Urban Master Plan Development for Cities in Arabic Countries Application to Nouakchott

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Abstract

The world recently entered an unprecedented period of urbanization due to the formation of dozens of super and hyper-cities (Muggah 2016). By 2050 city-dwellers are expected to account for two-thirds of the global population, or an estimated 6.4 billion people (Bosetti, Ivanovic, Munshey 2016). While a number of the world's largest cities still reside in North America and Western Europe, most future population growth will occur in sprawling cities and slums of developing countries in Africa and Asia. Urbanization brings with its possibilities of improved access to jobs, goods and services for poor people in developing countries. However, there are tremendous challenges and threats, with major implications for the humanitarian and development sector (Muggah 2012). As the world continues to urbanize, natural disasters, economic shocks, climate changes and other factors will increasingly affect populations in cities, potentially making it more fragile. Sitting on the frontline of global emergencies, cities are actively searching for ways to cope, adapt, and bounce back. Nouakchott is one of the largest cities in the Sahara. Located on the Atlantic coast and it lies on the west coast of Africa. It is the capital and largest city of Mauritania which serves as the administrative and economic center. Since the establishment in 1960 this city has known an exponential growth. According to the statistics by the National Statistical Office (OSN) of Mauritania the population has grown from around 2,000 in 1957 to 558,195 in 2000, and to number now over a million, encompassing around a third of the national population. This rapid growth of the city was driven not only by the "pull factors" such as commercial and economic center of the country, but also by some "push factors" such as serious poverty and scarcity of foods in the inland and rural areas caused by droughts and sandstorms took place in 1970's. Ever since, Nouakchott has spread in an uncontrolled, anarchic way until its star-formation covers about 30km in diameter. The site of the city presents a number of risks, among which: the shifting dunes surrounding the city, the fragile western costal cordon in the midst of salt-water wells. This city thus threatened by sand, salt, and water, all at once. Water is the foremost threat: recurring inundation and freshwater droughts are two major issues. This paper aims to issue a preliminary overview of the urban dilemma in Nouakchott and to highlight the most important risk factors that contribute to fragility of this city. In 2020 the Mauritanian government issued a new master plan for Nouakchott city made by JICA expert team. This master plan come up with three basic orientations in order to improve the city. The research aims to understand how these orientations will participate in minimizing the risks and solving the urban problems of Nouakchott, and how the city will be in 2040. Mauritanian institutions responsible for urban development are implementing fundamental changes, including new urban and housing policies in addition to the development of their legal frameworks. The research aims to understand how these changes will support the developing he Mauritanian cities in the future.

Keywords: Urban Development, Arabic Cities, Nouakchott, Urban Planning, Master Plan, Urbanization, Climate Change, Infrastructure, Sustainability, Housing Policies, Economic Growth, Environmental Risks, Urban Governance

Introduction

Most large cities of the Arabic World are located either along the region's great rivers or on the shores of the Mediterranean, the Red Sea, the Arabian Gulf, and the Atlantic Ocean. These are among cities having the world's longest histories of continuous habitation; first of ancient Sumerian, Akkadian, Hellenistic, Roman, Parthian, Sassanian civilizations, and then Christian and Arab-Islamic ones. Early establishment of irrigation canals allowed the development of agriculture, which led to the expansion of towns and cities. Jerusalem has been inhabited since 4000 BC; Mesopotamia areas were settled by Amorites since 2500 BC.

Urban morphology in the Arabic World has been a result of a large variety of historical evolution and cultural transition. In the course of urban development, the governments are increasingly challenged to provide adequate housing, in addition to public and social facilities [1].

In 1979, M. Hugh P. Roberts classified the history of planning to three categories: 1) Pre-Islamic (prior to c. 650 AD), 2) Islamic (c. 650 AD–c. 1800 AD), and 3) Urbanization of Economic Era (c. 1800 AD–c. 1950 AD) [2].

Since the 1950s, many new factors have contributed to the development of the Arabic World. Thus, a different type of development could be added and named as the Modern Urbanization.

Categories of Urban Development in Arabic countries

Number	Name	Period
1	Pre-Islamic Urbanization	prior to c. 650 AD
2	Islamic Urbanization	c. 650 AD - c. 1800 AD
3	Urbanization of Economic Colonial Era	c. 1800 AD - c. 1950 AD
4	Modern Urbanization : after colonial era	c.1950 AD ~ 2011
5	Modern Urbanization : after Arab Spring	2011 ~ current

Pre-Islamic Urbanization (Prior to c. 650 AD): Civilization of Mari

It is not clear how the urban character was before the Islamic era. However, monumental buildings such as temples and houses adopted the court yard principle. Elaborate sewage and water supply systems reflect an inheritance of the irrigation skills. The master plan of Mari city, now in the south eastern Syria near the borders with Jordan and Iraq, could be a good example to illustrate the concept of urban planning before the Islamic era.

Mary city was born on the west bank of Euphrates River in Syria. The essential urban characteristic of the city was consisting of a circular plan which was delimited by a dike of 1.9 km in diameter. It was intended to protect the city from floods of the river, while an inner rampart was to protect it from the human attacks [3].

The centre and its peripheries were connected via large radiating arteries designed on the model of a cart wheel; these roads were connected by secondary streets with circular paths. An artificial channel with 30 meters width connected to the Euphrates crosses the city to provide the city with water and to create a traffic access [4].

Around 2700 BC, Mari became denser with administrative and religious buildings established in the centre. The city was equipped with a rainwater drainage system which allowed the water to flow down from the centre to the peripheries where it was absorbed by the subsoil network filled with gravel, fragments of pottery and ash [5].

Islamic Urbanization (c. 650 AD–c. 1800 AD)

Following the death of the Prophet Muhammad in 632 ADS, the Islam spread widely, and the longest period of urban growth was realized. The urban institutions of conquered cities underwent major changes. Mosques, which became colleges later, played an important part in developing the administrative system and the legal code as the principal institutions. The city' urban administrations consisted of: Calipha, Walis (governor), Al-Shurta (police), Al-Qadi (judge), Al-Muhtasib (supervisor of markets), and the heads of the city quarters.

Arab-Islamic cities have been hierarchically organized around the great mosque, while markets were interconnected by streets. Although many areas were transformed from self-sufficient communities to economies oriented to import from industrializing Western countries, the major cities were still characterized by the historic concept of market place. Arab cities experienced a long period of relative stagnation from the 18th century. However, the urban transformations of the cities started in the 20th century with the introduction of the European planning principles, which created a dichotomy between the historic and the modern morphology and institutions of the city.

Urbanization of Economic Colonial Era (c. 1800 AD–c. 1950 AD)

The economic colonialism introduced a new era of urban growth; new suburbs were added to the cities, and wide boulevards were introduced with new concept of spatial planning and building. Although water supply and sanitation had once been a pride of the Islamic settlements, with the economic growth, the health of the cities was improved vastly by the introduction of the modern water supply system. These were followed by electrification and telephones, which created problems in extending such services to the Islamic quarters. On the other hand, those European quarters were too expensive for the majority of residents including the poor.

Modern Urbanization and Informal Settlements Phenomenon (c. 1950 AD–2011AD)

The Arabic cities have experienced a high rate of population growth due to the introduction of modern medical services. The increased urban populations made the governments face the challenge of unemployment problems. More and more people flowed into big cities searching for job opportunities, contributing to expanding the city territories. In the 1950s, many cities prepared development plans, accommodating people migrating from rural to urban areas. Many of the migrants settled surrounding the cities, creating informal settlement phenomena in the 1960s.

The massive shift toward urbanization has led to a radical transformation in the methods of urban fabric production in Arab countries. Arab cities have undergone tremendous physical transformations under the combined influences of two main factors. First, the inadequacy of policies implemented by the responsible authorities has resulted in limited state intervention to meet urban social demand in terms of housing, services, and economic resources. This, in turn, has led to an explosion of informal housing and the informal economy. Second, private investment was introduced as a solution to address the challenges faced by growing and impoverished cities striving for economic development. Despite significant investments, the spread of exclusive private cities, tourist resorts, industrial zones, and technology villages has failed to address the most pressing issues facing the vast majority of urban residents, such as the lack of jobs, functional educational infrastructure, and healthcare infrastructure. At the national level, the concentration of investment in major cities and specific economic sectors (such as tourism) has further deepened regional development disparities.

Modern Urbanization After Arab Spring (c. 2011 AD–)

The Arab Spring revealed the depth of social inequalities that had developed across various Arab countries. It also reflected the failure of existing development models driven by economic elites closely connected to political leaders, as well as the disappointing outcomes of national development policies promoted by governments over the years and their inability to address the regional and urban dimensions of emerging political challenges. Therefore, it is essential to critically examine the legacy of urban and regional policies implemented by previous regimes.

Urban development, policies, and planning in the Arab world face numerous challenges in the post-Arab Spring era. It is essential to carefully examine the potential elements of change in urban policies and projects, institutional settings, and the governance of urban and regional issues. While authorities in some places have introduced initiatives to address social discontent, a comprehensive evaluation of the legacy of past policies remains largely absent.

The next chapter introduces four case studies and gives more details about the modern urbanization in the Arabic world.

Case Studies
Saudi Arabia

Over the last 50 years, the Arabian Gulf countries have experienced a construction boom that has been fuelled by increasing national revenues from exporting highly priced crude oil. This construction boom resulted in an unprecedented expansion in the size of cities. In response to this phenomenon, urban planning practice was geared towards physical aspects of fast urban growth and rapid changes in the built environment. Its emphasis was on land use, land subdivisions, building regulations and dealing with urban sprawl.

The urban planning in Saudi Arabia could be divided into two eras. The first era which extended from the 1930s to 1970s was in response to the urban planning problems, and to set measures for specific situations in certain urban centres which later became applicable throughout as circulars and decrees. The second era which started in 1970 and has continued through today; adapted a comprehensive regional planning approach. A series of plans were formulated such as five- year national plans and master development plans, in addition to establishing the regional planning institutions [6].

First Era: Town Planning with Physical Emphasis (1930s–1970s)
This period focused on controlling the urban development with providing various infrastructure and institutionalizing the provisions of the land use controls.

In 1937, the Statute of Makkah Municipality was issued to be the first formal step of the urban planning in Saudi Arabia. This order has added more duties to the municipalities including the supervision of the towns' organization, setting the urban systems, zoning regulations, and building code. In 1941, the Roads and Building Statute was issued to deal with planning procedures, buildings codes, and zoning planning.

Since the late of the 1930s until the late of the 1950s, the oil companies built camps near the oil fields, and these camps used the system of blocks and gridiron pattern to accommodate commercial, residential, industrial and social facilities. However, the growth in the old towns continued to be organic and followed the pattern of the cities with narrow and irregular streets.

Later in 1947, the Arabian American Oil Company (ARAMCO) produced two layout plans for both of Dammam and Al-Khobar relying on the gridiron streets pattern [7].

In 1953, the government moved ts headquarters to Riyadh. For that, the Ministry of Finance initiated the AL-MALAZ project to provide housing for government employees [8].

This type of a gridiron plan depends on establishing a hierarchy of streets starting from a 60 meters boulevard, followed by 30 meters thoroughfares, 20 meters main street, 15 and 10 meters secondary and access streets. The boulevards divide the project into two parts: rectangular blocks with 100x50 meters, and typical lot size with 25x25 meters. Despite the very low density, the area did not have semi-private spaces.

Later, and due to the growth of the urban area, the government felt the need to control the urbanization especially in Riyadh, the Capital of Saudi Arabia. In 1968, Doxiadis Associates undertook the task of planning the capital as a milestone in the 110 urban planning at that time. The master plan introduced the super grid at the city level plan and used grid pattern in its proposals for

action area studies. The plan institutionalized the grid as the desired pattern in other cities of the Gulf countries.

During this era, numbers of development plans had been achieved for cities and villages specifying urban structure with population projection, economy and social studies, and plans for five areas (Hael, Tabok, Mecca, Kasem and Baha), as well as the first strategy for the local development which identified the urban patterns and the hierarchy of the cities and villages in the Kingdom.

Second Era (1970s–present)

Several zoning plans had been made by the Ministry of Municipal and Rural Affairs for directing the urban growth for 100 cities over 20 years. These plans included two periods of developments:

1. **Until 1995:** controlling or guiding the development in those cities; and
2. **From 1995–2000:** the government's approvals for land owners to plan their lands, and the owners' responsibilities to establish the infrastructure designed by the government.

The urban expansion caused more need for public facilities. Thus, it was necessary to think about encouraging the private sector to participate in the public utility development. During 2000's, due to the urbanization, the immigration to the big cities accelerated further. Thus, the national urban strategy was necessary to set a national framework for the spatial development, including the three levels of development (national, regional and local), for supporting middle and small size cities by creating development axis.
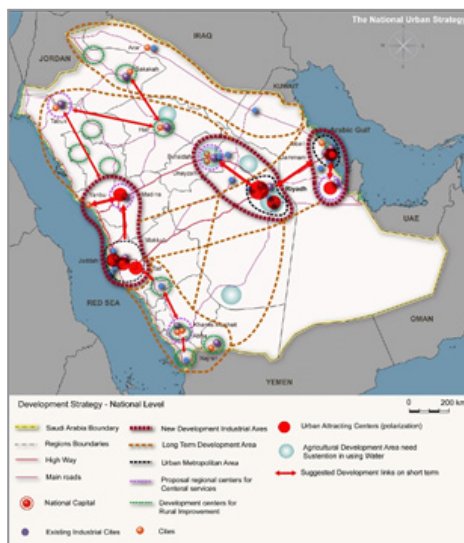

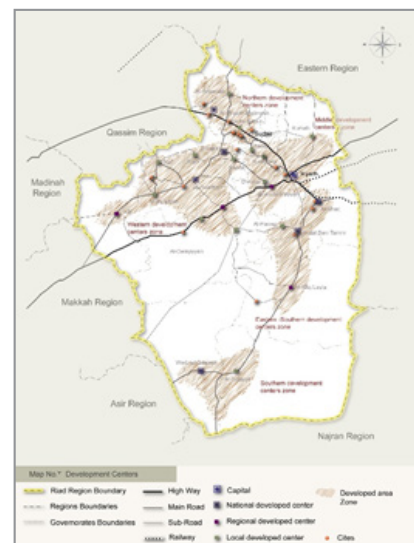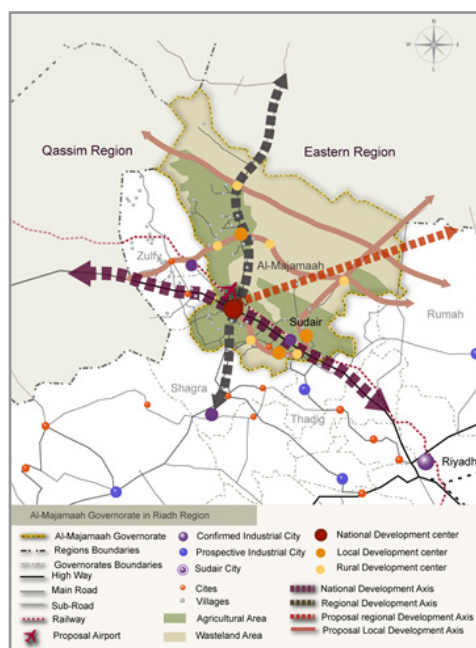**Figure 1:** Development Strategy of Saudi Arabia- National Level

**Figure 2:** Development Strategy of Saudi Arabia- Regional Level- Al Riyadh Region 2012

Development Strategy of Saudi Arabia- Local Leve

Since 2003, the Ministry of Municipal and Rural Affairs started to study detailed regional plans for the prefectures and detailed and semi regional plans for the provinces. These plans aim to achieve integrated links between the economy and the services, in addition to supporting the rural development to improve the living conditions of the rural residents to suppress their immigration to the cities.
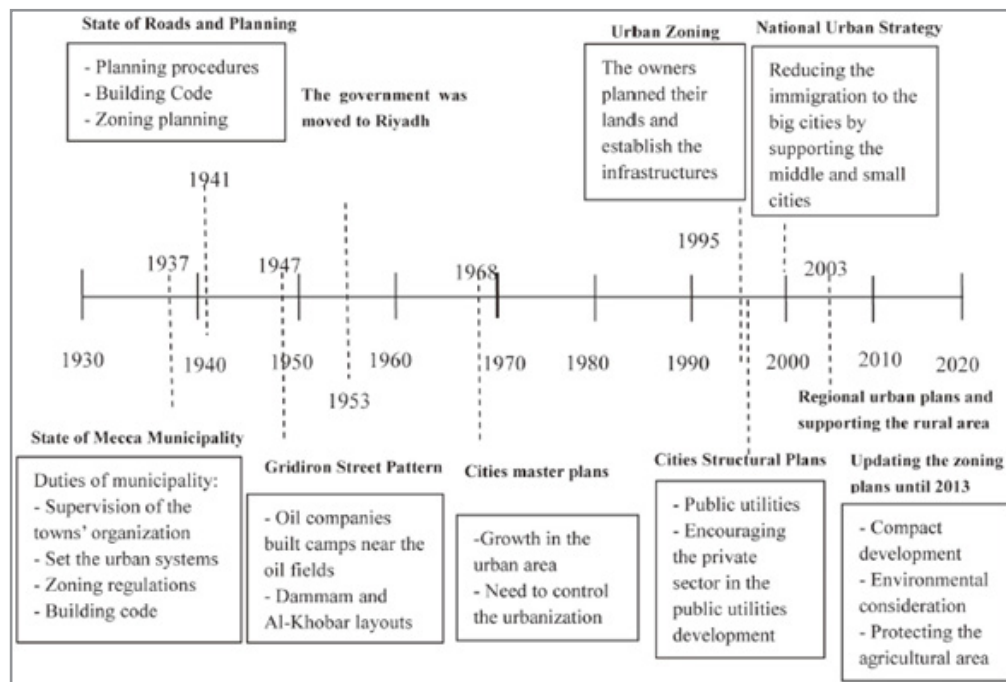
The Urban Development of Saudi Arabia

Egypt

Planning Strategies and Legal System

Due to the strategic location of Egypt in the old world, it has become the second most populous country in Africa. Due to its specific geographic condition, the urban development has taken place in the Nile valley and delta. Throughout the long history, urbanization has occurred, and numbers of cities and kingdoms have grown up along the river. Thus, population and economic activities have taken place only in this limited area.

Several strategies contributed to the urban development in Egypt such as the planning stage for the Greater Cairo Region in 1965–1973; the national perspective toward the urban process 1973–1982; the mechanism of urban planning in 1982–1990; the decentralization and the regional planning in 1990–1994; and international level and participation as well as orientation for the modern technology since1994 up to now.

For achieving the planning strategies, several laws and institutional entities have been set such as:
1. Law no. 70 in 1973 to set the General National Plan which identified the regional planning rule within the comprehensive national plan;
2. Establishing the Ministry of Planning in 1974 and setting the Law of Local Governments in 1975; in addition to the decision no. 495 in 1977 to establish the eight regions;
3. Law no. 43 in 1979 which gave the governments more accountability related to urban planning;
4. The Urban Planning Law no. 3 in 1982, the General Organization for Physical Planning (GOPP) of Ministry of Housing and Utilities to be responsible for formulating the general policy for planning, setting up plans and programs for this purpose at the national and regional levels, revising urban plans at the local level;
5. Law no. 145 in 1988 to modify the local government system to become local administration system.
6. These legal and institutional systems establish essential conditions for urban planning and development common to most other Arabic and Middle Eastern countries, including regional planning to set a framework for urban development, localization and decentralization of urban administration, and accountability of local governments for planned urban development.

The Five- Year Development Plans FYDP

There existed no clear efforts for urban and regional planning during the first FYDP 1982–1986 plan. Due to the war in 1973, the government concentrated on the rehabilitation process for the existing projects and their economic effects. The plan was according to sectors in line with the centralized administration, and projects were distributed according to the geographical locations.

The Second FYDP 1987–1991 worked on agricultural, industrial, touristic and services societies. Also, it concentrated on establishing infrastructure projects.

The Third FYDP 1992–1996 established the program of the industrial cities, while the Fourth FYDP 1997–2001 aimed to achieve the participatory approach, in addition to the program of the urgent plan in 2001 which concentrated on the villages 'development.

The Fifth FYDP 2002–2006 concentrated more on developing the villages, in addition to achieving the first stage of decentralization, and the Sixth FYDP 2007– 2012 aimed to increase the role of the local governments in the planning process [9].

Overview of Urban Development and Master Plans for Greater Cairo Region "GCR"

The built-up area of Cairo has fluctuated throughout the history; the city passed through periods of recession in the following centuries. The districts adjacent to the old city witnessed high rates of growth; new districts appeared to the north-east and the west. The introduction of a tramway in 1896 boosted the expansion of the city. After the 1952 revolution, massive housing projects were developed on the desert land east of the existing area. Also, the city expanded on the agricultural land to the south and the west.

Since the 1970s until 2000s, the government tried to develop master plans of Cairo. Starting with the master plan 1973, this defined the ring road as the outward boundary for urbanization of the city agglomeration and proposed new urban communities outside of the urban area. The second master plan was in 1982, which tried to organize the urban growth by physical planning in addition to the ring roads. In 1991, the master plan updated the land use [10].

The Main Current Challenge Facing GCR

The main challenge facing the region is the lack of stability and security which contributed to the deterioration of socio-economic life of residents. However, several previous factors might have contributed to the current situations. The deterioration of the liveability became a serious problem resulted from the lack of public spaces, air pollution, and inadequate housing policy. The lack of financial resources caused deterioration in the public facilities and services. Also, the government needs to reconsider the land use system and the urban management to be suitable for the low and middle income people. The informal settlements still face problems of lacking proper planning and public utilities, in addition to land tenure system [11].

Syria

Syria, the place of the first agricultural revelation which made the traveling persons settled residents and the land of the young people, has been inhabited since ancient times due to its strategic location along the ancient trade routes. It has some oldest continuously inhabited cities in the world with long urban history. After almost one thousand years as the center of Islamic empires (Umayyad), the Syrian cities have developed along main rivers. Between 1250 and 1516, Syria became a part of the Mamluk Sultanate of Egypt, and an important cultural exchange between Syria and Egypt took place during the Ayyubid period [12].

In 1864, the Ottoman Empire set a law which divided the area into two states: Damascus and Aleppo. In 1916, another division was made according to the Sykes-Picot agreement between Great Britain and France to give the country its boundary before 2011.
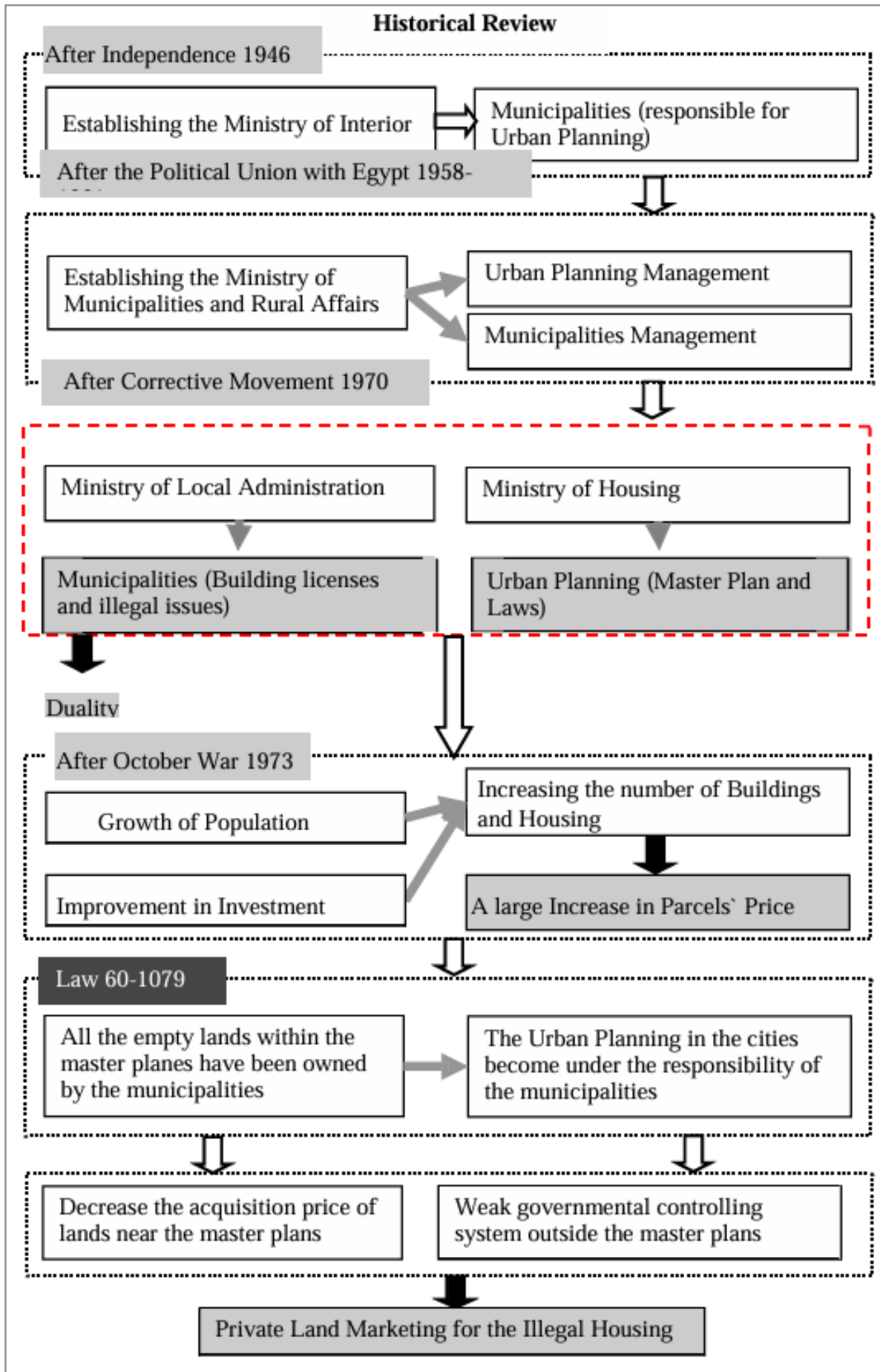
Informal Settlements in Syria-the Beginning

The occupations of 30 percent of illegal settlements in the Syrian cities before 2011 indicates the frailer of the urban system.

To understand the reasons of this problem, it is important to analyse the history of Syria, and understand the linkage between the policy, economy, legal system and the real estate market.

After the end of the French Mandate in 1946, the urban system in Syria has taken many forms. The ministry of the interior had the responsibility of the urban planning, and the municipalities were part of it. The experience of the Ministry of Municipalities and Rural Affairs was transformed from Egypt to Syria. In addition to others administrative units, this ministry included in its administration structure two separated management bodies. The first one is the topography and urban management directorate, while the second was municipality's administration which had the duties to manage the administration and financial issues.

After the Corrective Movement in 1970, Syrian government adapted many readjustment or correction works. One of the important steps was the decentralization in the government, and the Local Administration Law. The Ministry of local Administration was established, and the Ministry of Municipalities and Rural Affairs was replaced by the Ministry of Housing.

Historical Review

After Independence 1946

| Establishing the Ministry of Interior | → | Municipalities (responsible for Urban Planning) |

After the Political Union with Egypt 1958-

| Establishing the Ministry of Municipalities and Rural Affairs | → | Urban Planning Management |
| | → | Municipalities Management |

After Corrective Movement 1970

| Ministry of Local Administration | | Ministry of Housing |
| Municipalities (Building licenses and illegal issues) | | Urban Planning (Master Plan and Laws) |

Duality

After October War 1973

| Growth of Population | → | Increasing the number of Buildings and Housing |
| Improvement in Investment | | A large Increase in Parcels` Price |

Law 60-1079

| All the empty lands within the master planes have been owned by the municipalities | → | The Urban Planning in the cities become under the responsibility of the municipalities |

| Decrease the acquisition price of lands near the master plans | | Weak governmental controlling system outside the master plans |

| Private Land Marketing for the Illegal Housing |

The Reasons Behind the Informal Settlements in Syria

In 1970s the urban planning was one of the Ministry of Housing`s duties while the Ministry of Local Administration had the duties of the administration and financial issues related to the municipalities.

Dividing the duties of the Ministry of Municipalities and Rural Affairs between both of the other ministries created kind of duality in the urban planning work and that could be the beginning of the informal housing problem.

After the end of October war in 1973, there was an improvement in the economic situation and big investments t in the real estate market. As a result, sharp increasing in the land and housing prices. To solve this problem, the government issued the law no.60/1979.

This law had a bad effect on the urban planning in the Syrian cities. Although it was good from a theoretical view of point because the municipalities will do the master plan inside the administration boundaries, but the government lost the control over the land outside the master plan, and the people started to sell their land for the investors who participated in the sprawl of the buildings over the lands. On the other hand, the people were faster in their building activates than the governments in its preparing for the master plans.

Since 1980s, the Syrian government issued numbers of laws related the urban planning which seek to solve the problems of the illegal settlements, such as law no.5 in 1982, law no.26 in 2000. However, due to the bureaucratically working in the governmental bodies, most of those laws did not achieved its goals.

Due to the absence of regional planning in Syria before 2010, and due to the lack of comprehensive vision for development the main cities from the view point of urban planning level, the urbanization expanded to the rural area without considering the effects on the agricultural lands. On other hand, the concentration of government agencies in Damascus ,the capital of Syria , and large industries led to the creation of significant employment opportunities , and thus to the increasing of internal immigration to the Rural of Damascus as a place to build cheap houses near the industrial zones.

The previous reasons with many others encourage the farmers to sell their land to the investors who start establishing large scale housing projects on the agricultural lands.

Strategies and Projects for solving the Problem - 2000s: Case studies

JICA Project in Damascus Metropolitan Area

To solve the problems of the urbanization, and draw a good development strategy, a regional planning study was conducted from September 2006 through May 2008 (the first stage of the study) under the technical cooperation of JICA in response to request by the Syrian Government. The planning study was divided to three levels of development: Macro (national), Meso (regional) and Micro (urban).

Macro (on Syrian country level) is consisting of two frameworks, socio-economic and spatial frameworks. Socio-economic framework aims to achieve long-term development scenario through international cooperation in globalizing economy. In this level the study analysed the recent socio –economic performance and suggested some issues for the development of Syria such as continued deregulation and structural reform to pro mote private investment; modernization of agriculture responding to changing conditions in the urban and export markets; and utilization of domestic and international tourism for self-reliant economic development. The spatial framework is development strategy suggested establishing four components.

Meso (Damascus Metropolitan Area level) strategy includes a master plan for urban development of DAM for infrastructure and related institutional measures to support the Syrian development scenario. The second phase of this project continued until 2012 but stopped due to the Syrian crisis.

Between many suggested concepts, the master plan suggested special programs for living environment improvement initiative such as controlled urban and agricultural development program. This program contains five projects including productive urban greenery development and cooperative agricultural development with other projects [13].
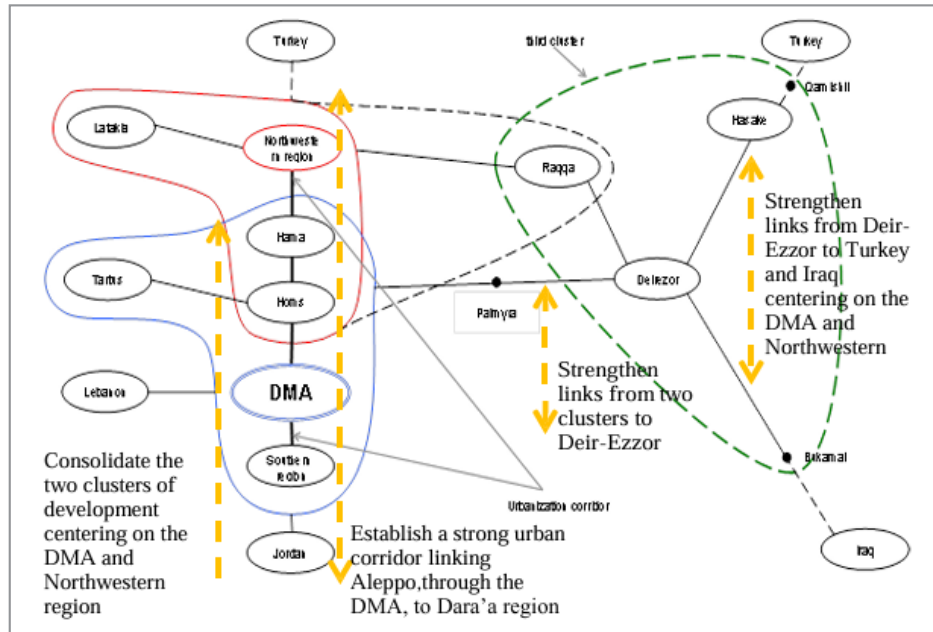
Strategy for Syria's Spatial Development. Source: Japanese Expert Team 2008 (modified by the author)

**JICA Proposal in 2007- Informal areas in Damascus City (Al-kabon district)**

By adapting the participatory approach, The Japanese International Agency conducted many workshops with the residents to puts suitable master plan for the area. During those workshops, the study teams identified the problems of the area such as, transportation Problems, lack of infrastructure networks, few numbers of schools, insufficient waste management system [14].

To solve the problem, JICA aimed to achieve the following points:

1. New master plan according to the law no.46 in 2004;
2. Improve the infrastructure system;
3. New institutional framework according to the readjustment system; and
4. Adapt the liner system for the land use plan.

The National Map for the Informal Settlements 2013

Since 2012, the Regional Planning Commission in Syria started its project to find solutions for the informal settlements in all the county, starting the first stage by establishing data base and studying situation in all the governments.
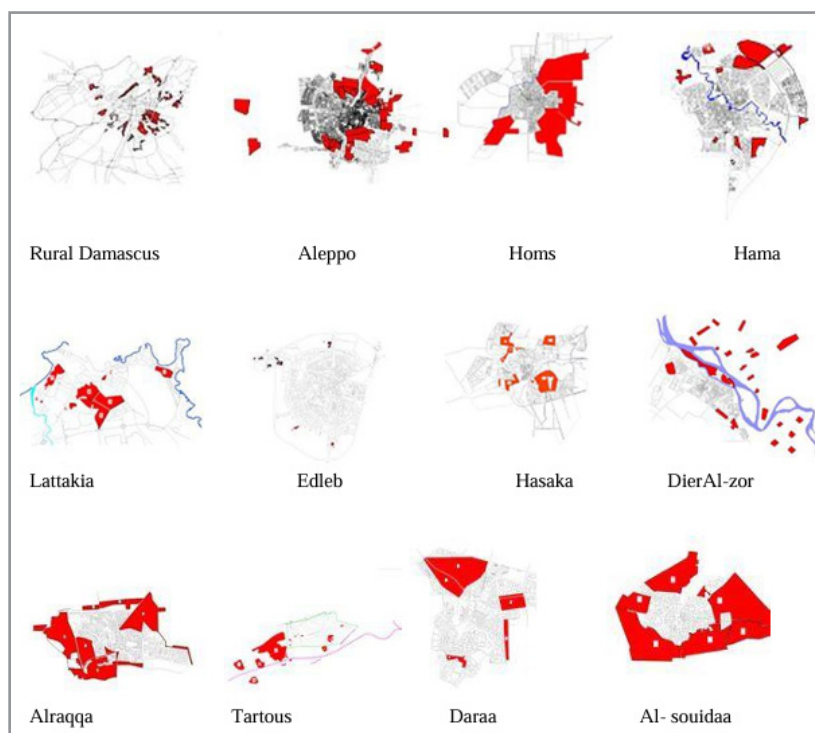
The Informal Settlements in Syrian Governments: Source: Regional Planning Commission- Syria

Due to the armed conflicts in Syria, majority of the informal settlements had been destroyed. Huge number of the residents already based away, and the other became refugees inside or outside Syria. The government started in 2013 next stage of the national map by analysing the satellite maps to know the size of the destroyed area and start new strategy.

Rural Damascus Before The Crisis 2011

Rural Damascus during the Crisis 2013

Source: The author during working with the Regional Planning Commission in Syria 2013

After more than 14 years huge damage happened in Syrian Governments especially in the informal areas. Although it is not clear how the reconstruction projects will be conduct, it is necessary to reconsider about the informal settlements and give those area big efforts.

After the end of the war, an important effort has to be made to build a confidence again between the people and the government. On other hand, a lot of researches have to be conduct in many areas to analyse the size of the deterioration after the conflict and build suitable strategy for development. Using the participatory approach in the institutional organization will help in understanding the necessity of working with the local people. The international cooperation agencies will play a major role in guiding the local government in the reconstruction plans and improving the living conditions of the residents.

Syria has been under the pressure of the civil war. There have been devastating losses of human lives and livelihoods in Syria. The impact on the economy has been severe, and infrastructure has been destroyed. As a consequence, Syria has witnessed multiple displacements not only of people as refugees and internally displaced people exceeding 50% of the population, but also the socio-cultural heritage and fabric as well as urban institutions.

Destruction of mosques, for instance, means a destruction of communities developed around them through the millennia history together with the livelihood of community members in relation to the neighbouring regions and countries as trade partners. Destruction of cities means not just loss of many buildings but more fundamentally loss of urban institutions.

"Reconstruction of Syria" with its cities, therefore, should take serious concerns on issues at the level of institutions, communities and the regional and international relationships.

What reconstruction should look like, who will participate, and how the relation between the international donors and the domestic will be. Also, the relation between the state and the citizen is very important point need to be considered in post conflict environment. The reconstruction approaches, however, might have several problems such as.

Adopting a structural approach to reconstruction of physical fabrics and related economic activities without the historical and socio-cultural concerns, there exist no guarantees that people's rights and their access to resources including real estate are properly respected as the base for them to reconstruct their communities and re-establish the urban institutions. After more than fourteen years of conflict, the landscape and demography have been changed. Thus, the new reconstruction plans will have to provide the institutions with development mechanisms and adapt resilient programs to ensure people's rights and their access to resources; the new services and infrastructure will have to enhance the communities in addition to the economic and social recovery.

Also, the cultural heritage must be recognized as a crucial element, not be considered a luxury to be attended later.

A comprehensive analysis of what worked during the history of the urban development in the Arabic countries and what did not work is required in the post conflict period.

Mauritania

The world recently entered an unprecedented period of urbanization due to the formation of dozens of super and hyper-cities [15].

By 2050 city-dwellers are expected to account for two-thirds of the global population, or an estimated 6.4 billion people [16].

While a number of the world's largest cities still reside in North America and Western Europe, most future population growth will occur in sprawling cities and slums of developing countries in Africa and Asia. Urbanization brings with it possibilities of improved access to jobs, goods and services for poor people in developing countries. However, there are tremendous challenges and threats, with major implications for the humanitarian and development sector. As the world continues to urbanize, natural disasters, economic shocks, climate changes and other factors will increasingly affect populations in cities, potentially making it more fragile. Sitting on the frontline of global emergencies, cities are actively searching for ways to cope, adapt, and bounce back.

Based on the results of the Fifth General Census of Population and Housing, conducted by the National Agency for Statistics and Demographic and Economic Analysis from December 25, 2023, to January 8, 2024, the population residing in Mauritania was estimated at 4,927,532. This figure includes all inhabitants of Mauritania, including citizens, foreigners, and refugees. The average annual growth rate between the 2000 and 2013 censuses was approximately 2.77%, while between 2013 and 2023, it increased to about 3.1%, indicating a steady rise in settlement rates.

Mauritania currently comprises 8,438 residential settlements, according to the National Agency for Statistics. The majority of these settlements are small in size, with those having fewer than 50 inhabitants accounting for 25% of the total.

Between 1969 and 1975, post-independence Mauritania experienced a significant wave of internal migration from rural areas to cities due to severe drought, which caused extensive damage to the agricultural and pastoral economy. This led to an increase in the population of urban centres, particularly in Nouakchott.

On the other hand, Mauritania has become a preferred destination for neighbouring African countries, especially for labour migrants, and a transit point for citizens of other African nations due to its Atlantic coastline.

The influx of migrants from various nationalities has accelerated, reaching 136,000 in 2022. This has contributed to increased fragility in Mauritania's security, social, and economic conditions.

Nouakchott

Nouakchott is one of the largest cities in the Sahara. Located on the Atlantic coast and it lies on the west coast of Africa. It is the capital and largest city of Mauritania which serves as the administrative and economic centre. Since the establishment in 1960 this city has known an exponential growth. According to the statistics by the National Statistical Office (OSN) of Mauritania the population has grown from around 2,000 in 1957 to 558,195 in 2000. The population of Nouakchott currently stands at 1,446,761 inhabitants, meaning that nearly one-third of Mauritania's population (29.4%) resides in the capital, compared to approximately 27% according to the 2013 census.

This rapid growth of the city was driven not only by the "pull factors" such as commercial and economic centre of the country, but also by some "push factors" such as serious poverty and scarcity of foods in the inland and rural areas caused by droughts and sandstorms took place in 1970's. Ever since, Nouakchott has spread in an uncontrolled, anarchic way until its star-formation covers about 30km in diameter.

The site of the city presents a number of risks, among which: the shifting dunes surrounding the city, the fragile western costal cordon in the midst of salt-water wells. This city thus threatened by sand, salt, and water, all at once. Water is the foremost threat: recurring inundation and freshwater droughts are two major issues.

In 2020 the Mauritanian government issued a new master plan for Nouakchott city made by JICA expert team. This master plan come up with three basic orientations in order to improve the city. This chapter aims to understand how these orientations will participate in minimizing the fragility of Nouakchott.

The Strategic Location of Nouakchott within the Regional Context

Nouakchott is relatively isolated compared to population centres in North and West Africa. It is also located outside the main cross-border trade corridors. However, despite this geographic isolation, Mauritania can be considered a transit country, which grants Nouakchott a relative advantage in the region with immense potential as a platform for trade and integration.

As a strategic location within Mauritania's urban hierarchy, Nouakchott holds a central geographic position in the country but remains distant from any major economic centre. Saint-Louis in Senegal is located 250 km to the south, while Nouadhibou, Mauritania's second-largest city, lies 300 km to the north. To support Nouakchott's development, strengthening the country's entire urban hierarchy by relying on key development poles such as Nouadhibou, Zouerate, Atar, Rosso (as a connection with Senegal), Kiffa, Kéyéhi, and Néma is a crucial task and a challenge for the country's future [17].

Natural Environmental Risks

Several reports including the reports done by GIZ and JICA indicate that Nouakchott is a fragile city.

Nouakchott is a low-altitude coastal city and situated in the desert climate. A sandy coastal line runs north to south and dunes with a height of 3 to 5 m are developed. In recent years, the dunes suffered loss due to illegal collection.

There are no rivers in Nouakchott. Groundwater is not used for drinking nor agricultural purposes. Dut to limitation of the rainwater from the inner desert land, the sea water enters to the land area for about 50 km from the coastal line. The salt concentration of the groundwater in the Nouakchott is very high, leading to corrosion of the building foundation.
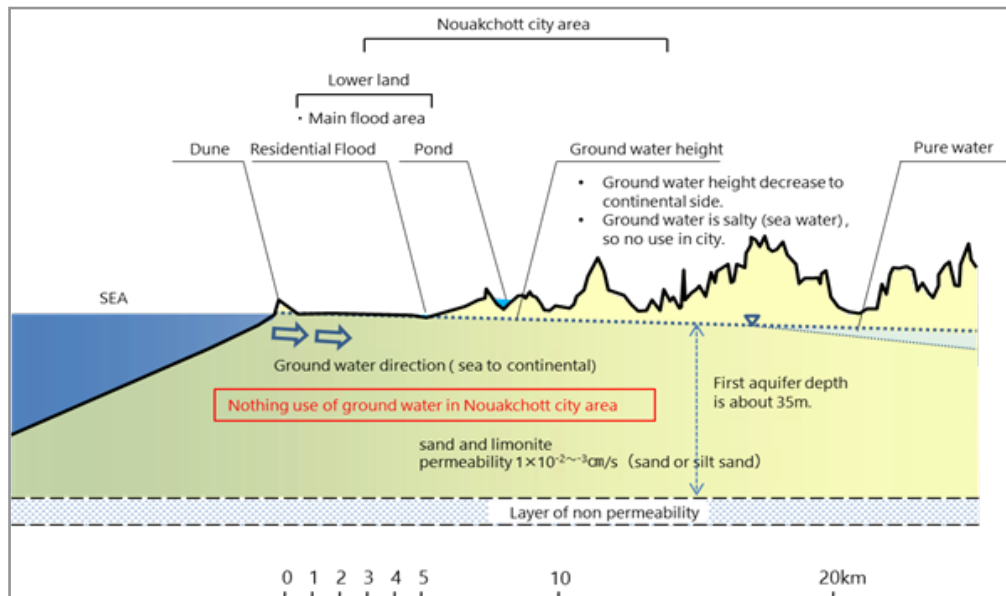
Hydrological Phenomena of Nouakchott: Source SDAU 2018 - JICA

Many areas are below sea level in Nouakchott. These are places where flood damages are likely to occur. Since Nouakchott is a part of the desert area, desertification and movement of sand dunes are one of the major concerns caused by the natural condition [18].
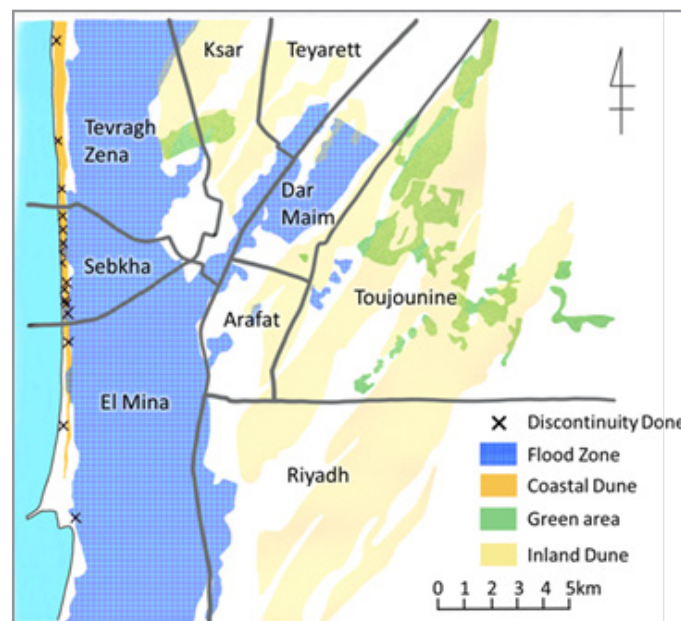
Map of Natural Disaster Risks in Nouakchott : Source : Vers une ECO ZAC pour la ville de Nouakchott

Global climate change is expected to further increase the threat of natural disasters. Future urban planning needs to take mitigation and adaptation measures against these natural disasters. High wave inundation occurs in coastal low elevation areas. Coastal sand dunes have the role of breakwater. Inland water damage occurs during rainy season due to insufficient maintenance of urban drainage. For this reason, this area is not suitable as a residential area improvement.

According to GIZ (2015), sea level rise in Nouakchott is expected to increase from 0.2 to 1.1m in the next 100 years. Floods and inland water damages are also expected to increase. In addition, GIZ reports that the change of the coastline is taking place due to erosion of sand beaches as well as recession. About 3 to 4 m per year of recession was observed from 2004 to 2014. With increasing rise of the sea level, further coastline erosion and flood damages are expected.

The coastal development has also caused change in the coastline. It has been observed that sediment accumulates on the northern side of the industrial seaport and a remarkable recession of the coastline on the south side is taking place.

Decline of Shoreline by Rising of Sea Level
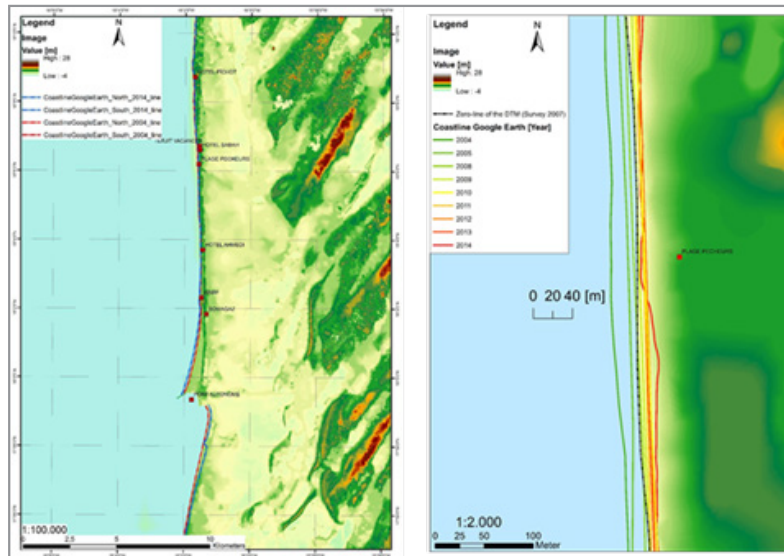
Source : ACCVC, Changement climatique, érosion côtière et risques d'inondations à Nouakchott, Mauritanie (2015), GIZ

Inland water damage occurs when the daily precipitation amount is 30 mm or more, and roads and residential areas are flooded. In addition, due to lack of functional urban drainage system, contaminated water remains exposed on the ground surface, which is a cause of malodour and deteriorating sanitary conditions. The rainwater gathers further in low altitude areas and become residual inner water ponds. Although it is necessary to develop municipal drainage facilities in order to resolve the internal water damage, it is a particularly important task because it is closely related to sanitation problems. Furthermore, since water is valuable resource here, reuse to agriculture etc, is desired.

Restricted Lands for Urban Use (non aedificanti areas)
In 2018 SDAU identified 4 type of restricted lands for urban use in Nouakchott:
1. **Two levels of risk of flooding (Flood-prone areas):** the highest in the coastal salty depression; and an average risk in low lands in the interior of the city.
2. **Buffer zone extends from the coastal dune to the hinterland (Coastal dune):** a sandy coastal line runs north to south and dunes with a height of 3 to 5 m. The dunes suffered loss due to illegal collection. Facilities such as fish market, industrial port, hotel and factory are seen in the coastal area
3. **Industrial hazard areas:** a 500-meters non-aedificanti buffer around the industrial zone.
4. **Green belt:** The green belt has a significant role in struggling against sand encroachment in the city. a major symbolic role in preventing urban development to spread outside in an anarchic way

Restricted Lands for Urban Use (non aedificanti areas): Source SDAU 2018 – JICA
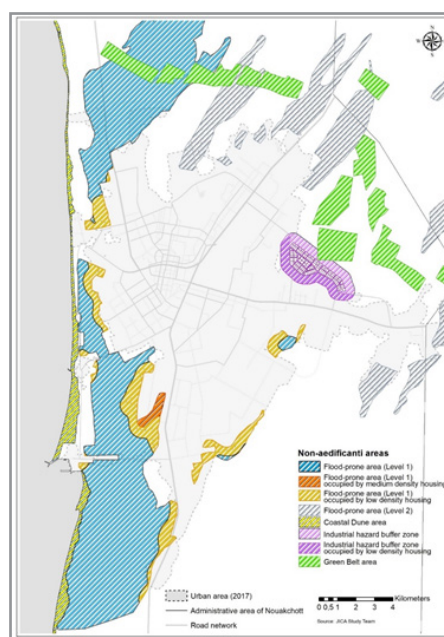
Nouakchott City Urban Master Plan SDAU 2018-2040: Strategic Orientations

Strategic orientations and planning principles have been developed to bridge the gap between the current situation's diagnosis and the proposed spatial plan. These orientations are formulated in response to the priority challenges of sustainable urban planning.

1. Strategic Orientation 1: Limiting Urban Sprawl and Intensifying Development in a New Polycentric, Articulated, and Inclusive Model

To reverse the trend of urban sprawl and the de-densification of the existing city while rebalancing the metropolis, SDAU aims to intensify the urban fabric, particularly by completely rethinking development in alignment with public transportation, notably through the establishment of secondary hubs. A qualitative and quantitative supply of housing and services in the city center and new secondary centers will enhance their attractiveness.

The proposed intensification model focuses densification efforts on key urban nodes (primary and secondary hubs, public transport corridors) while preserving the character and quality of life in Nouakchott's low-density residential areas.

2. Strategic Orientation 2: Establishing a New Relationship with Nature and Natural Elements (Water and Sand) While Ensuring Security

Nouakchott was built on an extremely vulnerable site. To ensure the city's harmonious future development, it is essential to fundamentally reconsider its relationship with nature and the elements that have historically shaped its identity—water and sand. SDAU proposes moving beyond merely enduring the effects of the natural environment to leveraging them as assets. Furthermore, since citizens expressed a strong demand for more green spaces through household surveys and public consultations, and urban professionals also recommended it during the seminar, SDAU advocates for greening initiatives and the opening of public spaces as a major strategy. By 2040, Nouakchott's natural landscape will be structured across three scales:

• A protective outer green belt,
• An internal green and blue network, and
• Numerous small parks integrated into the urban fabric.

Strategic Orientation 3: Enhancing Economic Influence and Boosting Employment

To anticipate and support economic development in a coherent and complementary territorial approach, SDAU suggests focusing on economic planning decisions at all levels.

This strategy will rely on new structuring factors, such as the ring road and the Bus Rapid Transit (BRT) system, while ensuring that these developments do not disrupt employment growth or fail to meet local needs within neighborhoods.

Strategic Orientation 1   Strategic Orientation 2   Strategic Orientation 3

Conclusion

Arab urban societies suffer from severe functional imbalances due to decades of political neglect. Governance and democracy issues are becoming increasingly important in the urban question, and urbanization is expected to bring cities back to the political agenda in the post-Arab Spring era.

The reordering of power hierarchies, shifts in decision-makers' mindsets, and the transformation of administrative and political bodies to adopt new solutions are all long-term processes. There is a pressing need to rethink urban studies on Arab cities more profoundly.

Additionally, urban studies in the Arab world should be framed within a more comprehensive analytical and conceptual framework while developing more comparative approaches to examine the region and its cities. The urban question must become a tool for political empowerment.

Despite the environmental challenges faced by Mauritania it is expected to leverage its political stability for the rapid development of its cities by drawing lessons from the experiences of neighbouring Arab countries. It is considered one of the most politically stable Arab countries. As a result, it has achieved sev-

eral milestones that could contribute to its urban development in the near future.

One of the most significant steps includes legal and urban reforms, such as the development of the Urban Code and the Real Estate Development Law, in addition to the revision of decree no 020- 077 related to the typology and sizes of human settlements and the general rules of sedentarization and setting the Criteria and Standards for the distribution of socio-collective infrastructures

Additionally, the relevant sectors are currently conducting several studies, such as the Urban Housing Strategy and the National Land Development Strategy, both of which will be transformed into development programs aimed at improving the urbanity across Mauritania at the local and national level.

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