وزارة الشـــؤون
البلدية و القروية
Ministry of Municipal & Rural Affairs

AL-AHASA
City Profile

مستقبل المدن السعودية
FUTURE SAUDI CITIES

UN HABITAT
FOR A BETTER URBAN FUTURE

Future Saudi Cities Programme
City Profiles Series: **Al-Ahsa**

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AL-AHSA

الأحساء

FUTURE SAUDI CITIES PROGRAMME

CITY PROFILE

View of the Al-Ahsa Oasis, a UNESCO World Heritage Site producing more than 2.5 million dates


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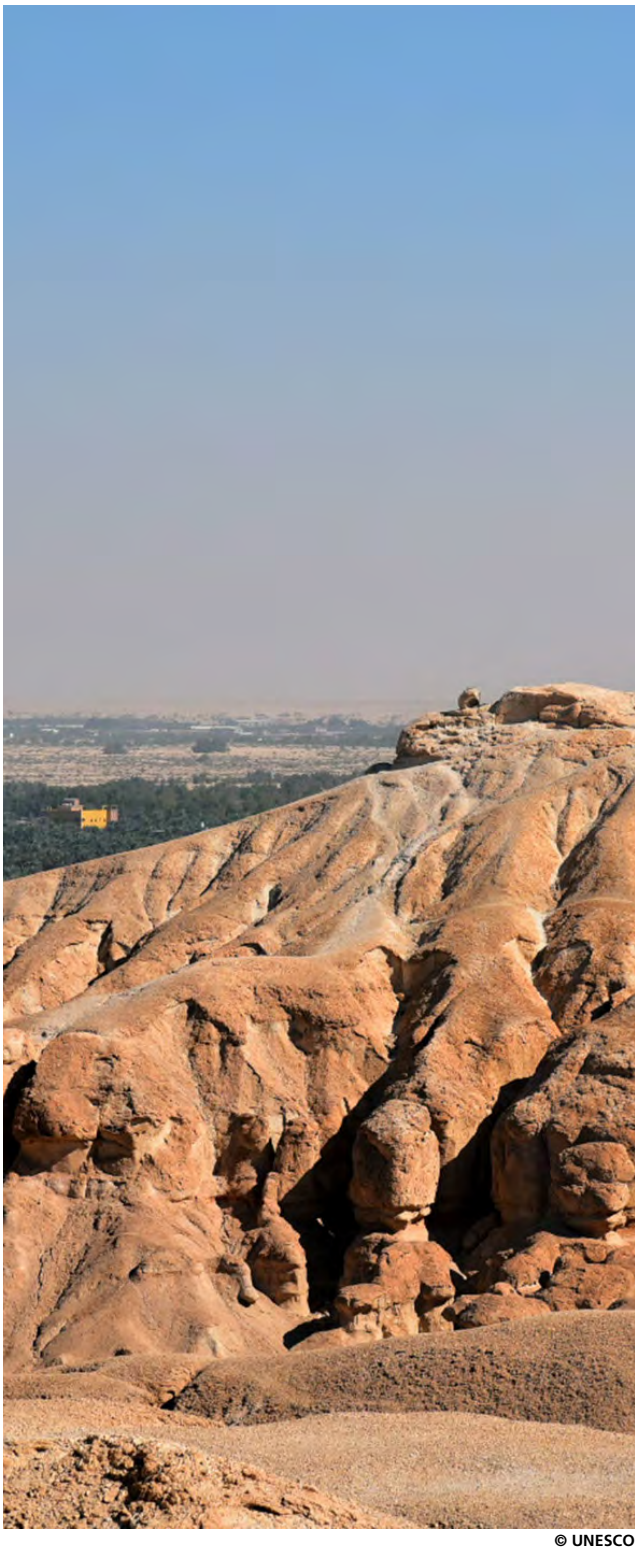
Contents

1 INTRODUCTION



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2.1 About the Future Saudi Cities Programme

The Future Saudi Cities Programme is a joint programme developed by the Saudi Ministry of Municipal and Rural Affairs (MoMRA) and UN-Habitat, implemented in close cooperation with the municipalities 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 regional development among the cities of Saudi Arabia. The chosen cities include Riyadh, Makkah, Jeddah, Taif, Madinah, Tabuk, Dammam, Qatif, Al-Ahsa, Abha, Najran, Jazan, Hael, Arar, Al Baha, Buraidah, and Skaka.

After undertaking city-level reviews in the 17 cities, five cities were chosen as a representative cross-section, for in-depth analysis. The city-level reviews 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 neighbourhood level. These reviews, when referenced with City Prosperity Index (CPI) reports and validation processes in the Rapid Planning Studio workshops, were used to extrapolate strong, evidence-based conclusions that relate to the planning system as a whole.

Applied research, with a strong focus on action-oriented conclusions, was used to collect evidence to diagnose the strengths and weaknesses of the planning system and local planning practices in each city. The methodology utilised design tests and demonstration projects as avenues to apply and analyse potential solutions, before concluding on policy recommendations.

UN-Habitat's three-pronged approach considers spatial planning in relation to legal and institutional frameworks, in addition to financial mechanisms. In this way, success criteria for the sustainable implementation of a spatial plan should include flexible but enforceable rules and regulations, in addition to a financing strategy and projections.

As a pragmatic explication of this approach, three local demonstration projects, representing essential elements of a strengthened and improved planning system, have been developed. These were elaborated to include schematic designs and feasibility studies, that can later be transformed into implementation plans. Such implementation plans are projected to be undertaken by MoMRA, in collaboration with other partners in the Kingdom.

In order to facilitate this process, a joint "FSCP Urban Lab" was created as a vehicle to strengthen endogenous capacities and to develop tailored tools, and instruments. The Lab, composed of international expertise from the planning, legal and economy branches of UN-Habitat Nairobi office, has been working with Saudi-based staff in the UN-Habitat Riyadh office (selected by MoMRA), to enhance knowledge exchange and to apply a learning-by-doing method to the programme.

As such, all 17 cities have been simultaneously engaged in a capacity-building strategy that included foundational learning, and 'on the job' training, culminating in Saudi-specific advanced training. This training was based on the planning-system conclusions and recommendations, that the FSCP produced. Thus, the Urban Lab functions as a tool to generate evidence whilst additionally strengthening capacities through a process of learning-by-doing.

2.2 Saudi Initiatives for Sustainable Urban Development

The Saudi Government, along with the respective Ministries, and in line with a larger country-wide transformation process, has made several efforts aimed at the sustainable development of its growing cities. These contributions vary from plans at the national level, like the National Spatial Strategy (NSS), to strategies and plans at the regional level, cutting across various sectors towards realising Vision 2030. The FSCP recognises these efforts as positive, supporting Vision 2030 goals to realise a sustainable urban environment for the Kingdom of Saudi Arabia. The FSCP acknowledges and builds upon the current tools, plans, and strategies as part of a comprehensive assessment and suggests variations and improvements where appropriate.

2.3 Objectives of the City Profile Report

2.3.1 Scope of the city profile

The city-profile combines MoMRA's new strategy, with a review of existing studies, plans, and strategic documents, such as the review of the Kingdom of Saudi Arabia (KSA) National Spatial Strategy (NSS) to identify and address the root causes of problematic conditions outlined in the preliminary findings. The report acknowledged low uptake of the NSS by regions, utilities and ministries, as a key weakness. The issue of horizontal (sectors) and vertical (scales) integration is thus a key challenge that the FSCP aims to address going forward.

Policy recommendations for improving urban planning frameworks and practice shall be structured through a multi-scalar lens, considering the city as a continuum in the urban fabric, that should grow from the neighbourhood to the wider city-region, whilst influenced by dynamics and regulations at the national and supranational levels. This ensures that policy recommendations for these cities do not operate in isolation from the city's envisioned role in the administrative region and the national system of cities.

2.3.2 Objectives of the city profile

The City Profile Report brings together diagnostic urban analysis and aligns that analysis with the UN-Habitat sustainable development framework and the Saudi Vision

The Al-Ahsa Oasis

2030. It performs as a thinking tool that constitutes together an assessment tool and guidance for the current and future planning of the city, whilst defining a clear strategy for sustainable development.

The definition of an ad-hoc strategy is rooted in an evidence-based approach to the issues, building upon both primary and secondary data collection and analysis. The profile, as well as the Programme as a whole, uses the data collected by the CPI, to identify significant trends and challenges at the city level. This evidence is then combined with reviews of existing planning documents, and cross-referenced with multi-scalar GIS spatial analysis, to define the above-mentioned ad-hoc strategy.

2.4 City Profile Methodology

2.4.1 Evidence-based input approach

The evidence-based planning approach creates a deeper understanding of the spatial dynamics of the urban area, by combining and comparing urban datasets such as demographics, density, land use, natural features, and accessibility analysis.

The evidence (data) is reflected in the form of indicators that can be compared with best practice standards and benchmarks for sustainable urban development. Not only does this provide a clear perspective on the main developmental issues, but it also quantifies the projected effect of future development proposals on the indicators applied in the analysis.

The programme recognises that the methodology, on which policy recommendations guiding improvements and adjustments in the planning system are based, needs to be evidence-based. For this purpose, different methods were integrated to first provide the necessary body of evidence on which to build an understanding, and full assessment of issues before making recommendations for the respective cities.

The elements constituting the evidence-based approach are primarily constituted of the following:

- Reviews of existing policy documents and plans;
- CPI reports;
- GIS spatial analysis.

All of these elements are utilised in a cross-scalar diagnostic methodology that incorporates quantitative and qualitative evidence. The method used to generate evidence-based policy recommendations, which develops capacities and engages stakeholders in all 17 cities, provides conclusions derived from both top-down and bottom-up approaches, cross-cutting all scales of planning.

Ibraham Fort Palace in Al-Ahsa

By analysing how the structures of spatial, socio-environmental and economic issues interact at different scales of influence, the diagnostic methodology moves from the national to the neighbourhood scale, tracking the interdependencies within the city's physical development patterns, and seeking to decrypt the reasons behind them.

2.4.2 The reviews

Several reviews of existing policy documents and plans were undertaken with the purpose of a) extracting information useful to the understanding of the context, and the city itself, and b) assessing their contents based on three criteria: content relevance, process integration, and effectiveness. The reviews focused on assessing the:

- National Spatial Strategy;
- Regional Plan for Eastern Region;
- Al-Ahsa Sub-regional Strategic Plan;
- Al-Ahsa Local Plan.

2.4.3 The City Prosperity Index assessment report

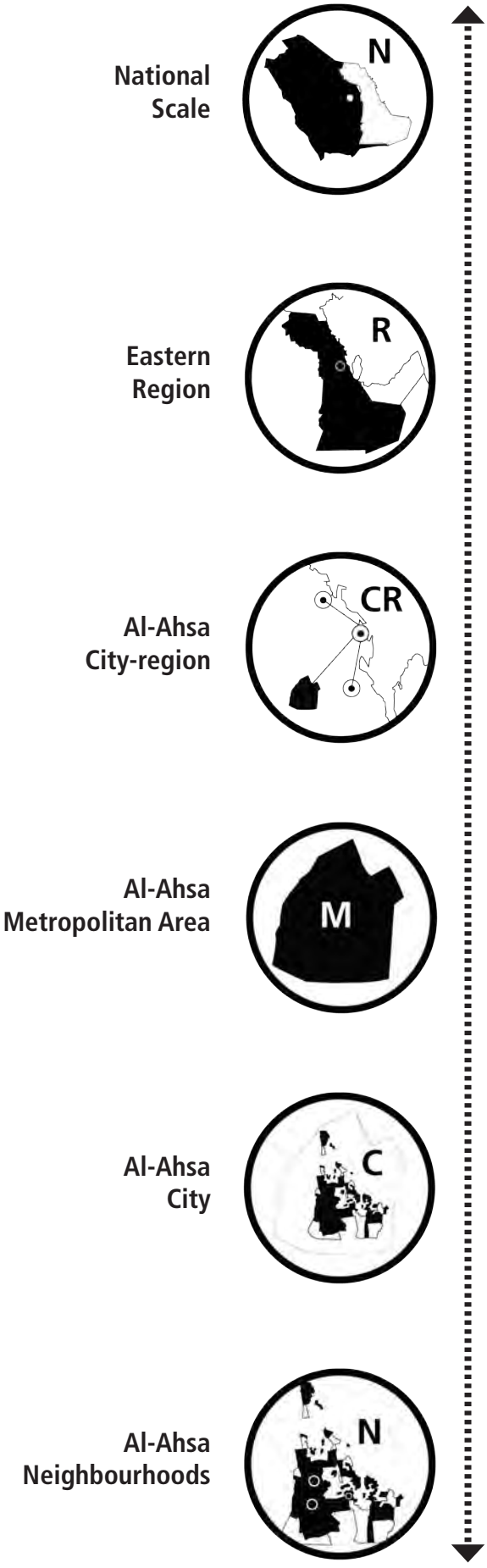
The City Prosperity Index is made up of six dimensions that serve to define targets and goals that can support the formulation of evidence-based policies. These include the definition of city-visions and long-term plans that are both ambitious and measurable. The six dimensions are:

- Productivity;
- Infrastructure;
- Quality of life;
- Equity and inclusion;
- Environmental sustainability;
- Governance and legislation.

These dimensions have been assumed as guiding principles in the spatial assessment of Al-Ahsa. There are ten detailed spatial indicators at the FSCP city profile level that link into the 72 flexible indicators of the CPI assessment.

2.4.4 The GIS spatial analysis

The spatial reflection of the above indicators highlights detailed patterns of development and the interactions and dynamics associated with movement, densities, and land-use within the urban system. This process enables a dynamic understanding of the physical expressions of weaknesses and strengths in the urban system and the main issues to be addressed. The effect of proposals for future development can also be assessed by use of the same indicators.



CROSS SCALAR DIAGNOSTIC METHODOLOGY

2

NATIONAL AND REGIONAL SPATIAL CONTEXT

3.1 The Region's Role in the Kingdom of Saudi Arabia

3.1.1 Historical background

Al-Ahsa is one of the oldest settlements in the world and is home to the world's largest oasis which was declared a UNESCO World Heritage Site in 2018. The origin of the oasis can be traced back several millennia and owes its sustained vitality to fertile soil and availability of groundwater in the region. It also lends its name to the municipality and governorate. In circa 1000-1200 A.D., its population was estimated at 100,000 people, close to that of cities such as Thebes in Egypt, Babylon in Iraq, Yinxu in China.[1] It exchanged several hands of rule and was later incorporated into the Saudi State in 1795.

Several small villages emerged within the oasis and the four cities: Al Hofuf, Al Mubarraz, Al Oyun, and Al Umran merged to form the municipality of Al-Ahsa. Al Hofuf, originally called Al-Ahsa was the capital of the Eastern Region until 1953, at which time the capital was moved to Dammam. Today, Al-Ahsa is the capital of the Al-Ahsa Governorate in the Eastern Region.

3.1.2 Geography and location

Al-Ahsa municipality is located within Al-Ahsa Oasis, the largest oasis in the Kingdom. Al-Ahsa Governorate extends from the Arabian Gulf from Kuwait at 29 20' North to the South point of the Gulf of Bahrain at 25 10' North, a length of 360 kilometres bound by the Al-Dahna and the Al-Daman deserts. This length forms borders with Qatar, the United Arab Emirates and the Sultanate of Oman, covering an area of 2,500 kilometres in the Southern part of the Eastern Region. The area around Al-Ahsa Municipality enjoys a tropical climate with only two seasons: a hot and dry summer and a moderate to warm winter with occasional showers.

3.1.3 Demographic background

Al-Ahsa is the major urban centre in the Al-Ahsa Oasis in the Eastern Region of Saudi Arabia. The municipality of Al-Ahsa is comprised of four major cities: Al Hofuf, Al Mubarraz, Al-Oyun, and Al-Umran. According to the housing census of 2010, the population of Al-Ahsa municipality was 1,136,935, and today stands at 1,241,140, including the villages in the 1450 Urban Growth Boundary (UGB). The non-Saudi population is 19%. The number of households in the city is estimated at 160,304 and the average size of each household is 6.7. Looking at the two main cities within the municipality of Al Hofuf and Al Mubarraz, there is a clear indication of rapid population rise during the period 1992-2016. It grew from 444,977 in 1992 to 572,908 in 2004, and to 660,788 in 2010. The current estimate is 768,000 in 2016 in the two city centres.

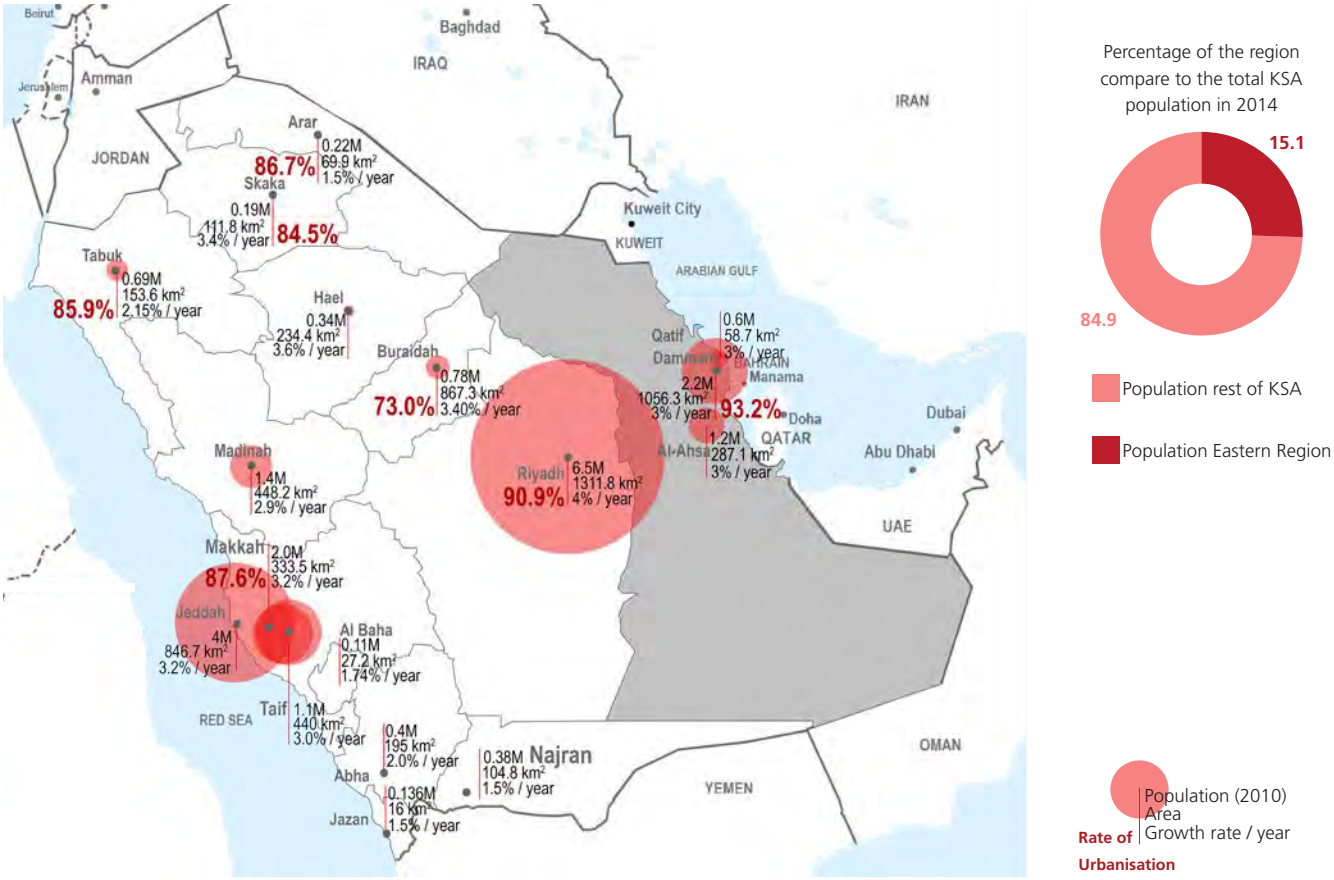


Fig. 1. Population distribution, growth rate and urban areas within the Kingdom of Saudi Arabia

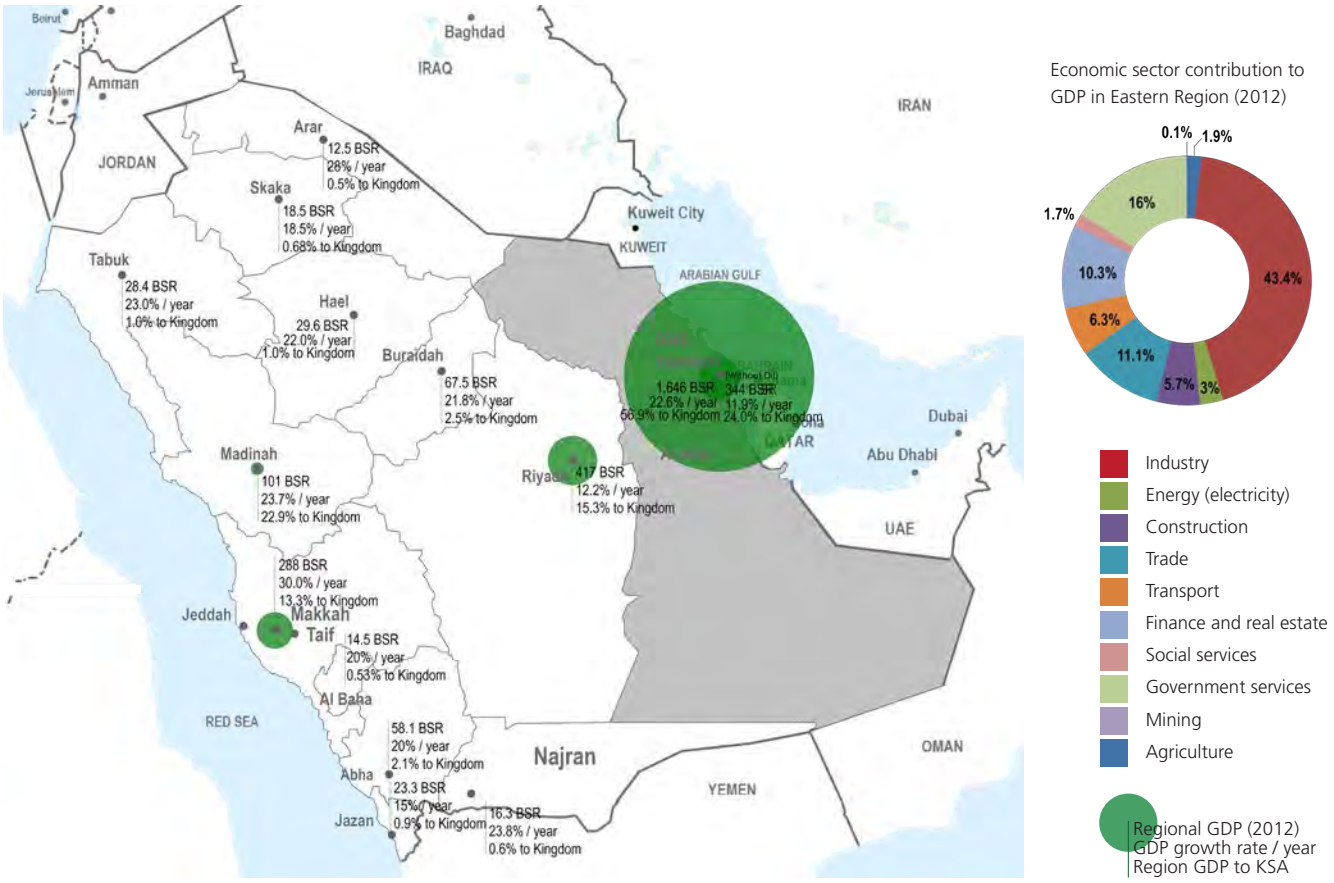


Fig. 2. Regional Gross Domestic Product and economic sector contribution

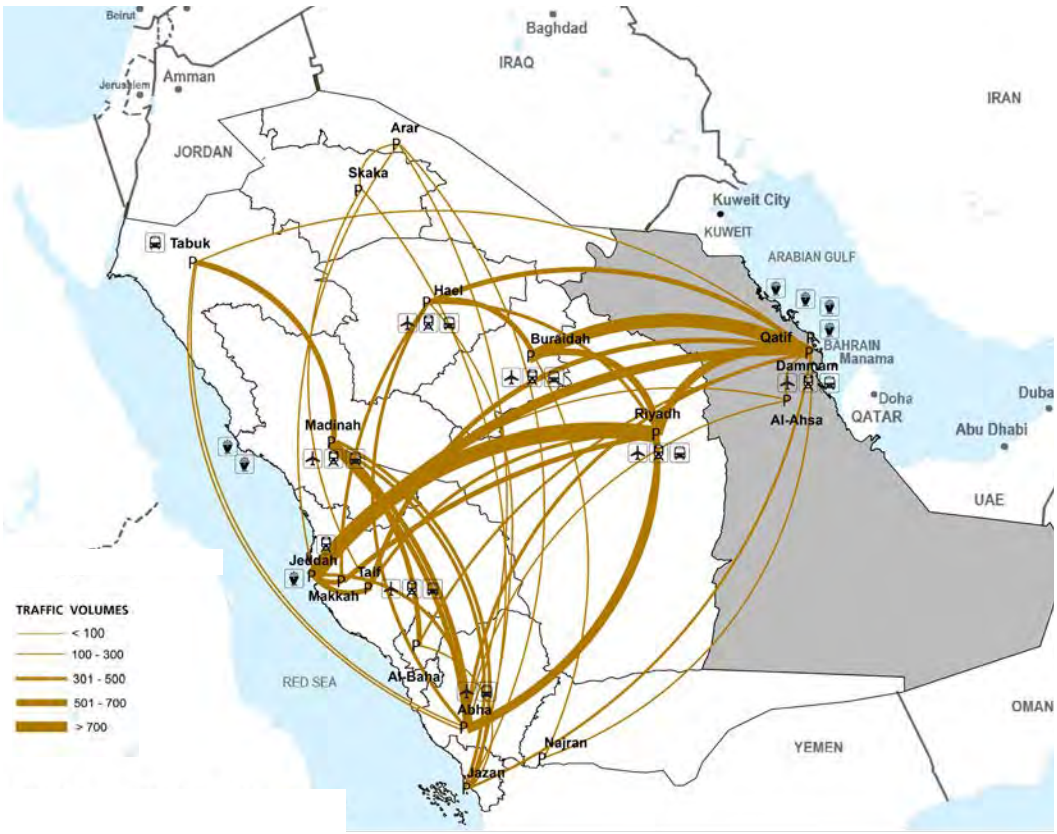


Fig. 3. Transport connectivity between Saudi cities

3.1.4 Socio-economic background

Historically, Al-Ahsa has been the agricultural bowl of the region, producing dates, wheat, rice, and fruit. Today, the oasis produces more than two million dates. With such a rich output, the government is trying to incentivise farming by improving profits for farmers. The region also hosts a large camel market in Al Hofuf in which camel trade is conducted weekly on Thursdays. Additionally, the market provides a trading ground for agricultural produce such as dates, wheat, rice and fruit.

Additional economic activities in the area include textile manufacturing, food processing and Arabian horse breeding. As is the case with all cities in Saudi Arabia, Al-Ahsa Municipality has benefited immensely from the oil industry during the last two decades; the Gross National Income (GNI) per capita has risen from 24,400 USD in 1990 to 54,730 USD in 2015.[2] This reflected positively on per capita income which increased from 21,000 USD in 2011 to 23,000 USD in 2012 and to 25,700 USD in 2013.[3]

Gross Domestic Product

The total GDP of the Eastern Region amounted to 1,646 billion Riyals in 2012, accounting for 60% of the Kingdom's total GDP. The GDP of the Region, discounting crude oil and natural gas, was 344 billion Riyals, representing 24% of the Kingdom's total GDP. The average annual GDP growth rate of the region, discounting crude oil and gas was 24.8% from 2009 to 2012. The industrial sector ranks first by contribution to the Eastern Region GDP (without crude oil) with 43.4%, followed by the trade sector with 11.1%, and real estate and financial services with 10.8%. Finally, the construction and communication sector contributes 5.7% to the GDP.

3.1.5 National connectivity

Air Transport

There are three airports in the Eastern Region: an international airport in Dammam and two regional airports in Al-Ahsa, and Al Qaysouma. The number of passengers using the airports in the Eastern Region was estimated at 2.74 million in 2011 and 3.15 million in 2012, recording an increase of 15% and representing 8.17% of the total passenger air traffic in the Kingdom.

Sea Transport

The Eastern Region has five ports on the Arabian Gulf. King Abdulaziz Port in Dammam is the second largest port in the Kingdom of Saudi Arabia. Others include King Fahd Industrial Port in Jubail, Jubail Commercial Port, Ras Alkhair and Ras Tannura. Ras Tannura is the main export port for oil, from which an estimated 97% of crude oil and petroleum products leave the Kingdom.

Date palm agricultural fields along major streets in the Al-Ahsa Oasis

Shops outside the Qaisariah Souq in the city centre of Al Hofuf

3.1.6 Trend of urban growth and existing spatial plan

Al-Ahsa was formed by an amalgamation of several smaller cities that merged to form one large municipality. Urban growth can be defined in terms of population growth and increase in geographical land area. During the early years of settlement, urban growth occurred concomitantly with the availability of water resources, such as wells and springs scattered across the region. This supported only small agricultural communities that remained concentrated around points of access.

The region witnessed rapid development after the discovery of oil which warranted better planning and management. With such significant economic improvements, the land use pattern changed, the built-up area increased, and materials such as concrete came to be favoured over traditional construction technologies. There was an increase in the demand for housing and better services infrastructure such as those pertaining to roads, water, electricity, and communication. With this pattern of urban growth, cities such as Al Hofuf and Al Mubarraz merged to form Al-Ahsa.

The discovery of oil, in close proximity to the city has had a major impact on the development pattern and growth of the region. The government has declared Al-Ahsa as one of the National Growth Centres that also played a crucial role in the growth of Al-Ahsa. The development of the industrial sector is one of the most prominent official efforts in promoting socio-economic development in the area.

3.2 Regional Development Patterns and Dynamics

3.2.1 Regional organisation

Administrative Boundaries

Al-Ahsa is the capital of the Al-Ahsa Governorate in the Eastern Region (one of 13 regions of KSA). The Eastern Region is subdivided into 11 governorates which are further subdivided into sub-governorates. The governorates of the Eastern Region are; Al Khobar, Abqaiq, Nariyah, Qaryat Al Ulya, Hafar Al Batin, Dhahran, Jubail, Ras Tanura, Qatif, Khafji, Al-Ahsa. Al-Ahsa Governorate, which includes the traditional oasis of Al-Ahsa and the Empty Quarter Desert, which is the largest governorate in Saudi Arabia in terms of area.

As is the case in all regions of the KSA, Al-Ahsa is governed by a "municipality" (Arabic: Amanah) and is headed by a Mayor. The Al-Ahsa governorate is home to the metropolitan region of Al-Ahsa, and some additional villages scattered outside the Development Protection Boundary (DPB) of Al-Ahsa city. The city, as such, has no city region scale.

Dammam, the capital of the Eastern Region, is located along the coast and is strategic for its port which facilitates commercial, industrial, and cultural exchange between the Kingdom and the other states of the Gulf Cooperation Council (GCC), and Southeast Asian Countries. The Eastern Region is

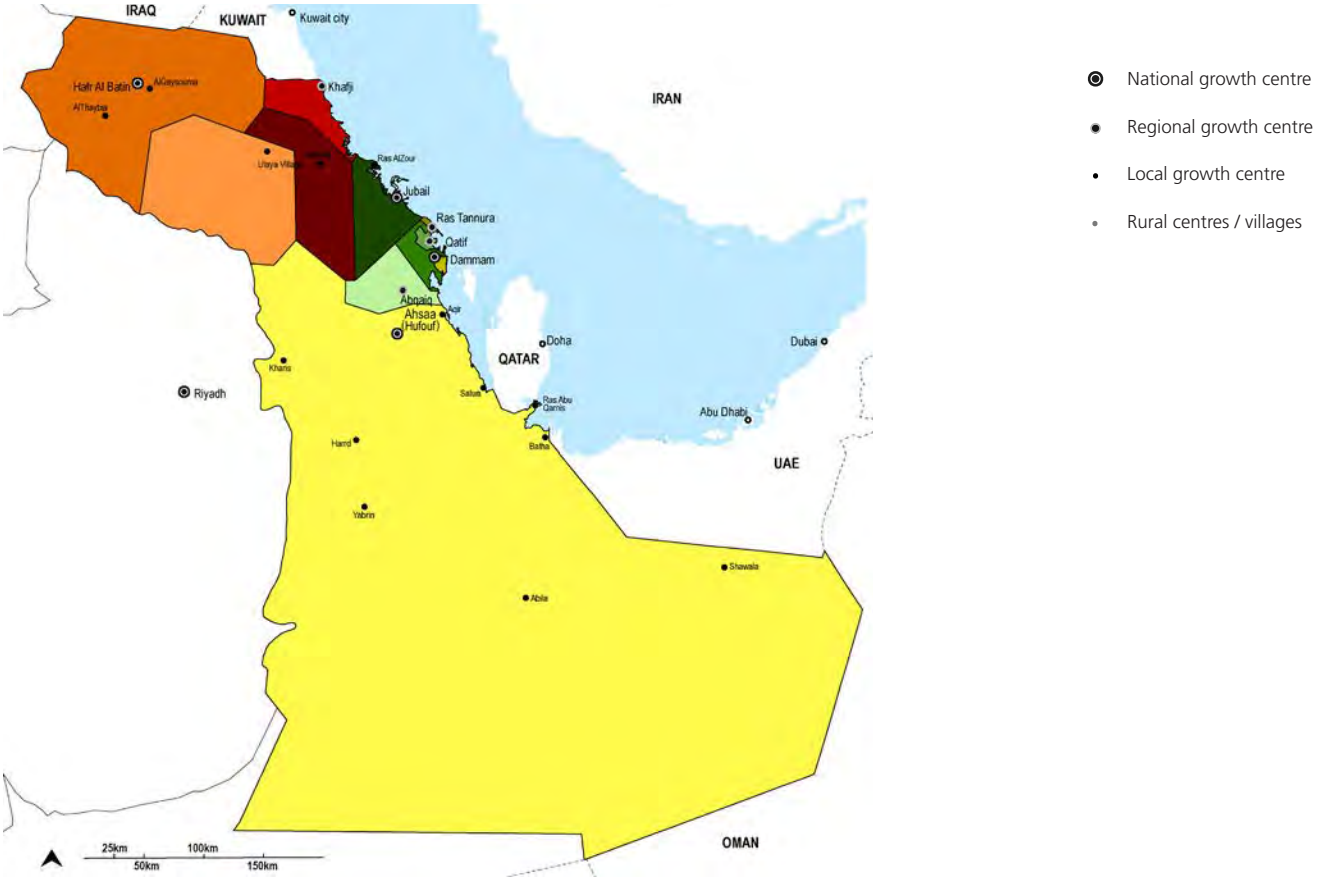


Fig. 4. Administrative boundaries

considered the core economic base of the Kingdom, due to its importance in petroleum production in the Kingdom, and port link to the GCC and as the East Gate of the Kingdom.

The 2005 Regional Plan for the Eastern Region divides the region into 5 major sectors as follows:

- Coastline (Dammam Sector): This sector hosts an estimated 24% of the region's total number of urban clusters. The most prominent economic activity of this sector is concentrated in administration, services, industry, and tourism.
- Al-Ahsa: Agricultural, tourism, and manufacturing activities are considered the focus of this sector in addition to local commercial activity.
- Hafr Al Batin: The economic activity in this sector is limited to small and medium scale pastoral and agricultural activities on the sector's arable lands.
- Adeed: This sector's most prominent economic activity is in security created by its position as the Southeastern entrance to the region and to the Kingdom. The plan aims to activate exchange between the region and the Gulf countries in trade, tourism, and service activities. An Economic City is proposed in Abu Gamees that is intended to ground the aforementioned exchange in a commercial and industrial activity centre.
- Empty Quarter: This sector holds the largest petroleum and gas reserve which is the focus of ongoing research and excavation. However, it is lacking a developed urban centre to extend supporting services to the sector.

Al-Ahsa City lies within the Al-Ahsa Sector and houses 25.7% of the population of the region, second to the coastline sector. The core economic activities of this sector include agriculture, tourism, and manufacturing.

The Regional Plan for the Eastern Region

The Regional Plan for the Eastern Region for the year 1450H proposed a hierarchy of growth centres and development corridors which were intended to organise development in the region. The map displayed in Figure 6 shows the proposed development corridors and the main growth centres located along them. Al-Ahsa has a strong system of functional and economic relations with other significant urban centres

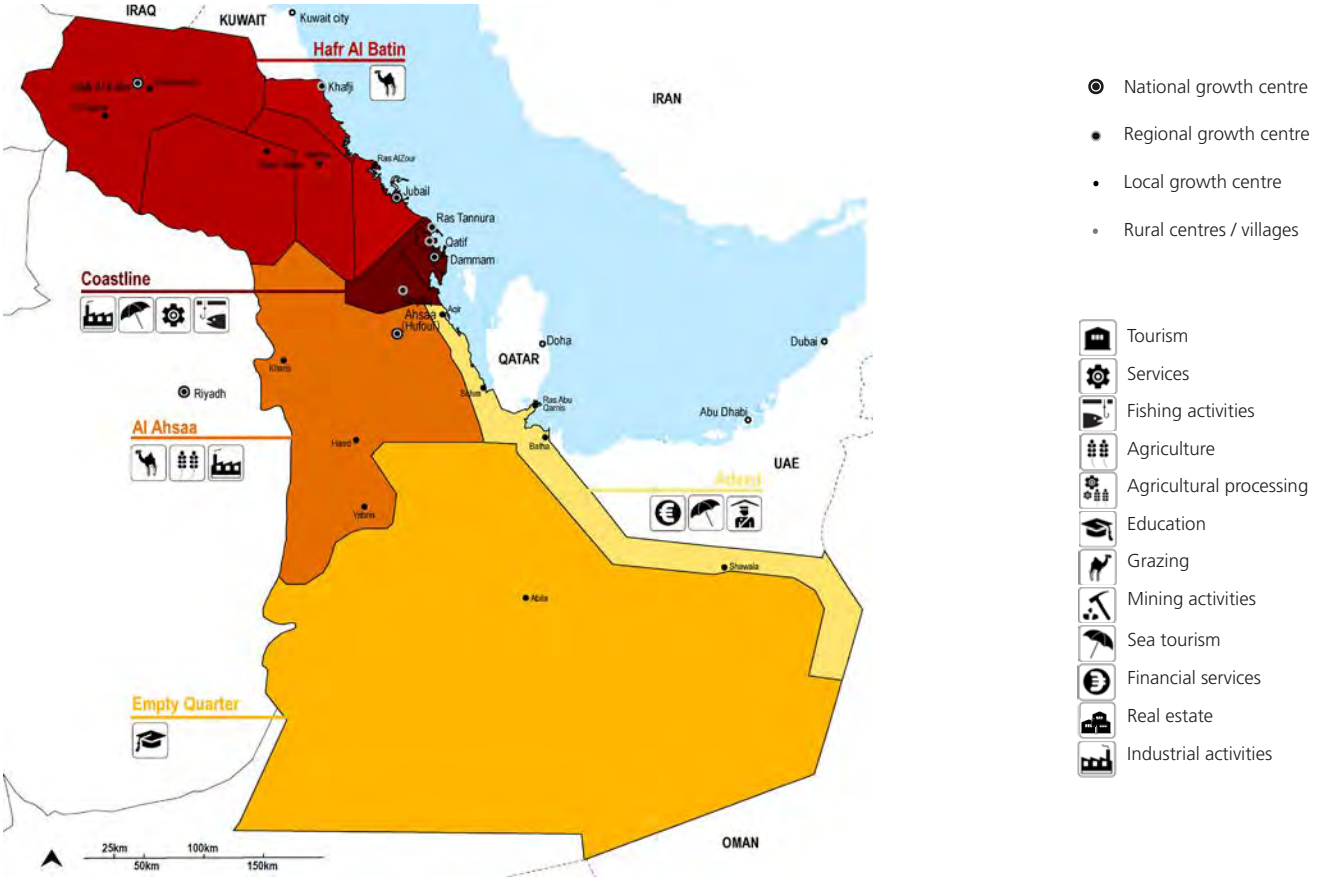


Fig. 5. Development sectors according to the Regional Plan for the Eastern Region

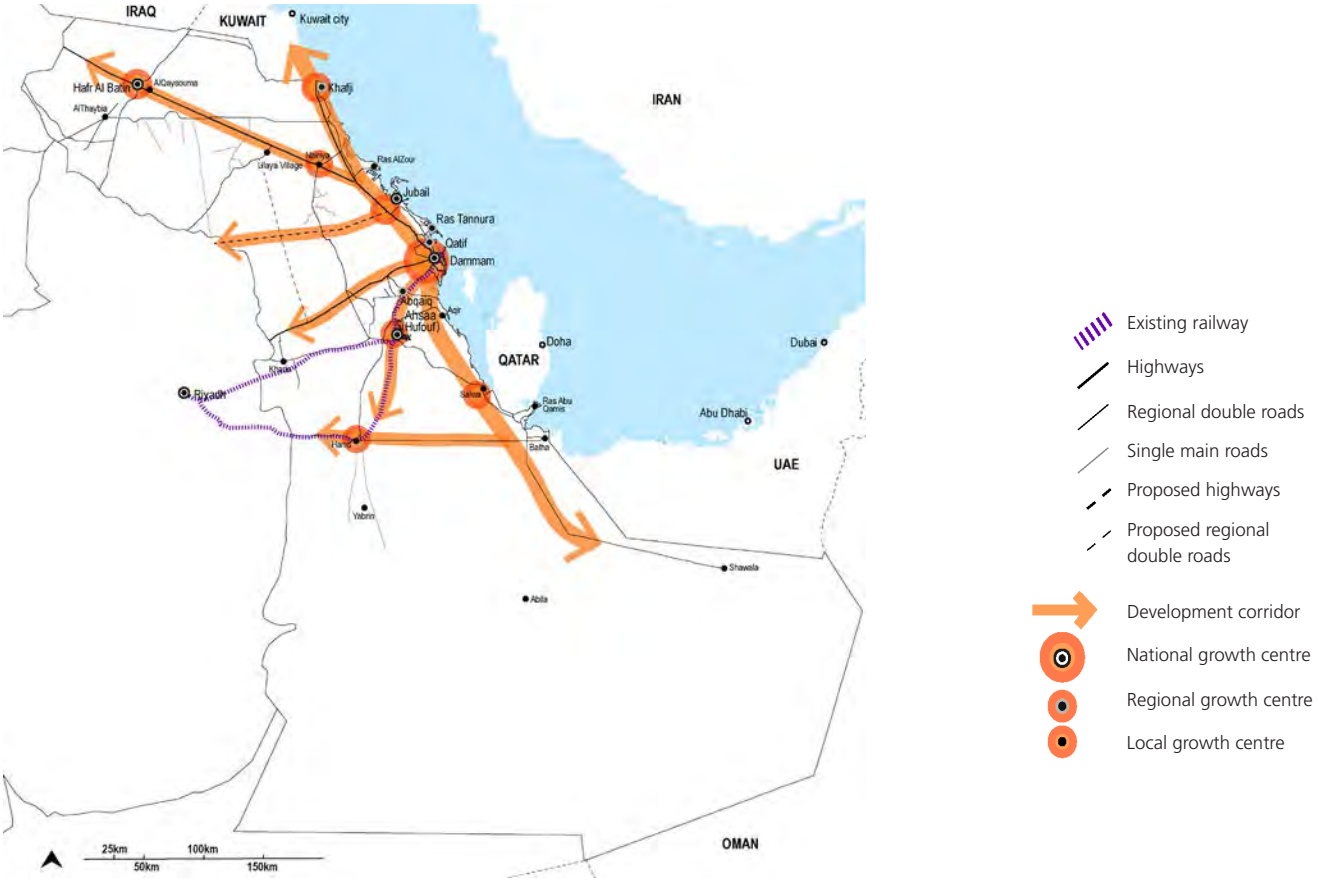


Fig. 6. Development corridors according to the Regional Plan of the Eastern Region

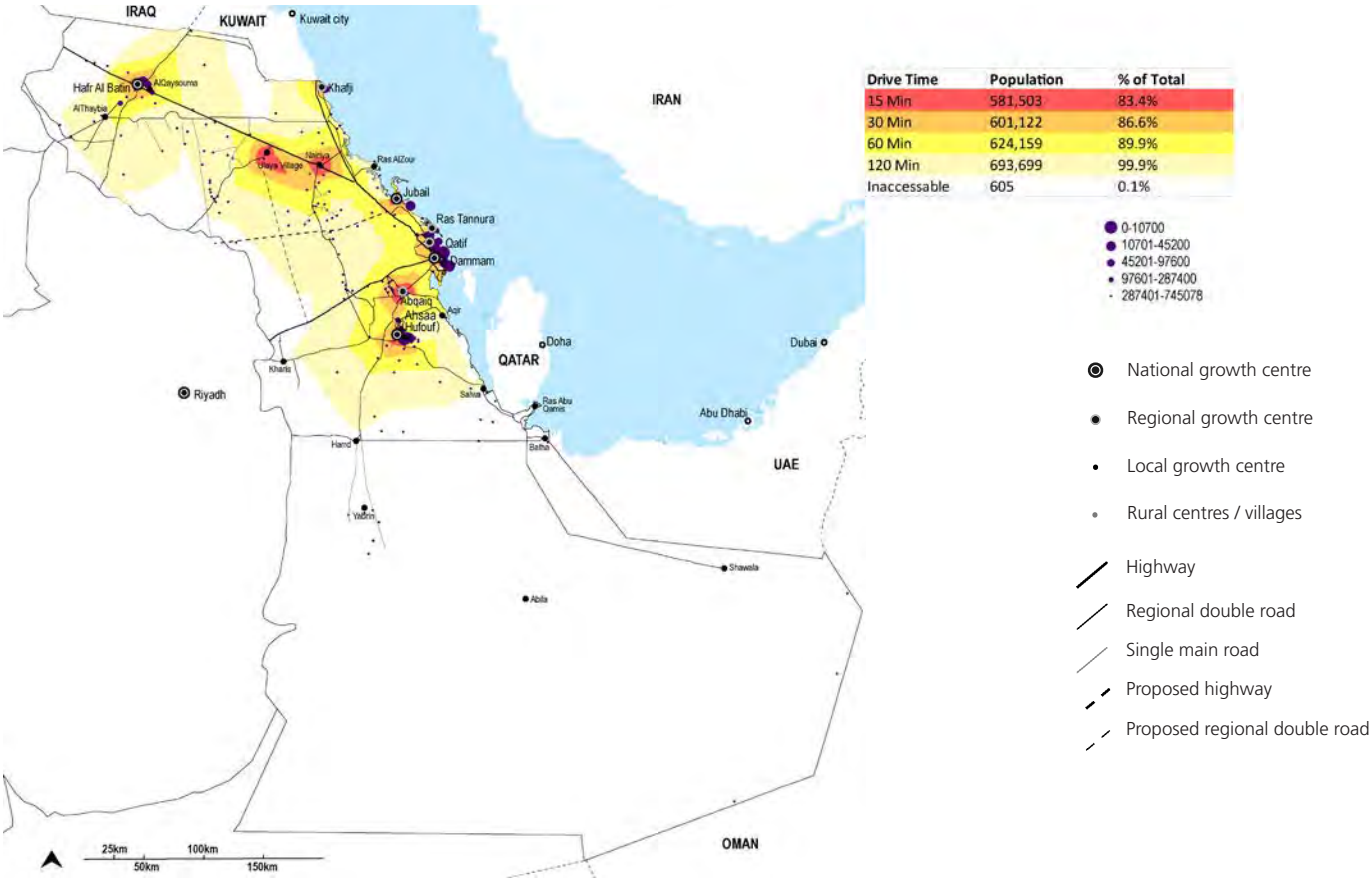


Fig. 7. Accessibility in the Eastern Region

Irrigation canals serving the agricultural fields in Al-Ahsa

surrounding it, including Dammam. Dammam is the capital of the Eastern Region, and also the major urban centre. 85% of the total regional population resides in the Coastline Sector. Within these regional urban centres, three main axes emerge, two of which lie on main highways that cut through the region:

- An institutional corridor is located along Highway 40. Highway 40 is the most important highway of Saudi Arabia. It crosses the entire country linking the largest cities and the Arabian Peninsula. The 1,359 kilometres long highway connects Jeddah and Makkah on the West Coast to Dammam on the East Coast, passing through the capital of Riyadh.
- The second corridor runs along Highway 95, also known as Abu Haidriyah Highway. The highway begins from the King Fahd Causeway and links Bahrain to Saudi Arabia, extending to the Kuwait border via major cities such as Dammam and Jubail. The highway is over 300 kilometres long and constitutes a major trucking route for transportation of goods in the area. The route runs parallel to the Dhahran-Jubail Highway and the two roads serve as interchangeable substitutes in the event that either undergoes maintenance or reconstruction. The highway also serves as an Eastern border for King Fahd International Airport in Dammam.
- The third axis is situated along Highway 75, which connects Dammam to Hofuf in Al-Ahsa. Along this highway runs the railway, connecting Dammam port, Dammam City centre, and Al Hofuf to Riyadh. This railway branches into farms and agricultural land in Al-Ahsa Oasis, the largest producer of dates in the region. Highway 75 terminates in a remote area in the South in Rub Al Khali and the road ends in the middle of the desert, rather than near a town or village, as would be expected. It is possible that the intention was to extend the road to Oman, However, this would require the road to extend through 600 kilometres of barren land consisting only of shifting sand dunes, which rendered the project unfeasible.

3.2.2 Regional structures and resources

Movement Infrastructure

The Eastern Region has a modern and developed network of motorways, highways, and bridges that connect the major cities to the different oil and industrial facilities both within the region, and in those adjacent to it. The Eastern Region accounts for 9.8% of total roads of the Ministry of Municipal and Rural Affairs.

The Region is currently witnessing new projects and expansions in its internal road network, including those linking the region with surrounding areas. Several new projects are currently under implementation. 83.4% of the city region population in the city region is able to access the city centres within a 15-minute drive time.

Environmental and Topographic Elements

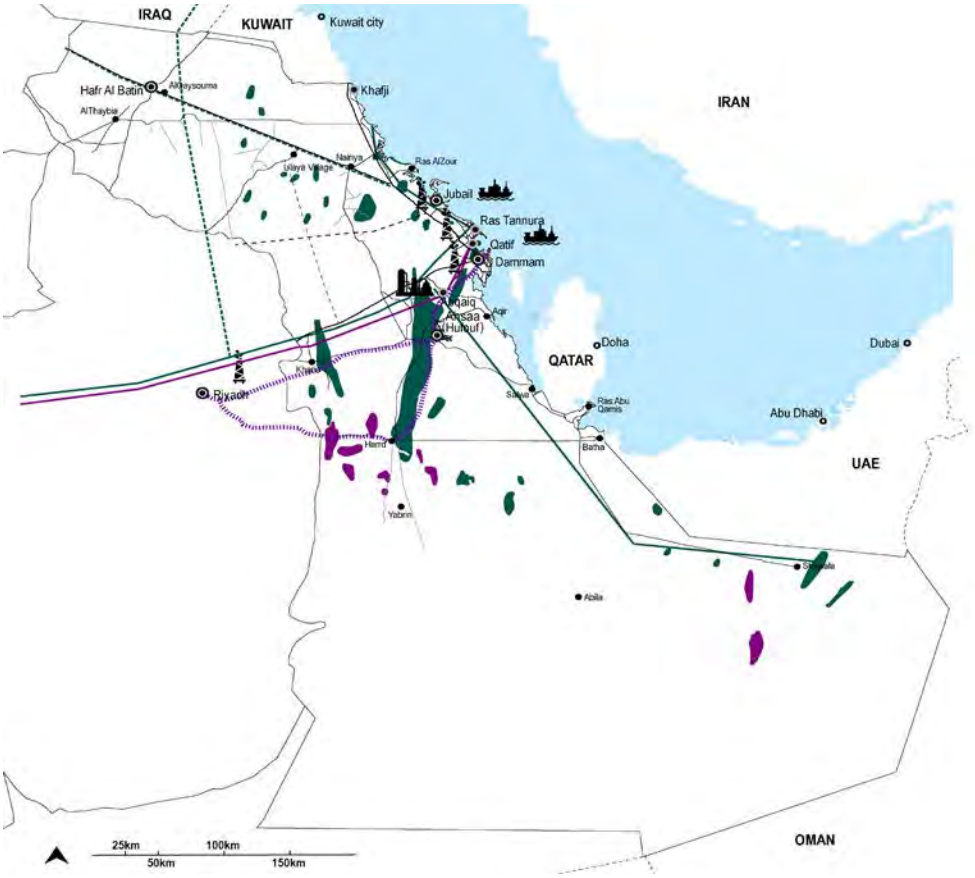
KSA represents 80% of the Arabian Peninsula. It comprises a range of topographical features, hosting 2,410 kilometres of sea coast, 2.7 million hectares of forest land, over 171 million hectares of rangelands, 35 square kilometres of mangroves and 1,480 square kilometres of coral reefs. Al-Ahsa is located between plains and sand dunes. The majority of the territory's topographic height is moderate and roughly 50% of the area ranges between only 0 and 50 metres, which facilitates urban development.

These ecosystems are valuable, not only in structuring the territory, but also in contributing to the national economy and the welfare of the population. Saudi Arabia has a mid to high rate of population growth, standing at 2.45%. If not well managed, this growth can seriously deteriorate natural systems affecting biodiversity and ecosystem balance. In Al-Ahsa, multiple factors are causing environmental degradation. From the built environment, unsustainable growth patterns and inadequate infrastructure are challenging future economic development and compromising existing natural resources. This places additional pressure on the environment that is already facing upheaval caused by climate change.

Dhahran is one of the most oil rich provinces in the world which has coincided with environmentally unsustainable practices in the past. The country has a climate ranging from semi-arid to hyper-arid, characterised by very low rainfall (annual average of 70.5mm), and extremely high evapotranspiration. The region has the lowest fresh water resource endowment in the world and the largest share of water consumed for agricultural, municipal, and industrial purposes which is extracted from fossil groundwater in sedimentary aquifers. Due to the low average rainfall, these water tables are hardly recharged and are thus non-renewable. This applies to the aquifers that supply Al-Ahsa City. The water for farmland irrigation is now supplied by the desalination plant in Qatif to prevent further depletion of the water table.

At the national level, trends indicate that average temperatures have been increasing by 0.2°C to 0.3°C per decade[4] due to climate change, which negatively impacts water, and green infrastructure. In Dhahran, the average temperature is expected to rise from 3.4°C to 3.6°C by 2080. Heat waves are more frequent and extreme, and records (up to 2013) show how peak temperatures have increased from 13 events (1978-1995), to 57 events (1996-2003).[5] The aridity index in the region is lower than 0.05. The higher temperatures are additionally affected by the frequent sand storms coming from the Northwest into the city, which have increased in frequency.[6]

In the Dhahran Region, recent climate models project both a possible decrease and a possible increase to average annual rainfall (87.6mm). However, both scenarios imply very low precipitation rates (72.4-122.2mm), which together with the increasing evapotranspiration, will decrease water levels



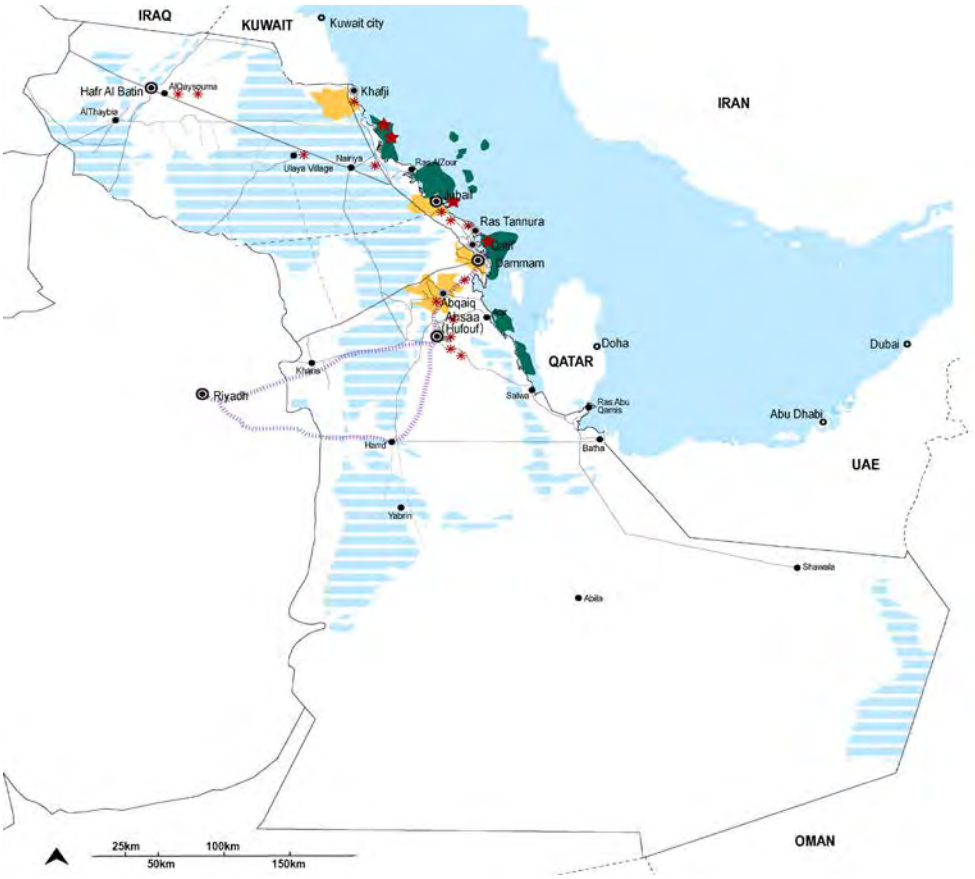
National growth centre
Regional growth centre
Local growth centre
Rural centres / villages

Existing railway
Highway
Regional double road
Single main road
Proposed highway
Proposed regional double road

Oil field
Gas field
Oil pipeline
Gas pipeline
Oil pipeline (closed)

Oil refinery
Oil processing complex
Oil export terminal

Fig. 8. Oil and gas reserves



National growth centre
Regional growth centre
Local growth centre
Rural centres / villages

Underground water
Air pollution
Coastal pollution
Pollution generating facility
Landfill

Fig. 9. Pollution and other environmental conditions

from open water bodies, soil, and plants. Due to the additional increase in air temperature, the rate of aquifer recharge will reduce over time.

This affects the area's agricultural potential, limiting its expansion, especially around Qatif, and limiting the development of open green spaces across the city. Agricultural land has decreased in the region and little land is dedicated to green space. Overall, the few green spaces configure a discontinuous green system that does not contribute to protecting and replenishing water-tables, nor does it mitigate the urban heat island effects.

Coastal areas, such as Dammam, are particularly affected by climate change and an estimated 401-1,726 hectares along the Arabian Gulf[7] are expected to be lost by the year 2100. This will impact a significant portion of Saudi's population, as an estimated 12% reside in urban coastal zones with low elevation, and 50% live within 100 kilometres of the coast.[8] It will also disturb natural habitats, such as coral reefs, which represent the most significant habitat found along the Arabian Gulf. These reefs, as well as the mangrove forests provide shelter and food for a wide array of marine life, and are likely to be negatively impacted by global warming and by sea-level rise.[9]

There are areas in Dammam that have already been identified as vulnerable. Tarout Bay has been defined by the Saudi Wildlife Commission as a Resource Use Reserve, equivalent to a protected seascape. However, 3,810 hectares of landfill development has encroached into the marine environment of Tarout Bay. Degradation of the marine environment has already been noted and it is estimated that 485 hectares of mangroves have been lost. In addition to damage noted in natural assets, the urban environment is also at risk, particularly the reclaimed areas on the coastline.

Economic Resources

Al-Ahsa is part of a larger system of cities that is quite unique in terms of the balanced dynamic struck by complementary functions. Including the Coastline Sector, which hosts Dammam, it comprises almost 85% of the total regional population and 46% of the total number of urban clusters. As a result, the area's economy is broad, encompassing a variety of administrative, service, industrial, agricultural, and touristic activities.

A diverse set of city functions can be identified on the regional scale for the cities in the Eastern Region. While Dammam has a mixed-use function of industry, trade, and commerce, with some agriculture practiced in the suburbs, the cities around it can be given a more specific functional identity. For example, Jubail to the North, acts as the main industrial hub in the region. Jubail is the largest industrial city in the Middle East, and lies close to the similarly functioning city of Ras Tanura. Qatif, carries a strong cultural identity known for its historical village and souks. In the South, Al Hofuf is the urban centre of Al-Ahsa Oasis, also known culturally for its old souks and palaces. It is agriculturally one of the largest date producer in the world.

Aerial view of the oasis from neighboring mountain

Internal street in the Qaisariah Souq

The Oil and Gas Sector

The oil and gas sector is the largest and most important economic contributor in the Eastern Region, where all productive oil and gas fields of the Kingdom are located. These include Dammam Field, the first field discovered in the Kingdom; Ghawar Field, the largest oil field in the world; Savanya; Al-Wafra; and Al-Shaibah fields in the Empty Quarter, which are the latest discoveries and contain huge oil and gas reserves. These are the most important fields, though there are additional fields.

The oil reserves in the Eastern Region rose in production levels to 265.9 billion barrels in 2012, equaling 25% of global supply. These reserves are equipped with the necessary infrastructure to stabilise, transport, and refine large volumes of crude oil, and are in an opportune position to export to both the East and West. The Saudi ARAMCO has its headquarters in Dammam and runs the entire line of operations for the sector, from prospecting, exploring, and extracting, through collecting, processing, refining, and finally, distributing, shipping, and exporting.

Dammam sits at the start of the East-West pipeline, which runs from the port of Yanbu on the Red Sea to Abqaiq in Eastern Saudi Arabia (a total of 1200 Km). Refining and processing takes place in Abqaiq, Saudi ARAMCO's processing and stabilisation plant (the world's largest), with a capacity of over seven MBOD. Saudi ARAMCO operates many refineries in the country and is currently producing more than 10 million barrels a day.

In regards to export, Saudi Arabia's crude and refined exports exit the country through major oil ports on the Arabian Gulf (notably the Ras al Ju'aymah Oil Terminal and the port city of Ras Tanura) and on the Red Sea (Yanbu). Saudi Arabia's access to Eastern markets through the Arabian Gulf, and Western markets through the Red Sea are a tremendous asset, particularly during times of regional unrest. During the 1980s Iran-Iraq Tanker War, Saudi Arabia still had a pathway to market.

Industry

Manufacturing is the second most important sector in the region. The Eastern Region hosts the largest number of industrial cities in the Kingdom, as well as the largest industrial city in the Middle East, Jubail. This city has expanded and grown exponentially. Dammam hosts three industrial plants, another lies in Al-Ahsa, and one further in Hafr Al Batin. The large petrochemical complexes located in Jubail Industrial City are among the most important in the Kingdom due to their large production capacities, most products of which, are exported.

Agriculture

Agriculture is also an important economic sector in the Eastern Region. In 2011, the total area for crop cultivation was 56,000 hectares, representing about 7.1% of the total cultivation area in the Kingdom, (788,000 hectares).[10]

Land Use and Urban Clusters

The coastline sector, together with Al-Ahsa Oasis is home to almost 85% of the total regional population and 46% of the total number of urban clusters. It hosts a variety of administrative, service, industrial, agricultural and touristic activities. This territory also had the first operational railway line, which remained the only one until the opening of the Al Qassim-Riyadh Line.

Figure 10, shows the railway line connecting Dammam with Al Hofuf that terminates in Riyadh. The urban centres for the region are largely concentrated along the coast in Dammam, Qatif, and Jubail and inland in Al Hofuf / Al-Ahsa, near the oasis. Agricultural areas are concentrated around Qatif and in Al Hofuf, the largest date farm oasis in the world. Each city additionally benefits from an industrial zone in close proximity.

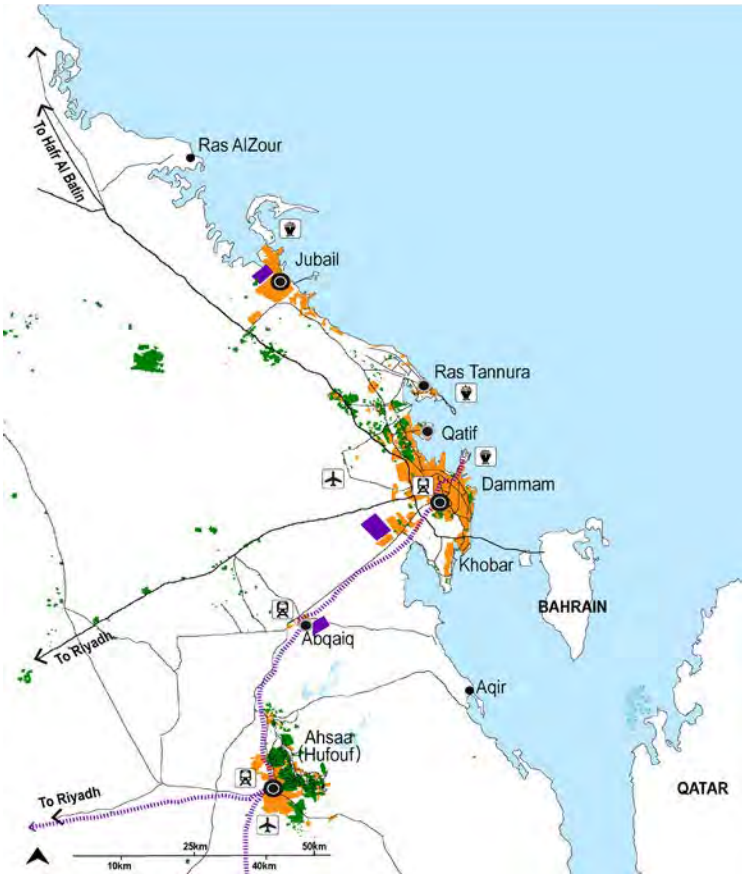


Fig. 10. Land use

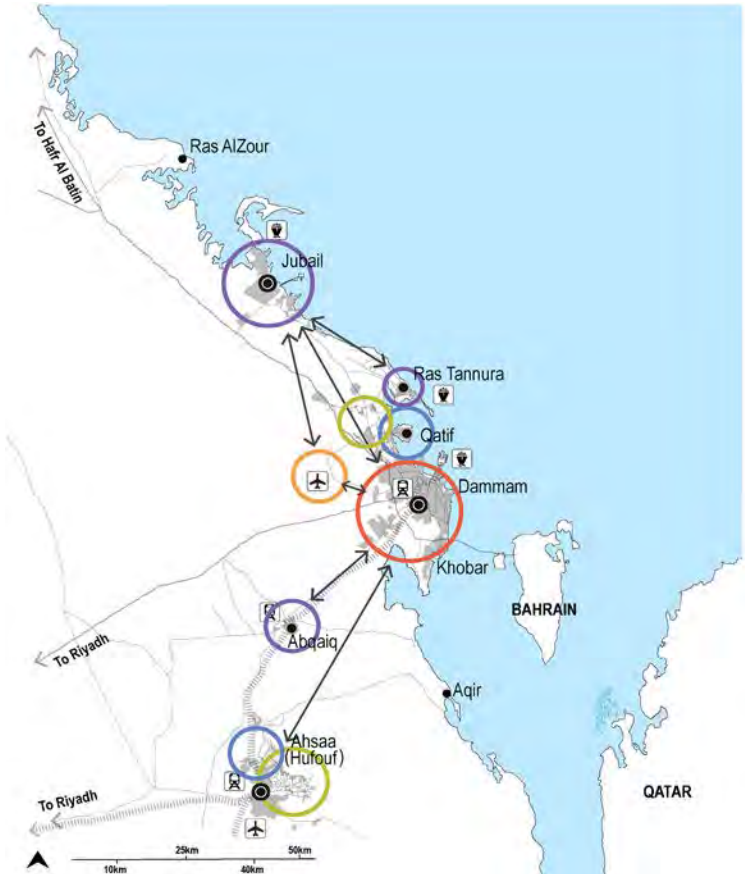


Fig. 11. Functional connectivity

GOVERNANCE AND FINANCIAL FRAMEWORKS

3

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4.1 Legal and Institutional Context

Al-Ahsa's legal planning framework is shaped by the Kingdom's legislative environment which is based on Islamic Sharia Law. The law-making authority is vested in four entities; the King, the Shura Council, the Council of Ministers and the Ministerial departments. Consequently, there are five legislative instruments (Royal Order, Royal Decree, Supreme Order, Council of Ministers Resolution and Ministerial Decree) that function in a hierarchical order, underpinning their authority and validity. This non-centralised law-making process, has given rise to a over 500 urban planning related instruments pertaining to the city of Al-Ahsa. However, the majority of these are promulgated at the lowest administrative level (Circulars)[11] and therefore lack authoritative legal force.

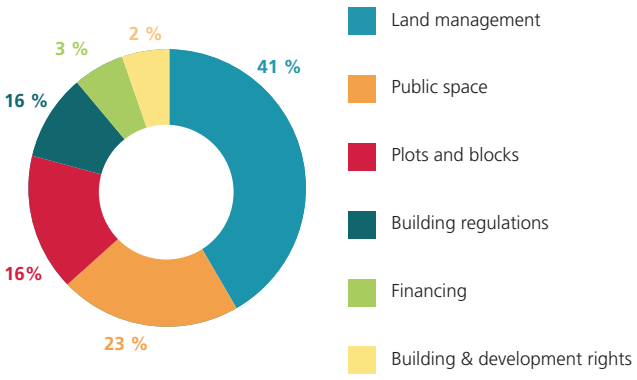


Fig. 12. Number of urban laws in KSA based on the Main Themes of Urban Planning Legislation (UN-Habitat)

The Ministry of Municipal and Rural Affairs (MoMRA) is legally entrusted with the task of urban planning and provision of all construction permits in the Kingdom's cities. MoMRA therefore plays a significant role in Al-Ahsa's growth and development patterns. The Municipality of Al-Ahsa (Amanah), as the local level actor for Al-Ahsa, acts as an implementing arm for MoMRA. The institutional budgetary system is also centralised, meaning that Al-Ahsa's development intervention is reliant on fund allocation from MoMRA through the sole fiscal means of annual line item budgeting.

The Kingdom's planning system that Al-Ahsa is subject to follows a spatial hierarchy and is predominantly top-down. The National Spatial Strategy (NSS) of 2001 is the guiding plan for the Kingdom. The Strategic Regional Plan for Eastern Region 2005 addresses the natural, urban, social and economic regional development aspects and the Strategic Sub-regional Plan of Al-Ahsa (2016) highlights the essential role that Al-Ahsa can play as the largest governorate in the region. The Al-Ahsa Local Plan identifies strategic land uses and infrastructure networks within the metropolitan area and applies controls to urban land use and building regulations within the municipal boundary. The Urban Growth Boundary (UGB) aims to prevent urban sprawl in the outskirts of cities in areas lacking access to adequate infrastructure and the Land Subdivision Plans are the basic building blocks that guide Al-Ahsa's development.

The NSS is the only plan that is enshrined in law, the remaining planning instruments are defined only by procedural manuals which compromises their legitimacy. By nature, these instruments cannot construct a system of legal accountability and transparency among the relevant actors.

There is evidence to suggest that land use and building control regulations have facilitated urban sprawl within Al-Ahsa. For example, large areas have been approved for low-density detached houses with a height limit of two floors, which has resulted in large amounts of land used for residential purposes. There is additionally vacant land within the Al-Ahsa urban core which is owned by ARAMCO and used for underground pipes. This use is incompatible with the zoning requirements and creates disconnected urban areas that are socially, economically and environmentally unsustainable. A key and unique urban feature in Al-Ahsa, is the preservation of existing agricultural lands within the city, which provide environmental and social benefits.

In terms of reform, Al-Ahsa would benefit from both fiscal and jurisdictional decentralization to facilitate independent and innovative solutions to urban social problems at the Amanah level. This should entail:

- The transfer of local planning power, authority and function from MoMRA to the Amanah with provision for independent action without recourse to effectively address community needs. This is supported by the New Urban Agenda, which specifies that territorial urban design and planning processes should be led by sub-national and local governments, though their implementation will require coordination with all spheres of government as well as participation from civil society, the public sector and other relevant stakeholders.
- Fiscal decentralization, which gives autonomy to the Amanah to source funds to finance development activities. Revenue generation activities in cities may also include taxes and levies. Urban areas should be allowed to collect some form of property taxes to fund development activities. The recent White Lands Act that imposes fees on undeveloped plots in urban areas to tackle land speculation, housing shortage and indiscriminate land development, shows that regulatory

mechanisms can be leveraged to generate revenue while fostering an efficient development framework.
- Opening of avenues for actors, including the private and voluntary sector and the general community, to participate in decisions regarding projects that affect them.

The legal framework needs to enshrine an acceptable level of public participation in decision making, to foster equality and inclusion. Agricultural land is a key urban feature in Al-Ahsa and local laws and policies against converting these lands to other uses should be enforced. The local plan needs to take into consideration the use of these agricultural lands and enact an urban management programme that can assist owners to develop these lands in ways from which the city will benefit. The local plan should also further integrate ARAMCO's protected lands (sensitive areas) with the surrounding urban areas and make use of the land around Al-Ahsa's Railways as an attractive public space.

Revising the Urban Growth Boundary Law to include clear criteria for its definition would enhance technical and vertical accountability. The Law also needs to place more emphasis on establishing the Development Protection Boundary as a no-development zone, not only to prevent haphazard development but also to discourage the advantage taken by private interests from laxity in the legal text. These initiatives will strengthen policy formulation designed to move the city towards a more sustainable, compact and dense future. Primarily, a post-legislative scrutiny of the urban growth boundary law should be undertaken to assess whether or not it has met its policy objectives. This could, in turn, inform the legal reform process as well as planning policy options.

4.2 Planning Instruments and Procedures

4.2.1 Hierarchy of plans

The planning system of Al-Ahsa is derived from the de facto planning hierarchy of the Kingdom. Within this framework, there are four different levels of spatial plans: national, regional, local and district. Figure 13 highlights the planning instruments in force in Al-Ahsa.

4.2.2 Regional Plan for Eastern Region

Regional planning represents the second-tier of spatial planning in KSA, which aims to address the natural, urban, social, and economic aspects of regional development. The

Qaisariah Souq

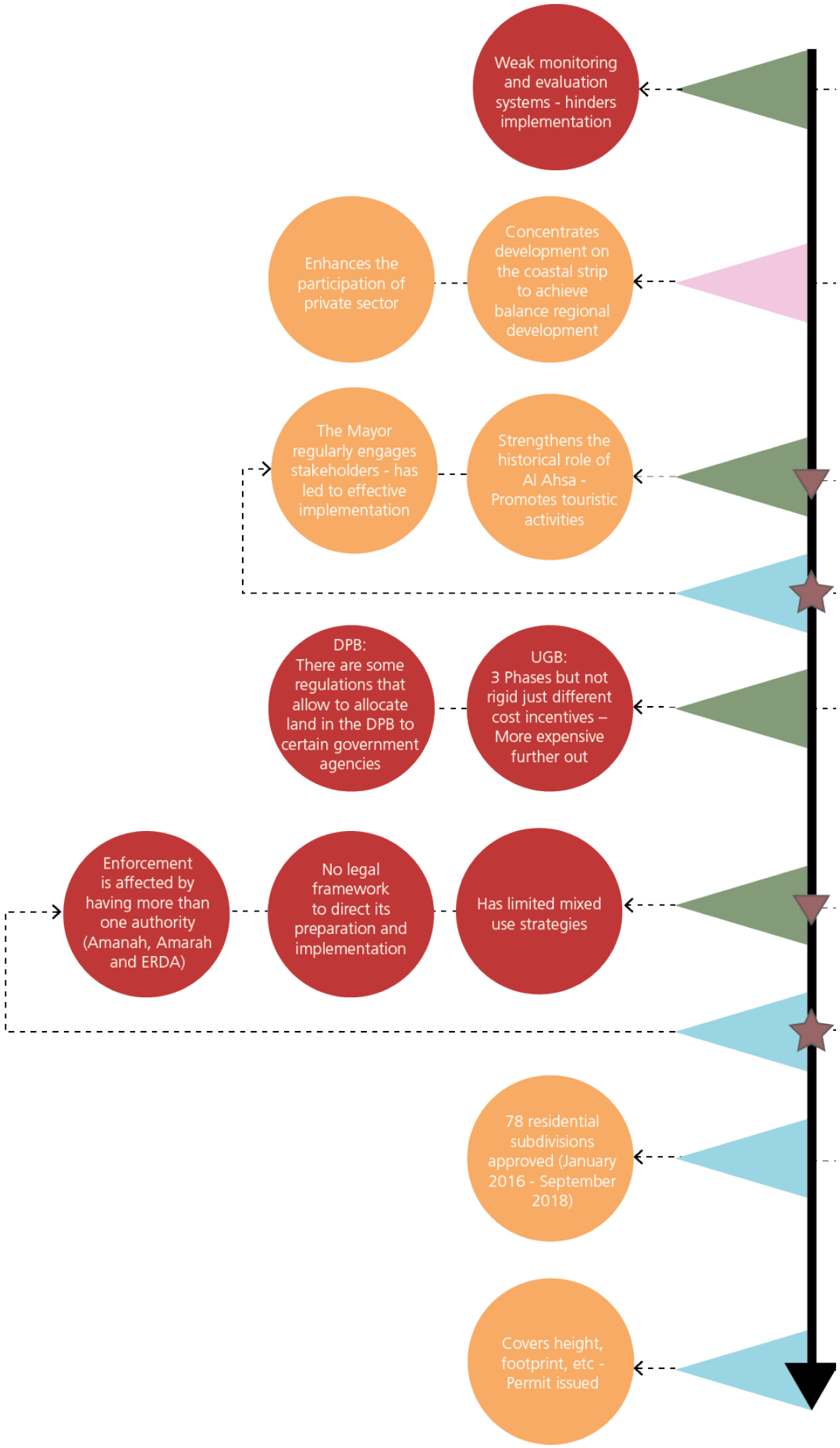


Fig. 13. FSCP simplified representation of hierarchy of plans and the planning instruments for the city of Al-Ahsa


NATIONAL SPATIAL STRATEGY (2001)
REGIONAL PLAN FOR EASTERN REGION (2005)
SUB-REGIONAL PLAN (2016)
UGB + DPB (2007)
LOCAL PLAN (2018)
LAND SUB-DIVISION PLAN(S)
BUILDING PERMIT
MOMRA
REGIONAL COUNCIL
AMANAH
DECISION
APPROVAL
CHALLENGE
TERMS & CONDITIONS
APPROVED
NOT APPROVED

Strategic Urban Eastern Regional Plan of 2005 was prepared and approved by the Regional Council for the Eastern Region. The Plan aims to:

- Take advantage of the region's strategic location at the Arabian Gulf as a link between the Kingdom and the other states of the Gulf Cooperation Council and Southeast Asian countries;
- Enhance the contribution of the region's non-petroleum resources in national development to achieve balanced growth;
- Exert expansion on projects in diverse industries that are non-dependent on the region's petroleum resources;
- Enhance the participation of the private sector in the provision of education and training across the region;
- Address the developmental concentration on the coastal strip to achieve balanced urban development in the region; and
- Support a balanced pattern of cities in the region that confirms the hierarchy of functions and population sizes.

4.2.3 The Al-Ahsa Plan

The Al-Ahsa Sub-Regional Strategic Plan
This Plan was prepared in 2016 by the Amanah of Al-Ahsa and approved by MoMRA. It aims to:

- Enhance the regional status and role of Al-Ahsa as one of the most important centres of national growth in the Kingdom alongside the regional capital (Dammam) and national capital (Riyadh), while supporting national economic activities both within and outside the city;
- Achieve the estimated population size (1.280 million people) in Al-Ahsa's urban centres (Al Hofuf and Al Mubarraz) by 2030, in the framework of its regional role as the second capital of the Eastern Region after the Dammam metropolitan area (Dammam, Khobar, and Dhahran). As the capital of the governorates, Al-Ahsa can play a key role in the region and achieve sustainable development for its proposed population size through optimal land use in Al-Ahsa and its surrounding areas;
- Support the commercial and administrative role of Al-Ahsa by taking advantage of its strategic location as the main connection to the Kingdom's eastern main gateway as well as its international link to the United Arab Emirates, Bahrain and Oman through the existing road network, railways, ports and airports;
- Strengthen the historical, archaeological role of Al-Ahsa by developing Al-Ahsa's tourist city, including the historic sites of the inner city (found amid the historic Al Hofuf and the historic centre).
- Enhance the contribution of the region's non-petroleum resources in national development to achieve balanced growth;
- Exert expansion on projects in diverse industries that are non-dependent on the region's petroleum resources;
- Enhance the participation of the private sector in the provision of education and training across the region;

Juatha Mosque,one of the oldest mosque in Islam

- Address the developmental concentration on the coastal strip to achieve balanced regional urban development; and
- Support a balanced pattern of cities in the region that reinforces the hierarchy of functions and population sizes.

The Mayor of Al-Ahsa follows the plan closely and holds meetings with several public and private stakeholders to ensure its effective implementation.

The Municipal Council of Al-Ahsa, alongside the Al-Ahsa Amanah, has had an active role in encouraging public participation during the planning process and addressing present and future needs of residents.This has led to the preparation of a legitimate strategic plan for development.

Al-Ahsa Local Plan

The Local Plan represents the third level of the urban planning system in KSA and is largely focused on those areas of the municipality that are contained within the urban growth boundary, with a special focus on housing.

The Local Plan contains the Urban Atlas which details the permitted land uses for every part of the city. It is complemented by a regulations report which contains specifications on permissible development rights such as floor area ratio, street dynamics, building heights, areas of special building regulations, etc.

The aim of the local plan is to a) apply controls to urban land use and building regulations; b) to provide public services and infrastructure in a cost effective and integrated manner; c) set basic requirements for proposed road networks; and d) help facilitate the development of public and private sector housing.

This plan aims to achieve the objectives of the regional strategy and the functional roles of the national urban strategy by exploiting and optimising available resources, under the principles of sustainable development.

There is no legal framework or technical procedural manuals (guidelines) to direct its preparation and implementation. Instead, it is prepared by various consultants following the "Booklet of the Terms of Reference for the Preparation of the Local Plan" which is formulated by MoMRA.

The Al-Ahsa Local Plan was prepared in 2018 by the Amanah and has not yet been approved by MoMRA. This Plan includes limited mixed-use land strategies, though such characteristics are still present in select areas of the city such as the city centre.

Additionally, the plan does not spread commercial activities along the urban tissue and mixed-uses are proposed only along main roads to preserve privacy in residential areas. This strategy engenders car dependency and poor quality public spaces.

Heritage hotel in Al-Ahsa

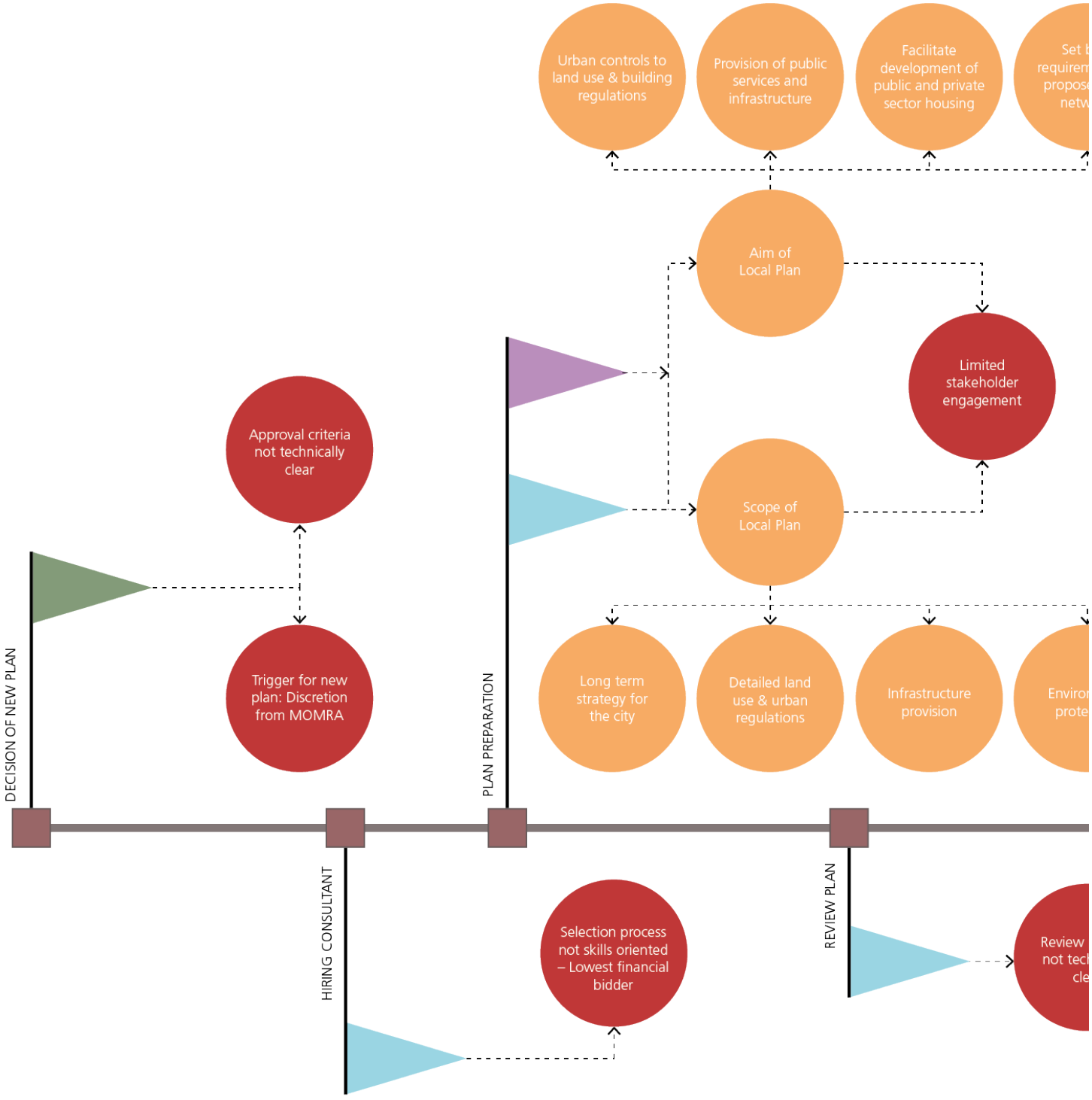
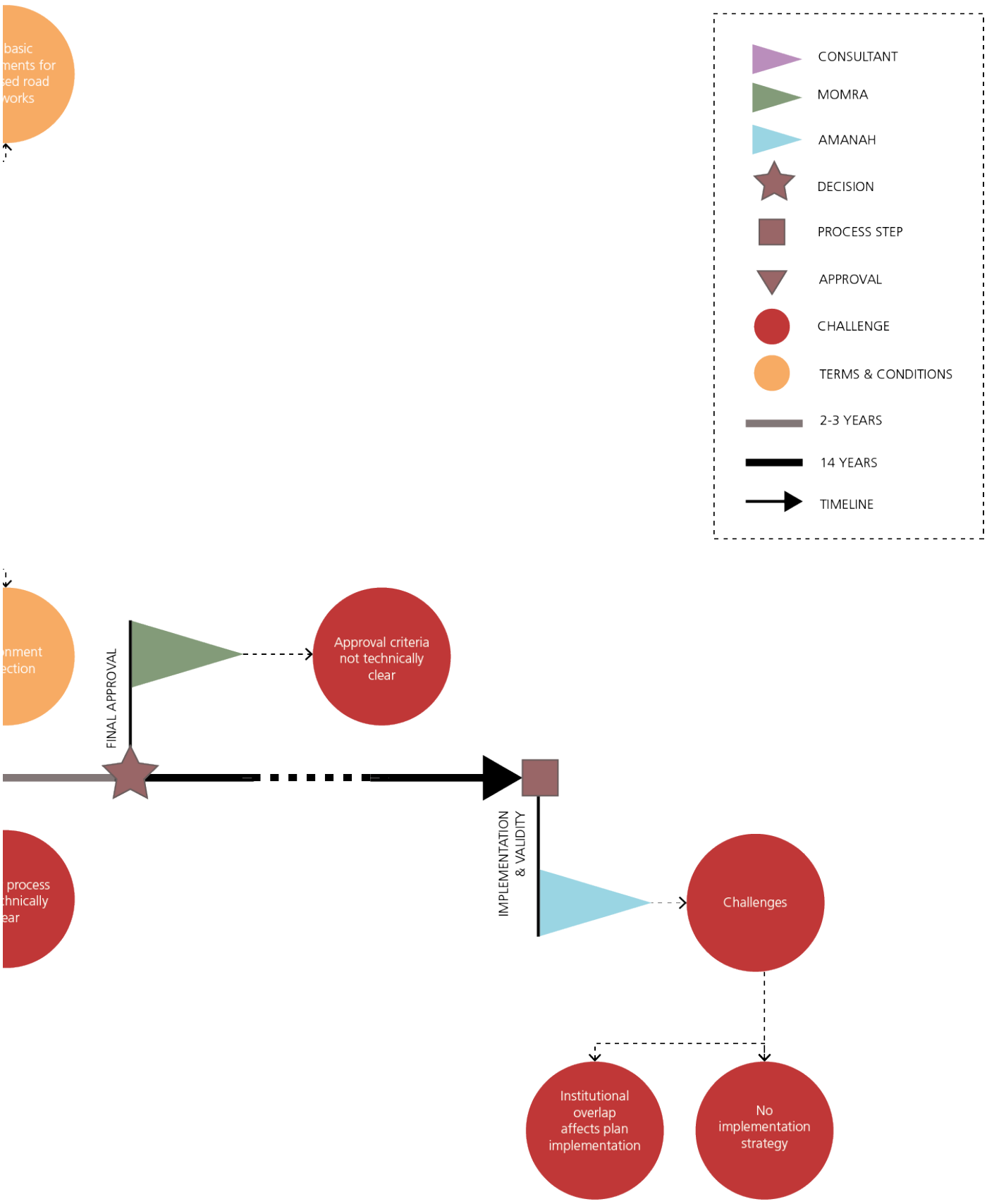


Fig. 14. FSCP simplified representation of Planning Process and Actors involved in the preparation of the Al-Ahsa Local Plan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PROCESS STEP
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TERMS & CONDITIONS
2-3 YEARS
14 YEARS
TIMELINE
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ection
FINAL APPROVAL
Approval criteria not technically clear
process
hnically
ear
IMPLEMENTATION & VALIDITY
Challenges
Institutional overlap affects plan implementation
No implementation strategy

4.2.4 Al-Ahsa Urban Growth and Development Protection Boundary

Legal Framework

In 2008, the Prime Minister issued decree No. 157, which sets the overall regulations of the Urban Growth Boundary (until 2030) and the Development Protection Boundary (DPB). The executive regulations were issued in 2010 by the MoMRA Ministerial Decree No. 11769 followed by the current revision (MoMRA Ministerial Decree No. 66000) which was enacted in 2014. The growth boundary is intended to control urban expansion and prevent sprawl in the outskirts of cities without adequate urban infrastructure, whereas the development protection boundary sets a long-term plan for future development of cities beyond the 2030 / 1450H Urban Growth Boundary.

The 2014 Decree stipulates several general development principles including:

- Strategic development projects that are part of the spatial strategies, including major road and railway networks passing through private lands, should be prioritised over any other development projects;
- Development projects outside of the boundary are only permitted with the approval of MoMRA; and
- Large-scale development projects should follow specified detailed standards.

The Law also defines infrastructural standards that developers are to follow based on the city's categorization as either national, regional or local centre and the size of the proposed lot. Al-Ahsa is categorised as a national growth centre (see figure 15).

Legally, the area between the Development Protection Boundary and the 1450 Urban Growth Boundary is protected and not earmarked for development, however, the law does outline exceptional mechanisms for building mega or national-regional economic projects therein.

Moreover, under the King's prerogative, certain agencies have rights to lands situated in such areas, in which cases approval of development projects is routine as the royal prerogative supersedes MoMRA's powers of assessing compliance. Additionally, given the legal flexibility around the definition of "mega" or "strategic" projects, private residential developments have been approved outside the 1450 UGB. These factors have undermined the functional effectiveness of the regulations, the rule of law and the compact development of urban areas.

Setting the Boundary

The urban growth boundary for Al-Ahsa, was set simultaneously alongside those of other cities by MoMRA, through a committee under the Unit of Coordination and Projects. The composition of the committee is not clear, however, it is known that it did

URBAN BOUNDARY CLASSIFICATION OF LAND SUBDIVISION APPROVALS AND THE URBAN BOUNDARY PHASES

EXECUTIVE REGULATION ISSUED BY THE MINISTERIAL DECREE NO 66,000 IN 20/12/2014

1ST PHASE (2014-2018)	2ND PHASE (2019-2024)	3RD PHASE (2025-2030)
NATIONAL GROWTH CENTERS (HAEL, TABUK, BURAIDAH, UNAYZA, ARAR, NAJRAN, JAZAN, AL BAHA, SKAKA, ABHA, TAIF AND AL-AHSA)		
MORE THAN 500,000 SQM		
- Tarmacking of internal roads - Sanitation and electricity - Water if available - Storm water infrastructure	- Tarmacking of internal roads - Sanitation and electricity - Water if available - Storm water infrastructure - Connect to closest main road - Percentage of residential area completed not less than 50% - Provide land for social services (schools, kindergartens, hospitals, etc.)	- Tarmacking of internal roads - Sanitation and electricity - Water if available - Storm water infrastructure - Connect to closest main road - Percentage of residential area completed not less than 50% - Provide land for social services (schools, kindergartens, hospitals, etc.)
- Tarmacking of internal roads - Sanitation and electricity - Provide land for social services (schools, kindergartens, hospitals)	-	-

Fig. 15. Matrix showing the development options within the phases of the urban boundary in the national growth centres (Including Al-Ahsa)

not include the municipality of the Eastern Region, which remains formally responsible for planning at city level. There is an understanding that the calculations were based on factors such as historical and expected population and built growth in the city, however, there are no published criterion explaining the methodological calculation of the boundary size.

Challenges

Although the growth boundary regulations set very clear rules that forbids development outside the boundaries, there are some impediments, such as railway lines and Aramco reservoirs, which undermine the efficacy of the law and affects accessibility and connectivity between the city's distinct areas. Accordingly, this has caused socio-ecological and economic imbalance (incompatible land uses & land speculation), in addition to unbalanced growth and development patterns (sprawl).

The Amanah is facing pressure from residents who wish to convert their agricultural lands to residential or commercial uses, contrary to the law.[12] The preservation of agricultural land enhances the social and environmental benefits for the city.

Disparity between the size of the boundary and Al-Ahsa's demographic calculations undertaken by the Committee, which undermines densification. Based on current population growth projections, the 2030 density will be 34 p/ha, which is well below any recommended target, including UN-Habitat recommendation of 150 p/ha.

Permitting

Development within the urban growth boundary is closely linked to permitting and development control. The process in Al-Ahsa is as follows:

- A developer submits a land subdivision plan with detailed implementation plans for the instalment of the requisite infrastructure to the Amanah (Al-Ahsa);
- The Amanah assesses application in accordance with the provisions of the Law on urban growth boundary; with exception of those cases defined by MoMRA Ministerial Decree No 17777. This decree delegates certain roles to mayors for approval of land subdivision, solely in relation to the size of residential projects. The Mayor of Al-Ahsa is not an approval authority under this Law, thus the application is reviewed by MoMRA in accordance with development standards and applicable building codes;
- Building permit is either refused or granted by MoMRA;
- A developer whose permit has been refused has two options of appeal: a) recourse to the Amanah, Amarah and MoMRA calling for a re-study of the application; and b) file the case in the relevant jurisdictional administrative court; and
- The decision in the above appeal processes is final and binding on all the parties.

White Lands Act

The percentage of undeveloped land ("white lands") in Al-Ahsa is low, at 7% of total land available for urbanisation within the growth boundary (see figure 16). The existence of white lands has been a major contributor to a growing housing shortage, particularly for youth and the growing population. This is largely attributed to property hoarding, intended to maximize land value before development. The government recently issued the White Lands Tax Law[13] that imposes an annual land tax of 2.5% of value on 'white land', which is defined as vacant land 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 better address housing shortages; b) make residential land available at reasonable prices; and c) combat monopolistic practices. The Ministry of Housing, which is the implementing authority, will enforce the Law in phases. At the moment, the Act is operational only in Makkah, Riyadh, Dammam and Jeddah (see figure 16).

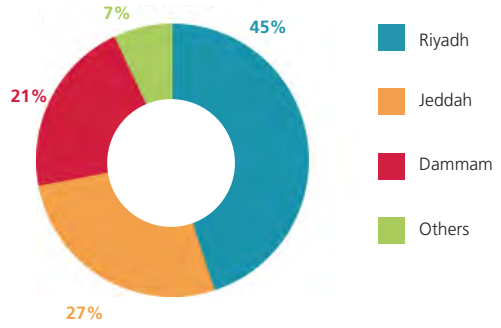


Fig. 16. Percentage of white lands – first phase of implementation of the White Lands Law

4.2.5 Land Subdivision Plans

The Land Subdivision Plans are the basic building blocks for KSA cities' growth and development. The Mayor of the Eastern Region has the power to approve land subdivision in accordance with the following criteria (Ministerial Decree No. 17777 of 2010):

- The land must be within the approved urban boundaries;
- The land use specified is consistent with the instructions and regulations that govern it;
- The subdivision will not result in cancellation or modification of an approved regulation, planning or authorized land use;
- All necessary planning procedures have been completed and the Deputy Ministry for Town Planning (DMTP) has been issued with a certified copy of the plan after its approval.

The Amanah of Al-Ahsa has approved 78 residential land subdivisions from January 2016 - September 2018.[14]

4.3 The Institutional Context

4.3.1 Urban institutions in KSA

Al-Ahsa's growth and development pattern is impacted by the centralised institutional planning framework of KSA under the Ministry of Municipal and Rural Affairs (MoMRA). MoMRA is entrusted with the task of conducting urban planning of the Kingdom's cities.That includes ensuring provision of necessary roads and fixtures, maintenance and cleanliness of the environment in addition to the management of licensing for all types of construction activity.[15] The Deputy Ministry of Town Planning, which falls under MoMRA and its departments such as Local Planning, Studies & Research, Projects Coordination and Urban Planning & Design, is mandated to coordinate with "concerned bodies" in charge of planning to achieve comprehensive urban development.[16] In practice, there is little coordination between these departments and the Amanah, which affects service delivery and project implementation.

4.3.2 Regional context

According to the Ministry of Interior's administrative classification, the Eastern Region is divided into 11 Governorates (6 class A, 5 class B) and 107 centres (71 class A, 36 class B). Al-Ahsa, as the largest governorate, is included in this classification though it is alternatively governed through a "municipality" (Amanah) headed by a Mayor. Given this structure, the Amanah is allocated funds by MoMRA for development action and municipal services through annual line item budgeting.[17] This is the sole fiscal resource available to Al-Ahsa.[18]

There are additional institutions in the Eastern Region that manage and regulate the development process: the Amarah and the newly established High Commission for the Development of the Eastern Region (HCDER). The Amarah of the Region, is headed by the Regional Prince who, pursuant to the Regional Law,[19] reports to the Ministry of Interior. The Regional Council[20] is based in the Amarah of Dammam and is required to:[21]

- Identify the needs of the region and propose their inclusion in the National Development Plan;
- Identify beneficial projects for the Region and submit these as activities requiring funding from MoMRA. These requests are vetted, and viable projects selected for funding. Funding is provided as part of the National Development Plans and yearly budget of the country. This is the sole resource available to municipalities;
- Study the organizational arrangement of the regional administrative centres, follow up implementation of any modifications; and
- Implement the provisions of the development, budget plan, and carry out the needed coordination.

New residential developments in southern parts of Al-Ahsa

The Municipal Council, also located in the Amanah of Al-Ahsa, supervises the activities of the municipalities to ensure conformity to the Llocal Plan in concurrence with the current needs of the region. Two thirds of Municipal council members are appointed by citizen's votes, the remainder appointed by the Minister of Interior. It approves:

- The municipal budget, allocated by the national government. This is subject to continual revision in accordance with priorities set jointly by the Council and Mayor;
- Residential plans, pending examination for procedural violation;
- The scope of municipal services; and
- Expropriation projects based on Mayoral priority.

The High Commission for the Development of the Eastern Region (HCDER) was established as a body to oversee 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 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. However, more recently, a decree defining a new authority, named Eastern Region Development Authority (ERDA), was issued.

4.3.3 Local context

Al-Ahsa is composed of several cities, including the most prominent cities in the governorate, Al Hofuf and Al Mubarraz. As outlined above, Al-Ahsa is managed by the Amanah, which is directed by a mayor. The mayor is appointed by the Minister of MoMRA. The Amanah of Al-Ahsa has undertaken extensive work to address several urban issues. For example, strategic objectives from the structural plan have been implemented to improve residential land availability. Housing availability is a core issue in most KSA cities. but The Amanah has additionally introduced regulations and policies to promote preservation of agricultural lands within the urban core of Al-Ahsa. Finally, the city of Al-Ahsa has achieved World Heritage status.

Al-Ahsa Urban Planning Department (AUPD),[22] ensures compliance with MoMRA's outline for the Kingdom's cities, rural areas, streets and construction designs. AUPD has only 3 planners and architects[23] distributed across four units: a) urban planning; b) Design and Studies; c) Operation and Maintenance; and d) Building and Facilities. The Amanah of Al-Ahsa established a Local Urban Observatory in 2007, which is monitored by the National Urban Observatory[24] (MoMRA Ministerial Decree No. 1280 of 2007). This observatory supports AUDP with progressional triennial measurements on the following:

- Achieving Vision 2030;
- Achieving Goal 11 of the SDGs; and
- City Prosperity Index indicators and other contextualised urban indicators.

The Local Planning Department under MoMRA is responsible for the implementation of two initiatives related to the National Transformation Programme: a) the preparation of the Local Plan; b) technical support to the drafting process of the Planning Act; and c) undertaking studies on roads and parking spaces.

The private sector such as the Saudi Arabian Oil Company (ARAMCO), also has a significant impact on Al-Ahsa's land development projects. ARAMCO is functionally independent from the Ministry of Energy, Industry and Mineral Resources but is directly managed by the highest levels of Government (the Ministers of Energy, Finance, Communication and Information Technology are on the Board)[25] Such large companies have been criticised for their contribution to the rising cost of housing, urban sprawl and speculative land market attributed to their construction and land filling activities along ecologically sensitive areas.[26]

4.3.4 Legal and institutional implications for Al-Ahsa

The majority of technical decisions and approvals passed in the local governance (Al-Ahsa Amanah) including planning decisions, are made on a discretionary basis according to the priorities set for the city. This affects the system's technical accountability, predictability, and practical clarity.

4.4 Financial Context

Al-Ahsa is home to a natural oasis where a diverse environment and rich cultural heritage has flourished. The city of Al-Ahsa is both an administrative and economic centre primarily focused in agriculture. However, manufacturing, construction, wholesale and retail trade, community and social services are the core employment providers, and constitute more than 85% of the workforce.[27]

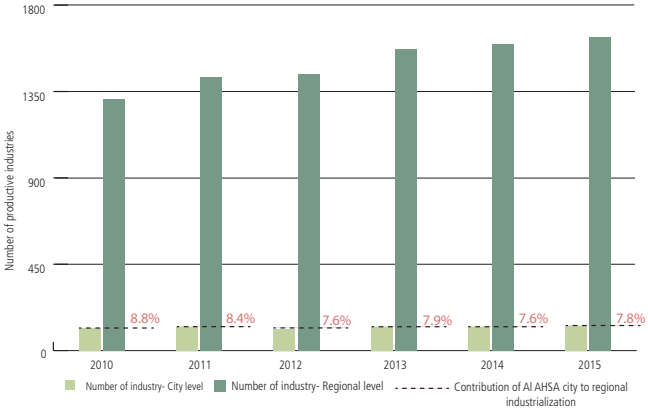
The government is working to identify strategic economic sectors that can foster local economic development, job creation, and innovation in Al-Ahsa. Economic diversification in this part of the Kingdom is key to achieving both the regional and the national economic goals of the 2030 Vision.[28] Consequently, the development of public infrastructure, (e.g., transportation, and water treatment facilities) serving Al-Ahsa's key industries, (e.g., agriculture) is a priority. These elements are fundamental to increase market access, spur competition, and harness the productive capacity of Al-Ahsa and heighten the city's contribution to the region and nation (see figure19).[29]

The government's economic strategy includes a renewed commitment to strengthen the feedback loop between regional and local needs and to boost education and training. This will contribute to human capital development and improved market conditions that will support research, innovation, and economic diversification.[30]

4.4.1 Financial system

Sustainable urban and local economic development requires a sound and resilient municipal public financial management system. Currently, the National Development Plan directs Al-Ahsa's public finance system. This system is highly centralised and depends on intergovernmental transfers to fund local development activities and projects. In 2017, the central government allocated 5% of the total budget to municipal services, which was to include projects and programs managed by the Ministry of Municipal and Rural Affairs (MoMRA), (see figure 19 and figure 20).

MoMRA, via the Amanahs,[31] is responsible for financing activities categorised as "municipal services," such as urban planning, building licensing, sanitation, and road maintenance. In addition to MoMRA, several other government ministries and entities, such as the Amir and regional councils, fund and implement projects at the municipal level, (e.g., the Ministry of Education provides direct funding for city schools).

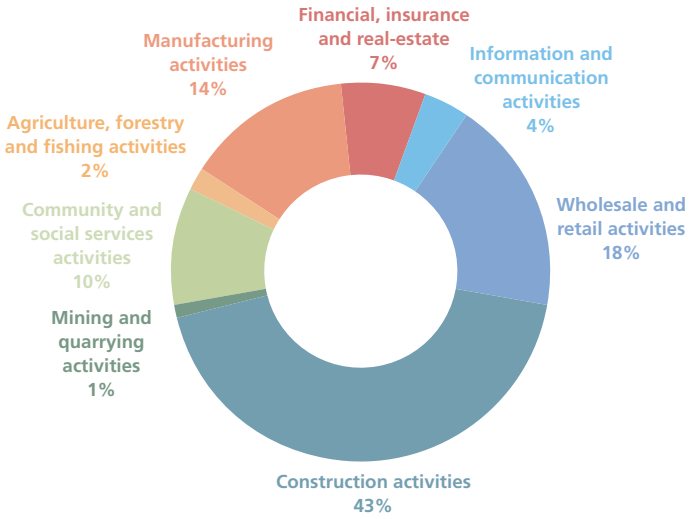


Source: Saudi Industrial Development Fund. (2016)

Fig. 18. Productive industries in Al-Ahsa and Eastern Region, 2010-2015

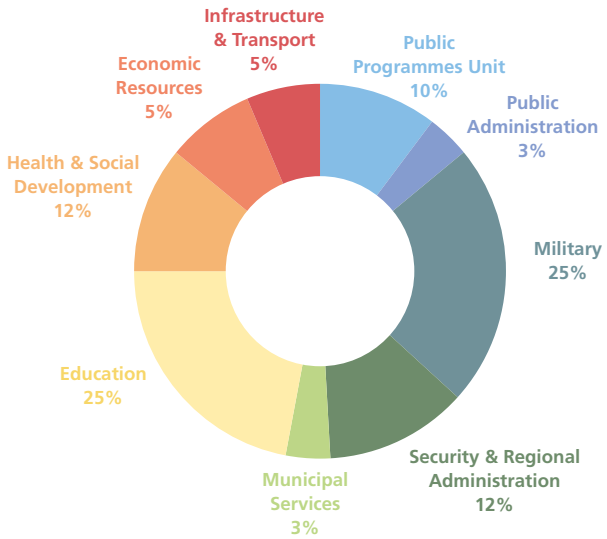
4.4.2 Municipal revenue

Currently, the Amanahs have few sources of revenue and limited authority to collect taxes. Although MoMRA introduced municipal fees, which expanded the own-source revenue base, local revenues remain insufficient. Consequently, Amanahs continue to be reliant on support from the central budget. Intergovernmental transfers from



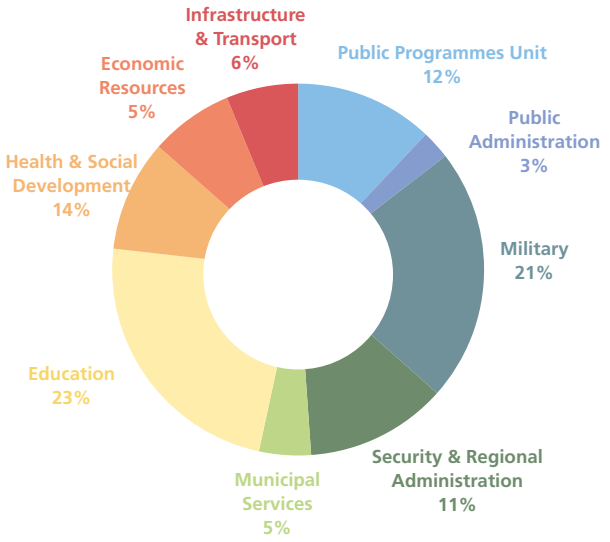
Source: General Organization for Social Insurance (GOSI), 2016

Fig. 17. Employment by sector, 2016



Source: Bhatia, R. (2017). Saudi Arabia Budget 2017. The Gulf's International Bank.

Fig. 19. Saudi Arabia national expenditure by sector, 2016



Source: Bhatia, R. (2017). Saudi Arabia Budget 2017. The Gulf's International Bank.

Fig. 20. Saudi Arabia national expenditure by sector, 2017

the MoF are based on annual budget proposals submitted by the various ministries.

In MoMRA, the budget drafting process tends to be heavily influenced by local needs and priorities. Municipal governments submit project proposals for the next budgetary cycle, which are then submitted to MoMRA's leadership for final approval. The projects approved are included in the MoF's budget review and submitted for royal approval to receive funding.

4.4.3 Financing municipal operating costs

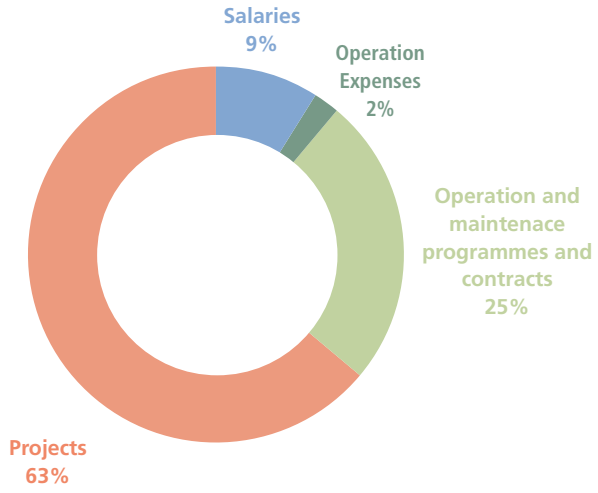
In 2016, Al-Ahsa collected SAR 44 million in own-source revenue, corresponding to 10% of the city's budget.[32] In an effort to improve municipal finance management and reduce dependency on the central government, the National Transformation Programme 2020 (NTP) directs the local government in the establishment of sound fiscal policies through the introduction of new finance instruments.[33]

4.4.4 Capital financing for municipal development

The demand for alternative financial sources to diversify the funds for local infrastructures, services, and facilities in emerging countries is becoming a priority, especially in cities like Al-Ahsa. This is strategic for the city to create favourable conditions to increase the contribution of local economy to Eastern Province GDP, reinforcing local competitive advantages, supporting new firms, and spurring innovation. In these terms, Al-Asha economy will have a direct impact from new capital financing options, experiencing social and economic returns for local key sectors like, agriculture, tourism, and manufacturing. Besides, they present great chance to create employment and

Budget Category	SAR (thousands)
Salaries	36,400
Operation Expenses	8,871
Operation and Maintenance Programmes and Contracts	98,950
Projects	249,450
Total Budget	393,671

Source: Ministry of Finance, Saudi Arabia (2017)



Source: Al-Ahsa Amanah, Kingdom of Saudi Arabia (2017)

Fig. 21. Budget for Al Ahsa, 2017

boost national and foreign direct investment (FDI) to support a diversified industrial pattern as recommended by Vision 2030. To address these new development challenges, hence, new financing options available to countries like Saudi Arabia has been rapidly expanding as priority.

Recent reforms were introduced to improve the Saudi market through increased capitalisation. For example, the Capital Market Law, the Securities and Exchange Commission, and a privately-owned Stock Exchange have recently been launched in Saudi Arabia as mechanisms to ease and enhance the market for domestic trade.

Between 2011 and 2016, Saudi equities rose in value from just over 50% of GDP to almost 70% of GDP. Today, Tadawul is the sole Saudi stock exchange market and the largest equity exchange market in the Arab world[34]. Alongside Tadawul, Saudi Arabia introduced Nomu, an equity market for small and medium-sized enterprises (SMEs). With fewer listing requirements, Nomu is a sound option for SMEs that are interested in going public.

In addition to provision of traditional banking services, Saudi Arabia's domestic banks went through a series of mergers and acquisitions after the recent oil price shock in 2014-2015,[35] diversified their assets, and began to offer both conventional and Islamic investment products to a varied investor base.[36] The Saudi Arabian market is becoming an example of efficient capital allocation driven by strategic reforms and increased market capitalisation.[37]

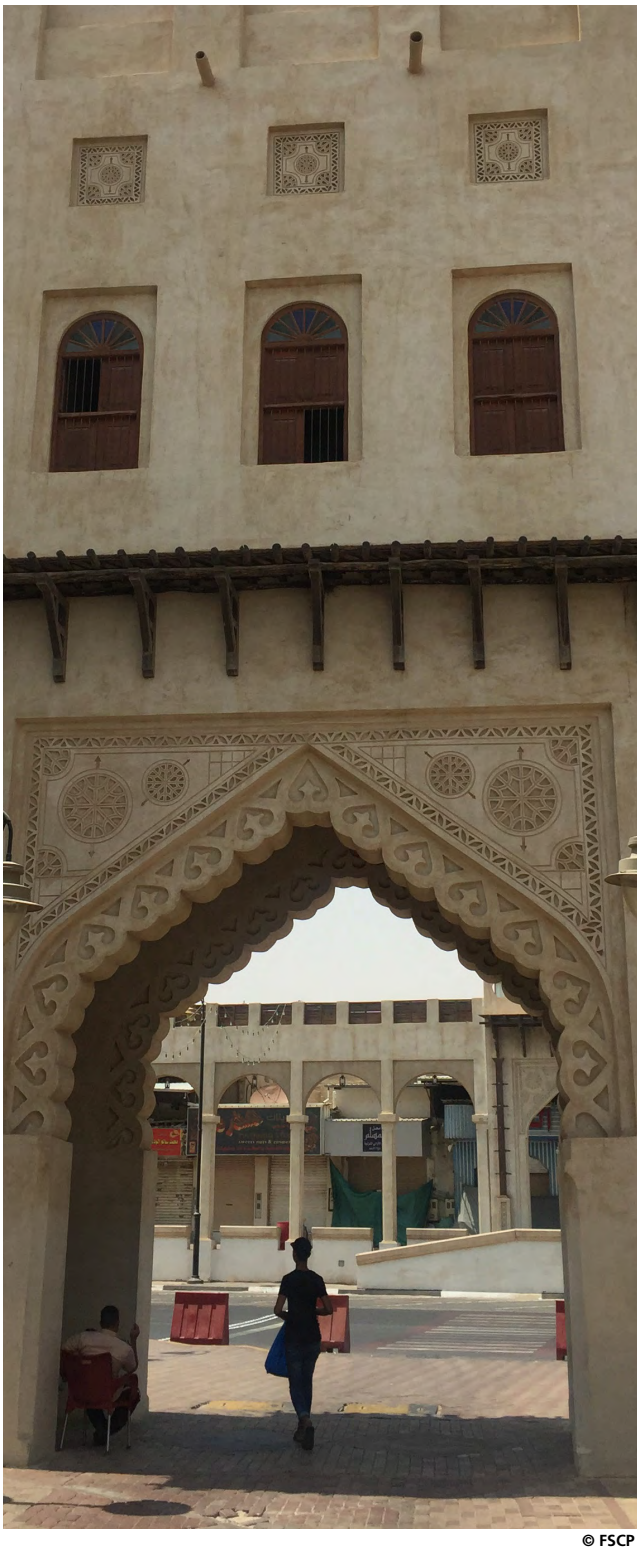
The government began issuing bonds for debt financing in 1988. In the last 15 years, the debt market has undergone a series of reforms, which have changed the processes for issuing bonds, pricing bonds, and setting bond maturity terms. The group, Investors in Government Development Bonds (GDBs), is a major buyer of government bonds. The group is comprised of domestic financial institutions, banks, and foreign investors. GDBs are Zakat deductible for domestic investors and exempt from withholding tax on income for foreign investors.[38]

This approach to creating competitive and attractive conditions for capital and equity investors is expected to have wide-ranging impacts on the local economies of cities like Al-Ahsa in the future, increasing the availability of capital to finance local development, improving the productivity, efficiency and sustainability of small and medium size cities.

Edge conditions along typical streets like Dhahran Road in Al-Ahsa

4

THE CURRENT CITY



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5.1 Urbanisation Patterns

5.1.1 The city's development patterns

Al-Ahsa is situated in the Eastern Region of the Kingdom of Saudi Arabia which is home to 15% of the total Saudi population. It is located 150 kilometres Southwest of Dammam and 330 kilometres East of Riyadh. Al-Ahsa is an oasis surrounded by desert conditions but the presence and careful cultivation of water resources has allowed Al-Ahsa to become the largest oasis in the world, growing more than 2,500,000 date palms.

Al-Ahsa is a congregate of multiple villages, the largest being Al Hofuf and Al Mubarraz, that form the metropolitan part of the city. Al-Ahsa is one of the oldest settlements in the world. Its history dates back to prehistoric times when it served as a major trade route in the region. Natural features played a critical role in the sustenance of Al-Ahsa through the centuries. Al Hofuf, originally called Al-Ahsa was the capital of the Eastern Region until 1953. In the 20th Century, oil was discovered in the Eastern Region and the capital of the region was moved from Al-Ahsa to Dammam. This changed the development pattern of Al-Ahsa. The Eastern Region is now known to contain the Kingdom's largest oil reserve, and is thus a major contributor to the region's economy.

Today, Al-Ahsa is the capital of the Al-Ahsa Governorate of the Eastern Region. Al-Ahsa is an L-shaped settlement defined by bordering agricultural lands in the North, East and South. It grew to connect the two main centres of Al Hofuf, and Al Mubarraz as they grew over time. The subsequent expansion of the assimilated towns extended their footing along the North-South axis. The town centres of Al Hofuf and Al Mubarraz now make up the metropolitan area of Al-Ahsa, together constituting an estimated population of 800,000. The expanded city of Al-Ahsa is additionally comprised of a number of villages that can also be considered towns. By definition in KSA, a village with more than 20,000 residents and a police station qualifies as a city. As a result, the Al-Ahsa Oasis includes the following towns that are interspersed with agricultural lands within the oasis.

- Al Hofuf - Al Mubarraz
- Al Oyun
- Al Umran
- Madinat Al Jafr
- Juatha

Al-Ahsa is one of the oldest settlements in the Kingdom of Saudi Arabia, and its village of Juatha is home to one of the oldest mosque known to Islam. The historic site of the Jabl Al Qarah Mountain, located near the Al-Ahsa Oasis is given its unique shape by caves that were created by subaerial weathering. Al-Ahsa's urban growth occurred in four phases. After Al-Ahsa emerged from the amalgamation of the two historic city centres of Al Hofuf and Al Mubarraz, and the population doubled in size from 45,000 on an area of 360 hectares between 1950

POPULATION

1,241,140

POPULATION DENSITY on built-up area

54.94 p/ha

AGE PROFILE

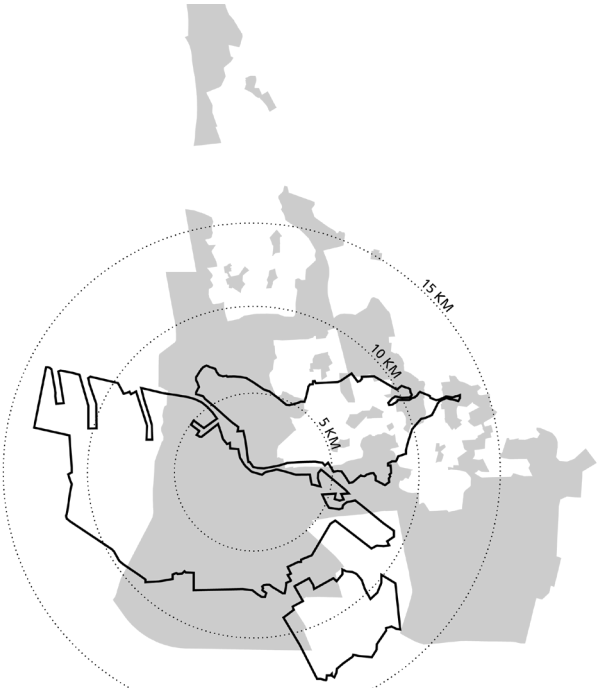
50% < 30

POPULATION GROWTH RATE

3.0 %

1,500,000 Expected population by 2030

AL-AHSA CITY COMPARED TO **AMSTERDAM**



Population: 1,365,000
Area: 18,067 ha
Density: 75.13 p/ha

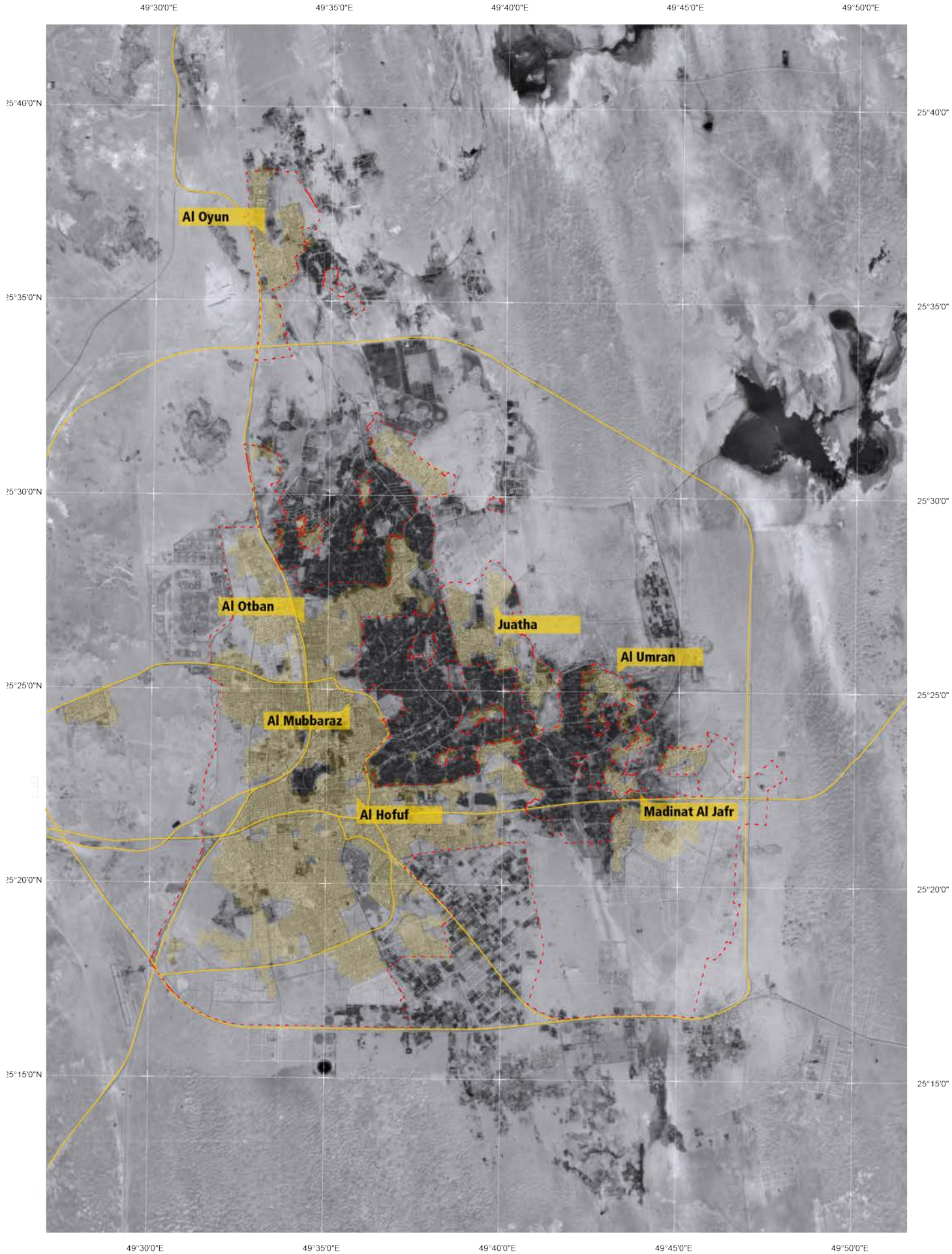
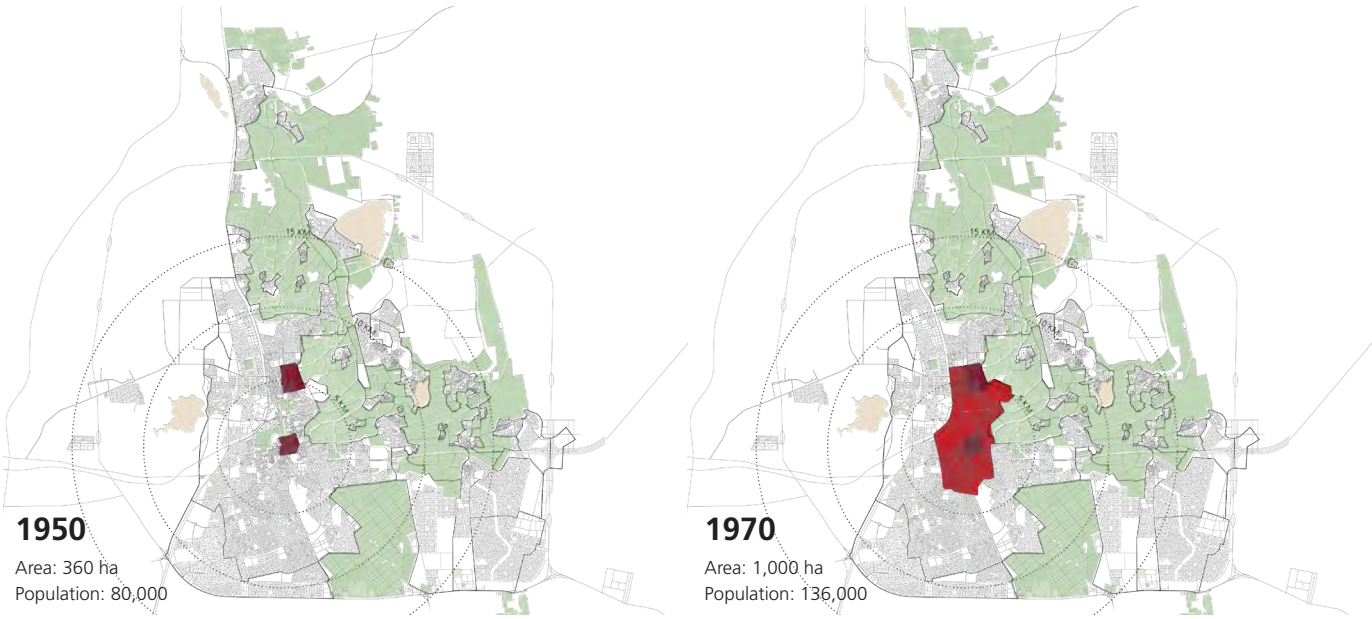


Fig. 22. Boundaries, neighbourhoods and key infrastructure



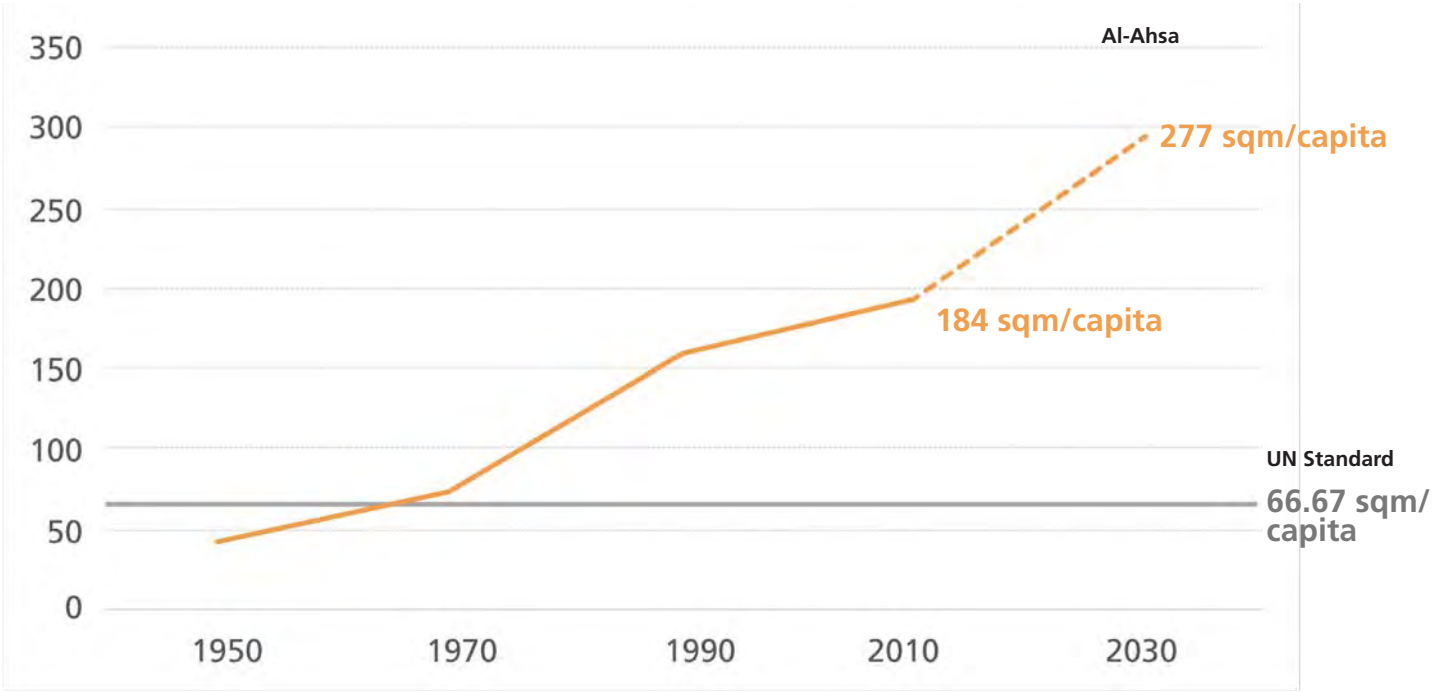
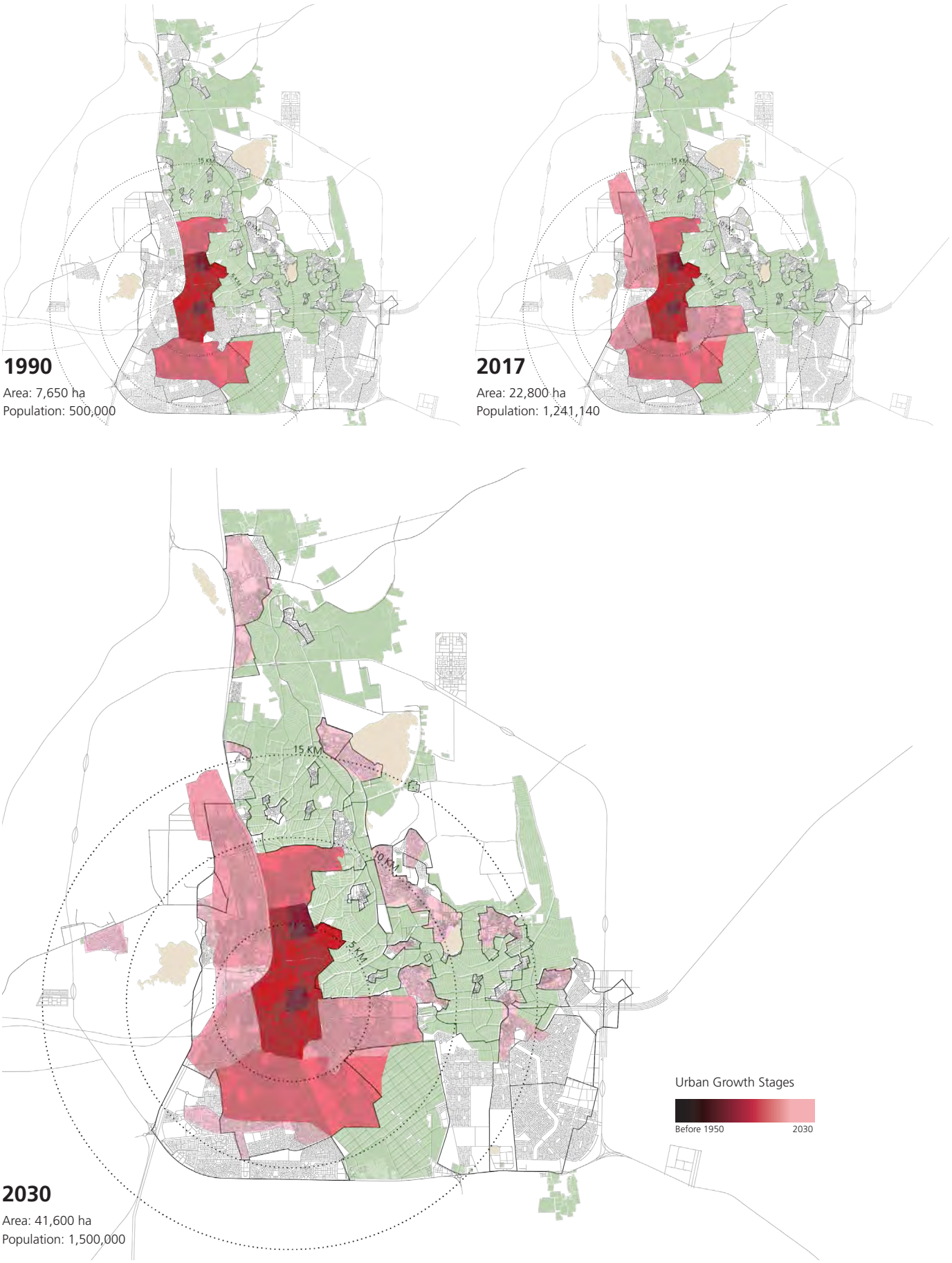


Fig. 23. Land allocated per capita



1990
Area: 7,650 ha
Population: 500,000

2017
Area: 22,800 ha
Population: 1,241,140

2030
Area: 41,600 ha
Population: 1,500,000

Fig. 24. Urban growth stages

and 1963. Until the 1960's, the town remained largely centred around agriculture. However, changes in the irrigation system, expansion of the date palm plantation, and growth in the oil industry catalysed urban growth from this time onwards. In the 1990's, Al-Ahsa metropolitan area increased from 7,650 hectares to 28,700 hectares with a population of 727,000. The growth of Al-Ahsa has been constrained by borders along agricultural lands but is now starting to sprawl along the southern boundary. The growth of Al-Ahsa is constrained on the east by lands owned by ARAMCO and the National Guard.

5.1.2 Administrative boundaries

The Eastern Region covers an extensive geographic area, the largest in the Kingdom of Saudi Arabia. The "Empty Desert Quarter" occupies a large portion of this region. The populated portion of the region is located in the north-eastern territory, where Al-Ahsa lies, close to Dammam. Al-Ahsa governorate is an oasis region formed of the metropolitan area with additional surrounding villages.

The area is legislatively confined by an Urban Growth Boundary that is redefined with time. The 1435 Urban Growth Boundary covered an area of 28,700 hectares and the 1450 UGB covers an area of 41,600 hectares. These growth boundaries are intended to contain development and the latest revision defines the growth limits for the city until 1450. The agricultural lands, that form the oasis lie outside the two boundaries.
Al-Ahsa also has a Development Protection Boundary, which is intended to protect the lands outside the 1450 UGB from being developed. It contains most of the agricultural and desert lands surrounding Al-Ahsa. This boundary covers an area of 191,450 hectares.

The agricultural land is excluded from the urban growth boundaries and is strategically located within the development protection boundary. While this stark segregation has helped to protect and preserve the agricultural land with UNESCO Heritage status, it has completely isolated the natural elements of the oasis from the urban built form. In this study, the agricultural land has been considered very much a part of Al-Ahsa City, as an integral element that shapes both the city's form and its economy. The agricultural land covers an area of 63,467 hectares and doubles the study area to 100,000 hectares.

Al-Ahsa has successfully protected a significant portion of the agricultural lands from encroachment and contained the urban footprint within reasonable extents. However, the 1450 UGB overestimates the land needed for future growth and is far more generous than required. Unless future development plans are carefully implemented in a phased manner, Al-Ahsa faces the threat of sprawl as demonstrated by its contemporaries.

Developments next to privately owned agricultural lands in Al-Ahsa

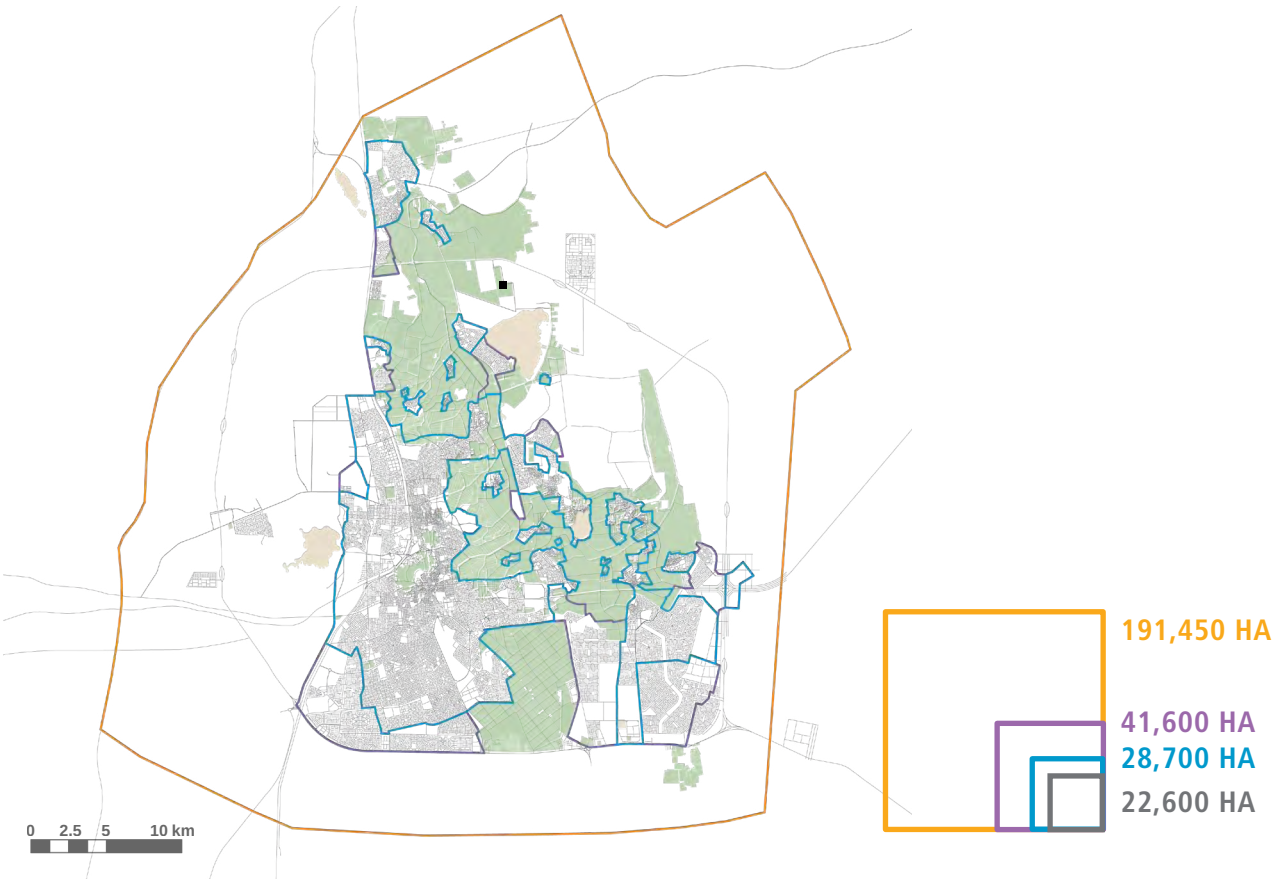


Fig. 25. Administrative boundaries

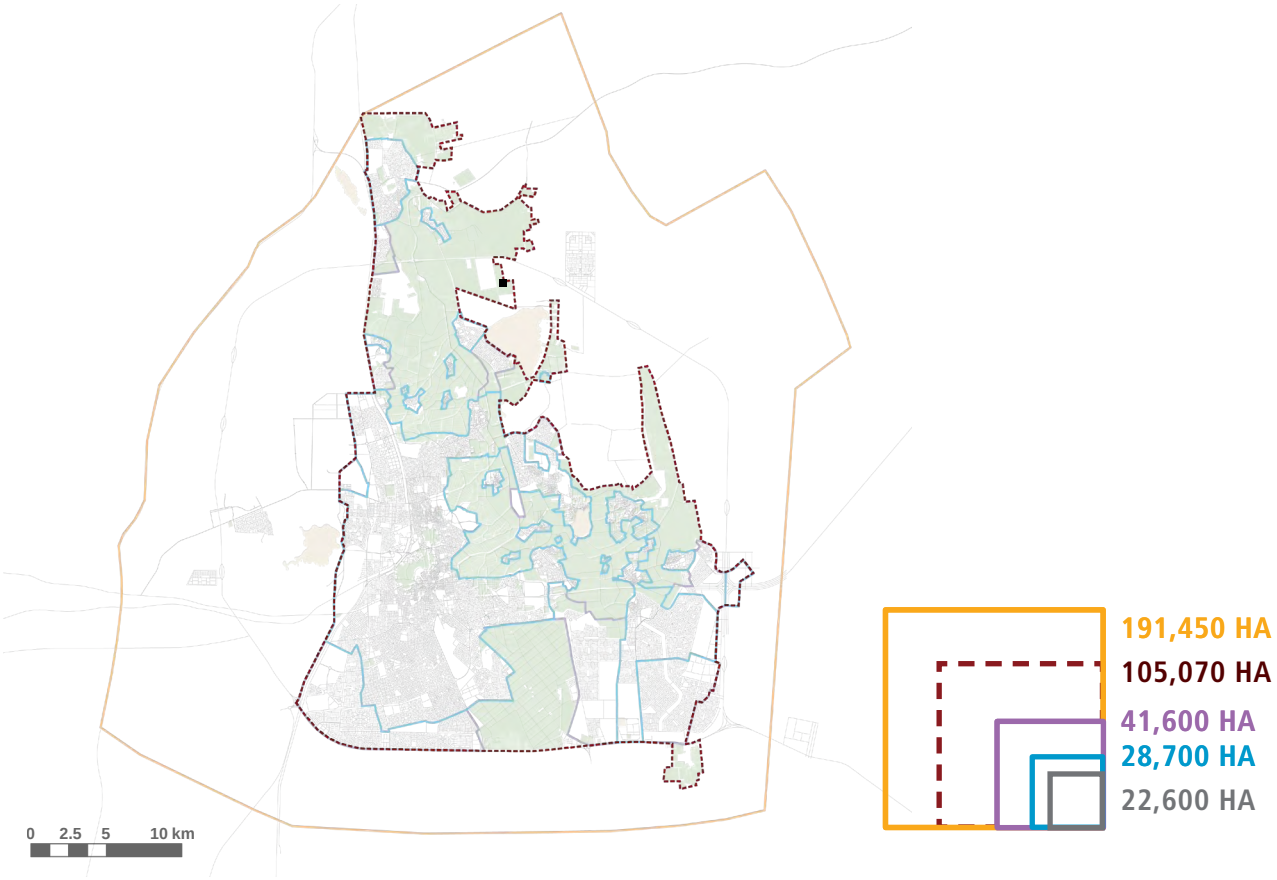


Fig. 26. Boundary of study area for Al-Ahsa

5.1.3 Urban density

Al-Ahsa has a current population of 1.24 million on a built area of 22,600 hectares. The population density of Al-Ahsa is 54.9 p/ha, much lower than the UN-Habitat density recommendations of 150 p/ha. This density goes down even further if we take into account the 1450 UGB (29.8 p/ha)

The highest density is observed in the metropolitan parts of Al-Ahsa, comprising of Al Hofuf and Al Mubbaraz city centres. As evident by the map shown in figure 28, the population density of Al-Ahsa decreases as one moves away from the centre towards the north and south, and varies significantly in the various villages contained within the oasis. Some villages like Al-Umran and Madinat Al Jafr to the east have higher densities compared to others. The new suburban and peripheral developments have the lowest density and have potential to densify before the city starts to expand on to new lands outside the current city limits.

Al-Ahsa has grown more than 200% since 1990 in its area, while its population has grown by 70% in the same time period. This indicates a sprawling pattern of development with increasing land per capita. The graph in figure 24 charts the increase in land area per capita over the years in Al-Ahsa, compared to the recommended UN density level of 66.7 sqm per capita. Urban residents in Al-Ahsa crossed the UN-Habitat benchmark around 1970, and today stands at occupying more than 300 sqm/capita. Greater land allocated per capita signifies fewer people in a given amount of area resulting in low density, characteristic of sprawl.

The projected population of Al-Ahsa in the year 1450 is 1.5 million. As per the municipality's plan, the urban footprint will expand to 44,800 hectares to accommodate the increase in population numbers, resulting in a proposed density of 33.48 p/ha. This trend of declining density is a matter of concern as it becomes uneconomical and burdensome for the city's sustenance over a longer term.

5.1.4 Land use

The largest single land use in Al-Ahsa is agricultural land, which covers 63,467 hectares. When excluding agricultural land from the study area, roughly 33% of the remaining land can be attributed to residential use, 18% to governmental and 13% to public facilities.

Commercial and mixed land use is largely concentrated around the two urban cores and along major road networks and corridors, representing 5% and 3% of total land respectively. Mixed land use can be observed at the street level, occupying the ground floor of buildings. This also occurs in residential neighbourhoods. This condition aligns with observations on the contribution of trade and commerce towards the economy and job markets of Al-Ahsa outlined in the economic section

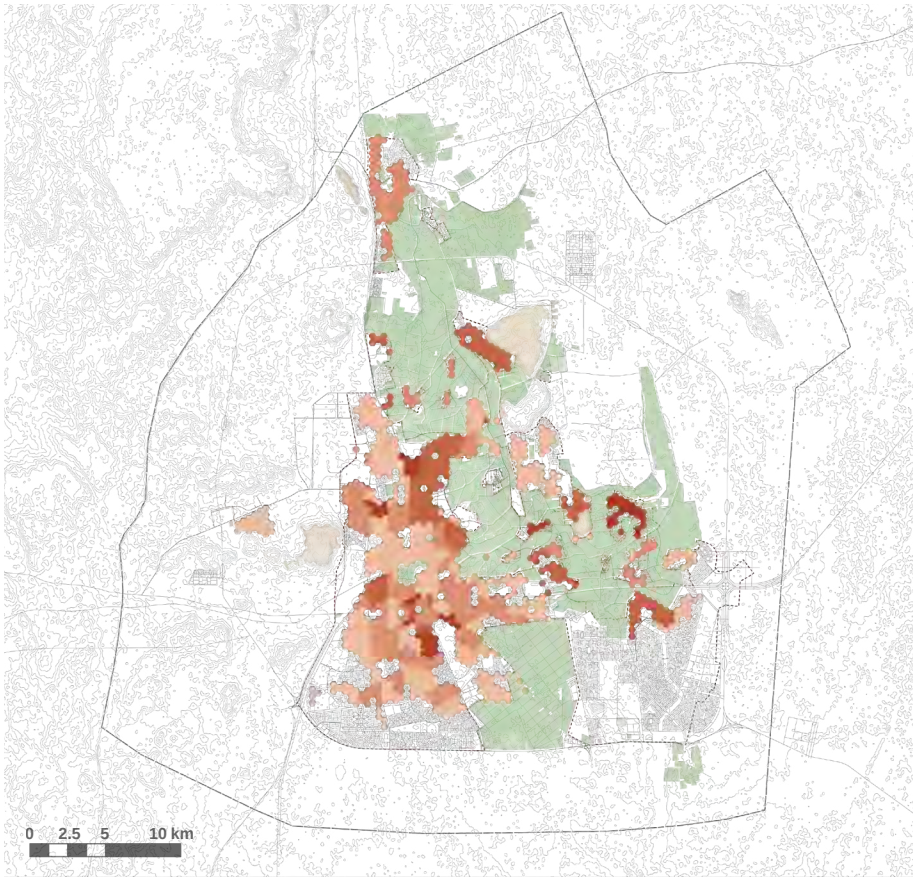


Fig. 27. Current distribution of population density

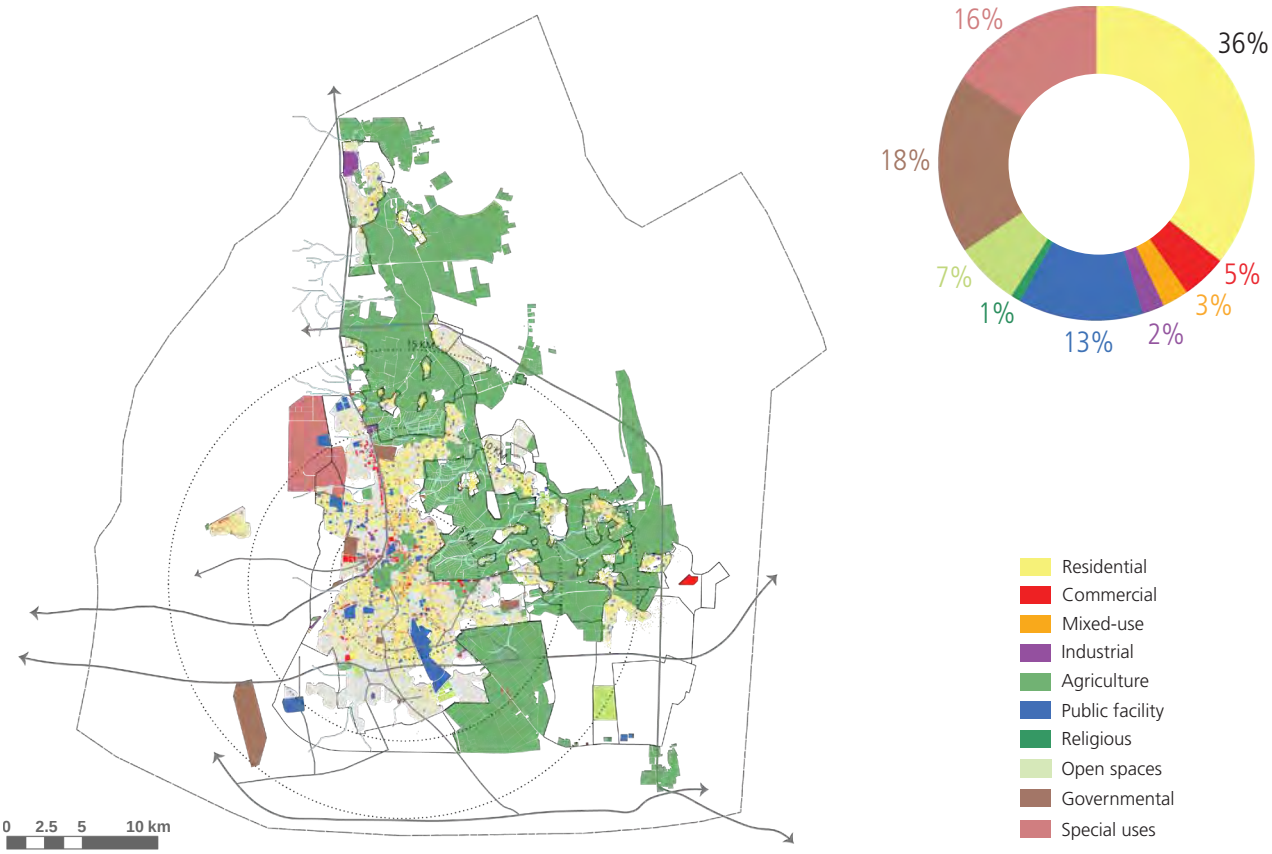


Fig. 28. Existing land use

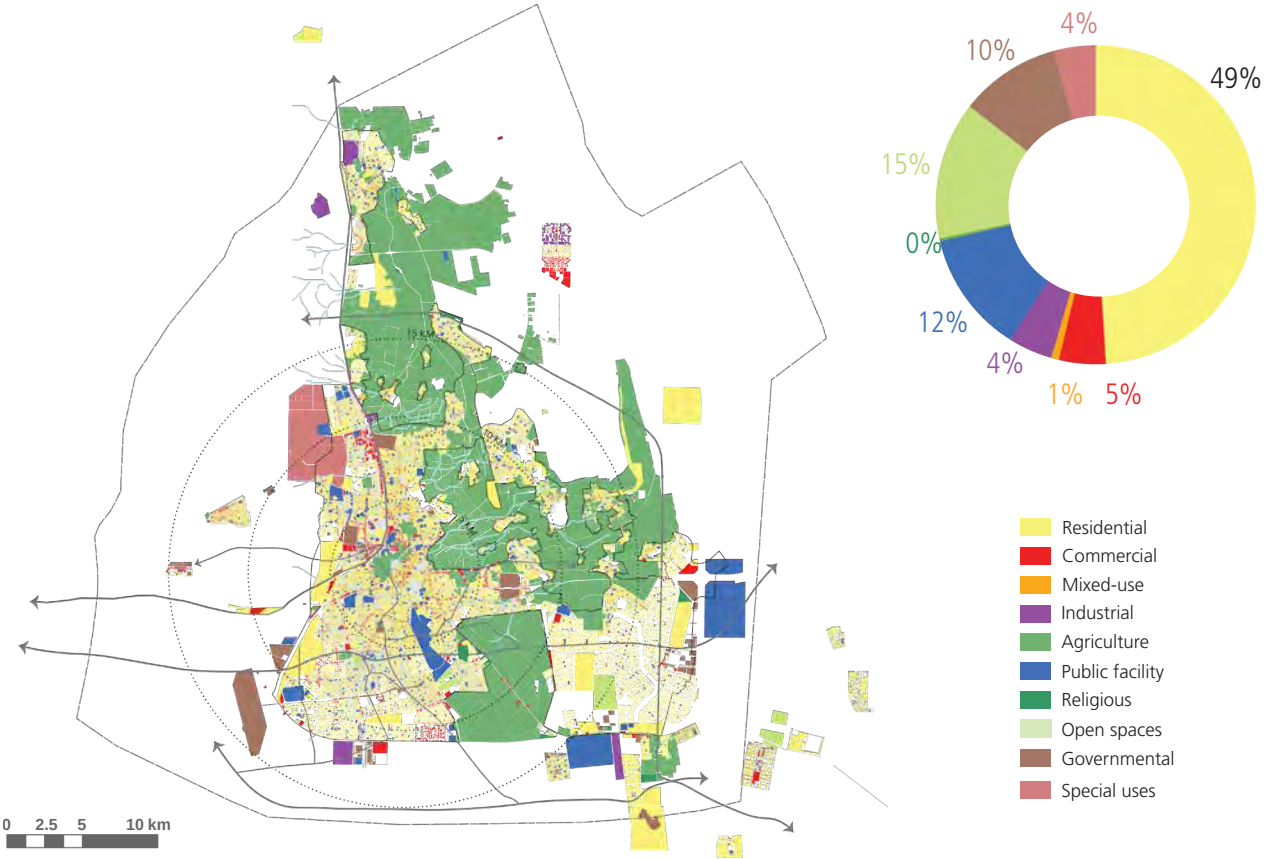


Fig. 29. Existing land use in the Al-Ahsa Plan

of this document. Commercial use varies from local services at a neighbourhood or village scale, to specialized markets such as that of auto parts in the connecting area between Al Hofuf and Al Mubarraz city centres. These businesses take advantage of agglomeration and economies of scale. There are additionally a small number of scattered large-scale shopping malls, including the new Al-Ahsa Mall in the South. This mall was built with the intention to create a new commercial node for the proposed developments in the southern part of the city. Distributed commercial facilities are critical for the city to create self-sufficiency at the local scale in individual villages and tie settlements together with larger, regional scale facilities.

The proposed land use for 2030 shows a 50% dedication to singularly residential land-use by expansion along the South and the East borders, outwards from the agricultural farmlands. There is a significant increase in land designated for open space. Overall, only 1% of land is devoted to mixed-use. Moving forward, the city should encourage and incentivise a mix of uses and reduce mono-use clusters to allow for diversity and to create active spaces in the city.

5.1.5 Vacant land

Past adoption of ad-hoc development strategies and the presence of protected agricultural lands, have left large portions of undeveloped land classified as 'vacant' within Al-Ahsa's growth boundaries. Within the 1435 boundary, approximately 35% is classified as vacant land, of which 20% (5,450 hectares) is within the existing built form. Inside the 1450 boundary, 45% of land is vacant, which includes the 18,610 hectares of areas planned outside its current footprint. For a scalar perspective, we can compare this number with the built footprint in cities like Barcelona (10,200 hectares), Paris (10,500 hectares), and Manhattan (7,100 hectares). It would fit almost two cities the size of Paris and two and a half cities the size of Manhattan. These numbers refer to the actual urban footprint, without taking into consideration the legal Metropolitan Area of the example cities.

If developed to UN-Habitat recommended densities of 150 p/ha, the vacant land within the built form itself, can accommodate 800,000 people, more than the projected increase in population for Al-Ahsa by 2030. Since the population increase for the Vision 2030 is 250,000 inhabitants for Al-Ahsa, only 1,670 hectares of current vacant land within the urban footprint, which constitutes 25%, is needed to accommodate the projected 2030 population increase of 250,000. This means that there is more than sufficient land within the current city extents to accommodate the projected population growth in Al-Ahsa, without expanding the city onto new, undeveloped lands.

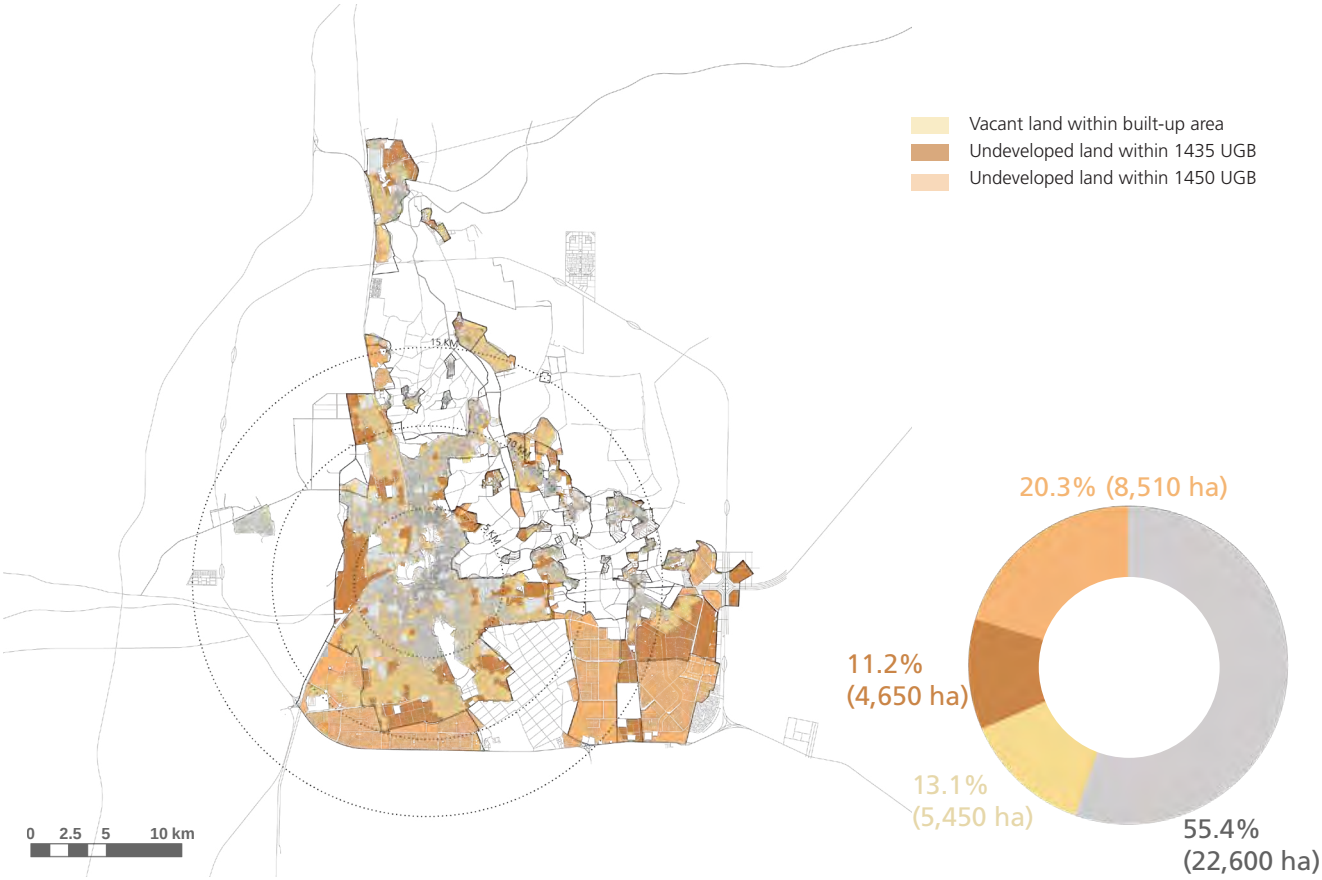


Fig. 30. Vacant land and undeveloped area

Vacant land in Al-Ahsa along major roads like Dhahran Road

5.2 Structuring Elements

5.2.1 Major infrastructure and economic nodes

Al-Ahsa is well connected to all major cities including Jeddah, Dammam, and Riyadh by air, rail and road network. The city is aligned along the southwest edge with the agricultural lands of the oasis. The major economic nodes include the Al Ghawwar oil field in the north, one of the largest oil fields in the region.

Air Transport
The city of Al-Ahsa has two airports, however, the older of the two currently lies abandoned. The new Al-Ahsa International Airport is used for domestic and limited international transit. The city is also served by the King Fahd International Airport in Dammam which is located 130 kilometres away.

Railways
Al-Ahsa has a railway station connecting the city with the capital, Riyadh to the west and Dammam to the North. There is a proposal to expand the railway line and increase service frequency through the introduction of a second track. The railway station is conveniently located close to the historic centre of Al Hofuf, close to all major roads and amenities.

Roads
Al-Ahsa is well connected through an extensive network of roads. The main North-South route of the Dhahran Road, connects the centres of Al Hofuf and Al Mubarraz. The railway line to Dammam runs parallel to the Dhahran Road.

There are two major East-West roads: Makkah Road in the North and Riyadh Road in the south. The King Abdullah Road is under construction. Upon completion, this ring road will connect the current city to the developments in the south.

Public Transportation
At present, there is no public transportation in the city and taxis serve as the only service for people without access to personal automobiles. A bus system is proposed with six routes connecting the north to the south of the city. This is discussed and analysed in greater detail in section 4.2.7.

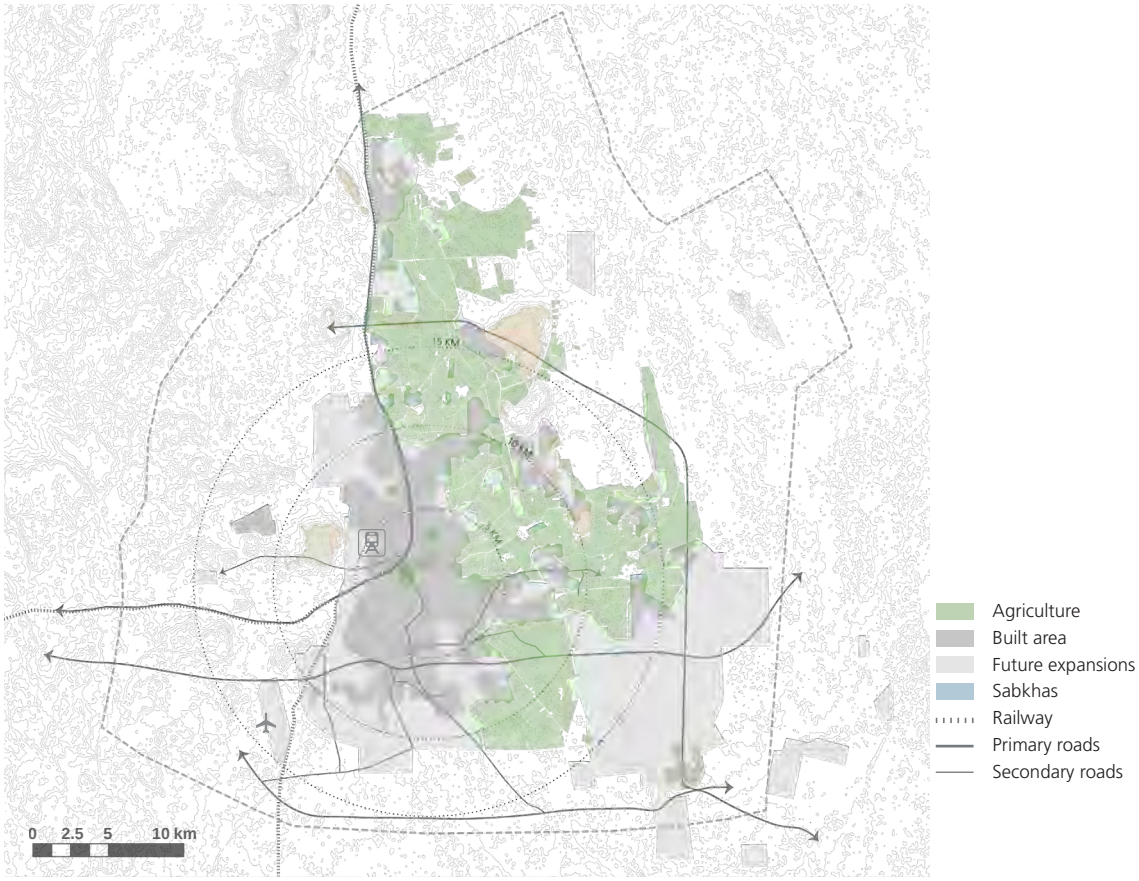


Fig. 31. Transport network

5.2.2 Environmental and topographic elements

The natural setting of Al-Ahsa has proved the most critical element of its origin, growth, and sustained success. Al-Ahsa dates back to prehistoric times in which water resources were harnessed and channelled to cultivate farms and produce crops for trade. The natural features of Al-Ahsa allowed for agriculture to flourish and remains the world's largest natural oasis.

The oldest maps of the region show an old river system that drained into Sabkhas. Sabkhas are low lying depressions made of saline flats underlain by clay, silt, and sand. They serve as catchment basins for the highly saline Al-Ahsa water that accumulates there during the winter months. This natural feature is explained in figure 34. The sabkhas represent the drainage areas for the adjacent irrigated oasis. Most of the sabkhas are now reclaimed, covered, or built over, and the fields are served by the 1970's Irrigation and Drainage Project.

The ancient water systems included scattered wells and springs that used gravity to draw water into canals and waterways. This farm irrigation system led to water table depletion, which became a major concern for the city. Today, the canals are supplied by water from the desalination plant in Qatif, utilizing the underground water only for drinking purposes. Protecting underground water from extraction at the volume required for irrigation of agricultural fields, preserves the water table.

Blue-Green Network

The success of the Al-Ahsa Oasis can be attributed to the collective effect of several favorable factors in the region. The presence of water, is of course the most critical resource that has shaped the landscape and economy of the region. However, the topographical features and climate also played a crucial role in the agricultural development of the region.

The aforementioned Irrigation and Drainage Project introduced in the 1970s, changed the growth pattern of the region significantly, as did the regional discovery of oil in the Eastern Region. The complex water and drainage system, whether natural hydraulic systems or modern canal systems, underpins the cultivation of the dates in this region and has sustained this ecosystem for many centuries. The images on the following page illustrate the ancient and modern water distribution system in the Al-Ahsa Oasis.

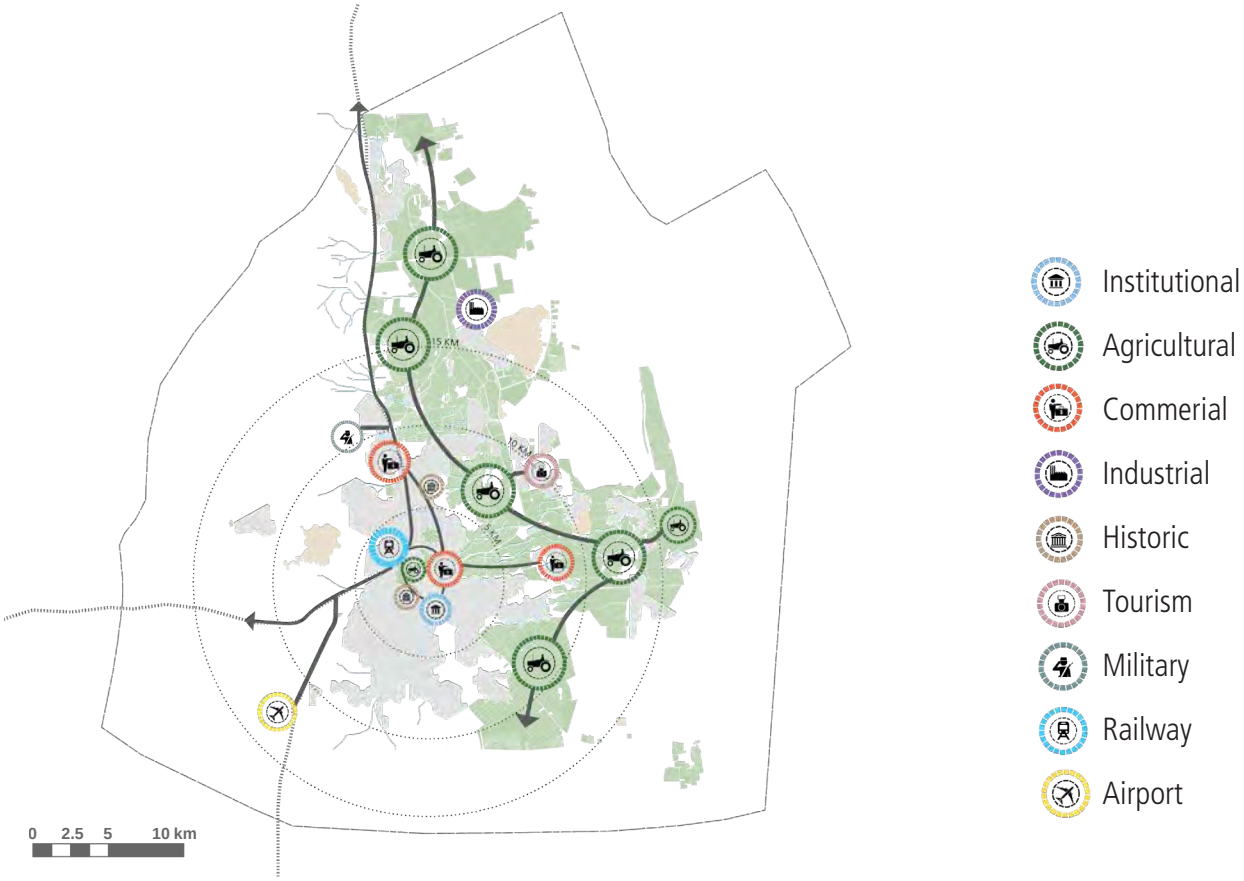


Fig. 32. Economic nodes and network

1970s Irrigation and Drainage Project

Canals

The canals use hydraulic systems to draw water and distribute them across the agricultural lands. The main canals, measuring 155 kilometres, follow the contour lines in the irrigation area, while the sub-canals, measuring 265 kilometres, cover the area between the main canals. These canals are formed of concrete and many of them have degraded or are ill maintained.

Drainage System

Directionally, the new drainage system largely follows the natural slopes within the oasis. The total length of the drainage canals is 1,320 kilometres. The drainage canals play a critical role in the water discharge for the region. It is also contended that the channelisation of the drainage system has adversely affected the natural slope and rain water run-off of the oasis region.

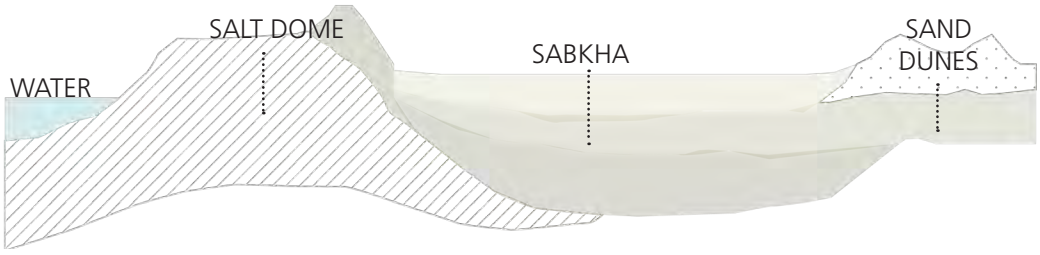


Fig. 33. Section of a Sabkha in Al-Ahsa

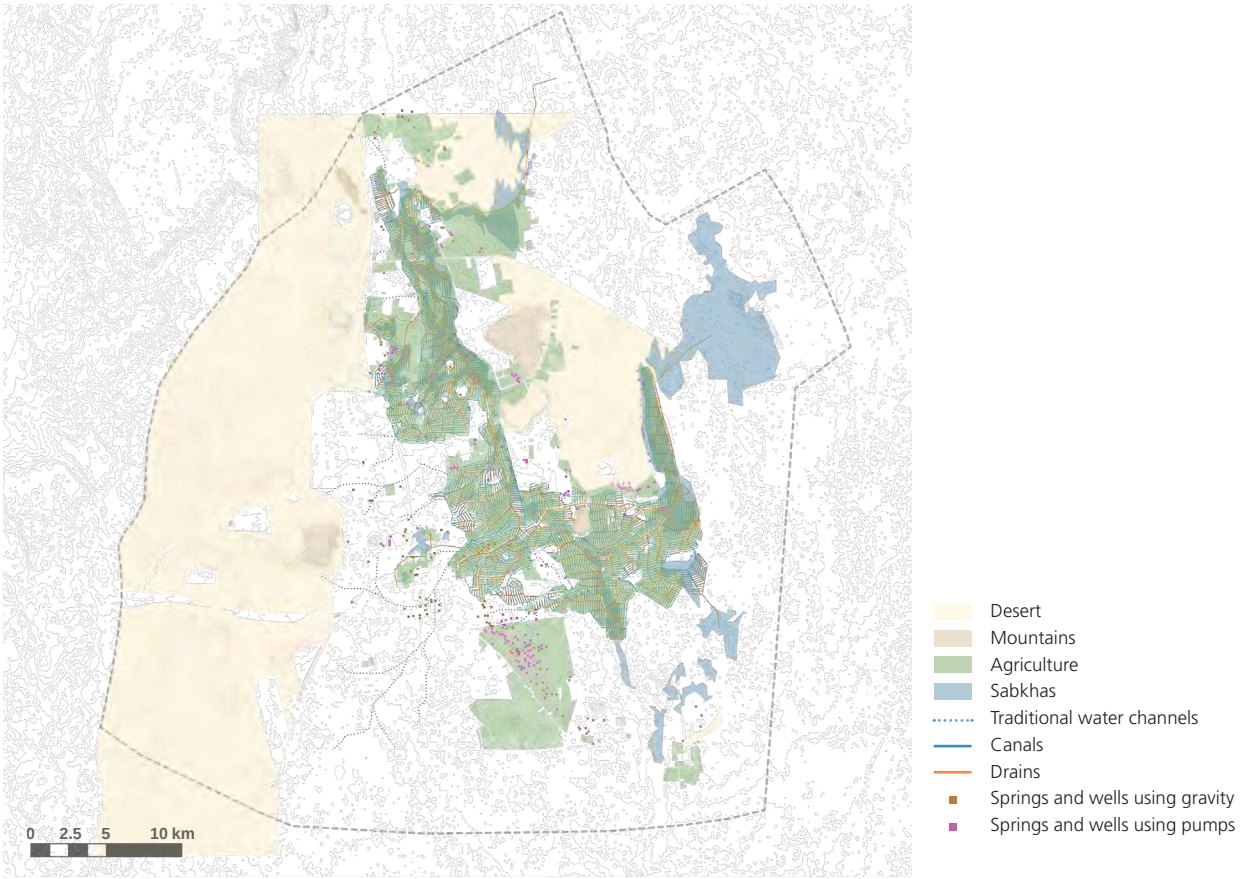


Fig. 34. Blue and green networks

Ancient and modern wells and canal systems in the Al-Ahsa Oasis

5.2.3 UNESCO World Heritage Sites

The Al-Ahsa Oasis was declared a UNESCO World Heritage site in 2018. The oasis is a symbol of long-standing human attempts to utilise water resources to transform natural landscapes into livable areas through agriculture in a very harsh desert climate.

The oasis represents a cultural landscape that has successfully integrated natural ecosystems, biodiversity and human settlements. It has been well protected through the years, by limiting urbanisation to the periphery of the agricultural lands. It has a varied composition of gardens, springs, irrigation and drainage systems, in addition to the historic buildings of Al-Ahsa City. The agricultural lands have been strategically outlined outside the two growth boundaries and within the development protection boundary, ensuring their future protection from urban encroachment.

The UNESCO Heritage Site covers an area of 8,544 hectares, with a buffer area of 21,556 hectares.The heritage property includes 12 components of the oasis with more than 2,500,000 date palm trees.

Most of the agricultural farms are privately owned and have been passed down over generations. However, the water resources are owned by the state and connection to the water supply is separate from farm ownership. The dates produced in the farms go to the state and the revenue generated from their export is used for upkeep of the city. Unfortunately, agriculture is no longer the primary source of economic livelihood for the city and faces the threat of losing its value. The World Heritage designation is an important step towards creating awareness and protecting this valuable piece of heritage.

5.2.4 The Al-Ahsa Plan

The aforementioned Sub-regional Strategic Plan for Al-Ahsa, (section 3.2.3), details the vision for the region up to 2030. The Municipality of Al-Ahsa coordinated with the Gulf States to prepare its Strategic Plan which includes local, regional, and international connections. The Strategic Plan considers the expansion of the city as part of the larger regional plan, to be of national importance.

The Strategic Plan moves development eastward, towards the coast and includes 40 villages with specialized economic and industrial sectors capitalising on their proximity to the port and oil-related activities. The Plan also proposes connections to Qatar and Bahrain physically, via bridges and economically, via new manufacturing industries.

The Strategic Plan has designated zones under the themes of residential, industrial, tourism (near the Asfar Lake), health, and education. This eastward developmental shift is intended to protect the agricultural land from urban encroachment.

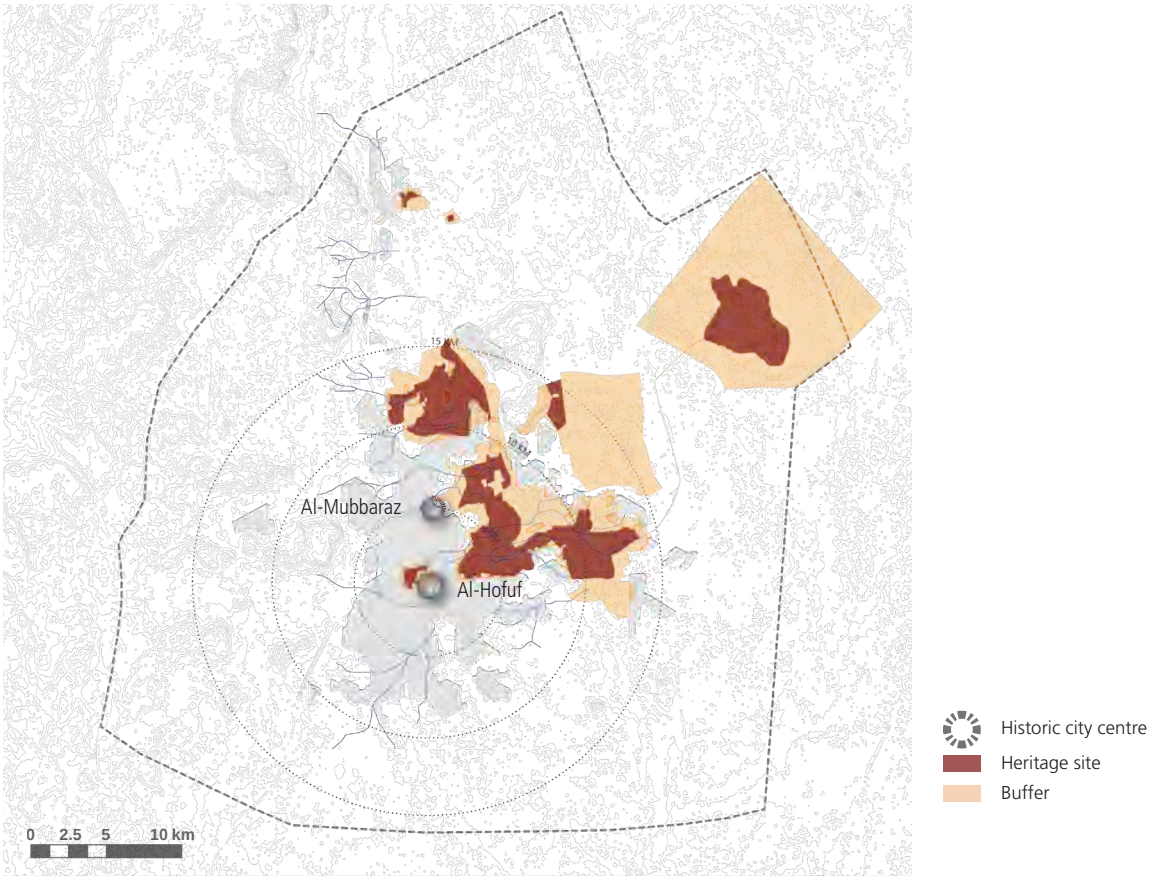


Fig. 35. UNESCO World Heritage Site

View of the Al Qarah Mountain surrounded by the date palm fields in Al-Ahsa Oasis

The Southern territories of the city that lie South of Al-Ahsa mall, are privately owned and are being developed in a piecemeal approach. Some roads have already have been laid in these areas though infrastructures such as electricity and communications remain under or awaiting construction. These factors engender the characteristics of sprawl. The Ministry of Housing owns land to the East of Al-Ahsa, near the Asfar Lake, and has already approved and started construction of new homes on the recommendation of the Amanah, in response to housing requests by residents. The land immediately west of the city of Al-Ahsa is owned by the National Guard and ARAMCO, and therefore, development has been suspended for these regions.

Taking into account the aforementioned territorial constraints, including the incentive to protect agricultural lands, the city has taken the decision to shift the settlement's focal point to the east. However, these plans overestimate the land required for future planning and underestimate the volume of underutilised lands within the current city extents with judicious planning efforts.

5.2.5 Movement and accessibility

Al-Ahsa has an extensive network of roads with connections to major cities such as Dammam to the Northeast and Riyadh to the west. There is a railway connection between the two cities with a station in Al Hofuf. The railway line is being expanded into a second track which will significantly improve the connectivity of Al-Ahsa in the region and nationally.

Today, the high concentration of mixed land uses in the two historic centres has brought forward their function as the modern city's urban cores. An estimated 3.6% of the urban population live within a 5-minute walk to these cores and 7.2% live within a 10-minute walk. These numbers are much lower than those of other Saudi cities. However, there is potential to increase the accessibility of these cores through the consolidation of the urban fabric. This would ensure the longevity of successful, compact and diverse cores that are able to serve a majority of the city's population.

The City Prosperity Index (CPI) report for Al-Ahsa (2016) ranks Urban Mobility as 'weak' and suggests addressing the issues of a missing public mass transport system, poor road safety, and low usage of the available transport system to improve this factor.

The Spatial Capital of Saudi Arabian Cities Report, (Street Connectivity Study for the City Prosperity Initiative, 2015) calculates street accessibility based on three variables:

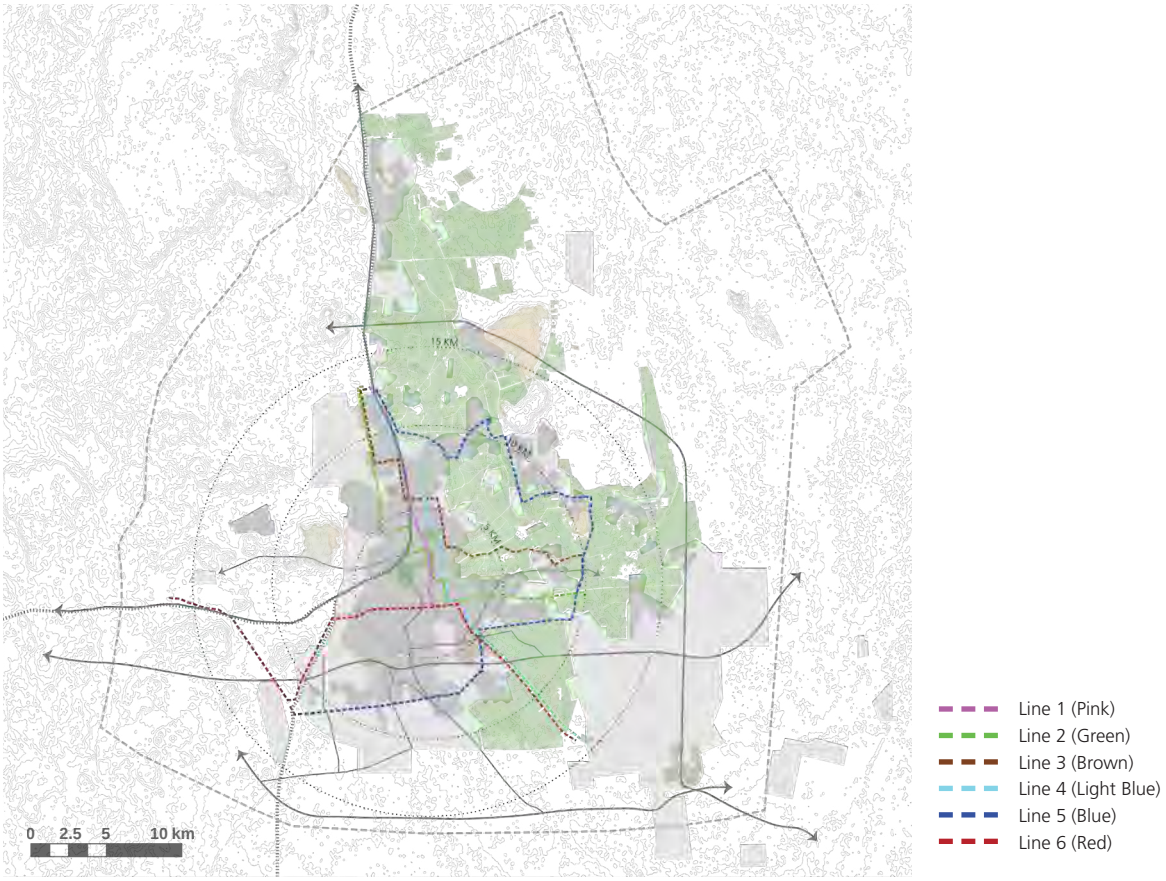


Fig. 36. Proposed transport network in Al-Ahsa

- Proportion of land allocated to streets;
- Street density, and
- Intersection density.

A high accessibility assessment value translates to better connectivity, penetration, mobility, and coverage of the city. Al-Ahsa has a high intersection density value of 110 intersections per square kilometre and a relatively low value of land allocated to streets (21%), but a strong street density. Intersection density is a fair indicator of compactness and walkability and is indicative of how condusive a city is to non-motorised means of transport. Overall, Saudi cities average 136 intersections per square kilometre, above the optimal level estimated by UN-Habitat of 100 intersections per square kilometer. Al-Ahsa's organic street pattern in the multiple village centres help achieve a higher number of intersections (110) when compared with other Saudi Cities. Though intersection density is one of the measures of accessibility, it does not take into account the pattern of the streets and whether they optimise circulation for the uses surrounding them. Al-Ahsa allocates 21% of its land to streets, which is lower than its contemporaries in the Kingdom. Cities such as Taif, Dammam, Jazan, and Makkah allocate an estimated 27% of their land to streets, which is close to the Saudi cities average of 27.8%. While a lower percentage of land allocated to streets could imply poor connectivity, it could also imply a more efficient layout of roads that gives access to most parts to the city. With less land dedicated to cars, the city demonstrates potential to utilise more land for alternative transportation modes, open spaces, and other economic uses.

5.2.6 Assessment of proposed transportation systems

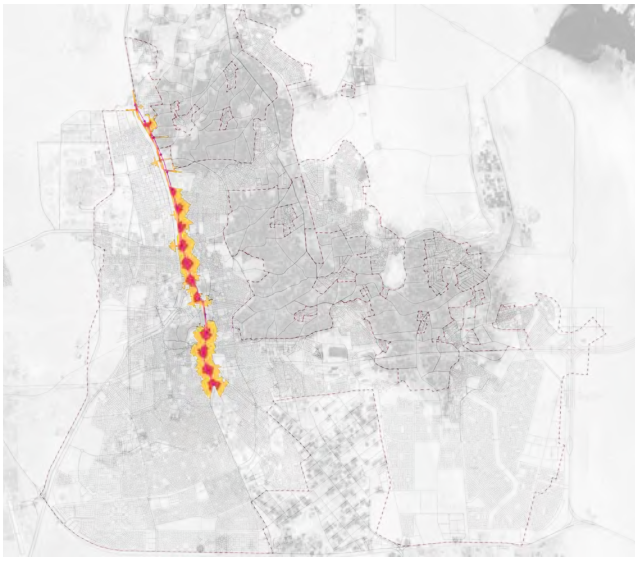
It is important for cities the size of Al-Ahsa, particularly when experiencing growth, to invest in an accessible public transportation system and to advocate a shift to a more sustainable model that reduces congestion and emissions. The public transport system currently under proposal in Al-Ahsa comprises a network of six new bus routes. After careful analysis or assessment, some of these routes could potentially transform into Bus Rapid Transit (BRT) or Light Rail routes.

Al-Ahsa is not currently served by any form of public transportation system. The proposed public transportation system outlines a network of six bus lines that will span the extents of the city. The bus lines together cover 190 kilometres and will serve an estimated 43.3% of the population within a 5-minute walking distance and 64.1% of the population within a 10-minute walking distance.

Each of these line are individually analysed for a 5-minute and a 10-minute walking distance in figures n the following page. These figures indicate the efficiency of each line and the population served by each line. Based on this analysis, some of the lines may require re-routing to maximise access while some may be strengthened by focussing new development within a 10-minute walk distance. It is important to integrate the public transportation system with other modes of transport and install pedestrian and bike-friendly infrastructure to enhance last-mile connectivity.

Modern water canal part of the Irrigation and Drainage Project

Bus Line I (Pink)



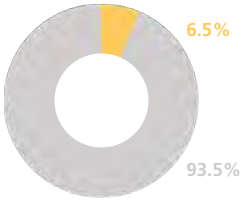
PEOPLE SERVED BY PINK LINE

5-minute walking distance

32,270 - 2.6%

10-minute walking distance

80,674 - 6.5%



City-wide accessibility to bus line

Bus Line 2 (Green)

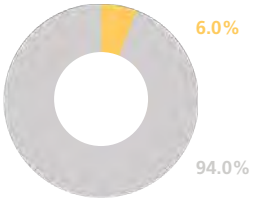
PEOPLE SERVED BY GREEN LINE

5-minute walking distance

19,858 - 1.6%

10-minute walking distance

74,468 - 6.0%



City-wide accessibility to bus line

Bus Line 3 (Brown)

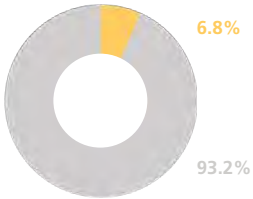
PEOPLE SERVED BY BROWN LINE

5-minute walking distance

19,900 - 1.6%

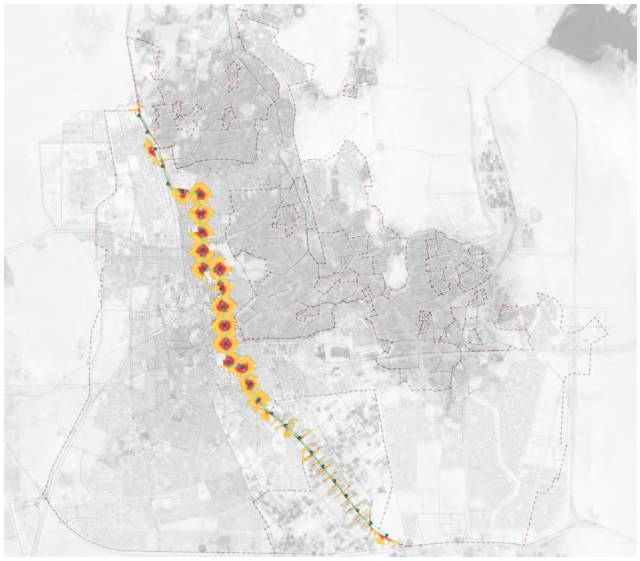
10-minute walking distance

84,398 - 6.8%



City-wide accessibility to bus line

Bus Line 4 (Light Blue)



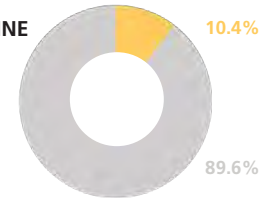
PEOPLE SERVED BY LIGHT BLUE LINE

5-minute walking distance

35,993 - 2.9%

10-minute walking distance

129,079 - 10.4 %



City-wide accessibility to bus line

Bus Line 5 (Blue)

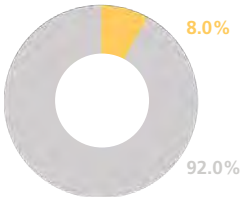
PEOPLE SERVED BY BLUE LINE

5-minute walking distance

23,582 - 1.9%

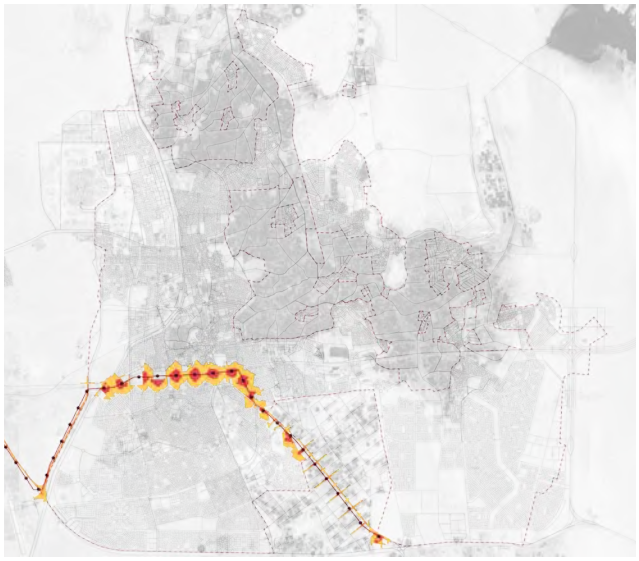
10-minute walking distance

99,291 - 8.0%



City-wide accessibility to bus line

Bus Line 6 (Red)



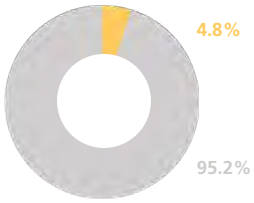
PEOPLE SERVED BY RED LINE

5-minute walking distance

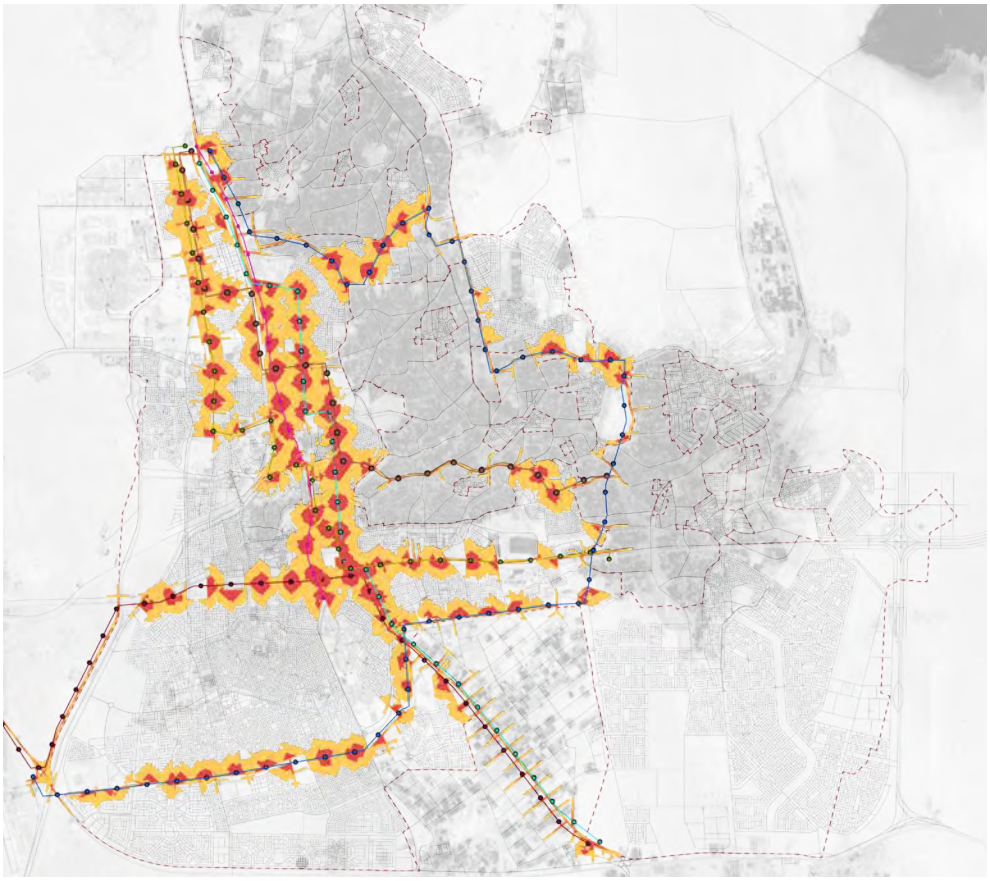
13,653 - 1.1%

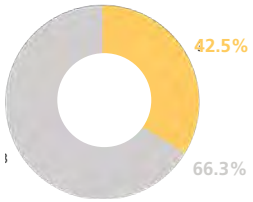
10-minute walking distance

59,575 - 4.8%



City-wide accessibility to bus line





5-minute walking distance from bus stop

10-minute walking distance from bus stop

Fig. 37. Proposed bus system and transportation hubs

5.3 Urban Density Scenarios

Crosscutting the diagnosis of the current urban conditions and the approved/submitted projects proposals, FSCP conducted a scenario-analysis for increased urban density, based on conditional variations. The scenarios depict three conditions: the current condition, the condition emerging from the approved planning instruments, and a condition in which density distribution is allocated following the UN-Habitat's recommendations. This UN-Habitat scenario is constructed around the Five Principles for Sustainable Neighbourhood Planning, which are as follows:

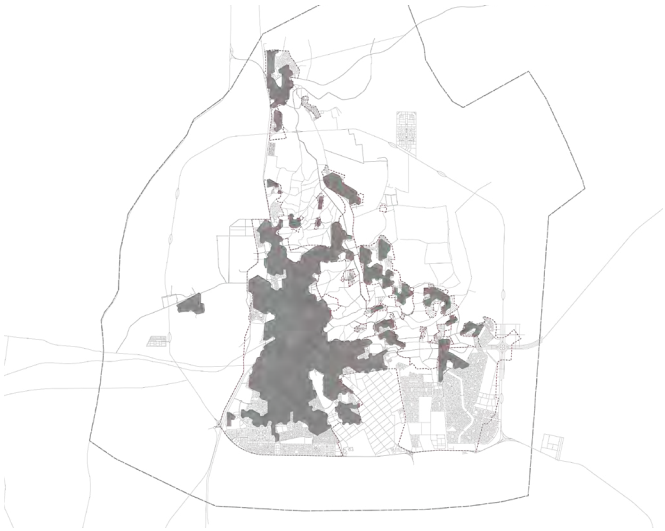
- Adequate space for streets and an efficient street network: The street network should occupy at least 30% of the land and at least 18 kilometres of street length per square kilometre,
- High density: At least 15,000 p/km², that is 150 p/ha or 61 p/acre,
- Mixed land use: At least 40% of floor space should be allocated for economic use in any neighbourhood,
- Social mix: The availability of houses in different price ranges and tenures in any given neighbourhood to accommodate different incomes; 20% to 50% of the residential floor area should be allocated for low-cost housing and each tenure type should not constitute more than 50% of the total,
- Limited land use specialisation: This is to limit single function blocks or neighbourhoods; single function blocks should cover less than 10% of any neighbourhood.

Current Condition
The current population of Al-Ahsa amounts to 1,240,000 people spread over a built-up area of 22,600 hectares. This generates a population density of 54.9 p/ha, which is less than one third of the recommended UN density of 150 p/ha. However, compared to other Saudi cities, Al-Ahsa is denser and performs more efficiently. Despite this relative efficiency in proximity to the centres, the density decreases when considered over the entirety of the 1450 boundary (29.8 p/ha).

Scenario 1: Al-Ahsa Plan
According to Al Ahsa Plan, the planned built-up area is projected to increase to 44,800 hectares, hosting a total population of 1,500,000 people. Despite the substantial projected increase in population, the density on this land area will decrease to 33.4 p/ha over the built-up area, and 36 p/ha within the 1450 UGB. This can be attributed to the single land uses and sprawling development patterns in the proposed plan.

Scenario 2: UN-Habitat Recommendations
The UN-Habitat scenario supports sustainable neighbourhood planning for Al-Ahsa, starting with promotion of increased density, to bring Al-Ahsa in line with the average UN density of 150 p/ha. Considering the current growth rate, and a consequent population increase of 1.5 million by 2030, the additional built-up area required to accommodate the city's future growth at the recommended standards, is projected to require only 10,000 hectares (one-tenth of the built-up area proposed by the 2006 plan). Developing the 5,450 hectares of vacant land within the built up area of present day Al-Ahsa alone, can accommodate 800,000 people at the UN-Habitat recommended density. These analyses suggest that the projected increase in population of 250,000 can be accommodated in 1,670 hectares of existing vacant land built to a density of 150 p/ha. The Strategic Plan is visionary and creates new economic opportunities for the future development of Al-Ahsa. However, it overestimates the required spatial extents of development and therefore, encourages sprawl. The same requirements of the Strategic Plan can be met by concentrating the uses and planning for a compact form of settlement within the existing footprint.

CURRENT CONDITION

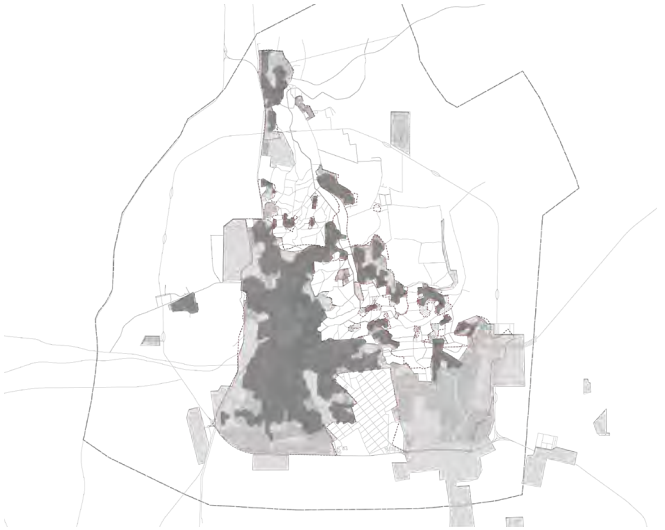


population **1,241,140**

built-up area **2,580 ha**

average density on built-up area **54.94 p/ha**

SCENARIO 1: AL-AHSA PLAN

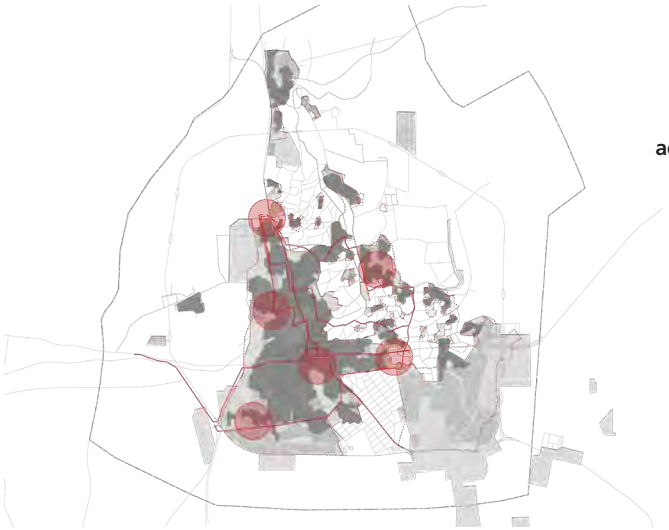


population **1,500,000**

planned built-up area **44,800 ha**

average density on planned built-up area **33.48 p/ha**

SCENARIO 2: UN-HABITAT RECOMMENDATIONS



population **1,500,000**

built-up area needed according to UN-Habitat recommendations **10,000 ha***

vacant land needed to accommodate population growth **1,670 ha**

average UN-Habitat recommended density **150 p/ha**

* 1/4 of the built up area proposed by the Al-Ahsa Plan

5

STRATEGIC DIAGNOSIS

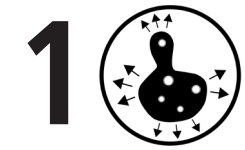
© FSCP

6.1 Identifying and Defining Main Strategic Issues

The in-depth, evidence-based and cross-scalar analysis brought to light three main issues affecting Al-Ahsa's performance in relation to the principles of sustainable urban development. These issues represent the strategic framing of a complex diagnosis, synthesised through three conceptual lenses. These lenses, once defined in their conceptual nature, were then contextualised by examining how they manifest spatially in Al-Ahsa at different scales.

6.1.1 Unbalanced growth and development patterns

This often happens when a city grows rapidly, presenting a widespread sprawl phenomenon that manifests in inharmoniously balanced developments across its territorial extension. Dysfunctionalities in urban management, both institutionally and experientially, are brought to light. In this scenario, the city demonstrates low-density and does not perform effectively, its services and facilities are not well-balanced in distribution and accessibility, which results in inequitable citizenry experience. This condition additionally makes the provision and maintenance of basic services and transport infrastructure costly and challenging. In Al-Ahsa the rapid growth of population and the urban area, has lead to a sprawled pattern of development, leaping over the preserved agricultural land and extending the city limits to 1450 UGB.



[SPRAWL]

6.1.2 Divisions and lack of cohesion in city structure

In cases of unbalanced growth, sprawl, and inharmonious development, forms of non-contiguous and non-cohesive city structures tend to co-exist, without integration. Pockets of leapfrog development are widespread. Undeveloped land, overdimensioned infrastructures and/or large extensions of monofunctional developments, hinder the continuity of the city's fabric, and therefore, its social, economic, and ecological performance. As in cases of sprawl, this renders the equal provision of infrastructure and services to the entire city difficult and costly. The fragmentation phenomenon also spatially affects the social dimension of sustainability, creating urban inequalities and segregation in areas that lie at a distance to the largest hubs, and become isolated by a discontinuous urban landscape. In the case of Al-Ahsa, disconnected village centres scattered around the oasis present a stark distinction between the built-up areas and agricultural lands.

[FRAGMENTATION]

6.1.3 Socio-Ecological and Economic imbalance

Each city is formed by complex social, economic and ecological systems. In a sustainable city, the balance between these three interrelated systems is maintained and enhanced over time. If any one system is given continued preference over the others, over time, a structural imbalance will emerge that alters the sustainable trajectory of the city's growth and development. This misalignment generates an issue in terms of water provision and food security, heavily impacting other socio-spatial aspects of the city's health. Segregation between agricultural lands and the urban fabric is a good example of this condition. The city does not interact with green space and is disconnected from farmlands by a strong boundary. A resilient city would integrate its natural and built elements, ensuring their balanced coexistence.

[LACK OF RESILIENCE]

King Abdulaziz Road through the Al Hofuf city centre

6.2 Analysing Al-Ahsa's Three Issues in Depth

6.2.1 Al-Ahsa's unbalanced growth and development patterns

In most cities in Saudi Arabia that are experiencing growth in population numbers and creating new economic centres, the development patterns observed are sprawling, unbalanced, and disproportionate. The development patterns observed in Al-Ahsa follow a similar trajectory, as the city's built-up area has grown multifold, without a proportionate increase in population, leading to an overall decrease in density.

Moreover, the development is not structured or streamlined to create a compact urban form that can accommodate a diverse mix of social classes and commercial uses to create a vibrant and thriving urban life. The growth of Al-Ahsa has been characterised by the propagation of exclusive enclaves and neighbourhoods disconnected from the historic city centre or public services. This pattern of growth is unsustainable in the long term, extending infrastructure systems over longer distances in order to serve a smaller population.

In an attempt to preserve the agricultural lands, the city has been pushing growth outwards rather than containing it. However, opening large extents of land for development, without a strategic vision, is demonstrably linked to sprawling patterns of development. The Vision 2030 plan exacerbates the existing sprawl patterns with the intention of protecting agricultural lands by directing development to the exterior. The vision proposes to extend the city to the 1450 UGB in order to accommodate the projected 2030 population. However, this strategy would encourage sprawl and create low-density neighbourhoods at an fracturing distance from the city core.

A contributor to the disharmony in the city's growth pattern is piecemeal development and land use conversion. In most cases, projects are approved under the private landowner's discretion, without taking into consideration a plan for the larger context area. This ad-hoc planning mechanism, manifests in uncoordinated, scattered growth patterns, both within the growth boundaries and outside them.

There is an opportunity to control the expansion of the city at and beyond the peripheries by densifying the vacant and underdeveloped spaces within the existing city structure, in a systematic manner, to create a more compact and efficient urban form.

Sprawling pattern of development in Southern parts of the city

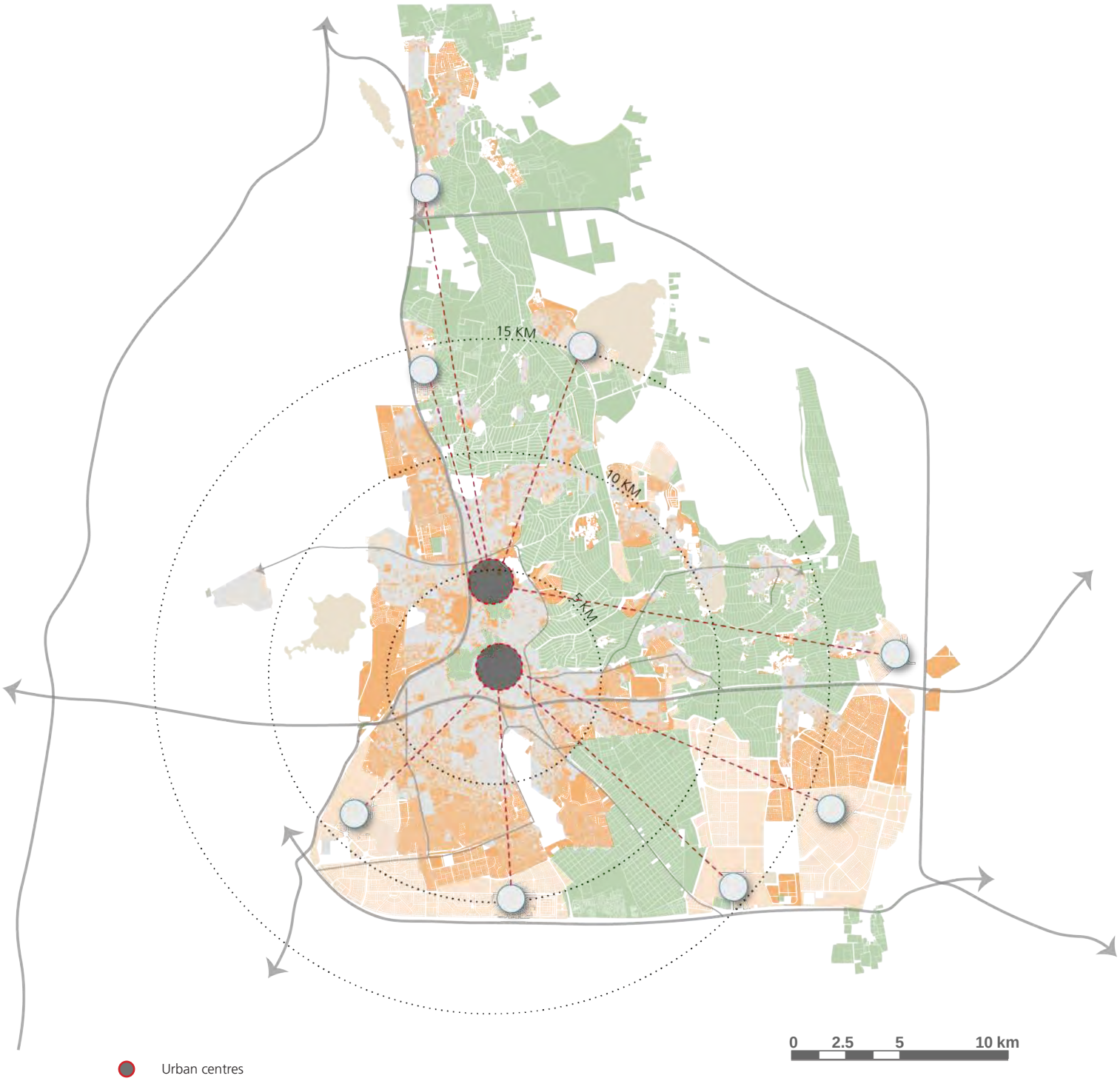


Fig. 38. Al-Ahsa's unbalanced growth and development patterns

6.2.2 Divisions and lack of cohesion in Al-Ahsa's urban structure

The city of Al-Ahsa is formed of an agglomeration of villages bordering agricultural lands, anchored by the oasis. These villages are scattered across the region, connected by roads and a system of water channels that stretch across the farmlands. While the Al-Ahsa Oasis appears as a continuous, urbanised region, each settlement is identified by a unique name and has its own characteristic physical structure. This fragmented city structure, is demonstrated in the unequal distribution of, and access to facilities.

Though Al-Ahsa has a well-established network of roads linking the different villages, the absence of a robust public transportation system further aggravates divisions and spatial disconnect. Without well-defined nodes, main axes, and connections, the city feels divided by physical and psychosocial barriers. Wide roads with large swathes of vacant land to the sides, create a discontinuous city fabric. These roads, which are intended to generate connections, actually create physical impediments, which is exacerbated by the lack of crosswalks, sidewalks, and intermodal connections. Pedestrian crossings, which are rare and scattered, often appear in the form of underused and neglected foot overbridges. The railway line, which runs parallel to Dhahran Road on the North-South axis, also physically divides the city. There is an opportunity to re-stitch the urban fabric by concentrating development on vacant land that runs along the major roads and proposed transportation corridors.

The proposal for a secondary city to the east of the oasis with amenities such as a medical city, tourism centre, academic and educational facilities, and residential suburbs, will aggravate the divisive nature of the existing built environment through development of monofunctional land blocks with limited access and connections. Extensive areas of distinct and isolated projects will create vacant land pockets with scattered developments and the city will struggle to reach optimal density benchmarks. Hence the proposed amenities should be relocated to the vacant lands within the city.

The agricultural land is clearly segregated from the city fabric meaning that there is no integration between the urban form and natural features. The city lacks public open spaces within its built footprint. The water canals, that run along the median of most roads, have the potential to be extended into the city and redeveloped as landscaped, public boulevards in select areas.

Urban form interruped by vacant land and other infrastructure

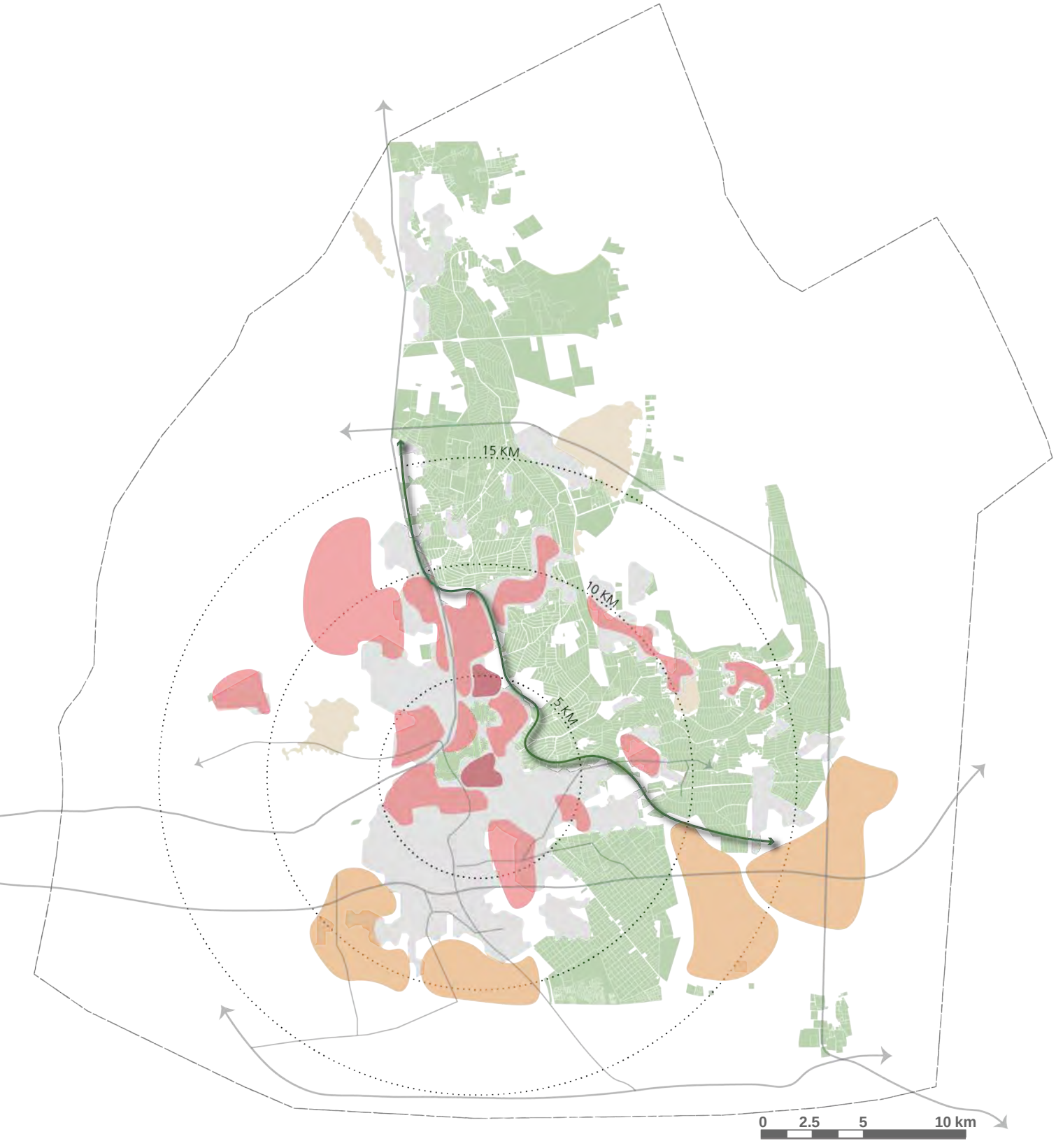


Fig. 39. Divisions and lack of cohesion in Al-Ahsa's urban structure

6.2.3 Socio-ecological and economic imbalance in Al-Ahsa

The social structure of Al-Ahsa is derived from and dependent on the agricultural system of the region. The oasis is an important part of Al-Ahsa's history and sustained success as a major settlement. Over the decades, it has been well-protected from urban expansion in most parts of the city and has suffered little loss of land. The agricultural production from the region previously sustained a significant contribution to the region's economy, though the output is now diminishing. As a result, increasing measures of agricultural land is being converted to alternative, better performing uses. It is critical that the agricultural land be protected from future encroachment to preserve the history and unique ecology of the region.

As noted above, there is no existing integration between the urban form and the natural features, including agricultural lands. This stark segregation is a result of the urban growth boundaries defined for 1435 and 1450. While these boundaries have helped protect the agricultural land, they have stripped the urban fabric of Al-Ahsa of any connection with the oasis. The majority of farms are privately owned and often have boundary walls to protect the properties and safeguard against trespass. Water channels and drains that serve the fields end abruptly when they meet the urban boundary. The design of the canals and drains additionally add to the physical disconnect, though there is opportunity to integrate them with city elements. Despite Al-Ahsa's position as inclusive of the world's largest oasis, the city appears much like any other city in the Kingdom of Saudi Arabia. In fact, Al-Ahsa comprises a lesser percentage of green space per capita than comparative Saudi Cities. The oasis is an integral part of the city's identity that should be made more visible by integration with the urban footprint, in the form of extended green spaces for public use.

Prior to the 1970s development of the Irrigation and Canal System, agriculture in Al-Ahsa was supported by the springs and wells in the region. As a result, the underground water table depleted to alarming levels. To remedy this situation, agricultural lands are now supplied by water from a desalination plant in Qatif. However, the switch to a mechanized canal system to preserve underground water has created challenges of its own. The modernization of the irrigation system included the creation of concrete water channels, which has reduced the storm water run-off and weakened resilience against flash floods. The natural water streams were able to accommodate fluctuations in the water flow levels as water could percolate down into the water table which could expand or contract in size. The natural vegetation along the channels also helped purify and desalinate the water before it drained into the Asfar Lake. The potential for re-naturalisation of the water channels should be studied to the extent possible and maintained to preserve the agricultural ecology of the region.

Exposed water channel running along the roads in Al-Ahsa

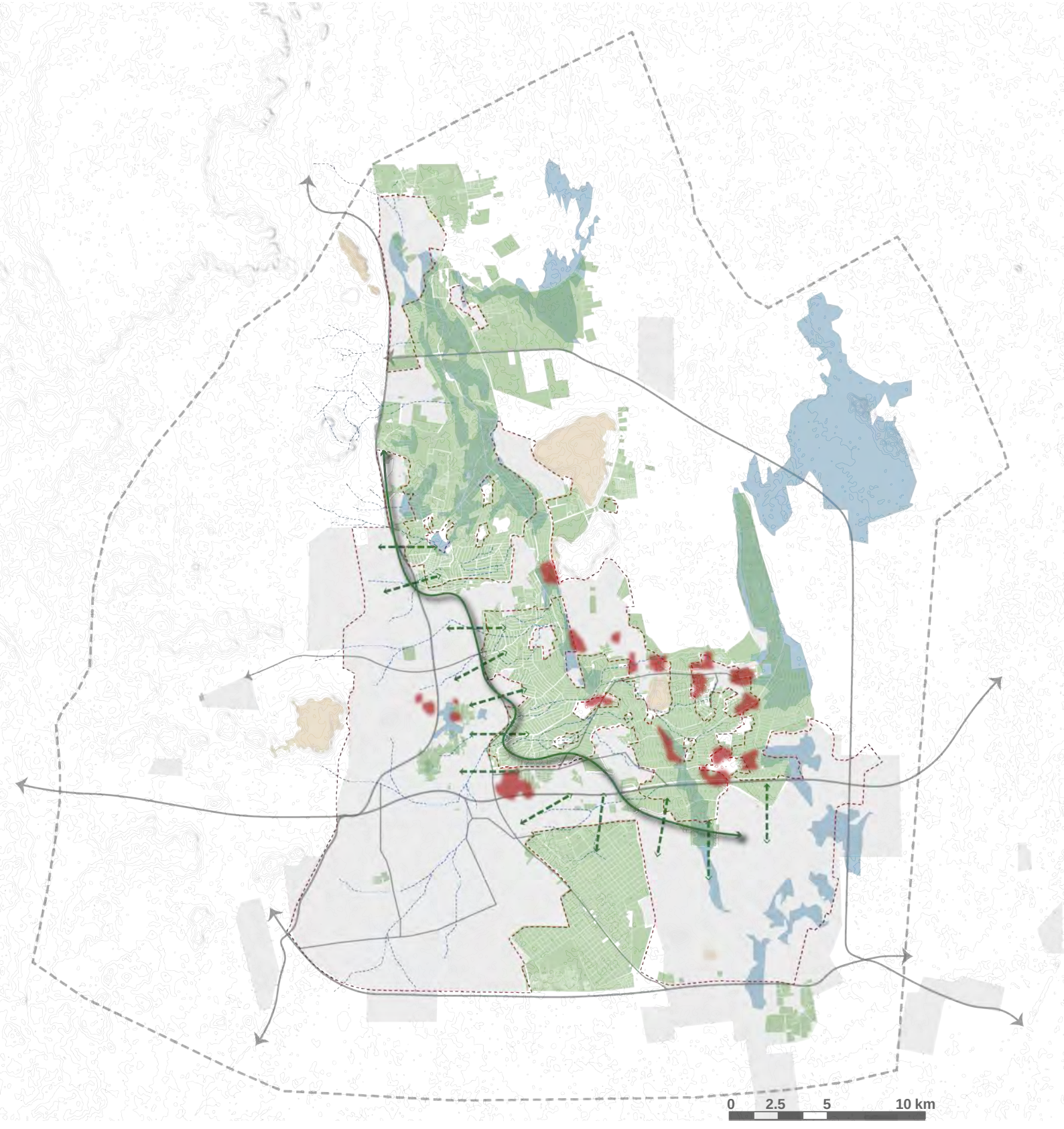


Fig. 40. Socio-ecological and economic imbalance in Al-Ahsa

6

THE FUTURE CITY

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7.1 Strategic Responses

After performing a strategic diagnosis, and identifying three main issues affecting the urban development of Al-Ahsa, three strategic recommendations were identified in response. Akin to the three strategic issues, the above-mentioned three strategic recommendations define the conceptual framing for a systemic and strategic level of solutions. Once defined in their conceptual nature, they are developed into a more detailed description, spatially interpreted and contextualised in Al-Ahsa, at the various scales. This is followed by a roadmap to implementation, in the form of an articulated Action Plan.

7.1.1 The Compact City

According to UN-Habitat principles, cities need to encourage spatial development strategies that take into account, as appropriate, the need to guide urban extension, prioritising renewal by planning for the provision of accessible and well-connected infrastructure and services. A Compact City is envisioned as a high-density urban settlement, characterised by mixed-use development, recognisable, dense and vibrant urban areas, with well-distributed services and facilities (such as hospitals, parks, schools). Establishing spatial and legal mechanisms to consolidate a Compact City should increase accessibility and walkability, therefore increasing use of public transport and public space, reducing congestion, boosting the local economy and increasing interactions across society. Policies to promote urban compaction involve the promotion of urban regeneration, the revitalisation of town centres, restraint on development in rural and peripheral areas, promotion of higher densities and mixed-use development, promotion of public transport and the concentration of urban development around public transport nodes.

[CONSOLIDATE]

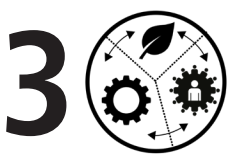
7.1.2 The Connected City

The Connected City is envisaged as a continuous, well connected, and well-balanced network of neighbourhoods, each with its own parks and public spaces, and accommodating a diversity of overlapping private and public activities, shaping a healthy and vital urban environment. Most importantly, these neighbourhoods create opportunities and conveniently accessible facilities which, in turn, reduces the need for private vehicles. In large cities, mass transit systems can provide high-speed, cross-town travel by linking one neighbourhood centre with another, leaving local distribution to local systems and foot traffic. This reduces the volume and impact of traffic, which can be calmed and controlled, particularly around the public cores of neighbourhoods. Local trains, light railway systems, and electric buses become more effective, and as a result, cycling and walking become more pleasant. Moreover, congestion and pollution are drastically reduced, and a sense of security and conviviality in public spaces is increased.

[RE-STITCH]

7.1.3 The Resilient City

A Resilient City takes into consideration appropriate built form and physical infrastructure to increase resilience to the physical, social, and economic challenges that arise from depleting carbon-based fuels and climate change. As such, a Resilient City can be defined as a sustainable network of physical systems and communities,[39] in which these physical systems consist of both the constructed and environmental components of the city. According to the New Urban Agenda (NUA), cities need to ensure environmental sustainability by promoting clean energy and sustainable use of land and resources, protecting ecosystems and biodiversity, promoting sustainable consumption and production patterns, reducing disaster risks, as well as mitigating and adapting to climate change. These elements amount to resilience. A Resilient City also supports and is mutually supported by its territorial systems, activating positive urban metabolism mechanisms, ensuring a reliable supply and balanced value chains. This is particularly important for Al-Ahsa that is deeply rooted in its agricultural heritage, but is trying to balance its heritage with a growing population and a diversifying economy.



[PROTECT & IMPROVE]

Street section of Dhahran Road, the major North-South axis in Al-Ahsa

7.2 Appropriate Models for Al-Ahsa Urban Development

7.2.1 The Compact City: Consolidating development by creating and densifying new centres in Al-Ahsa

The first strategy concentrates on limiting the urban sprawl in Al-Ahsa by developing the area within the Urban Growth Boundaries. The main anchor for Al-Ahsa is the oasis and all efforts must be directed towards protecting and enhancing the oasis ecosystem. Ensuring that the oasis stays intact and protected from developmental pressures is paramount to sustain the future of Al-Ahsa.

By establishing a strong boundary that limits extension and consolidates the size of the city, it is possible to increase the density within the built up areas and in parallel, push for developing the empty plots within the existing the urban fabric. This measure should be extended to the villages within the oasis to protect the agricultural lands from further horizontal urban expansion. These villages, though scattered, often fall inside the oasis extents or on the periphery. As the city population increases, there will be a tendency for these villages to expand and encroach on agricultural lands. Defining the physical growth extents for urbanization will encourage developers to address the existing vacant land first and protect green farmlands from encroachment.

A dense city fabric can be more efficiently served by basic infrastructure and other services like public transport, positively impacting economic and environmental sustainability. This will reduce pressure on the municipality for maintenance and supply of basic infrastructures such as sewerage, electricity, and clean water distribution networks. Densification also brings people together from diverse social and economic backgrounds and encourages interaction in the public realm leading to a more dynamic society. This proximity of opportunities and variant demographics also leads to innovation and human development that, in turn, contributes to a higher quality of life and competitive economies.

The land to the South of Al-Ahsa has already commenced development through the addition of roads and residential buildings. However, this expansion must be carefully phased to align the development with other infrastructure and transportation investments. The city must create incentives to encourage development on vacant land within the city limits as a priority. Installing public transport will help to concentrate development along corridors that are accessible and strategically important to the city's connectivity. Defining a hierarchy of primary, secondary, and local nodes with correspondingly scaled catchment areas and levels of commercial services, will also create a structured pattern of development making the city more legible.

Vacant land in the North

Vacant land along Dhahran Road

New developments in the South

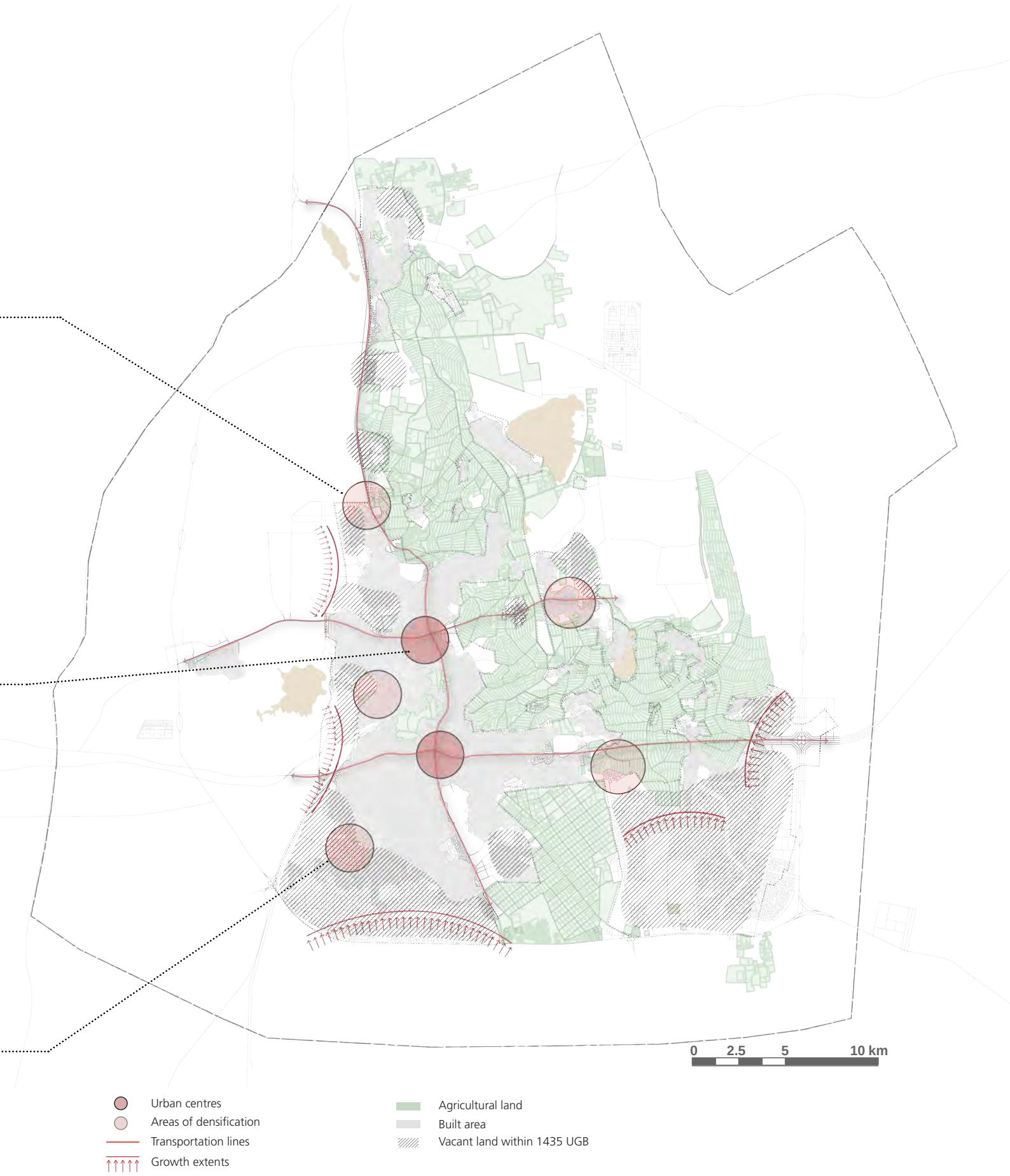


Fig. 41. The Compact City: Consolidating development by creating and densifying new centres in Al-Ahsa

7.2.2 The Connected City: Linking Al-Ahsa through public transport

Al-Ahsa is comprised of a cluster of urban villages anchored by the oasis. However, the city has not fully unified as a cohesive whole. Rather, it functions as a collection of villages, that maintain multiple identities and are not coordinated through a unified vision. It is, therefore, important to establish a central identity for the city that stitches these villages together without losing their unique structure and characteristics.

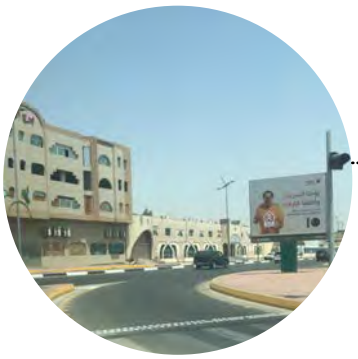
The Al-Ahsa Oasis is a World Heritage Site and would benefit greatly from a strong unified city structure that is anchored by its ecological heritage and forwards a coherent vision for future growth. The new plans for Al-Ahsa must emphasise a consolidated vision for the region.

The villages in and around the oasis are largely residential with small neighbourhood-scale commercial facilities. These villages require connections to the historic city centres and other amenities through strong, well-established links. These connections could take the form of well defined public transportation lines along major corridors or through green spaces that connect the villages with the commercial cores. The provision and integration of both these strategies would prove most beneficial for Al-Ahsa.

Establishing a public transportation system can assist in the hierarchical organisation of the city's centres and spaces and define a structure that comprises well-defined nodes, corridors, and equitable distribution of amenities. The routes defined in the proposed transportation network will help to streamline future development and prioritise areas for growth and renewal by in-filling the interstitial vacant or underdeveloped spaces, thus resulting in a continuous urban fabric.

The developments proposed on the Eastern side of the oasis need to be carefully re-examined due to the distance of their location from existing infrastructure and the proposed transportation lines. The addition of new uses at the proposed scale will counter and compete with the present city structure of Al-Ahsa and weaken its significance. In the regional context, expanding Al-Ahsa eastwards to connect it to the coastal developments might be far fetched. It may be more effective to create a secondary town on the coast with strong linkages to Al-Ahsa than to create a contiguous urban belt to the coast with specialised land use typology.

Al-Ahsa is in possession of more than 5000 hectares of vacant land within the current built fabric of Al-Ahsa, which provides immense potential to accommodate a large percentage of the future population within the city limits. New pockets of development in these lands would take advantage of existing infrastructure networks and public transportation lines. There is also a possibility to accommodate a number of the proposed facilities such as the university, tourism-related developments and medical facilities on such lands, within the city footprint. Urban campuses that are integrated into the wider functions of the city can prove more efficient and generate heightened or new economic activity in the vicinity. The city should reassess the amount of land needed for the proposed developments and consider the potential for accommodation within the current city footprint.



Al Mubarraz city centre

Dhahran Road, North-South axis

Al Hofuf city centre

Fig. 42. The Connected City: Linking Al-Ahsa through public transport

7.2.3 The Resilient City: Rebalancing Al-Ahsa's socio-ecological and economic systems

This strategy promotes the development of urban spatial frameworks that support the sustainable use and management of natural resources and land, supporting the appropriate compactness and density, polycentrism and mixed-use from previously illustrated strategies. The approach, aimed at rebalancing the working mechanisms of the city, is expected to strengthen urban resilience. In so doing, it is designed to enhance resource efficiency and environmental sustainability by fostering risk reduction, food, and water security and to trigger economies of scale and agglomeration.

As referenced in the first strategic recommendation, the city requires a strategic plan for growth that does not infringe upon Al-Ahsa's unique agricultural lands that form such an important aspect of its identity. It is important to preserve the oasis with its water channels, drains, and other related resources that contribute to its sensitive ecosystem.

The city, in its current physical form, is completely detached from the oasis ecosystem, and functions independently from it. The built area of Al-Ahsa additionally lacks any form of public green or open space. There is an opportunity to integrate and add to the existing green network by extension into the city through punctuated interventions. The extension and connection of the oasis to form a network of interconnected green spaces, could re-characterise the city as an 'urban oasis'.

While densifying, it is equally important to create open spaces that can balance the density of the built form with the introduction of natural elements, landscaping, and other forms of outdoor social activities. This linked green network should be interspersed with public spaces that are comfortable, accessible, inclusive and equitably distributed across the city.

An important element for consideration in the integration of the agricultural lands with the city is the design of the channels. The current system of channels was engineered to prioritise only efficiency and economy. The channels lie either above grade in concrete troughs, or at grade in the middle of roads. The water channels and drains that run along the median of the road are exposed in some areas or else covered by roadways. The channels, in their current state, do not contribute to the visual landscape or perception of the city. Careful redesign of the channels can improve their public presence and integrate them with the urban ecosystem in the form of public spaces, urban agricultural land or corridors for enhanced connectivity.

Private farms in the oasis

Water drainage channel

Water supply canal

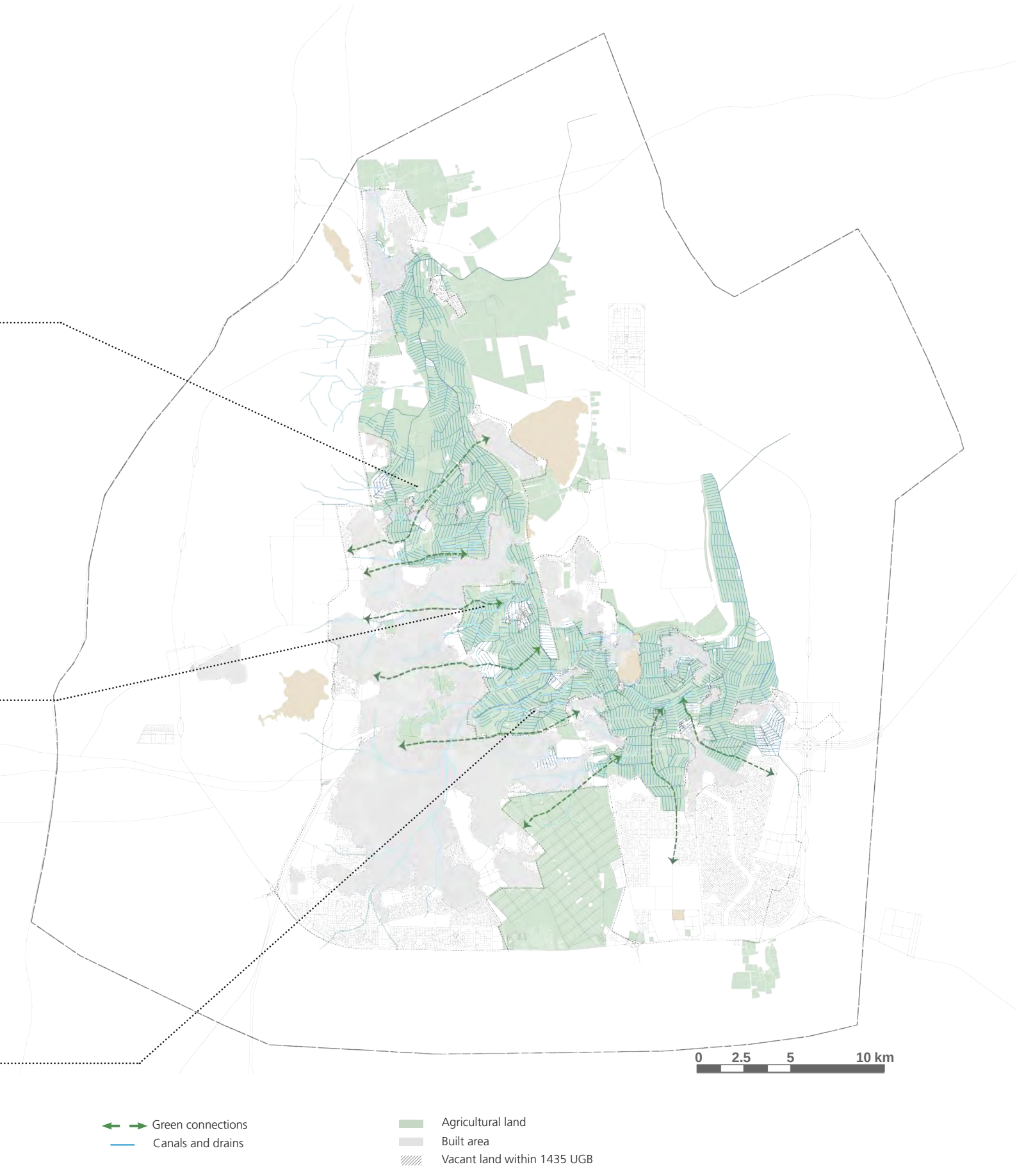


Fig. 43. The Resilient City: Rebalancing Al-Ahsa's socio-ecological and economic systems

7.3 An Action Plan for Al-Ahsa

Transforming conceptual recommendations into concrete and implementable strategies requires detailed systemic actions that can trigger the envisaged spatial, economic and social transformation. A responsive action plan is designed to implement the three strategic recommendations with a series of systematically packaged interventions for Al-Ahsa. These interventions serve as a guide for their implementation and detail the priorities for transition toward an integrated and resilient city. The Action Plan outlines three systemic actions, envisaged specifically for Al-Ahsa, and are defined as:

- **ACTION 1: Establish an extensive public transport system to support the creation of new corridors;**
- **ACTION 2: Implement strategic densification around main nodes and transport lines;**
- **ACTION 3: Relink natural elements to the city and establish a well-integrated green and public space network;**

Actions 1 and 2 address the need for a system of distributed interventions that address the issue of sprawl and segregation in the city. The implementation of TOD to provide key intermodal hubs and densification along a well considered public transportation network, acts at the city scale. Action 2 focuses on the neighbourhood scale, through surgical densification and concentration of development on available vacant land. Tightly controlling development boundaries and 'white lands tax' enforcement are also applicable at this scale. Simultaneously, action 3 focuses on micro-scale interventions that will foster socio-ecological rehabilitation through the development of a public space network.

The action plan therefore, creates synchronised impact at three scales: Al-Ahsa City the neighbourhood and the micro. It supports the retrofitting and extension of existing infrastructure (such as the oasis and drainage channels) with multiple purposes, rebuilding the relationships between different city users, improving integration between the urban outskirts and the inner city, improving transport and mobility networks, development of heritage preservation programmes for vernacular and historical settlements and expanse of financing and legal instruments that support all of these transformations.

Public plaza in the city centre of Hofuf

Pedestrian street near the Qaisariah Souq

7.4 Three Systemic Actions for Structural Change

7.4.1 Action 1: Establish an extensive public transport system to support the creation of new corridors

The first action addresses the need to restructure the city around its mobility patterns. Embracing the proposal for a new public transportation system, Action 1 provides guiding priorities for its phased implementation, such as access points in the existing city. This integrated multi-modal transport network will expand the reach of public transit to a system of interconnected villages and make the city structure more navigable. Furthermore, it outlines the preconditions for an incremental densification of the urban fabric and for the creation of new centralities around the emerging major transport nodes. Action 1 can be summarised in the following steps:

1.1 Define major arterial North-South and East-West axis with public transport

Create a central transportation line in the North-South direction along the Dhahran Road, the main arterial axis connecting the two major historic centres of Al Mubarraz and Al Hofuf. The orientation of this line will ensure that the most densely populated city centres are served by public transport and an efficient connection is established to and from these centres. Two additional arterial connections are proposed on the East-West axis in the North and the South in parallel with Makkah Road and Riyadh Road respectively.

1.2 Create a hierarchy of nodes

Establish a nodal hierarchy of local, city level, and regional significance, to concentrate public amenities along transportation lines. The two major centres of Al Hofuf and Al Mubarraz demonstrate an existing concentration of mixed-use and commercial establishments. Building upon these centres with a strong link to other village centres will give definition to the city structure.

1.3 Create transverse connections linking to the various villages and towns

Connect the main axes to the secondary and tertiary road networks linking the villages of Al Umran, Juatha, Madinat Al Jafr and Al Oyun with the metropolitan area of Al-Ahsa. Creating intermodal connections from the railway station and aforementioned nodes will improve accessibility across Al-Ahsa. These transversal connections will create critical linkages between the commercial centres, corridors and the residential neighborhoods of Al-Ahsa.

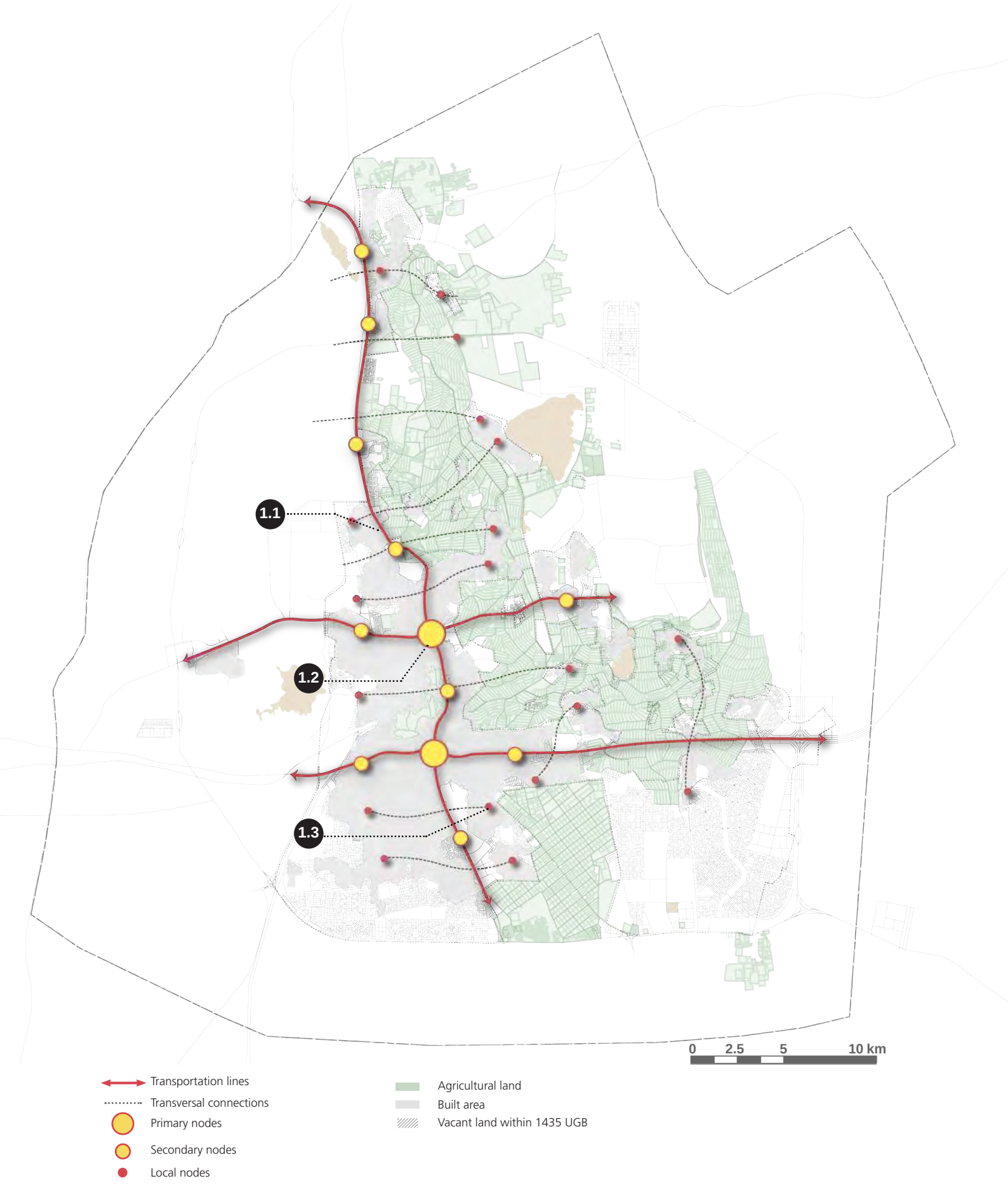


Fig. 44. Action 1: Establish an extensive public transport system to support the creation of new corridors

7.4.2 Action 2: Implement strategic densification around main nodes and transport lines

Following the implementation of a public transportation network, the city should begin actively promoting transit-oriented development (TOD), incentivising densification in the areas within walkable distance to public transport. Strategic densification should be applied to selected major nodes to define new centralities with incentivised mixed-use development and concentrations of services and facilities. Action 2 can be summarised in the following steps:

2.1 Densify along the defined transportation networks

Once a transportation line has been defined, it helps organise a city and provides structure to guide future development. Surrounding neighbourhoods become more attractive for individuals and businesses as a result of improved access to amenities or proximity to other businesses. The densification process must be carefully articulated to be contextually responsive to the surrounding uses.

2.2 Incentivise infill development on vacant or underdeveloped land

The vacant or underdeveloped land bordering major roads and transportation lines should be prioritised for future development by incentives. Infill developments on vacant land will provide a continuous city fabric, activating the street frontages and creating vibrant urban spaces. This infill development can be used to create balanced land use and provide amenities lacking in surrounding neighbourhoods such parks, open spaces, or public facilities.

2.3 Encourage mixed-use

New development should encourage mixed-use to ensure diversity and vibrancy along the aforementioned network. A twenty-four hour district is often safer and economically more successful than a single-use district. This is also an opportunity to potentially relocate and redistribute the uses proposed in the eastern expansion of the city, back into the vacant land inside the urban boundary. Anchoring uses of city or regional significance such as education or health will increase the significance of surrounding villages and strengthen existing city functions.

Fig. 45. Action 2: Implement strategic densification around main nodes and transport lines

7.4.3 Action 3: Relink natural elements to the city and establish a well-integrated green and public space system

Action 3 aims to make the city more resilient, more sustainable, and enjoyable for its residents. As such, and in parallel to the strategic densification process of Al-Ahsa, this section proposes protections for agricultural land and extension into the city to create a network of green public space, with particular attention to areas targeted for densification. The water distribution channels should be naturalised and integrated with the city's development to enhance its identity as an urban oasis. In addition, promotion of urban and peri-urban agriculture along the canals will support the gradual reconnection of green and blue networks, while strengthening food security and resilience. Action 3 can be summarised in the following steps:

3.1 Define and protect the agricultural lands that form part of the oasis

The oasis forms an anchor for the settlement of Al-Ahsa and must be defined and protected from future growth and conversion requests. As the pressure increases to expand and develop greater revenue production via alternative functions on new land, protection measures for agricultural lands must be enforced to emphasise their role in Al-Ahsa's unique heritage and prevent encroachment. The villages must clearly demarcate their growth boundary, beyond which development should be discouraged and restricted.

3.2 Extend the water channels into the city at strategic places

The agricultural fields must become an integrated part of the city fabric through the network of water channels that can additionally function as potential pedestrian transportation connections, or green spaces. The city should study and assess the canal system, to determine potential locations for the water channels to dovetail into green boulevards. This will create a seamless transition from the urban lands to the agricultural oasis forming an integrated urban-ecological system.

3.3 Redesign the cross section of the channels to naturalise and create a green corridors

The channels of the irrigation system are designed and engineered exclusively to optimise the function of water supply through agricultural fields. These channels should be re-evaluated as elements of urban infrastructure that can contribute to the organisation of urban life around it. The majority of the channels are elevated over the ground in the form of troughs, have been covered by roads, or have become overgrown with vegetation on either side. These water channels can be redesigned to create more interactive edges that are visible and protected.

Fig. 46. Action 3: Relink natural elements to the city and establish a well-integrated green and public space system

FINAL RECOMMENDATIONS: THE THREE-PRONGED APPROACH

7

8.1 Spatial Recommendations

8.1.1 A strategic view of the Al-Ahsa Region

The Eastern Region is the Eastern Gate of the Kingdom, and a primary connection to the other Gulf Cooperation Council (GCC) countries. As such, its strategic location should be better utilised, as there are currently very few strategies to leverage spatial synergy in the GCC area, where there is high competition but little strategic cooperation. Though the region is the largest in the Kingdom in terms of area, population is concentrated in a few major cities along the coastal strip, including Dammam, Dhahran, Al Khobar, Jubail, Hafr Al Batin, and inland cities such as Al-Ahsa.

Currently, public service provisions are lacking in medium and small cities as compared to major centres on the coastline. These smaller cities lack infrastructure networks, basic education and health services, which is a prominent driver in migration from rural areas to coastal cities such as Dammam and Jubail. This inequitable access to services and opportunities, together with the unbalanced population distribution, clearly demonstrates the need for a territorial rebalancing strategy. This strategy should aim at redefining a hierarchical system for the cities of the region, building opportunities for secondary cities such as Al-Ahsa to contribute to the diversification of the economy in the region, progressively rebalancing the population distribution and capitalising on the potential role of these secondary cities.

Economically, the Eastern Region is considered to be the core economic engine for the Kingdom, as it is the primary centre for petroleum production. Over 86% of the Kingdom's basic industries are located in this province. However, the long-term expansion and diversification of the region's economic base is necessary. While industrial areas in Dammam and Jubail show significant achievements and unique developments for the region in petroleum industries, expansion in other sectors is required to capitalise on the non-oil resources of the region. A diversification strategy should support the emergence of new economic sectors by leveraging other regional and territorial resources.

Cultural and ecological tourism sectors hold great potential for expansion. A regional strategy for economic diversification should, therefore, aim to develop tourism activities through the preservation of monuments and cultural heritage in the region, such as the Al-Ahsa Oasis and the historic mosque in Juatha. Such a strategy should additionally support marine tourism and in parallel, develop the agricultural and fisheries sector.

Almost 6.5% of the region's total area is agricultural land suitable for agricultural use. As outlined above, this is due to the presence of underground water reserves, especially in the oasis area of Al-Ahsa, which is one of the most fertile areas in the entire country. In addition, there are various archaeological sites and tourist attractions. The preservation of these sites and addition of necessary services to attract and revitalise the tourism industry in the region, could add significant value.

The proposed extension of Al-Ahsa metropolitan region towards the coast, should be phased out after careful assessment of the needs of the region and its economic feasibility. In light of the core objectives of this extension, which is largely to connect the city to the new manufacturing centres and port induced trade, it may be more feasible to create a new economic node on the coast with strong connections and to enhance the functional connectivity to the existing city of Al-Ahsa.

It is crucial to emphasise that there are many sites along the coastline of the region that are environmentally sensitive, such as the coastal strip from Safaniya to Manifa Bay and Tarout Bay, in addition to a group of marine islands. An environmental protection strategy at the regional level needs to be mobilised and implemented coherently. This should be considered as central to and strongly interlinked with any tourism plans in the region.

8.1.2 Towards Al-Ahsa, a Sustainable Urban Oasis

The strategic vision for Al-Ahsa, through the actions described in Chapter 6, aims to promote sustainable forms of development with conscientious planning efforts. Therefore, Al-Ahsa's Action Plan illustrates three basic steps to trigger a structural change, activating an incremental system for spatial modifications to the fabric of the city, which will, in turn, modify its social, economic, and environmental structure. Implementing the systemic transformations depicted in the Action Plan, will transform Al-Ahsa into a more sustainable, intermodal, diverse, and vibrant city.

Al-Ahsa Sustainable City

Al-Ahsa, with its dominant fertile lands, natural water features, and suitable climate has long been the agricultural centre for the Eastern Region. Rapid urbanisation poses a threat to these ecological systems, disrupting their natural capacities and connections. Protecting and limiting the growth of the villages in and around the oasis can ensure a tenable future of the ecosystem that coexists with the expanding urban realm. Responsible use and management of the natural resources, while encouraging lifestyle shifts to sustainable alternatives would also help Al-Ahsa transition to a resilient and thriving urban centre.

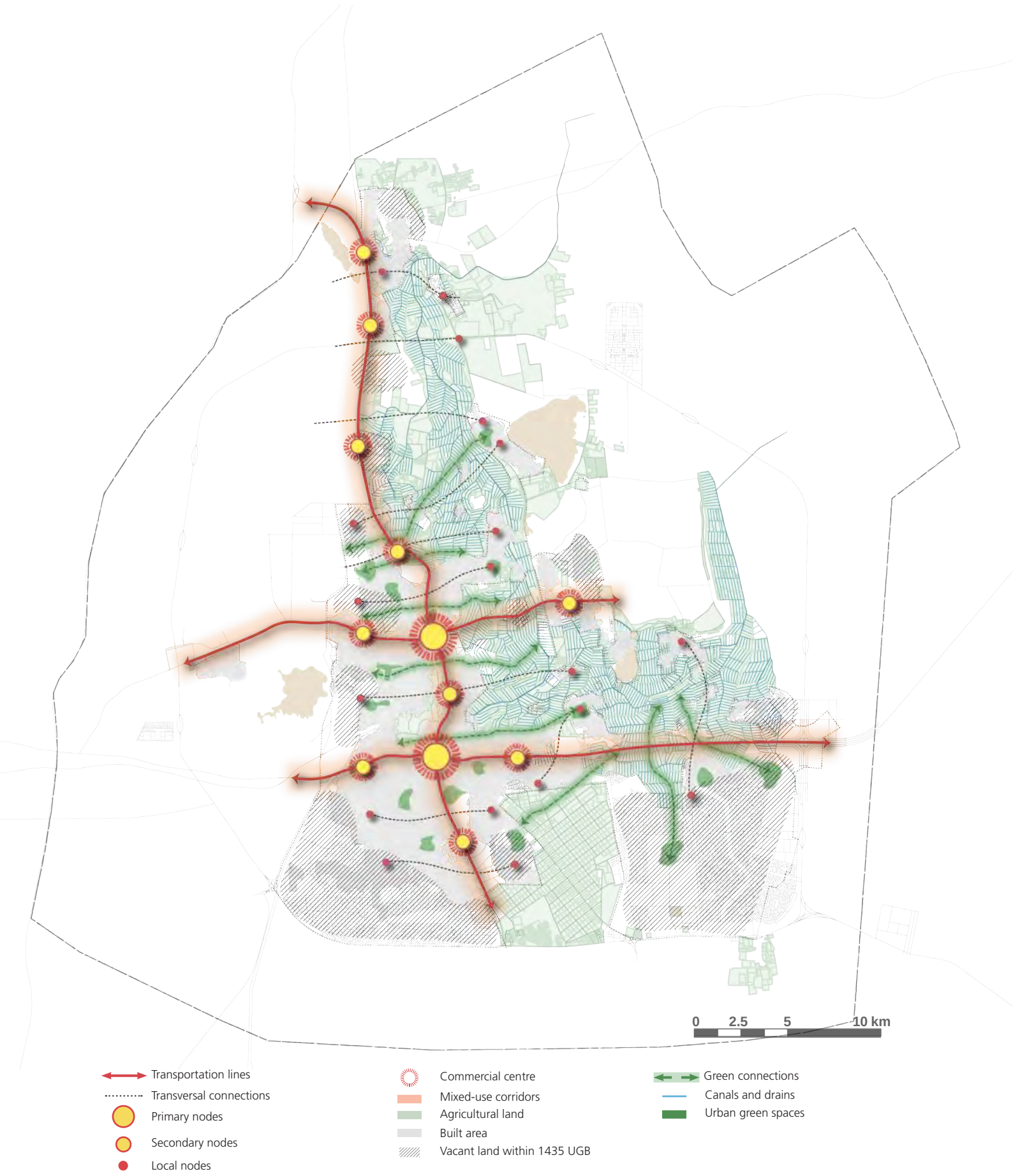


Fig. 47. Action Plan for Al-Ahsa

Al-Ahsa Intermodal City

The Strategic Vision for Al-Ahsa envisions a public transportation system with 6 bus routes. Concentrating new development and a mix of uses along these transportation lines should reduce travel times and dependence on personal vehicles. The public transportation system combined with the extensive supporting road network and a pedestrian friendly street and public space system should encourage shifts in modal behavior. The city should also focus on improving last-mile connectivity and aligning new developments with the trajectory of these lines to extend reach, access, and connections across the city.

Al-Ahsa Diverse City

For a city to be resilient and adaptable to change, it is fundamentally important to diversify its economy and reduce dependence on a single or few volatile industries. The Al-Ahsa Strategic Plan invests in a diverse range of areas such as transportation, education, industry and housing projects which increases Al-Ahsa's capacity to host and sustain multiple avenues of activity, though it currently pushes their development away from the current city and approaches them as separate, single-use entities. The principal objective of a diverse city is to promote social welfare and economic productivity. A multi-faceted, mixed-use economic and spatial structure would support innovation and creativity in Al-Ahsa. Growing opportunity bases would attract talent and varied skill sets, leading to socio-economic diversity vital to any dynamic city.

Al-Ahsa Vibrant City

A vibrant city is characterised by social connections, cultural activities and a dynamic ecosystem. A diverse city is a precondition for a vibrant city. Active street life, thriving public spaces and well connected public transportation systems are crucial elements in creating vibrant urban environments. Mixed-use neighbourhoods would create twenty-four hour districts that are safe and encourage pedestrian activity. Natural systems that are integrated and protected will inculcate a sense of ecological awareness and respect among the residents, to co-exist and care for the environment as an extension of their city. Infilling the vacant spaces with diverse uses would help to reactivate and connect various city centres, establishing continuity and infusing the city with vibrancy.

8.2 Institutional and Legal Recommendations

In terms of legal reform, Al-Ahsa would benefit from both fiscal and jurisdictional decentralization to facilitate independent and innovative solutions to urban social problems at the Amanah level. This should entail:

- The transfer of local planning power, authority and function from MoMRA to the Amanah, with provision for independent action without recourse to effectively address community needs. This is supported by the New Urban Agenda, which specifies that territorial urban design and

Interior of Qaisariah Souq

planning processes should be led by sub-national and local governments but that their implementation will require coordination with all spheres of governments with participation of civil society, the public sector and other relevant stakeholders.

- Fiscal decentralization, which gives autonomy to the Amanah to source funds to finance development activities. Revenue generation activities in cities may also include taxes and levies. Urban areas should be allowed to collect some form of property taxes to fund development activities. The recent White Lands Act that imposes fees on undeveloped plots in urban areas to tackle land speculation, housing shortage and indiscriminate land development shows that regulatory mechanisms can be leveraged to generate revenue while fostering an efficient development framework.
- Opening of avenues for actors, including the private and voluntary sector and the general community, to participate in decisions regarding projects that affect them.

Consolidation of the legal planning instruments would also support development intervention of Al-Ahsa, along with review, update and modernisation of these laws to improve their relevance to the current development paradigm. This should also entail re-consideration of the lawmaking process to limit the number of actors. The mere existence of the laws in KSA will not guarantee sustainable urban development as they additionally must be functionally effective, i.e. precise in achieving their intended results, clear, consistent and simple to understand.

The agricultural land is a key urban feature in Al-Ahsa, and the local laws and policies that protect against conversion to other uses such as residential and commercial should be enforced. The local plan needs to consider the use of these agricultural lands and provide an urban management programme that can help owners to develop these in ways from which the city will benefit. The local plan should also integrate ARAMCO's protected lands (sensitive areas) with the surrounding urban areas and make use of the the railway adjacent areas as attractive public spaces.

There is a need for a functionally effective urban planning law that, inter alia:

- Introduces incentives/requirements that will enable more compact city growth;
- Defines clear institutional roles and responsibilities at each level;
- Enforces linkage between all levels of plans (national-regional-local);
- Provides effective coordination and monitoring mechanisms;
- Increases meaningful public participation and engagement in planning.

The legal framework also needs to enshrine an acceptable mode of public participation in public decision making to foster equality and inclusion. The consolidation of the urban legislation would also lend legitimacy to the plans that Al-Ahsa relies on.

Presentation at the urban planning workshop in Al-Ahsa

Revising the Urban Growth Boundary Law to include clear criteria on how it is set would enhance technical and vertical accountability. The Law also needs to place more emphasis on the Development Protection Boundary as a no-development zone, not only to prevent haphazard development but also to prevent private interests from taking advantage of laxity in the legal text. These initiatives will strengthen policy formulation designed to make the city more sustainable, compact and dense. Primarily, a post-legislative scrutiny of the urban growth boundary law should be undertaken to assess whether it has met its policy objectives. This could, in turn, inform the legal reform process as well as planning policy options.

8.3 Financial Recommendations

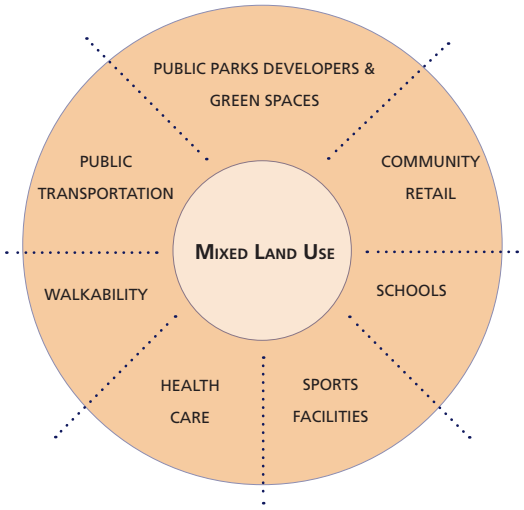
In 2015, the KSA began implementing reforms aimed at creating sustainable local public finance. The central government continues to promote strategies to increase own-source revenue at the local level through improved tax administration and economic diversification.

Al-Ahsa's public finance priorities are closely aligned with Saudi Arabia's larger national development goals, which include supporting SMEs in key sectors such as agriculture, tourism, trade and manufacturing. Therefore, expanding the public sector's capacity to finance essential local infrastructure and projects supporting development in these areas is imperative for the city.

International experience with enhancing own-source revenue through a variety of tax mechanisms that harness local financial resources for public use are promising.[40] (specifically, through the taxation of the real estate value capture mechanisms). Although some cities of the Kingdom have been implementing new property taxes such as the White Lands Tax, exploring other tax instruments should be a priority for Al-Ahsa, in order to generate a diverse income stream portfolio.[41]

Introducing land-based taxation establishes reliable own-source revenue for municipal governments. Moreover, the benefits of public development projects, (e.g. public transportation and social infrastructure), are often multiplied by the positive externalities and value created by investing in sustainable and accessible urban spaces.[42] UN-Habitat suggests that Al-Ahsa make use of land-based tax mechanisms, (i.e. betterment levies) in public projects.

Public infrastructure such as transportation systems can spur adjacent residential and commercial development, enhance mixed land use, and create jobs, (figure 48). Local development driven by public projects can also result in increased land value and indirectly engender a number of other community benefits [43] (figure 49).



Source: United Nations Human Settlements Programme (2018)

Fig. 48. Components of mixed land use

THE IMPACT OF INFRASTRUCTURE DEVELOPMENT ON LAND VALUE

Case Examples	Key Findings
Bogotá, Colombia	Research suggests that for every additional 5 minutes of walking time to a public transportation station, rental prices fall by 6.8 - 9.3%
Dubai, UAE; Cairo, Egypt	• Urban development that included retail facilities resulted in a price premium of 15 – 20%. • Schools increased residential land prices by approximately 13% • Walkability within a residential community increases home values by up to 9%

Source: Colliers International (2017); Rodríguez and Targa (2004).

Fig. 49. The Impact of infrastructure development on land value

While betterment levies are well suited for infrastructure projects, fiscal instruments such as waste management fees, parking fees, and congestion fees are useful tools in the process of reducing vehicle dependency and increasing pedestrian traffic, particularly in commercial and leisure areas.

Several finance tools are available to local governments interested in expanding own-source revenue. Municipal governments can maximise the benefits of these instruments by:

- Coordinating and collaborating with different levels of government to connect national strategies to local priorities. For example, establishing a local liaison office or a local PPP unit linked to the National Centre for Privatisation in charge of proposing, implementing and monitoring PPP projects,
- Investing in capacity building and improving tax administration,[44]
- Stimulating participatory processes in order to involve the community and build a sense of trust towards local reforms,[45]
- Tailoring fiscal instruments according to local needs, (e.g., fiscal cadaster in Bogotá, Colombia).[46]

Lastly, coordinating among planning, legal/regulatory frameworks, and local finance is crucial to the creation of the necessary local conditions for sustainable and equitable development, as outlined in the New Urban Agenda.[47]

CASE STUDIES AND BEST PRACTICES

WASTE MANAGEMENT

In the Tamil Nadu State of India, a waste management project proposed the central government (35%) and the state government (15%) share 50% of the total project costs. A private entity (via a PPP) would provide the remaining 50% of project funding. The private concessionaire would be responsible for planning, designing, building, financing, operating, and maintaining the municipal solid waste management facility for the concession period. Land would be provided by the municipality through an annual lease as specified by the Government of Tamil Nadu.

PARKING FEES

Chicago leased 34,500 curb side parking meters to the bank Morgan Stanley for 75 years, trading meter revenues for an upfront payment of nearly USD $1.16 billion. This type of PPP contract includes a fixed schedule of meter rate increases, which raised rates two to four-fold by 2013. As a result, Chicago had the highest curb side meter rates in the United States. Meters were netting USD $20 million annually while Morgan Stanley managed pricing and maintenance of the metres.

CONGESTION FEES

In 2007, Stockholm introduced a cordon pricing-based scheme to reduce congestion, local pollution, and generate local revenue. Following the introduction of the cordon, traffic decreased by 19% in the first year in addition to generating € 59 million annually. In Singapore, the implementation of an Area Licensing System (ALS) reduced traffic from 12,400 vehicles in May 1995 to 7,300 vehicles in August 1995 during restricted hours. Moreover, revenue from the sale of area licenses amounted to US$ 47 million with capital costs were US $ 6.6 million in 1975 with an additional US $17 million from ALS revisions in 1989.

Source: Ernst and Young Pvt Ltd., Ministry of Urban Development of the Government of India, & the Confederation of Indian Industry. Compendium on public private partnerships in urban Infrastructure: case studies. (2017). World Bank. Washington, DC.; Weinberger, R., Kaehny, J., & Rugo, M. (2010). U.S. parking policies: an overview of management strategies. Institute for Transportation and Development Policy. New York, NY.; Croci, E. (2016). Urban Road Pricing: A Comparative Study on the Experiences of London, Stockholm and Milan. Transportation Research Procedia 14, 253-262.; Phang, S., & Toh, R.S. (2004). Road Congestion Pricing in Singapore: 1975-2003. Transportation Journal, 43(2), 16-25.

8

ANNEX

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9.1 Picture Credits

9.2 List of Figures

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9.3 Notes and References

1 City Prosperity Index, 2016

2 World Bank, 2016

3 Arab News, 2017

4 The World Bank. 2012. Adaptation to a Changing Climate in the Arab Countries

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10 The information and figures used in the Al-Ahsa National and Regional Spatial Context were extracted from the following resources: Eastern Region Economic Report, 1434/1435, SAGIA 2014 Review of Regional Planning in Saudi Arabia - The Case of The Eastern Region, FSCP Dammam City Review Report, FSCP National Spatial Strategy Review, UN-Habitat

11 Represent the instructions issued by a Minister, his representative or any official of the Ministry to announce new regulations and updates regarding any intent or action to be undertaken.

12 This information is sourced from the planners of Al-Ahsa Municipality.

13 Royal Decree No M/4 dated 24 November 2015 (the "Law") and Council of Ministers Decision No. 377 dated 13 June 2016 (the "Regulations").

14 Al-Ahsa workshop, September 2018

15 Royal Decree of 1975.

16 See Royal Decree No. (1663) of 1976.

17 A line-item budget lists, in vertical columns, each of the city's revenue sources and each of the types of items such as capital outlays, contractual services, personal services etc. the city will purchase during the fiscal year.

18 Chapter 5 of the State of Saudi Cities Report, "Managing Urban Transformation in Saudi Arabia - The Role of Urban Governance (2018)" pg. 16.

19 See Article 5 of the Law of Regions to Royal Order No. A/92 (1993).

20 It consists of a) the Prince/Governor of the Region as president; b) Deputy Governor of the region as the vice as the vice president; c) Deputy Mayor of the 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.

21 See ibid n.15, Article 23.

22 This department is supported by the City Planning Department at MoMRA.

23 UN-Habitat workshop in Al-Ahsa 2018.

24 The National Urban Observatory is situated in the Department of Urban Studies, MoMRA.

25 Shearman and Sterling LLP, 'Understanding the Key Government Institutions and Ministries

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26 See supra footnote 3. From a UN-Habitat workshop, it emerged that there was a city constructed by Aramco outside the urban boundary (in a location between Al-Ahsa, Begig and Ihsaa). The location suitability was not decided by the regional plan; rather it was a decision by Aramco to carry out that development.

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31 Each of the 13 regions is divided into governorates and the region capital. The capital of the region is governed by an Amanah (municipality), which is headed by a mayor.

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