[67] Suitably, as highlighted in NSS 2030, MoMRA through its National Spatial Planning office will support line ministries to localize their respective sectorial policies that touch on water as well as other key sectors (most of which are highlighted in this report).

3.5 Waste management

Rapid urbanization and an increased standard of living has also resulted in the growth of municipal solid waste. With a population of 33 million, Saudi Arabia generates at least 15 million tonnes of solid waste each year, most of which ends up untreated and landfilled.[68] In Dammam, Jeddah and Riyadh municipal production exceeds 6 million tonnes per annum,[69] with improved sanitation taking the form of either urban sewer systems or septic tanks.

Most of the waste collected ends up in landfills or dumpsites. This often creates problems such as municipal waste sludge, leachate production, soil contamination, as well as spontaneous fires and greenhouse gas emissions. Landfills are becoming ruinous to the kingdom, with the per capita waste generation of 1.5kg to 1.8 kg per person per day, mostly composed of plastic and food.[70] With so much waste produced, open landfills are expected to reach full capacity in the next decade.[71] As landfills contribute 76 per cent of methane emissions in the kingdom, Vision 2030 recognizes the need to create strategies and policies to improve waste management due to its effects on the environment and on public health. In this respect, Vision 2030 seeks to increase efficiency of waste management by establishing comprehensive recycling projects and reduce pollution from waste, especially of plastic products.

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Poor waste management within Saudi Arabia can be attributed to many problems linked to a lack of policies, strict laws and strategies for solid waste.[72] Although solid waste collection is managed by local municipalities and some private companies, existing waste management is basic within the cities. [73] For example, Jeddah's limited waste management infrastructure relies heavily on landfills for disposal.[74]

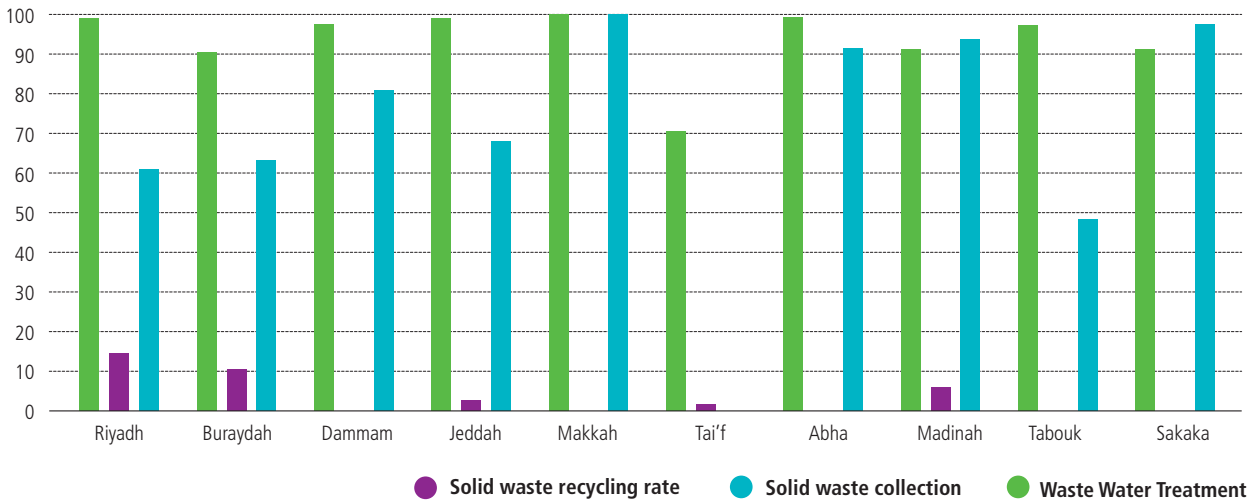
The lack of recycling (currently at less than15 per cent) and the huge generation of solid waste coupled with inefficient management and poor implementation has led to a poor systematic waste collection (se).[75] National environmental agencies need to build the desire for local municipalities to encourage increased recycling practices and sustainable waste disposal. There is an imperative need to encourage waste avoidance and reduction through the implementation of policies that limit landfill use on recyclable products. This effort can be accomplished through collaboration with city partners, imposition of strict laws and legislation, and increasing public awareness about the need for environmental protection and conservation.

The kingdom needs to drive behavioural change in households. It can do so by promoting waste avoidance and reduction through community awareness, by recycling projects; and by connecting waste recovery to markets through the imposition of taxes on non-recyclable products. A key aspect is also the introduction of source segregation, which forces consumers to separate their waste at the point of discard, so they can be recycled. Moreover, environmental awareness campaigns involving municipalities, educational institutions and Islamic scholars, which highlight the idea that "fulfilling human and moral duties involves the preservation of environment and natural resources", can be advantageous. Encouraging reuse and recycling of waste requires the mandatory involvement of companies (especially of construction), as they contribute to waste generation and can influence consumer attitudes into accepting pro-environmental behaviour.[76]

As mentioned in the kingdom's Vison 2030, alongside the need to protect the environment and prevent desertification, the National Water Company aims to use solid waste to generate thermal energy, electricity and water.[77] Some other notable initiatives are Jeddah's Old Landfill and the city's New Landfill Gas Capture and Utilization projects, which are expected to reduce approximately 362, 668 tonnes of CO_2 annually from 2012 to 2021.[78]

Following the introduction of laws, strategies, and policies, a step further for the kingdom should be the introduction and implementation of modern waste management techniques.

Figure 3.7: Waste Management in selected cities of Saudi Arabia



Source: The State of Saudi Cities Report, City Prosperity Initiative, UN-Habitat, 2016.

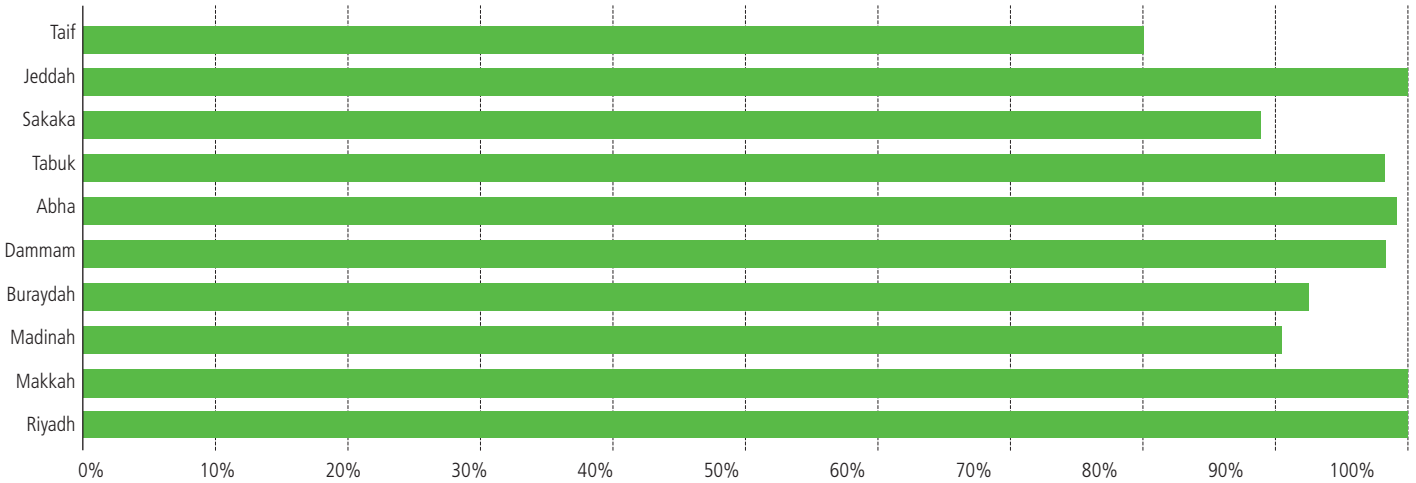
The use of solid waste for energy, or as a fuel source, can contribute to minimizing environmental impacts and final landfill amounts whilst maximizing material and energy recovery from waste. Figure 3.8 illustrates the waste disposal frequency in Saudi cities. Over 40 per cent of all households in most cities practice daily disposal of waste, highlighting the high volume of waste generated per day, but also the higher demand of waste disposal services.

The identified challenges—population growth, climate change and rapid urbanization—has burdened waste management in Saudi Arabia and has led to higher demands for energy.[79] The kingdom is considering waste-to-energy as a potential renewable energy source that can contribute to electricity demands. With an ambitious target of 3GW of energy from waste to be achieved by 2025, the demand for incineration technologies to deter the creation of more landfills is increasing in demand with plants operating in Makkah and Medina.[80] Incineration is the production of energy from non-recyclable waste through combustion. On average 70 per cent of organic matter make up municipal solid waste in Saudi Arabia.[81] This technique of dealing with waste is favoured due to the requirement of low-level technologies and human resource skills. Although, this represents a positive development, a drawback of incineration is the generation of high levels of air and waterborne pollutants containing toxins.[82] Therefore, the kingdom needs to consider utilizing this technique alongside other less harmful ways, namely pyrolysis or gasification.

Gasification is the conversion of organic material with the use of steam and oxygen to produce combustible synthesis gas, or syngas. [83]Syngas can be used as a substitute for natural gas, fertilizer transport fuels, hydrogen and electricity.[84] Like gasification, pyrolysis turns waste into energy (oil, gas) through thermal degradation but in the absence of air. Both methods are more efficient than incineration and can generate cheaper and less toxic energy, as pollutants are removed in the process so syngas does not produce high levels of emissions.[85] These methods can also be used to power desalination plants, which are currently powered by fossil fuels. The drawback of the method is the newness of the technology; with limited plants around the world there are few examples from which to learn. Therefore, a pilot study may be required. This offers Saudi Arabia an opportunity to play a leading role in the development of third generation waste-to-energy technologies.

The combination of improved waste collection techniques, the imposition of strict laws and policies, educating of urban populations, and the pursuing of waste for energy purposes, presents a sustainable path for the kingdom to achieve zero waste, amongst other goals and targets.

Figure 3.8: Waste disposal frequency in Saudi cities



Source: Future Saudi Cities Program, State of Saudi Cities Report, Urban City Prosperity Initiative, UN-Habitat, 2016.

3.6 Urban air pollution

In recent years, air pollution has become a major issue of concern in Saudi Arabia cities due to rapid urbanization and growing industrialization. Along with industrial processes often concentrated in cities, vehicle emission and stationary-source fuel combustion are the primary sources of local air pollution. Adverse health effects of ambient (outdoor) air pollution have been mainly associated with sulfur dioxide (SO_2), respirable particles ($PM_{2.5}$ and PM_{10}), ozone (O_3), carbon monoxide (CO), lead, and the known ozone precursors which are volatile organic compounds (VOCs) and nitrogen oxides (NO_x). These are described in Box 3.1. Distribution of the pollutants is often facilitated by major sandstorms that frequent the Arabian Peninsula.

Box 3.3: Air pollutants

Nitrogen oxides (NOx) when combined with other air pollutants can lead to respiratory difficulties and reduced lung functions, particularly in high density urban areas.

Volatile organic compounds comprise a wide variety of hydrocarbons and other substances (e.g. methane and ethylene) that result from the incomplete combustion of fossil fuels. When combined with NOx in heat and sunlight, hydrocarbons and volatile organic compounds generate low-level ozone, a main contributor to photochemical smog. Their impact has a measurable effect on respiratory functions, but these levels are declining as technologies improve.

Carbon monoxide (CO) is an odorless gas, which is very toxic as it interferes with the absorption of oxygen. This, in turn, can lead to increased morbidity and can affect fertility and general health levels. The transport sector is a major contributor as carbon monoxide comes principally from the incomplete combustion of fuel.

Particulate matter consists of minute particles (under 10 microns in diameter: PM_{10}) that come mainly from diesel fuels, particles of tire rubber and dust. They can cause cancer, worsen heart and breathing problems, and lead to premature mortality.

Other pollutants: Sulphur dioxide (SO_2) is harmful to plants and animals. Lead and other heavy metals can lead to brain damage; they accumulate in the body and impair tissues and organs. Ground level ozone (O_3) damages lung tissue and is implicated in many lung disorders.

Source: EEA, 2011; EC, 2006; World Bank, 2007.

Also, of concern related to the stratosphere are climate changes caused by excessive greenhouse gas emissions and depletion of the ozone layer protecting life on Earth from the Sun's ultraviolet radiation. Although indoor air pollution and odor pose stark health risks, it tends to be overlooked as it does not affect nature.

3.6.1 Trends and challenges in urban air pollution

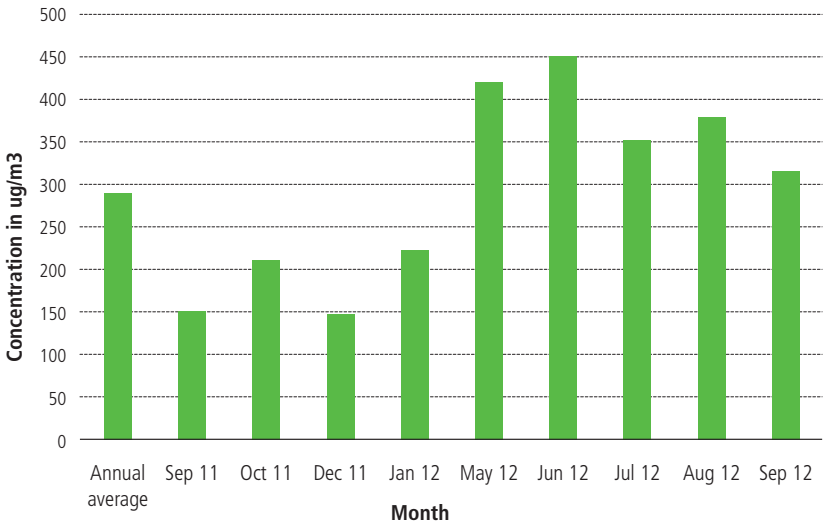
Based on a World Health Organization (WHO) report, Riyadh, Dammam and Jubail are facing urban air pollution levels for small and fine particulate matter (PM_{10} and $PM_{2.5}$), [86] far exceeding WHO air quality guidelines (see Table 3.2). The limits indicate that by reducing PM_{10} pollution from 70 to 20 micrograms per cubic metre (µg/m), air pollution-related deaths could be reduced by roughly 15 per cent.[87] Table (3-2) shows the spread of the dust phenomenon in the Kingdom's cities throughout the year, especially Medina and Riyadh, which leads to many health problems. This data helps track progress on SDG 7.1.2 (access to clean fuels and technologies), and SDG 11.6.2 (improving air quality in urban areas). It is also the basis for determining the disease burden from air pollution for SDG 3.9.1 (See Chapter 2). An assessment of Riyadh's air quality was carried out between 2011 and 2012 shows that the PM_{10} levels for the city are about three times higher than the standards set by the General Authority of Meteorology and Environmental Protection (GAMEP) of Saudi Arabia (see Figure 3.9). This was based on the monitoring of ambient air quality from the King Abdulaziz City for Science and Technology (KACST) air quality surveillance network.It is recognized that air pollution levels are affected by variations in local climatic conditions, emissions and daily activities of inhabitants. The trends in air pollution levels, however, are not always well defined. The PM_{10} concentration in the city during the summer months were about 84 per cent higher than

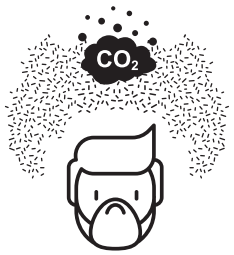
Table 3.2: Twenty of the world's worst polluted cities based on $PM_{2.5}$ and PM_{10} values

Station	December	November	October	September	August	July	June	May	April	March	February	January
Arar	1	0	12	17	6	1	6	8	9	5	9	2
Al-Jouf	7	11	11	20	12	5	9	16	11	14	13	7
Tabuk	0	4	1	8	7	0	0	2	5	1	2	0
Hail	2	7	14	9	4	0	2	14	25	18	10	6
Qassim	4	10	21	6	9	1	5	24	28	20	15	9
Dmmam	16	14	28	22	36	36	23	22	18	12	22	25
Al-Ahsa	20	13	20	20	13	28	28	16	22	11	21	15
Madinah	18	16	21	23	20	17	16	11	25	29	27	29
Riyadh	24	26	22	21	27	23	24	26	30	22	23	19
Jeddah	3	6	16	7	17	0	3	5	19	7	9	11
Makkah	3	3	1	4	26	2	11	14	29	15	11	10
Taif	14	17	17	12	25	4	12	11	42	19	17	7
Al-Baha	9	3	1	1	14	19	21	4	38	13	10	4
Abha	3	1	0	0	9	30	11	3	27	4	5	4
Najran	5	4	3	2	11	18	13	15	21	15	14	9
Jizan	1	3	4	11	43	38	27	20	32	15	8	2

Source: Presidency of Meteorology and Environment (PME)

Figure 3.9: PM_{10} level in Riyadh city (2011-2012)





The PM_{10} concentration in the city during the summer months were about 84 per cent higher than those experienced during winter

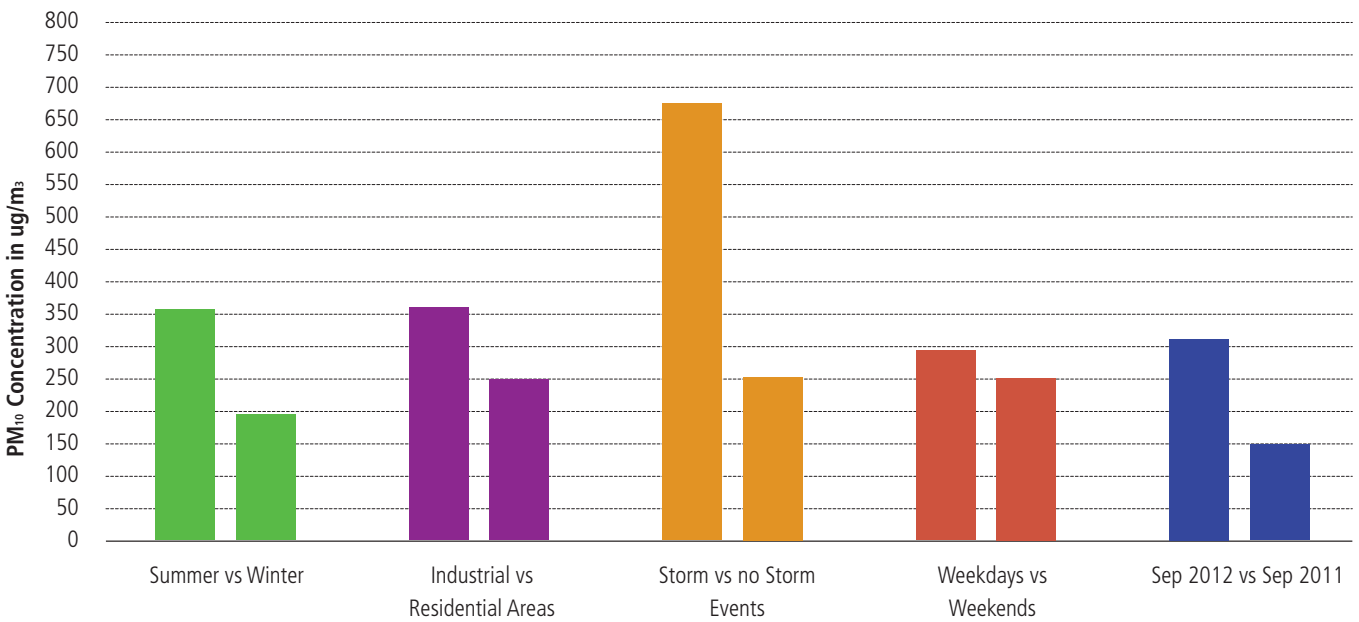
Source: Alharbi et al., 2015.

those experienced during winter. Similarly, during weekdays, recorded PM_{10} values were 17 per cent higher than weekends, indicating automobile contribution (see Figure 3.10) Due to dust storms, the crustal matter species increased by several folds during summer.[88]

3.6.2 National policies affecting air pollution

Actions to manage and improve air quality are largely driven by part of Article 2 of the Saudi General Environmental Law, which is one of the country's most important indicators of air quality measurement.[89] GAMEP monitors, assesses and regulates air

Figure 3.10: PM_{10} Variations with seasons, location and weather conditions



Source: Alharbi et al., 2015.

quality in the kingdom. As part of the NTP, and a fundamental step toward achieving Vision 2030, an air monitoring network is being expanded at the national level, with numerous new air quality stations being installed in cities and towns.[90] Further, the Government is exploring several policies and investments supporting cleaner transport, energy-efficient housing, power generation, industry and better municipal waste management, which have the potential to reduce key sources of urban outdoor air pollution.[91]

Available evidence suggests that with improved air quality, health costs from air pollution-related diseases shrink, worker productivity expands and life expectancy grows.[92] Reducing air pollution also brings an added climate bonus, which can become a part of Saudi Arabia's commitments to the climate treaty. As part of its overall emissions strategy, Saudi Arabia's intended nationally determined contribution (INDC) emphasizes the need to expedite conversion of its single cycle power plants to a combined cycle.[93] Also included is a plan to build the world's largest carbon capture and use facility, which would capture and purify about 1,500 tonnes of carbon dioxide per day for use in the kingdom's petrochemical plants.[94]

...with improved air quality, health costs from air pollution-related diseases shrink, worker productivity expands and life expectancy grows.

In 2012, GAMEP set legally binding limits for ambient air quality, stationary and mobile source emissions that impact public health.[95] Alongside this directive, the agency decreed that industries would have five years to conform to the new requirements, thus aligning maximum air, water and noise pollutant levels with international benchmarks like the United States' Green Building Council's Leadership in Energy and Environmental Design (LEED) certification system.[96] New property developments such as the King Abdullah Finance District have been designed to meet LEED standards by using local building materials to reduce energy consumption in transport, rooftop solar panels to generate power, district cooling systems to minimize expenditure on air conditioning, and intelligent lighting that switches off when a room is unoccupied.[97] Running solely on electricity, a 3.6-kilometre six-station monorail system for the District[98] has the potential to create new environmental benefits for Riyadh's residents.

GAMEP regulations stipulate requirements for environmental impact assessments for residential and industrial development.[99] It is also responsible for planning multi-agency responses to major incidents like oil spills. Action calls for the need to strengthen provisions for O_3 and smog, which includes setting ceilings for SO_2, NO_X, $PM_{2.5}$ and VOCs. Further, a sustainable national air pollution plan needs to be put in place to integrate monitoring, modelling, and database tools. This plan should be complemented by emission monitoring studies, risk assessment and risk management, database development, and dispersion models for stationary and mobile sources.[100]

The industrial cities of Jubail and Yanbu are prime examples of adoption of advanced monitoring and control technologies for new and existing facilities.[101] Even so, estimating the impact of alternatives using multiple-criteria decision-making tools is also key.[102] Hence, active stakeholder participation in air quality policy implementation ought to be governed effectively from all levels. Consideration for development of key indicators to monitor implementation (for example, the PM indicator covered under SDG 11) and the design of new policies by the Ministry of Environment, Water and Agriculture will be essential.

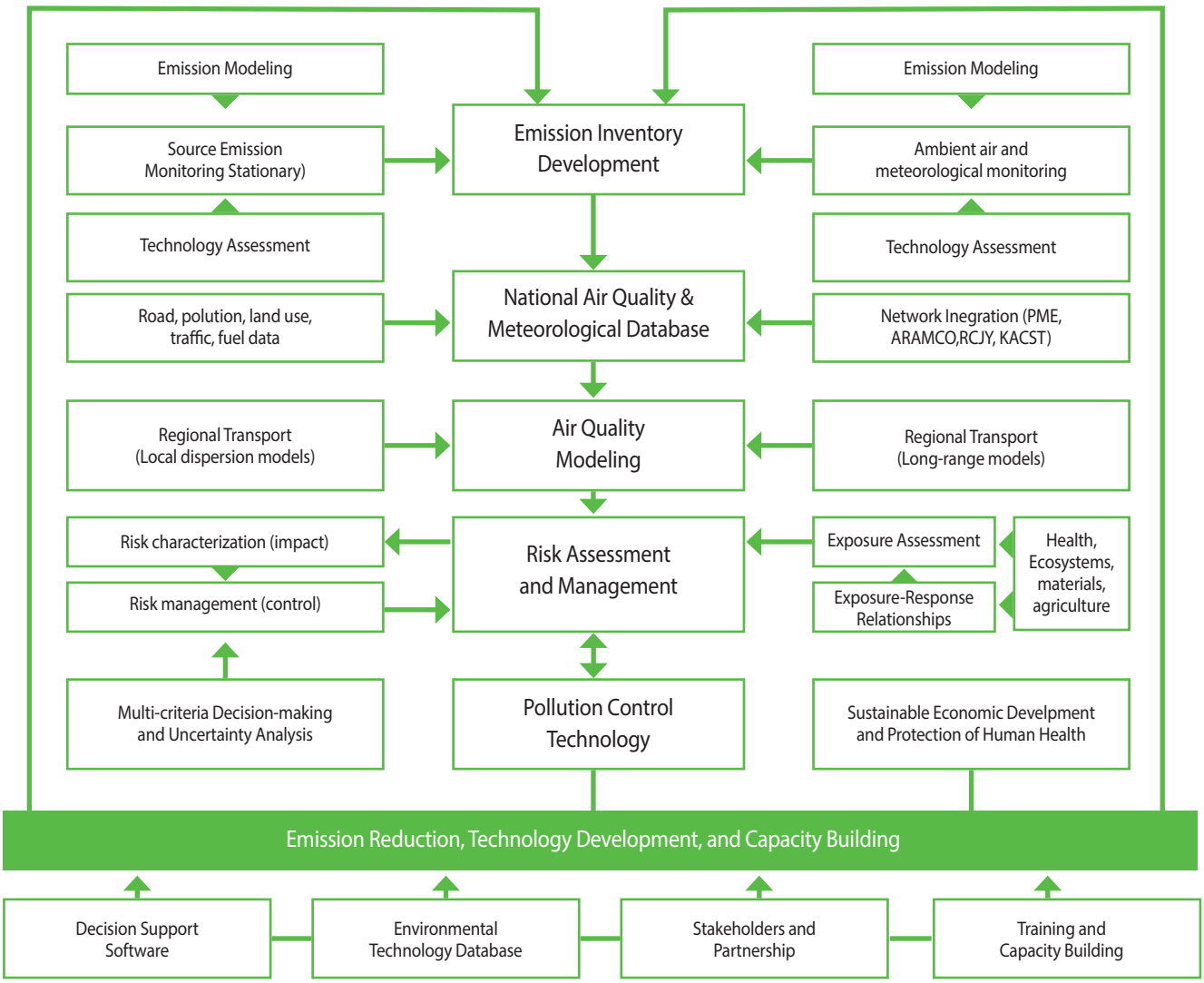
Several ambient monitoring networks supporting air quality include Saudi Aramco's Air Quality Monitoring and Meteorology Network (AMMNET); the Royal Commission for Jubail and Yanbu (RCJY) network; and the King Abdulaziz City for Science and Technology (KACST) air quality network in Riyadh.[103] To maximize the overall availability and use of air quality and source emission data, GAMEP is integrating these datasets in a central data repository (see Figure 3.11).

Arguably, partnering with existing air quality and meteorological networks will leverage synergies. Priority should be given to investing in the development of expertise in all aspects of air monitoring, to ensure data comparability and consistency. Also, MoMRA plans to link the existing initiatives of the development of municipal oversight mechanisms and procedures to the development of strategic indicators through an index of client satisfaction of urban landscapes that monitor hygiene, visual noise, and air pollution.

3.7 Climate change: Vulnerabilities and impact

Climate change has emerged as a central issue in urban

Figure 3.11: National air quality database system

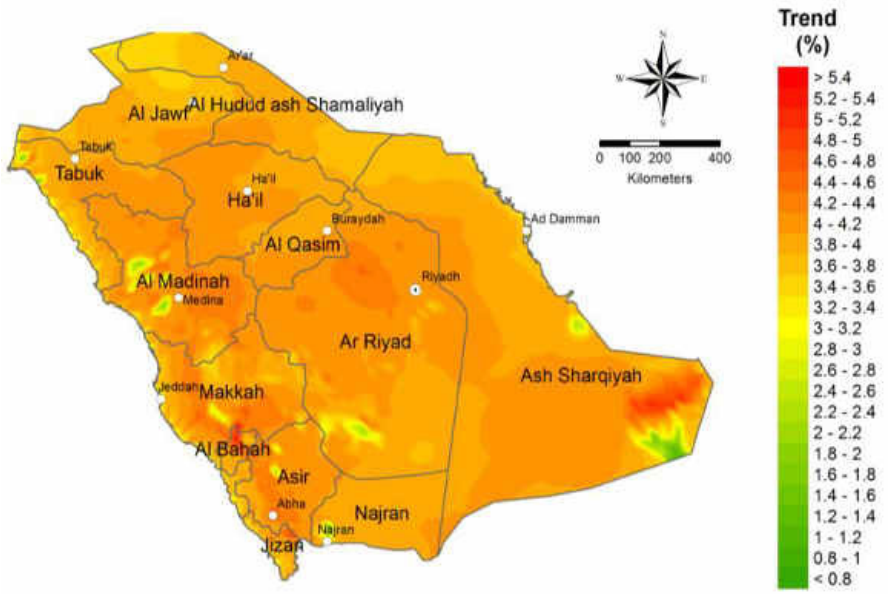


Source: Husain and Khalil, 2013; ERII, 2006.

agendas.[104] Over the past three decades, Saudi Arabia has recorded 14 natural disasters, affecting nearly 30,000 people and resulting in economic losses of approximately US$450 million. Flooding has been the most common natural hazard. [105]Some of the risks posed by climate change in the country include:

- **Increasing frequency and severity of heat waves**. The year 2010 was exceptionally warm in the Arabian region and the summer saw temperatures reaching 52°C in Jeddah,[106] causing an unprecedented demand for electricity.[107] Anticipated average warming for 2040 in Saudi Arabia is higher than the global average, with three quarters of the country expected to experience an increase in dryness by the end of the century.[108] Figure 3.12 illustrates the annual mean extreme temperature over the 2030-2080 period, which increases within the range of -0.6°C to 5°C.[109]

Figure 3.12: Mean annual temperature trend (2030-2080)



Source: Designated National Authority, 2016.

Figure 3.13: Areas at risk of urban heat island effect and sandstorm, Dammam

As a result of climatic change, and low levels of green open space the dense urban areas will suffer from increasing temperatures (and increasing heatwaves events) as well as increasing sandstorm events whose impacts include:

- Thermal discomfort
- Threats to urban health
- Decrease in potential for walkability
- Decrease in livability

Diagnosis

1 Existing areas at highest risk of UHI

2 Potential areas for growth near to coastal winds

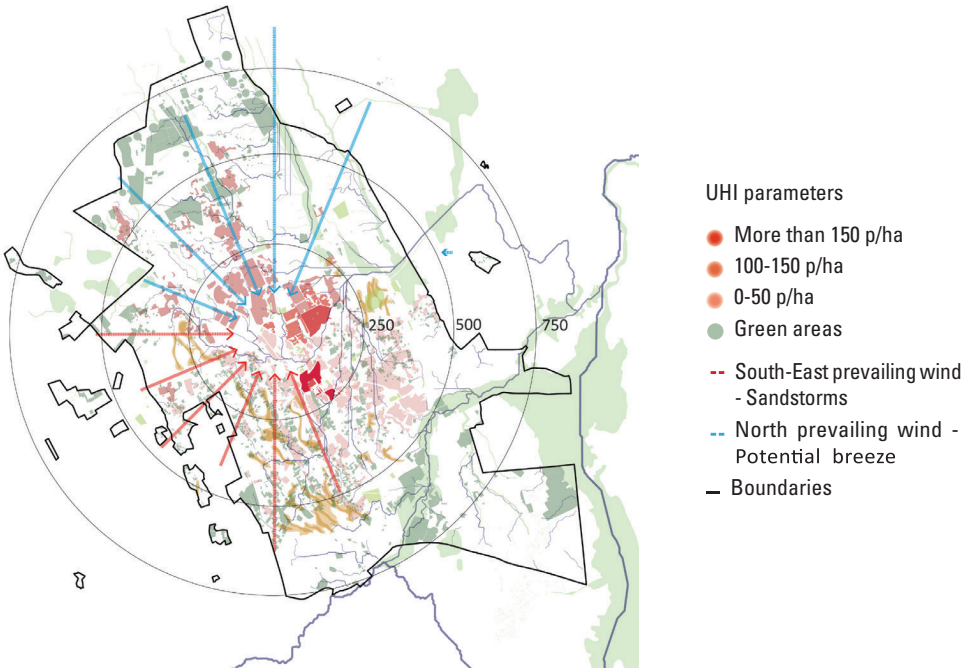
3 Areas closest to the impacts of sand storms

UHI parameters

- Less 180-400 p/ha
- Less 120-180 p/ha
- Less 60-120 p/ha
- Green areas
- Norht-West prevailing wind - Sandstorms
- South-East prevailing wind - Ocean breeze
- Administrative Boundaries

Source: The Present Status - Metropolitan Dammam, Saudi Future Saudi City Program 2018

Figure 3.14: Areas at risk of urban heat island effect, Buraydah



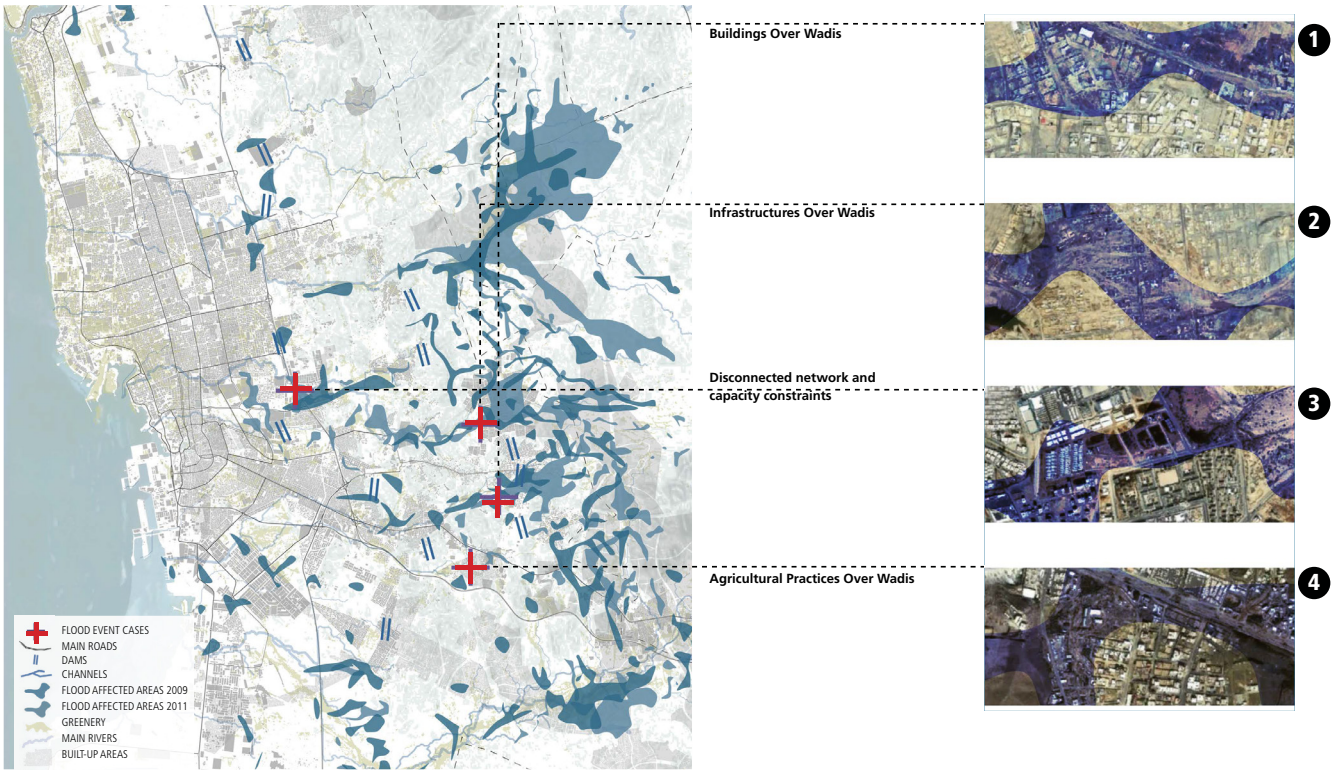
Source: City Profiles, Future Saudi Cities Program 2018.

- **Increased dust storms** affecting tourism and agriculture; the latter already under severe climate stress.[110] The expected yield losses of different types of field crops (including cereals, vegetables and forage crops) and fruit trees (including date palms) will range between 5 per cent and more than 25 per cent.[111]

- **Changes in timing, form and intensity of rainfall**. While rainfall had dropped from a monthly average of 6.24 mm to 6.06 mm from 2006 to 2009, and 5.44 mm from 2010 to 2012, there are now more frequent episodes of heavy rainfall and flash floods.[112] Parts of the south-west, notably Asir, have experienced more frequent and severe storms as its topography, seasonal winds, and temperature and moisture patterns are conducive for storm formation.[113] Despite increased rainfall in some areas, evapotranspiration is also expected to increase simultaneously. Thus, less than half of the water lost to evapotranspiration will be replenished by rainfall, leaving surface water resources still limited.[114] This causes pressure on, and deterioration of, water and sanitation infrastructure, particularly for weak or aging municipal infrastructure facilities,[115] jeopardizing the quality of existing water resources.[116] Conversely, alterations in precipitation further exacerbate the existing drought conditions, leading to adverse effects in cities, like food shortages, escalating food costs, and increased migration into cities from drought-affected regions.

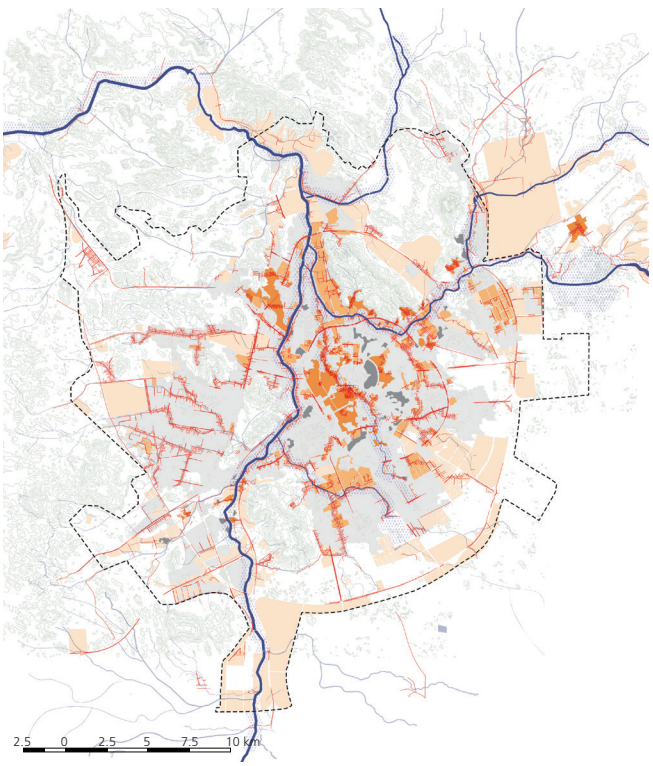
- **Severe or unprecedented flooding.** An estimated 12 per cent Saudi population reside in urban coastal zones with low elevation.[117] Compared to other countries, the magnitude of the impact of sea level rise on the coastal population in Saudi Arabia could be small. However, considering some of the weather events highlighted above, the impacts could be large on the kingdom's coastal population. For example, a 10 per cent intensification of the current historic storm surge combined with a one-metre sea level rise could affect about four out of every 10 people in the coastal regions of Saudi Arabia.[118] Dammam, Jubail, Khafji and Ras Tanoura on the east coast, and on the west Jeddah, Jizan Rabigh and Yanbu are the most vulnerable. In 2009 and 2011, flash floods in Jeddah were registered as the kingdom's worst in 30 years (see Figure 3.15).[119] This was due to an increase in impervious urban surfaces that do not absorb water, inadequate and drainage systems, and increased construction in low-lying areas and *wadis*. [120] Additionally, heavy storms which drive flash floods increase the vulnerability of unplanned areas of cities (see Figure 3.16).

Figure 3.15: Massive flood events in Jeddah, 2009 and 2011



Source: City Profiles, Future Saudi Cities Program.

Figure 3.16: Areas at risk of floods in Madinah



32% existing road infrastructure at risk

10% existing built-up area at risk

30% proposed built-up area at risk

7% unplanned areas

70% unplanned areas at flood risk

Wadis to be protected
Wadis buffer zone
(100m aprox. flooding analysis to be developed)
Unplanned areas at risk
Existing built-up at risk
Proposed built-up at risk
Infrastructure at risk
Unplanned areas
Current built-up area
Slope higher than 30%

Source: City Profiles, Future Saudi Cities Program 2018.

In the years ahead, the risks from global warming are expected to intensify and fresh pressures are emerging. Energy demand in the Middle East, North Africa and Turkey is expected to grow by 7 per cent annually until at least 2020, while energy consumption in Saudi Arabia is anticipated to treble by 2030.[121] This will possibly hasten biodiversity loss and stimulate the spread of infectious diseases. Thus, adaptation to climate change must continue to mobilize local action, alongside preservation of biodiversity.[122]

3.7.1 Climate change mitigation strategies in urban areas

Urban areas have a crucial role to play in climate change mitigation and adaptation as almost 70 per cent of global greenhouse gas emissions come from cities.[123] Particularly, city and municipal governments can influence patterns of energy and land use via land-use planning; urban design; zoning; building codes and height by-laws; transit planning road networks; master plan and subdivision controls.[124] Led by MoMRA, the National Spatial Strategy (NSS) formulated in 2001 emphasizes the need to protect the environment, reduce urban sprawl and promote spatially balanced development. It offers policy orientation strategies and guidelines to help transform and accelerate the kingdom's climate change mitigation measures.

...the Ministry of Energy, Industry and Mineral Resources aims to reduce CO_2 emissions from fuel consumption by 10 per cent, from 28 billion standard cubic feet per day, to 26 billion standard cubic feet per day by 2020

The prescribed policy intervention mechanism includes, but is not limited to, the adoption of green economy principles; changing the energy mix in favour of renewable and nuclear energies to alter the oil and gas consumption within the kingdom; manage the climate change risks by increasing resilience of human settlements and activities; and combating desertification through experimentation of new technologies, including cloud ionization and desert farming using solar technology[125]. Besides, the 2013 *Sustainable Planning Guidelines for Urban Growth* prohibits the siting of new development projects in areas prone to flooding, seismic activity, or environmental pollution. Whereas the NSS does refer, in some sections, on how to mitigate climate change-related risks,[126] attention should be drawn to urban and rural areas in equal measure, where climate change is compelling communities to reconsider the consequences of climate change.[127]

Previous parts of this chapter noted the rising frequency and severity of disasters in Saudi Arabia occurring primarily due to climate change and other environmentally related causes. Rapid and unplanned urban development is identified as the main cause of damage and loss, which in turn significantly outstrips progress in building resilience.[128]

An assessment of Saudi Cities demonstrates the need to build and strengthen urban resilience, given that 21 per cent of unplanned areas in Taif, 26 per cent in Makkah and 17 per cent in Madinah are vulnerable to the effects of climate change; with 32 per cent of infrastructure in Taif needing to be developed.[129] As a concept, resilience is the ability of a system, community, or society exposed to hazards to resist, absorb, accommodate , and recover from the effects of a hazard promptly and efficiently by preserving and restoring essential basic structures.[130] This calls for better territorial planning, sound environmental policies to maintain ecosystem buffers, appropriate building practices, and a culture of prevention and early warning.[131] Although Saudi Arabia has taken steps to advance the disaster risk management agenda, priority should also be given to the development of a framework to support local regulations.[132]

Efforts to build urban resilience can benefit from integrating climate change adaptation with existing efforts in disaster risk reduction, and other similar planning processes.[133] Still, only Riyadh's comprehensive metropolitan development strategy 1450H includes specific risk management measures and interventions, including the capture and storage of storm-water runoff. The Arriyadh Development Authority has implemented a city greening programme. Some of the measures that have been taken include integrating flash-flood management; enhancing agricultural land in the valley; conserving the natural environment; developing recreational areas; and landscaping the *Wadi Hanifah*.[134]

In order to strengthen urban resilience, Saudi cities must reassess their spatial growth strategies, and integrate climate change considerations into design standards and planning of roads, drainage networks and building codes.[135] This includes age and gender-sensitive consideration of infrastructure, and ecosystem-based approaches, in line with the Sendai Framework for Disaster Risk Reduction (2015-2030).[136] A multilevel governance framework is critical for addressing climate change.[137]

Saudi Arabia is at the centre of international discussions on greenhouse gas (GHG) emissions, ecological footprints, and

Oil platform in Saudi Arabia

international cooperation for environmental sustainability and the fight against climate change.[138] Not only is the country the world's leading oil producer, it is one of the highest greatest consumers of the commodity,[139] which makes the energy sector the main contributor to GHG in Saudi Arabia.[140] Accordingly, the Government has prioritized energy efficiency as a key policy to reduce local oil consumption. The three pillars of the national policy are fuel economy standards for imported vehicles by 2020, insulation standards for new buildings and tightened minimum energy performance standards for air conditioners.[141] In particular, the Ministry of Energy, Industry and Mineral Resources aims to reduce CO_2 emissions from fuel consumption by 10 per cent, from 28 billion standard cubic feet per day, to 26 billion standard cubic feet per day by 2020.[142] Saudi's Intended Nationally Determined Contribution (INDC), encourages actions that promote the development and use of mass transport systems in urban areas, such as expediting the planning and development of metro systems in Dammam, Jeddah and Riyadh.[143]

According to its INDC, Saudi Arabia aims to reduce its annual emissions by up to 130 $MtCO_2e$ by 2030 [144]. It plans to do this through contributions that have co-benefits in diversifying the economy and mitigating GHG emissions.[145]

Nevertheless, Saudi Arabia has been actively participating in all the UNFCCC's Conference of the Parties and related protocols. It is also a member of an international initiative, the Carbon Sequestration Leadership Forum, which advances cost-effective technologies for carbon capture and storage.[146] A review of Saudi Arabia's three national communications reports to the UNFCCC and current projects initiatives shows that the kingdom is implementing various climate-friendly policies, encompassing measures to reduce anthropogenic GHG emissions and enhance carbon sinks.[147]

While good examples of adaptation projects are emerging (largely focused on water management, agriculture and rural development), are often underfunded.[148] Moreover, the kingdom needs to consider implementing policies and initiatives able to impact the behaviour of transnational corporations, especially those in the oil and industrial sector. These corporations are becoming important global actors in environmental policies they tend to invest in areas that are environmentally sensitive.[149]

The Eastern Region is home to companies like Saudi Aramco and Sabic so it is considered one of the areas most exposed to the risk of exposure to pollution sources. (150) Carbon market to reduce greenhouse gas emissions, (151) or to impose financing activities related to coping with the impacts of climate change. In this context, the General Authority of Meteorology and Environmental Protection should encourage companies to join the International Organization for Standardization ISO 14000, currently there are only three oil companies in Saudi Arabia that are bound by the United Nations Global Compact. (152)

3.7.2 Climate change adaptation strategies in urban areas

Saudi Arabia has taken steps to advance adaptation measures, which can take several forms: actions to reduce climate change vulnerability; spread risk among a wider population (insurance); eliminate activity or behaviour that causes climate change; and move vulnerable populations away from hazards.[153] According to UN-Habitat, there are five sectors across which cities can consider climate change adaptation options and strategies (see Table 3.1). This can help establish a framework for the development of indicators and measurement on adaptation progress.[154]

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3.8 Marine pollution and ecological impact

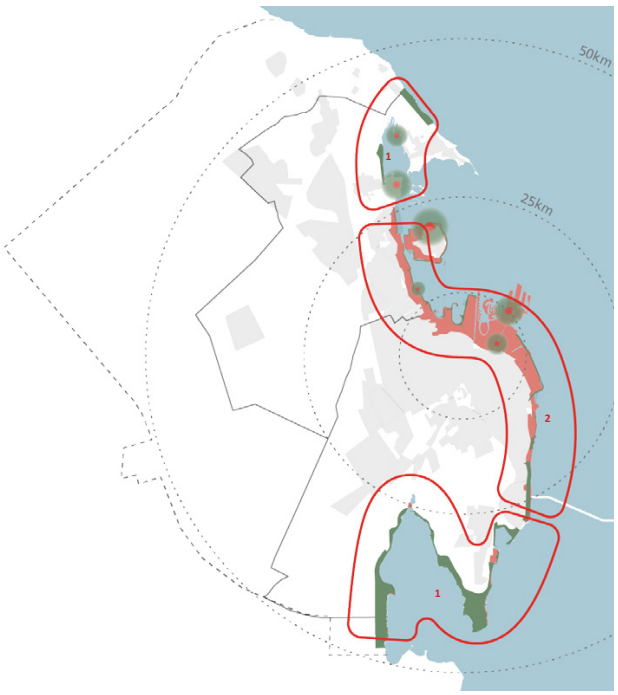
The economy and quality of life in Saudi Arabia's coastal towns mainly depend on the status of the natural coastal habitat and associated marine life. In recent years, the Arabian Gulf has witnessed a consistent trend of population growth in urban and rural areas. The unprecedented rate and scale of economic development has led to the loss and severe degradation of important natural habitats, including mangroves, seagrass beds and coral reefs.[155] Figure 3.17 illustrates the areas at risk of coastal degradation in Dammam. The potential impact of such degradation include: water stagnation; ecosystem and biodiversity degradation (loss of 485 hectares of Mangroves as a result of beach infringement/land reclamation); and a threat to the local fisheries economy.[156]

Table 3.3: Sector-based adaptation strategies for healthier urban environments

Sector	Adaptation Option/Strategy	Underlying Policy Framework
Water	Water storage and conservation techniques; incentives for water conservation; water reuse and recycling; desalination; increase water use efficiency; public education; flood risk map; public participation flood adaptation and mitigation programmes; greater investment in water supply systems; controlled use of urban and groundwater systems.	Urban water polices and Integrated Water Management; integrating climate change into public policy; policy to control groundwater extraction.
Infrastructure and Settlements	Cleaning drainage system and replacement of primary sewer system; encourage infiltration, increasing depression and street detention storage; re-designing structures; relocation; sea walls and storm surge barriers; dune reinforcement; land acquisition and creation of wetlands as buffer zone against sea level rise and flooding; protection of existing natural barriers; maintaining defensible space around each building and neighborhood.	Design standards and code regulations; integrate climate change standards into design; land-use policies; insurance; financial incentives; public education regarding risk of living in hazard prone areas.
Human health	Heat-health action plans; emergency medical services; access to public 'cooling centers'; improved climate sensitive disease surveillance and control; access to safe water and improved sanitation; greater intergovernmental coordination and cross-boundary coordination.	Public health policies that recognise risk; strengthened health services; intergovernmental, regional and international cooperation; greater investment in health services.
Urban Transport	Environmentally friendly transport system; energy efficient cars; carpooling; efficient public transport system; new design standards for urban roads, rails, etc., to cope with warming and drainage; fuel substitution.	Integrating climate change considerations into national policy; investments in R&D; incentives for energy efficient car industry.
Energy	Strengthening of overhead transmission and distribution lines; underground cabling for utilities; increasing energy efficiency; emphasis on renewable resources.	Sustainable urban energy policies; regulations; fiscal and financial incentives to encourage green energy use and green building; incorporate climate change in design standards and codes.

Source: UN-Habitat, 2008a.

Figure 3.17: Areas at risk of coastal degradation in Dammam



Source: City Profiles, Future Saudi Cities Program.

Another example is Jeddah, the groundwater is being polluted by septic tanks and uncontrolled discharges from the industrial sector. The discharge of untreated effluent is polluting the fragile marine environment and reducing water safety for swimming. Coastal development activities is threatening mangroves and fringing reefs, leading to coastal erosion.[157] Growing coastal populations in other major cities like Jazan, Jubail and Yanbu have been accompanied by extensive dredging and filling operations associated with expanding industries (including power and desalination plants), tourism and waste disposal.[158] Other forms of anthropogenic stress include oil bunkering, coastal mining and quarrying activities.[159] These increasing pressures make coastal zones especially vulnerable to climate change impacts; not only flooding and erosion, but also implications for ecosystems such as through intrusion of saline waters.[160]

Adaptation strategies are, therefore, necessary to reduce the consequences of climate change by improving resilience and reducing vulnerability. Aggregating the various strains from rapid urbanization, industrialization, water scarcity and climate change demonstrates the serious threat to ecosystems. Hence, strategies which prevent and significantly reduce marine pollution, including debris and nutrient pollution, is needed urgently. It should be integrated with strategies to improve socioeconomic development, food security and reduce of threats from anthropogenic sources and rehabilitation techniques to prevent infringement of coastlines.

3.8.1 Ecosystem adaptation measures

Ecosystem-based adaptation includes the sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to the adverse effects of climate change. Examples include enhancing coastal defence, reducing coastal flooding through the maintenance and restoration of mangroves.[161] Saudi Arabia's INDC identifies sinks for "blue carbon" (that is wetlands, coastal and marine conservation) as an adaptation action with significant co-benefits, such as spawning grounds for commercial fish, water purification and improving livelihoods.[162] Also highlighted is the implementation of coastal management strategies as a measure through which this can be achieved.[163]

A plethora of studies on carbon sequestration have identified mangroves as the most important natural CO_2 storage source in Saudi Arabia.[164] The country boasts more than 100 mangrove stands on the Red Sea coast, with an estimated area of 3,500 hectares, which is equivalent to 6.2 million tonnes of CO_2.[165] As part of Saudi Aramco's Corporate Biodiversity Plan, the company recently finalized the design for a mangrove eco-park in Rahima Bay on the Arabian Gulf coast, planting 10,000 mangrove seedlings at the location. On completion, the park is expected to protect over 63 square kilometres of mangroves, salt marshes and seagrasses.[166] Building on the experience and successes of ecosystem-based management in Saudi Arabia, such as blue carbon projectst, in collaboration with the

international community, should evaluate how blue carbon ecosystems could be more effectively included within existing policy frameworks, including carbon financing mechanisms.[167]

Based on the topography, financial resources, and site specifics, mitigation and adaptation measures could be taken to protect the coastline along the Arabic Gulf and the Red Sea from storms, floods and sea level rise. These measures would be to undertake spatial planning, sand nourishment, dune management, salt marsh works, restoring and protecting seagrass beds, and building sea dikes. In practice, however, a combination of engineering works and more ecosystem-based adaptation measures is usually required.[168]

3.8.2 Policies regarding marine pollution

Recognizing the need to manage natural endowments for present and future generations, Saudi Arabia has taken bold steps to protect the coastal and territorial waters, especially the Arabian Gulf, in accordance to the Regional Organization for the Protection of the Marine Environment (ROPME). As a signatory party, Saudi adheres to ROPME's regional legal instruments, which aim to tackle marine emergencies, hazardous waste, land-based activities, and sea-based pollution.[169] The kingdom is also a member of the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden, which was established in collaboration with the United Nations Environment Programme.[170]

Established under the General Environmental Regulations, GAMEP is responsible for enforcing environmental laws to include the environmental assessment of ecological areas in Saudi Arabia.[171] Of crucial importance are Saudi Arabia's three directives that inform and make specific reference to planning tools, such as the Integrated Coastal Zone Management Plan (ICZM), which manages indiscriminate development activities that put people and property at risk. The directives are the following:[172]

- Decision of Council of Ministers Number 14 (dated 21/1/1408 H) on fishing and the utilization and protection of living marine resources of Saudi Arabia's territorial waters.

Coral Island, Dammam

- Royal Decree Number 1982 (dated 15/9/1419 H) regarding reclamation and backfilling of coastal zone areas.

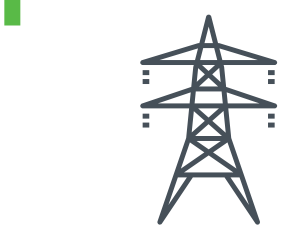
- Royal Decree Number M/34 (dated 28/7/1422 H) regarding general environmental regulations.

Included in the country's INDC are set measures to develop and implement ICZM plans that would protect coastal infrastructure like roads, residential areas, industrial complexes, desalination plants and seaports.[173] It is also important that planning studies and pollution risk assessments for each new coastal development do not occur in isolation. Regional level pollution and oil spill assessments are one way to inform ICZM plans protecting the environment from the potential harmful effects of spills [174]. it is critical to formulate a shared vision and objectives related to the use and management of Saudi Arabia's coastal resources, through stakeholder involvement, in light of the broader sustainable development goals.

3.9 Renewable energy

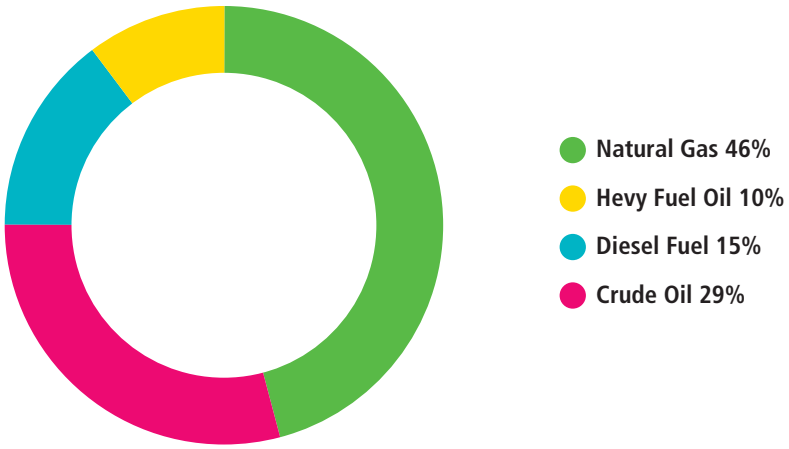
Saudi Arabia's growing population, its rising per capita income and the ability to export oil and gas are strongly interlinked. Electricity demand is growing by nearly 8 per cent annually, with the country's power generation capacity composed almost entirely of conventional thermal plants fueled by crude oil, refined oil products, and natural gas (see Figure 3.18). By 2030, the country's electricity needs are expected to be around 120 GW per year.[175] Yet no less than 25 per cent of the country's oil production is consumed domestically, which is mostly used for electricity production. Due to the extreme warm and dry climate, 70 per cent of the electricity production is consumed for air conditioning with summer peak demand nearly twice the winter average.[176]

Demand drivers are urbanization, industrial development, and a subsidy regime that encourages wasteful consumption (see Table 3.4). Price paid by producers in Saudi Arabia are low, thus discouraging investment in renewable energy. The low price of electricity spills into consumer prices, thus encouraging unsustainable use of electricity (see Table 3.4)



Electricity demand is growing by nearly 8 per cent annually

Figure 3.18: Fuel types used in electricity production



Source: Demirbas and Bakhsh, 2017.

Table 3.4: Fuel prices paid for Saudi electricity producers Vs. international producers (US$)

	Price paid by electricity producers	International process for electricity producers
Heavy Fuel oil	0.43	15.43
Natural Gas	0.75	9.04
Diesel	0.67	21.67
Crude Oil	0. 73	19.26

Source: The Electricity & Co-Generation Regulatory Authority, 2015.

3.9.1 Towards a sustainable electricity policy

Sustainable development will require electricity services that are reliable, available, and affordable for all over the long term. However, if energy efficiency is not improved and current trends continue, domestic fossil-based fuel demand in Saudi Arabia is expected to reach over 3 million barrels of oil per day by 2030.[177] Further, the investment needed to meet this demand may exceed US$90 billion.[178] Not only is this growth unsustainable in terms of resources, it is also acknowledged that emissions from fossil fuels like coal, oil and gas are material contributors to climate change and damaging to the natural environment.[179] Thus, the implementation of energy conservation policies, efficiency programmes and other sustainable development solutions remain an urgent need. Expressly, the reform of electricity tariffs; the application of energy-saving standards covering all electric devices, machinery and equipment and the use of thermal insulation in all buildings and facilities, is needed.

3.9.2 Progressive liberalization of the electricity sector

In parallel with the rising demand, the Saudi Government is upgrading the country's electricity production and distribution capacity. Whereas electricity reliance rests primarily on production plants to generate the bulk of the country's needs, some privately-owned power companies, driven by efficiency, supply the rest.[180] Led by the Electricity and Cogeneration Regulatory Authority, a detailed restructuring plan has been initiated with provisions to unbundle the Saudi Electricity Company, ultimately moving the nation towards a more competitive wholesale electricity market.[181]

As Saudi Arabia's electricity systems undergo progressive transformation, policy should facilitate the adoption of innovative technologies and configurations to improve energy infrastructure and reach underserved areas. Markedly, the Shuaibah Integrated Water and Power Plant, utilizing flue gas desulphurization technology with low NO_2 burner and electrostatic precipitator to reduce GHG emissions, is the first of its kind in the country.[182] To better equip its grid system for peak power demand, Saudi Arabia recently led a Gulf Cooperation Council city project linking the power systems of Bahrain, Qatar, and the United Arab Emirates.[183] This is a vital step towards the liberalization of power markets and promoting regional development. However, capacity development is needed if the critical policy frameworks on functioning markets, the electricity sector, rural energy, and the innovation chain are to be established.[184]

Table 3.5 Energy conservation policies and initiatives

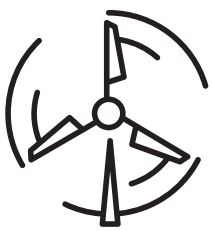
Type of Policy	Agency/Programme	Responsibility
Energy Demand	Ministry of Energy, Industry and Mineral Resources	Government agency handling policy and planning in the power sector.
	Saudi Arabian Standards Organization	Promoting construction materials with insulating properties. Approved technical regulations and standards for fuel economy of light vehicles.
Energy Supply	National Energy Efficiency Programme	Includes eight objectives centred on energy audits, energy efficiency labels, standards for appliances, and a construction code. Set provisions to reduce electricity subsidies
	Electricity and Cogeneration Regulatory Authority	Developed a national strategy for smart meters and smart grids in order to improve network reliability, increase operational efficiency and realize better asset utilization.

Source: Designated National Authority, 2016; Nachmany et.al., 2014.

3.9.3 Energy efficiency

Managing domestic demand and finding new sources of energy supply are now high policy priorities in Saudi Arabia. Cutting subsidies and moving to a targeted subsidy regime of direct aid to the poor will be the most important issue. In furtherance of this trend, the Government aims to eliminate energy subsidies by 2020, entailing higher electricity costs for consumers. According to the King Abdullah Petroleum Studies and Research Center, restructuring the power generation sector, alongside accompanying price reforms, has the potential to contribute an additional US$4 billion to the economy.[185]

Equally important, the National Energy Efficiency Programme to promote best practices in the economic consumption of electricity was followed by the establishment of the Saudi Energy Efficiency Center.[186] The latter is the entity responsible for the development of energy efficiency and conservation policies targeting buildings, the transport and industry sectors, which has formulated energy efficiency labels for air conditioners.[187] Still, reducing inefficient energy consumption is challenging as individual and industrial consumers have long benefitted from highly subsidized electricity. Table 3.5 summarizes Saudi Arabia's energy conservation policies and initiatives.



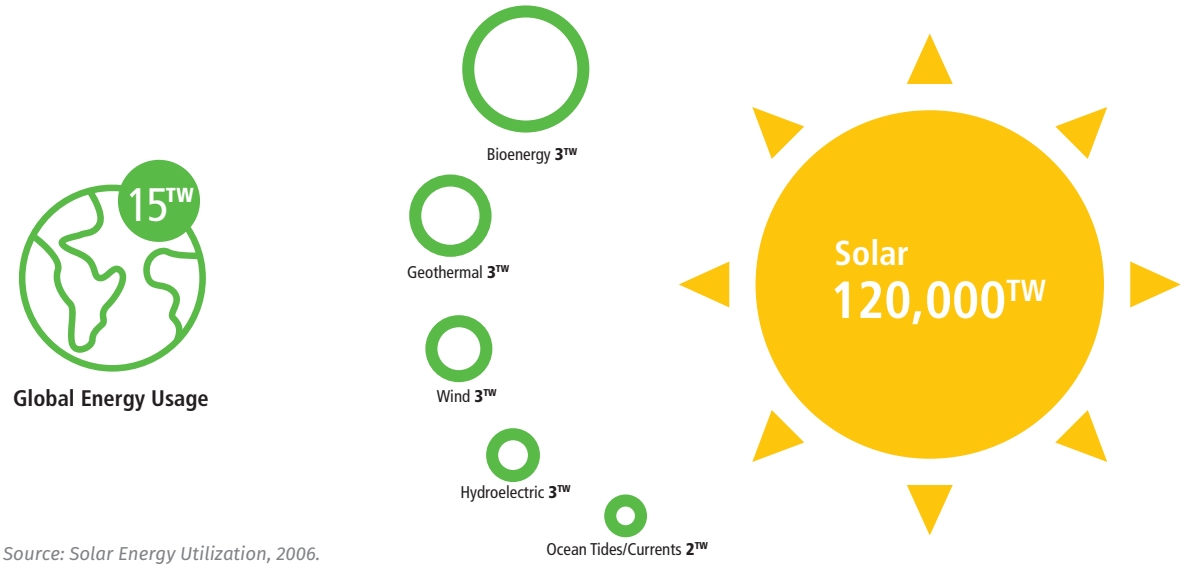
...this discussion emphasizes the increased utilization of renewable or nuclear energy alternatives which potentially provide energy with zero or almost zero emissions of air pollutants and greenhouse gases

As part of Vision 2030, the Government is backing the process of energy diversification, emphasizing Saudi Arabia's commitment to a cleaner future. The Renewable Energy Project Development Office (REPDO) is responsible for all initiatives related to renewable energy in Saudi Arabia.[188] Intermediate goals are to achieve 3.45GW of renewable energy by 2020, 9.5GW by 2023, and 54GW (41GW solar, 9GW wind, 3GW waste-to-energy and 1GW geothermal) by 2040.[189] The potential savings are noteworthy, with research suggesting that fulfilment of these targets could decrease power sector fossil fuel consumption 25 per cent by 2030.[190] Meanwhile, the NTP aims to ensure that almost 7,800 jobs are supplied by the atomic and renewable energy sectors in 2020.[191]

3.9.4 Towards renewable energy

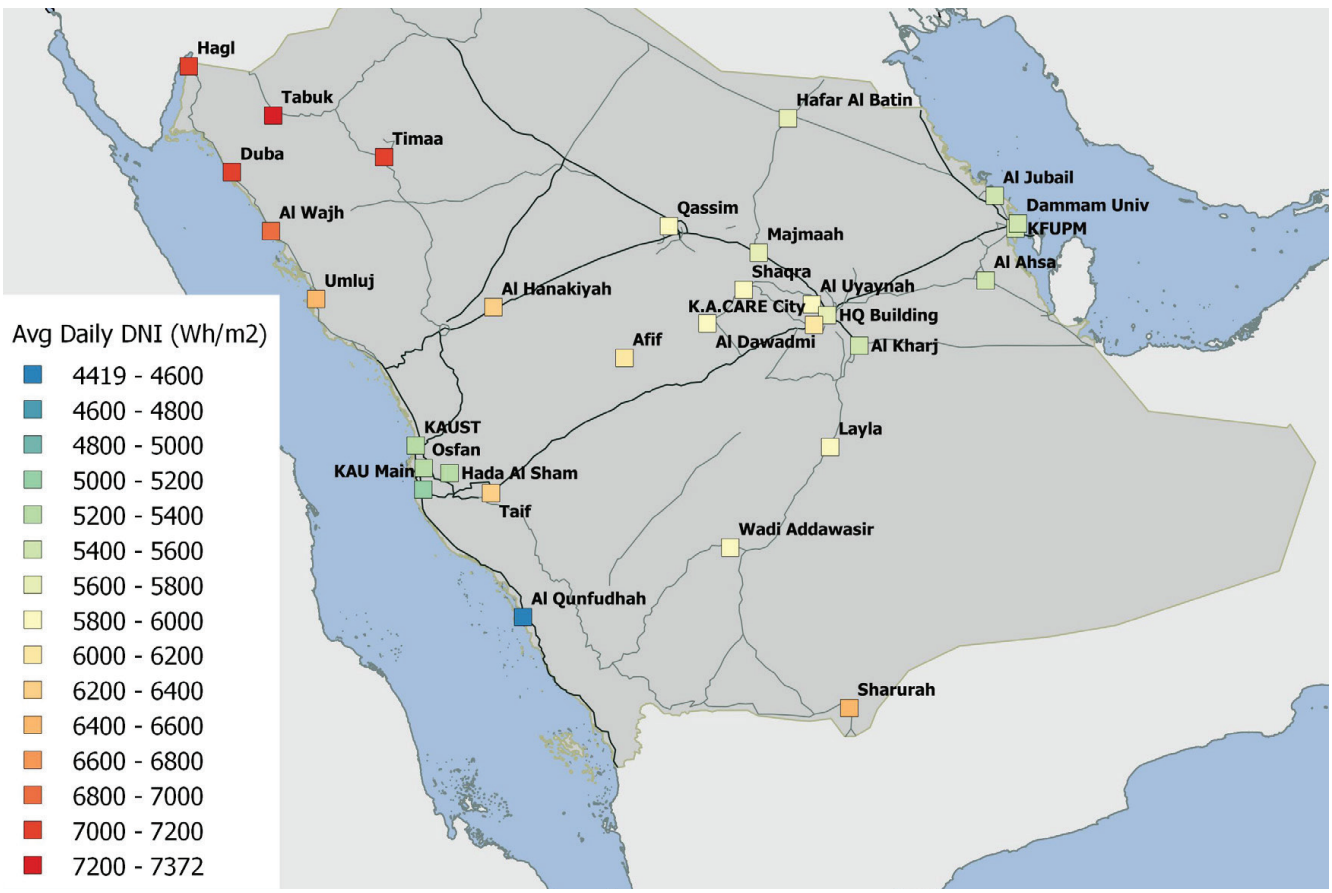
Apart from the current reliance on oil, this discussion emphasizes the increased utilization of renewable or nuclear energy alternatives which potentially provide energy with zero or almost zero emissions of air pollutants and greenhouse gases. The kingdom's climate makes it an ideal location for solar and wind energy projects. Situated between 35°N and 35°S, Saudi Arabia lies within the "Global Sunbelt" and is characterized by high solar irradiation, with annual average daily Global Horizontal Irradiance measured at 5700 to 6700 watt-hour per square metre (See Figure 3.19 and Figure 3.20).[192]

Figure 3.19: Maximum possible power that could be captured from renewable energies



Source: Solar Energy Utilization, 2006.

Figure 3.20: Daily direct normal solar radiation



Source: Zell, et al, 2015.

Box 3.4: Concentrated thermal power in Saudi Arabia

Saudi Arabia has launched ambitious plans to integrate alternative energy sources into the national grid, including 25 GW of concentrated solar power (CSP). Among numerous solar energy projects already under way, the Green Duba based on Integrated Solar Combined Cycle (ISCC) marks the kingdom's first CSP in a combined cycle plant. Commissioned by the Saudi Electricity Company (SEC), it is anticipated that the power station will generate up to 600 megawatts (MW) from the combined cycle plant, and 50 MW from the CSP installation. This has the potential to transform the city of *Tabuk*, into a gateway for the global export of electric power. The plant itself will be supplied by General Electric (GE) and based on gas turbines, one of which has been configured to use condensate fuel. The project will generate enough power to supply approximately 600,000 homes per year.

Sources: Samus et. al., 2013; Meza, 2015.

The abundance of solar resource potential and the declining cost of photovoltaic technology are key factors influencing the attractiveness of solar energy in the region.[193] Accordingly, the Government intends to invest between US$30 billion and $50 billion across 60 projects, with 1 GW of capacity earmarked for concentrated solar power (CSP), according to REPDO (see Box 3.4).[194] This will free up large quantities of petroleum for export and further reduce air pollutants and GHG levels in the country.

Investment in solar energy can be used for residential buildings (solar powered water heaters and air conditioning); industrial purposes (generation of electricity for road lightning, tunnel lighting and traffic lights); governmental facilities, and desalination, agricultural and metrological solutions. Moreover, it can be used to provide reliable and sustainable electricity to desolate remote areas. There is, however, a need to study the variables that may affect solar power generation, such as climatic change, wind, and humidity, thereby ensuring the optimization of solar energy systems for the kingdom.

Wind power use in Saudi Arabia is low compared with other developing or middle-income countries.[195] Untapped wind resources, in the country's regions, can be connected and optimally integrated into the grid using smart technologies and expand transmission facilities.[196] Moreover, due to the large areas of unused land, renewable energy sources can meet the significant share of energy requirement thereby supporting depletable energy sources. Wind speeds range from about 14 to 22 km/h, and 16 to 19 km/h over the Arabian Gulf and Red Sea coastal areas, respectively.[197] These are above the levels needed for wind energy to become economically viable. Recently, REDPO pre-qualified companies for the installation of 400 MW of wind power generating capacity in Dumat Al Jandal, in the region of Al Jouf.[198] As renewable energy comes online, there will be increased demand for integration technology into the national grid.

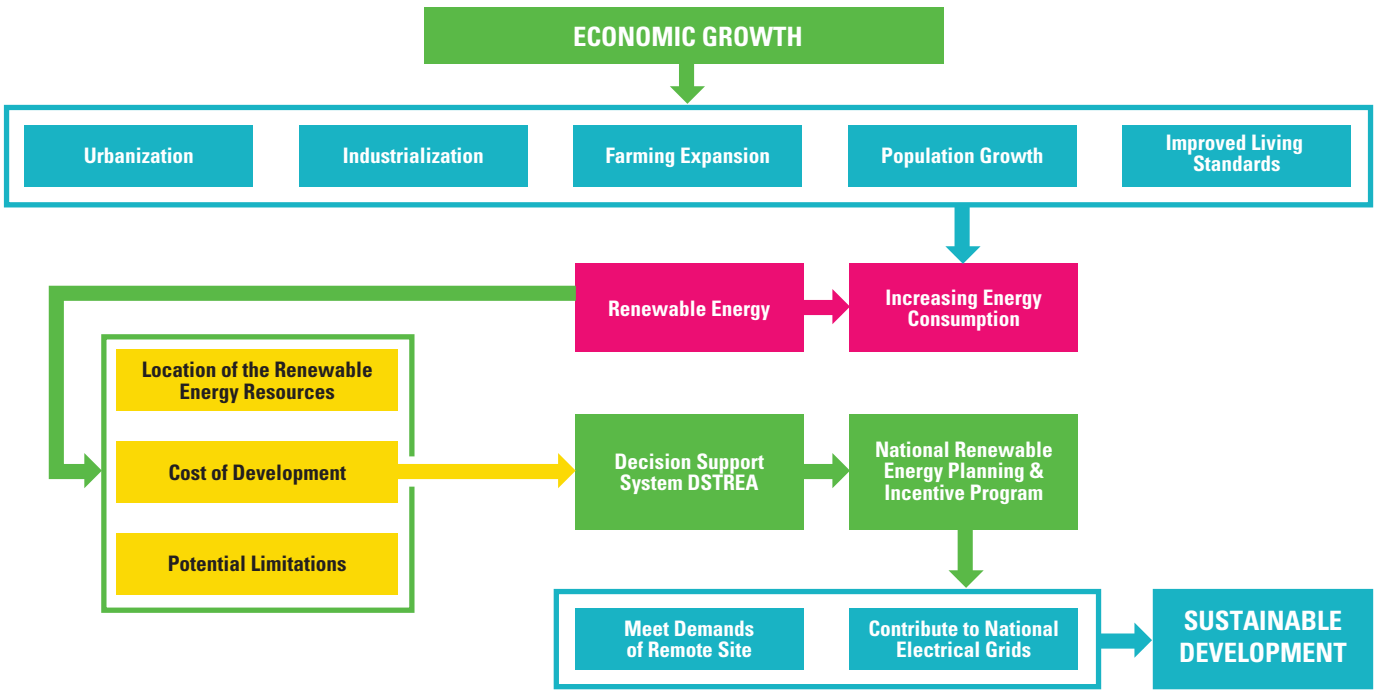
The King Abdullah Economic City is one of four greenfield city developments being created in Saudi Arabia to promote industrial expansion, diversify its economy from oil, and to provide housing and job opportunities for a young population

3.9.5 Eco-cities and sustainable urbanism

Recently launched, the privately led "eco" or "smart' cities"[199] typically showcase private sector engineering and design capacity for sustainable urban development,[200] reflecting ongoing global climate change (policy) discourses. Fueled by the dual necessity to "decarbonize" cities as key source of GHG emissions and to grow urban centres to meet socioeconomic demands, eco-cities promise an opportunity to stimulate urban development and regeneration through socio-technological innovation, business development and cultural branding.[201]

The King Abdullah Economic City is one of four greenfield city developments being created in Saudi Arabia to promote industrial expansion, diversify its economy from oil, and to provide housing and job opportunities for a young population, 65 per cent of which is under 30 years old. Benefitting from a substantial new port facility, and a station on the Haramain high-speed train line, energy, water, waste, biodiversity and pollution prevention have been adopted as key parameters in the city's design. However, innovation cannot be embraced for its own sake and instead must respond to the need for more liveable cities, as embedded in the SDGs.[202] This (together with participatory governance) is the background against which appropriateness of "smart cities," as future development models, is to be carefully considered.[203]

Figure 3.21: DSTREA and interconnected modules for sustainable energy planning



Source: Mofarrah and Husain, 2012.

3.9.6 Sustainability of future energy systems

The sustainable management of energy systems is complex, including policy and drivers such as economic growth, security of supply, mitigation of climate change, and anticipated technological development. An optimization-based decision support tool for renewable energy assessment (DSTREA),[204] provides a comprehensive analysis of energy planning, climate change impacts, and energy and environmental policy responses within an energy management system framework.

Multiple-criteria decision-making (MCDM) methods are useful in this regard as they help deal with multiple conflicting criteria in a structured way, allowing consideration for different preferences for sustainability criteria. For illustration, an MCDM method is integrated with Statistic models, incorporating institutional and legal boundary conditions, including socioeconomic data such as population; energy consumption; technology; land cover; road access; and the database cost for the region.[205] Along with the DSTREA, various scenarios to explore alternative energy futures can be analyzed, thus contributing to more informed decision and policymaking for national sustainable development (see Figure 3.21).

Conclusions and recommendations

Sustainable development thrives where models of good asset management are applied. It is economic development that supports social development, or the improvement of human well-being, without compromising the fundamental environmental and cultural framework in which it takes place thus ensuring intergenerational equity.[206] In 2011, the United Nations Environment Programme while highlighting how the global economy can shift to a low-carbon growth path a concerted package of policy-driven investments in the general range of 1-2 per cent of global GDP demonstrated that a green investment scenario of 2 per cent of global GDP delivers long-term growth over 2011-2050. [207] Such scenarios revitalize the global economy, while protecting social and environmental interests. Since the environment pervades all dimensions of human life, its proper management provides a of leverage to spark the transformative power of cities.[208] In coming decades, building inclusive urban climate change resilience will be an essential urban policy and a smart investment for cities.

This chapter, through a variety of practical examples, amply demonstrates climate policy interventions, which incorporate mitigation, low-carbon development and adaptation, and cover all sectors. It highlights the wider systemic approach that urban planners and policymakers should take to uproot the causes of climate change vulnerability. To reap the resilience dividend, municipal governments must collaborate better and harness the energies of all stakeholders, from corporations, civil society organizations and the public. By building systems that bind several interconnected issues linked to disruption and climate change, Saudi Arabia's cities will survive disasters and fortify their social and economic foundations for the future.

The kingdom can leapfrog in its development pathway given its abundant resource base and bold leadership. Vision 2030 and the NTP illustrate that the Government has a clear understanding of the challenges to be tackled in transforming urban sustainability. Nonetheless, the burgeoning population and its attendant needs is somewhat outpacing the needed improvement of competence and institutional capacity of city authorities. This situation is making the implementation of strategies difficult. Improved industrial efficiency and technological innovation, in tandem with an integrated approach to urban planning and participatory governance, will greatly support the country's move towards sustainable development. A mix of indicators (for example, reduction in GHG emissions, natural area protected from development, air or water quality) should provide guidance on policy decisions, as Government defines the framework under which industry will operate.

This chapter recommends the following towards realizing sustainable development:[209]

- Addressing complex and interdependent environmental challenges, through more cross-sectoral collaborations, involving multi-stakeholders and interdisciplinary research.
- Recognizing the innovative potential of the various stakeholders in urban governance, including business, civil society and the citizenry.
- Reaffirming the need for renewed urban planning and the incorporation of green growth strategies in core planning instruments (such as national development plans).
- Using participatory and inclusionary planning to mainstream the right to the city[210] and to develop effective environmental programmes.
- Underscoring the linkages between local and global environmental agendas and climate change as an urban issue.

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A view of the city of Riyadh

CHAPTER 4

Dynamics of the urban economy

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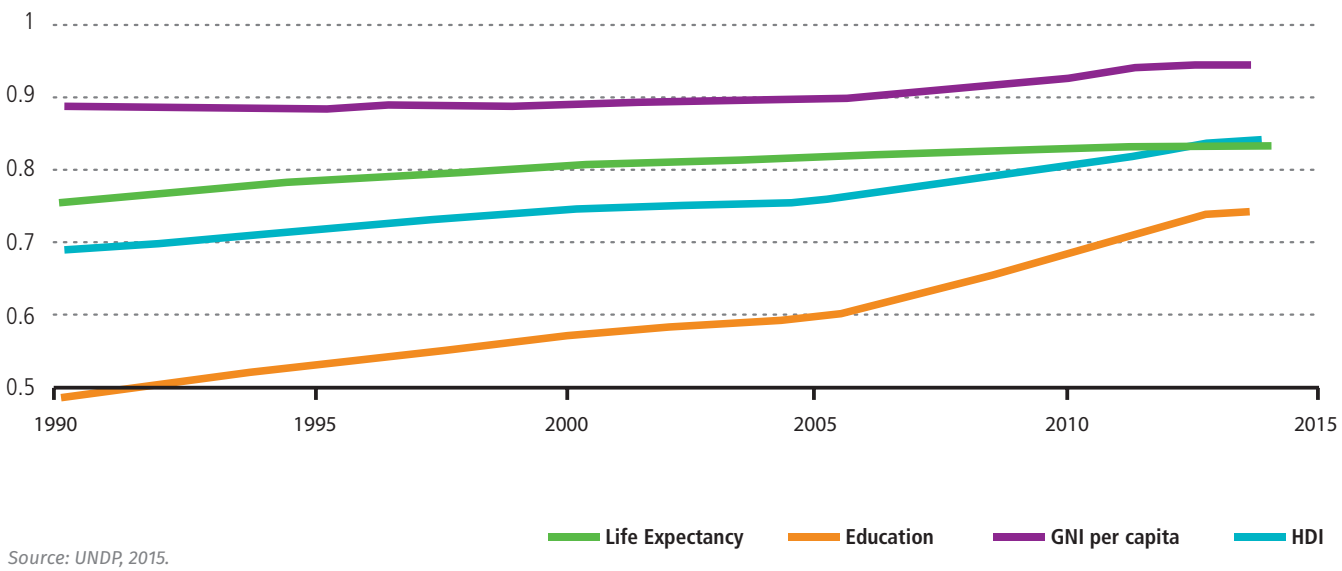
Cities are the bedrock of success for Saudi Arabia's policy to diversify its economy away from its dependency on oil. As illustrated in Chapter 1, the kingdom is highly urbanized and this has been driven by the success of the long-term policy to achieve sustainable economic growth by expanding the contribution of the non-oil sector to the GDP. Indeed, the rise in public revenue following the 1973–1974 rise in oil prices, as well as similar price surges in subsequent years, allowed the kingdom to make a range of investments, including urbanization projects. These investments were geared toward building a diversified urban-based economy. In recent times, also, there has been a renewed appreciation that cities are the engines of growth and of national economic diversification.[1] Indeed, the creation of an attractive environment for local and international investors and enhancement of their confidence in the economy, as envisaged in Vision 2030 and National Transformation Program 2020, will be hinged on cities.

Overall, the growth of urban areas and their economies in the kingdom has had positive outcomes in the overall standard of living as well as productivity. The sustained high rate of economic growth since the 1970s and Government policies (that ensured major investments in education, health, housing, infrastructure and human development) have resulted in a significant rise in the quality of life of the rising urban population, as well as the increases in the kingdom's human development index (from 0.690 in 1990 to 0.837 in 2014) as shown in Figure 4.1.

Since the inception of the First Development Plan 1390–1395H (1970–1974), there has been massive investments in the country. Besides the development of natural resources (water, oil and gas), priority has been given to provision of infrastructure[2], educational and health facilities. Combined, all these investments have provided a firm basis for the expansion of the national economy and for social development. Investments in education health and human development, for instance, have risen steadily and accounted for 70 per cent of public investment in the Ninth Development Plan (2010–14). However, fiscal adjustment measures following the oil price collapse in 2014 has resulted in a curtailment of some investments such as urban infrastructure, even though the provision of basic services is still lagging in secondary cities.

The country's rapid urban growth has brought with it benefits and challenges. The level of education has risen dramatically, and larger cities have excellent infrastructure. However, youth unemployment remains relatively high; and affordable housing will be needed by 2020; and significant investment is still needed to complete the upgrading of older central urban and peripheral areas developed informally in the 1970s and 1980s, during the early years of the oil boom. Similarly, the rapidly rising labour demand resulting from the massive construction projects initiated under successive five-year development plans— coupled with a skills shortage in this sector among Saudis— resulted in a steady inflow of expatriate workers, first from other Arab countries, later from the Indian subcontinent and South Asia. As of the fourth quarter of 2016, 78 per cent of the employed labour force were non-Saudis (see Box 4.5).

Figure 4.1: Saudi Arabia's HDI component indices, 1990-2014



Source: UNDP, 2015.
Note: HDI component indicators are evaluated from 0-1

Box 4.1: Key national agencies integrating urbanization into the economy

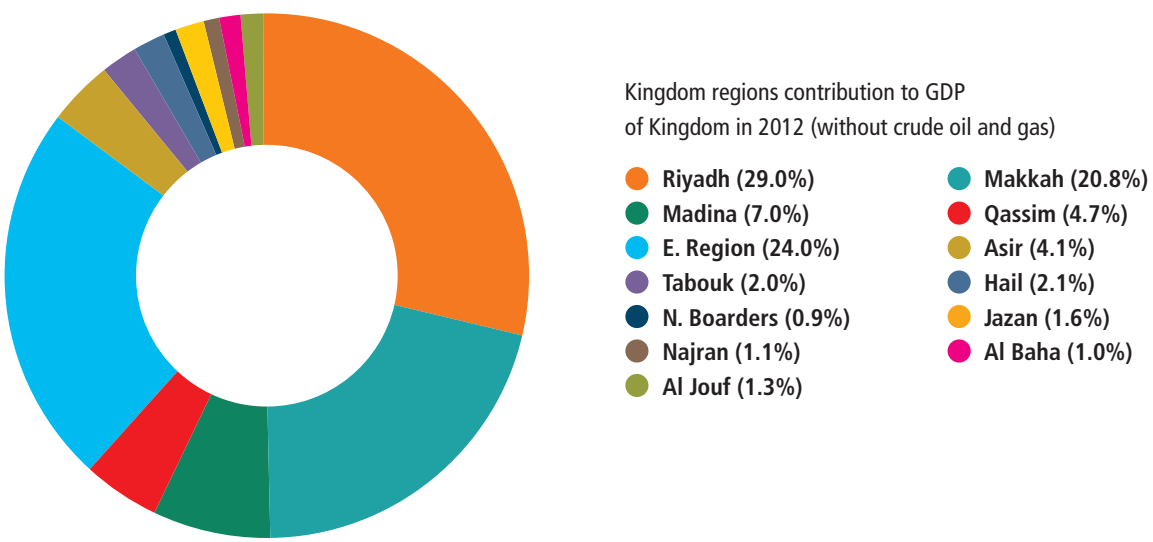
National policy rather than the private sector has been key to urbanization. The Ministry of Economy and Planning is responsible for preparing and implementing the five-year plans that define public investment for the execution of the national development strategy. The Ministry of Municipal and Rural Affairs (MoMRA) is responsible for the development of Urban spatial growth at all levels of Government and the construction of infrastructure, while the Ministry of Housing (MoH) and the Real Estate Development Fund are the major sources of housing financing for Saudi households.

4.1 The competitive advantage of primary cities

The rapid growth of Saudi Arabia's urban population from 2.8 million in 1970 to 26 million in 2015 has been driven by a national development strategy intended to lessen the kingdom's dependency on oil exports by diversifying its economy and developing urban-based activities in manufacturing, trade and services. This strategy has seen the steady growth of these sectors with the locus being the major urban agglomerations. In 2016, for instance, the contribution of manufacturing to GDP rose to 12 per cent and the number of commercial company registrations had reached 129,900. Of these, Riyadh Region had 39.6 per cent, Makkah Region 26.1 per cent, and the Eastern Region 20.5 per cent. [3]

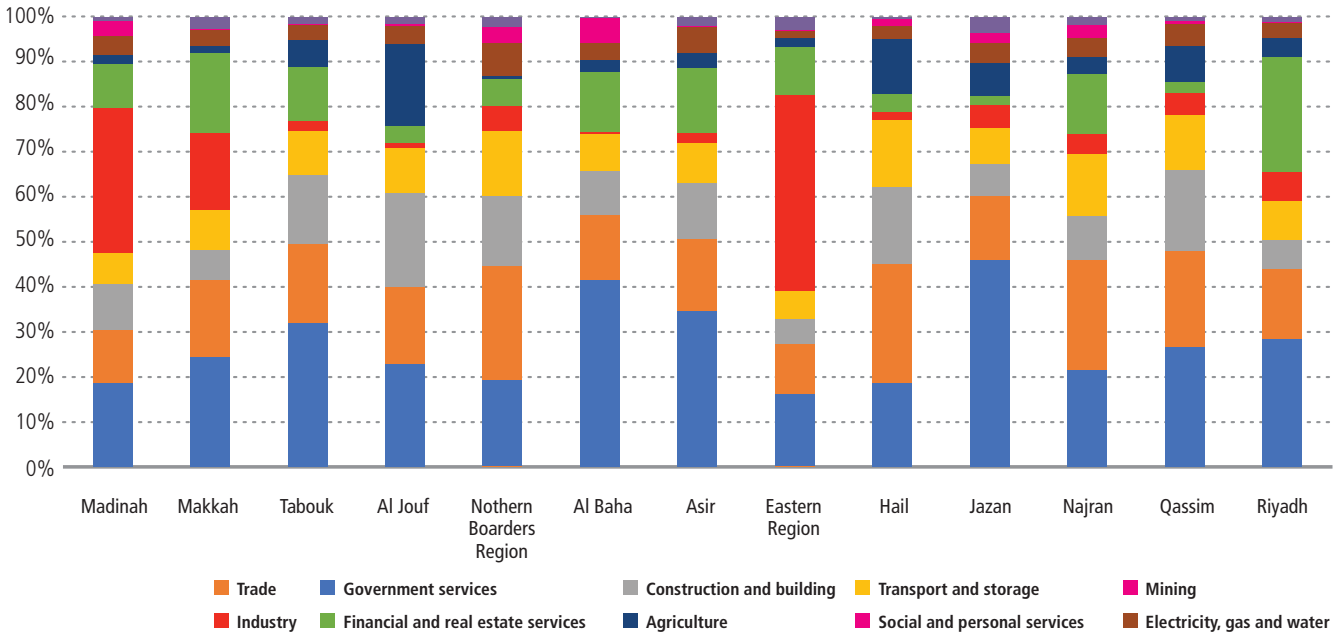
As mentioned in Chapter 1, the kingdom's development has largely been guided by a National Spatial Strategy that aims to achieve balanced development among the regions. It also seeks to achieve a spatially balanced pattern of population distribution within the country. The rationale for this is to minimize the negative consequences of rapid population growth in major cities. However, the dynamics of urbanization have clearly favoured a few major urban agglomerations that were the prime beneficiaries of the prosperity brought about by rising oil prices and the kingdom's economic growth. As illustrated in Figure 4.2, the regions where these cities are located dominate the economy.

Figure 4.2: Contribution of regions to the GDP (without crude oil and gas), 2012



Source: City Profiles, Future Saudi Cities Program.

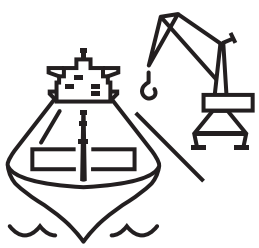
Figure 4.3: Economic contribution to GDP in regions (without crude oil and gas), 2012



Source: Economic reports for the regions of the Kingdom, Ministry of Investment 2014

The massive infrastructure investments undertaken by Government to implement its economic development strategy have over the years predominantly benefited the existing larger cities: Riyadh, the national capital and a major economic driver; the Red Sea port city of Jeddah , which also a gateway for two other large cities — the holy cities of Makkah and Madinah, the destination of the yearly Hajj pilgrimage;[4] and the East Coast urban agglomeration centred on Dammam in the heart of oil production led by Saudi Aramco.

The dynamics of urban economies of these cities is becoming increasingly sophisticated. They are linked to the global systems and anchor the country's major development corridors, gateways and intermodal transport nodes (see Chapter 2). In terms of regional contribution to the GDP (without crude oil and gas), the three regions where these cities are located account for nearly three quarters of the kingdom's GDP: Riyadh 29.0 per cent, Eastern Region 24 per cent and Makkah 20.8 per cent (see Figure 4.2).

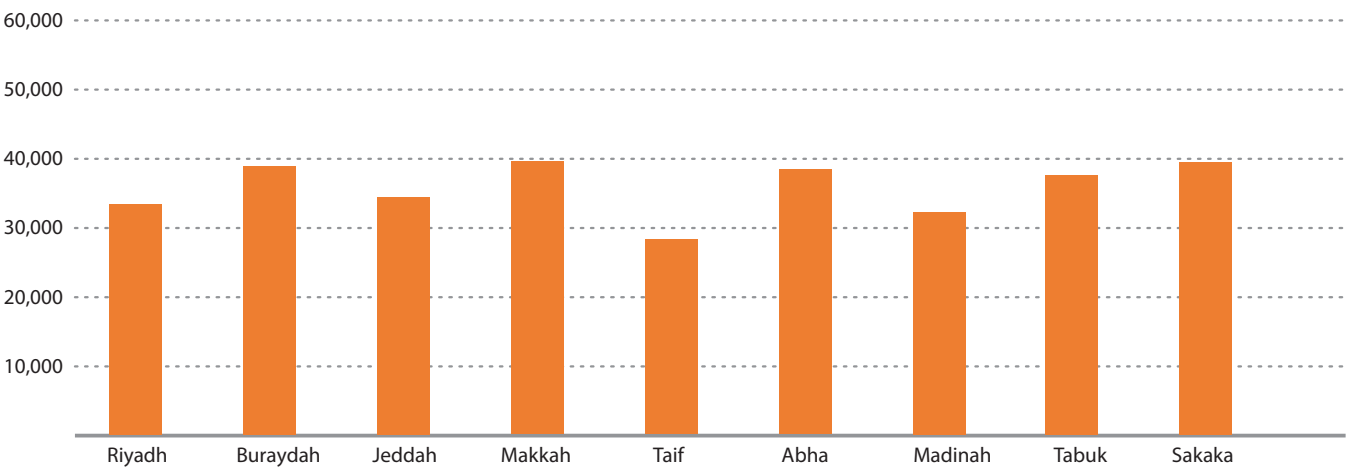


The massive infrastructure investments undertaken by Government to implement its economic development strategy have over the years predominantly benefited the existing larger cities

With a 2015 population of over 6 million, Riyadh is the largest urban agglomeration in the Gulf Region. It is Saudi Arabia's largest economic centre, accounting for about one-third (34 per cent) of national employment or 3.6 million jobs in 2016.[5] The city's productivity is further enhanced by being a major educational centre, accounting for 20 per cent of higher education enrolments.[6] Riyadh is also an important manufacturing centre; it recorded a 17 per cent increase in the number of productive industries between 2010 and 2015. By 2015, the city was home to nearly half of the productive industries (46 per cent) in the urban city system and about a third (34 per cent) of the productive industry in the country— which represents 42 per cent of jobs in the productive industry in the urban city system and 30 per cent in the kingdom, respectively. The sectors that are largest employers in the Riyadh Region are construction, and wholesale and retail trading (see Figure 4.6). Combined, these two sectors employed about 1.2 million people in the region, representing 63 per cent of the share of its employment. Its 2013 average household income of US$34,195 yearly was second only to Dammam's (see Figure 4.4)

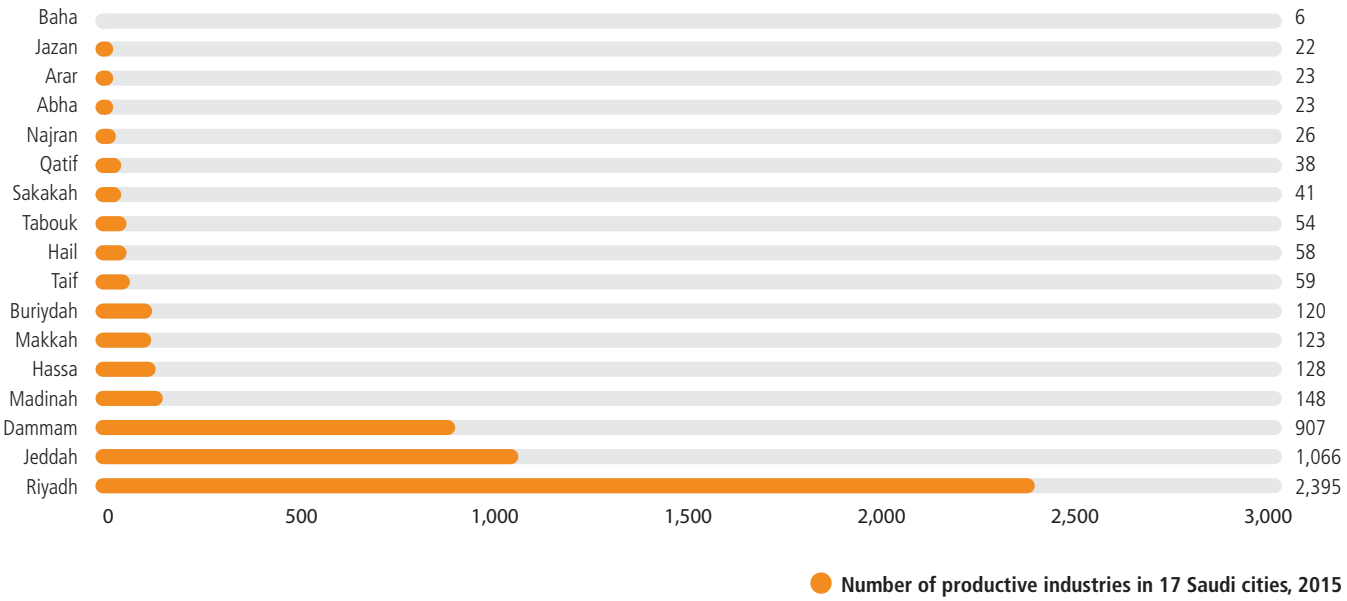
Jazan Port

Figure 4.4: Mean household incomes



Source: Results of the Household Income and Expenditure Survey, General Authority for Statistics, 2018

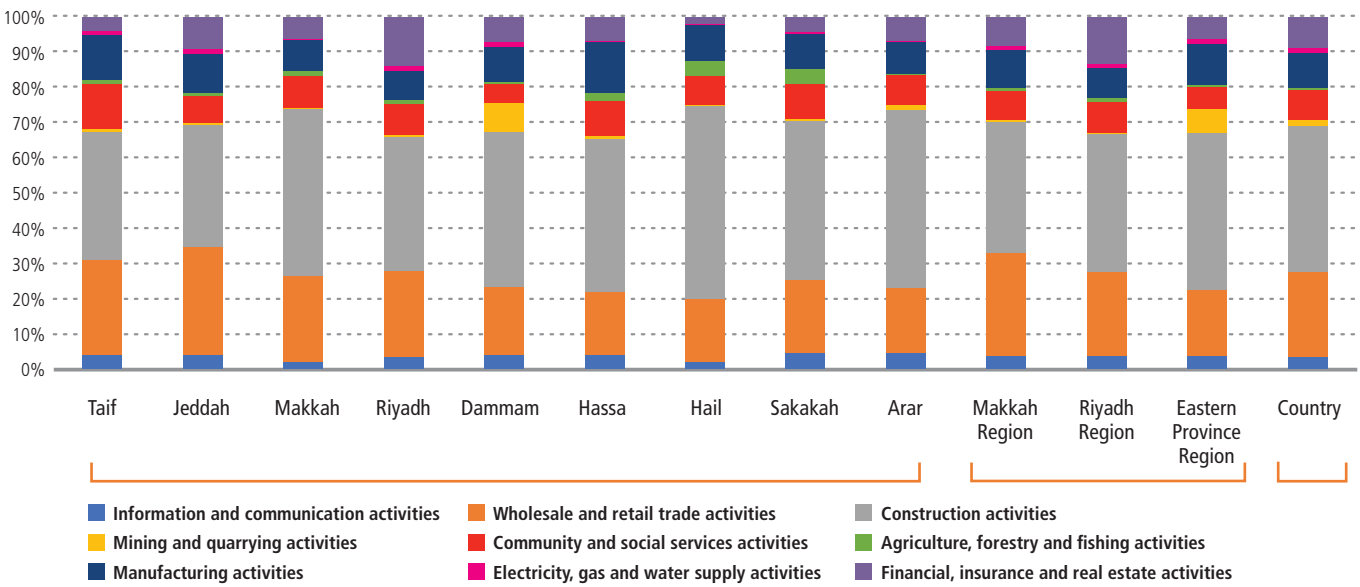
Figure 4.5: Number of productive industries in 17 Saudi cities



Source: Saudi Industrial Development Fund, 2016.

Jeddah, on the other hand, is the country's second largest city, with a population of about 4 million. Approximately 80 per cent of consumer goods imports enter through its port. The city has the second highest numbers of productive industries after Riyadh, accounting for a 15 per cent share in the kingdom in 2015. In 2016, its employed labour force of nearly 1.8 million (the second largest in the country after Riyadh) was engaged mainly in construction (34 per cent), as well as wholesale and retail trade activities (31 per cent). Jeddah's average annual household income was US$28,997 yearly in 2013. The city's rapid growth has resulted in sprawling development, which often hinders efficiency in the provision of service in urban areas.

Figure 4.6: Employment by economic sectors in selected cities and regions, 2016

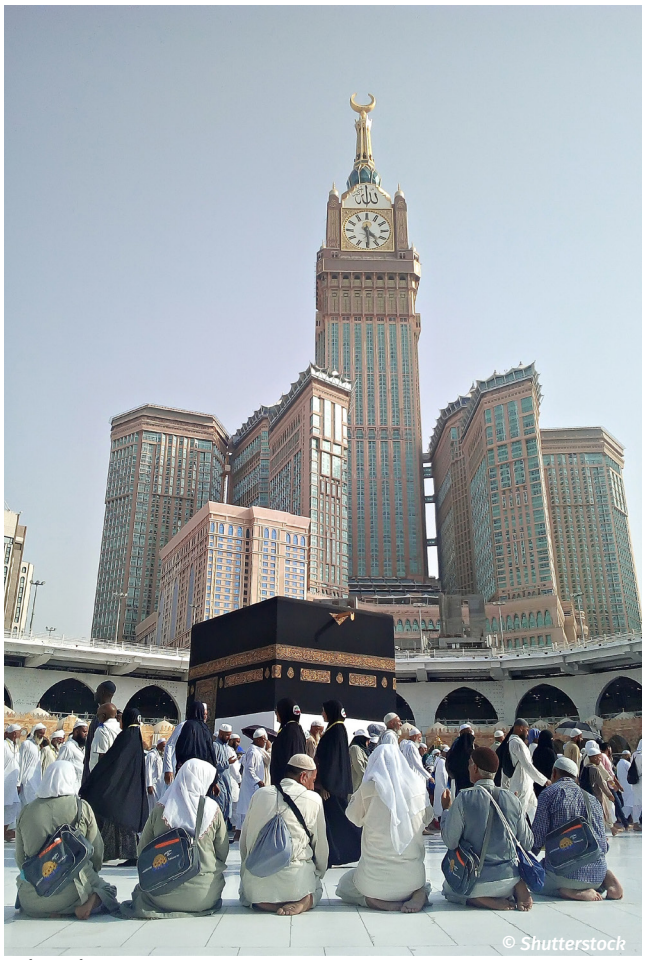


Source: General Organization for Social Insurance (GOSI), 2016.

The economy of Dammam, in the centre of the oil fields in Eastern Region,[7] is interconnected with Khobar and the new industrial city of Jubail. Whilst driven by the extractive and refining activities, the region is the location of diversified manufacturing activities. The industrial sector contributes about two-fifths of the regions GDP (without crude oil). In 2016, the city of Dammam accounted for 14.8 per cent of the country's total labour force (or 1.5 million jobs), whilst the whole of the Eastern Region comprised 20.8 per cent (nearly 2.2 million). The cities of Makkah Al-Karma and Al-Madinah Al-Munawwarah are the holy cities. While their economies are partially driven by Hajj and Umrah, their economic base is diversified. In Madinah, for instance, the industrial sector contributes nearly a third of the regions GDP. The next four medium-sized cities, with populations of 500,000 or more (Taif, Buraydah, Tabuk and Hail) are regional economic centres that account for about a tenth of the urban population. As illustrated in Figure 4.2, the contribution to GDP of the regions where some of these cities are located is less than 5 per cent. Some of these cities, especially those along development corridors, have been expanding in recent years and have been included as growth poles in the current national development strategy to foster the progress of new economic activities in lagging regions. Smaller cities include historic trading centres along ancient trade routes or market towns for their agricultural hinterland.

As illustrated in Chapter 1, the proportion of urban population living in small cities of less than 300,000 inhabitants has been declining dramatically, implying a diminishing role of small size cities. Similarly, despite healthy rates of population growth in some intermediate cities, others have been experiencing a net outmigration of their Saudi population, primarily young men searching for better economic opportunities. Some had rates of population growth at or below their rate of natural increase even with a continued inflow of expatriate workers. Those that gained in importance benefited from significant public investments or of local advantages to develop their economies. For example, Taif's elevation and cooler summer temperatures as well as its proximity to Makkah and Jeddah have made it a popular resort. In Buraydah, an old trading town and the capital of Qassim Region, major public investments have been made to develop agriculture (for example, growing of dates) and food processing, in addition to the construction of regional educational and service facilities.

While the competitive advantage of large cities is evident, the importance of other classes of cities is being recognized as the newly adopted national urban strategy provides a growing range of incentives for private investment outside the three leading regions. Such cities are called upon to have a growing role in the new national development strategy. As part of an effort to redirect growth to lagging regions,



Holy Kaaba

13 regional investment councils have been established. They are to cooperate with the Saudi Arabian Ministry of Investment (SAGIA),[8] the Public Investment Fund, the Real Estate Development Fund, the Saudi Credit and Saving Bank for microenterprises, and the Human Resources Development Fund to create an enabling environment for investment in lagging regions and develop their potential to become growth nodes.

Managing their expansion will be critical to avoiding the growth of informally developed peri urban areas as new economic activities are established. Given that the quality of the urban infrastructure of medium-sized and small cities lags that of the large cities, SAGIA's involvement is of interest as it funds a wide range of projects. These are in transport, housing, infrastructure, education, healthcare, building materials, manufacturing, renewable energy, information and communications technology, and tourism. The kingdom, for instance, is improving the infrastructure in Asir, Ha'il, Medina, Tabuk, Al-hasa and Taif to spur economic growth.

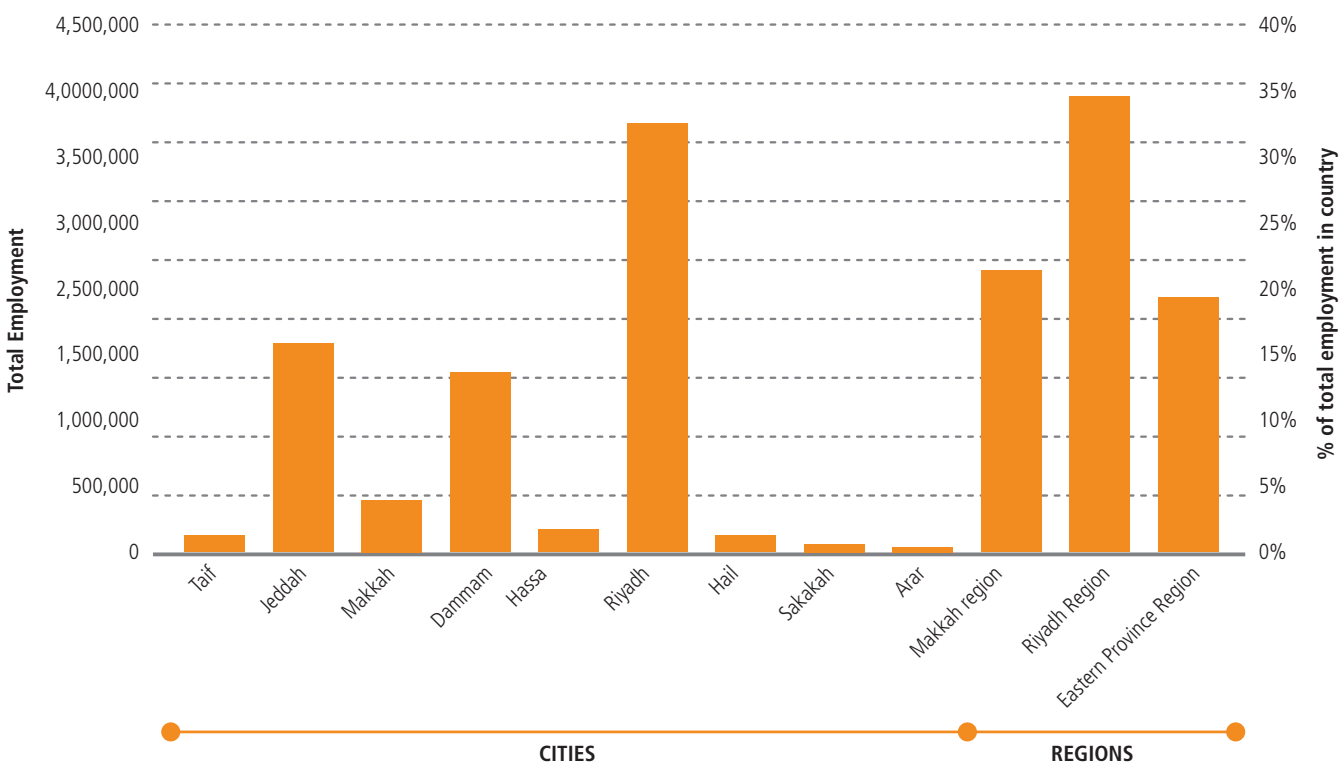
4.2 Cities as engines of economic growth

The growth of cities and their economies in Saudi Arabia has been positive in terms of aggregate incomes. Vibrant cities drive economic growth; thus, the kingdom's high level of urbanization should be viewed as an asset. Saudi Arabia's urban sector reflects its desert ecology. The sector also mirrors the economic dynamics driven by public investment preference for a small number of primary cities tied to the global economy over cities whose economic role is primarily regional. Some of these cities–for instance, Jeddah, Makkah and Riyadh–rank favourably in indices monitoring largest metropolitan economies in the world.[9] It is also foreseen that Dammam will be on the global map owing to its economic performance and its high concentration of advertising, accounting, banking, and legal services.

Vibrant cities drive economic growth; thus, the kingdom's high level of urbanization should be viewed as an asset

It is envisioned that the future economy will be supported by the metropolitan dynamics of these key Saudi cities. These cities—with their human capital, high income, educational institutions, cultural and social wealth and diversity—will lead the kingdom's efforts to diversify its economy and sources of revenue. This will offer a broad range of job opportunities. The economic dominance of these cities is illustrated in Figure 4.7 by the share of national employment that they command; together, they account for over half of national employment. In addition, reports show that the percentage difference of GDP per capita between large metro areas and the rest of the kingdom was 25.7 per cent in 2016.[10]

Figure 4.7:Employment in selected cities and regions, 2016



Source: General Organization for Social Insurance (GOSI), 2016.

While the national role of other cities is not as pronounced as those mentioned above, they are the dominant economic drivers of their regions, and enhancing the national importance of some of them is part of the current review of the national strategy. The alignment of economic and other strategic infrastructure across cities within the kingdom is becoming increasingly seen as vital for improved productivity, investment flows and employment creation. Already, the national spatial structure envisages the economic development of five major corridors to support the strong shift in the kingdom's economic model (see Figure 4.8). These are as follows:

- The central development corridor linking the east and west of the kingdom: Jeddah - Makkah Al-Mukarramah - Riyadh - Dammam
- The western development corridor along the Red Sea coast: Jizan - Jeddah- Medina and the city of the new future "NEOM"The Northern border Corridor connecting Dammam to Jordan.
- The eastern development corridor on the Arabian Gulf coast (linking the borders of the United Arab Emirates with Dammam and Kuwait, and is supported by the new railway line for the Gulf Cooperation Council states)
- The central development axis towards the north: Riyadh - Hail - towards the borders Jordanian)
- Buraidah Development Center - Al-Madinah Al-Munawwarah

These main corridors will be complemented by the following secondary logistic corridors: The logistics hubs - the main industries: 1- Jeddah - Riyadh - Dammam 2- Riyadh-Buraidah-Hail-Jordan

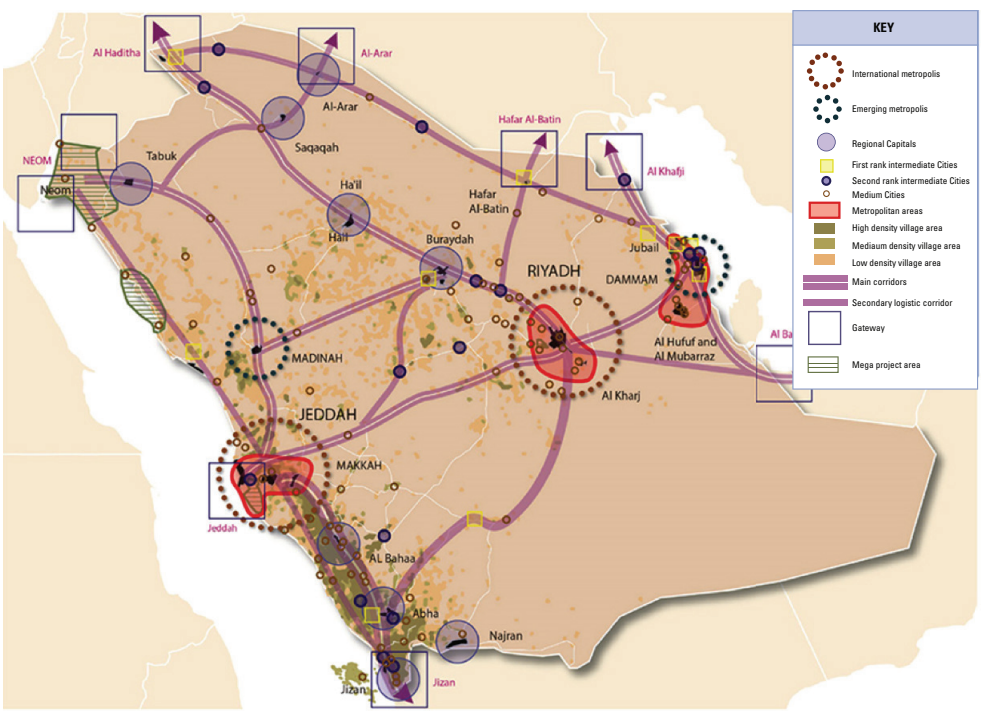
The economic corridor:1- The corridor of the East Coast 2- The western internal corridor, Jeddah and Madinah-Neom and Jazan 3- Buraidah city corridor

Tourism corridor: 1- West Coast corridor

Transport corridor: 1- Riyadh - Yemen - Jazan / Riyadh - Yemen - Nizan 2- Tabuk - Iraq 3- Dammam-Jordan 4- Riyadh, Iraq 5- Riyadh- Emirates

These envisioned corridors, together with intermediate cities and towns, are likely to create more metropolitan areas and hubs of economic activity. It is also envisaged that border cities will be transformed into important gateways into the economy. In the kingdom's vision to rise from its position

Figure 4.8: Discuss the development and classification of cities proposed in the National Spatial Strategy 2030



Source: The Kingdom of Saudi Arabia (2018a) Moving Toward the Future: The Updated National Urban Strategy 2030 - White Paper: 2018

at 25 to the top 10 countries in the Global Competitiveness Index, the *Green Paper for the National Spatial Strategy 2030* proposes regional capitals and intermediate cities to be the main enabler for local development. Human settlements in the proximity of large and intermediate cities will benefit from the facilities found in these main and intermediate cities. The urban transformations encompassing the hinterlands as envisioned in the development of corridors will give cities significant opportunities to work together and is bound to stimulate regional and national economic development.

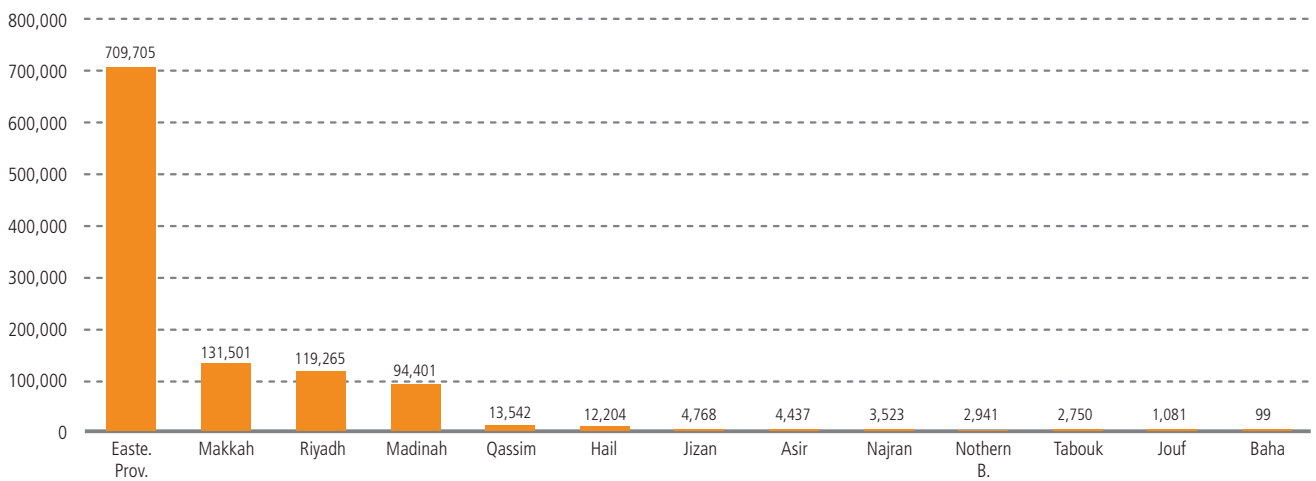
Oftentimes, corridors result in unbalanced regional development and severe urban primacy. This is because they often bolster the ties to the existing economic centres, thereby creating a more localized development as opposed to allowing more diffused spatial development across the regions. The kingdom's policymakers, however, are keen on ensuring a more balanced and inclusive economic development across the regions. Indeed, efforts to improve the quality of the urban environment across all regions are often reflected in a relatively balanced distribution of Government financing among them. Government expenditures on infrastructure, public services and development projects will increase the economic importance of the regional cities(Capitals of the regions) by enabling them to reach the functional efficiency threshold necessary to enhance their competitiveness as Suggested locations for investments and jobs.

In order to achieve an economically and geographically balanced growth pattern, the kingdom emphasizes development of the non-oil sector. As specifically outlined in the National Spatial Strategy 2030, the kingdom's health and long-range prosperity will depend on its ability to diversify its economy and sources of revenue, while ensuring streamlined services for private sector participation and partnerships. Saudi cities (regardless of size or geographical location) are integral to achieving this; cities allow industries to emerge and flourish. This ability of cities to provide opportunities for the emergence of small and medium size enterprises is evidenced by the absorption of credit provided by specialized institutions, even though the Saudi private sector in the larger cities of the four most developed regions have often been the main beneficiaries.

During the Ninth Development Plan period, for instance, the Eastern Region was the largest recipient of industrial credit (about 70 per cent); Riyadh, Madinah, and Makkah received most of the remaining funds. Riyadh was the largest recipient of real estate credit (about 25 per cent) followed by Makkah, the Eastern Region, and Qassim. Together, Riyadh, Makkah, Madinah and the Eastern Region received 60.5 per cent of the loans granted by the Credit and Saving Bank in 2008.[11] As illustrated in Figure 4.13, the Eastern Region still dominated share of industrial credit (65 per cent) in 2015. Makkah, Riyadh and Madinah received most of the remaining funds—12 per cent, 11 per cent and 9 per cent, respectively. The urban system comprising 17 selected cities received 24 per cent of these funds, threequarters of it went to Riyadh Cities (36 per cent), Jeddah (29 per cent) and Dammam (21 per cent) as shown in Figure 4.10.

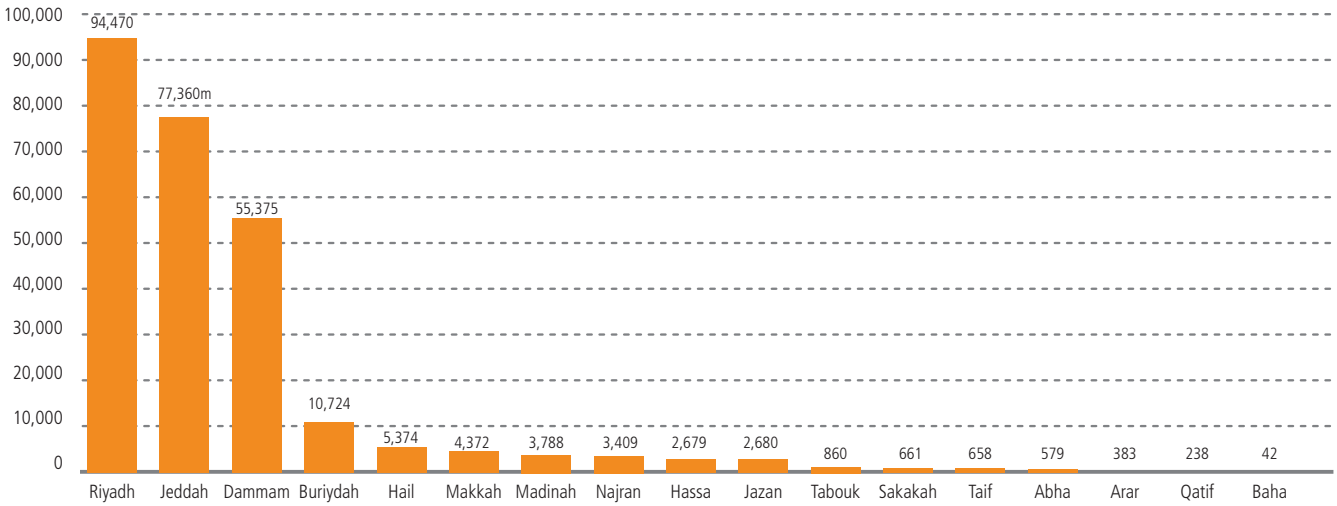
The Government also has a long tradition of intervention to manage and alter the dynamics of the urban sector to ensure its success and enhanced contribution to the nation. Since the 1970s, its policy has been to improve the quality of the urban environment and economic performance of cities. It has made major investments in planned urban extensions and new towns including the construction of the two industrial cities of Jubail and Yanbu.

Figure 4.9: Government funding of productive industry in regions, 2015 (Millions SAR)



Source: Saudi Industrial Development Fund, 2016

Figure 4.10: Government funding of productive industry in 17 cities, 2015 (Million SAR)



Source: Saudi Industrial Development Fund, 2016

Although the 2014 drop in oil revenue has slowed their implementation, an important component of the current national economic diversification strategy is the construction of new economic cities.[12] Besides diversification of the economy, these economic cities (some of which are highlighted in Box 4.2) are aimed at enhancing the kingdom's global competitiveness, job creation, achieving balanced development, as well as improving Saudi skill levels. Even as the Government continues to restructure the economic cities as well as create special zones, the success of its current economic diversification strategy will depend on its ability to increase the productivity of the non-oil sectors and that of its cities to be drivers of the economy. For this to happen, the Government must address existing mismatches and disparities in the labour sector. There are severe mismatches between the skills of a large cohort of young Saudis entering the labour force and the needs of the private sector, resulting in a higher unemployment rate for young Saudis with a tertiary education and a preference for private sector employers prefer to hire migrant workers less than Saudis. This is discussed further in the next section.

Free access to higher education has been a major component of the Saudi economic development strategy. An unintended consequence of this policy has been the reluctance of young Saudis to work in manual and service activities, where expatriate labour has long been dominant. Thus, highly educated young males have high unemployment rates. Similarly, while there has been a sharp increase in the number of women with tertiary education, their labour participation rate remains low due to previous social and cultural constraints.

Jubail Industrial City

Box 4.2: Enhancing Saudi Arabia's competitiveness through economic cities

Economic cities are greenfield development projects being implemented as part of the Saudi Arabia vision to diversify from dependency on the oil as well as create employment and boost foreign direct investment. These cities present great opportunities for growing investments in new sectors such as emerging technologies, leisure and tourism activities that would further enhance the country's competitiveness.

The cities are being developed by the private sector with support from the government. They are planned on "smart city" and sustainable development principles, and they provide a gateway toward a green economy. Being modern, these cities are envisaged to meet the emerging socioeconomic needs in the country; for instance, growing the knowledge economy, which would enhance productivity and competitiveness in the kingdom particularly in equipping younger Saudis with professional skills required to implement the nation's economic development strategy.

King Abdullah Economic City: Located along the coast of the Red Sea, north of Jeddah. The focus of the city includes port and logistics (logistics hub), light industry, and services. It occupies 168 million square metres and the estimated investment size is US$27 billion. It is projected to host 2 million people.

Prince Abdulaziz bin Musaid Economic City: Located in Ha'il on the crossroads of trade and transportation routes of the Middle East. The city is a mixed-use development whose main economic focus is logistics (transport and logistics hub), agribusiness, minerals, and construction material. It occupies 156 million square metres and its investment size is US$8 billion. It is expected to host 80,000 people.

The Knowledge Economic City: Located in Madinah and will have access to Makkah and Jeddah via the Haramain High Speed Railway. It focuses on knowledge-based industries and services. It occupies 4.8 million square metres at an investment of US$7 billion. It is expected to host 200,000 people.

Jazan Economic City: Located on the Red Sea coast in the south-western region of the nation. Its economic focus includes heavy industries, agribusiness, energy and labour-intensive industries. It occupies100 million square metres and an estimated investment of US$27 billion. It is expected to host 250,000 people.

King Abdullah Financial District: Located north of Riyadh, the development occupies 1.6 million square metres and its estimated investments size is US$10 billion.

Al Faisaliyah City: Located in the western part of Makkah, Al Faisaliyah City is expected to provide one million jobs in different sectors including health, education, technology and services. The project covers 2,450 square kilometres. The project will provide 995,000 housing units and is anticipated to accommodate 6.5 million people by 2050.

NEOM city: Located in Tabuk, it is a futuristic city expected to occupy 26,500 square kilometres. The estimated investment is US$500 billion. The city is expected to be a major commercial location in the Middle East.

Qiddiya Project: Located 40 km away from downtown Riyadh. It is expected to be the world's largest entertainment city that will satisfy the recreational, social, and cultural needs of the nation's current and next generation. The project occupies 334 square kilometres.

4.3 Persistent challenges in the urban economy and Saudi Arabia's vision for transformation

Saudi Arabia's drive for transformation is encapsulated in Vision 2030 and the National Transformation Program (NTP) 2020. The former is the road map for economic and developmental action, whilst the latter was launched across 24 Government bodies operating in the economic and development sectors to build the institutional capacity and capabilities needed to achieve the ambitious goals. The diversification of the economy and lessening its dependency on the oil sector is a prime component of the kingdom's vision. Operationally, the main objectives of the NTP 2020 are to:

- Develop the non-oil sectors of the economy to diminish the dependency on hydrocarbons by 2020.
- Increase non-oil Government revenues from US$43.5 billion to US$160 billion by 2020, and US$267 by 2030.
- Increase the private sector's share from 40 to 65 per cent of GDP.
- Raise the share of non-oil exports from 16 per cent to 50 per cent of the non-oil GDP.

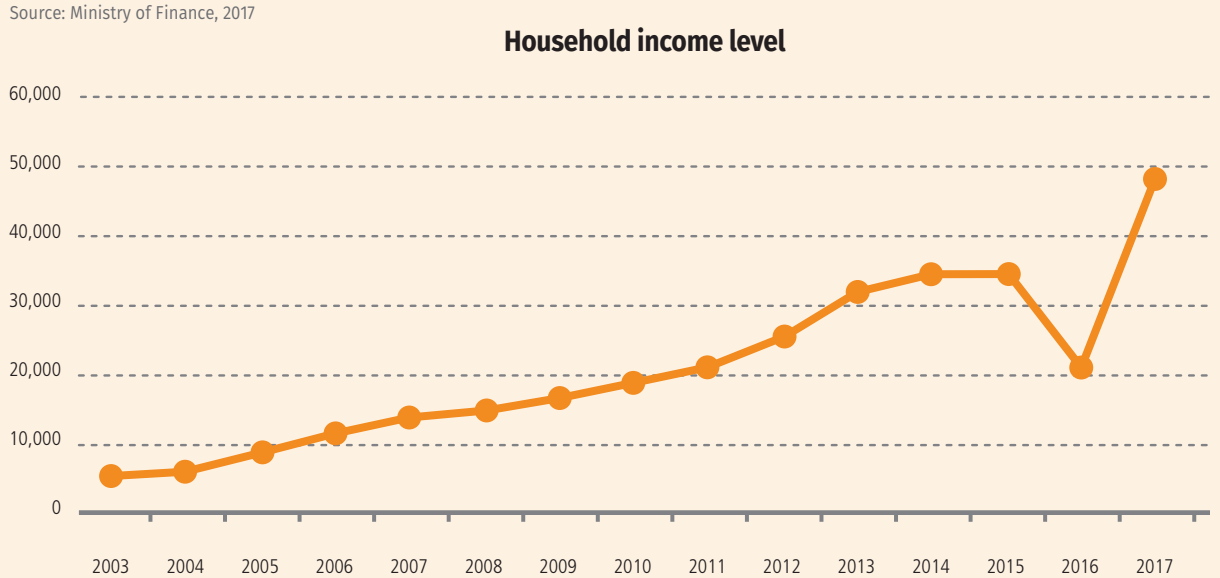
Box 4.3: Recent economic trends

Saudi Arabia is the world's largest oil exporter and Government derives about 69 per cent of its revenue from such exports. The oil boom of 2003–2013, when prices shot rose from US$30 to US$110 per barrel in 2013, fuelled Saudi Arabia's rising prosperity. The Government used its oil revenue to finance an ambitious national development programme and public spending quadrupled during the decade. About $450 billion was invested on programmes to improve education, health, social welfare, infrastructure and transport. As the GDP doubled, 1.7 million jobs were created for Saudis and the average Saudi household monthly income rose by 71 per cent from US$2,100 in 2004 to $3,600 in 2013. This increase in domestic wealth was largely driven by the growth of the public sector that employs more than two-thirds of all Saudi workers; the public sector added more than one million employees during the boom. The number of Saudi households dependent on Government wages or social transfers also rose from about 66 per cent to 80 per cent.[13]

The sharp drop in world oil prices from US$100 per barrel in May 2014 to under US$30 per barrel in January 2016 had a profound impact on Saudi Arabia. As reflected in the national accounts, the country's oil revenues fell from SAR 913.35 billion (US$243.5 billion) in 2014 to SAR 333.7 billion (US$89 billion) in 2016. There was a concurrent drop in Government revenues, from SAR 1.04 trillion (US$278 billion) to SAR 519.4 billion (US$138.5 billion). This period also saw a decline in GDP from SAR 2.83 trillion (US$756 billion) to SAR 2.41 trillion (US$645 billion). Additionally, public debt grew sharply— the ratio of public debt to GDP rose from 1.6 per cent to 13.1 per cent. This ratio reached 17.2 per cent in 2017.[14]

Given the traditional use of oil revenue to finance the major public works that drive the economy, the drop in oil revenue cascaded through domestic sectors.[15] Local authorities (regardless of the size) are largely dependent on central government funding, this period was marked by a significant decline of municipal expenditures from SAR 34.6 billion (US$9.2 billion) in 2014 to SAR 21.2 billion (US$ 5.6 billion) in 2016.

Source: Ministry of Finance, 2017



Source: Ministry of Finance, 2017

Despite these challenges posed by the realities in oil markets, the kingdom has continued to pursue the path depicted in Vision 2030 and embarked on countering these challenges through several reform initiatives, such as the National Transformation Program, the Fiscal Balance Program, and the Government Restructuring Program.[16] While the longer-term commitments of major infrastructure projects have, for the most part, ensured their continuation during the economic slowdown, other major development projects at various phases of construction were delayed or put on hold.

On the whole, Saudi Arabia has continued to make massive investments in its infrastructure. Billions of dollars have been invested in upgrading transport and utility networks. An additional US$43.8 billion has been allocated to water, agriculture and related infrastructure and to improvements to the national transport grid, including airports and the development of interurban rail systems—Haramain High-Speed Rail (primarily for passengers) and the Saudi Landbridge Project (primarily for freight) [See chapter 2].

Table 4.1: Percentage share of GDP by economic sector, 2015—2017

Economic Sector	2015	2016 *	2017*
Agriculture, Forestry and Fishing	2.3%	2.3%	2.4%
Mining and Quarrying:	40.0%	40.5%	39.4%
a) Crude Petroleum and Natural Gas	39.6%	40.1%	39.0%
b) Other	0.4%	0.4%	0.4%
Manufacturing:	11.7%	11.9%	12.2%
a) Petroleum Refining	3.3%	3.7%	3.8%
b) Other	8.4%	8.2%	8.4%
Electricity, Gas and Water	1.3%	1.3%	1.3%
Construction	4.9%	4.7%	4.6%
Wholesale and Retail Trade, Restaurants and Hotels	9.1%	8.8%	8.9%
Transport, Storage and Communication	5.7%	5.7%	5.9%
Finance, Insurance, Real Estate and Business Services	9.1%	9.2%	9.6%
Community, Social and Personal Services	1.9%	1.9%	2.0%
Government Services	13.9%	13.7%	13.9%

*Provisional

Source: General Authority for Statistics, 2018 ; SAMA, 2018b.

4.3.1 Uncertainty of global oil prices

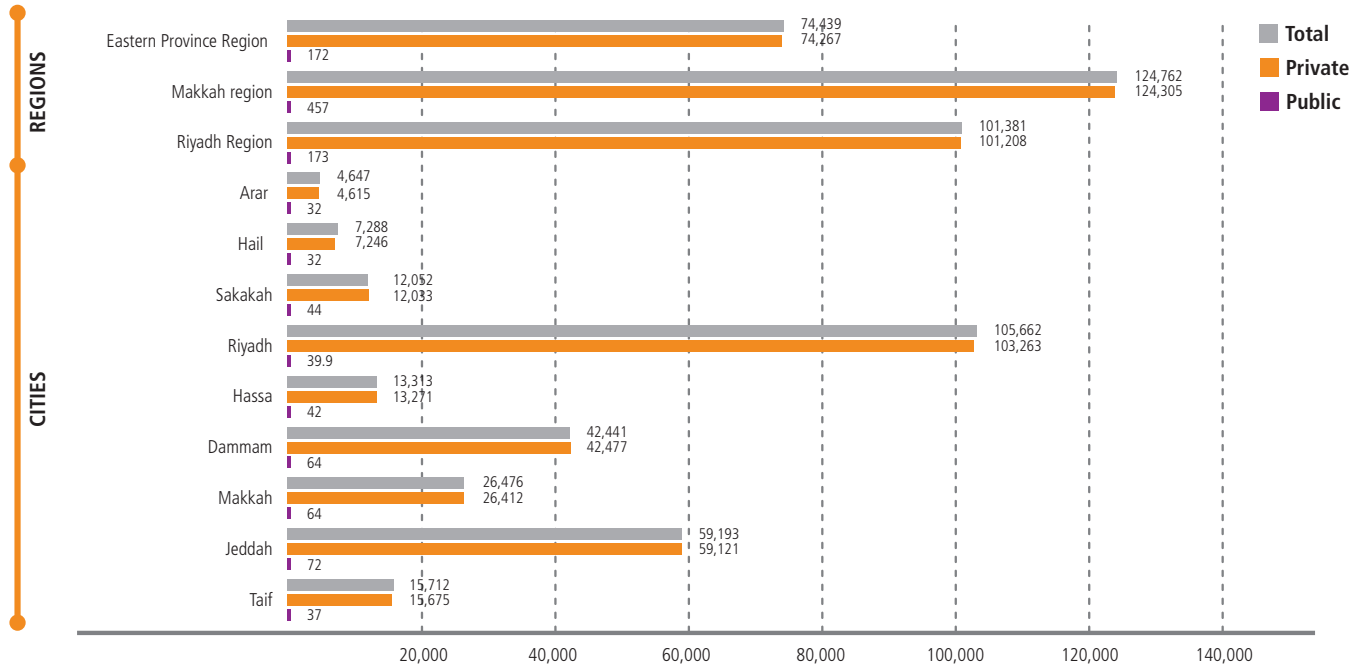
The dependency of the Saudi economy on oil has made it particularly vulnerable to fluctuations in global demand and prices, often resulting in a sharp contraction of the economy as highlighted by recent trends captured in Box 4.3. These occurrences exert considerable uncertainty in the oil sector and in those of other Gulf Cooperation Council (GCC) countries.

Since the financing of urban development largely depends on the government, these fluctuations have a significant impact on municipal expenditure. However, since 2015, Saudi Arabia has been using its extensive reserves and tapped international markets to finance its current accounts deficit. As part of its effort to diminish its economy's dependency on oil, it is accelerating reform of its capital market to attract foreign investment. Banks have started to bring down their foreign assets and purchase Government bonds as part of the Saudi Arabian Monetary Authority's policy to increase liquidity to fund domestic credit. Like other GCC countries, Saudi Arabia is attempting to rein in public expenditures by raising domestic energy and water prices; increasing fees, charges and excises; and attempting to curtail public sector jobs. To diversify public revenues, Saudi Arabia started to issue bonds and obtained syndicated loans in international markets in 2016.

Concurrently, Saudi Arabia has started to diversify its economy; a crucial move given the need to create adequate jobs for its rapidly swelling labour force. The strategy is based on generating stronger non-oil growth and includes the privatization of selected public enterprises; encouraging a greater participation of the private sector, including public-private partnerships; streamlining permit processes; and encouraging foreign investment. This has ensured a considerable rise in the number of private establishments. Between 2012 and 2016, for instance, the number of private establishments rose by 36 per cent (from 334,494 to 453,389 establishments).[17] As illustrated in Figure 4.12, the largest proportional increase was in the city of Jeddah where these enterprises grew by 61 per cent, whilst the lowest was in Ha'il (5 per cent). Overall, the Riyadh and Makkah regions had the largest increase in private establishments with each at 52 percentage points.

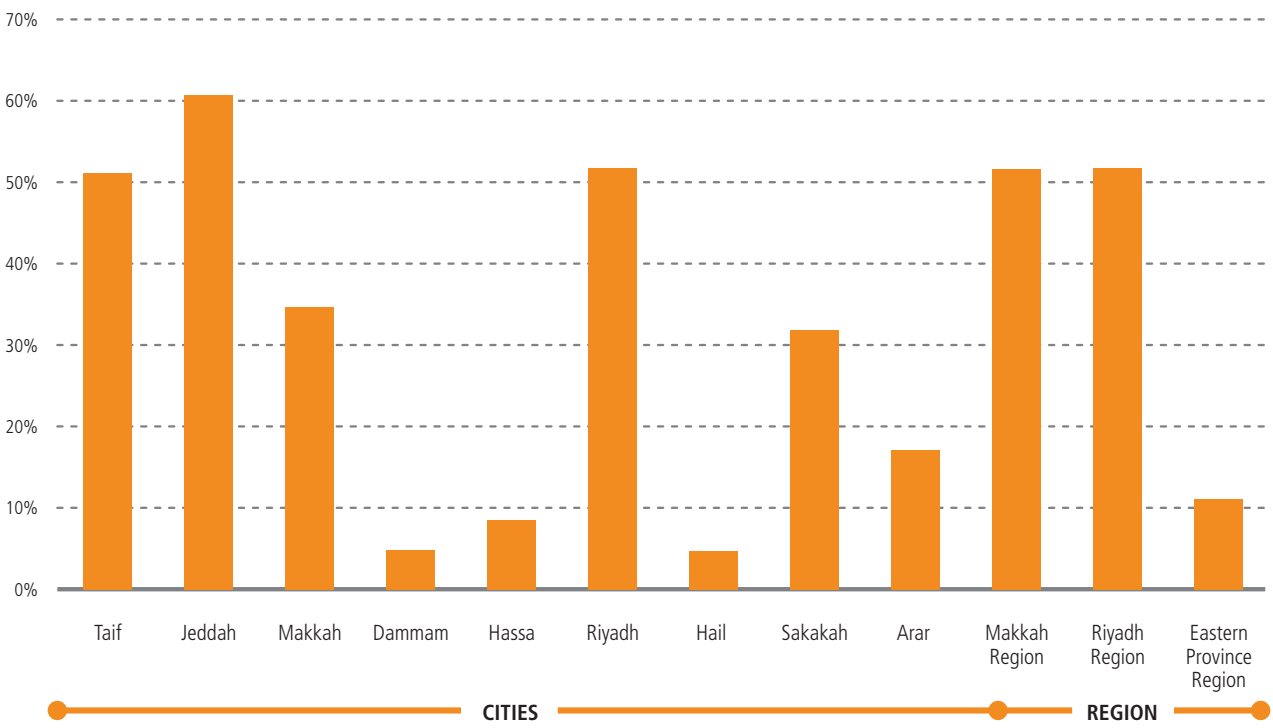
Meeting the ambitious targets of Vision 2030 and NTP 2020 depends on reinforcing and expanding non-oil urban economic activities and on developing the economic role of secondary and tertiary cities. Historically, Saudi Arabia's non-oil economy has been concentrated in four of its 13 provinces. Therefore, the likely primary beneficiaries of future urban migrations will continue to be the five megacities in these regions, unless a major effort is made to improve the economic competitiveness of secondary and tertiary cities or diverting newly created employment to new growth poles.

Figure 4.11: Number of establishments in selected cities and regions, 2016



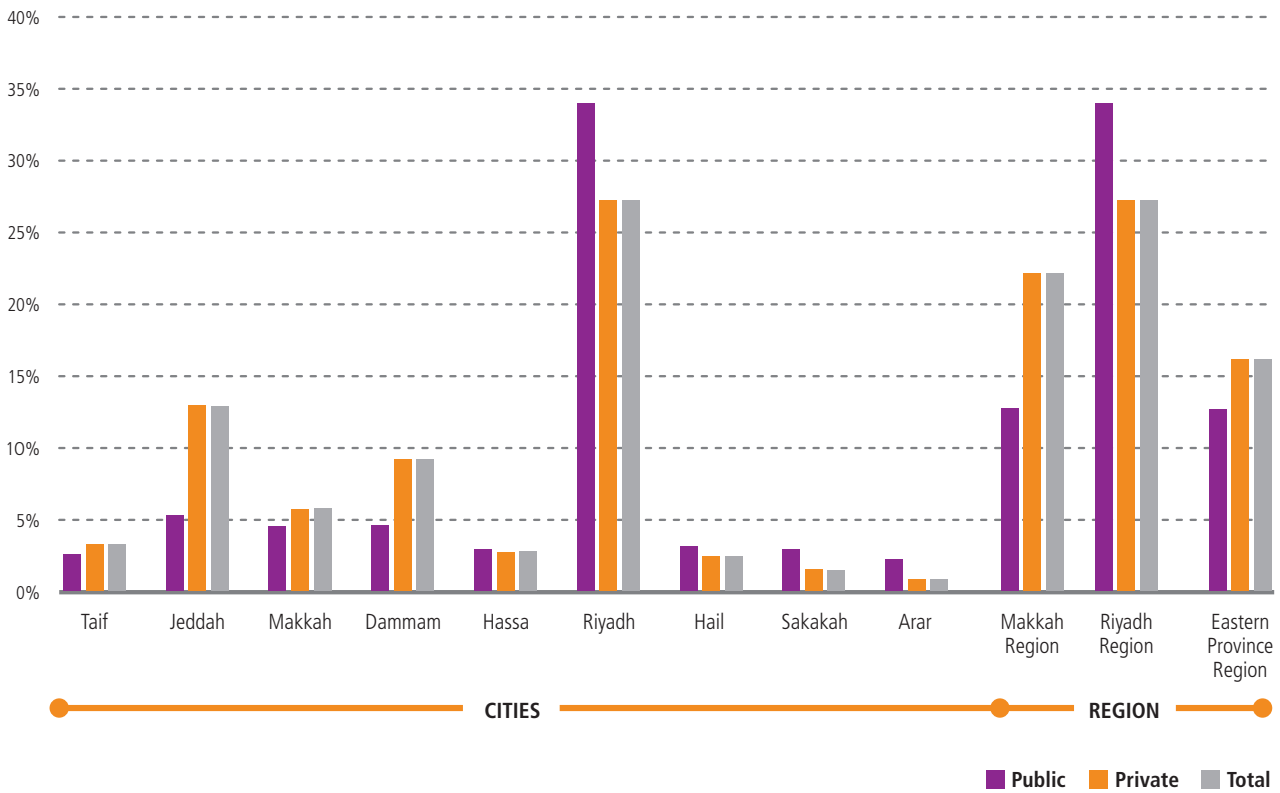
Source: General Organization for Social Insurance (GOSI), 2016

Figure 4.12: Private establishment growth, 2012–2016



Source: General Organization for Social Insurance (GOSI), 2012–2016

Figure 4.13: City and regional share of establishments in 2016



Source: General Organization for Social Insurance (GOSI), 2016

4.3.2 Low labour force participation

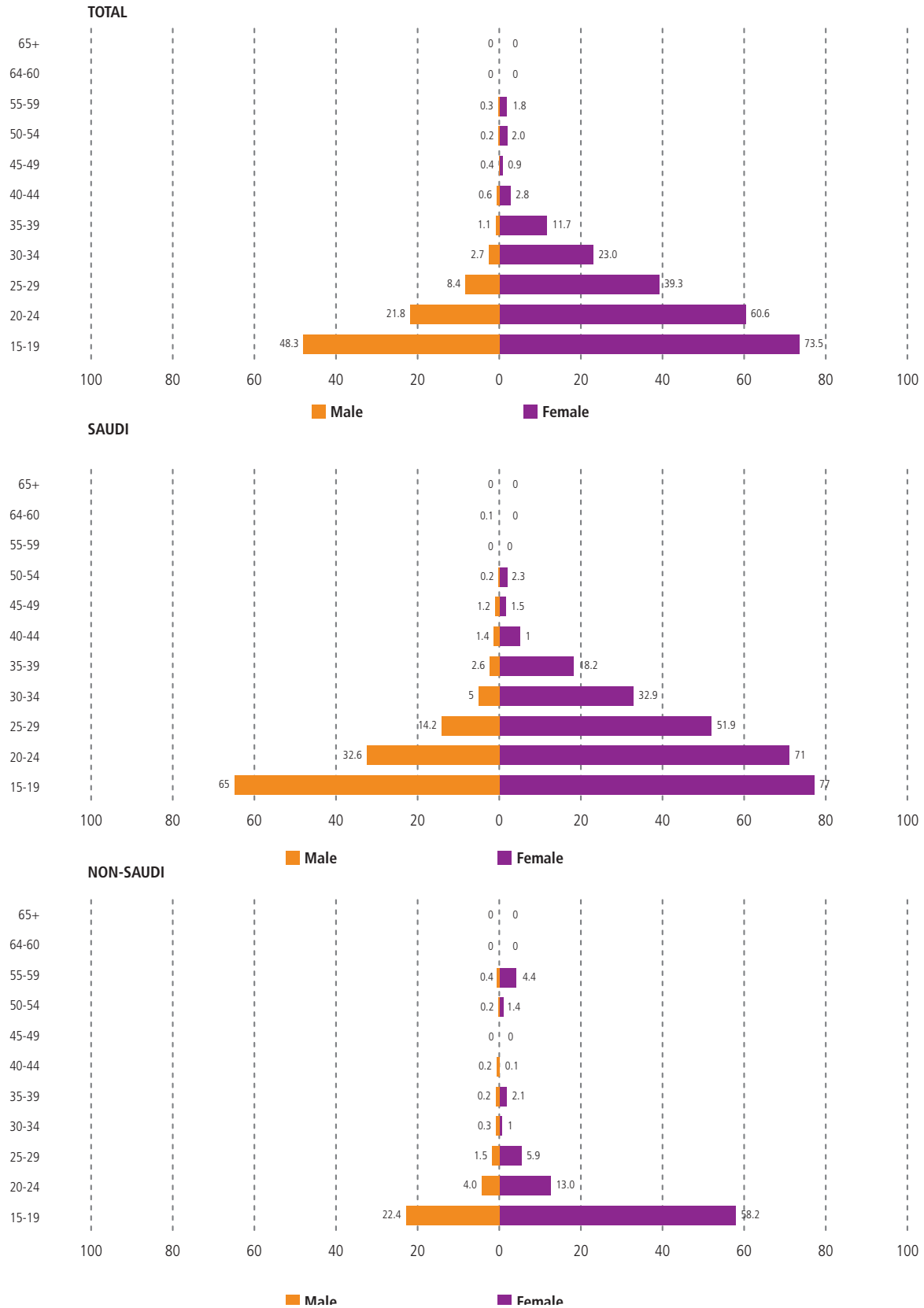
Adult economic participation rates in the kingdom are low, only 55.6 per cent of the working age population were economically active in the fourth quarter of 2017. This is far low compared to the 72 per cent average in countries of the Organisation for Economic Co-operation and Development (OECD).[18] Furthermore, participation rates of Saudi nationals are lower (42 per cent) than the country's measure. Notably, in this period an estimated 175,313 Saudi males and 911,248 females were looking for jobs.

The unemployment rate in the kingdom is generally low at 6 per cent (3.2 per cent for men and 21.1 per cent for women). However, the unemployment rate among Saudi nationals is relatively higher, at 12.8 per cent (see Table 4.2). Whilst unemployment rates were lowest in the Eastern Region (2.6 per cent), the opposite was reported in the regions of Al Jouf (12.5 per cent), Jazan (12.4 per cent), Northern Borders (11.8 per cent), Madinah (11.3 per cent) and Al Baha (10.7 per cent) which recorded relatively higher rates of unemployment, at double digits (see Figure 4.14).

Adult economic participation rates in the kingdom are low, only 55.6 per cent of the working age population were economically active in the fourth quarter of 2017.

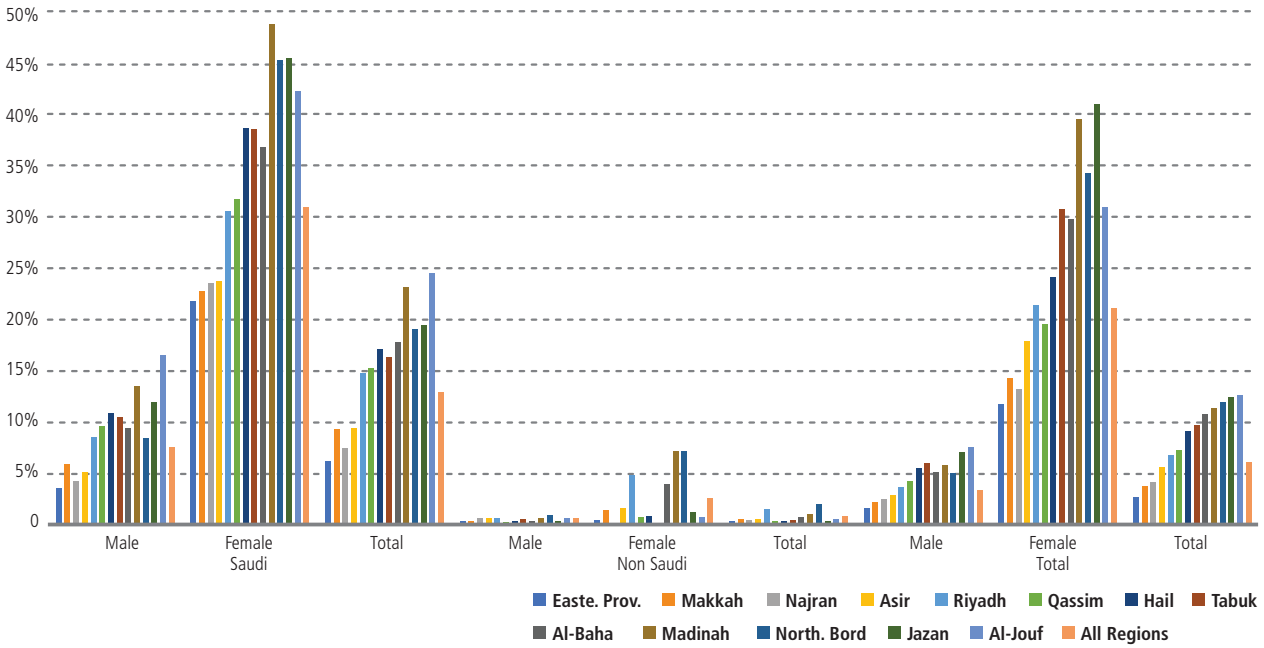
Overall, there is a relatively higher youth unemployment rate in spite of recent educational achievements (see Figure 4.14). Paradoxically, this high rate of unemployment is partially related to the improvements in the kingdom's educational system over the past two decades. In terms of educational status, the cohort with the highest unemployment rate is persons with a bachelor's degree at 11.4 per cent (male at 3.6 per cent and female at 31.9 per cent). In addition, studies have shown that unemployment rate among tertiary-educated 25-34-year-olds is higher compared to those without an upper secondary qualification; in 2014 the former was 20 per cent whilst the latter two per cent. [19]

Figure 4.14: Unemployment rate (15 years and above) by age cohorts, 2017 (percentage)



Source: General Authority for Statistics, labour market fourth quarter, 2017.

Figure 4.15: Unemployment rate (15 years and above) by gender, nationality and administrative region, 2017



Source: General Authority for Statistics, labour market fourth quarter, 2017.

Table 4.2: Employment, 2017

	Male	Female	Total
Total Employed Persons	11,522,764	2,058,377	13,581,141
Saudi Employed Persons	2,080,601	1,083,245	3,163,846
Non-Saudi Employed Persons	9,442,163	975,132	10,417,295
Saudi Job Seekers	175,313	911,248	1,086,561
Total Economic Participation Rate (15 years+)	79.0%	20.9%	55.6%
Saudi Economic Participation Rate (15 years+)	63.4%	19.4%	41.9%
Non-Saudi Economic Participation Rate (15 years+)	94.2%	24.2%	74.2%
Total Employment Rate (15 years+)	96.8%	78.9%	94.0%
Saudi Employment Rate (15 years+)	92.5%	69.0%	87.2%
Total Unemployment Rate (15 years+)	3.2%	21.1%	6.0%
Saudi Unemployment Rate (15 years+)	7.5%	31.0%	12.8%

Source: General Authority for Statistics, labour market fourth quarter, 2017.

Labour force participation for women has traditionally been low in the kingdom, thus creating a high gender gap in employment.[20] However, women participation in the workforce has been rising gradually from this low base. The current share of Saudi women in the total work force is 17 per cent, which under the NTP is targeted to reach 25 per cent by 2020.[21] Notably, the fastest growth of employment for women has been in the private sector, the sector registered a 130 per cent increase in the number of working Saudi women during the last four years. [22] This occurrence has been attributed to the Government initiative to get women into certain types of employment such as retail. Despite such efforts, restrictions on mixed gender work environments often pose barriers to raising female employment.[23] Projects are underway to offer women the option to work from home, this is likely to generate over 140,000 jobs by 2020. In addition, several initiatives are being implemented to tackle the challenge of transport that women face while commuting to work.[24] Additional measures to increase women's participation in the economy are highlighted in Box 4.4.

Box 4.4: Increasing women's participation in the economy

Vision 2030 aims to Strengthen women's stature as an effective player at all levels. It sets a separate strategic objective to increase women's participation in the labour market. Several women were appointed to top-level positions in the private sector. One noteworthy progress has been the steady rise in the share of Saudi women in total manpower labour market from 12 per cent in 2009 to 17 per cent. This share is expected to grow to 25 per cent by 2020. Saudi Arabia is also inching closer to achieving its goal of gender parity of wages. Other notable achievements and targets include:[25]

- Allowing women to pursue business by herself.
- Ensuring that women account for 20 per cent of private sector's investments in 2017.
- 127,000 new commercial registrations issued for women in 2017.
- Creation of 450,000 jobs for women.

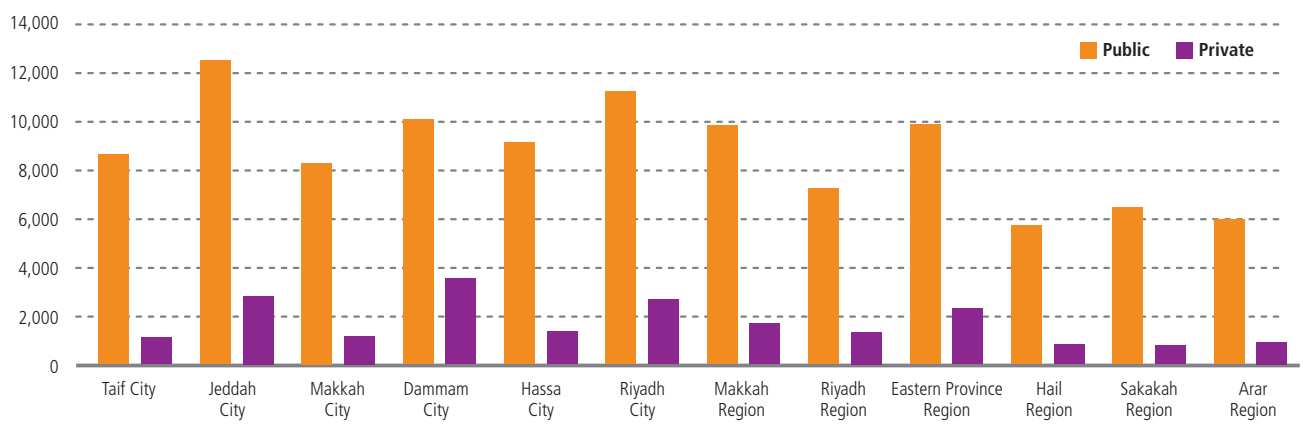
Source: Kingdom of Saudi Arabia, 2018c.

To realize the kingdom's vision of creating a thriving, business-friendly economy, a higher labour participation is essential. Higher labour participation not only reduces fiscal pressures associated with welfare support, it also mitigates against the consequences of long-term unemployment (such as psychosocial well-being and poor health outcomes) and improves social inclusion and equity.[26] Among the measures the Government had put in place was the adoption of the National Employment Strategy in 2009. This set out a comprehensive blueprint of policies and actions designed to increase Saudi participation in the labour market, progressively, as well as increasing job opportunities in the different sectors the economy.

Over the years, the Government has been the main driver of the Saudi economy as it's foremost the first polarizer to employ Saudis. In the last quarter of 2017, the civil service had 1.23 million employees—about 9 per cent of the country's workforce. Of these, 1.18 million (96 per cent) were Saudis and 51,004 (or 4 per cent) non-Saudis. The civil service is also the primary source of employments for nationals (37 per cent of employed Saudis) —34 per cent for Saudi males, 44 per cent for females. [27]While the growth of the private sector has been impressive (as shown in Figure 4.15), it has strongly depended on a growing expatriate labour force; expatriate labourers have largely filled the gap in the urban labour market. The fastest growing sectors of the economy – construction and retail – depend on lower-wage unskilled expatriate workers.

Further, as illustrated in Figure 4.16, there is a huge disparity between average earnings in the public sector and that of the private sector. The public sector workers in the Kingdom have a wage advantage . This positive earnings differential in favour of the public sector is likely to reduce the attractiveness of work in the private sector in favour the public sector's stable and well-paying jobs, and 'wait unemployment' especially among Saudi nationals in cities.

Figure 4.16: Average salaries in selected cities and regions, 2016



Source: General Organization for Social Insurance, 2016.

A prime objective of NTP 2020 is to create 450,000 new private sector jobs and lessen the dependency on expatriate labour by reducing the wage gap between Saudi and expatriate workers. In the fourth quarter of 2017, Saudi workforce comprised 18.37 per cent (or 1,779,460 workers) of private sector manpower—68.26 per cent were male and 31.74 per cent were female.[28] To increase the rate of "Saudization" of jobs, a major challenge will be to ensure the match between the skills demanded by the diversification strategy and those of new entrants into the labour force by providing education, training and financial incentives for Saudi youth. One of the measures proposed by NTP 2020 to increase Saudi labour force participation is providing unemployment assistance coverage (hafiz) to all 20 to 60-year-olds actively looking for jobs.

Additionally, the new dynamics created by removing constraints on the movement of expatriate workers within the labour market will be a predominantly urban feature as the benefits of mobility are best reaped in centres of concentrated economic activity. It is in cities that young Saudis and expatriates will find employment in the expanding commercial and technology sectors.

4.3.3 Housing

The provision of affordable sanitary housing has been a priority and a keystone of Saudi Arabia's urban policy since 1974, despite the challenged posed by rapid urbanization. The Government has traditionally provided land grants and interest-free home construction loans through the Real Estate Development Fund, while the Ministry of Housing has been building homes. The Fund is the principal housing financier. Over the last decade, the Government has expanded the annual budget for the Fund from SAR 49.9 billion (US$13.5 billion) in 2008 to SAR 230 billion (US$62.1 billion) in 2013.[33]

Despite these expenditures through the Real Estate Development Fund, Saudi Arabia still has serious housing shortages; an estimated 1.25 million units are needed for new housing and the replacement of substandard units (see Figure 4.17). The persistent housing deficit is due to the high sustained rate of urbanization since the 1970s and to a culturally driven tradition of lower-density residential land development in all cities. To accommodate household desires for privacy, the initial planned expansions of the major cities in the 1970s and 1980s consisted primarily of single-family homes and two- and three-storey mixed-use buildings along 30-metre wide streets. While more recent zoning regulations have increased densities to four stories in residential neighbourhoods, they remain low by world or regional standards and result in high infrastructure costs for housing developments.[34]

The high rate of Saudi family formation and the growing number of expatriate workers has also contributed to the above-mentioned shortfall. It is reported that the Saudi Arabian real estate market is 10 times bigger than any other Gulf market but remains underdeveloped, with the balance of estimates suggesting that fewer than half of Saudis own their own home.[35]

Box 4.5: Dependency on expatriate labour

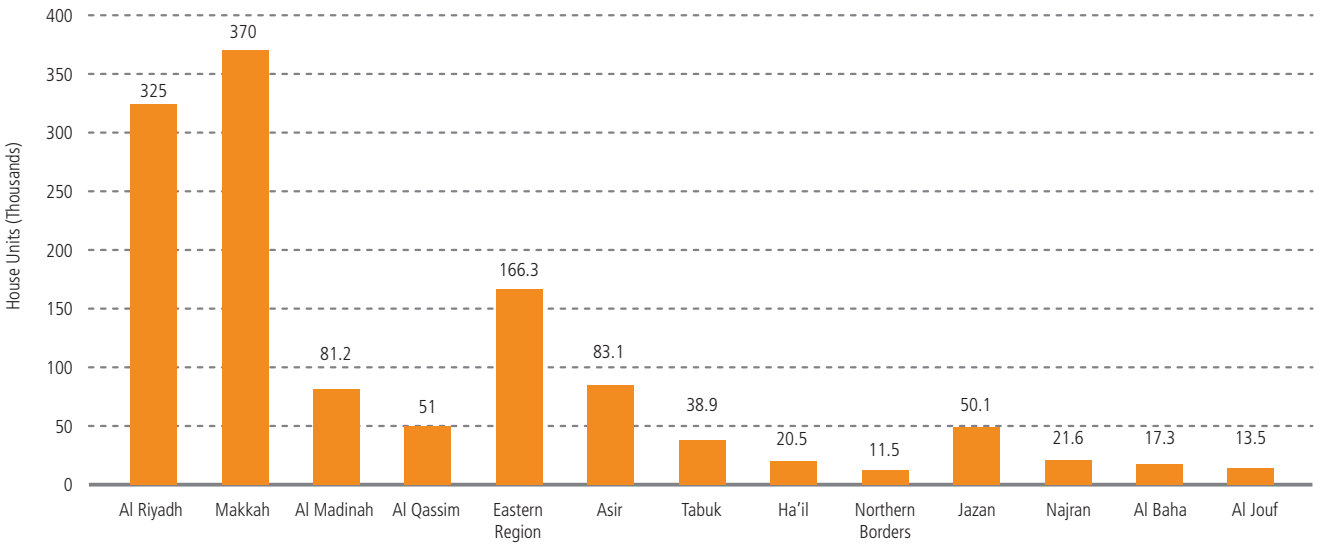
In 1970, the Saudi population was only six million. This, coupled with a low female labour participation rate (which was just 10 per cent then), meant that implementation of the national development policy had to depend on expatriate labour. Expatriate labour has pervaded in all sectors of the economy, particularly services and construction. Non-Saudis currently dominate the private-sector workforce: about four of every five private-sector workers are non-Saudis. On average, the length of stay an expatriate worker is about eight years and their visa is usually tied to the company through a sponsorship system by which they enter Saudi Arabia.[29]

Presently, Non-Saudis constitute over one-third (37 per cent) of Saudi Arabia's population.[30] Available data shows that a significantly higher concentration (of at least 40 per cent) was in cities with over one million inhabitants. Cities that reported the largest concentration of expatriates are Jeddah (52 per cent of the population), Makkah (47 per cent), Riyadh (42 per cent) and Dammam (41 per cent).[31]

As of the fourth quarter 2017, 10.9 million non-Saudis accounted for 77 per cent of the employed labour force even though the unemployment rate for Saudis was 12.8 per cent (see Table 4.2). Notably, approximately two-thirds of expatriate workers are single-status males, many of whom live in group-quarters.

It is also reported that foreigners captured just 23 per cent of total household income in 2013. They accounted for 19 per cent of total household consumption in 2013, equivalent to 5 per cent of GDP. This has been attributed to low average salaries compared with Saudi nationals, as well as their remittances to their countries of origin.[32]

Figure 4.17: Housing demand in the regions, 2010-2014



Source: Ninth Development Plan, Ministry of Economy and Planning, 2014

Notably, the rate of growth of urban private sector activities has somewhat outpaced the provision of housing. This growth has, in part, been fuelled by Government financing through the Public Investment Fund as well as the Saudi Industrial Development Fund. These institutions' lending activities are based on sound financial and economic criteria, and they play a key role in the effort to transition Saudi Arabia from an oil-based to a diversified economy. However, while they are prime drivers of urban growth, sufficient attention has not been given to the impact of the activities they finance in the municipalities, thereby contributing to local shortages in affordable housing and in infrastructure.

Generally, housing costs are high for both Saudis and non-Saudis.[36] Households with a median monthly income of SAR 11,500 (US$3,066) spend 28 per cent on housing whilst those with incomes of below SAR 9,000 ($2,400) spend around 40 per cent.[37] In regard to home acquisition, there is difficulty in accessing adequate housing finance. This is evident by a low mortgage penetration in the kingdom (about 4–6 per cent of the GDP, and 23 per cent of retail loans), which has also been attributed to the shortage of affordable housing coupled with the high real estate prices.[38] Oftentimes, construction approval and permits take longer periods to obtain. Studies have shown that new housing supply responsiveness tends to be lower in countries where it takes longer to acquire such permits.[39] Such inefficiencies in the real estate sector often results in higher housing cost, which developers pass on to buyers.

The existence of undeveloped "white lands" has been a major contributor to a growing housing shortage, particularly for the youth and the growing population, as owners choose to hoard property to maximize value rather than construct. In Riyadh, for instance, land constitutes as much as 50 per cent of the cost of a housing unit, compared with 20 per cent that is typical in more affordable areas globally.[40]

In Dammam, the white lands represent 21 per cent of total land available for urbanization. The Government recently issued the White Lands Tax Law that imposes an annual land tax of 2.5 per cent of the value on these lands, which are defined as vacant lands located in "populated areas", zoned for residential or for dual residential and commercial use. The aim of this law is to: a) increase the supply of developed land to reduce housing shortages; b) make residential land available at reasonable prices; and c) combat monopolistic practices.[41] The Ministry of Housing, which is the implementing authority, will initially implement the law in Dammam, Riyadh and Jeddah.

The dynamics of the housing market have also resulted in an imbalance. There is limited availability of suitable housing units for all community segments in the kingdom. The segmentation of the housing market is exemplified in the shortage of homes for lower and middle-income households and a concurrent surplus of luxury housing. The growing mismatch between asking price and household revenue has resulted in housing units being vacant, yet low- and middle-income households make up about 80 per cent of the unmet demand.

In Jeddah, where one in eight units is vacant and there is an oversupply of luxury housing, the shortfall of dwelling units for low- and middle-income households has left an estimated

250,000 people living in overcrowded units. In 2010, about 35 per cent of the population lived in informal and substandard housing, the highest percentage in the country. Developed in the 1980s, a period of rapid municipal expansion when the municipality was unable to provide sufficient quantity of serviced land, informal settlements sprang up on unserviced land in what were then peripheral locations; they are now well within the built-up area. These settlements are estimated to occupy around 4,800 hectares and house 1.2 million persons.[42] To meet the needs of the growing population, Jeddah's Strategic Plan calls for the construction of 950,500 housing units, with 685,000 units affordable to lower- and middle-income groups. [43] The municipality has allocated 25.5 million square metres of land for the construction of affordable houses.

Except for Riyadh—where 98 per cent of dwellings units are constructed of durable material; 97 per cent have access to piped water; 86 per cent to improved sanitation; and less than one per cent of households live in substandard units—the quality of housing in most Saudi cities is still lagging. Informal housing still constitutes approximately 43 per cent of the central area of Makkah and 23 per cent in Madinah's.[44] Consisting primarily of smaller, overcrowded rental units in densely developed low-rise buildings (two to three stories in Madinah, five or more in Makkah), they are occupied by a mixture of low-income expatriate workers, from various countries.

...an estimated 1.25 million units are needed for new housing and the replacement of substandard units

Riyadh has experienced a construction boom, with 28 per cent of all building permits issued countrywide much of the construction has been speculative. The average asking rent of US$66 per square metre per month is clearly unaffordable to a median-income family earning US$1,600 per month; 495,000 affordable units will be needed by 2024. While housing is expensive in the major cities, particularly for expatriates, it is even more so in some secondary cities. In Buraydah, it accounts for 31 per cent of household expenditures; 26 per cent in Sakakah; 25 per cent in Najran; and 24 per cent in Ha'il.[45]

In spite of the challenges highlighted in some of these cities, the NTP and Vision 2030 mark a significant milestone in the provision of housing in the kingdom. The goals aspired to are likely to boost investment flows into the real estate sector, and they will also increase private sector participation and contribution to the GDP.

4.3.4 Financing urban growth: Dependency on government

The kingdom's traditional centralized hierarchical governance system is gradually evolving and the role of local authorities growing, albeit slowly. Ministries, however, still play a key role in the formulation and enforcement of policies.

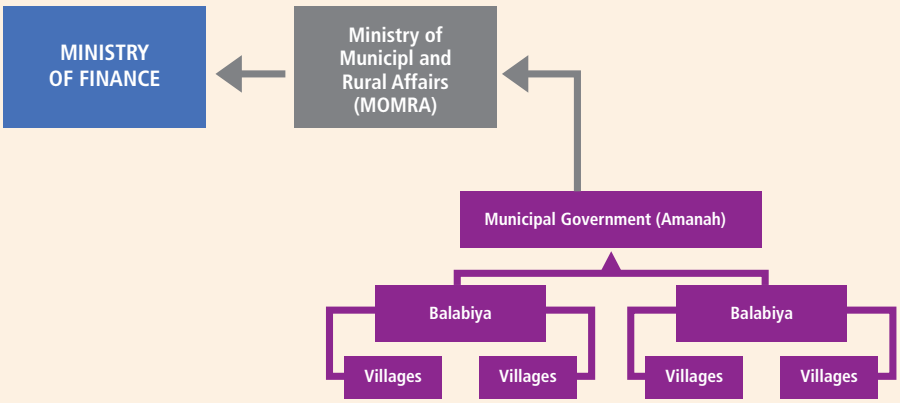
While regional Commission and Amanat are now empowered —to prepare master plans for their areas, determine needed public investments, develop local regulations and manage their implementation— their autonomy is still limite. While the major cities have powerful and efficient local authorities,[46] the Ministry of Municipal and Rural Affairs (MoMRA) still has to approve proposed land development projects and also plays an active role in the development of local plans for smaller municipalities (See Chapter 5). The central government also often intervenes by providing direct funding, especially in lagging regions. There has also been a significant role played by corporations in financing urban projects (directly and indirectly); for instance, the case of Saudi Aramco in Dammam and Eastern Region.

The effective management of urban development will require increasing the role of municipalities as planners and managers of urban growth. However, financing urban development continues to be a major challenge for local administrations. Regardless of the size, the municipalities are largely dependent on financial support from the central government for their budgets. The current financial system demonstrates a high level of centralization that is observed in the overall governance system, where most of the infrastructure and services for cities are financed by the central government via specific General Authority and ministries.

The Ninth Development Plan recognized the need to collect modest fees for municipal services to shore up local revenues. Recent introduction of new municipal fees by MoMRA widens the base of own-sourced revenue, although this falls short of providing the much-needed fiscal self-sustainability. Furthermore, the lack of cadastral information has complicated structuring an effective property tax collection system. As a result, municipalities continue to depend on funding from the governments, which is administered through the process described in Box 4.6.

Box 4.6: The budget process

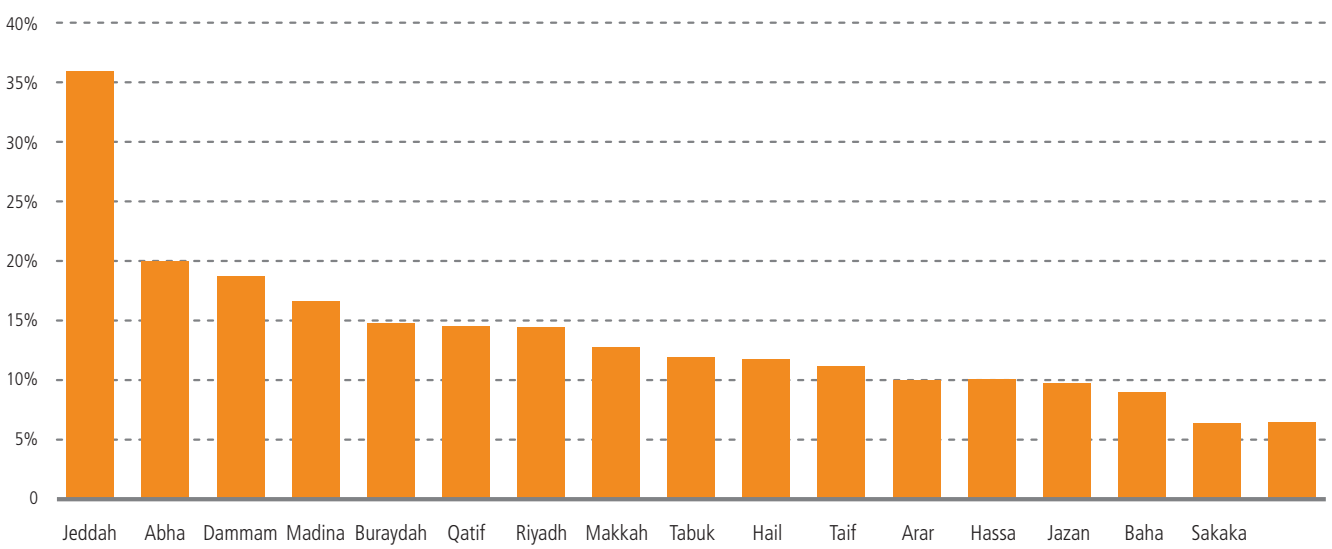
Every year the Ministry of Finance solicits budgetary expenditure to each ministry and ministries prepare the budget proposal compliant to preset guidelines. Although the final decision is a top-down process, within MoMRA the budget proposal tends to be a bottom-up process where lower-level governments submit projects for the next budgetary cycle and seek approval from the higher level of government. For instance, municipal governments aggregate projects proposals from Baladiyahs and, thereafter, approach MoMRA. Upon evaluation and negotiation, only the approved projects are included for the MoF's review. Upon review and royal approval, MoF allocates budget to each sector.



Source: Ministry of Finance, Kingdom of Saudi Arabia.

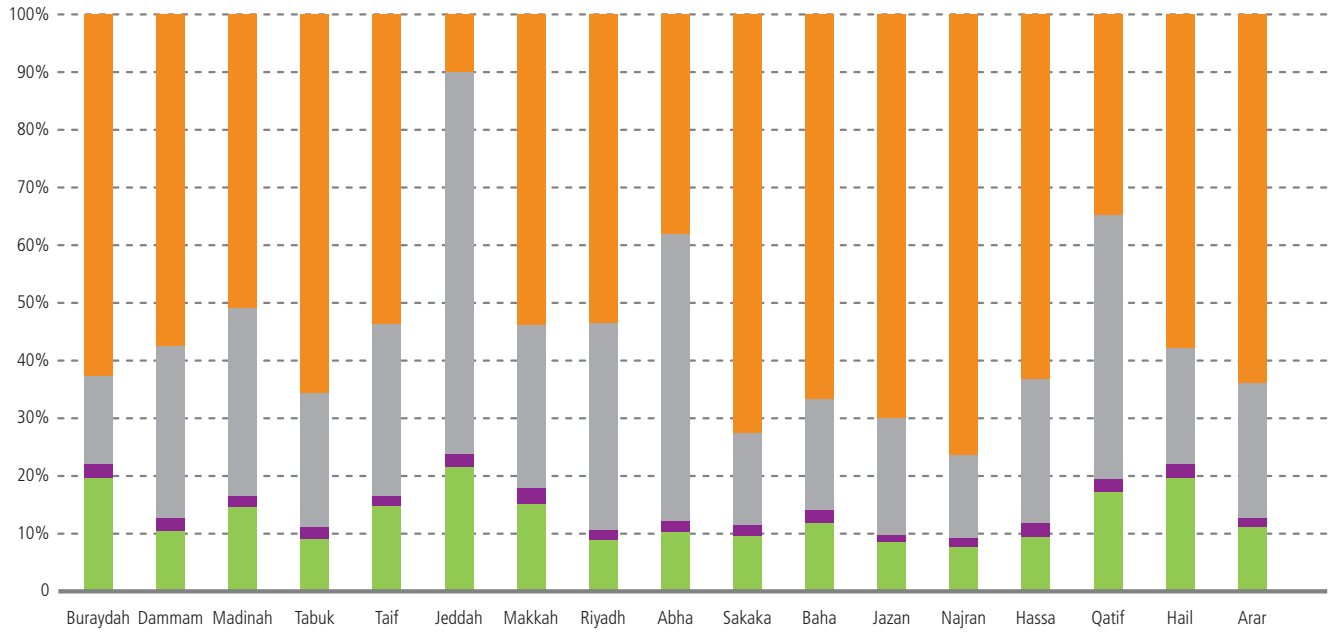
On average, these transfers account for more than three-quarters of local authorities' budgets. This is attributed to an inadequate local tax base, low efficiency in local revenue collection and the traditional provision of many public services either free of charge or at subsidized rates by local authorities as highlighted in Chapter 3.[47] Local revenue is often limited to licenses and fees of which the most important are building permits and licenses to operate economic activities.[48] As illustrated in Figure 4.18, the ratio of own-source revenue to budget was highest in the city of Jeddah (36 per cent) and lowest in Najran (6 per cent). Riyadh's direct revenues were highest reaching SAR 1.25 billion (US$333 million), 15 per cent of its total budget. Expenditures on projects comprised the largest share of the budgets (see Figure 4.19).

Figure 4.18: Direct revenue as a share of total budgets of Amanahs



Source: Ministry of Finance, 2015/2016.

Figure 4.19: Municipal expenditure in approved budget, 2015/2016



Source: Ministry of Finance, 2015/2016.

4.4 Achieving economically sustainable cities— Looking at the future

4.4.1 A national smart structure that enhances the economic role of secondary cities

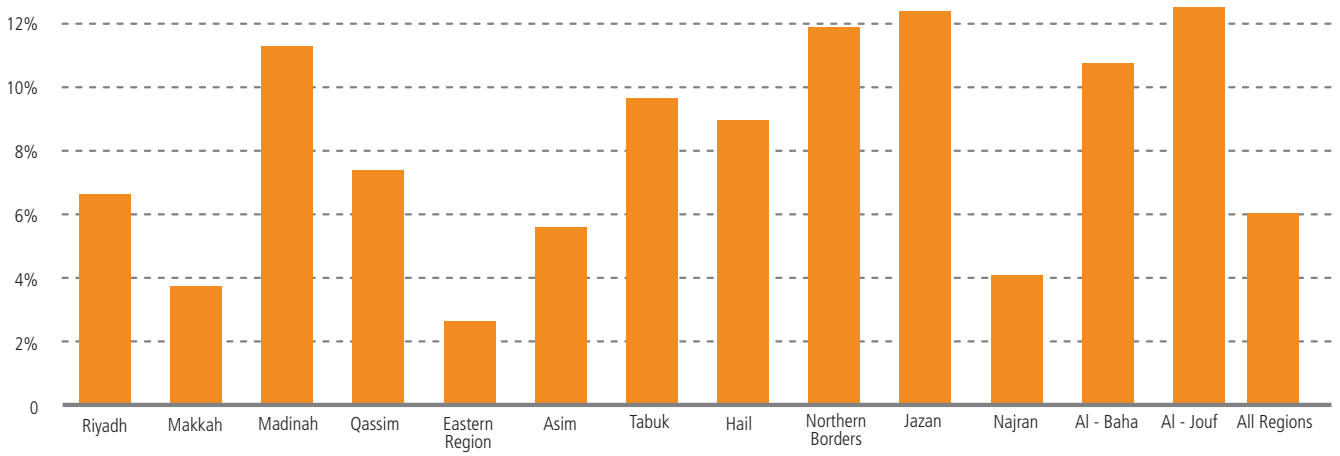
Whilst the future economy will be supported by the metropolitan dynamics of major cities, it is important to recognise that intermediate and small towns play a key role as hubs and spokes in a national system of growth poles as part of an industry-attraction policy. The national strategy's objective to achieve a more balanced economic and demographic distribution between primary and secondary cities is an ambitious one. This is due to the net outmigration of Saudi population in some intermediate cities and towns, primarily young men searching for better economic opportunities. The primary cities correspond to the economic activities most attractive to the educated Saudi labour force; people generally move to places they are likely to find high value employment to maximize the return on their investments.

it is important to recognise that intermediate and small towns play a key role as hubs and spokes in a national system of growth poles as part of an industry-attraction policy

Given the significant unemployment levels in the more isolated regions (see Figure 4.20), the national strategy's emphasis on redressing economic imbalances will require a re-examination of national public investment priorities to improve the economic competitiveness of secondary cities. While the successful use of new towns as part of the economic development strategy of the 1970s and 1980s was warranted, given the low level of urbanization at the time, there should be a re-examination of the cost and time lag involved in the construction of the current generation of new economic cities (see Box 4.2).

The size of economic cities is ambition and investment in construction of their infrastructure is very high. However, while they are expected to contribute to the policy of national economic diversification, yet they compete with smaller secondary cities, three of which are adjacent to such cities.[49]

Figure 4.20: Regional unemployment rates (15 years and above), 2017



Source: General Authority for Statistics, labour market fourth quarter 2017.

Managing growth has been and will continue to be a major challenge. At the macroeconomic scale, the National Spatial Strategy 2030 aims to adjust investment policies to foster a more balanced and sustainable development of the different regions based on their comparative advantages. This entails a targeted focus on improving the functional efficiency of their major cities and providing incentives for private investment outside the leading regions: Eastern, Riyadh and Makkah. In this regard, it is worth recognizing that the National Spatial Strategy seeks to promote clusters around small cities and in regions where there are connections between villages.

4.4.2 Innovation in municipal financing

Saudi Arabia's municipal expenditures have been rising. Heavy dependence on government grants implies that municipal expenditures are greatly impacted by the downturns in the national economy as described in Box 4.3. Therefore, increasing local revenues should be a priority concern. New financing instruments that mobilize adequate local revenues and consider future expenditures levels will be needed to support and finance sustainable urban development. Also, municipalities cannot continue to provide essentially free or heavily subsidized services to the growing urban populations of rapidly expanding cities; sustainable urbanization demands that households pay for the resources they consume and the services they use.

Likewise, it is unrealistic to assume that the current service charges, fees for licenses and other low-yield taxes can fund municipal operating expenditures, let alone a capital investment budget. Given rapidly increasing urban property values, only a tax on real property (land and buildings) has the buoyancy needed to fund the capital and operating expenditures in infrastructure and services in the rapidly growing cities. Taking socioeconomic and demographic factors into account, these measures can be modulated to reflect an equitable and socially conscious approach that does not burden lower income Saudi families in the cities where they are implemented.

In this regard, the Green Paper for the new National Spatial Planning Act–a critical implementation tool of National Spatial Strategy 2030–also calls for rapid, adaptive and innovative finance mechanisms, given the rapid pace of urban growth, to meet the demand for public infrastructure and service provision. The Green Paper also outlines charges, fees, taxes (such as betterment levies, congestion fees), and special development-based mechanisms (such as floor area ratio increment fees, impact fees, and transfer of development rights), that directly relate to urban development that will be enabled under the Spatial Planning Act.[50] The Green Paper also proposes the monitoring of land as a basis for fiscal purposes, this is enabled by establishing a linkage between the existing (or proposed) land laws, registration of cadastre and its titling.[51]

Already, the suggested monitoring mechanism is increasingly being recognized as a better revenue generating instrument for subnational governments. Under the "white lands" tax law introduced in 2015, owners of empty plots of urban land designated for residential or commercial use in towns and cities are required to pay an annual tax of 2.5 per cent of the land value. The tax is imposed on a minimum lot size of 10,000 square metres. The measure has been adopted in the cities of Riyadh, Jeddah and Dammam.[52]

Table 4.4: A suggested example of municipal fee policies in the metropolitan Dammam

	Design Options	Recommendations for Dammam
Determining land value capture objectives	Revenue targets based on either (a) a per cent of infrastructure cots or (b) a per cent of the increase in land value	● Betterment levies are a good option for scenarios involving public transport and waterfront development ● Data on changes in land value and efficient tax administration are critical success factors
Timing and collection of payments	Payments collected: ● Upfront, as with developer contributions made before the infrastructure is built ● Annually, as with an increment to local administration rates ● At the time of property sale	● Consideration should be given to whether there are negative financial consequences for landowners who may not have the capacity to pay a levy or who are asset rich, but income poor ● The Government might consider only requiring the levy to be paid when a property is sold or transferred
Application of the Levy by Land Use Groups	● Real estate developers ● Commercial landowners ● Residential landowners	● Application of the levy should be determined using the beneficiary-pays principle ● If it can be demonstrated that benefits will flow to specific types of property owners, then there is a strong case to include them in the land value mechanism design
Application and Boundaries of Levy	Levies can be structured to have a broad based (for example, citywide) or time and distance based	● In Dammam, land value benefits are maximized for a 1.5km area with a walking catchment for public transport ● This benchmark given is supported by other cases (for example, Bogotá, Dubai and London) and will require additional analysis focussed on project specifics
Setting the Rate	The rate structure is variable and is determined on a case-by-case basis	● The choice of rate structure will need to reflect the choice of who to tax and the revenue base selected ● In Dammam, the base is related to the percentage of land value increase
Governance structures for Land Value Capture	● Various existing legal instruments that can used for the purpose of supporting value capture tools ● Regulation of new area-specific levies associated with infrastructure projects or urban planning ● Selecting the right legal instrument reduces the potential for unintended consequences ● KSA and, specifically, Dammam currently use land value capture mechanisms ● Lessons learned from current instruments (for example, white land tax) can inform the selection and implementation of appropriate legal instruments that support land value capture instruments	

Source: Adapted from Youngman, J.M. (1996) 'Tax on land and buildings', in Thuronyi, V. (ed.) Tax Law Design and Drafting, International Monetary Fund,Washington, DC.

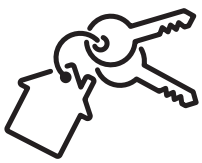
The Government envisions public-private partnerships (PPPs) in the delivery of many urban development projects in infrastructure and services. This partnership models harnesses the private sector's expertise in infrastructure and finance while re-allocating some capital expenditures on infrastructure and risk from the Government to the private sector. In this regard, PPP legislation is in the process of being delivered by National Centre for Privatization, whilst the Ministry of Economic Planning will take on the role of country's central PPP coordinating unit. The Government aims to link the Spatial Planning Act with the new national PPP law to implement urban development and infrastructure projects identified as part of the implementation action plans in the National Spatial Strategy 2030. This also expected to provide impetus to private sector investments.

4.4.3 Urban housing at the centre of economic growth

Housing is a socioeconomic imperative for a vibrant society that the kingdom envisages through Vision 2030. Housing speaks to

every dimension of personal human development, generating a sense of identity and social belonging.[53] However, housing involves much more than shelter; it is central to economic growth and development. Housing infrastructure is a critical part of the economic activities in urban economies; without adequate housing for urban dwellers, economic development can be hampered. Investments in housing have direct effects on employment creation, income generation and savings, increase in labour productivity, and regional development.[54] Under the National Transformation Program (NTP), the Ministry of Housing, for instance, seeks to improve performance of the real estate sector and by 2020 double the sector's current 5 per cent baseline contribution to the GDP.[55]

The Green Paper for the National Spatial Planning Act outlines enabling suitable homeownership among Saudi families as one of the key ways of achieving the strategic objectives (offering a fulfilling and healthy life). Based on Vision 2030, the Ministry of Housing aims to increase the ownership rate by at least 70 per cent by 2030, whereas the housing goal set forth as part of the NTP objectives is to increase homeownership to 52 per cent by the end of 2020. The Government has decided to invest SAR 250 billion (US$67 billion) to construct 500,000 units[56] in a bid to erase the deficit in affordable housing for nationals. Therefore, under the NTP, some of the housing will be delivered through public-private-partnerships and build-operate-transfer projects.



Based on Vision 2030, the Ministry of Housing aims to increase the ownership rate by at least 70 per cent by 2030, whereas the housing goal set forth as part of the NTP objectives is to increase homeownership to 52 per cent by the end of 2020

Under the NTP, the Government strives to reduce the cost of housing from an estimated 10 times gross salaries to five times by 2020, and to increase by ten-fold the number of proper housing units provided to needy families benefiting from social security to 101,700 by the same year. In terms of the operations of the real estate sector, the Government plans to reduce the average time required to approve and license new residential real estate development projects from a baseline of 760 days to 60 days by 2020.

Recent Government policies have striven to diversify financing sources. The demand for real estate financing is expected to increase to SAR 500 billion (US$133 billion) by 2026, from SAR 280 billion (US$75 billion) in 2017. To this end, the Public Investment Fund has created the Real Estate Refinance Company (RERC) to improve the liquidity and performance of the real estate market, and increase its contribution to the GDP.[57] The refinance company is expected to provide up to SAR 75 billion (US$20 billion) of housing loans over the next five years and SAR 170 billion (US$45 billion) by 2026.[58] Launched as a partnership with the Ministry of Housing, the RERC will finance some of its activities by issuing bonds on the private market, a new initiative for the nation's housing sector. The introduction of Real Estate Investment Funds (REITs) in the Saudi stock market is expected to spur growth in the sector given by encouraging real estate investments. Further, under the NTP 2020, the Government plans to provide housing subsidies to enable Saudis take out mortgages as well as to reduce waiting times for housing finance from an average of 15 years to 5 years by 2020.

The Saudi Arabian Monetary Authority, the nation's central bank, has also undertaken to stimulate the real estate market and ease the housing shortage by taking measures to make mortgage financing more accessible. It has not only allowed banks to supply a bigger share of funding for purchases of homes, it has also scrapped administrative fees for mortgage holders.[59]

The completion of economic cities is further expected to boost housing supply. They are expected to provide new living space. King Abdullah Economic City, for instance, will offer an integrated zone with diverse of housing units for all income groups.

Despite the above measures that are largely driven by the central government, all cities must develop proactive policies to engage the participation of the private sector to cover their shortage of affordable housing. Jeddah's strategic plan, for instance, calls for the construction of 950,000 housing units, with 685,000 units affordable to lower- and middle-income groups in anticipation of a rising population. The city is also implementing *Jeddah without Slums* programme to upgrade several informal settlements that hold a strategic significance for future development, and establish public-/private partnerships to develop, fund and implement regeneration strategies for specific areas. In Taif, the Taif Development Plan also proposes rehabilitation plans for 15 different unplanned urban areas.

Sunset Beach, Al-Khobar Al-Aziziya

Concluding Remarks

This chapter has recounted key issues pertaining to dynamics of the urban economy of the Kingdom of Saudi Arabia. Accordingly, it has pointed out challenges and opportunities, particularly opportunities presented by Vision 2030 and NTP 2020, in attending to some of the challenges. This section presents some important measures that should inform policy to enhance the country's urban economy in its quest for economic diversification.

It is true that primary cities have been the key drivers of the regional economies. Future urban migrations will continue, predominantly, to these cities unless a major effort is made to improve the economic competitiveness of secondary cities or divert newly created employment to new growth poles. As is the case in other rapidly urbanizing societies, maintaining the attractiveness of secondary cities to young people entering the labour force will require a coherent policy involving the support of General Authorities. In addition to the creation of jobs matching the increasing levels of skilled young Saudis, the availability of affordable housing and other urban amenities in secondary cities will be critical to reversing their demographic downturn.

Even as the Saudi Arabia continues to restructure its economic cities and create special zones, the success of its current economic diversification strategy will depend on its ability to increase productivity in the non-oil sectors and of its cities as drivers of the economy. For this, it must redress the mismatches between skills and expectations, especially of the large body of young people entering the job market and the needs of private sector employers.

Additionally, to realize the Government's vision of creating a thriving economy that is business friendly, a higher Saudi labour participation is essential. At the moment, Saudi Arabia is hindered by the limited domestic supply of skilled labour in some fields and still depends on expatriate labour to fill the void. This is likely to persist in most cities, especially with the current ambitious plans envisioned in Vision 2030.

Housing should not be seen just as a peripheral activity of the economy. Rather, it is a central force for sound economic development. A fully functioning housing market is a source of economic development.[60] It is necessary to link economic effects of housing investments in the cities to the Government's macroeconomic goals and objectives. This linkage will ensure that housing is seen as a productive sector and ensure that housing provision keeps pace with macroeconomic policy and urban private sector activities so that shortages in affordable housing and infrastructure in urban areas are minimized.

Endnotes

1 Kingdom of Saudi Arabia, 2018a.
2 Mostly electricity and transport infrastructure. While only SAR 14.1 billion were invested in infrastructure in the first Five Year Plan, SAR 428.1 billion were invested between 1975 and 1989 and an average of SAR 14.6 billion per year from 1990 to 2014. Although investments in transport and the national electrical and telecommunications grids were significant, the bulk of these investments took place in urban areas.
3 Manufacturing industries contributed to GDP at constant prices by 12.0 per cent or SAR 310 billion in 2016 compared to 11.7 per cent in the preceding year and the number of working factories also increased by 6.3 per cent [Saudi Arabian Monetary Authority, 2017].
4 In 2017, the Hajj attracted pilgrimage of 2.35 million people, of whom 1.75 million and 0.6 million were foreign and local, respectively.
5 Riyadh Region comprising 37 per cent or (nearly 3.9 million) of the same.
6 Central Authority for Statistics, Labour Market for 4th Quarter 2016.
7 The Oil-rich Eastern Region has three major cities–Dammam, Dharan and Jubail– whose economy is driven by petrochemical industries.
8 SAGIA is also leading the development of the new economic cities, starting with King Abdullah Economic City, by bringing together Saudi private investors and Government entities [SAGIA ,(n.d)].
9 Global Metro Monitor (Brookings Institution), City Competitiveness rankings (The Economist Intelligence Unit)
10 Brookings Institution, 2018.
11 Kingdom of Saudi Arabia, 2010.
12 The Government is striving to rehabilitate some economic cities of the last decade that did not realize their potential. Work halted in several cities, whilst others face challenges that threaten their viability.
13 McKinsey Global Institute, 2015.
14 SAMA, 2018a; SAMA, 2018b SAMA, 2017; SAMA, 2015.
15 The contribution of the construction sector declined from 17.89 cent of GDP in 2011 to 6.54 per cent in 2015; wholesale and retail trade (which includes the hospitality industry) declined from 13.42 per cent to 4.27 per cent; transport and communication from 13.9 per cent to 5.4 per cent; and personal savings from 10.92 per cent to 4.01 per cent. Finance, insurance and real estate, a predominantly urban sector, was less affected.
16 The International Monetary Fund's assessment of current conditions is that Saudi authorities have made considerable progress in initiating the implementation of their ambitious reform agenda. While non-oil growth is expected to reach 1.7 per cent in 2017, overall real GDP growth is expected to be close to zero. Growth is expected to strengthen over the medium term as structural reforms are implemented [IMF, 2017].
17 According to statistics from General Organization for Social Insurance (GOSI), the private establishments constituted 99.7 per cent of total establishments in the country in 2016.
18 General Authority for Statistics, labour market fourth quarter, 2017; OECD Data, 2018b.
19 OECD, 2018a.
20 In addition, according to ILO, the labour force participation rate among males was 78.3 per cent and 22.2 per cent for females at the end of 2016 [International Labour Organization, ILOSTAT, www.ilo.org/ilostat/]. Further, OECD data shows that only 35 per cent of 25-34-year-old tertiary-educated women are employed the country compared to the male (92%); this gender gap of 57 percentage points is well above the OECD average (9 percentage points). This disparity is even more pronounced at lower levels of educational attainment. [OECD, 2018a]
21 Council of Economic and Development Affairs, KSA, 2016b.
22 Saudi Gazette, 2017.
23 McKinsey Global Institute, 2015.
24 Saudi Gazette, 2017.
25 Kingdom of Saudi Arabia, 2018.
26 Commonwealth of Australia, 2015.
27 General Authority for Statistics, labour market fourth quarter, 2017.
28 General Authority for Statistics, labour market fourth quarter, 2017.
29 Mckinsey Global Institute, 2015.
30 General Authority for Statistics, 2016.
31 Central Department of Statistics and Information, 1431 AH (2012) Population Tables 1-14,
32 Mckinsey Global Institute, 2015.
33 Ministry of Municipal and Rural Affairs, KSA, 2016.
34 "The dominance of the family villa as the built form in residential areas reflects the family focus of Saudi society, but as social preferences change and families have become smaller a more diverse housing stock is emerging." [Ministry of Municipal and Rural Affairs, KSA, 2016]
35 Dammam City Profile, Future Saudi Cities Program 2018.
36 Lower-income non-Saudis households tend to live in group quarters.
37 General Authority for Statistics, 2013.
38 McKinsey Global Institute, 2015.
39 OECD, 2011.
40 McKinsey Global Institute, 2015.
41 The KSA's Council of Ministers approved a proposal to apply a 2.5% WLT in November 2015.
42 MMM Group, Moriyama and Teshima, 2010.
43 Jeddah Municipality,2009; Jeddah Municipality and AECOM, 2014.
44 AFM Consultants (DCOMMM, 1428H).
45 Central Dept. of Statistics and Information, 2012.
46 Royal Commission for Riyadh (HCDA) has a long history of innovative and successful planning of the capital region.
47 Ninth Development Plan, Paragraph 32.3.
48 Current rates charged for city services are concessionary for electricity whilst there are no charges for solid waste collection or water consumption, despite the high cost of producing desalinated water. A municipal tax on undeveloped white lands was only imposed in 2015.
49 The Knowledge Economic City in Madinah and Al-Faisaliah City in Makkah are part of the existing large cities which have a competitive advantage in the kingdom's urban fabric.
50 The fees and taxes include, among others: Charges for various planning services; standardized development contribution; development agreements (for infrastructure development); parking facilities; and special area development levies.
51 Kingdom of Saudi Arabia, 2018b.
52 Dammam City Profile, Future Saudi Cities Program 2018.
53 WCR, 2016.
54 Tibaijuka, 2009.
55 The Ministry of Housing also aims to raise annual growth rate in the real estate sector from a baseline of 4 per cent to 7 per cent by 2020 as one of the key performance indicators of the National Transformation Program 2020. It is also envisages that the contribution of property financing to non-oil GDP will increase from 8 per cent to 15 per cent by 2020.
56 Council of Economic and Development Affairs, KSA, 2016b.
57 The company aims to enhance the real estate sector, increase its contribution to GDP, to reach 52 per cent in 2020; Ministry of Housing, 2017.
58 Reuters, 2017a.
59 Reuters, 2017b.
60 Tibaijuka, 2009.

CHAPTER 5

Managing urban transformation in Saudi Arabia: The role of urban governance

Holy Kaaba
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5.1 Introduction

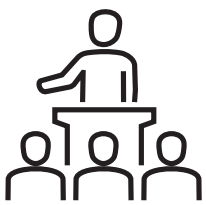
This chapter examines the role of governance in managing urban transformation in Saudi Arabia. It takes stock of the emerging trends and issues associated with urban governance systems in Saudi cities, and highlights the barriers to effective sustainable urban development. Saudi Arabia has experienced rapid urbanization since the 1950s, along with global social transformation from the early 20th century. Consequently, its population has increased from 3.1 million in 1950, to 31.6 million in 2015, with projections indicating it will reach 45 million by 2050.[1] The country has a bottom-heavy demographic distribution, with a relatively high proportion of youth population, as indicated in Chapter 1.

The scale of this urban transformation is clear in any spatial analysis, indicating that Saudi Arabia needs to "expand the current land area of cities by about 50 per cent or build 44 new cities of 250,000 inhabitants; in other words, a city every 9 months from the present till 2050"[2] to accommodate this growth. This is a challenging endeavour considering that the country is already struggling to manage current urbanization.[3] The situation points to a need for significant changes in the planning and management of Saudi cities to address "persistent, current and future urban challenges".[4] One key aspect lies within the urban governance system, which can serve as a basis for assessing and improving development administration with a focus on efficiency, effectiveness, equity, inclusiveness, livability and general societal prosperity.

This chapter begins with a description of the scope of urban governance and the issues that it will examine. It then considers the basic sources of urban policy in the kingdom in the form of the vision and guidance instruments that shape policy and provide specific consideration of urban development priorities. Then, the chapter proceeds to consider the principal governance elements for delivering policy, including institutions, finance, development planning structures, administrative capacity, and approaches to participation. This is followed by an examination of the legal and regulatory framework that shapes and provides accountability for these elements before making some general conclusions about urban governance in the Kingdom of Saudi Arabia.

5.2 The nature of urban governance

Urban governance is central to the achievement of sustainable urbanization and to the development and management of inclusive, safe, sustainable and resilient cities. How we choose to make decisions and organize the relationships among institutions and communities shapes the outcomes that we produce. Together with the New Urban Agenda (NUA) adopted in October 2016, Goal 11 of the Sustainable Development Goals is a clear expression of the increased recognition of urban development in global governance structures and decisions promoting cooperation among different governance actors operating on different scales. Urban development is not just a factor in other policy areas, such as environmental protection or economic development. The proportion of population and economic activity existing in urban areas and the unique nature of urban development dynamics mean that it is itself a driver of sustainable development.



Urban governance is central to the achievement of sustainable urbanization and to the development and management of inclusive, safe, sustainable and resilient cities

Urban governance refers to how "government, local, regional, national and stakeholders decide on how to plan, finance, and manage urban areas. It involves a continuous process of negotiation and contestation over the allocation of social and material resources, as well as political power."[5] It is viewed as a political process that is influenced by the structure and operation of political institutions and the capacity of governments to make and implement decisions. Additionally, urban governance is used in reference to government, or the public sector, and the institutional underpinning of public authority and decision-making. Therefore, governance systems relate to the institutions, rules of the game, and other factors that determine how political and economic interactions are structured, decisions made, and resources allocated.[6]

Whereas the form and structure that public governance takes differs among countries and localities, the philosophy behind it is commonly shared. This philosophy has evolved with time in response to the peculiarities of historical periods, and the general demand for reform. During the 19th century, the central focus was on nation building, and the Traditional Public Administration system (TPA) emerged as the most efficient form of managerial control through bureaucracy.[7] By the 1980s, problems with public service provision, such as high costs,

low quality, lack of asset maintenance, insufficient revenue, and low capital investment created an impetus for change. Consequently, the New Public Management (NPM) system[8] was established, which focused on deregulation, liberalization of public services and the application of the market to improve efficiency in public service provision.

After more than 10 years of experimenting with the NPM, there was another paradigm shift to New Public Governance (NPG), which focused on the role and importance of effective public institutions in development and democracy.[9] It has also expanded the scope of governance to include a greater range of actors with states playing a less central management role. This has contributed to a more balanced political process for negotiating demands between states and societal groups.

Good governance is usually associated with defined characteristics that include the following:[10]

- Basis in Rule of Law and the existence of a fair legal and regulatory framework.
- Transparency and universal availability and access to services to those affected by policy and its implementation.
- Is responsive, designed to serve the best interest of stakeholders.
- Is consensus oriented, requiring participation of all stakeholders.

Al-Balad District, Jeddah

- Is equitable and inclusive, providing an opportunity for all stakeholders, including vulnerable groups, to improve their well-being.
- Is effective and efficient, ensuring the best use of resources.
- Is accountable to those affected by its decisions and actions.

These factors, along with governance provisions from the New Urban Agenda,[11] have been taken into consideration in this chapter. Emphasis is on understanding the fundamental drivers of change that include: national urban policies, system and structures of governance, institutions, regulations, planning practices, the economy of cities, and models of financing urban development and how they could be leveraged to improve practices.

For most of its history, Saudi Arabia has operated an orthodox model of public administration that is highly centralized.[12] Throughout the history of the modern kingdom there have also been instances, mostly related to cities with a special status, of an almost complete devolution of many decision-making and service-delivery functions to various forms of parastatal bodies. In recent years, there has been a visible push for change in political and institutional reforms that aim to improve Government effectiveness.[13] This has included some elements of decentralization of service delivery. The emphasis on such effectiveness and reform of the entire Government creates an opportunity to lay the foundation for improving governance and public engagement.

5.3 Vision and guidance instruments in national development

National development policies are critical elements in good governance. They provide a clear direction and set of priorities that guide Government institutions and provide a framework for what citizens may expect from their leadership. The New Urban Agenda commits states to developing and implementing national policies that lead to building integrated systems of cities and human settlements and achieving national development targets.[14] Saudi Arabia has developed a multiplicity of policy instruments for the management of its national development process. The principal tool has been the National Development Plan. The regular succession of such plans has recently been superseded by Vision 2030 and its associated National Transformation Program 2020 (NTP), which seek a radical change in the society. There is also an ongoing cooperation

with UN-Habitat[15] aimed at improving the functionality of cities. These policy instruments are examined below.

5.3.1 National Development Plan

The National Development Plan has historically been the principal tool used to articulate development policy and associated actions in Saudi Arabia. These plans were prepared by the Ministry of Economy and Planning to cover five-year periods, focusing on thematic issues within a multisectoral framework. The key contribution of the plans was the articulation of the objectives for development action. The first plan (1975–1980), for instance, had the objectives of increasing housing supply, ensuring an orderly urbanization pattern and adequate institutional structures to support development action. The recent plan focused on the optimization of the use of oil resources in production activities and the promotion of industrial development. It also addressed issues related to education, economic diversification, private sector development and government efficiency, and generally reinforces a trend towards economic expansion and the broadening of participation. A clear and accepted outcome of Saudi Arabian national development planning is the broad expansion in the availability of services and facilities to the population that is visible in health statistics.[16]

5.3.2 Saudi Arabia Vision 2030 and the National Transformation Program

Replacing the National Development Plan, the Government has recently formulated Vision 2030, which seeks to build on the country's status as the heart of the Arab and Islamic world. Additionally, it marks the Government's determination for Saudi Arabia to become a global investment powerhouse, and solidify its unique strategic location connecting continents. The Vision also sets out to radically transform the nation by 2030 into a vibrant society, with a thriving economy and effective governance. The Vision harbours wide-ranging changes in values and aspirations. From a governance and urban management perspective, some of the anticipated changes include the following:

- Committing to a high level of security and development in cities.
- Ensuring the provision of high-quality services.
- Reducing pollution, fighting desertification and optimizing the use of water.
- Providing equal employment opportunities for all.

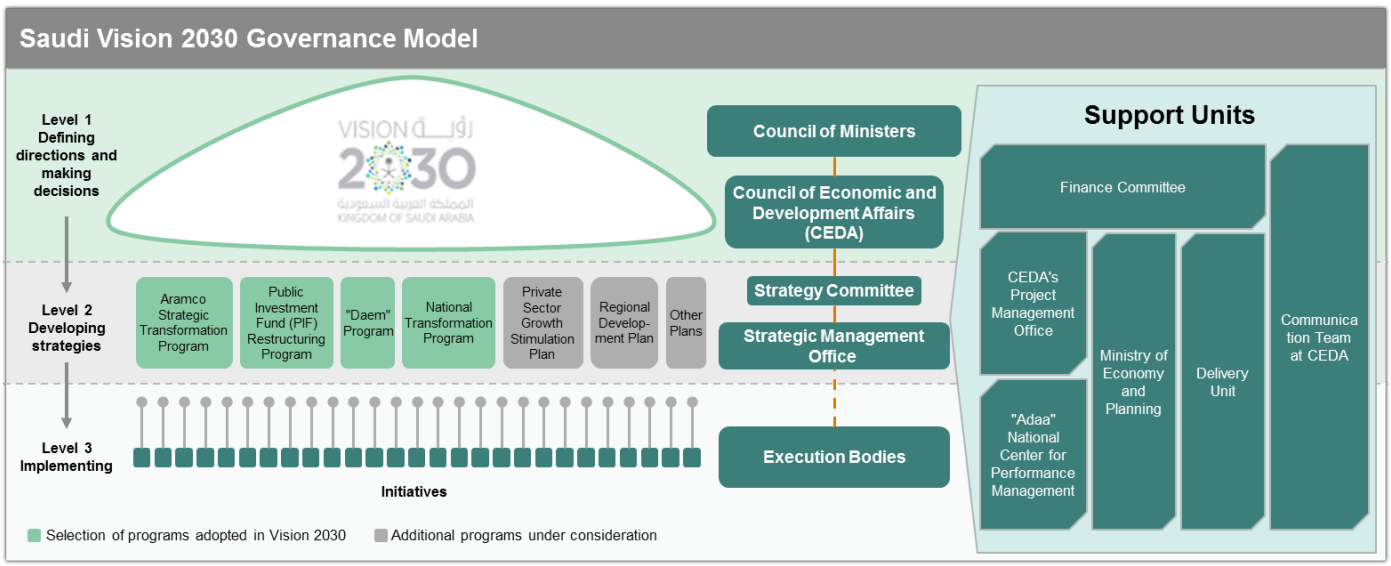
Corniche Road, Jeddah

- Increasing the role and contribution of small- and medium-sized enterprises.
- Increasing the long-term contribution of the private sector to the economy.
- Reforming regulations to pave the way for investors and the private sector to acquire and deliver services.
- Shifting the Government's role from providing services to regulation and monitoring.
- Applying international legal and commercial regulations to create a business environment conducive for long-term investment.
- Setting and upholding high standards of administrative and financial accountability.
- Deepening communication channels between Government agencies, the public and the private sector.
- Examining Government structures, procedures, roles, responsibilities and capabilities.
- Creating a more conjoined Government with clearer links between policy decisions, delivery and performance.
- Making public spending radically more efficient and resource use more effective.

Implementation of the Vision is through several plans. The most important of these for urban development and management is the NTP, which includes a determination to achieve a new level of efficiency in governance, planned tax increases, strategically executed spending cuts, and provides a greater role for the private sector. All ministries are required to align their objectives and workplans with the Vision, which is now the principal framework for all non-recurrent expenditure. The Public Investment Fund Restructuring Program is also important because of its potential for delivering funds to targeted projects.

A new governance model was developed for use in implementing Vision 2030 (see Figure 5.1). The model is built on a three-level strategy of defining directions and making decisions, developing strategies, and implementing the strategies. The various actors and participants in the process are specified. The Council of Economic and Development Affairs (CEDA) is particularly notable as a Cabinet-level body that is central to strategic decision-making and resource allocation.

Figure 5.1: Saudi Vision 2030 governance model



Source: Vision 2030 Kingdom of Saudi Arabia; see: http://vision2030.gov.sa/en/node/259.

5.3.3 National Spatial Strategy

Saudi Arabia has incorporated the objective of well-planned and managed urbanization as an integral part of its vision for managing its territory.[17] Action towards meeting this objective has resulted in the formulation of a National Spatial Strategy (NSS) and a growing interest in the introduction and application of regional planning. The process of producing a National Spatial Strategy was initiated in 1970, with the first created in 1985 and revised in 1987. Subsequent versions were produced in 2000 and 2005.[18] A recent revision was initiated in 2016 in close relationship with the Future Saudi Cities Program and the development of proposed physical planning legislation. The current NSS has nine key objectives:

- Promoting a spatially balanced pattern of population distribution.
- Minimizing the adverse consequences of the continuous increase of population in large cities.
- Ensuring the efficient utilization of the infrastructure and public services already in place.
- Intensifying efforts to diversify the economic base of different regions to fully utilize their existing and potential resources.
- Supporting selected settlements to serve as growth centres capable of transmitting and developing impulses towards surrounding areas.
- Supporting new activities that contribute positively to the integration of rural and urban areas.
- Improving the administrative structures of selected growth centres and defining their service areas.
- Fostering development within border cities due to their importance for national security.
- Supporting the overall urban growth of small and medium cities.

A positive outcome of the NSS is the introduction of regional planning as an important component of territorial management. The impetus for and interest in this heightened during the Sixth Development Plan period following the issuance of Royal Decree No A92 on 2/3/1992. The decree created the provincial system of governance and established regional councils to oversee issues of regional planning and development. Thirteen regions were created, each with its administration and council. Though regional planning was introduced by the sixth plan period (1995–1999), the framework for its implementation has remained weak, which is still evident in the lack of a clear framework for implementation on a national scale. Consequently, the Government, through the ambit of a proposed National Planning Act, intends to strengthen the regional planning system by introducing primary policy orientations for institutions such as a Regional Spatial Planning Commission. The commission will be responsible for planning at the regional level, supported in its executive function by the Regional Council.

5.3.4 The Future Saudi Cities Program (FSCP)

The Kingdom of Saudi Arabia has also entered a collaboration with UN-Habitat to implement the Future Saudi Cities Program in collaboration with the Ministry of Rural and Municipal Affairs (MoMRA) to address urban challenges and to achieve sustainable urbanization.[19] The objectives of the programme are in line with the recently adopted Vision 2030, the Municipal Transformation Program and the Sustainable Development Goals, including SDG 11, which seeks to make cities and human settlements inclusive, safe and resilient. The FSCP intends to accomplish the following:

- Provide a better urban environment in 17 Saudi cities, in accordance with the standards of city prosperity and well-being.
- Reduce the phenomenon of urban sprawl and address urbanization through thoughtful and appropriate planning principles.
- Find sustainable institutional solutions and improve coordination between the ministries and partners for urban development .
- Raise the institutional and technical capacity in the fields of planning urbanization processes and their management in a sustainable manner.
- Involve all segments of the population, especially women and youth, in the development of urban plans and their implementation.

These policies show the Government's commitment to guide and manage spatial transformation. Their scope is wide since they not only deal with economic issues, but also spatial strategies that seek to guide the management of the country's territory. National development planning has been recognized for its outcome of ensuring universal extension of services and infrastructure, along with economic opportunities to all parts of Saudi Arabia. Vision 2030 espouses values that are in consonance with the New Urban Agenda and its call for a more inclusive and prosperous society.

There are also evident limitations in the policies due to their formulation and content. One obvious observation is the national policy's centralization and lack of clearly articulated mechanisms for inclusion and public stakeholder participation. The Vision and guidance policies appear as top down processes that mirror the structures of governance. This is without prejudice to feedback mechanisms existing through municipalities and their councils.

Independent reviews of the NSS have highlighted some limitations of the policy. There is a need for the policy to go beyond just examining what exists in terms of development corridors. It must articulate a robust system to guide the population, activities and settlements into a form that is compatible with the objectives of the country, as highlighted in Chapter 4. Though the NSS provides for regional planning, there are no mechanisms to promote a systematic practice of regional planning in ways that facilitate the exploitation of comparative regional advantages. Accordingly, regional planning is not evolving as a universal practice in all regions of Saudi Arabia. The NSS has also been criticized for lacking clear definition of corridor and growth centers and their supposed roles in facilitating balanced national development. It has no clear monitoring and evaluation frameworks to assess its implementation, which is characterized by a project-to-project approach rather than a holistic vision aimed at supporting the strategy's achievement.

5.4 Institutional structure, actors and responsibilities in governance

The New Urban Agenda calls for an integrated approach based on actions at all levels, pointing out that the realization of the transformative commitments entailed in the Agenda will require multilevel means of implementation.[20] Figure 5.2 illustrates the governance system in Saudi Arabia which is multilevel, consisting of various national and subnational entities. This system is also complemented by the existence of several independent agencies, which have been established by royal decrees for specific purposes.

At the national level, the Government is headed by the King and the Crown Prince, who are also the prime minister and deputy minister, respectively. They hold executive powers over all functions of the Government. They are advised by an elective council, the *Majlis Al-Shura* (Shura Council), which serves as a legislative and consultative body on matters related to policy, economic and social development. Another body, the Supreme Judicial Council, advises on legal and religious issues. The King chairs the Council of Ministers which comprises heads of ministries, who oversee the daily implementation of policies and development action in their respective sectors. Another key actor is the Council of Economic and Development Affairs (CEDA). Recently created, CEDA's role is to oversee implementation of Vision 2030. Resource allocation lays the fundamental framework for action to achieve development objectives.

All these entities influence urban planning through national policy making. However, MoMRA is the principal actor, as it is

mandated to conduct all planning and licensing activities within cities.[21] Exceptions are in the regions of Makkah, Madinah and Riyadh which have their respective development authorities and Eastern Region and cities such as *Jubail* and *Yanbu* that have special commissions to oversee their planning and development. [22]

MoMRA is also responsible for planning and the implementation of plans, from the strategic level of the National Spatial System to the tactical level of local implementation in cities, along with developing requisite policies and regulations. MoMRA has various departments and directorates, such as the Deputy Ministry of Town Planning[23] which, among other things, prepare urban policies and plans at different levels, and coordinate their implementation with assistance from the departments of Local Planning, Studies and Research, Projects Coordination and Urban Planning and Design. Other ministries also influence urban planning (see Table 5.1).

Criminal Court Park, a distinctive example of an open space in downtown Riyadh

Table 5.1: Planning responsibilities of key ministries and independent national planning authorities

Ministry	Responsibility
Ministry of Economy and Planning (MoEP)	● Prepares the 5-year development plans that guide development action
Ministry of Interior (MoI)	● Oversees provinces and governorates, with a focus on security
Ministry of Municipal and Rural Affairs (MoMRA)	● Planning urban development of all cities and towns ● Formulating urban planning regulations ● Formulating the National Spatial Strategy and updating ● Urban services provision ● Land administration
Ministry of Housing (MoH)	● Develops housing strategies ● Administers land grants ● Administers interest-free loans
Independent National Planning Authorities[24]	● Prepare and approve all plans for the regions ● Supervision all sectoral plans including the strategic projects ● Urban regeneration projects for inner cities and historical areas ● Prepare land use regulations ● Review and approve land subdivisions

Source: Al-Helmi, 2015 ; Ajaj, 2013.

Subnational governance includes the regional and municipal level. The kingdom is spatially divided into regions [25]and governorates. There are currently 13 regions or provinces, each with a regional capital. These regional capitals, unlike other cities, are not included within any governorate, but instead are assigned the status of an independent municipality (*Amanah*) headed by a mayor (*Amin*). The emirate of the region, headed by (*Amir*), oversees all institutions operating within the region and reports to the Ministry of Interior,[26] whereas the Region Councils[27] (*Majlis*) are established to:[28]

- identify the needs of the region and propose their inclusion in the National Development Plan;
- identify beneficial projects for the region and propose their adoption in the State budget;
- study the organizational arrangement of the regional administrative centres and follow up implementation of any endorsed changes and implement the provisions of the development and budget plan and carry out the needed coordination.

At the local level, governance and development administration is carried out by the municipalities. Saudi Arabia has 285 municipalities (see Table 5.2)

Table 5.2: Typology of municipalities

Municipalities		The administrative region	Municipalities associated with each *Amana*	*Amanat*	Total (*Amanat* + municipalities)	population
1	Riyadh Municipality	Riyadh	47	1	48	6390436
2	Holy Makkah municipality	Makkah	3	1	4	1560331
3	Jeddah Municipality		15	1	16	3671986
4	Taif Municipality		10	1	11	691097
5	Madinah Municipality	Madinah	17	1	18	1476416
6	Eastern Province Municipality	Eastern Province	20	1	21	2074850
7	Alahsa Municipality		3	1	4	1067769
8	Qasim Municipality	Qasim	27	1	28	1037781
	Assir Municipality	Assir	33	1	34	1141492
10	Hail Municipality	Hail	17	1	18	413044
11	Albaha Municipality	Albaha	11	1	12	204863
12	Municipality Of Tabuk	Tabuk	13	1	14	693455
13	Jazan Municipality	Jazan	25	1	26	566054
14	Najran Municipality	Najran	10	1	11	439750
15	Municipality of Al Jouf Region	Al Jouf	9	1	10	375865
16	Municipality of the Northern Border Region	Northern Border Region	9	1	10	462802
Total			269	16	285	22267991

Source: City and Village Classification Summary, Ministry of Town Planning Agency, 2018

Based on the scope of service provision, the size of the population, and regional importance, the municipalities are divided into four categories (Class A, B, C and D).[29] According to their class, these municipalities have varying levels of authority and responsibility for city and town planning, formulating and enforcing zoning regulations, granting permission, urban beautification, and open space management. Notably, however, Amanat have some autonomy over urban planning and development decisions, which is subject to MoMRA's control and oversight.[30] For example, Class A municipalities may approve subdivision plans according to MoMRA promulgated guidelines, while smaller municipalities may have to seek explicit approval for larger subdivisions, and the smallest municipalities will rely on Amana approval in all cases.

Consisting of an equal number of elected and appointed councillors, the primary function of the municipal council is the administration of municipalities throughout the kingdom. Municipal councils are intended to prepare master plans, review budgets, and approve changes to plans and regulations. Some large metropolitan municipalities, such as Jeddah, have branch municipalities managing part of the urban area, which are answerable to their parent municipality. In practice, most municipal councils have a limited role in the planning of cities and are limited to occasional review and accountability functions. Local administrative agencies play more prominent roles in a number of cities but usually with only limited independence from central government direction.

Central technical agencies and ministries are responsible for developing national, regional and local urban plans, while the power of municipal authorities is restricted to the implementation of local plans

Saudi Arabia has a strong centralized system of government, which includes planning and urban administration. Central technical agencies and ministries are responsible for developing national, regional and local urban plans, while the power of municipal authorities is restricted to the implementation of local plans.[31] However, the prevalent centralization within the governance framework is evidenced in the policy formulation and in planning and management of development, with subnational levels of government essentially acting as implementing arms for the national government.

Such centralization tends to create unnecessary bureaucracy through long channels of communication and decision-making, thereby limiting the ability to promptly address development issues so as to meet the needs and aspirations of citizens.

Chapter 6 also notes that the creation of multiple government agencies to manage the kingdom's development activities has resulted in ill-defined distributions of responsibilities between different levels of governments. For example, one of the challenges facing the transport sector is fragmented decision-making caused by overlapping institutional responsibilities among the Ministry of Interior (Traffic Department), MoMRA, Ministry of Transport and Ministry of Commerce and Industry (Chapter 2).

Similarly, as pointed out in Chapter 6, uncontrolled urban expansion was partly attributable to the lack of coordination between departments. Duplication of roles and inadequate coverage in some areas is shown to characterize ineffective multilevel governance systems that compromise planning processes, risk backlogs in budget spending, incur higher transaction costs and create wider economic inefficiencies.

Another apparent characteristic of the system is the lack of mechanisms for public participation and inclusiveness. Decision-making takes place within formal Government institutional structures; and even when consultations take place, as in the case of the regional and municipal councils, they do not seem to be broad enough to reflect the characteristics of the society and its various segments. The scope of decision-making is also limited. It has been noted that even issues involving public interest such as building regulations, land use, and zoning are dealt with without any form of participation. Limited participation through the municipal councils appears to be too narrow to cater to the diverse needs of the population. The effect of this is inadequate or poorly enforced regulations governing urban management, as further highlighted in Chapter 6. The private sector usually engages the Government through approved industry groups or associations. There is also some allowance for participation by civil society and voluntary organizations.

Saudi Arabia has a broad and diverse domestic voluntary sector, made up of up of charities, NGOs, not-for-profit organizations, chambers of commerce, professional and informal groups and associations.[32] The groups and associations are registered with the Government and licensed to hold meetings. The non-profit sector is viewed as agents that can facilitate greater civic participation "both in terms of volunteering as well as setting up institutions that address key fundamental issues" such as health, housing and education.[33]

Some of the issues hampering activities in the sector include the lack of clarity in regulations governing it and delineation of the scope of activities the sector can undertake, with emphasis on greater freedom of action.[34] This discourse points to the need for review and redesign of the current structure towards reducing the level of centralization as well as providing mechanisms for engagement within the governance structure.

In general terms, institutions have traditionally been sectoral and geographic in nature with both their funding and policy drivers coming from the highest level of central government. The implementation of such a complex governance matrix is challenging. The fragmentation of roles and responsibilities combined with weak integration and process conceptualization exacerbates the challenge. More positively, the existence of a political commitment to proportionate funding for a nationally coordinated urban development policy that is primarily implemented at the local level creates significant potential for more effective governance in future.

5.5 Financing urban development

The availability of robust financing is an essential requirement for development intervention and action in any country. The management of urban transformation to achieve the goals of the New Urban Agenda requires countries to develop adequate, context-sensitive and integrated financing frameworks.[35] Financing is particularly critical to meeting service and infrastructure needs, and to promote economic growth, job creation and general prosperity. It is also fundamental in eradicating inequality and exclusion. Without adequate financing tools, cities will face multiple risks, including increased inequality, housing affordability crises, insufficient maintenance, and failing infrastructure and services.[36]

The management of urban transformation to achieve the goals of the New Urban Agenda requires countries to develop adequate, context-sensitive and integrated financing frameworks

As highlighted in previous chapters, Saudi Arabia has benefitted from its rich reserve of natural resources that has provided the income needed for development activities and for achieving the phenomenal changes such as the expansion of education, public services and infrastructure to all parts of the kingdom. (see Table 5.3).[37] The funding system is centralized, with the national government making allocations for management and development to local authorities through yearly line item budgeting. In addition, agencies and departments, including local authorities, submit proposals for activities requiring funding to the Committee for Economy and Development Agency (CEDA). Such requests are vetted, and viable projects selected for funding. Funding is provided as part of the NTP and yearly budget of the country. With limited exceptions, this line of funding is the sole means available to municipalities.

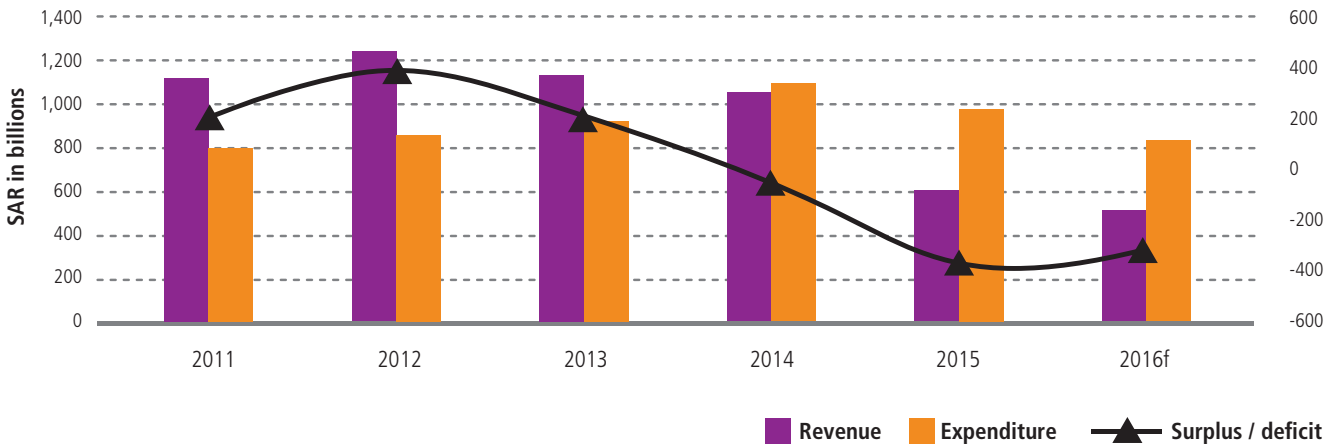
Currently, however, the decline in oil

Table 5.3: Investing in urban development projects in the Kingdom

Year	Investment (Billion SAR)	% of Total Expenditure
1970-74	14.1	41.35
75-79	171.3	49.33
80-84	256.8	40.42
85-89	100.7	28.86
90-94	74.2	21.77
95-99	68.1	16.20
2000-04	61.4	12.65
2005-09	122.3	14.16
2010-2014	211.6	14.65

Source: IBI Consulting Group, 2018

Figure 5.2: KSA Government revenue and expenditure profile, 2011-2016



Source: EYGM, 2016.

Table 5.4: KSA GDP, demographic profile and unemployment

KSA economic proficiency	Male	Female	Total
	2013	2014	2015
Nominal GDP (%change)	5.25	1.9	-2.3
Real GDP (%change)	10.13	13.5	13.5
Inflation (CPI, % y-o-y)	13.13	10.13	8.25
GDP per capita (SAR)	92,546	90,941	86,771

KSA demographic profile	Male	Female	Total
	2013	2014	2015
Population (million)	30.2	30.9	31.5
Population growth rate (%)	2.30	2.30	2.20
Labour supply (million)	11.3	11.7	12.2
Unemployment rate	5.60	5.50	6.0

Source: EGYM, 2016.

prices is affecting the ability of Saudi Arabia to marshal adequate resources to fund its development activities. As indicated in Chapter 4, as the kingdom's. the country's oil revenues fell from SAR 913.35 billion (US$243.5 billion) in 2014 to SAR 333.7 billion (US$89 billion) in 2016, Government revenues also dropped from SAR 1.04 trillion (US$278 billion) to SAR 519.4 billion (US$138.5 billion). The Gross Domestic Product (GDP) also declined from SAR 2.83 trillion (US$756 billion) to SAR 2.41 trillion (US$645 billion) These declines resulted in deficit expenditure in the yearly budget along with a gradual contraction of the national economy. Figure 5.3 and Figure 5.4 show the level of deficit spending in the period 2011–2016.

A reduction in income and increase in deficit spending is, however, occurring at a time when the population and unemployment are increasing (Figure 5.4). This is creating a condition that can lead to economic stress and stagnation, unless concerted action is taken. The situation calls for a review of the financing system with the aim of seeking ways to expand availability of resources to fund development activities for the economic prosperity of cities, and a sustainable funding path of the kingdom's development. Similarly, as highlighted under Chapter 4, the success of the current economic diversification strategy will depend on its ability to increase the productivity of the non-oil sectors by promoting public-private partnerships and providing medium and long-term bank credit to small and medium enterprises.

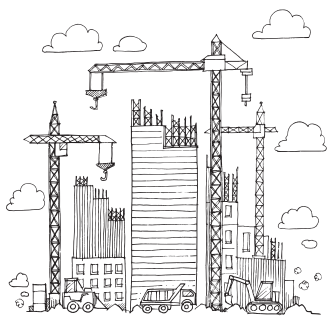
Another key and critical tool to create a sustainable development funding mechanism is for the Government to consider fiscal decentralization. This involves the devolution of fiscal power from the central government to subnational governments. The measure is seen as an effective part of a reform package that can lead to several benefits in governance such as the ability to facilitate innovative searches for funding sources, improve efficiency, increase competition, and stimulate economic growth.[38] Efficiency in this respect occurs because local authorities are able to match service needs of communities with their preferences based on the principle of subsidiarity, leading to optimal distribution. The weakness in the local relevance of funding priorities in the kingdom is particularly well illustrated by the limited availability of funds for the implementation of local, or other citywide equivalent, plans at the same time that relatively abundant funding is available for sectoral and mega-projects.

There is also the need to increase the level of private sector participation in development action and service provision. This participation is already recognized as necessary with the issuance of the Council of Ministers' Resolution No. 123 of 22/12/2001, which lists the type of facilities, activities and services to be privatized. These include operation and maintenance services, public markets and parks, transport services, collection of municipal revenues, cleaning and waste disposal services.[39] Private sector participation can be vastly expanded to encourage different types of development intervention, based on partnership arrangements.

Another option for improving local revenue |is through growing the urban economy. As Chapter 4 points out, cities are clearly viewed as engines of growth under the Vision 2030, and they are integral to achieving the envisioned diversification— which will be the key driver in the reduction of disparities and enhancement of social equity among the regions. The bottom-heavy demographic characteristics of the country's population distribution can become a potential resource for expanding urban production activities, particularly in export-based industries. This will require significant investment in education, skills development and entrepreneurship. It will also need the creation of innovation and entrepreneurship centres in cities as a means of encouraging young people to become entrepreneurs rather than job seekers. The conditions for such mechanisms already exist in the industrial cities of Jubail and Yanbu, and the commercial centres of Dammam, Jeddah, Madina and Makkah.

Revenue generation activities in cities may also include taxes and levies. As discussed in Chapter 4, urban areas must be allowed to collect local revenue through property taxes and to charge appropriate rates for public services to fund development activities. The recent White Land Tax Law[40] that imposes fees on undeveloped land in urban areas to stamp out land speculation, housing shortage and indiscriminate land development shows that regulatory mechanisms can be leveraged to generate revenue while fostering an efficient development framework.[41] The Government also introduced a value-added tax system that will allow municipalities to channel and generate revenue.[42]

The exploration of new local revenue mechanisms is important for its role in diversifying local funding, and for its potential to direct or redirect the behaviour of citizens and other actors. The ability to make developers internalize the indirect costs of various forms of urban development can be a valuable tool in shaping cities and ensuring their sustainability.



The government adopts the use of local plans as the main means to guide and control urban development in cities.

5.6 Development planning and urban management activities

A principal function of urban governance systems is to facilitate planning and implementation to achieve societal goals. Planning is recognized as a powerful tool for reshaping the form and shape of cities and regions, and for enabling economic growth, employment and general prosperity.[43] This section examines development planning practices at the different levels of governance in Saudi Arabia as well as the nature of services that are provided to urban residents. The section examines the nature of activities carried out at the national and subnational levels of government.

As highlighted earlier, planning and policymaking at the national level takes place from an economic and spatial perspective; that is, the five-year economic plans prepared

by the Ministry of Economy and Planning, which outline the framework for revenue allocation and the National Spatial Strategy developed by MoMRA, which guides regional and local spatial planning. MoMRA is also responsible for preparing and approving plans and regulations for municipalities. The practice of regional planning, which was recently introduced and incorporated into the National Spatial Strategy, is generating much interest. This is demonstrated by the growth of ongoing regional planning activities in Jeddah, Madina and Makkah.

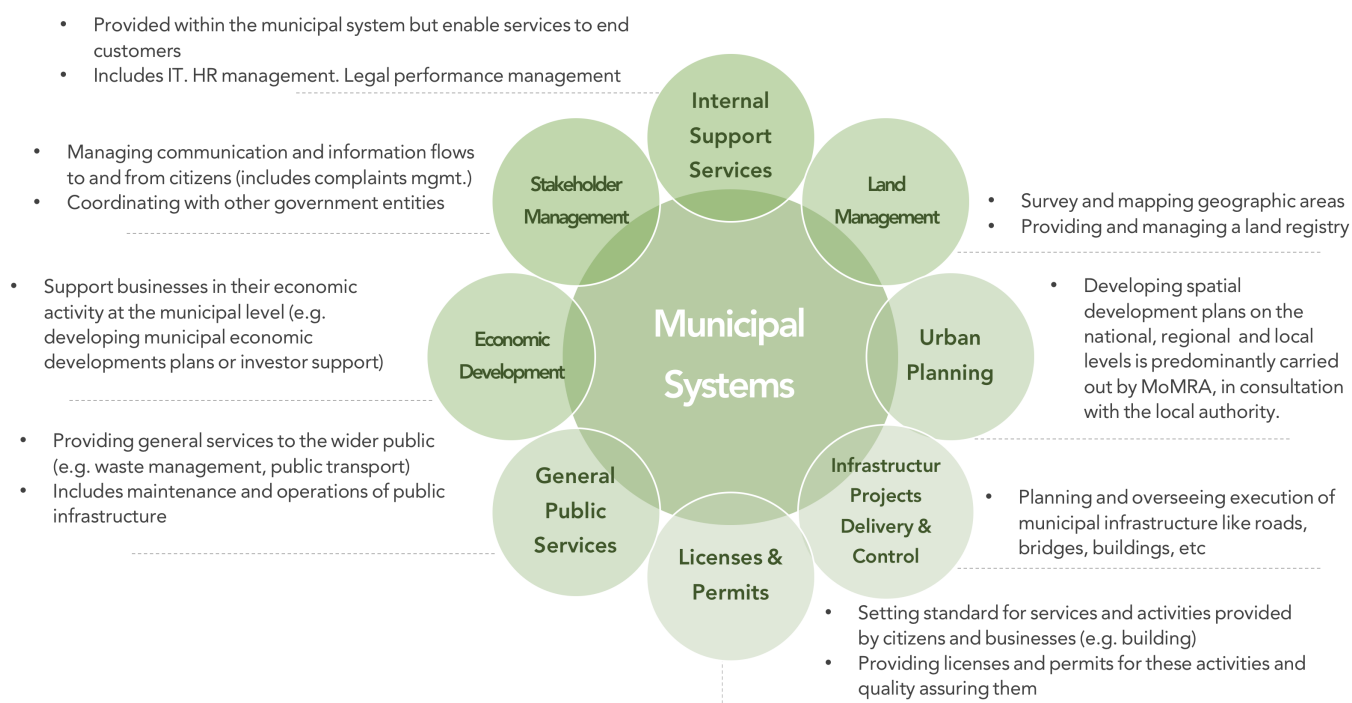
Regional planning is also providing an avenue to solve the problems of rapid growth and uneven population distribution in various parts of the country. Such planning is managed mostly at the regional level, overseen by regional councils or, in some cases such as Riyadh and Eastern Region, Makkah Al Mukarramah, Al Madinah Al Munawwarah, Hail, Aseer by Development agencies .

At the municipal level, the country is moving towards using local plans as the principal vehicle in guiding the development of cities.[44] It outlines land use, transport and major infrastructure in the city, and provides development controls to enhance planning flexibility and empower decision-making by planning departments in each municipality. The plan is normally the backbone of main roads and highways linking these parts internally and externally to other urban centres, major utilities stations, and public service facilities' locations.

All developments are expected to respect and be subservient to the plan. Local plans are approved by MoMRA and are subsequently detailed in master and action area plans, which interpret the plan into detailed urban components in the form of city parts and blocks. The local plan is usually revised in line with changes in the urban context. The plan is rarely executed through individual projects that are implemented according to funding availability.

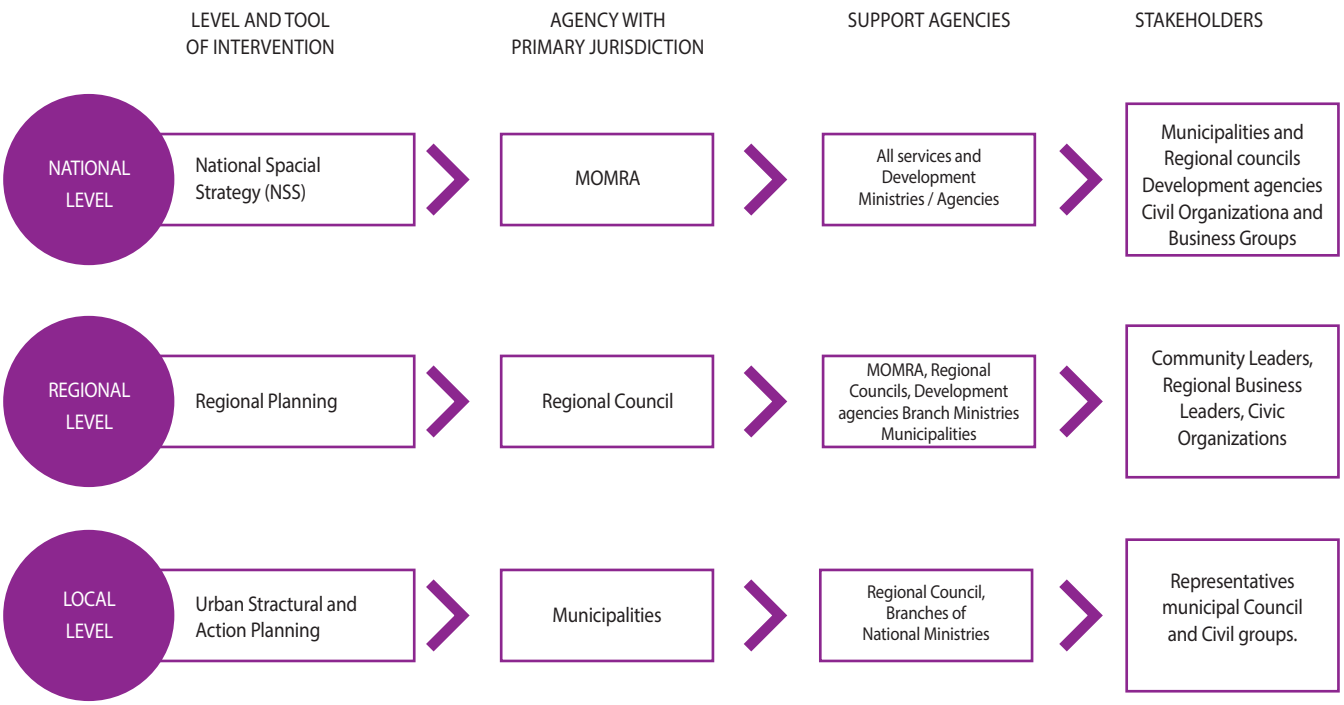
Part of the governance activities of municipalities is the provision of different types of public services. Figure 5.5 shows some of these services provided. The service-oriented activities of the municipalities are a significant contributor to the country's

Figure 5.3: Services provided by the municipal sector



Source: Shaw and Sturzaker, 2017/FSCP; UN-Habitat.

Figure 5.4: Suggested decentralized structure of organizational responsibility in planning and development management



Source: Dr. Shaibu Bala Garba.

objective of raising and achieving a high standard of living and ensuring the provision of basic needs for citizens. Some of the specific services provided include: the construction and operation of municipal networks (such as storm water drainage, streets) and facilities (slaughter houses, *souqs*, markets, parks); maintenance of environmental hygiene through street cleaning, waste collection and environmentally safe disposal; and the removal of debris.

Municipalities also enforce different types of conditions and regulations. These include issuance of local plans that spell out development patterns, zoning standards, issuance of building permits along with other development control approvals. Riyadh, for instance, on its official website, has classified its regulations into five categories: health, municipal, constructional, technical and general.[45]

The analysis of the spatial planning hierarchy reveals some distinctive issues in need of review to facilitate greater efficiency and effectiveness in achieving development goals. As illustrated by Figure 5.6, while the spatial system appears to have some semblance of distributed responsibility, in practice urban activities occurring at the subnational level are controlled by the central government. This leaves subnational governments with limited fiscal and spatial autonomy of their jurisdictions, and them merely acting as implementing agents.

This situation negates the principle of subsidiarity that links effective action to the immediate levels where the problem occurs. There is, therefore, a need to revise the governance framework through jurisdictional decentralization to attend, effectively, to community needs. This is supported by the New Urban Agenda, which specifies that territorial urban design and planning processes should be led by subnational and local administrations, but their implementation will require coordination with all spheres of governments as well as participation of civil society, the public sector and other relevant stakeholders as highlighted in Chapter 6. Moreover, the Agenda calls for participatory planning processes.[46] Such decentralization would also only be viable when carried out within the framework of fiscal decentralization, which gives every level of government the ability to source and utilize generated funds in development action.

Additionally, there is a need for enhanced horizontal and vertical coordination in the management of development

action. Effective coordination of governance institutions contributes significantly to establishing the appropriate context for development action and management.[47] Institutional coordination also promotes effective collective action between the different stakeholders, especially in sectoral policy formulation. Such coordination is needed in Saudi Arabia, particularly at the regional level where exchange of information between sectoral departments and the regional council is vital to effectuate balanced spatial regional development. Regional plans are developed under the auspices of the regional councils and with accountability to the Ministry of the Interior. While these plans are often developed in consultation with MoMRA, they neither follow a consistent form. Similarly, while city-level master or local plans, usually developed by MoMRA in consultation with the local authority, There is also need to improve expertise of regional staff and introduce monitoring mechanisms such as performance indicators to assess the level of achievement of regional planning projects. Chapter 6 underscores the importance of strengthening capacity development for urban governance, considering institutional capacities, the technical and professional skills of individuals, as well as local leadership skills.

5.7 Municipal capacity and local management

This section examines the role of municipalities and their capacity to manage local development. Specifically, the section focuses on the nature of their activities, their ability to proactively manage growth and development and contribute to the evolution of functional and livable cities. This section also focuses on the nature of the challenges that municipalities face and how the ability to deal with these challenges is reflective of their management capacity. The section makes a general examination of the capacity situation of all municipalities and later progresses to a detailed examination of case studies from Dammam and Jeddah.

5.7.1 Municipal planning and action responsibility

Municipalities in Saudi Arabia form a part of the local institutional structure for managing growth and development of urban areas. However, they lack a decisive role in local management and that has been observed to create fragmentation of responsibilities.[48] The activities of municipalities are controlled by and dependent on MoMRA, which prepares structure plans for local implementation. Municipalities only have autonomy to prepare and implement action plans.

The structure plan is not conceived as a static document, but rather as a living plan that guides the numerous incremental projects and improvements, such that the small parts combine to create an efficient whole. The structure plan identifies investments in the form of projects that can be taken up when they are prioritized. Recently, there has been a growing trend towards using consultants to prepare plans for the various municipalities. This trend has been criticized for introducing solutions and models of development that are not appropriate to the Saudi Arabian context. [49]

Municipalities are also responsible for enforcing different types of regulations to ensure the orderly growth and development of cities. These regulations cover a broad range of issues; from specifying code requirements for different building types to building approval and permits processes, and construction monitoring. The action plans usually involve land development and infrastructure provision, which is carried out in coordination with branches of other national ministries. Municipalities are also mandated to provide services such as garbage collection, urban landscaping and cleaning, among others. Sometimes municipalities prepare guidelines and regulations to control development action and activities in the city. The above analysis points to some level of dissatisfaction with the autonomy of municipalities in local governance and the quality of service provision.

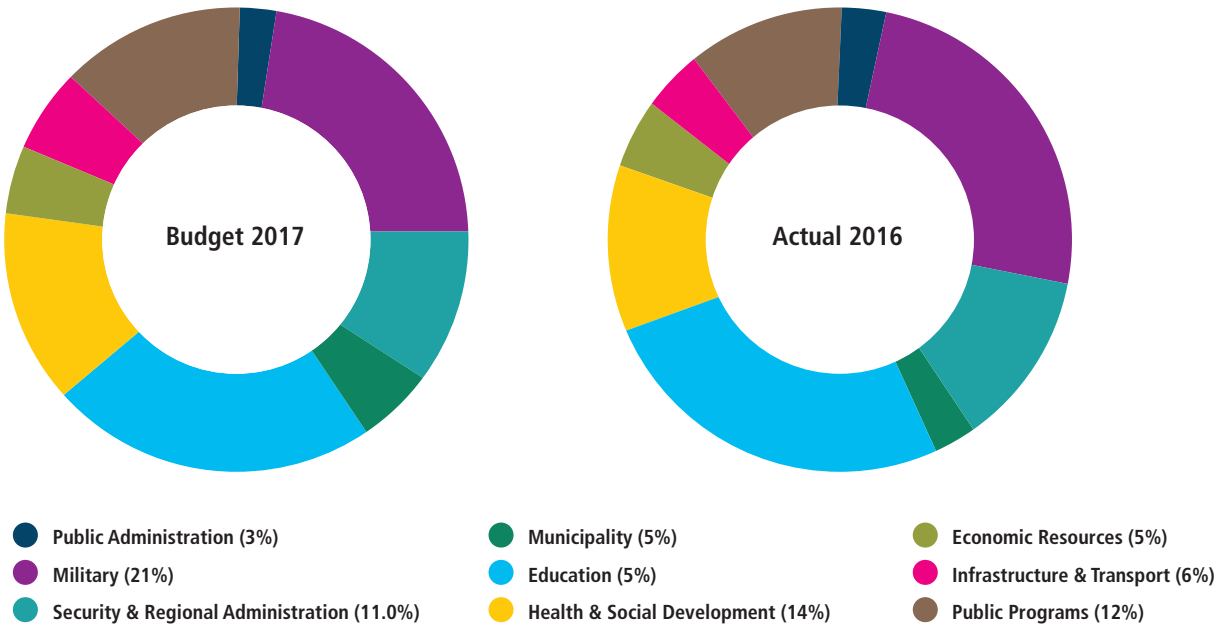
5.7.2 Municipal financing

As highlighted earlier, municipalities acquire their funding for development activities from the central government. As illustrated in Figure 5.7, in 2016, the municipality services sector received only 5 per cent of the budgetary allocation to cover activities of MoMRA, its branches in regions and cities, and the activities of about 178 municipalities in the kingdom. Of the 5 per cent, the actual remittance to the sector for that year was 3 per cent. In the 2017 budget, 5 per cent of the total budgeted figure was allocated to the municipality services sector, which is meant to cover the expenses of the *Amanahs* and municipalities.

Such funding appears to be inadequate to support the activities of municipal authorities in a way that will facilitate effective and efficient management of development activities. There is, therefore, pressure on municipal councils to source alternative means of generating revenue to support their development activities to improve the level of their services to their communities.

Municipalities, however, have very limited ability to generate funds; even large municipalities, such as Jeddah, usually generate only around 35 per cent of their expenditure.[50] They

Figure 5.5: Distribution of public expenditure in Saudi Arabia for 2016 and 2017



Source: Gulf International Bank, 2017.

lack mechanisms to generate tax revenue, and most of the services they provide are complimentary. Indeed, as advanced in Chapter 4, the current rates charged for city services are concessionary for electricity and there are no charges for solid waste collection or water consumption, despite the high cost of producing desalinated water. Avenues for revenue generation emanate mainly from advertisement signs and posts and collection of penalties.

There are suggestions that the implementation of past plans was unsuccessful due to development funding relying entirely on the Government.[51] Chapter 6 observes that the national government continues to retain significant control over local authorities with the municipalities lacking the authority to levy local taxes. This dependency on Government hinders their ability to define development strategies that address local economic, social and environmental issues.

Moreover, local authorities exercise little control over the conversion of under-utilized, well-located urban land to affordable housing development. Therefore, strengthening of municipal financial capacities through better use of public-private partnerships, local taxes and user charges, and the development of more equitable fiscal arrangements between national and city governments as crucial elements of sustainable development, is encouraged.

5.7.3 Key challenges in municipal management of growth

The following are some of the broad key challenges confronting Saudi Arabia's municipalities.

Rapid urban growth: The premier force laying the framework for the challenges in the cities is rapid urban growth. There is reference to growth of towns and cities at rates that have never been experienced in the Arabian Peninsula and has been referred to as "one of the world's fastest".[52] As highlighted in Chapter 1, Saudi Arabia's level of urbanization has increased from only 21.3 per cent in 1950 to 83.1 per cent in 2015; and is expected to reach 90 per cent in 2050. This urban transformation has been characterized by high population growth, rapid expansion of city boundaries, particularly within the five major urban centers of Jeddah, Riyadh, Dammam, Madinah and Makkah.

Central planning limiting proactive management: Municipalities are subject to control by MoMRA. As previously noted, central technical agencies and ministries are responsible for developing national, regional and local urban policies, while the power of municipal authorities is restricted to the implementation of local plans. With over 285 diverse municipalities, it is difficult to conceptualize how they can be managed effectively. The situation points to a need for governance reform with focus on decentralization of authority and introduction of multilevel governance.

Multilevel governance might be structured along already existing structures, from national level to regions, and to municipalities, with each level given appropriate independent responsibility and capability for action. Such responsibility would, however, only be effective if accompanied by the ability of the different levels to raise independent funds to supplement that provided by central Government to support their development activities. This can also be supplemented by public-private partnerships that will enable the supply of money for public development. Chapter 6 also highlights the importance of participatory governance where a top-down approach is combined with bottom-up engagement in urban policy formulation and implementation. This is possible through increased stakeholder participation in the decision-making processes of Government.

Low gross density and urban sprawl: As highlighted in Chapter 1, Saudi Arabia's major cities have evolved with a low gross density of population and development. This low-density typology has been associated with suburbanization and urban sprawl that limits optimal use of land and engenders land speculation. The effect has been sprawling development with low density, monofunctional zones that leave vacant land unused in urban centres. Additional negative effects of urban sprawl include long travel distances and a preference of private over public transport, which increases carbon emissions that heavily contribute to climate change as is highlighted in Chapter 3.

Increasing cost of providing services and infrastructure: Urban sprawl is also leading to additional costs in the provision of a public infrastructure network.[53] As pointed out in Chapters 4 and 6, cultural preference for detached and semi-detached housing over apartments, coupled with rising incomes and the availability of interest-free housing loans, have resulted in sprawling urban development with attendant high infrastructure costs (for example, in roads, water supply, sewerage and drainage). The increased cost is also highlighted in Chapter 1 where urban sprawl is attributed to increasing demand for mobility and energy consumption; contributing to environmental degradation; increasing the cost of providing basic services and managing public space and infrastructure; reducing the economies of agglomeration; and decreasing urban productivity. Planned city extensions and city infills are proposed in Chapters 1 and 6 as ways of increasing density to promote economies of agglomeration, lowering the costs of providing infrastructure and services.

Traffic generation and transport problems: Low-density development is increasing distances between destinations and, coupled with the prevalence of the use of private cars, is exacerbating urban congestion, causing productivity loss and environmental problems in addition to a high number of traffic fatalities. The consequent high carbon emission rates are credited with contributing to global warming, climate change as well as negative health effects caused by air pollution which Chapter 3 notes will mostly affect the most vulnerable. Notably, as indicated in Chapter 6, the country's National Spatial Strategy (NSS) aims to protect the environment, reduce urban sprawl and promote spatially balanced development. Local authorities are also considering the introduction of accessible, safe and effective public transport systems including light rail and dedicated bus transport to provide comprehensive mobility solutions in urban areas.[54]

Prevalence of informal development: The patterns of development have also engendered informal development and the inability to enforce development control actions. For example, Chapter 6 highlights that 35 per cent of Jeddah's population resides in informal settlements as a result of demographic pressures coupled with inappropriate regulatory frameworks. These frameworks may take the form of building

King Fahd Road, Riyadh

regulations that specify standards with which most of the population is unable to comply, as noted in Chapter. Consequently, land development in urban areas is inequitable and inefficient, thus driving the majority into the informal sector where housing does not qualify for bank loans as further enumerated in Chapter 6.

5.7.4 Case 1: Growth and transformation of the Eastern Province

The Dammam Metropolitan Area, in the Eastern Region of Saudi Arabia, comprises the cities of Al-Khobar, Al-Aziziyah, Dammam, Dhahran and Half Moon Bay. It is the third largest urban agglomeration in Saudi Arabia after Riyadh and Jeddah, respectively. Dammam has undergone significant growth and change over the course of its development in terms of population, spatial coverage, pattern and morphology as highlighted in Chapter 1.

Planning intervention and actions towards managing growth

A comprehensive development plan for the coast of the northern part of the Eastern Region was prepared in 1976 by G. Candilis-Metra International Consultants. The outcome included master and indicative plans for Dammam, Khobar and Qatif cities. The earliest known master plan for Dammam was commissioned in 1978 by the Town Planning Office of the Ministry of Interior with work assigned to CH2M HILL and CEG & Associates.[55] Action on the plan was formally started in 1983. The plan provided a growth strategy for expansion and development until 2005. The goals specified for the plan included controlling expansion and managing it in a way that maximizes benefits for all residents.[56] The last plan for the city was a structure plan prepared in 1996 by the *Amanah*. This plan examined problems, constraints and potential of the city and established a regional development strategy along with general objectives.[57]

In 2015, however, the Council of Ministers instated the High Commission for the Development of the Eastern Province to contribute to the comprehensive development of the region (Resolution of the Council of Ministers No. 64 of 2015). The same law establishes a Council composed of 14 members[58] that should, *inter alia*, draw up general policies for projects within the region and follow up their implementation in coordination with the Regional Council and the *Amanah*. However, the organizational structure of this entity is still debated.[59] Once active, the high commission is expected to provide an autonomous regulatory tool for effective participation in the regional development process, as it will have separate powers and budget.

The high commission was given responsibility for formulating policies and procedures to raise the efficiency of services and facilities to improve standards of living. It is also empowered to undertake projects in Dammam, as well as preparing plans and studies at a regional level.[60]

Key challenges in managing Dammam's growth

- Dammam is growing faster than its population and beyond the projected need of its population, pointing to low land utilization and sprawl.
- The situation generates large traffic volumes creating transport problems.
- Approval of large-scale urban developments without consideration of their need or the impact contribute to sprawl.
- Low-density urban development that spreads over a vast amount of the territory.
- Large areas of vacant land in the developed area of the city create inefficiency in infrastructure investment and use.
- Weak capacity of Dammam Municipality to effectively manage and control the growth and development of the city reinforces the need to review the state of municipal capacity to ensure sustainable and livable cities.

5.7.5 Case 2: Growth and transformation of Jeddah Municipality

Jeddah is on the Red Sea coast of western Saudi Arabia. Jeddah serves as an entry point for visitors to Saudi Arabia, particularly those coming for the Muslim pilgrimage. Jeddah is the second largest city in Saudi Arabia after Riyadh and is one of the main drivers of the urban economy, as highlighted in Chapter 4. Its built area has also significantly increased over the past decades. The transformation has driven the demand for improvement in services and infrastructure to cater adequately to the urgent needs of residents.

Planning interventions and actions towards managing growth

Several master plans have been formulated to address the transformation that Jeddah is witnessing. These plans have served as a basis of interventions to improve the living conditions of residents. These interventions have been classified into five stages as follows:[61]

1. **Stage 1.** This occurred in 1960 after the demolition of the city wall. The demolition saw an increase in development

towards the coastal plains in the north and the south of the city. The main characteristics of this period were the lag in provision of services compared to the rate of growth, resulting to areas growing without needed services. The issues of this period set the stage for the preparation of the Makhloof Master Plan for the city.

2. **Stage 2.** The second planning stage started with the preparation of a master plan by Robert Mathew in 1973. The plan organized the city's district around urban commercial centres, improved the transport network inside and around the city, while maintaining and improving the existing land uses. The plan also included a detailed study of the city's centre and its old quarters, with the historical buildings classified to preserve the city's heritage. Growth within this plan was limited to existing vacant areas, towards the southern, central, eastern and northern sectors of the city.

3. **Stage 3.** The third city master plan was prepared by Jackson in 1978. The major contribution of the plan was in creating a robust urban road network, along with detailed associated land uses. The Southern part of the city was allocated as industrial Zone, with urban growth directed towards the northern sector.

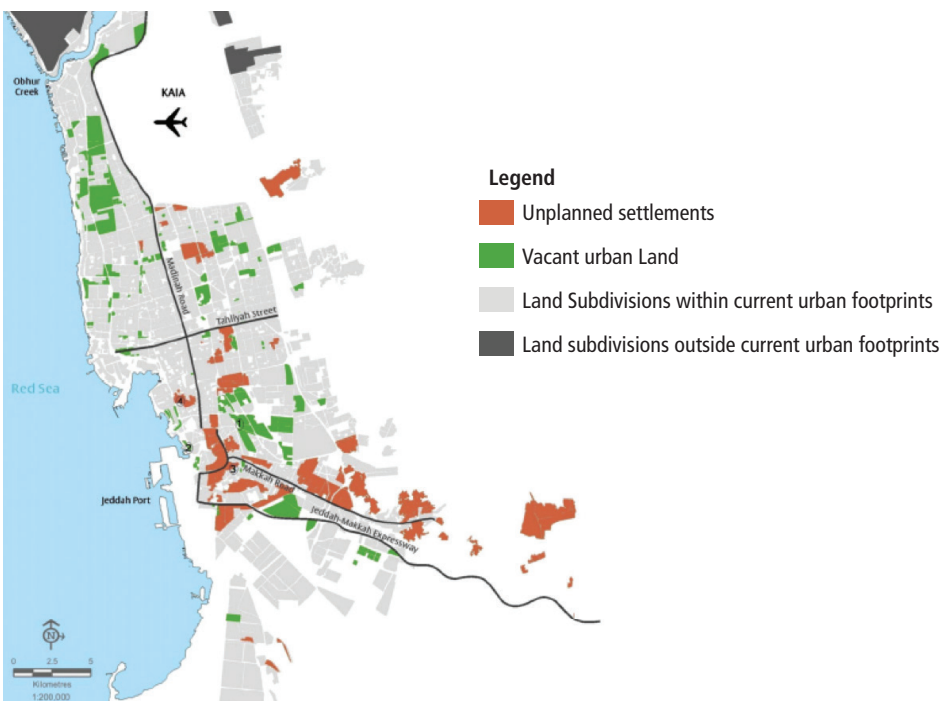
4. **Stage 4**. The *Al-Somait* Master Plan, prepared in 1990, directed urban growth towards the Eastern Hills and northern areas of the *Obhor* Creek. New urban satellite centres were created around recently established residential areas. Based on the recommendation of the plan, a new municipality was established to handle the growth issues of the area.

5. **Stage 5**. Another master plan was prepared in 2006, which includes a new structure for the city. Planning was informed using space syntax, which facilitates assessment of central and accessible areas of the city. The plan seeks to rebalance growth to the north, strengthening the city centre and its surroundings. The plan also creates new urban satellites around the periphery of the city to reduce the size of intercity vacant lands. It also stretches linear city growth to improve transport and ease traffic along roads, increases density, and maximizes mixed use developments. The 2006 plan has been supplemented by a structure plan approved by MoMRA in 2015.

Key challenges in managing Jeddah's growth and transformation

Jeddah is facing many challenges in its management of growth, such as:

Figure 5.6: Prevalence of unplanned settlements in Jeddah



Source: Abdelaal, 2012.

- A rise and expansion of informal settlements, which is affecting form and future growth of the city as illustrated in Figure 5.8.[62] [63]

- Problems in service and infrastructure project executions due to lack of coordination leading to cancellation of projects.

- Unbalanced and unsustainable growth due to inability to control development on land designated for planned uses.

- Weak independent sources of revenue for the city.

- Rapid land subdivision for development, even without necessary infrastructure, which is also symptomatic of the weak capacity of the municipality to control land development or protect it.

- Conflict in laws and practices between the various implementing agencies, which causes duplication of roles and administrative delays.

- Lack of required technical personnel and expertise forcing the municipality to use consultants, limiting participation in the preparation of plans and projects, and the ability to improve both skills and delivery.

5.8 Participation and inclusiveness

There is a growing acknowledgement in development cycles that urban development and good governance are inherently tied together; that is, civil society participation in decision-making is an essential element for good governance and development administration. The New Urban Agenda recognizes the importance of participation and inclusivity by pledging to "leave no one behind". It calls for urban and rural development that empowers individuals and communities while enabling their full and meaningful participation. The Agenda, as pointed out in Chapter 6, also emphasizes involvement of stakeholders on decisions that affect them as well as equal sharing of the benefits offered by urbanization. Participation serves as a means to have a more effective and efficient development process that addresses issues based on citizens' needs and engages in ways that promote civic responsibility. Participation and inclusiveness also ensure that solutions to problems in public intervention have a higher probability of implementation because of public acceptability and support, as reiterated in Chapter 6.

Participation of youth and women in workshops

For participation to be meaningful and provide for equality and inclusiveness in development actions, there is a need for well-designed participation programmes that are context-sensitive and that identify the various sectors of society affected, and invite them to participate. For Saudi Arabia in particular, participation is becoming an increasingly important issue because of the growing manifestation of exclusion by parts of the society.

Published estimates of social conditions show that 1.6 per cent of Saudi families live in extreme poverty, and another 20 per cent live on less than US$1,000 per month. Migrants and foreign workers also face high rate of poverty and inability to secure adequate housing.[64] Addressing such situations in development intervention requires engaging with communities to determine their needs and how these could be met through public sector action programmes.

Such participation must be designed for real engagement through partnership, delegated power to citizen control aimed solely at addressing needs of different stakeholder communities. It also requires providing information in ways that make planning and development issues clear to the participants whether in the identification of solutions, the implementation or evaluation. To achieve an effective participation process, participation should be included in all the stages of the development cycle, from planning to implementation and evaluation of project outcomes. Participation should be structured depending on the level at which action is taking place. Development of a national strategy should be organized to ensure broad citizen participation across the whole country, while regional and local level development activities should involve actors from the areas to be affected.

In the current governance system of Saudi Arabia, there are limited ways for engaging citizens in the development process. Some opportunities for stakeholders' participation are found in the Council of Ministers, the *Shura* Council, regional councils that exist at governorate levels, and in the municipal councils.[65]

The contribution of women to the workforce was low despite their educational attainment, but since 2015 as part of the Kingdom's 2030 vision, the government has worked to increase employment opportunities for women to enhance their participation in public life and national development.[67]

There are various organizations designed to accommodate the interest and participation of young people. There are formal institutions such as the General Presidency for Youth Welfare, responsible for coordination of youth sports and social activities, and organizations such as the Red Crescent, the Directorate of Civil Defense and the Boy Scouts that engage youth in civic and voluntary activities. There are also informal and community-based programmes such as the Jeddah Friends Programme, which engages young people in repairing and maintaining houses belonging to poor Saudi citizens to promote a culture of voluntary work. The Government partnered with the United Nations Development Programme to develop a National Youth Strategy as a reflection of their

Box 5.1: Learning from Jakarta: Harnessing people for good governance

Jakarta, Indonesia, is a metropolitan city of 10 million people faced with many urban challenges including complex traffic problems and deadly floods. Recently, however, the city is getting recognized for its urban innovations, particularly its web-based planning mechanism. This mechanism involves residents in decision-making at the local level. Citizens are engaged in identifying pressing city problems and proposing solutions. They can use their smartphones to report problems in need of fixing, as part of a broader push for technology use to engage residents in urban planning. Residents use phone apps such as Qlue that allows them to capture images of service issues, such as uncollected garbage and broken street lamps.

The city also uses solutions that seek to engage residents in deeper, long-term questions about the city's future, through face-to-face meetings at local level where residents can propose ideas or by submitting proposals through a web-based platform. The proposals decided upon at the local level are forwarded to the city government for action. In 2016, the city government received more than 46,000 proposals from the public. The web-based platform also served as a tracking mechanism, enabling the public to check on the progress of their suggestions. Local officials must give reasons for the rejection of any proposal. Records show that 76 per cent of the proposals from the community are accepted, validated and funded for implementation.

It has been observed that while the participation regime may not solve all of Jakarta's problems, it contributes to a new bottom-up formula to address these problems. Citizen engagement is crucial to improving services, transparency in governance and holding local leaders accountable. Participatory urban planning is not solely viewed from a technological point perspective; rather it is embraced as an approach to finding new ways to tap resources and energy in the community. The city's participatory planning strategy was one of 15 programmes acknowledged in 2016 by the Guangzhou International Award for Urban Innovation.

Source: Chatterjee, 2017.

aspiration to engage the youth, productively.[68] The Ninth Development Plan (2010–2014) identified the target areas of emphasis to include sports, health, education, culture, and involvement of women. The results of a youth survey indicated their desire for increased access to decision-making process and policy implementation at local levels, with suggestion for the creation of local youth councils as a means to facilitate effective participation.[69]

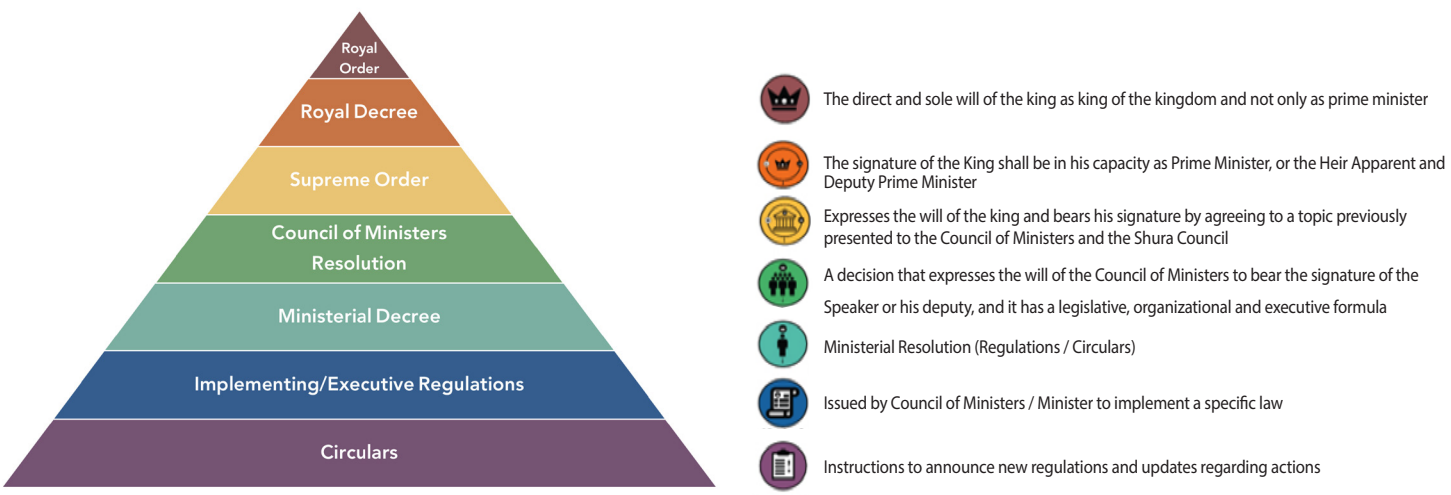
The review of the governance system shows very limited provision for active stakeholder participation and inclusion in the development process. Many scholars have criticized the planning system for being non-participatory.[70] Some of the factors for the current state of participation include the lack of institutional provision or platform for citizen participation.[71] There is a need to search for ways to improve participation as part of development activities. This will in turn enhance a sense of ownership and belonging for city dwellers. In doing so, Saudi Arabia can learn from experiences of cities like Jakarta, the Indonesian capital (see Box 5.1), where technological advances have been used as platforms to design and engage stakeholders in a successful manner.

5.9 Legal and regulatory frameworks

The New Urban Agenda emphasizes the importance of urban law as a component of sustainable urban development. Urban law, defined as the collection of laws, policies, institutions and practices that govern the management of urban areas, is therefore the pillar upon which urban institutions and management authorities are grounded. However, the mere existence of legislation does not guarantee effective management of urban areas. Quality urban law provides predictability and order in urban development, from a wide range of perspectives (spatial, societal, economic and environmental) and contributes to investment, strong economic performance and wealth creation. Legislative quality is characterized by laws that are precise in achieving their intended results, yet clear and simple to understand. This refers to the suitability of the law for directing the desired socioeconomic and other changes in the society. The quality in the form of the legislation and its intelligibility can be defined by the clarity, accuracy, unambiguity and simplicity of the law.[72]

For Saudi Arabia, the legal system is reflective of the cultural and religious contexts. The Government is a hereditary monarchy based on Islam. The country's legal system is rooted in the Basic Law (*Nizam Al-Hukum*), first established in 1926, as a form of written constitution.[73] The law provides the basis for legal and political authority in governance, and recognizes the *Quran* and the *Sunnah* (Traditions) of the Prophet Mohammed as the constitution of Saudi Arabia. The legal system is based on the Sharia, derived from the same sources. Legal precedence is established through the interpretation of the *Quran* and Traditions by judges and scholars. The Basic Law sets out features of the political system and provides the basis for rights with a legal foundation, though without clearly specified mechanisms for arbitrating disputes.

Figure 5.7: Types of laws in the Kingdom of Saudi Arabia



Source: UN-Habitat

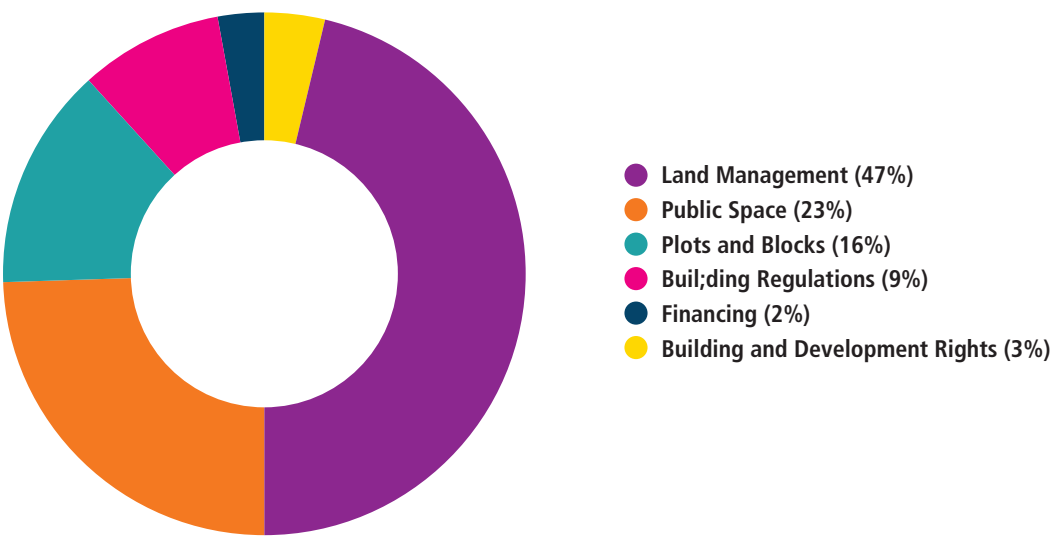
The law-making authority is vested in four entities; the King, the *Shura* Council, the Council of Ministers and the various ministerial departments. Consequently, there are five legislative instruments (Royal Order, Royal Decree, Supreme Order, Council of Ministers Resolution and Ministerial Order) that function in a hierarchical order, underpinning their authority and validity. In practice, the Royal Decrees act as the primary legislation ("Statute") while the Council of Ministers Resolution and Ministerial Orders act as the subsidiary legislation (regulatory rules and their implementation). However, some Ministerial Orders take the form of Circulars to prescribe new procedural rules and make official announcements.

Laws, international treaties and agreements, and concessions issued or amended by Royal Decrees are published in the Official Gazette to become valid. In addition to legislation at the national level, *Amanahs* and municipalities have some scope for enacting and enforcing local regulations in the discharge of their duties. These regulations are usually found on their websites covering issues such as zoning, height restrictions, and specification for facilities of different types. Plans prepared for managing the growth of cities do also contain regulations that facilitate the control of developments. Such practices are found in Jeddah.[74]

There is a need to consolidate urban legislation to support development intervention, along with review, update and modernization of these laws to make them relevant to the current development situation

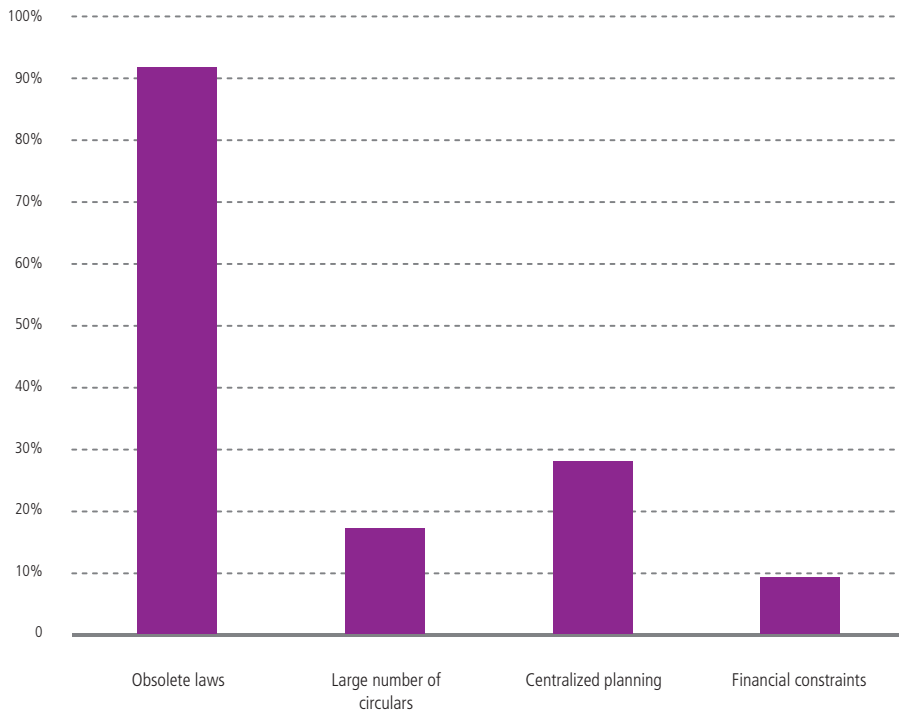
The history of planning laws in Saudi Arabia dates to 1927, with the promulgation of the Ordinance for Municipal Administration. This law defined the concept of municipalities, their functions, responsibilities and authority.[75] Some of the duties of municipalities included supervising urban development, monitoring of housing conditions and improving the living conditions. In 1937, the Statute of Makkah Municipality and other Municipalities was issued to address the need for control of physical development. The Road and Building Statute was issued in 1941, focusing on planning procedures, building codes and zoning regulations. These laws were supplanted by a much broader one, the Statute of Municipalities and Villages of 1977 that consolidated the functions and powers of municipalities in the management of local development. Basically, urban laws consist of over 500

Figure 5.8: The number of laws on the main themes of urban planning legislation



Source: FSCP, Saudi Cities Report 2018

Figure 5.9: Key challenges of the Planning Law Framework according to Amanahs



- Cities and Regions depend on obsolete plans and legislation
- Scattered planning regulations and access to the laws
- Lack of decentralization of planning functions
- Lack of coordination among various authorities and overlapping roles between institutions
- Financial constraints
- Public participation and stakeholder engagement in the planning process is on an ad hoc basis and does not influence the plan

Source: Future Saudi Cities Program 2018.

pieces of legislation with most of these being regulated at the lowest level (Circulars) lacking inviolable authoritative force. Figure 5.8

The assessment of the existing law-making and legal framework reveals certain shortcomings that require remedial action. One shortcoming is that the lack of codification of the legal system, including judicial precedence, has created uncertainty about the scope and content of laws. This has also led to varied application of laws within cities due to challenges related to their accessibility by various *Amanahs*. There is, therefore, a need to consolidate urban legislation to support development intervention, along with review, update and modernization of these laws to make them relevant to the current development situation. This will also entail rethinking the law-making process to limit the number of actors.

...the mere existence of the laws will not guarantee sustainable urban development as they must be functionally effective; that is, precise in achieving their intended results, clear, consistent and simple to understand

Furthermore, the mere existence of the laws will not guarantee sustainable urban development as they must be functionally effective; that is, precise in achieving their intended results, clear, consistent and simple to understand. The importance of laws that reflect a multilevel institutional understanding, which helps to strengthen complementary forms of supervision and responsibility, working as a continuum, not in conflict is also emphasized in Chapter 6. It advocates for reforms that not only cover sectoral policies but also consider cooperation between different spheres of Government and non-state actors, fostering a balanced distribution of powers, capacities and resources including the revision of legislative, regulatory and fiscal frameworks. The legal framework also needs to enshrine an acceptable

mode of public participation in public decision-making to foster equality and inclusion. Furthermore, participation is credited, under Chapter 6, with improved rates of compliance.

Conclusion and recommendations

Saudi Arabia is witnessing rapid urban transformation with significant challenges. This calls for re-examination of the country's governance system to improve effectiveness and efficiency in development management to promote sustainable development. The examination of the existing governance system was carried out with a focus on the institutional structure, policy instruments, legal framework, planning practices and development management, capacity for local action and state of participation and inclusiveness in governance.

The current spatial planning governance structure is based on a fairly orthodox linear hierarchy of plans. However, this linear hierarchy is generally ineffective because the different levels of plans are not well linked through clear processes or mutual accountability. In addition, different elements of the planning hierarchy are dominated by different institutions, again without adequate coordination mechanisms. Further challenges exist because numerous actors have the power or the ability to cut across the hierarchy and introduce conflicting or contradictory initiatives.

Further, there are significant ambiguities in the nature, content and intended function of plans at different levels. Finally, the institutional capacity and relative responsiveness of the system to local need are too weak to be able to manage such an administratively complex system. The result of this is, on the one hand, a relatively poor ability of the system to respond to policy direction and, on the other, a relatively unready environment for foreign investment. Consequently, there has been a tendency for the Government to carve exceptions, as large as city or even of metropolitan scale, out of the system as a means of achieving desired policy outcomes and attracting foreign investment.

Governance has the potential to play a significant role in enabling the management of urban development towards desired goals. Currently, challenges related to resource availability, rapid growth and the potential for future significant population growth, coupled with its implication on service provision and job creation, has stretched the ability of the governance system to respond to these challenges. This points to the need for re-examination of governance practices. A clearer and coherent system that provides for greater predictability and accountability is needed. The foundation of this is most easily achieved by framework legislation but will also require regulatory development and institutional change. It is important to note that reform in the spatial planning system alone will only achieve limited results because spatial planning interacts with a variety of different fields and responsibilities.

The development of "whole of government" approaches and coordination will be necessary to achieve maximum impact. The effective decentralization to local authorities of a number of spatial planning policy and regulatory functions will also be important in achieving long-term sustainability. The ability of the system to respond to local perceptions of need and priority is important to achieve relevance and ownership. Decentralization needs to include a financial component because the capacity of local authorities to implement plans at the municipal level depends, at least in part, on the ability to deliver catalytic projects. At present the institutional capacity to deliver a spatial planning system is limited. The further development of institutional capacity is, therefore, a priority. However, there is a limit to how much capacity can be developed in the immediate future and close attention needs to be given to ensuring that any proposed planning system is not excessively complex.

This chapter identifies and examines key issues facing the governance system and suggested mechanisms for improvement. It calls for jurisdictional and fiscal decentralization of functions, multilevel governance and public participation in the decision-making process to improve efficiency and ensure that the best value is derived from the use of limited available resources. This will expand agglomeration advantages and investment opportunities and guarantee shared prosperity of urban areas.

Endnotes

1 United Nations, 2017.
2 Abou-Korin and Al-Shihri, 2015.
3 Al-Hathloul and Mughal, 2004.
4 UCLG, 2016.
5 Avis, 2016.
6 Grindle, 2012.
7 Van De Walle and Scott, 2011.
8 Mandelli, 2016.; ADB, 2008.
9 Brinkerhoff and Brinkerhoff, 2002.; Brinkerhoff, 2005.; Van De Walle and Scott, 2011.
10 Grindle, 2012.; Avis, 2016.; UNDP, 2013.
11 See the following paragraphs of the New Urban Agenda: 12, 13, 14(a), 15(b), 15(c)(ii), 20, 26, 28, 30, 34, 36, 37, 39, 40, 41, 43, 47, 48, 81, 84, 85, 86, 89, 90, 91, 100, 103, 108, 109, 117, 134, 148, 151, 152, 153, 155, 156
12 Mandeli, 2016.
13 Vision 2030 recently formulated to guide national development reflects the trend towards reform
14 UN-Habitat, 2017.
15 Future Saudi Cities Program 2018
16 GCC Statistical Center: www.gccstats.org
17 UN-Habitat, 2016a.
18 UN-Habitat, 2016b.
19 Future Saudi Cities Program,2016a.
20 UN-Habitat, 2017b.
21 Royal Decree of 1975.
22 Makkah Region (Makkah Development authority); Madinah Region (Madinah Development Authority); Riyadh Region (Ariyadh Development Authority- ADA); and Royal Commission for Jubail and Yanbu.
23 This institution was established through a Royal Decree No. (1663) dated 01/10/1396H (25/09/1976.
24 Royal Decree No 475 of 22 May 2018, supported by the Ministry of Economy
25 Law of regions A/92 1991 and A/21 of 1993
26 The Law of Regions (1993).
27 It consists of (a) the Prince/Governor of the Region as president; (b) Prince of the region as the vice president; (c) Mayor of the Emirate/ AMARAH; (d) Heads of government authorities in the Region who are determined pursuant to a decision issued by the Prime Minister according to the directives of the Minister of Interior; and (e) Ten citizens who are scholars, experts and specialists and are appointed by order of the Prime Minister based on the nomination of the Prince of the Region and the approval of the Minister of the Interior, for a renewable four year term.
28 See Article 23 of the Law of Regions
29 Classifications first introduced in the Law of Region A 92 of 1991, as amended by Royal Decree A/21 of 1993, but MoMRA is responsible for designation, Ajaj, 2013, P.75.
30 Ajaj, 2013.
31 UN-Habitat, 2016a.
32 Montagu, 2015.
33 Voluntary Service Overseas and Institute of Development Studies, 2015.
34 Montagu, 2015.
35 UN-Habitat, 2017.
36 UN-Habitat, 2017, p.11.
37 Ajaj, 2013, p.58.
38 Davoodi and Zou, 1998, p.244.
39 Ajaj, 2013, p.88.
40 Royal Decree No M/4 dated 24 November 2015 (White Land Tax Law. and Council of Ministers Decision No. 377 dated 13 June 2016 (Implementing Regulations).
41 EGYGM, 2016, p.6.
42 Global experiences have allowed the central government to assign a percentage of value-added tax as revenue for municipalities to support their activities.
43 UN-Habitat, 2015d, p.2.
44 Ajaj, 2013, p.86.
45 Al Riyadh Municipality, https://www.alriyadh.gov.sa/en/ municipality/
46 UN-Habitat, 2017 p.9.
47 ADB, 2008, p.8-9.
48 For instance, whilst the legal mandate for planning clearly lies in the Municipalities (under MoMRA), there are jurisdictional overlaps with the Mohafezat (Governates – sub-regional) and Markaz (Districts), which are set up under the Ministry of Interior.
49 Menoret, 2011, p.280; Al-Joufie, 2014.
50 Abdelaal, 2008, p.16.; In 2015/2016 fiscal year, the direct revenue as a share of total budget for Jeddah was 36 per cent (see Chapter 4)
51 Ibid
52 Daghistani, 1993, p.1; Mandeli, 2008, p.15.
53 Mandeli, 2008, p.515.
54 Aldalbahi and Walker, 2016.
55 Daghistani, 1993.
56 Future Saudi Cities Program, 2016b, p.20.
57 Ibid, p.21.
58 (a) Prince of the Eastern Region – President; (b) Vice Prince of Eastern Region - Deputy President; (c) Al-Ahsaa Mayor – member; (d) Vice Finance minister – member; (e) Vice minister of Economy and planning – member; (f) Mayor of the Eastern Region - (g) Vice President of Aramco- Saudi Arabia – member; (h) General Manager of Irrigation and Drainage Authority in Al-Ahsaa – member; (i) Mayor of the Al-Ahsaa Province – member; (j) General Manager of Saudi Commission for Tourism and Antiquities Branch in Eastern Region – member; (k) Representative of the Royal Commission of Jubail and Yanbu (to be nominated by the President of the Royal Authority) – member; (l) Chairman of the Council of the Administration of the Chamber of Commerce and Industry in the Eastern Region – member; (m) Mr. Khalid Bin Abdullah Allah Zamil – member; (n) Mr. Mohammed Bin Abdullah bin AbdulAziz Al- Afaliq – member.
59 The proposed organizational structure of the Authority includes five specialized centres in addition to the administrative and financial affairs to keep track of all aspects of development in the Region.
60 Alhowaish, 2015, p.96.
61 Ajaj, 2013, p.96.
62 Aljoufie, 2014, p.207.
63 Ajaj, 2013, p.100.
64 UN-Habitat, 2012, p.149.
65 Montagu, 2015, p.24.
66 Rajkhan 2014, p.19
67 Human Rights Watch, 2015.
68 United Nations Country Team, 2012.
69 Youthpolicy.org, 2014.
70 Mashabi, 1995; Garba, 2004; Mandeli 2008; Al-Helmi, 2015; Ajaj, 2013.
71 Al-Helmi, 2015, p.140-147.
72 UN-Habitat, 2017, p.7.
73 Al-Helmi, 2015.
74 Abdelaal, 2012.
75 Al-Helmi, 2015.

CHAPTER 6

Implementing the New Urban Agenda in Saudi Arabia

View of the Jeddah Corniche
© *Shutterstock*

The Kingdom of Saudi Arabia is in transition. Recent economic reforms, in line with the nation's Vision 2030 and the National Transformation Plan (NTP) 2020, have already unleashed positive outcomes, others are yet to come.

These plans are in tune with the New Urban Agenda (NUA) in fundamental issues such as appropriate fiscal and administrative decentralization, the empowerment of local authorities to play a role in development initiatives and the support to urban economies to diversify and transit to other forms of technological upgrading.[1] For instance, the Government is pursuing fiscal reforms; the 2018 national budget outlines the Government's decision to slow the pace of fiscal adjustment, coupled with an introduction to value-added tax, and measures to increase women's participation in the economy.[2]

The NTP, which was designed to implement elements of the Vision, focuses on diversifying the economy by opening it up to investors and reducing the country's oil dependency. Accordingly, an International Monetary Fund report predicted that Saudi Arabia's real gross domestic product will grow by 1.6 per cent in 2018, after a previous estimate of 1.1 per cent.[3] Although the Saudi economy has been resilient so far, the central issue now is how to sustain this momentum amid the plummeting oil prices of recent years. Evidently, transforming its cities and injecting new dynamism will be critical to the kingdom's future economic growth.

According to UN-Habitat, cities are key to harnessing the transformative forces of urbanization.[4] A key statement to this effect was ratified at the United Nations Conference on Housing and Sustainable Development (Habitat III) held in Quito, Ecuador, in October 2016. This important conference concluded with the unanimous adoption of the New Urban Agenda (NUA).[5] This Agenda, which will guide urban development in the next 20 years, sets out a collective vision and global standards for urban development in future decades at a decisive moment; when the world has experienced a historically unprecedented transition from being predominantly rural to urban.

This was a significant moment in history when the international community and the United Nations adopted a clear focus on cities as drivers of sustainable development. It reinforced the wider multilateral attention that culminated with the adoption of a special Goal on cities and human settlements as part of the 2030 Agenda of the Sustainable Development Goals (SDGs). This was a very special time when it was recognized that the integrated and interdependent nature of development agendas, and the unique role that urbanization and cities play connecting these agendas. As the United Nations Secretary-General's report on the *Progress on the Implementation of the New Urban Agenda* states, "The New Urban Agenda is an accelerator for the achievement of all other agendas"[6]: the Sendai Framework for Disaster Risk Reduction, the Addis Ababa Action Agenda on financing development, and the Paris Climate Agreement.[7] As this chapter asserts, if planned and well managed, cities and human settlements can drive development, growth and creation of jobs, while also contributing to a healthier, better quality of life for residents and the long-term protection of the global environment.[8]

Cities matter to Saudi Arabia, and this is a major shift in policy thinking in the kingdom. Thanks to its extensive capital resources, the country has made substantial investments in roads, air and seaports, telecommunications, schools and hospitals, providing some of the most modern infrastructure available in the region.[9] As highlighted in Chapter 1, an estimated 26 million people already lived in urban areas by 2015, representing 83 per cent of the total population.[10] More than half of the Saudi population is concentrated within a Western-Eastern corridor comprising the 5 metropolises: Riyadh, Jeddah, Makkah, Medina and Damman. Economic activities are concentrated in three regions (Riyadh, Makkah and Eastern) where two-thirds of establishments are located, as illustrated in Chapter 4.

Tackling this extreme concentration of population and economic growth is part of the Government's national policy to bring more balanced, sustainable and integrated territorial development, as stipulated in the New Urban Agenda.[11] As noted in Chapter 4, part of the Government's response to this is to develop new economic cities that will spur economic growth and improve the quality of life for citizens. These cities will enhance competitiveness and regional prosperity, contributing to the development of all regions. Over the next 12 years, the country could create an estimated six million jobs,[12] enough to absorb the influx of the growing "youth bulge" who are of employable age.[13] There will also be a growing number of older people to support, which will increase the demands on the country's health system and finances.[14]

A proven magnet has been the surging growth and employment opportunities in the major cities, fueled by rural-urban migration and the increasing numbers of non-Saudi migrant labourers mostly from South Asia.[15] Because of these population shifts, there has been substandard housing due to a deficit of affordable housing units; lack of collective public transport; and poor air quality. Yet, due to State-led provision of basic services, almost all of the country's housing units are connected to the electricity network; 95 per cent to the public water network; and 80 per cent to sanitary sewage systems.[16]

However, this model tends to concentrate investments, public goods and services in a few major urban major centres, producing an unbalanced territorial development. As noted in previous chapters, the rapid demographic and spatial growth, coupled with the expansion of economic activities and the environmental footprint of Saudi cities, has also triggered dynamics which public institutions are unable to manage effectively.

Integrated urban planning offers a unique opportunity for Saudi Arabia's cities to realign their growth trajectories onto a more sustainable, resilient and inclusive path.[17] Under the guidance of the Ministry of Municipal and Rural Authorities (MoMRA) and UN-Habitat collaboration, the Future Saudi Cities Program was established to apply multisectoral approaches, including revisions of existing urban plans, formulation of urban policies and legislation, utilization of urban information, institutional capacity development and the empowerment of people's engagement, particularly women and youth. As a structural part of this process, the National Spatial Strategy (NSS) aims to achieve sustainable and balanced development in Saudi Arabia.[18]

The NUA, as a key instrument for national, regional and local administrations, including all relevant stakeholders, commits to a paradigm shift towards a new urbanization vision based on the science of urban development, providing tools in crucial areas.[19] This chapter illustrates how the New Urban Agenda and the urban components of SDGs can support the Government's efforts to achieve sustainable development through a dedicated action framework. This framework encapsulates national urban policies; a system of institutions, regulations and governance; urban and territorial planning; the urban economy and municipal finance; and local implementation in the form of planned city infill. Already, an analysis of the key emerging issues and trends in Saudi cities shows that there are new forms of collaboration and cooperation, planning, governance, finance and learning that can sustain positive change.

The chapter highlights aspects that are crucial to implementing the NUA. These include placing housing at the centre of urban policies and urban development; ensuring environmental sustainability via green city development; and continuously "reinventing" urban planning and design to respond to emerging urban challenges. Additionally, the chapter identifies initiatives needed to ensure the NUA's effective implementation. This includes recognizing the effective policies, strategies, practices that have facilitated success or progress towards the realization of the commitments set out in the NUA. Important considerations are given to *monitoring and evaluation* for evidence-based policies and *capacity development and enhancement*— not only in terms of strengthening institutions of governance but also in terms of giving visibility to the role of training institutions, technological innovations, among others— in the implementation of the NUA.

6.1 Implementation measures are key to success

By creating an action-oriented roadmap for implementation, the NUA drives the achievement of the 2030 Agenda for Sustainable Development, especially Goal 11, of making cities and human settlements inclusive, safe, resilient, and sustainable, as well as other targets across the Sustainable Development Goals.[20] The NUA itself rests on three guiding principles and commitments that can be understood as the normative directions for the transformation of cities, enabling these to achieve sustainable development (see Table 6.1):[21]

Rahima Neighborhood Park, Ras Tanura

Table 6.1: New Urban Agenda guiding principles

Guiding Principles	Actions
Leave no one behind, ensure urban equity and eradicate poverty	● Sectoral national urban policies to promote an efficient territorial development pattern ● Providing equitable access for all to physical and social infrastructure ● Adequate housing and shelter at the centre of the agenda ● Public spaces as an enabler of socioeconomic function of the city ● Recognizing and leveraging culture, diversity and safety in cities ● Enabling and strengthening participation and enhancing livability and quality of life
Achieve sustainable and inclusive urban prosperity and opportunities for all	● Enhancing agglomeration benefits of urbanization and avoiding land speculation ● Fair and equitable employment creation, productivity, competitiveness, diversification ● Innovation through a sustainable economic development
Foster ecological and resilient cities and human settlements	● Driving sustainable patterns of consumption and production ● Protecting and valuing ecosystems and biodiversity ● Adapting to and mitigating the impact of climate change while increasing urban systems resilience to physical, economic and social shocks and stresses

Source: United Nations, 2017; World Economic Forum, 2018.

The principles listed in Table 6.1 suggest, in general terms, what should be changed and through which general actions. Their generality makes these principles largely unobjectionable to most governments and interested civil society groups. Whereas they point to a direction of change, they stop short of suggesting what needs to be changed, how in specific terms, or in what time frame. The answer to the "what" question lies in the "effective implementation" components of the New Urban Agenda, which include the following:[22]

1. Developing and implementing urban policies at the appropriate level, including in local-national and multi-stakeholder partnerships, building integrated systems of cities and human settlements, and promoting cooperation among all levels of government to enable them to achieve sustainable integrated urban development.

2. Strengthening urban legislation and systems of governance, with sound institutions and mechanisms that empower and include urban stakeholders, as well as appropriate checks and balances; providing predictability and coherence in urban development plans to enable social inclusion, sustained, inclusive and sustainable economic growth, and environmental protection.

3. Reinvigorating long-term and integrated urban and territorial planning and design in order to optimize the spatial dimension of the urban form and deliver the positive outcomes of urbanization.

4. Support effective, innovative and sustainable financing frameworks and instruments to enable strengthened municipal finance and local fiscal systems in order to create, sustain and share the value generated by sustainable urban development in an inclusive manner, particularly women and youth.

5. Strengthen the capacities of local authorities to implement the NUA through planned city extensions and planned city infills.

Box 6.1: Elements necessary for a successful implementation of the New Urban Agenda

Given that the NUA is a resource for all levels of government, including civil society organizations and the private sector, the coordination of the following elements is necessary, to ensure successful implementation:

- Sectoral national urban policies to promote an efficient territorial development pattern.
- National and local urban legislation and regulations to promote local economic development and manage growth.
- Urban planning and design interventions to achieve an efficient and socially equitable development pattern.
- Participatory municipal governance to ensure the efficient and fair implementation of local regulations.

Sources: United Nations, 2016b.

Operationally, Member States of the United Nations, as contracting parties, have made the following commitments:[23]

1. **Provide basic services for all citizens,** including access to housing, safe drinking water and sanitation, nutritious food, health care and family planning, education, culture and access to communication technologies.

2. **Ensure that all citizens have access to equal opportunities and face no discrimination.** Everyone has the right to benefit from what their cities offer. The New Urban Agenda calls on city authorities to consider the needs of women, youth and children, people with disabilities, marginalized groups, older persons, indigenous people, among other groups.

3. **Promote measures that support cleaner cities.** Tackling air pollution in cities is good both for people's health and for the planet. In the NUA, leaders have committed to increase their use of renewable energy, provide better and greener public transport, and sustainably manage their natural resources.

4. **Strengthen resilience in cities to reduce the risk and the impact of disasters.** Leaders have now committed to implement mitigation and adaptation measures to minimize the impacts of natural disasters in cities. Some of these measures include better urban planning, quality infrastructure and improving local responses.

5. **Take action to address climate change by reducing greenhouse gas emissions.** Leaders have committed to involve not just the local authorities but all actors of society to respond to climate changes, considering the Paris Agreement on climate change which seeks to limit the increase in global temperature to well below 2 degrees Celsius. Sustainable cities that reduce emissions from energy and build resilience can play a lead role.

6. **Fully respect the rights of refugees, migrants and internally displaced persons regardless of their migration status.** Leaders have recognized that migration poses challenges, but it also brings significant contributions to urban life. Consequently, commitments have been made towards the establishment of measures that help migrants, refugees and internally displaced persons make positive contributions to societies.

7. **Improve connectivity and support innovative and green initiatives.** This includes establishing partnerships with businesses and civil society to find sustainable solutions to urban challenges.

8. **Promote safe, accessible and green public spaces.** Urban planning should facilitate human interaction, which is why the NUA calls for an increase in public spaces such as sidewalks, cycling lanes, gardens, squares and parks. Sustainable urban design plays a key role in ensuring the livability and prosperity of a city.

6.2 Implementing the NUA: Emerging issues and trends

Recognizing cities as transformative forces to accelerate development, this section provides an overview of an expanding spectrum of emerging opportunities— coupled with the strength of the Saudi economy— which provide the country with the impetus to build its capacity, competitiveness, and efficient and harmonious territorial development. At the same time a range of emerging challenges, coupled with inherent weaknesses, are likely to pose obstacles to the effective implementation of the NUA in Saudi Arabia. These include limited independence of local authorities from central government direction, limited fiscal power, lack of access to development finance, low levels of institutional capacity, absence of robust multilevel government cooperation and integration, and the inability to attract or be part of strong multi-stakeholder partnerships.

6.2.1 Participatory, innovative governance for open, inclusive Cities

Urban governance as a term captures the complex interaction between stakeholders or groupings, which influence urban development.[24] Saudi Arabia has a strong centralized system of government, which includes planning and urban administration. Central technical agencies and ministries are responsible for developing national, regional and local urban policies, while the power of municipal authorities is restricted to the implementation of local plans.[25] Over decades, however, the increasing complexity of urban socioeconomic challenges in Saudi Arabia's cities has necessitated the development of novel solutions to support effective urban governance responses (see Chapter 5). Participatory governance is one such solution that aims to combine top-down and bottom-up engagement in urban policy formulation and implementation through increased stakeholder participation in the decision-making processes of government.[26]

In 2005 and 2011, the Saudi government embarked on a new initiative towards decentralization, where municipal council structures were set up. However, of a total 1,212 members, only 506 were elected.[27] Another round followed in 2015, in which women were allowed to vote and run the election,

Box 6.2: Increasing women's participation for sustainable development

The Kingdom of Saudi Arabia is promoting women's standing in development through capacity development and harnessing. Vision 2030 dedicates important efforts for enablement of women in community and economic development, as well as in raising women's stature as an effective player at all levels. Saudi Arabia has taken several measures that aim to enable women to hold leading positions in the government. Earlier on, women became members of the Shura Council (Consultative Council) with a Royal Order issued in 2013 to reserve 20 per cent of the Council's seats for female members. Women were also elected to municipal board councils and several women were appointed to top-level positions in the government and private sectors. They hold several leading positions, such as vice minister, chairperson of Councils and deputy minister and a first ever appointment of a woman as Dean of Student Affairs, Taif University.

Source: MOEP, First voluntary National Review Towards Saudi Arabia's sustainable Tomorrow, 2018.

winning 20 of 2,000 local positions.[28] This process needs to be consolidated in coming years by opening new avenues for political organization, social participation, and the expression of cultural diversity to influence decision-making and change policy outcomes for the benefit of the majority. It also requires an effective local platform that allows for genuine and efficient collaboration between different levels of government and interested groups to steer the nation's urban growth towards a more sustainable path.

Led by MoMRA, the role of local authorities (municipalities) have been expanded, to include the preparation of subdivision plans, the establishment of building regulations, and the issuance of building permits (see Chapter 5).[29] Still, the national government continues to retain significant control over local authorities. The municipalities have no authority to levy local tax rates, such as property tax. Even the provision and maintenance of services and utilities is heavily subsidized by the national government.[30] Notably, municipalities continue to depend largely on transfer of funds from higher levels of government for capital as well as revenue expenditure.

The development of inclusive governance structures ensures participatory processes for Saudi Arabia's urban policies and plans that mainstream sustainable urban and territorial development as part of integrated development strategies. This needs to be supported by institutional and regulatory frameworks linked to transparent and accountable governance and finance mechanisms. Open data and use of new technologies are vital for meaningful citizens' engagement and improved service delivery. For example, the Saudi Fast Growth 100 was launched in 2008 by the Saudi Arabian Ministry of Investment (SAGIA) private initiative, with the aim of identifying the country's fastest-growing companies and start-ups.[31] This enabled Saudi Arabia to recognize the contribution of businesses that were creating jobs, spurring innovation, and adapting the National Spatial Strategy, accordingly.

6.2.2 Localizing climate action

City climate action takes place in the context of diverse social, environmental, economic, and developmental realities. For instance, as highlighted in Chapter 3, Saudi Arabia's total greenhouse gas (GHG) emissions in 2014 was 583 million tonnes of CO_2-equvalent ($MtCO_2e$). Saudi Arabia's Intended Nationally Determined Contribution (INDC), recently submitted to the United Nations Framework Convention on Climate Change (UNFCCC), proposes a series of strategies to mitigate the impacts of climate change. These measures include cultivating energy efficiency; renewable energies; carbon capture utilization and storage; and integrated water and waste management to improve environmental quality.[32]

All these actions are in line with the environmentally sustainable and resilience urban development principles of the NUA. In 1994, Saudi Arabia ratified the UNFCCC to stabilize GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the global climate system. It also acceded to the Kyoto Protocol on 31 January 2005 and ratified the Paris Agreement on 3 November 2016. Markedly, the kingdom has been an active participant in global discussions on climate change mitigation solutions. At the heart of this lies an opportunity, if managed well, of building compact, resilient, inclusive and resource-efficient cities that are environmentally sustainable and which hold higher prospects for a greener way of life.

As indicated in Chapter 3, efforts to build urban resilience can benefit from integrating climate change adaptation with existing efforts in disaster risk reduction, and other similar planning processes.[33] Local authorities and other urban stakeholders have an essential role to play here. To this end, MoMRA, together with other line ministries and government institutions, developed the National Spatial Strategy in 2001, emphasizing the need to protect the environment, reduce urban sprawl and promote spatially balanced development. Additionally, the 2013 *Sustainable Planning Guidelines*

for Urban Growth were established, to reduce energy consumption and adverse impacts on climate.[34] Although the Spatial Strategy is not explicit in what way climate change-related risks can be mitigated. [35]

Not only is Saudi Arabia the world's leading oil producer, but its oil consumption is one of the highest, placing it sixth on the global ranking, with China, the United States and India ranked in first, second and third, respectively.[36] As highlighted in Chapter 3, the energy sector is the main contributor to greenhouse gases in Saudi Arabia— 88 per cent of emissions (or 583 $MtCO_2e$) translating to 16.77 tonnes of CO_2-equvalent capita.[37] In addition to urban planning and public transport standards outlined in Chapters 2 and 3, new standards on district cooling and energy-efficiency in building have been introduced to reduce energy consumption and consequently greenhouse gas emissions. Specifically, as highlighted in Chapter 3, the Ministry of Energy, Industry and Mineral Resources aims by 2020 to reduce CO_2 emissions from fuel consumption by 10 per cent.[38] Saudi's Arabia's Intended Nationally Determined Contribution to the Framework Convention encourages actions that promote the development and use of mass transport systems in urban areas, such as expediting the planning and development of metro systems in Damman, Jeddah and Riyadh.

Reflected in Vision 2030 is the Government's strategy for oil and mineral resources, and its commitment to develop renewable energy sources to produce electricity and desalinated water. Implementing the NUA would further enhance Saudi Arabia's commitment to tackle climate change through mitigation and adaptation efforts, as well as contribute to environmental sustainability and resilience. This includes tackling unsustainable consumption and production patterns, loss of biodiversity, pressure on ecosystems, pollution, natural and human-made disasters and related risks. To this end, the Government has taken responsibility for policies related to the urban environment, including its marine and desert habitats and natural spaces in its cities.[39]

6.2.3 Cities for all and housing at the center

Development must protect the planet and enable all inhabitants, whether living in formal or informal settlements and slums, to lead decent, dignified, and rewarding lives, and to achieve their full human potential. In Jeddah, for example, 35 per cent of the city's residents live in informal settlements, due to a combination of demographic pressures and inappropriate regulatory frameworks.[40] Consequently, land development in urban areas is inequitable and inefficient, thus driving the majority into the informal sector where housing does not qualify for bank loans.

Trends suggest that the average densities of around 50 persons per hectare in most of Saudi cities,[41] may be too low to be sustainable and should be increased, in order to reduce travel distances and time, increase the viability of transport, reduce carbon emissions, and thus mitigate their adverse effects on climate change.[42] A global study on urban expansion conducted by UN-Habitat, New York University and the Lincoln Institute for Land Policies that was presented during Habitat III shows that Riyadh – one of the 200 cities included in a global sample of cities – has been reducing densities of built-up areas from 73 persons per hectare in 1990, to 53 persons per hectare in 2015. In the same years, the city's built-up area expanded by 5.7 per cent, while the population grew by 4 per cent.[43] In this respect, UN-Habitat's sustainable neighbourhood planning standards recommends a density of 150 persons per hectare.[44]

housing must be at the centre of the actions towards sustainable and inclusive urban development, including ensuring equal opportunities and better living conditions to the most vulnerable

The poor management of the increasingly endangered open space within Jeddah's and Riyadh's residential areas has led to reduced social interactions and is a public burden that continues to diminish the quality of life for residents.[45] Through a people-centred approach, UN-Habitat promotes urban space as a "new commons," and cultural diversity as an asset for inclusive and cohesive cities with socioeconomic integration and a strong sense of belonging.[46]

As an essential element of urbanization, housing must be at the centre of the actions towards sustainable and inclusive urban development, including ensuring equal opportunities and better living conditions to the most vulnerable[47]. This is compounded by the continued demand for expanded access to basic urban services, which must feature in any long-term socioeconomic development and environmental protection strategy. [48] As highlighted in Box 4.5 (Chapter 4), the influx of foreign workers is evidenced by their high concentration

in large cities, where there is demand for a broad range of services and construction workers.[49]

Seemingly, the dramatic increase in migration has led to increased multicultural sharing of cities, a changing sense of place, and increased pressure on housing supplies in urban areas.[50] If the concerns of the urban poor remain overlooked, then the 2030 Agenda for Sustainable Development will only be achieved partially, hence denying millions of residents the benefits of urbanization.[51] This calls for citywide strategies where planning, urban economic development, laws, and institutions would play a fundamental role.

UN-Habitat has proposed a strategy that puts housing at the centre of the NUA —which implies housing at the centre of urban policies, and cities.[52] Still, affordability continues to be an increasingly elusive concept for young and low-income Saudi households who spend 40 per cent or more of their monthly income on housing.[53] As highlighted in Chapter 4, the country still has serious housing shortages and an estimated 1.25 million units are needed to meet this demand. The chapter has also highlighted several measures being undertaken by the Government to boost Saudi homeownership from 47 per cent to 70 per cent by 2030. These include an increased access to housing finance as well as a greater emphasis on private sector involvement and foreign investments for municipal and housing services.[54] Accordingly, public-private partnerships are a critical element of the Ministry of Housing's operating model, which seeks to leverage new technologies that can hasten housing provision.[55]

While considerable progress has been made towards the NUA's principle of *leaving no one behind by ending poverty in all its forms and dimensions*, speculative housing investments, including unnecessary land and construction costs, have reduced the ability of low-income or newly formed Saudi families to house themselves. Further, the imbalances resulting from some of these dynamics are demonstrated by the shortage of homes for lower and middle-income households and a concurrent surplus of luxury housing. Major cities like Riyadh have experienced rent and sale prices of apartments fall by 3 per cent annually.[56] Yet the nation's property market is likely to weaken further in the short to medium term, with concerns that an array of expatriate levies could reverse the traditional migration trend. As many as 2.5 million expatriates could leave by the end of 2018 as the cost of living for many of them and their dependents becomes intolerable.[57]

Repositioning housing as part of a renewed approach to urban form and sustainable development constitutes an important lever for the NUA. It implies shifting from simply building houses to a holistic framework for housing development that abides by the fundamental principles of sustainable urban development.[58] There are notable signs of the catalytic role exerted by housing in Saudi Arabia's economic development. These gains have been in employment generation, poverty eradication and mitigation of a range of vulnerabilities in cities. According to the Saudi Contractors Authority (SCA) the Saudization rate in the construction sector has increased to 20 per cent,[59] which falls in line with the MoH's plan to increasingly rely on local content, alongside increasing productivity and efficiency in the housing construction sector.

The Government is facing considerable challenges implementing the NUA principle of *ensuring sustainable and inclusive urban economies by leveraging the agglomeration benefits of well-planned urbanization.* All decision makers must know that high productivity, competitiveness and innovation, job

Buraidah city

creation, equal access to economic and productive resources and opportunities are unthinkable without appropriate urban service infrastructure and adequate housing. Over the past two decades, Saudi Arabia has witnessed volatility and change in urban property and land markets, with the inability to deliver housing at an affordable price. This is occurring in the context where the rate of household formation continues to exceed levels of proposed housing supply.

Further, the cultural preference for detached and semi-detached housing over apartments which has resulted in sprawling urban development across the cities with high costs for infrastructure such as roads, water supply, sewerage and drainage. As highlighted in Chapter 1, the average population densities in the major cities are well below the international average. Less dense cities in the kingdom should be allowed to densify in order to reduce the long travel distances, increase the viability of public transport, reduce carbon emissions, and thus mitigate their adverse effects on climate change.[60] There is no doubt that these are commendable goals, and the Saudi government's success at attaining them may indeed be worthwhile.

Still, an accumulating body of evidence attests that the rising incomes of the first generation of Saudi professionals, and the sizable interest-free housing loans provided by the Real Estate Development Fund, has fueled the sprawling low-density development in cities, coupled with large portions of the cities with vacant land.[61] Additionally, land management and urban expansion have been a challenge, due to weak, inefficient institutions and poor civil society participation. Typically, local administrations exercise little control in the conversion of under-utilized, well-located urban land to affordable housing development.

The necessity of continuing, reforming land use and building regulations and standards [62]—including allowing for increment housing improvements and construction—are essential, if authorities are to keep pace with current and future housing demand.

Ensuring environmental sustainability is another principle that needs to reflect the broad shift in the kingdom's strategic and policy thinking. The New Urban Agenda can lead to transformative change in Saudi Arabia when a critical connection is established between environment, urban planning and governance with respect to issues such as land and resource use, energy consumption, rural-urban linkages, material flows, land fragmentation, and climate change-induced environmental hazards. The need to integrate "green" growth considerations, "decoupling" of urban growth from resource use and its environmental impacts, and environmental strategies in long-term urban planning and management of Saudi cities, is a fundamental aspect of this guiding principle.[63]

However, despite massive investments in infrastructures that have resulted in the improved delivery of basic services,[64] local authorities lack the resources, access to legal expertise or powers to do this all on their own. Therefore, effective local governance rests on participatory service delivery planning, budgeting, management, and monitoring.[65]

6.2.4 Urbanization and development: Investing in the transformative force of cities

Sustainable financial capacities and well-targeted investments are important for urbanization to generate prosperity and create opportunities for all. Inclusive and sustainable economic growth, with full and productive employment and decent work for all are key elements of sustainable urban development towards ensuring healthy, productive, prosperous, and fulfilling lives to all while enabling joint contribution to the urban economy. [66]

As described in Chapters 1 and 4, the resulting urban pattern in Saudi Arabia has favoured the rapid growth of a limited number of cities that had either been historically important or that became keystones of the national economy.[67] Not surprisingly, the capital, Riyadh, with a population of about 6 million, grew at the fastest rate and became the largest and most important economic city. Conversely, Saudi Arabia's secondary cities shrank in importance as the dynamics of urbanization clearly favoured a few major urban agglomerations that were prime beneficiaries of the prosperity brought about by rising oil prices and the kingdom's economic diversification. In other countries of the region, secondary cities are growing faster than their capitals and big urban centres, a pattern of growth that is not yet present in Saudi Arabia. The unprecedented urban growth in Saudi Arabia's major cities has been remarkable in every aspect, emphasizing how important the challenge of urban planning and management is to the Government and its citizens.

While acknowledging that many cyclical and longer-term risks and challenges persist, this report notes that, across the kingdom, conditions have improved to support the significant investment necessary for secondary and new cities to strengthen urban-rural economic links, delivering goods and services to satisfy the needs of a growing population. These pave the way to reorient policy towards longer-term issues, such as rehabilitating and protecting the environment, making economic growth more inclusive, and tackling institutional obstacles to development.

Saudi Vision 2030, the National Transformation Plan as well as the National Spatial Strategy are reorienting policies and actions to address these more fundamental drivers of growth and sustainability, underpinning a virtuous circle of change. Investment in areas such as education, health care, resilience to climate change, and building financial and digital inclusion supports economic growth and job creation in the short-term and promotes long-term sustainable development.

Over the past three decades or so, Saudi Arabia has been transformed into an urban society, with much of the country's economy and the physical development spurred by its rich oil resources. An extraordinary boom in oil prices between 2003 and 2013 enabled the Government to invest heavily in education, health, infrastructure, and job creation.[68] Notwithstanding, the increased competition in the energy market, along with impoverished and youthful populations, is obliging the Government, through the reform plan set out by Vision 2030 Roadmap and in the National Transformation Program, to diversify the economy, and streamline welfare and subsidy spending. It is also worth noting that several of the Government's five-year development plans also outlined diversification as a priority objective. Arguably, a unique opportunity exists for the nation to be at the forefront of highly urbanized countries in their efforts to achieve sustainable development. Indeed, Saudi cities have the potential to become major players in world economy, as outlined in the National Spatial Strategy.

Although coverage of safe drinking water is almost universal, this is one of the most critical infrastructure and development challenges facing Saudi Arabia. This is due to the fact that the largest share of water consumed for agricultural, municipal and industrial purposes comes from non-renewable sources. In 2013, the per-capita consumption for Saudi Arabia was 265 liters a day, twice the world's average, coupled with household water demand, which is growing by 7.5 per cent annually.[69] A shortage in water distribution networks, together with a high reliance on food imports, represents challenges to food and water security in the kingdom. This situation is compounded by the country's steadily growing population, thus creating the need for desalination plants. Unfortunately, desalination is a capital and energy intensive process, which for Saudi Arabia means the burning of oil. Sustainable development requirements call for the rationalization of urban and agricultural water consumption, and more reliance on conventional renewable water resources to prevent further environmental damage. As the New Urban Agenda recognizes, culture needs to be considered in the promotion and implementation of new sustainable consumption and

A family picnic by the Wadi Arar promenade

production patterns that contribute to the responsible use of resources.[70]

In order to address the various urban challenges, and achieve sustainable urbanization, the Kingdom issued to implement the Future Saudi Cities Program through MoMRA, in collaboration with UN-Habitat. The overall objectives of this programme are in line with Vision 2030 and the ministry's Municipal Transformation Program. They are also in line with the Sustainable Development Goals, which includes making cities and human settlements inclusive, safe, resilient and sustainable and the New Urban Agenda.

The main purpose of the Future Saudi Cities Program is to achieve a qualitative leap and a shift in urbanization of Saudi cities with strong support of data and information by paying attention to areas of enhancement of economically productive cities, strengthening and improving urban legislation and institutional framework, as well as planning and management of sustainable urban development. This is besides empowering citizens to become agents of change through their involvement in sustainable development initiatives within their local communities, and in that way enhance their lives.

National Urban Policies (NUPs) are essential instruments through which governments harness the dynamics of urbanization to support sustainable development, as well as urban prosperity

6.3 An action framework for the implementation of the New Urban Agenda

The implementation of the New Urban Agenda can play a crucial role in making Saudi cities safe, inclusive, resilient, sustainable, and more prosperous. The following section analyzes the future of Saudi cities with respect to elements critical for the implementation of the New Urban Agenda.

6.3.1 Adopt and Implement National Urban Policies

National Urban Policies (NUPs) are essential instruments through which governments harness the dynamics of urbanization to support sustainable development, as well as urban prosperity. Its inclusion as one of the Policy Units for Habitat III and as a proposed indicator for Goal 11 of the SDGs comes as a recognition of the fundamental role they have to play in any sustainable development agenda. Saudi Arabia has a long tradition of using comprehensive national planning to achieve its social and economic development objectives and urbanism.

The objectives of the country's First Development Plan (1975–1980) were to increase housing supply, ensure an orderly pattern of urbanization, provide needed education and health facilities, and create institutional structures to support its national economic development strategy. The country's current long-term development blueprint— Vision 2030 —focuses on the transition from an oil-based economy to one that is more diverse. The Vision also focuses on issues related to education, economic diversification, private sector development and broadened participation in Government. The recently created Council of Economic and Development Affairs (CEDA) is responsible for overseeing the implementation of this vision and providing the necessary guidance in this respect.

The National Spatial Strategy 2030 seeks to achieve a balanced urban system over the entire national space through:[71]

- Stressing the national spatial identity, civilization and cultural heritage.
- Devoting the approach of "improving the quality of life and services in cities" to increase their attractiveness and enhance their competitiveness.
- Achieve a sustainable urban system. While preserving the natural resources.
- Improve infrastructure efficiency and service sustainability in urban and rural areas.
- Enable local authorities in decision-making process.
- Investing in developing and building local capacities.
- Enhancing the Kingdom's regional and international integration.
- Enabling sectoral / spatial institutional coordination.

The responsibility for development and implementation of policies and programmes of the strategy is shared by two national agencies, the Ministry of Economy and Planning, and the Ministry of Municipal and Rural Affairs. The former oversees the preparation of national development plans that detail programmatic interventions and the allocation of resources to various sectors of the economy. MoMRA is

responsible for the development and implementation of urban plans, from the strategic level of the National Spatial Strategy to the municipal level. It also formulates requisite urban policies and regulations as the primary framework for action, implementation, monitoring and evaluation.

As highlighted in Chapter 5, whereas the role of regional councils, local municipalities is primarily focused on implementation rather than planning, the larger cities have respective development authorities and special commissions to oversee their planning and implementation of their development strategies. Amongst some of Saudi Arabia's notable urban development initiatives include:

- The Royal Commission for Jubail and Yanbu, which developed the two new towns of Yanbu and Jubail between 1976-1979;
- The Royal Commission for Riyadh, which is responsible for both planning and implementation in the capital city;
- Royal Commission for Makkah City and Holy Sites, established in 2007 to plan and manage growth in the holy cities;
- The High Authority for the Development of the Eastern Region; the Jeddah Development and Urban Regeneration Company;
- Hail and Asir Development Authorities.
- Jeddah Development and Urban Development Company / Jeddah Municipality.
- Al-Balad Al-Ameen for Development and Urban Regeneration in Makkah; Holy makkah municipality

Although Saudi cities, particularly the larger ones, developed their own spatial patterns and growth dynamics, they still face a variety of challenges that make it difficult for MoMRA to ensure efficiency and reflect local particularities. Consideration needs to be given to a broad-ranging institutional view on the way in which the public sector reflects urban processes, well beyond housing and basic services to the framing of the economy and society. However, from national policymaking to urban planning, minimal opportunities exist for the participation of local administrations, non-state actors or citizens at large. There is mounting evidence that inadequate or poorly enforced rules and regulations governing urban management in Saudi Arabia is due to weak, inefficient institutions at local level and poor civil society participation.

Good governance is generally associated with certain values that include fairness, transparency, participation, accountability, equity, and rule of law.[72] Accordingly, the relationships among various levels of government and their respective responsibilities and powers must be clearly defined. Though the role of the central ministries is crucial, creating a more efficient local governance structure will require the devolution of specific powers to municipalities to facilitate quicker responses to local development issues. At present, the creation of multiple government agencies to manage development activities has resulted in ill-defined distributions of responsibilities between different levels of governments, leading to the duplication of roles and blind spots as noted in Chapter 5. Such ineffective multilevel governance systems compromise planning processes, risk backlogs in budget spending, incur higher transaction costs, and create wider economic inefficiencies.

To advance the NUA in the kingdom, the Future Saudi Cities Program provides a holistic approach to develop a National Urban Policy and Strategy that amalgamates the dispersed energy and potential of urban centres within the national system, regions, governorates, and cities.[73] The National Urban Policy will coordinate the work of different sectors and tiers of government, establish the incentives for more sustainable practices, and will provide a planned and geographically connected basis for the allocation of resources. Ultimately, MoMRA's future role will be to articulate clear national and regional spatial policies that define the comparative advantages of cities in their respective regions. It should provide the context for the development of effective local development strategies for individual cities and urban clusters within a coherent national system of cities.

cities must increase revenues to finance public expenditures, to build, operate and maintain adequate infrastructure as well as run services such as health, education, security and environmental, while also producing public goods such as clean air, unpolluted water, and public space.[74] Trends suggest that Saudi Arabia's cities experience growing concentrations of private income and wealth, but this is accompanied by a decline in, and depreciation of, public resources and assets.

As indicated in the previous chapters, Saudi municipalities lack adequate fiscal mandates as well as capacities to raise revenues and are therefore principally dependent on the central government. Notably, most municipalities generate less than

25 per cent of their funding (see Chapter 4). This dependency on transfers from higher tiers of government, impedes the ability of municipalities to define development strategies that address local economic, social and environmental issues. To achieve sustainable urban development, it is essential to strengthen municipal financial capacities through better use of public-private partnerships, adoption of local taxes and user charges, and the development of more equitable fiscal arrangements between national and city governments.

Data and metrics are essential if public authorities are to deliver on the promise of sustainable development for all. The General Authority for Statistics collects, analyzes and publishes macroeconomic data at the national and sectoral levels to substantiate decision-making. In addition, the Ministry of Economy and Planning, the Ministry of Municipal and Rural Affairs, and other executive ministries also collect and publish additional data related to their activities, and the General Authority for Statistics is currently collecting urban data and information at the city level, which will include social and economic information at the regional and city levels.

In 2012, UN-Habitat introduced an urban analytical indicator— the City Prosperity Index (CPI)— that allows to measure present and gauge future progress of cities towards the prosperity path. The CPI measures the overall achievements in a city in six dimensions related to how cities create and distribute socioeconomic benefits or prosperity. The six dimensions are: urban governance and legislation; urban planning and design; urban economy and municipal finance; infrastructure development; urban ecology and environment; social cohesion and equity. Led by MoMRA, municipalities in Saudi's major cities have customized the CPI framework to national priorities and defined a representative sample of 17 cities to assist in creating a national baseline and data collection plan that can support urban planning and management at the national, regional and local levels.

The Index integrates SDG Goal 11 and a selected number of other SDG indicators that have an urban component (see Figure 6.1). Consequently, 16 local urban observatories have been established, which will foster national dialogue to analyze results and identify key issues. This will result in the development of national monitoring strategies for urban policies. Through the Index, UN-Habitat is offering support to local and national governments in establishing customized monitoring mechanisms, which will allow better-informed decision-making on policies and regulations, city plan and extensions, and finance management for the implementation of the New Urban Agenda.

Still, the Future Saudi Cities Program has found a certain number of shortcomings or areas that require improvement, particularly with regards to data gaps in spatial and territorial planning, the standardization and harmonized values and methods, missing information in various CPI indicators, and additional information at city level. To address these shortcomings, creation of an urban data system, as part of a system-wide strategy for sustainable capacity-building is recommended. This urban data system will reinforce and expand the use of urban indicators within the General Authority for Statistics, strengthen local urban observatories, enhance coordination mechanisms and approaches among different ministries and government offices in the collection and use of data. The urban data system will also reinforce national and local capacities to follow-up on and review the implementation of the National Urban Agenda and the SDGs. I will also reinforce and expand the City Prosperity Initiative. The shortcomings notwithstanding, the ability of national and local urban observatories to produce data at city level has certainly increased, as well as the capacity to better understand urban growth and related dynamics which is essential for developing and implementing sound urban policies.

Box 6.3: Stocks, flows and the sustainable urban development agenda

The concept of stocks and flows provides a prism to help think about urban "balances," which is the basis of sustainability.

Stocks include those of a physical nature — existing economic activities, infrastructure, environmental resources, the built environment, cultural heritage, as well as population scale and settlement patterns — together with those of an institutional nature, namely existing policies and regulations that are in place at local, national, and global levels.

Flows represent new additions to; and subtractions from, these stocks, partly fuelled by absolute growth in population, economic activity, or availability of natural resources. Flows can also be negative in the sense that stocks depreciate and decline over time, when finite quantities of resources are consumed, or when significant technological or climatic change reduces the value of the stock of resources. These processes are at the core of sustainability.

Source: UN-Habitat (2016) 'Urbanization and Development: Emerging Futures - World Cities Report 2016,' UN-Habitat, Nairobi.

Figure 6.1: Connecting SDGs and the New Urban Agenda

6.3.2 Strengthening urban legislation and systems of governance

It is widely acknowledged that the outcomes in terms of quality of urban settlement depend on the set of rules and regulations that are framed and made effective.[75] Strengthening urban governance and legislation in Saudi Arabia will provide directives for urban development and the necessary stimulus to municipal finance. In this regard, this report advocates for critical reforms to enable sustainable urban development in Saudi Arabia. Typically, the nation's municipalities deal with everyday urban management, but lack adequate resources or capacity to undertake urban management functions with any substantive degree of autonomy. In addition, the lack of coordination between departments has often resulted in contradictory policies. For example, the Government's policy of free land and interest-free loans to real estate developers, without consultation with spatial policymakers, has resulted in uncontrolled urban expansion, as indicated in preceding sections.

UN-Habitat affirms that the laws establishing the institutions of government at the national and local levels, should reflect a multilevel institutional understanding, which helps to strengthen complementary forms of supervision and responsibility, working as a continuum and not in conflict.[76] The New Urban Agenda also recognizes the leading role that national governments play in the definition and implementation of inclusive and effective urban policies and legislation for sustainable urban development, and the equally important contributions of subnational and local administrations in this process.[77]

In this respect, Saudi Arabia acknowledges the need to go beyond sectoral policies and consider cooperation between different spheres of government and non-state actors, fostering a balanced distribution of powers, capacities, and

resources, including the revision of legislative, regulatory and fiscal frameworks. To this end, capacity development for urban governance in Saudi Arabia needs to be strengthened; considering institutional capacities, the technical and professional skills of individuals, as well as local leadership skills.

Nonetheless, more participatory processes suffer from structural constraints thus leading to inequalities, insufficient access to basic services, lack of decent housing, job insecurity and informality, all of which shape spatially fragmented and socially segmented cities.

Based on historical trends in labour participation, it is anticipated that at least 4.5 million new working-age Saudis will need to be absorbed into the labour market by 2030.[78] There will also be an increased number of older people to support, which will increase the demands on the country's health system and finances. [79]

Strong and capable local authorities are the key levers to ensuring inclusive and sustainable urban development, with accountable urban governance systems and balanced multi stakeholder involvement. The kingdom needs empowered local authorities which employ professional staff. Inter-municipal cooperation, including between urban and rural municipalities, should be facilitated through adequate incentives to create economies of scale and integration. Experience shows that decentralization, on the one hand, empowers and, on the other hand, obliges—implying that increased responsibilities and duties to Saudi's local administrations demand openness, transparency, accountability, and responsibility.

6.3.3 Reinvigorating territorial planning and urban design

Against today's intensifying pressures associated with urbanization and climate change, the challenge of territorial planning and appropriate urban design in Saudi Arabia is more pronounced than ever. Yet many of Saudi's cities still rely on outdated modes of planning, notwithstanding that planning is central to achieving sustainable urban development. One thing is certain: the quality of life for Saudi's citizens will depend largely on the quality of the design of their cities. To this end, investing in well-planned sustainable cities implies investing in economic viability, social prosperity and environmental quality. The recent adoption of the 2030 Agenda is an important step forward in this sense as it recognizes the vital role of urbanization as a tool for sustainable development. This is reflected strongly in Sustainable Development Goal 11—make cities and human settlements inclusive, safe, resilient and sustainable—and its related targets.

Accordingly, the sustainable development of Saudi's cities calls for the best use of the economies of agglomeration, higher residential densities, enhanced mobility demand with transport sustainable solutions, and strengthening of social interactions. This report unequivocally demonstrates that this can be achieved with high quality streets and public spaces, properly designed density, limited land-use specialization, better connectivity, energy and resource efficiency, increased urban resilience, and practically enforceable norms and rules. Traditionally, planning objectives and strategies in Saudi Arabia's cities have been identified over a long period, with the use of master plans reflecting the perception that urban areas could be ordered, planned, and managed through conscientious arrangement of space. However, the emphasis of planning objectives, with new spatial and economic requirements, and the need of regional responses, especially regarding urban growth in the kingdom, has changed from 1970 to the present. Territorial planning and design in the country needs to adapt rapidly to these changes.

Adopted in 2000, Saudi Arabia's National Spatial Strategy is a planning instrument which is informed by the regional, territorial, and city strategies and plans. To bridge the urban and territorial divide and the enormous regional disparities, the NSS focused on creating development corridors and targeted investment to less-developed regions, designating small- and medium-sized cities as regional growth centres. However, rapid urbanization has seen some challenges— such as inequality, large environmental footprints and suburban sprawl and informal housing in some cities— persist in the Saudi urban system.

Whereas improved urban service delivery and the provision of public goods are essential to unlocking the potential of urbanization,[80] the weak regulatory frameworks and lack of planning structures in Saudi cities are an impediment to the realization of this full potential. Consequently, city leaders struggle to meet the demands of those who live, work, and move across urban regions. The reality of urban expansion and dispersal is evident in most Saudi cities, spurred by individual preferences for a suburban lifestyle, including poor land management and lack of sound regulatory control over peri-urban areas.

Reversing these trends will require that cities adopt a reinvigorated and integrated long-term urban and territorial planning and design in order to optimize the spatial dimension of the urban form to deliver the positive outcomes of urbanization.[81] Saudi cities require strategic urban planning interventions in areas such as planned city infills within denser, more environmentally aware urban areas.[82] They

also need to prepare programmes for slum upgrading and urban regeneration in informal and dilapidated areas,[83] diverging from the current approach of land and property evacuation with compensation that was implemented in Jeddah, Makkah, Medina and Riyadh. UN-Habitat advocates for a more sustainable solution, involving the development of implementation tools for participatory upgrading and regeneration with public-private partnership and community development.

When well-planned and managed, urbanization can play a central role in Saudi Arabia's National Spatial Development Strategy updated in 2018/2019, especially in terms of diversifying the economy, and developing industrial and serviced-based urban activities. Equally, Saudi Arabia's Vision 2030 and the National Transformation Program 2020 provide a roadmap for the diversification of the economy from an oil-based to a high technology, urban-based economy.

Just as the Vision is stated convincingly, its implementation mechanisms should also be clear— particularly about the specific action plans. Given the undercurrents created by past investment patterns, changing the development strategy to optimize Saudi Arabia's territorial and urban dynamics will require the coordinated interventions of national agencies and more empowered regional and municipal authorities. Additionally, new pragmatic development strategies, bold urban programmes and transformative local initiatives are needed for Saudi Arabia to achieve its economic, social and cultural potential. Integrated urban planning and management at the national and local levels will be essential to address the multisectoral impediments that constrain the functional efficiency of large- and middle-sized cities.

changing the development strategy to optimize Saudi Arabia's territorial and urban dynamics will require the coordinated interventions of national agencies and more empowered regional and municipal authorities

Still, progress in decentralization has been limited. Despite the deterioration in economic conditions in the Middle East and North Africa (MENA) region, it can be safely stated that the prospects for the New Urban Agenda in the region, will chiefly rest on how oil-producing countries, such as Saudi Arabia urbanize and diversify in the next twenty years achieve more balanced regional development. At the national scale, and toward realizing Vision 2030, the Government is reviewing its investment policies, with the aim of achieving a more balanced and sustainable development of the different regions, based on their comparative advantages. This entails a targeted focus on improving the functional efficiency of the major cities and providing incentives for private investment outside the three leading regions— Riyadh, Makkah and the Eastern Region. To overcome these challenges the Government is increasing its longer-term public investment through the national specialized institutions. These include: the Public Investment Fund; the Real Estate Development Fund; the Saudi Credit and Saving Bank for microenterprises and the Human Resources Development Fund. Thirteen regional investment councils are being established to work in cooperation with the Saudi Arabian Ministry of Investment, to create an enabling environment for investment in the kingdom's lagging regions. Until now, SAGIA had focused its activities in the development of the new economic cities.[84]

The example of planning and design for new urban extensions and infill projects is important, so is the implementation of this strategy, which depends on reducing quality of life disparities in the lagging regions relative to the major cities. This can be achieved through government expenditures on infrastructure networks, urban public services and development projects to enable cities to reach a threshold of functional efficiency, enhancing their competitiveness as alternative locations for private investments. As part of its effort to shift economic growth to secondary cities, the Government is improving the infrastructure of Asir, Ha'il, Hofuf, Tabuk, and Taif. This includes the Government's decision to construct new economic cities in the secondary cities of Jizan, Ha'il in Tabuk, in the long-term. However, these expensive investments should not divert attention from the need to improve the kingdom's existing urban assets to enhance city comparative advantages and their quality of life.

Innovative and effective participation tools should be adopted to foster meaningful engagement and empowerment of all inhabitants, bringing social justice, livability and democratic governance to the process of urban transformation in Saudi Arabia. Local authorities are key actors in promoting the social inclusion needed to "make cities and human settlements at the heart of sustainable development in an urbanizing world" (SDG 11). They can promote the participation of minorities and underrepresented groups in public consultation processes; provide public services in a non-discriminatory way; and boost the employment and housing opportunities of disadvantaged groups.[85]

As a constituent of the New Urban Agenda, urban planning aims to "reinvent" the 21st century city model, in the sense of a more sustainable approach that has the power to raise densities, make cities more compact and walkable, and reduce energy consumption in transport and other infrastructure[86]. Over the past two decades, the transport sector of Saudi Arabia has emerged as a driving force for economic and social development.[87] The country is home to two of the world's fastest growing cities:[88] Riyadh, the capital, and Jeddah, the economic gateway and commercial outlet on the Red Sea coast. Transport infrastructure is considered one of the main causes of the accelerated urban growth and spatial expansion in these and other urban areas, but also of very high energy intensity consumption. This is largely due to the high number of motor vehicles per 1,000 people; that was equal to 192 units per 1,000 people in Saudi Arabia in 2005, while worldwide it reached 147 units per 1000 people.[89]

Due to affluence, increase in the fleet of vehicles especially private car ownership, and subsidized gasoline prices, traffic congestion in Saudi cities has worsened. The drawbacks of traditional transport—including traffic fatalities and the health effects of air pollution— are some of these consequences that will continue to be felt predominantly by the most vulnerable. In response, the National Spatial Strategy aims to protect the environment, reduce urban sprawl and promote spatially balanced development.[90]

As a solution towards meeting future travel requirements, local authorities are considering the introduction of accessible, safe and effective public transport systems.[91] As noted in Chapter 2, numerous integrated public transport projects are underway, which include light rail and dedicated bus transport to provide comprehensive mobility solutions in urban areas. Nonetheless, cultural restrictions regarding privacy, particularly for women, have impeded the development of the transport system.[92]

Revitalizing urban planning and transport engineering designs is essential towards accessible sustainable mobility, the transformation of which requires a redirection rather than any substantial increase in infrastructure. Density can be optimized through zoning laws and application of locational incentives such as infrastructural investments and through design interventions. A related attribute is the need to ensure diversity and mixed neighbourhoods, which promotes non-motorized transport by increasing proximity and reducing the need to travel.

6.3.4 Strengthening municipal finance and local fiscal systems

Adequate and predictable funding is critical for municipalities to discharge their responsibilities, effectively. As described in Chapter 4, the financing of Saudi municipalities depends primarily on financial support, with own-source revenues forming a small fraction of their budgets. This is largely due to a combination factors such as lack of taxing powers and the provision of public services that are free of charge. In 2017, MoMRA was allocated 5 per cent of the national budget was devoted to the operating expenses of the *Amanahs* and municipalities (see Chapter 5). Other sectoral projects with an urban dimension, including infrastructure and transport, water desalination and distribution, waste collection and management, health and social services, housing, and education were financed through respective line ministries. Poor implementation of local authorities' plans has often been attributed to the excessive reliance on the general budge.

Saudi Arabia's national urban governance frameworks need to enable effective multilevel governance through clear legal and institutional structures, based on the principles of subsidiarity and decentralization (respect for local self-government, clear sharing of powers and responsibilities, among others), as well as an adequate intergovernmental allocation of financial resources. Ensuring a better allocation of national resources to subnational governments needs to be coupled with equalization mechanisms to reduce inequalities among regions, metropolitan areas and intermediary cities, with the aim of building synergies and complementarities among cities and territories.

As stipulated in the New Urban Agenda, participatory urban policies need to be supported by national and local institutional and regulatory frameworks, adequately linked to transparent, accountable, and sustainable finance mechanisms.[93] The way Saudi cities are planned, financed, developed, built and governed is critical to ensuring urban sustainability and resilience.

In recent years, rising urban land values have had a negative impact on housing affordability in the kingdom and have required substantial public subsidies to eligible households. Some form of partial recovery of the rapid rate of appreciation through a property tax would enable local authorities to continue to improve the quality of the services they provide. Capturing part of the value added by public investments in infrastructure and services, that is capitalized in the escalating prices of real estate, needs to be instituted. There is no other

local asset that can make a meaningful contribution to local revenue given the size of the budgets required by the country's rapidly growing cities. Effective innovative and sustainable financing of urban frameworks and instruments enabling strengthened municipal finance require value-sharing strategies, as postulated in the New Urban Agenda. MoMRA, along with other line ministries and municipalities from the major cities, can work in the design and implementation of these value capture instruments.

Besides, higher incidence of climate change effects and extreme weather events across the kingdom have highlighted the importance of municipal finance. Coastal cities face the prospect of flooding and sea-level rise, revealing the importance of designing houses with "safe storage", as part of a mitigation strategy. The financing of adequate water supply and sanitation facilities is also an urgent need in Saudi cities.

Having a diversified transport system can also help Saudi cities build resilience to a range of shocks. The Government should also explore innovative strategies like public-private partnerships (PPPs) and land-readjustment schemes that can leverage additional resources to cope with public resource limitations. The adoption and implementation of disaster risk reduction and management strategies, as stipulated in the New Urban Agenda, can reduce vulnerability and build resilience in Saudi Cities, with higher responsiveness to natural disasters.[94]

6.3.5 Planned city extensions and city infills

Managing Saudi Arabia´s urban growth has been a challenge for decades. In the 1970s, the kingdom transitioned from rural to urban and its cities expanded rapidly with little control and oversight. This uninhibited growth was a direct consequence of the institutional framework around urban and territorial planning, housing policy, and a lack of leadership in place at the time. As illustrated in Chapter 1, as the kingdom experienced a rapid rise in urban population, there was a concomitant increase in area of developed land, at a higher pace. With urban expansion outpacing the natural rate of population growth, the effect was sprawling development with low-density, monofunctional zones, leaving vacant land unused throughout urban centres.

Saudi's cities should turn to infill development to create coordinated and compact urban growth strategies (Chapter 1). This kind of development allows both residents and the local administration to tap into existing urban assets by building on vacant, abandoned, or underutilized land within the existing city limits. Planned city infills can enhance local revenue collection through higher local taxation and land value capture. The results that should be achieved through the development of city expansions and densification plans are:[95]

- the creation of spatial structures to support urban development and attract investments;
- availability of large areas of land for development, thus reducing land prices and speculation;
- increase in urban densities, accommodating population growth more efficiently;
- minimization of the city's ecological footprint with more compact cities;
- increased density that promotes economic agglomeration advantages, including lower costs of providing infrastructure and services;
- strengthened social interactions and reduced mobility demand; and
- mixed use of land that increases social heterogeneity and generates economic densities.

Many of the reforms in Saudi Arabia are in line with the New Urban Agenda, including a better integration of urban and territorial planning, to maximize the positive outcomes of urbanization by achieving a more efficient and optimized urban forms. Their implementation will require a close collaboration between newly empowered local administrations, MoMRA and other line ministries. Currently, larger municipalities have an active participation in planning and implementation of their growth strategy.

The successful implementation of the NUA in Saudi Arabia requires revisiting the impact of urban dynamics on cities. As shown in Chapter 1, the pace at which large cities are growing hinders the kingdom's efforts to achieve a more balanced development among regions and cities. Presently, rapid sprawl in the large cities has resulted in inefficient land-use patterns, and a surplus of vacant serviced land, high housing costs, and environmental pollution. Accordingly, managing their growth seems to be beyond the capacity of their local administrations or the national authority alone. Slowing the demographic surge in larger cities and developing the competitive advantages of smaller cities, requires a coordinated effort of national, regional and local administrations, including the MoEP, SAGIA and the newly established regional investment Commissions.

The articulation and implementation of a clear national urbanization strategy can direct regional infrastructure

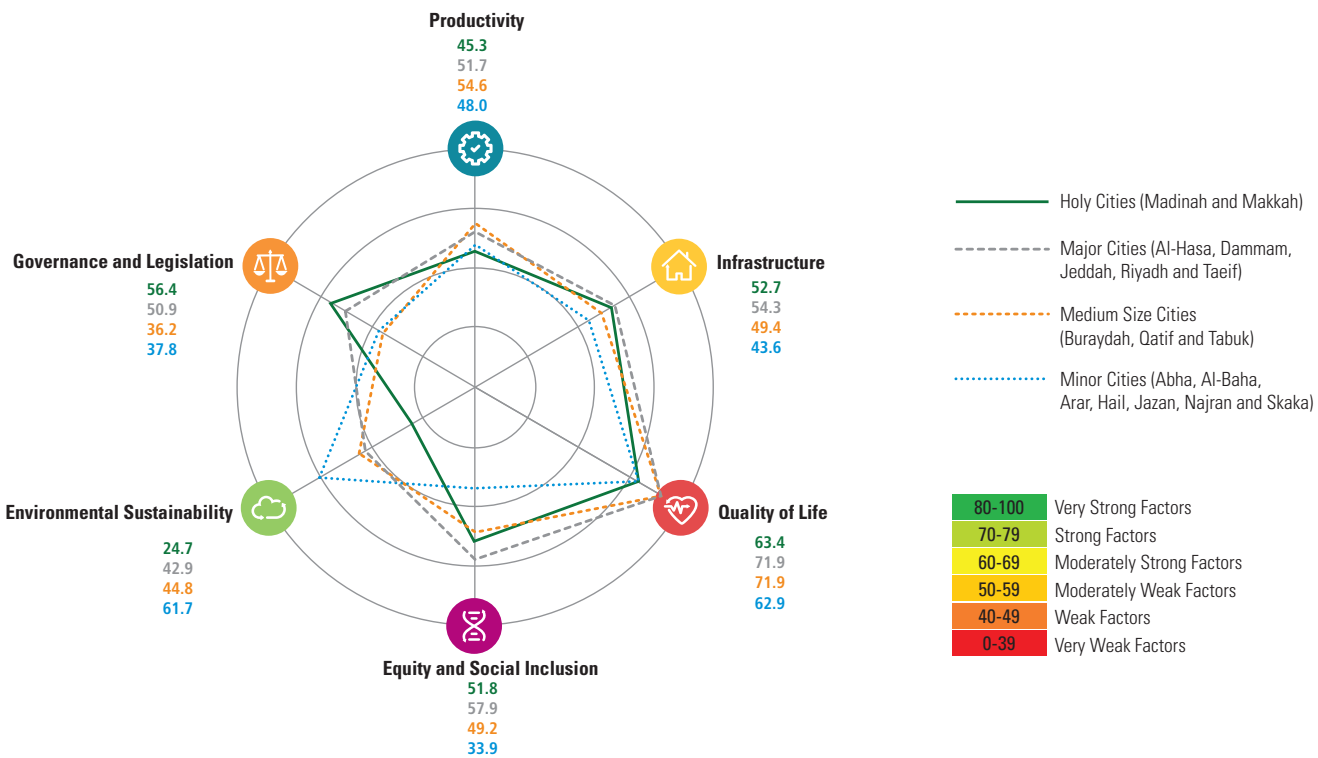
investments and the public financial and institutional support needed to direct private investors to specific locations, including development poles in designated secondary cities. The decision to locate in a specific city depends, to a considerable extent, on the institutional, social and environmental qualities that the city can offer and its potential. The City Prosperity Index , particularly for the smaller Saudi cities, offers a precise diagnosis based on a comparative assessment of their physical, economic, social, institutional and environmental characteristics (see Figure 6.2) — highlighting opportunities and challenges that are needed to develop transformative actions.[96]Associated to the Updated National Spatial Strategy, city action plans can increase the competitiveness of secondary cities as desirable living environments for households in the kingdom, as well as places to earn a good living.

6.4 Conclusion: Effective implementation of the New Urban Agenda guided

The adoption of the New Urban Agenda in 2016 marked a milestone in global urban policy. The Agenda seeks to chart the course and provide an action-oriented roadmap to guide sustainable urban development in the world's cities. Saudi Arabia's national urban and regional transformation can refer to the commitments, principles and implementation recommendations of this Agenda for the next 20 years. In many respects, the Agenda represents a paradigm shift[97] that will: readdress the way cities and human settlements are planned, financed, developed, governed and managed; recognize the important role of national, subnational and local administrations, as well as civil society, in a transparent and accountable manner; and adopt sustainable, people-centered, age- and gender-responsive and integrated approaches to urban and territorial development by implementing policies, strategies, capacity development and actions at all levels.

One of the main challenges that Saudi Arabia will face in implementing the Agenda is the integration of these strategies at the regional and local levels. Even though the National Spatial Strategy 2030 provides a global development vision, it will require more detailed adjustments to adapt to the needs and potential of the kingdom's regions and cities. Likewise, reorienting the current growth dynamics of the five major cities

Figure 6.2: The City Prosperity Initiative as a platform for urban data



Source: City Prosperity Index, 2018.

to lagging regions and secondary cities by developing their comparative advantages calls for key specific interventions. The Government must recognize the role of the private sector in the delivery of urban infrastructure and services and various key aspects of the urban value chain. This includes policymaking, planning, design, implementation, operation and maintenance, and monitoring, as well as the financing and delivery of urban services and public goods.

This chapter unequivocally demonstrates that major revisions to the Government's current top-down administrative structure will be needed to synchronize implementation at the national, regional and local levels. While national and regional policies tend to be more directive, successful local development strategies require a level of community participation that has been lacking. While the recently adopted Saudi Vision 2030 calls for extensive and wide-ranging changes to the society, compelling evidence suggests that there was minimal popular participation in its formulation. Formulating the corresponding development strategies for the large and secondary cities will demand the institutionalization of consultative processes to ensure its success at the local level. The chapter calls for the creation of a conducive enabling environment for public-private cooperation with well-defined urban policies that promote multi-stakeholder collaboration.

Of equal importance is the need to re-examine the current institutional and legal framework that defines the respective responsibilities and powers of local authorities, particularly the role and the relationship of the different national and local actors. The chapter is explicit on the need for a clearer articulation and coding of laws and regulations to ensure that the different levels of government have the mandate and authority to discharge their responsibilities. This will help provide political commitment and maximize long-term investments, as well as strengthen urban planning and design for the public good. To enable better inclusion, the new articulation of the national urban strategy should enshrine acceptable modes of public participation in the decision-making process. The chapter advocates that empowering Saudi Arabia's cities with strong local authorities and solid institutions is fundamental. This is key towards enabling local authorities build their capacity, resources and revenue with the aim of delivering sustainable urban development.

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Statistical Annex

Table 1: Population by sex, Administrative Area and Nationality (Saudi/ Non-Saudi)

Administrative Area	Saudi			Non - Saudi			Total		Total
	Males	Females	Total	Males	Females	Total	Males	Females	
Al-Riyadh	2,375,041	2,204,529	4,579,570	2,359,968	1,062,562	3,422,530	4,735,009	3,267,091	8,002,100
Makkah Al-Mokarramah	2,252,525	2,188,046	4,440,571	2,479,396	1,405,337	3,884,733	4,731,921	3,593,383	8,325,304
Al-Madinah Al-Monawarah	679,327	673,775	1,353,102	485,296	242,038	727,334	1,164,623	915,813	2,080,436
Al-Qaseem	501,831	489,201	991,032	298,073	98,891	396,964	799,904	588,092	1,387,996
Eastern Region	1,607,478	1,480,209	3,087,687	1,259,272	433,660	1,692,932	2,866,750	1,913,869	4,780,619
Aseer	850,598	869,352	1,719,950	332,554	111,668	444,222	1,183,152	981,020	2,164,172
Tabouk	365,082	345,617	710,699	135,173	45,050	180,223	500,255	390,667	890,922
Hail	261,899	267,113	529,012	115,654	39,953	155,607	377,553	307,066	684,619
Northern Borders	143,572	141,914	285,486	53,978	19,771	73,749	197,550	161,685	359,235
Jazan	600,649	586,635	1,187,284	229,229	117,167	346,396	829,878	703,802	1,533,680
Najran	216,759	213,952	430,711	98,705	39,916	138,621	315,464	253,868	569,332
Al-Baha	181,132	195,072	376,204	67,886	22,294	90,180	249,018	217,366	466,384
Al-Jouf	189,757	183,905	373,662	93,130	30,717	123,847	282,887	214,622	497,509
Total	**10,225,650**	**9,839,320**	**20,064,970**	**8,008,314**	**3,669,024**	**11,677,338**	**18,233,964**	**13,508,344**	**31,742,308**

Source: Demographic Survey 2016 _General Authority for Statistics

Table 2: Housing Units (Occupied With Saudi Households) by Type of Housing Unit

Administrative Area	Type of Housing Unit					
	Traditional House	Villa	"A Floor in a Villa	A Floor in a Traditional House	Apartment	Total
Al-Riyadh	47596	374900	125836	1630	279708	829670
Makkah Al-Mokarramah	179023	112805	20803	9962	548496	871089
Al-Madinah Al-Monawarah	58820	36676	2249	692	145493	243930
Al-Qaseem	25440	93600	31200	0	14240	164480
Eastern Region	55567	163443	29503	10317	241635	500465
Aseer	55815	105774	31110	1098	105774	299571
Tabouk	37048	6952	880	264	72512	117656
Hail	30388	31027	3266	71	13419	78171
Northern Borders	6076	15372	4172	1904	9548	37072
Jazan	101084	32560	11100	296	29156	174196
Najran	21328	15810	3410	0	25482	66030
Al-Baha	13048	22232	4872	0	25928	66080
Al-Jouf	13888	20496	2464	168	19264	56280
Total	**645121**	**1031647**	**270865**	**26402**	**1530655**	**3504690**

Source: Housing Survey 2017 _General Authority for Statistics

Table 3: Housing Units (Occupied With Saudi Households) by approximate age of housing

Administrative Area	Approximate age of housing unit (in years)					
	Less than 5 years	5 - 10	Larger than 10 to 20	Larger than 20 to 30	Larger than 30	Total
Al-Riyadh	71068	238632	257214	176692	86064	829670
Makkah Al-Mokarramah	54205	203928	238795	213304	160857	871089
Al-Madinah Al-Monawarah	23182	52073	59858	61242	47575	243930
Al-Qaseem	17280	49280	54400	27840	15680	164480
Eastern Region	32037	105885	149868	122718	89957	500465
Aseer	32025	81984	98271	54717	32574	299571
Tabouk	6952	34672	39600	25520	10912	117656
Hail	6035	18815	27122	18105	8094	78171
Northern Borders	1176	7756	9968	8204	9968	37072
Jazan	15836	36852	57276	33152	31080	174196
Najran	6572	26598	22692	8804	1364	66030
Al-Baha	4760	18536	25424	12096	5264	66080
Al-Jouf	5264	14336	14168	11760	10752	56280
Total	276392	889347	1054656	774154	510141	3504690

Source: Housing Survey 2017 _General Authority for Statistics

Table 4: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Construction Material

		Type of Housing Unit					
Administrative Area	**Construction Material**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Concrete	34230	374900	125836	1630	279708	816304
	Block / Brick	13040	0	0	0	0	13040
	Mud	0	0	0	0	0	0
	Stone	326	0	0	0	0	326
Makkah Al-Mokarramah	Concrete	34867	112805	20803	9962	548496	726933
	Block / Brick	144156	0	0	0	0	144156
	Mud	0	0	0	0	0	0
	Stone	0	0	0	0	0	0
Al-Madinah Al-Monawarah	Concrete	6228	36676	2249	692	145493	191338
	Block / Brick	52246	0	0	0	0	52246
	Mud	173	0	0	0	0	173
	Stone	173	0	0	0	0	173
Al-Qaseem	Concrete	6880	93600	31200	0	14240	145920
	Block / Brick	18560	0	0	0	0	18560
	Mud	0	0	0	0	0	0
	Stone	0	0	0	0	0	0
Eastern Region	Concrete	15385	163443	29503	10317	241635	460283
	Block / Brick	39639	0	0	0	0	39639
	Mud	181	0	0	0	0	181
	Stone	362	0	0	0	0	362
Aseer	Concrete	8235	105774	31110	1098	105774	251991
	Block / Brick	44835	0	0	0	0	44835
	Mud	732	0	0	0	0	732
	Stone	2013	0	0	0	0	2013
Tabouk	Concrete	20152	6952	880	264	72512	100760
	Block / Brick	15928	0	0	0	0	15928
	Mud	88	0	0	0	0	88
	Stone	880	0	0	0	0	880
Hail	Concrete	11999	31027	3266	71	13419	59782
	Block / Brick	18389	0	0	0	0	18389
	Mud	0	0	0	0	0	816304
	Stone	0	0	0	0	0	816304
	Other	0	0	0	0	0	816304
Northern Borders	Concrete	4592	15372	4172	1904	9548	35588
	Block / Brick	1456	0	0	0	0	1456
	Mud	0	0	0	0	0	0
	Stone	28	0	0	0	0	28
Jazan	Concrete	50320	32560	11100	296	29156	123432
	Block / Brick	49876	0	0	0	0	49876
	Mud	0	0	0	0	0	0
	Stone	888	0	0	0	0	888
Najran	Concrete	9548	15810	3410	0	25482	54250
	Block / Brick	11780	0	0	0	0	11780
	Mud	0	0	0	0	0	0
	Stone	0	0	0	0	0	0
Al-Baha	Concrete	8624	22232	4872	0	25928	61656
	Block / Brick	4312	0	0	0	0	4312
	Mud	0	0	0	0	0	0
	Stone	112	0	0	0	0	112
Al-Jouf	Concrete	11816	20496	2464	168	19264	54208
	Block / Brick	2072	0	0	0	0	2072
	Mud	0	0	0	0	0	0
	Stone	0	0	0	0	0	0
Total	Concrete	222876	1031647	270865	26402	1530655	3082445
	Block / Brick	416289	0	0	0	0	416289
	Mud	1174	0	0	0	0	354
	Stone	4782	0	0	0	0	861

Source: Housing Survey 2017 _General Authority for Statistics

Table 4B: Housing Units (Occupied With Saudi Households), Households and Individuals by Type of Construction Materials

		Type of Construction Materials				
Administrative Area		**Concrete**	**Block / Brick**	**Mud**	**Stone**	**Total**
Al-Riyadh	Housing Units	816304	13040	0	326	829670
	Households	816304	13040	0	326	829670
	Individuals	4753632	83664	0	899	4838195
Makkah Al-Mokarramah	Housing Units	726933	144156	0	0	871089
	Households	726933	144156	0	0	871089
	Individuals	3814321	817371	0	0	4631692
Al-Madinah Al-Monawarah	Housing Units	191338	52246	173	173	243930
	Households	191338	52246	173	173	243930
	Individuals	1116222	277408	613	2240	1396483
Al-Qaseem	Housing Units	145920	18560	0	0	164480
	Households	145920	18560	0	0	164480
	Individuals	954619	95301	0	0	1049920
Eastern Region	Housing Units	460283	39639	181	362	500465
	Households	460283	39639	181	362	500465
	Individuals	2879822	338296	489	1803	3220410
Aseer	Housing Units	251991	44835	732	2013	299571
	Households	251991	44835	732	2013	299571
	Individuals	1413960	335416	7438	9071	1765885
Tabouk	Housing Units	100760	15928	88	880	117656
	Households	100760	15928	88	880	117656
	Individuals	634557	89775	400	3392	728124
Hail	Housing Units	59782	18389	0	0	78171
	Households	59782	18389	0	0	78171
	Individuals	430729	122251	0	0	552980
Northern Borders	Housing Units	35588	1456	0	28	37072
	Households	35588	1456	0	28	37072
	Individuals	286133	13254	0	53	299440
Jazan	Housing Units	123432	49876	0	888	174196
	Households	123432	49876	0	888	174196
	Individuals	822587	390495	0	7327	1220409
Najran	Housing Units	54250	11780	0	0	66030
	Households	54250	11780	0	0	66030
	Individuals	376121	69251	0	0	445372
Al-Baha	Housing Units	61656	4312	0	112	66080
	Households	61656	4312	0	112	66080
	Individuals	352793	38286	0	627	391706
Al-Jouf	Housing Units	54208	2072	0	0	56280
	Households	54208	2072	0	0	56280
	Individuals	376596	13970	0	0	390566
Total	Housing Units	3082445	416289	1174	4782	3504690
	Households	3082445	416289	1174	4782	3504690
	Individuals	18212092	2684738	8940	25412	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 5: Housing Units (Occupied With Saudi Households), by Type of Housing Unit and Tenure of Housing Unit

		Type of Housing Unit					
Administrative Area	**Tenure of Housing**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Owned	38468	333824	57050	1304	34230	464876
	Rented	8802	39120	68134	326	242544	358926
	Provided by Employer	0	1630	0	0	1304	2934
	Other	326	326	652	0	1630	2934
Makkah Al-Mokarramah	Owned	159099	96690	16115	7911	231470	511285
	Rented	19631	14650	4688	2051	307943	348963
	Provided by Employer	293	1465	0	0	9083	10841
	Other	0	0	0	0	0	0
Al-Madinah Al-Monawarah	Owned	50170	26815	692	519	69546	147742
	Rented	8304	8477	1557	173	70065	88576
	Provided by Employer	173	1384	0	0	5882	7439
	Other	173	0	0	0	0	173
Al-Qaseem	Owned	23360	87040	8800	0	320	119520
	Rented	2080	5760	21280	0	13120	42240
	Provided by Employer	0	0	320	0	320	640
	Other	0	800	800	0	480	2080
Eastern Region	Owned	37286	140275	15566	7240	42535	242902
	Rented	18281	18281	13756	3077	168692	222087
	Provided by Employer	0	4887	181	0	30408	35476
	Other	0	0	0	0	0	0
Aseer	Owned	52887	98088	19032	732	29463	200202
	Rented	2745	7320	11712	366	76311	98454
	Provided by Employer	183	366	366	0	0	915
	Other	0	0	0	0	0	0
Tabouk	Owned	30624	5720	704	264	23232	60544
	Rented	6160	1232	88	0	48840	56320
	Provided by Employer	0	0	0	0	176	176
	Other	264	0	88	0	264	616
Hail	Owned	27690	28045	1420	0	1207	58362
	Rented	2698	2911	1846	71	12141	19667
	Provided by Employer	0	71	0	0	71	142
	Other	0	0	0	0	0	0
Northern Borders	Owned	4928	11592	2212	980	3976	23688
	Rented	1008	3192	1932	868	5208	12208
	Provided by Employer	0	84	0	0	168	252
	Other	140	504	28	56	196	924
Jazan	Owned	91908	26788	5624	0	13024	137344
	Rented	7992	2516	5180	296	15984	31968
	Provided by Employer	148	0	148	0	0	296
	Other	1036	3256	148	0	148	4588
Najran	Owned	19344	15314	2852	0	8122	45632
	Rented	1798	372	558	0	17174	19902
	Provided by Employer	0	0	0	0	186	186
	Other	186	124	0	0	0	310
Al-Baha	Owned	11704	18984	3920	0	14392	49000
	Rented	1232	2688	784	0	11200	15904
	Provided by Employer	0	0	0	0	0	0
	Other	112	560	168	0	336	1176
Al-Jouf	Owned	11704	19040	2072	168	6048	39032
	Rented	2184	1456	392	0	13160	17192
	Provided by Employer	0	0	0	0	56	56
	Other	0	0	0	0	0	
Total	Owned	559172	908215	136059	19118	477565	2100129
	Rented	82915	107975	131907	7228	1002382	1332407
	Provided by Employer	909	10447	1183	0	47990	59353
	Other	2125	5010	1716	56	2718	12801

Source: Housing Survey 2017 _General Authority for Statistics

Table 5B: Housing Units (Occupied With Saudi Households), Households and Individuals by Tenure of Housing Unit

Administrative Area		Tenure of Housing Unit				
		Owned	Rented	Provided by Employer	Other	Total
Al-Riyadh	Housing Units	464876	358926	2934	2934	829670
	Households	464876	358926	2934	2934	829670
	Individuals	3113008	1691795	21233	12159	4838195
Makkah Al-Mokarramah	Housing Units	511285	348963	10841	0	871089
	Households	511285	348963	10841	0	871089
	Individuals	2844316	1746656	40720	0	4631692
Al-Madinah Al-Monawarah	Housing Units	147742	88576	7439	173	243930
	Households	147742	88576	7439	173	243930
	Individuals	849654	505853	40437	539	1396483
Al-Qaseem	Housing Units	119520	42240	640	2080	164480
	Households	119520	42240	640	2080	164480
	Individuals	804518	233829	3734	7839	1049920
Eastern Region	Housing Units	242902	222087	35476	0	500465
	Households	242902	222087	35476	0	500465
	Individuals	1776000	1349461	94949	0	3220410
Aseer	Housing Units	200202	98454	915	0	299571
	Households	200202	98454	915	0	299571
	Individuals	1306878	454163	4844	0	1765885
Tabouk	Housing Units	60544	56320	176	616	117656
	Households	60544	56320	176	616	117656
	Individuals	388315	335750	742	3317	728124
Hail	Housing Units	58362	19667	142	0	78171
	Households	58362	19667	142	0	78171
	Individuals	456419	95851	710	0	552980
Northern Borders	Housing Units	23688	12208	252	924	37072
	Households	23688	12208	252	924	37072
	Individuals	208364	82196	1160	7720	299440
Jazan	Housing Units	137344	31968	296	4588	174196
	Households	137344	31968	296	4588	174196
	Individuals	1036736	167332	610	15731	1220409
Najran	Housing Units	45632	19902	186	310	66030
	Households	45632	19902	186	310	66030
	Individuals	327941	114572	1018	1841	445372
Al-Baha	Housing Units	49000	15904	0	1176	66080
	Households	49000	15904	0	1176	66080
	Individuals	311643	71212	0	8851	391706
Al-Jouf	Housing Units	39032	17192	56	0	56280
	Households	39032	17192	56	0	56280
	Individuals	304197	85924	445	0	390566
Total	Housing Units	2100129	1332407	59353	12801	3504690
	Households	2100129	1332407	59353	12801	3504690
	Individuals	13727989	6934594	210602	57997	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 6A: Housing Units (Occupied With Saudi Households), by Type of Housing Unit and Source of Water Supply

		Type of Housing Unit					
Administrative Area	**Source of Water Supply**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Public Piped Water	29992	334802	117686	978	256562	740020
	Water Truck	17278	40098	8150	652	23146	89324
	Well	326	0	0	0	0	326
Makkah Al-Mokarramah	Public Piped Water	40727	68562	15822	8204	419869	553184
	Water Truck	138003	44243	4981	1758	128627	317612
	Well	293	0	0	0	0	293
Al-Madinah Al-Monawarah	Public Piped Water	25604	21625	2249	519	123176	173173
	Water Truck	33216	15051	0	173	22317	70757
	Well	0	0	0	0	0	0
Al-Qaseem	Public Piped Water	9120	82880	28160	0	13920	134080
	Water Truck	16320	10720	3040	0	320	30400
	Well	0	0	0	0	0	0
Eastern Region	Public Piped Water	41992	154936	27874	9955	232585	467342
	Water Truck	13575	8507	1629	362	9050	33123
	Well	0	0	0	0	0	0
Aseer	Public Piped Water	2379	30378	10248	366	50508	93879
	Water Truck	49044	75396	20862	732	55266	201300
	Well	4392	0	0	0	0	4392
Tabouk	Public Piped Water	16456	4224	880	264	71192	93016
	Water Truck	20504	2728	0	0	1320	24552
	Well	88	0	0	0	0	88
Hail	Public Piped Water	12283	26483	3124	71	11999	53960
	Water Truck	17111	4544	142	0	1420	23217
	Well	994	0	0	0	0	994
Northern Borders	Public Piped Water	6076	14168	4172	1904	8736	35056
	Water Truck	0	1204	0	0	812	2016
	Well	0	0	0	0	0	0
Jazan	Public Piped Water	74148	26196	9472	296	23976	134088
	Water Truck	26936	6364	1628	0	5180	40108
	Well	0	0	0	0	0	0
Najran	Public Piped Water	3534	5208	1240	0	13144	23126
	Water Truck	17112	10602	2170	0	12338	42222
	Well	682	0	0	0	0	682
Al-Baha	Public Piped Water	8008	18144	2800	0	22064	51016
	Water Truck	4536	4088	2072	0	3864	14560
	Well	504	0	0	0	0	504
Al-Jouf	Public Piped Water	10080	19768	2240	56	19096	51240
	Water Truck	3808	728	224	112	168	5040
	Well	0	0	0	0	0	0
Total	Public Piped Water	280399	807374	225967	22613	1266827	2603180
	Water Truck	357443	224273	44898	3789	263828	894231
	Well	7279	0	0	0	0	7279

Source: Housing Survey 2017 _General Authority for Statistics

Table 6B: Housing Units (Occupied With Saudi Households), Households and Individuals by Source of Water Supply

Administrative Area		Source of Water Supply			
		Public Piped Water	Water Truck	Well	Total
Al-Riyadh	Housing Units	740020	89324	326	829670
	Households	740020	89324	326	829670
	Individuals	4393271	443133	1791	4838195
Makkah Al-Mokarramah	Housing Units	553184	317612	293	871089
	Households	553184	317612	293	871089
	Individuals	2978717	1652475	500	4631692
Al-Madinah Al-Monawarah	Housing Units	173173	70757	0	243930
	Households	173173	70757	0	243930
	Individuals	1015243	381240	0	1396483
Al-Qaseem	Housing Units	134080	30400	0	164480
	Households	134080	30400	0	164480
	Individuals	885465	164455	0	1049920
Eastern Region	Housing Units	467342	33123	0	500465
	Households	467342	33123	0	500465
	Individuals	2926511	293899	0	3220410
Aseer	Housing Units	93879	201300	4392	299571
	Households	93879	201300	4392	299571
	Individuals	379276	1351202	35407	1765885
Tabouk	Housing Units	93016	24552	88	117656
	Households	93016	24552	88	117656
	Individuals	603382	124421	321	728124
Hail	Housing Units	53960	23217	994	78171
	Households	53960	23217	994	78171
	Individuals	353301	188086	11593	552980
Northern Borders	Housing Units	35056	2016	0	37072
	Households	35056	2016	0	37072
	Individuals	285462	13978	0	299440
Jazan	Housing Units	134088	40108	0	174196
	Households	134088	40108	0	174196
	Individuals	863377	357032	0	1220409
Najran	Housing Units	23126	42222	682	66030
	Households	23126	42222	682	66030
	Individuals	180634	258465	6273	445372
Al-Baha	Housing Units	51016	14560	504	66080
	Households	51016	14560	504	66080
	Individuals	284539	101337	5830	391706
Al-Jouf	Housing Units	51240	5040	0	56280
	Households	51240	5040	0	56280
	Individuals	335842	54724	0	390566
Total	Housing Units	2603180	894231	7279	3504690
	Households	2603180	894231	7279	3504690
	Individuals	15485020	5384447	61715	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 7A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Source of Drinking Water

		Type of Housing Unit					
Administrative Area	**Source of Drinking Water**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Public Piped Water	4564	102038	47270	326	94214	248412
	Water Purifier	2934	74654	16952	0	28036	122576
	Water Truck	19886	45966	8802	1304	22820	98778
	Well	1630	0	0	0	0	1630
	Bottled Water	18582	152242	52812	0	134638	358274
Makkah Al-Mokarramah	Public Piped Water	9962	7911	2637	879	143570	164959
	Water Purifier	879	8790	293	293	32230	42485
	Water Truck	65339	16701	586	1758	82040	166424
	Well	586	0	0	0	1172	1758
	Bottled Water	102257	79403	17287	7032	289484	495463
Al-Madinah Al-Monawarah	Public Piped Water	20760	4152	1038	346	47748	74044
	Water Purifier	1211	4671	865	0	12975	19722
	Water Truck	25258	4498	0	173	19722	49651
	Well	0	0	0	0	346	346
	Bottled Water	11591	23355	346	173	64702	100167
Al-Qaseem	Public Piped Water	3360	28480	8480	0	5120	45440
	Water Purifier	3200	30400	8000	0	4800	46400
	Water Truck	11200	14720	3520	0	1760	31200
	Well	0	0	0	0	0	0
	Bottled Water	7680	20000	11200	0	2560	41440
Eastern Region	Public Piped Water	6516	36200	5792	1629	71314	121451
	Water Purifier	362	7964	1267	181	4706	14480
	Water Truck	24254	25883	10860	4525	28236	93758
	Well	0	0	0	0	181	181
	Bottled Water	24435	93396	11584	3982	137198	270595
Aseer	Public Piped Water	1830	17385	7320	183	17019	43737
	Water Purifier	183	3660	732	0	4392	8967
	Water Truck	34038	19581	4392	183	16470	74664
	Well	0	0	0	0	0	0
	Bottled Water	19764	65148	18666	732	67893	172203
Tabouk	Public Piped Water	11704	528	264	0	21648	34144
	Water Purifier	528	440	176	0	5016	6160
	Water Truck	6424	88	0	0	2200	8712
	Well	176	0	0	0	88	264
	Bottled Water	18216	5896	440	264	43560	68376
Hail	Public Piped Water	4473	6035	639	0	3053	14200
	Water Purifier	1349	4260	497	0	1278	7384
	Water Truck	15052	8875	710	0	2343	26980
	Well	213	0	0	0	0	213
	Bottled Water	9301	11857	1420	71	6745	29394
Northern Borders	Public Piped Water	1428	952	280	252	924	3836
	Water Purifier	168	2044	392	0	1036	3640
	Water Truck	2744	7896	1764	1456	3920	17780
	Well	0	0	0	0	0	0
	Bottled Water	1736	4480	1736	196	3668	11816
Jazan	Public Piped Water	11100	7104	1184	0	6364	25752
	Water Purifier	3996	1184	148	0	888	6216
	Water Truck	12432	2368	888	0	2516	18204
	Well	1184	0	0	0	0	1184
	Bottled Water	72372	21904	8880	296	19388	122840
Najran	Public Piped Water	1922	1860	868	0	4464	9114
	Water Purifier	2232	2728	186	0	3224	8370
	Water Truck	8308	3596	372	0	3348	15624
	Well	310	0	0	0	0	310
	Bottled Water	8556	7626	1984	0	14446	32612

		Type of Housing Unit					
Administrative Area	**Source of Drinking Water**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Baha	Public Piped Water	504	1960	112	0	1064	3640
	Water Purifier	952	5264	1400	0	4648	12264
	Water Truck	1232	728	56	0	336	2352
	Well	168	0	0	0	0	168
	Bottled Water	10192	14280	3304	0	19880	47656
Al-Jouf	Public Piped Water	2464	5600	448	0	6272	14784
	Water Purifier	168	616	0	0	784	1568
	Water Truck	9632	3248	1120	168	2632	16800
	Well	0	0	0	0	0	0
	Bottled Water	1624	11032	896	0	9576	23128
Total	Public Piped Water	80587	220205	76332	3615	422774	803513
	Water Purifier	18162	146675	30908	474	104013	300232
	Water Truck	235799	154148	33070	9567	188343	620927
	Well	4267	0	0	0	1787	6054
	Bottled Water	306306	510619	130555	12746	813738	1773964

Source: Housing Survey 2017 _General Authority for Statistics

Table 7B: Housing Units (Occupied With Saudi Households), Households and Individuals by Source of Drinking Water

		Source of Drinking Water					
Administrative Area		**Public Network**	**Water Purifier**	**Water Truck**	**Well**	**Bottled Water**	**Total**
Al-Riyadh	Housing Units	248412	122576	98778	1630	358274	829670
	Households	248412	122576	98778	1630	358274	829670
	Individuals	1424719	820306	522779	11734	2058657	4838195
Makkah Al-Mokarramah	Housing Units	164959	42485	166424	1758	495463	871089
	Households	164959	42485	166424	1758	495463	871089
	Individuals	908703	242448	789221	13867	2677453	4631692
Al-Madinah Al-Monawarah	Housing Units	74044	19722	49651	346	100167	243930
	Households	74044	19722	49651	346	100167	243930
	Individuals	429329	123833	262431	2034	578856	1396483
Al-Qaseem	Housing Units	45440	46400	31200	0	41440	164480
	Households	45440	46400	31200	0	41440	164480
	Individuals	310390	284769	215655	0	239106	1049920
Eastern Region	Housing Units	121451	14480	93758	181	270595	500465
	Households	121451	14480	93758	181	270595	500465
	Individuals	609851	85836	763082	1078	1760563	3220410
Aseer	Housing Units	43737	8967	74664	0	172203	299571
	Households	43737	8967	74664	0	172203	299571
	Individuals	190971	35038	568343	0	971533	1765885
Tabouk	Housing Units	34144	6160	8712	264	68376	117656
	Households	34144	6160	8712	264	68376	117656
	Individuals	208055	45512	45452	1423	427682	728124
Hail	Housing Units	14200	7384	26980	213	29394	78171
	Households	14200	7384	26980	213	29394	78171
	Individuals	90554	56745	205745	2242	197694	552980
Northern Borders	Housing Units	3836	3640	17780	0	11816	37072
	Households	3836	3640	17780	0	11816	37072
	Individuals	30762	31660	142909	0	94109	299440
Jazan	Housing Units	25752	6216	18204	1184	122840	174196
	Households	25752	6216	18204	1184	122840	174196
	Individuals	124660	52261	183199	8210	852079	1220409
Najran	Housing Units	9114	8370	15624	310	32612	66030
	Households	9114	8370	15624	310	32612	66030
	Individuals	74914	41307	108855	3295	217001	445372
Al-Baha	Housing Units	3640	12264	2352	168	47656	66080
	Households	3640	12264	2352	168	47656	66080
	Individuals	21012	65110	22697	1070	281817	391706
Al-Jouf	Housing Units	14784	1568	16800	0	23128	56280
	Households	14784	1568	16800	0	23128	56280
	Individuals	76788	16293	142280	0	155205	390566
Total	Housing Units	803513	300232	620927	6054	1773964	3504690
	Households	803513	300232	620927	6054	1773964	3504690
	Individuals	4500708	1901118	3972648	44953	10511755	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 8A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Water Storage

		Type of Housing Unit					
Administrative Area	**Water Storage**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Cement Tank	41728	360556	120294	1630	259496	783704
	Tin Tank	3586	326	0	0	326	4238
	Fiberglass Tank	2282	14018	5542	0	19886	41728
Makkah Al-Mokarramah	Cement Tank	171991	108703	20510	9962	534725	845891
	Tin Tank	2051	0	0	0	586	2637
	Fiberglass Tank	4981	4102	293	0	13185	22561
Al-Madinah Al-Monawarah	Cement Tank	44115	27507	2076	692	132864	207254
	Tin Tank	6228	173	0	0	3633	10034
	Fiberglass Tank	8477	8996	173	0	8996	26642
Al-Qaseem	Cement Tank	24320	90400	29920	0	14080	158720
	Tin Tank	960	480	0	0	0	1440
	Fiberglass Tank	160	2720	1280	0	160	4320
Eastern Region	Cement Tank	20634	67513	9231	2534	83803	183715
	Tin Tank	724	181	181	362	905	2353
	Fiberglass Tank	34209	95749	20091	7421	156927	314397
Aseer	Cement Tank	21594	63501	21411	915	66246	173667
	Tin Tank	17934	8235	915	0	2928	30012
	Fiberglass Tank	16287	34038	8784	183	36600	95892
Tabouk	Cement Tank	24728	5896	792	264	63184	94864
	Tin Tank	1584	0	0	0	352	1936
	Fiberglass Tank	10736	1056	88	0	8976	20856
Hail	Cement Tank	26341	28684	3266	71	12922	71284
	Tin Tank	1704	213	0	0	0	1917
	Fiberglass Tank	2343	2130	0	0	497	4970
Northern Borders	Cement Tank	2576	9688	3024	1372	8176	24836
	Tin Tank	336	308	392	196	0	1232
	Fiberglass Tank	3164	5376	756	336	1372	11004
Jazan	Cement Tank	42328	22200	8436	0	20572	93536
	Tin Tank	38924	1776	592	0	1480	42772
	Fiberglass Tank	19832	8584	2072	296	7104	37888
Najran	Cement Tank	13330	8990	2976	0	20088	45384
	Tin Tank	5456	5766	186	0	2728	14136
	Fiberglass Tank	2542	1054	248	0	2666	6510
Al-Baha	Cement Tank	10752	21280	4872	0	25536	62440
	Tin Tank	728	112	0	0	0	840
	Fiberglass Tank	1568	840	0	0	392	2800
Al-Jouf	Cement Tank	2968	8456	2016	0	6720	20160
	Tin Tank	3304	3808	112	0	2352	9576
	Fiberglass Tank	7616	8232	336	168	10192	26544
Total	Cement Tank	447405	823374	228824	17440	1248412	2765455
	Tin Tank	83519	21378	2378	558	15290	123123
	Fiberglass Tank	114197	186895	39663	8404	266953	616112

Source: Housing Survey 2017 _General Authority for Statistics

Table 8B: Housing Units (Occupied With Saudi Households), Households and Individuals by Water Storage

Administrative Area	Water Storage	Cement Tank	Tin Tank	Fiberglass Tank	Total
Al-Riyadh	**Housing Units**	**783704**	**4238**	**41728**	**829670**
	Households	783704	4238	41728	829670
	Individuals	4631086	17211	189898	4838195
Makkah Al-Mokarramah	Housing Units	845891	2637	22561	871089
	Households	845891	2637	22561	871089
	Individuals	4488362	10816	132514	4631692
Al-Madinah Al-Monawarah	Housing Units	207254	10034	26642	243930
	Households	207254	10034	26642	243930
	Individuals	1195067	46827	154589	1396483
Al-Qaseem	Housing Units	158720	1440	4320	164480
	Households	158720	1440	4320	164480
	Individuals	1015126	10568	24226	1049920
Eastern Region	Housing Units	183715	2353	314397	500465
	Households	183715	2353	314397	500465
	Individuals	1268089	19473	1932848	3220410
Aseer	Housing Units	173667	30012	95892	299571
	Households	173667	30012	95892	299571
	Individuals	1107407	198630	459848	1765885
Tabouk	Housing Units	94864	1936	20856	117656
	Households	94864	1936	20856	117656
	Individuals	599389	6637	122098	728124
Hail	Housing Units	71284	1917	4970	78171
	Households	71284	1917	4970	78171
	Individuals	508078	8214	36688	552980
Northern Borders	Housing Units	24836	1232	11004	37072
	Households	24836	1232	11004	37072
	Individuals	193424	11784	94232	299440
Jazan	Housing Units	93536	42772	37888	174196
	Households	93536	42772	37888	174196
	Individuals	652883	388456	179070	1220409
Najran	Housing Units	45384	14136	6510	66030
	Households	45384	14136	6510	66030
	Individuals	302556	106955	35861	445372
Al-Baha	Housing Units	62440	840	2800	66080
	Households	62440	840	2800	66080
	Individuals	360176	4487	27043	391706
Al-Jouf	Housing Units	20160	9576	26544	56280
	Households	20160	9576	26544	56280
	Individuals	131907	61038	197621	390566
Total	Housing Units	2765455	123123	616112	3504690
	Households	2765455	123123	616112	3504690
	Individuals	16453550	891096	3586536	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 9A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Source of Electricity

		Type of Housing Unit					
Administrative Area	**Source of Electricity**	**"Traditional House"**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Public Network	46944	373922	125836	1630	279382	827714
	Private Network	652	978	0	0	326	1956
Makkah Al-Mokarramah	Public Network	178437	111340	20803	9962	548203	868745
	Private Network	586	1465	0	0	293	2344
Al-Madinah Al-Monawarah	Public Network	58820	36503	2249	692	145320	243584
	Private Network	0	173	0	0	173	346
Al-Qaseem	Public Network	25440	93280	31040		14240	164000
	Private Network	0	320	160		0	480
Eastern Region	Public Network	55386	162900	29503	10317	241454	499560
	Private Network	181	543	0	0	181	905
Aseer	Public Network	55632	105408	30744	1098	105774	298656
	Private Network	183	366	366	0	0	915
Tabouk	Public Network	37048	6952	880	264	72512	117656
	Private Network	0	0	0	0	0	0
Hail	Public Network	30317	30956	3266	71	13419	78029
	Private Network	71	71	0	0	0	142
Northern Borders	Public Network	6076	15344	4172	1904	9548	37044
	Private Network	0	28	0	0	0	28
Jazan	Public Network	101084	32560	11100	296	29156	174196
	Private Network	0	0	0	0	0	0
Najran	Public Network	21328	15810	3410	0	25482	66030
	Private Network	0	0	0	0	0	0
Al-Baha	Public Network	13048	22232	4872	0	25928	66080
	Private Network	0	0	0	0	0	0
Al-Jouf	Public Network	13888	20496	2464	168	19264	56280
	Private Network	0	0	0	0	0	0
Total	Public Network	643448	1027703	270339	26402	1529682	3497574
	Private Network	1673	3944	526	0	973	7116

Source: Housing Survey 2017 _General Authority for Statistics

Table 9B: Housing Units (Occupied With Saudi Households), Households and Individuals by Source of Electricity

		Source of Electricity		
Administrative Area		**Public Network**	**Private Network**	**Total**
Al-Riyadh	Housing Units	827714	1956	829670
	Households	827714	1956	829670
	Individuals	4826665	11530	4838195
Makkah Al-Mokarramah	Housing Units	868745	2344	871089
	Households	868745	2344	871089
	Individuals	4622828	8864	4631692
Al-Madinah Al-Monawarah	Housing Units	243584	346	243930
	Households	243584	346	243930
	Individuals	1393822	2661	1396483
Al-Qaseem	Housing Units	164000	480	164480
	Households	164000	480	164480
	Individuals	1047864	2056	1049920
Eastern Region	Housing Units	499560	905	500465
	Households	499560	905	500465
	Individuals	3216046	4364	3220410
Aseer	Housing Units	298656	915	299571
	Households	298656	915	299571
	Individuals	1761916	3969	1765885
Tabouk	Housing Units	117656	0	117656
	Households	117656	0	117656
	Individuals	728124	0	728124
Hail	Housing Units	78029	142	78171
	Households	78029	142	78171
	Individuals	552637	343	552980
Northern Borders	Housing Units	37044	28	37072
	Households	37044	28	37072
	Individuals	299286	154	299440
Jazan	Housing Units	174196	0	174196
	Households	174196	0	174196
	Individuals	1220409	0	1220409
Najran	Housing Units	66030	0	66030
	Households	66030	0	66030
	Individuals	445372	0	445372
Al-Baha	Housing Units	66080	0	66080
	Households	66080	0	66080
	Individuals	391706	0	391706
Al-Jouf	Housing Units	56280	0	56280
	Households	56280	0	56280
	Individuals	390566	0	390566
Total	Housing Units	3497574	7116	3504690
	Households	3497574	7116	3504690
	Individuals	20897241	33941	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 10A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Cooking Fuel

		Type of Housing Unit					
Administrative Area	**Type of Cooking Fuel**	**"Traditional House"**	**Villa**	**"A Floor in a Villa"**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Gas	47596	358926	120946	1630	257540	786638
	Electricity	0	15974	4890	0	22168	43032
Makkah Al-Mokarramah	Gas	178437	101671	20217	9962	523005	833292
	Electricity	586	11134	586	0	25491	37797
Al-Madinah Al-Monawarah	Gas	58301	30102	1903	692	138746	229744
	Electricity	519	6574	346	0	6747	14186
Al-Qaseem	Gas	25440	92640	30880	0	14080	163040
	Electricity	0	960	320	0	160	1440
Eastern Region	Gas	52852	120908	26245	9412	154212	363629
	Electricity	2715	42535	3258	905	87423	136836
Aseer	Gas	55632	104676	30744	915	105774	297741
	Electricity	183	1098	366	183	0	1830
Tabouk	Gas	37048	6864	792	264	72336	117304
	Electricity	0	88	88	0	176	352
Hail	Gas	30388	30885	3266	71	13348	77958
	Electricity	0	142	0	0	71	213
Northern Borders	Gas	6076	15344	4172	1904	9464	36960
	Electricity	0	28	0	0	84	112
Jazan	Gas	100936	32264	11100	296	29008	173604
	Electricity	148	296	0	0	148	592
Najran	Gas	21328	15810	3410	0	25420	65968
	Electricity	0	0	0	0	62	62
Al-Baha	Gas	12992	22120	4760	0	25928	65800
	Electricity	56	112	112	0	0	280
Al-Jouf	Gas	13888	20496	2464	168	19208	56224
	Electricity	0	0	0	0	56	56
Total	Gas	640914	952706	260899	25314	1388069	3267902
	Electricity	4207	78941	9966	1088	142586	236788

Source: Housing Survey 2017 _General Authority for Statistics

Table 10B: Housing Units (Occupied With Saudi Households), Households and Individuals by Cooking Fuel

Administrative Area		Type of Cooking Fuel		Total
		Gas	Electricity	
Al-Riyadh	Housing Units	786638	43032	829670
	Households	786638	43032	829670
	Individuals	4595769	242426	4838195
Makkah Al-Mokarramah	Housing Units	833292	37797	871089
	Households	833292	37797	871089
	Individuals	4454252	177440	4631692
Al-Madinah Al-Monawarah	Housing Units	229744	14186	243930
	Households	229744	14186	243930
	Individuals	1310037	86446	1396483
Al-Qaseem	Housing Units	163040	1440	164480
	Households	163040	1440	164480
	Individuals	1043514	6406	1049920
Eastern Region	Housing Units	363629	136836	500465
	Households	363629	136836	500465
	Individuals	2650204	570206	3220410
Aseer	Housing Units	297741	1830	299571
	Households	297741	1830	299571
	Individuals	1754862	11023	1765885
Tabouk	Housing Units	117304	352	117656
	Households	117304	352	117656
	Individuals	726663	1461	728124
Hail	Housing Units	77958	213	78171
	Households	77958	213	78171
	Individuals	550801	2179	552980
Northern Borders	Housing Units	36960	112	37072
	Households	36960	112	37072
	Individuals	298772	668	299440
Jazan	Housing Units	173604	592	174196
	Households	173604	592	174196
	Individuals	1218557	1852	1220409
Najran	Housing Units	65968	62	66030
	Households	65968	62	66030
	Individuals	445199	173	445372
Al-Baha	Housing Units	65800	280	66080
	Households	65800	280	66080
	Individuals	390735	971	391706
Al-Jouf	Housing Units	56224	56	56280
	Households	56224	56	56280
	Individuals	390449	117	390566
Total	Housing Units	3267902	236788	3504690
	Households	3267902	236788	3504690
	Individuals	19829814	1101368	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 11A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Type of Sewage Disposal

		Type of Housing Unit					
Administrative Area	**Sewage Disposal**	**Traditional House**	**Villa**	**A Floor in a Villa**	**A Floor in Traditional House**	**Apartment**	**Total**
Al-Riyadh	Public Sewage Network	13366	258518	112144	326	243848	628202
	Private Network	652	652	0	0	326	1630
	Ditch	33578	115730	13692	1304	35534	199838
Makkah Al-Mokarramah	Public Sewage Network	21682	37211	12599	3809	346326	421627
	Private Network	293	879	0	0	293	1465
	Ditch	157048	74715	8204	6153	201877	447997
Al-Madinah Al-Monawarah	Public Sewage Network	11591	16262	2076	0	89268	119197
	Private Network	0	0	0	0	0	0
	Ditch	47229	20414	173	692	56225	124733
Al-Qaseem	Public Sewage Network	4480	59680	21120	0	10240	95520
	Private Network	0	0	0	0	0	0
	Ditch	20960	33920	10080	0	4000	68960
Eastern Region	Public Sewage Network	33666	133940	21720	9050	213399	411775
	Private Network	0	362	0	0	181	543
	Ditch	21901	29141	7783	1267	28055	88147
Aseer	Public Sewage Network	4758	49410	20496	915	63318	138897
	Private Network	183	183	366	0	0	732
	Ditch	50874	56181	10248	183	42456	159942
Tabouk	Public Sewage Network	8888	3784	792	176	55264	68904
	Private Network	88	0	0	88	88	264
	Ditch	28072	3168	88	0	17160	48488
Hail	Public Sewage Network	3124	11076	2343	71	6958	23572
	Private Network	0	71	0	0	0	71
	Ditch	27264	19880	923	0	6461	54528
Northern Borders	Public Sewage Network	2576	6356	2688	1344	4564	17528
	Private Network	0	0	0	0	0	0
	Ditch	3500	9016	1484	560	4984	19544
Jazan	Public Sewage Network	12284	8584	2516	296	8436	32116
	Private Network	0	0	0	0	0	0
	Ditch	88800	23976	8584	0	20720	142080
Najran	Public Sewage Network	1426	1984	806	0	5704	9920
	Private Network	0	0	0	0	0	0
	Ditch	19902	13826	2604	0	19778	56110
Al-Baha	Public Sewage Network	560	1064	56	0	672	2352
	Private Network	0	0	0	0	0	0
	Ditch	12488	21168	4816	0	25256	63728
Al-Jouf	Public Sewage Network	3696	11368	1792	0	9968	26824
	Private Network	0	0	0	0	0	0
	Ditch	10192	9128	672	168	9296	29456
Total	Public Sewage Network	122097	599237	201148	15987	1057965	1996434
	Private Network	1216	2147	366	88	888	4705
	Ditch	521808	430263	69351	10327	471802	1503551

Source: Housing Survey 2017 _General Authority for Statistics

Table 11B: Housing Units (Occupied With Saudi Households), Households and Individuals by Type of Sewage Disposal

Administrative Area		Type of Sewage Disposal			
		Public Sewage Network	Private Network	Ditch	Total
Al-Riyadh	Housing Units	628202	1630	199838	829670
	Households	628202	1630	199838	829670
	Individuals	3607899	10240	1220056	4838195
Makkah Al-Mokarramah	Housing Units	421627	1465	447997	871089
	Households	421627	1465	447997	871089
	Individuals	2262625	5916	2363151	4631692
Al-Madinah Al-Monawarah	Housing Units	119197	0	124733	243930
	Households	119197	0	124733	243930
	Individuals	740230	0	656253	1396483
Al-Qaseem	Housing Units	95520	0	68960	164480
	Households	95520	0	68960	164480
	Individuals	607107	0	442813	1049920
Eastern Region	Housing Units	411775	543	88147	500465
	Households	411775	543	88147	500465
	Individuals	2452231	2884	765295	3220410
Aseer	Housing Units	138897	732	159942	299571
	Households	138897	732	159942	299571
	Individuals	591601	3421	1170863	1765885
Tabouk	Housing Units	68904	264	48488	117656
	Households	68904	264	48488	117656
	Individuals	478588	2675	246861	728124
Hail	Housing Units	23572	71	54528	78171
	Households	23572	71	54528	78171
	Individuals	127932	197	424851	552980
Northern Borders	Housing Units	17528	0	19544	37072
	Households	17528	0	19544	37072
	Individuals	142796	0	156644	299440
Jazan	Housing Units	32116	0	142080	174196
	Households	32116	0	142080	174196
	Individuals	87943	0	1132466	1220409
Najran	Housing Units	9920	0	56110	66030
	Households	9920	0	56110	66030
	Individuals	80290	0	365082	445372
Al-Baha	Housing Units	2352	0	63728	66080
	Households	2352	0	63728	66080
	Individuals	12550	0	379156	391706
Al-Jouf	Housing Units	26824	0	29456	56280
	Households	26824	0	29456	56280
	Individuals	148298	0	242268	390566
Total	Housing Units	1996434	4705	1503551	3504690
	Households	1996434	4705	1503551	3504690
	Individuals	11340090	25333	9565759	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 12A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Waste Disposal

Administrative Area		Type of Housing Unit						
	Waste Disposal	Traditional House	Villa	A Floor in a Villa	A Floor in Traditional House	Apartment	Other	Total
Al-Riyadh	Public Bin	53149	384111	144498	4755	222213	711	809437
	Incineration	0	0	0	0	0	0	0
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Makkah Al-Mokarramah	Public Bin	178760	139414	30177	9890	498572	293	857106
	Incineration	0	0	0	0	0	0	0
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	232	0	0	232
Al-Madinah Al-Monawarah	Public Bin	59255	29512	4259	1717	143125	0	237868
	Incineration	130	0	0	0	0	0	130
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Al-Qaseem	Public Bin	23588	86365	28716	979	12251	169	152068
	Incineration	0	0	0	0	0	0	0
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Eastern Region	Public Bin	51249	176265	33495	15026	219909	0	495944
	Incineration	0	0	0	0	708	0	708
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Aseer	Public Bin	56455	95938	37004	3293	87115	199	280004
	Incineration	398	199	0	0	0	0	597
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Tabouk	Public Bin	34736	4622	5820	3330	66429	0	114937
	Incineration	0	0	0	0	0	0	0
	Burying	0	0	0	55	0	0	55
	Other	0	0	0	0	0	0	0
Hail	Public Bin	30942	32636	1634	1015	10323	28	76578
	Incineration	63	0	0	0	0	0	63
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Northern Borders	Public Bin	9781	10127	2924	3870	9962	0	36664
	Incineration	0	45	0	0	0	0	45
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Jazan	Public Bin	99642	20319	12497	7408	31534	0	171400
	Incineration	0	384	0	0	161	0	545
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Najran	Public Bin	17785	14108	7450	3903	21344	612	65202
	Incineration	106	0	0	0	0	0	106
	Burying	0	0	0	0	0	0	0
	Other	136	0	0	0	68	0	204
Al-Baha	Public Bin	19033	13701	5466	1260	23354	84	62898
	Incineration	0	0	0	0	0	0	0
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Al-Jouf	Public Bin	14248	21790	2393	440	16002	0	54873
	Incineration	67	57	0	0	0	0	124
	Burying	0	0	0	0	0	0	0
	Other	0	0	0	0	0	0	0
Total	Public Bin	648623	1028908	316333	56886	1362133	2096	3414979
	Incineration	764	685	0	0	869	0	2318
	Burying	0	0	0	55	0	0	55
	Other	136	0	0	232	68	0	436

Source: Demographic Survey 2016 _General Authority for Statistics

Table 12B: Housing Units (Occupied With Saudi Households), Households and Individuals by Type of Waste Disposal

Administrative Area		Type of Waste Disposal				
		Public Bin	Incineration	Burying	Other	Total
Al-Riyadh	Housing Units	809437	0	0	0	809437
	Households	809437	0	0	0	809437
	Individuals	5126104	0	0	0	5126104
Makkah Al-Mokarramah	Housing Units	857106	0	0	232	857338
	Households	857106	0	0	232	857338
	Individuals	4712423	0	0	480	4712903
Al-Madinah Al-Monawarah	Housing Units	237868	130	0	0	237998
	Households	237868	130	0	0	237998
	Individuals	1394895	1048	0	0	1395943
Al-Qaseem	Housing Units	152068	0	0	0	152068
	Households	152068	0	0	0	152068
	Individuals	1031456	0	0	0	1031456
Eastern Region	Housing Units	495944	708	0	0	496652
	Households	495944	708	0	0	496652
	Individuals	3307818	4201	0	0	3312019
Aseer	Housing Units	280004	597	0	0	280601
	Households	280004	597	0	0	280601
	Individuals	1738543	1764	0	0	1740307
Tabouk	Housing Units	114937	0	55	0	114992
	Households	114937	0	55	0	114992
	Individuals	716976	0	82	0	717058
Hail	Housing Units	76578	63	0	0	76641
	Households	76578	63	0	0	76641
	Individuals	548903	379	0	0	549282
Northern Borders	Housing Units	36664	45	0	0	36709
	Households	36664	45	0	0	36709
	Individuals	296361	213	0	0	296574
Jazan	Housing Units	171400	545	0	0	171945
	Households	171400	545	0	0	171945
	Individuals	1218685	5658	0	0	1224343
Najran	Housing Units	65202	106	0	204	65512
	Households	65202	106	0	204	65512
	Individuals	433333	641	0	942	434916
Al-Baha	Housing Units	62898	0	0	0	62898
	Households	62898	0	0	0	62898
	Individuals	383995	0	0	0	383995
Al-Jouf	Housing Units	54873	124	0	0	54997
	Households	54873	124	0	0	54997
	Individuals	384507	759	0	0	385266
Total	Housing Units	3414979	2318	55	436	3417788
	Households	3414979	2318	55	436	3417788
	Individuals	21293999	14663	82	1422	21310166

Source: Demographic Survey 2016 _General Authority for Statistics

Table 13A: Housing Units (Occupied With Saudi Households) by Type of Housing Unit and Frequency of Waste Disposal

Administrative Area		Type of Housing Unit						
	Frequency of Waste Disposal	Traditional House	Villa	A Floor in a Villa	A Floor in Traditional House	Apartment	Other	Total
Al-Riyadh	Daily	46465	325960	118287	4529	166966	470	662677
	Once a Week	5361	51447	24468	226	49152	241	130895
	More Than Once a Week	1323	6704	1491	0	5843	0	15361
	Other	0	0	252	0	252	0	504
Makkah Al-Mokarramah	Daily	93343	110678	20995	3026	336694	293	565029
	Once a Week	68542	20730	7623	6180	146155	0	249230
	More Than Once a Week	16615	8006	1559	916	15723	0	42819
	Other	260	0	0	0	0	0	260
Al-Madinah Al-Monawarah	Daily	31286	25156	3309	1337	114963	0	176051
	Once a Week	17044	4356	652	130	26524	0	48706
	More Than Once a Week	11055	0	298	250	1638	0	13241
	Other	0	0	0	0	0	0	0
Al-Qaseem	Daily	12229	71936	23018	885	9935	169	118172
	Once a Week	10983	13997	5698	94	2222	0	32994
	More Than Once a Week	376	432	0	0	94	0	902
	Other	0	0	0	0	0	0	0
Eastern Region	Daily	38283	161376	23960	10605	191492	0	425716
	Once a Week	12295	14268	8334	2850	25382	0	63129
	More Than Once a Week	671	621	1201	1571	3743	0	7807
	Other	0	0	0	0	0	0	0
Aseer	Daily	16462	49273	26782	2328	57656	0	152501
	Once a Week	28465	27163	6817	965	24259	0	87669
	More Than Once a Week	11926	19701	3405	0	5200	199	40431
	Other	0	0	0	0	0	0	0
Tabouk	Daily	24803	2741	5435	2579	35324	0	70882
	Once a Week	7817	1551	308	674	26169	0	36519
	More Than Once a Week	2116	330	77	132	4936	0	7591
	Other	0	0	0	0	0	0	0
Hail	Daily	13859	23043	1083	863	7723	0	46571
	Once a Week	10776	8172	406	70	2364	28	21816
	More Than Once a Week	6370	1421	145	82	236	0	8254
	Other	0	0	0	0	0	0	0
Northern Borders	Daily	7789	8556	2800	3554	8954	0	31653
	Once a Week	1902	1556	124	316	978	0	4876
	More Than Once a Week	90	60	0	0	30	0	180
	Other	0	0	0	0	0	0	0
Jazan	Daily	44918	14177	2557	3772	16425	0	81849
	Once a Week	48930	6202	7908	3636	14765	0	81441
	More Than Once a Week	5794	324	2032	0	505	0	8655
	Other	0	0	0	0	0	0	0
Najran	Daily	8744	8893	4496	1467	11902	340	35842
	Once a Week	6080	3419	2689	1411	7608	68	21275
	More Than Once a Week	3203	1796	265	1025	1902	204	8395
	Other	0	0	0	0	0	0	0
Al-Baha	Daily	9032	4368	1862	609	10272	84	26227
	Once a Week	4306	7854	2442	422	9778	0	24802
	More Than Once a Week	5695	1479	1162	229	3304	0	11869
	Other	0	0	0	0	0	0	0
Al-Jouf	Daily	5675	13571	1856	309	7489	0	28900
	Once a Week	8003	7359	537	131	7090	0	23120
	More Than Once a Week	637	917	0	0	1423	0	2977
	Other	0	0	0	0	0	0	0
Total	Daily	352888	819728	236440	35863	975795	1356	2422070
	Once a Week	230504	168074	68006	17105	342446	337	826472
	More Than Once a Week	65871	41791	11635	4205	44577	403	168482
	Other	260	0	252	0	252	0	764

Source: Demographic Survey 2016 _General Authority for Statistics

Table 13B: Housing Units (Occupied With Saudi Households), Households and Individuals by Frequency of Waste Disposal

Administrative Area		Frequency of Waste Disposal				
		Daily	Once a Week	More Than Once a Week	Other	Total
Al-Riyadh	Housing Units	662677	130895	15361	504	809437
	Households	662677	130895	15361	504	809437
	Individuals	4356660	700863	66827	1754	5126104
Makkah Al-Mokarramah	Housing Units	565029	249230	42819	260	857338
	Households	565029	249230	42819	260	857338
	Individuals	3285985	1257963	165769	3186	4712903
Al-Madinah Al-Monawarah	Housing Units	176051	48706	13241	0	237998
	Households	176051	48706	13241	0	237998
	Individuals	1106619	229436	59888	0	1395943
Al-Qaseem	Housing Units	118172	32994	902	0	152068
	Households	118172	32994	902	0	152068
	Individuals	821187	204451	5818	0	1031456
Eastern Region	Housing Units	425716	63129	7807	0	496652
	Households	425716	63129	7807	0	496652
	Individuals	2913038	373194	25787	0	3312019
Aseer	Housing Units	152501	87669	40431	0	280601
	Households	152501	87669	40431	0	280601
	Individuals	944337	539923	256047	0	1740307
Tabouk	Housing Units	70882	36519	7591	0	114992
	Households	70882	36519	7591	0	114992
	Individuals	481529	209523	26006	0	717058
Hail	Housing Units	46571	21816	8254	0	76641
	Households	46571	21816	8254	0	76641
	Individuals	331864	154060	63358	0	549282
Northern Borders	Housing Units	31653	4876	180	0	36709
	Households	31653	4876	180	0	36709
	Individuals	259892	35420	1262	0	296574
Jazan	Housing Units	81849	81441	8655	0	171945
	Households	81849	81441	8655	0	171945
	Individuals	633459	543726	47158	0	1224343
Najran	Housing Units	35842	21275	8395	0	65512
	Households	35842	21275	8395	0	65512
	Individuals	264917	118641	51358	0	434916
Al-Baha	Housing Units	26227	24802	11869	0	62898
	Households	26227	24802	11869	0	62898
	Individuals	164643	146858	72494	0	383995
Al-Jouf	Housing Units	28900	23120	2977	0	54997
	Households	28900	23120	2977	0	54997
	Individuals	214505	154407	16354	0	385266
Total	Housing Units	2422070	826472	168482	764	3417788
	Households	2422070	826472	168482	764	3417788
	Individuals	15778635	4668465	858126	4940	21310166

Source: Demographic Survey 2016 _General Authority for Statistics

Table 14: Housing Units (Occupied With Saudi Households), Households and Individuals Number of Televisions

Administrative Area		Number of Televisions					
		1	2	3	4	5+	Total
Al-Riyadh	Housing Units	228381	317960	143769	63322	46890	800322
	Households	228381	317960	143769	63322	46890	800322
	Individuals	1072251	1980402	1067304	530145	428019	5078121
Makkah Al-Mokarramah	Housing Units	356263	357980	97142	26188	11209	848782
	Households	356263	357980	97142	26188	11209	848782
	Individuals	1666850	2073578	638014	205373	91553	4675368
Al-Madinah Al-Monawarah	Housing Units	120069	79236	23254	5122	2846	230527
	Households	120069	79236	23254	5122	2846	230527
	Individuals	604729	515481	167287	46645	25452	1359594
Al-Qaseem	Housing Units	72134	40282	19488	4940	2663	139507
	Households	72134	40282	19488	4940	2663	139507
	Individuals	392768	302625	168245	47571	26745	937954
Eastern Region	Housing Units	160873	208055	76907	30522	15737	492094
	Households	160873	208055	76907	30522	15737	492094
	Individuals	837738	1383083	609569	275037	182498	3287925
Aseer	Housing Units	174195	77416	19191	2979	1270	275051
	Households	174195	77416	19191	2979	1270	275051
	Individuals	985556	536902	148100	26651	10684	1707893
Tabouk	Housing Units	48572	53316	9796	1447	556	113687
	Households	48572	53316	9796	1447	556	113687
	Individuals	252140	356999	83727	11954	7332	712152
Hail	Housing Units	21955	32990	13690	5637	1770	76042
	Households	21955	32990	13690	5637	1770	76042
	Individuals	123310	231324	116049	53151	21233	545067
Northern Borders	Housing Units	8395	20287	5638	1562	475	36357
	Households	8395	20287	5638	1562	475	36357
	Individuals	54386	160312	56828	16652	5184	293362
Jazan	Housing Units	69488	79811	18010	2444	976	170729
	Households	69488	79811	18010	2444	976	170729
	Individuals	423510	587319	161004	29035	15411	1216279
Najran	Housing Units	27734	28009	7599	1967	133	65442
	Households	27734	28009	7599	1967	133	65442
	Individuals	150901	193127	69615	19957	1240	434840
Al-Baha	Housing Units	24940	27216	8018	1474	336	61984
	Households	24940	27216	8018	1474	336	61984
	Individuals	132629	172506	57462	13691	2320	378608
Al-Jouf	Housing Units	18877	22074	8578	2506	1910	53945
	Households	18877	22074	8578	2506	1910	53945
	Individuals	105108	159414	74110	22178	18139	378949
Total	Housing Units	1331876	1344632	451080	150110	86771	3364469
	Households	1331876	1344632	451080	150110	86771	3364469
	Individuals	6801876	8653072	3417314	1298040	835810	21006112

Source: Demographic Survey 2016 _General Authority for Statistics

Table 15: Housing Units (Occupied With Saudi Households), Households and Individuals by Number of Personal Computers

Administrative Area		Number of Personal Computers			
		1	2	3+	Total
Al-Riyadh	Housing Units	314414	142229	115708	572351
	Households	314414	142229	115708	572351
	Individuals	1808793	975462	985666	3769921
Makkah Al-Mokarramah	Housing Units	363531	106985	61060	531576
	Households	363531	106985	61060	531576
	Individuals	1999410	681191	450518	3131119
Al-Madinah Al-Monawarah	Housing Units	91880	32196	19361	143437
	Households	91880	32196	19361	143437
	Individuals	535567	226424	150271	912262
Al-Qaseem	Housing Units	51467	19135	9759	80361
	Households	51467	19135	9759	80361
	Individuals	334084	155247	91398	580729
Eastern Region	Housing Units	235502	70705	28957	335164
	Households	235502	70705	28957	335164
	Individuals	1491730	568408	305135	2365273
Aseer	Housing Units	99729	21777	7558	129064
	Households	99729	21777	7558	129064
	Individuals	597149	159470	62966	819585
Tabouk	Housing Units	40937	5303	2079	48319
	Households	40937	5303	2079	48319
	Individuals	260868	39639	24092	324599
Hail	Housing Units	28076	4644	1591	34311
	Households	28076	4644	1591	34311
	Individuals	211804	40360	17613	269777
Northern Borders	Housing Units	14667	3050	1034	18751
	Households	14667	3050	1034	18751
	Individuals	116469	31246	10753	158468
Jazan	Housing Units	69259	11386	4094	84739
	Households	69259	11386	4094	84739
	Individuals	459558	100712	41425	601695
Najran	Housing Units	39498	5842	1290	46630
	Households	39498	5842	1290	46630
	Individuals	242347	50106	14784	307237
Al-Baha	Housing Units	23923	9221	1782	34926
	Households	23923	9221	1782	34926
	Individuals	141772	63850	16117	221739
Al-Jouf	Housing Units	21155	4611	2039	27805
	Households	21155	4611	2039	27805
	Individuals	139644	37387	20136	197167
Total	Housing Units	1394038	437084	256312	2087434
	Households	1394038	437084	256312	2087434
	Individuals	8339195	3129502	2190874	13659571

Source: Demographic Survey 2016_General Authority for Statistics

Table 16: Housing Units (Occupied With Saudi Households), Households and Individuals by Number of Internet Users

Administrative Area		Number of Internet Users					
		1	2	3	4	5+	Total
Al-Riyadh	Housing Units	74485	222177	104225	94759	261462	757108
	Households	74485	222177	104225	94759	261462	757108
	Individuals	330120	973264	615195	644045	2277887	4840511
Makkah Al-Mokarramah	Housing Units	73946	262815	118044	110298	174256	739359
	Households	73946	262815	118044	110298	174256	739359
	Individuals	293958	1172676	658456	701614	1364971	4191675
Al-Madinah Al-Monawarah	Housing Units	17940	63379	25206	21101	55093	182719
	Households	17940	63379	25206	21101	55093	182719
	Individuals	74856	291464	153969	142739	456970	1119998
Al-Qaseem	Housing Units	14838	38245	21431	16291	36749	127554
	Households	14838	38245	21431	16291	36749	127554
	Individuals	67364	194789	149570	120506	357702	889931
Eastern Region	Housing Units	39933	159831	70292	58175	112539	440770
	Households	39933	159831	70292	58175	112539	440770
	Individuals	195808	774375	463043	438572	1125636	2997434
Aseer	Housing Units	25972	74463	28690	20225	28958	178308
	Households	25972	74463	28690	20225	28958	178308
	Individuals	137863	373901	203098	149947	258436	1123245
Tabouk	Housing Units	11366	40964	15008	8772	9158	85268
	Households	11366	40964	15008	8772	9158	85268
	Individuals	53394	212200	104302	68486	97001	535383
Hail	Housing Units	6518	20543	8202	6810	14362	56435
	Households	6518	20543	8202	6810	14362	56435
	Individuals	37397	110250	62465	54227	147868	412207
Northern Borders	Housing Units	3044	10863	4474	3902	6748	29031
	Households	3044	10863	4474	3902	6748	29031
	Individuals	23778	63468	37004	34840	78320	237410
Jazan	Housing Units	14008	61517	22504	10735	13877	122641
	Households	14008	61517	22504	10735	13877	122641
	Individuals	83632	347254	186052	96646	172487	886071
Najran	Housing Units	15438	27813	8035	4054	6649	61989
	Households	15438	27813	8035	4054	6649	61989
	Individuals	71296	149628	70399	41112	84658	417093
Al-Baha	Housing Units	4646	18523	7639	6787	9916	47511
	Households	4646	18523	7639	6787	9916	47511
	Individuals	21579	89611	47942	46675	87139	292946
Al-Jouf	Housing Units	4093	14294	5944	4909	8550	37790
	Households	4093	14294	5944	4909	8550	37790
	Individuals	23995	75142	43692	39723	83812	266364
Total	Housing Units	306227	1015427	439694	366818	738317	2866483
	Households	306227	1015427	439694	366818	738317	2866483
	Individuals	1415040	4828022	2795187	2579132	6592887	18210268

Source: Demographic Survey 2016 _General Authority for Statistics

Table 17: Housing Units (Occupied with Saudi Households), Households and Individuals by Availability of a Fixed Telephone Line in Housing Unit

Administrative Area		Noumber of Fixed Telephone Lines			
		1	2	3+	Total
Al-Riyadh	Housing Units	350654	22446	4428	377528
	Households	350654	22446	4428	377528
	Individuals	2416762	207646	34936	2659344
Makkah Al-Mokarramah	Housing Units	221894	8700	2717	233311
	Households	221894	8700	2717	233311
	Individuals	1293274	70553	20258	1384085
Al-Madinah Al-Monawarah	Housing Units	59195	3313	1078	63586
	Households	59195	3313	1078	63586
	Individuals	388228	25679	8969	422876
Al-Qaseem	Housing Units	58324	1618	1076	61018
	Households	58324	1618	1076	61018
	Individuals	428052	16162	8841	453055
Eastern Region	Housing Units	213398	10622	1042	225062
	Households	213398	10622	1042	225062
	Individuals	1582780	96238	12247	1691265
Aseer	Housing Units	61057	3303	1563	65923
	Households	61057	3303	1563	65923
	Individuals	366339	25179	12924	404442
Tabouk	Housing Units	16037	439	298	16774
	Households	16037	439	298	16774
	Individuals	115122	5259	1928	122309
Hail	Housing Units	20236	795	180	21211
	Households	20236	795	180	21211
	Individuals	163887	9115	1620	174622
Northern Borders	Housing Units	3711	268	114	4093
	Households	3711	268	114	4093
	Individuals	33701	2510	985	37196
Jazan	Housing Units	20456	1069	441	21966
	Households	20456	1069	441	21966
	Individuals	141226	8620	7973	157819
Najran	Housing Units	41612	272	128	42012
	Households	41612	272	128	42012
	Individuals	273343	4168	999	278510
Al-Baha	Housing Units	18787	495	372	19654
	Households	18787	495	372	19654
	Individuals	119253	3066	2373	124692
Al-Jouf	Housing Units	8264	578	183	9025
	Households	8264	578	183	9025
	Individuals	60691	4865	1455	67011
Total	Housing Units	1093625	53918	13620	1161163
	Households	1093625	53918	13620	1161163
	Individuals	7382658	479060	115508	7977226

Source: Demographic Survey 2017 _General Authority for Statistics

Table 18: Housing Units (Occupied With Saudi Households), Households and Individuals by Number of Mobile Phones

Administrative Area		Number of Mobile Phones										
		1	2	3	4	5	6	7	8	9	10+	Total
Al-Riyadh	Housing Units	34118	248817	124184	101523	82049	69158	48502	37392	18654	30724	795121
	Households	34118	248817	124184	101523	82049	69158	48502	37392	18654	30724	795121
	Individuals	116657	1059394	712216	655195	604374	548583	426428	339555	191965	387512	5041879
Makkah Al-Mokarramah	Housing Units	57817	308091	148674	123777	89886	54047	26613	15826	5771	8088	838590
	Households	57817	308091	148674	123777	89886	54047	26613	15826	5771	8088	838590
	Individuals	188760	1327826	800597	769753	623911	407497	218557	144880	51205	90574	4623560
Al-Madinah Al-Monawarah	Housing Units	22360	81702	34372	26917	18463	14822	12054	7223	2988	3083	223984
	Households	22360	81702	34372	26917	18463	14822	12054	7223	2988	3083	223984
	Individuals	84020	382396	200731	177582	128138	116099	100420	65724	28704	36750	1320564
Al-Qaseem	Housing Units	12911	49915	19893	19205	17050	9775	7164	4607	2487	4114	147121
	Households	12911	49915	19893	19205	17050	9775	7164	4607	2487	4114	147121
	Individuals	52470	245793	133060	143927	137421	91764	67609	46071	26440	53460	998015
Eastern Region	Housing Units	21372	193383	88051	66029	42658	30597	18526	10045	5601	6536	482798
	Households	21372	193383	88051	66029	42658	30597	18526	10045	5601	6536	482798
	Individuals	67197	945729	564929	494318	363989	276763	201402	124905	78483	108232	3225947
Aseer	Housing Units	31230	111360	43688	37390	18878	14037	6331	3468	1271	3500	271153
	Households	31230	111360	43688	37390	18878	14037	6331	3468	1271	3500	271153
	Individuals	124648	562042	294959	274311	157048	126287	57025	35434	12971	43831	1688556
Tabouk	Housing Units	12590	51156	18279	13642	6928	2753	1658	1299	602	704	109611
	Households	12590	51156	18279	13642	6928	2753	1658	1299	602	704	109611
	Individuals	48779	265362	129332	107027	61847	22476	17636	14110	6913	14162	687644
Hail	Housing Units	3652	26610	12630	9519	8040	6026	4193	1734	956	1918	75278
	Households	3652	26610	12630	9519	8040	6026	4193	1734	956	1918	75278
	Individuals	14495	129507	86356	76497	71298	54604	44460	18997	11988	29311	537513
Northern Borders	Housing Units	1223	13566	6814	4657	3842	2214	1429	911	432	637	35725
	Households	1223	13566	6814	4657	3842	2214	1429	911	432	637	35725
	Individuals	6766	80359	54373	42413	36640	24438	16887	11954	5607	9700	289137
Jazan	Housing Units	18531	75436	28750	19786	10075	6577	1518	2376	723	1685	165457
	Households	18531	75436	28750	19786	10075	6577	1518	2376	723	1685	165457
	Individuals	107066	416073	215111	173210	99736	77586	21971	33691	9990	32660	1187094
Najran	Housing Units	8053	33347	10549	5399	2613	1938	1581	796	334	614	65224
	Households	8053	33347	10549	5399	2613	1938	1581	796	334	614	65224
	Individuals	26794	169657	83223	55972	26038	22698	17384	13166	4589	12029	431550
Al-Baha	Housing Units	3123	24802	12004	7303	6107	3600	1471	933	474	397	60214
	Households	3123	24802	12004	7303	6107	3600	1471	933	474	397	60214
	Individuals	13520	120513	71229	53662	45675	30787	14510	9240	4887	5670	369693
Al-Jouf	Housing Units	5767	20597	9146	5473	4270	2951	2007	1265	999	1488	53963
	Households	5767	20597	9146	5473	4270	2951	2007	1265	999	1488	53963
	Individuals	30931	114438	64307	44955	36610	26229	20175	12052	9743	18300	377740
Total	Housing Units	232747	1238782	557034	440620	310859	218495	133047	87875	41292	63488	3324239
	Households	232747	1238782	557034	440620	310859	218495	133047	87875	41292	63488	3324239
	Individuals	882103	5819089	3410423	3068822	2392725	1825811	1224464	869779	443485	842191	20778892

Source: Demographic Survey 2016 _General Authority for Statistics

Table 19: Housing Units (Occupied With Saudi Households), Households and Individuals by Total Number of Rooms

Administrative Area		Noumber of Rooms															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
Al-Riyadh	Housing Units	4890	26732	69438	174410	183864	113774	86064	55420	45966	27710	17604	11410	6520	3586	2282	829670
	Households	4890	26732	69438	174410	183864	113774	86064	55420	45966	27710	17604	11410	6520	3586	2282	829670
	Individuals	9498	58039	282050	800859	1052403	685417	579814	409043	345683	214497	150100	117788	71809	28424	32771	4838195
Makkah Al-Mokarramah	Housing Units	3809	27249	114563	272490	268681	94932	45415	19045	11720	7032	2344	1172	586	586	1465	871089
	Households	3809	27249	114563	272490	268681	94932	45415	19045	11720	7032	2344	1172	586	586	1465	871089
	Individuals	5300	92009	489927	1309435	1483075	610346	325231	125548	92548	48929	18812	10150	2552	5573	12257	4631692
Al-Madinah Al-Monawarah	Housing Units	1730	9515	43077	75774	67470	32351	7612	2422	1211	1211	346	519	519	173	0	243930
	Households	1730	9515	43077	75774	67470	32351	7612	2422	1211	1211	346	519	519	173	0	243930
	Individuals	2853	32394	201944	407062	409080	231279	55322	18347	13389	8626	4861	5049	5262	1015	0	1396483
Al-Qaseem	Housing Units	160	1920	10560	24160	33600	21600	21760	17760	14240	8480	4640	3040	960	480	1120	164480
	Households	160	1920	10560	24160	33600	21600	21760	17760	14240	8480	4640	3040	960	480	1120	164480
	Individuals	195	3434	35292	109471	183690	128817	148505	129373	125504	79315	45045	35194	8832	5777	11476	1049920
Eastern Region	Housing Units	8145	34571	91948	89233	87242	63169	41811	30770	22082	13575	8688	5068	1991	1086	1086	500465
	Households	8145	34571	91948	89233	87242	63169	41811	30770	22082	13575	8688	5068	1991	1086	1086	500465
	Individuals	11534	110063	448675	503892	599674	490657	348132	251059	168282	111655	74210	48227	24825	15494	14031	3220410
Aseer	Housing Units	3294	8784	21594	59658	81984	47946	38064	15189	8418	5490	2562	3294	1647	1098	549	299571
	Households	3294	8784	21594	59658	81984	47946	38064	15189	8418	5490	2562	3294	1647	1098	549	299571
	Individuals	12180	35899	110489	298467	418964	324866	257081	127819	60961	42552	22894	28099	12778	6733	6103	1765885
Tabouk	Housing Units	352	4136	15312	33704	30624	17512	8800	3872	1408	528	968	264	88		88	117656
	Households	352	4136	15312	33704	30624	17512	8800	3872	1408	528	968	264	88		88	117656
	Individuals	663	12768	68161	200312	199429	119769	66197	29887	11198	3871	10782	2172	1305	0	1610	728124
Hail	Housing Units	142	1917	9372	11005	15123	13064	11573	6177	3692	1562	1917	1562	426	355	284	78171
	Households	142	1917	9372	11005	15123	13064	11573	6177	3692	1562	1917	1562	426	355	284	78171
	Individuals	296	6705	39866	66920	102229	99599	93704	51250	27937	14088	20321	18928	3451	3483	4203	552980
Northern Borders	Housing Units	140	476	2352	6804	10892	7000	4900	2492	1176	420	224	140	28	0	28	37072
	Households	140	476	2352	6804	10892	7000	4900	2492	1176	420	224	140	28	0	28	37072
	Individuals	281	2228	12955	46993	80489	61269	42384	25012	14645	6278	3214	2428	571	0	693	299440
Jazan	Housing Units	2516	14504	40404	55648	36852	12876	5624	3108	592	888	148	444	444	148	0	174196
	Households	2516	14504	40404	55648	36852	12876	5624	3108	592	888	148	444	444	148	0	174196
	Individuals	9271	59610	226207	377397	305416	130730	56808	30840	3854	8007	2600	5108	4034	527	0	1220409
Najran	Housing Units	744	992	4712	14384	25296	11036	4030	1736	1488	868	558	124	0	62	0	66030
	Households	744	992	4712	14384	25296	11036	4030	1736	1488	868	558	124	0	62	0	66030
	Individuals	1443	2187	20860	77951	161830	86314	37805	20615	15546	11007	7117	1802	0	895	0	445372
Al-Baha	Housing Units	0	896	4312	16856	23576	10696	5712	1848	1008	560	224	56	112	0	224	66080
	Households	0	896	4312	16856	23576	10696	5712	1848	1008	560	224	56	112	0	224	66080
	Individuals	0	3089	24526	87384	139883	70016	38304	10794	8578	2840	1498	680	2033	0	2081	391706
Al-Jouf	Housing Units	616	3360	10864	15344	8792	5656	4424	2688	1624	1792	336	616	112	0	56	56280
	Households	616	3360	10864	15344	8792	5656	4424	2688	1624	1792	336	616	112	0	56	56280
	Individuals	1569	18129	57927	95000	61666	48032	39903	27661	12975	17020	3070	4984	1850	0	780	390566
Total	Housing Units	26538	135052	438508	849470	873996	451612	285789	162527	114625	70116	40559	27709	13433	7574	7182	3504690
	Households	26538	135052	438508	849470	873996	451612	285789	162527	114625	70116	40559	27709	13433	7574	7182	3504690
	Individuals	55083	436554	2018879	4381143	5197828	3087111	2089190	1257248	901100	568685	364524	280609	139302	67921	86005	20931182

Source: Housing Survey 2017 _General Authority for Statistics

Table 20: Housing Units (Occupied With Saudi Households), Households and Individuals by Number of Bedrooms

		Number of Bedrooms							
Administrative Area		**1**	**2**	**3**	**4**	**5**	**6**	**7+**	**Total**
Al-Riyadh	Housing Units	69112	281990	224940	128444	75306	32274	17604	829670
	Households	69112	281990	224940	128444	75306	32274	17604	829670
	Individuals	211150	1390681	1357121	873158	569227	260187	176671	4838195
Makkah Al-Mokarramah	Housing Units	197482	375040	218578	50982	19338	3809	5860	871089
	Households	197482	375040	218578	50982	19338	3809	5860	871089
	Individuals	722142	1918514	1406300	378203	123968	28654	53911	4631692
Al-Madinah Al-Monawarah	Housing Units	81483	89441	54841	14186	2422	1038	519	243930
	Households	81483	89441	54841	14186	2422	1038	519	243930
	Individuals	363151	520758	369441	108410	19394	10808	4521	1396483
Al-Qaseem	Housing Units	16960	41280	41280	28480	20960	10880	4640	164480
	Households	16960	41280	41280	28480	20960	10880	4640	164480
	Individuals	56199	208570	252986	199297	184298	102821	45749	1049920
Eastern Region	Housing Units	64074	167606	125976	72581	37648	22444	10136	500465
	Households	64074	167606	125976	72581	37648	22444	10136	500465
	Individuals	190498	903788	935027	565656	299483	203056	122902	3220410
Aseer	Housing Units	51240	117852	85461	28365	8784	4575	3294	299571
	Households	51240	117852	85461	28365	8784	4575	3294	299571
	Individuals	219991	651358	556200	205318	70761	35818	26439	1765885
Tabouk	Housing Units	24288	38632	27456	18304	6160	1496	1320	117656
	Households	24288	38632	27456	18304	6160	1496	1320	117656
	Individuals	107260	228728	196416	131437	38216	11792	14275	728124
Hail	Housing Units	8165	21229	22791	13490	6390	3479	2627	78171
	Households	8165	21229	22791	13490	6390	3479	2627	78171
	Individuals	36335	118011	169997	109406	56132	32633	30466	552980
Northern Borders	Housing Units	1456	9324	14476	8008	2688	504	616	37072
	Households	1456	9324	14476	8008	2688	504	616	37072
	Individuals	6881	55367	116452	75272	28901	7228	9339	299440
Jazan	Housing Units	68376	74000	22348	6364	1776	888	444	174196
	Households	68376	74000	22348	6364	1776	888	444	174196
	Individuals	446815	484088	205489	60923	14497	5694	2903	1220409
Najran	Housing Units	5208	27032	21576	7688	2728	1054	744	66030
	Households	5208	27032	21576	7688	2728	1054	744	66030
	Individuals	18703	136080	163029	73828	30449	13209	10074	445372
Al-Baha	Housing Units	3808	28168	24584	7112	1736	336	336	66080
	Households	3808	28168	24584	7112	1736	336	336	66080
	Individuals	18362	157238	143861	55532	10120	2479	4114	391706
Al-Jouf	Housing Units	14784	20048	11760	5600	1624	1848	616	56280
	Households	14784	20048	11760	5600	1624	1848	616	56280
	Individuals	80412	123549	90690	54145	17364	17650	6756	390566
Total	Housing Units	606436	1291642	896067	389604	187560	84625	48756	3504690
	Households	606436	1291642	896067	389604	187560	84625	48756	3504690
	Individuals	2477899	6896730	5963009	2890585	1462810	732029	508120	20931182

Source: Housing Survey 2017 _General Authority for Statistics

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