7. CASE STUDY OF LAGOS

7.1. Geography and climate

Lagos is the biggest and most important city in the Federation of Nigeria. The country, which is located in the coast of West Africa, consists of 30 states. Nigeria shares borders with Benin, Cameroon and Niger. Lagos is the main city of Lagos State, which is situated in the southwestern coast of Nigeria. The Metropolitan area of Lagos takes up to 37 per cent of the land area of Lagos State and houses about 90 per cents of its population (Unicef 1995, Aina 1990a).

The area of Lagos constitutes of two major regions: the Island, which is the original city and the Mainland, which is made up by rapidly growing settlements. The climate in Lagos is tropical, hot and wet. The environment is characteristic as coastal with wetlands, sandy barrier islands, beaches, low-lying tidal flats and estuaries. The average temperature in Lagos is 27 °C and the annual average rainfall 1532 mm (Aina 1994, Peil 1991).


7.2. Economy

Lagos was until 1991 the capital of Nigeria. Nowadays Abuja is country’s administrative and political capital but Lagos is still Nigeria’s industrial, commercial and financial center. Lagos is estimated to count for over 60 per cent of nation’s industrial and commercial establishment, 90 per cent of foreign trade and controlling about 80 per cent of the total value of the imports of the country. It benefits Nigeria’s oil, natural gas, coal, fuel wood and water. Also about 70 per cent of the national industrial investment are in the Metropolitan Lagos (Aina 1994, UN 1995, McNulty 1988).
7.3. Population

7.3.1. Urbanization

The population in Lagos started to grow since 1970 due to migration from rural areas and high fertility rate. Even the fertility rate is lower in Lagos than in the countryside, in the future the city population tends to grow more than the population in rural areas. Also migration to the city does not seem to decrease, rather increase. The population growth in the last ten years was highest than ever and the growth in the future is estimated to be even higher.

Lagos is the biggest city in West Africa. It was the first city in the continent to become one of the world’s ten largest cities. At the moment the population is about 14 million but the city is projected to be one of the world’s five biggest cities already by 2005. Population in the city is expected to grow at the annual rate of 4 per cent for the next 20 years, reaching 24 million people by 2015. Then it is expected to rank third among the world’s cities. The population density was 20 000 persons per km² already in 1988, but it has increased a lot from this in the past 13 years (Bilsborrow 1998, Peil 1991).

7.3.2. Migration

The total population growth rate is much higher in Lagos than the national average. Between 1953 and 1980 the annual growth rate was 9.4 per cent which from, net migration rate was 5.4 per cent. Also at the moment migration takes the biggest part of the population growth in the city and it is estimated to even increase from the past (Bilsborrow 1998b, McNulty 1988).

Because Lagos is smallest state in Nigeria, the government has tried to change the capital to central Nigeria, Abuja. This is one way to control the enormous migration and urbanization in Lagos. Although, the population in Lagos is growing all the time and the pull factors of the city are high, even higher than Abuja’s (UN 1995).
7.3.2.1. Push and pull factors

Lagos is a unique national center for trade and commerce in Nigeria so the pull factors of the city are evident. The main motivation for migration to Lagos is economic. Income levels are higher in Metropolitan Lagos than in other regions of Nigeria. Many people come to Lagos in search for a job and most of these migrants tend to work within the informal sector (Kuvaja 2001, McNulty 1988).

The main push factors to Lagos are poverty, too small arable land areas per persons, big family sizes and worse soil quality. Due to these factors many rural people do not have other choice than to move to the city and try their luck. Fortunately the nepotism is so strong that immigrants are often welcomed to live in the houses of their relatives and often the first job is household work in their relatives' houses. (Rinne 2001)

7.4. Water resources

7.4.1. Water supply

Water supply to Lagos comes from surface and groundwater sources. Water losses caused by leaking and illegal use are considerable and due to this the water supply of the city is inadequate. It is estimated that only about 85 per cent of households in Lagos have access to safe water. In Lagos 12 percent of population use piped water, 33 per cent public taps, 35 per cent hand pumps, 11 percent ponds, 2 per cent wells, and 3 percent other sources. The distance to water source in Lagos is for 11 per cent of the population more than one kilometer and for 89 per cent less than one kilometer. In Lagos male, female and children participate in fetching of the water (Unicef 1995, Aina 1994, Uduku 1994).

7.4.2. Demand of water

The demand of water in Lagos is much bigger than the supply. Many people use too small amount of water because they either do not have access to water or they have to carry it from far away. In the city only 216,000 cubic meters of treated water is available. The reliability and quality of water supply is often not adequate and sometimes inhabitants have to survive without water for couple of days. In this case residents have only two opportunities, buy water from vendors with very high price or steel it from neighbors well. Often the quality of water bought by vendors is insufficient and people get illnesses, like diarrhea from it. The price of the bought water from vendors in Lagos is normally 4 to 10 times higher than the water got from piped water supplies (Harday et.al.2001, Rinne 2001).

7.4.3. Wastewater treatment and sanitation

Wastewater treatment in Lagos is almost non-existing; only few per cents of it is treated. Also the sewage systems of the city are poor, the only conventional sewerage system is in the metropolitan area of Lagos, Victoria Island, which is the first commercial area in the city. Due to an inadequate sewerage, much of the excreta and sullage is disposed of by the drainage of rainwater through open ditches. During the dry season, when the flushing action of rainfall is not existing, drainage
channels become blocked with solids, creating stagnant pond of contaminated water. Some people even use this water for household purposes (UN 1995).

About 94 percent of the population in Lagos have access to sanitary toilets, 56 percent of population use sewage toilets, 33 percent of pit latrines and 4 septic tanks. The rest of the population uses pail, bush, river/stream or other kind of unconventional toilets. Likewise most of these sanitary toilets are water closets only by name. It is quite normal than water doesn’t run in these toilets or water is wastewater from other households (FOS 1997, Aina 1994, Unicef 1995).

7.4.3.1 Water quality

Sources of pollution of the Lagos estuary includes breweries, food processing industries, chemical industries, solid wastes from houses, sawmills and domestic sewage. The estuary is a sink for disposal of liquid, solid and gaseous wastes for the entire city. Sawdust from the sawmills is very harmful because it causes silting, eutrophication, and harm the lives of fishes by clogging their gills.

Contamination of groundwater in Lagos is sometimes evident due to flooding which carries sewage to the wells. Likewise seepage from industrial storage systems is normal. Contamination of pipe water sources in Lagos is also common. This is either result of inadequate functioning of treatment plants or lack of treatment. Contamination can also occur due to water tankers, through pipe or storage systems (Aina 1994).

In piped water *Escherishia coli, Salmonella, Streptococcus and Bacillus* are normal contaminants. This indicates to faecal pollution of human and animal origin. This impurity leads to diarrhea, guinea worm, cholera and typhoid. Malaria, respiratory illnesses and measles are also normal diseases in the area. In general Lagosian people do not boil the water they drink, they either buy pure water from vendors or clear the water with aluminum. The visible clarity is more important to Lagosian than microbiological clearance. Filters are not often used (Rinne 2001, Aina 1994).

7.4.4 Flooding

Flooding is a big problem in Lagos, even during the mild rainfalls streets are flooded and many times water rises to house levels. Intensity of rainfall in short period, in rainy season, leads to extremely high runoffs and floods. Lagos is partly extremely flat which makes the situation even worse and prevents the water discharge to the sea. Due to poor soil infiltration only a small proportion of rainwater seeps into the ground (Aina 1994).

Due to bad infrastructure planning, buildings often block natural watercourses and canals are too narrow to convey rainwater away from the area. Roads are often unpaved and the hard rain makes them muddy and bumpy. Inhabitants of the city wish to have expanded canals, paved roads and better drainage to prevent flooding of homes and other problems during the rains (Nwangwu 1998, Rinne 2001).
7.5. Environment

Lagos has often been referred to as the dirtiest, most disorganized, and the most unsafe mega-city in the world. Lagos is seen as an intolerable place, which offers minimum resources for a healthy, safe, and productive life. The problems in the city are similar to all the other mega-cities; traffic jams make transportation inefficient, waste management is malfunctioning leaving tons of waste on the streets, water resources are overused or polluted and inadequate housing, as well as slums, are becoming reality for an increasing number of inhabitants. It has been estimated that the infrastructure of Lagos is able to fulfill the needs of 300,000 people, although the population nowadays is 14 million. Due to this it is clear that the infrastructure is not sufficient. (Kuvaja 2001).

![Tinubu square in Lagos](http://www.motherlandnigeria.com/webcards.html#pick_up)

7.5.1. Solid wastes

About 66 per cent of the solid wastes in Lagos area are disposed. Waste is either disposed through private or community efforts or left at various illegal dumps. The disposal is hardly ever done properly; garbage is being dumped in valleys or swamps or untreated industrial waste is dumped to public drains or surface water bodies. The solid waste problem is huge in Lagos with mountains of garbage and hardly bearable stench. The estimated amount of generated solid wastes is almost million tons per year (Aina 1994, Ogu 2000).

7.5.2. Housing

The lack of housing facilities in Lagos is enormous. Even the middle-income people have to live in very crowded accommodations. It is normal that the size of the family is five or more persons and they all live together in the small room, average on 4.30 m². Most of the houses are in poor conditions and the facilities in them are shared. The poor condition often includes lack of basic services, serious flooding and bad house conditions. Most of the people live in the compounds, face-to-face-facilities. Even in the better houses water often has to be carried from the backyard. Sewage systems are non-existing, only in some high-income areas sewage is served (Aina 1990).
7.5.2.1. Shomulu local government area in Lagos

Shomulu is one of the most densely populated areas in the central Lagos consisting of more than one million inhabitants. The area represents common neighborhood in Lagos, about 45 per cent of Lagosians live in this kind of accommodations. Majority of the houses are low- and middle income houses, and services such as health care, schools, roads, water systems, electricity, and communal waste management are somehow provided. However these services are not reliable and people have to often rely on self-help. Already in 1970’s the majority of Lagosian families lived in one-room dwellings. At that time the average family size was almost five persons. Due to population growth in the city the occupation of the rooms is estimated to be nowadays even higher (LHO 1996).

Slum or not?
Commonly the low-income houses are referred to as slums. In Lagos the situation is other. The common type of housing (face-me-face-you) cannot be considered shelf-help, spontaneous, or illegal. The houses are well constructed, and the city plans their communal services, either both are not properly done. The lack of housing in the city is high and different social groups have to live in this kind of accommodations even they would have more money. The rent is paid regularly and houses are registered and legal. Even the way of living in Lagosian “slums” is not similar to other study regions slums, they face many of the same problems; lack of adequate sanitation and water supply, malfunctioning waste management system, bad roads and limited access to municipal electricity sources (Nwangwu 1998).

Problems in Shomulu
Shomulu is placed to the unplanned area and the land use is uncontrolled. There is no planned trees or green places but all the places are full of shops, houses or garbage. The area is often flooded and it is overcrowded and dirty. There is no sewer system or drainage. Roads are unpaved and bad and waste disposal is uncontrolled. Buildings are in bad condition, built with poor building materials and there is no air space between them (Aina 1994).

Water distribution
Most of the compound has one tap, which is located to the backyard of the compound. All the members use tap water to household purposes, drinking, cooking and washing. This tap water is also used for flushing the toilet and bathing. The water is carried in containers to the toilet and bathroom. Because the tap water is not working continuously many compounds have their own well from where the water is fetched when the tap is out of order. In some compounds the tap water is not drinkable and they have to fetch water from taps in the other compounds. Responsibility of fetching the water falls often on women (Kuvaja 2001).

Sanitation
Each compound member is responsible for sanitation maintenance. Cleaning is considered to be task of women, but each inhabitant is required to clean toilets and bathrooms after use. The use of facilities is organized by timetable, where the priviledge is for those who work outside the compound (Kuvaja 2001).
Waste management

The compound members carry the wastes to the waste containers, which are kept in the backyard. Then household members or “barrow-men” empty the household containers into the communal containers. After this it is government responsibility to empty these containers. Many times communal containers are not taken care off and people have to transport the wastes straight to the dumping sites. Often “barrow-men” are paid to collect the wastes (Kuvaja 2001).

7.5.3. Traffic

The traffic congestion is a fact of everyday life also in Lagos, where it takes almost three hours to travel a mere 10 to 20 kilometers. The motor vehicle fleet is very old and most of the cars are in bad shape. Even public transportation is quite comprehensive it is very overcrowded. Buses and taxes are both in poor condition and they pollute a lot. Traffic congestion is common in Lagos and because of high crime rate, robberies may occur during the peak period. The quality of air is bad due to traffic and industries like in any other mega-city (UN 1995, Rinne 2001).
7.5.4. Crime

Crime is common in Lagos, especially robberies. Due to violence in the area, robberies often end up to a murder. Police cannot do anything for the mushrooming criminality, so people have taken law in to their own hands and they do punish the criminals straight away. This has leaded to murders because robbers do not have anything to lose even they kill people or not. Robberies are normal in traffic and even inside houses (Rinne 2001).
7.6. Summary of the case studies

All the case study cities Bangkok, Mexico City and Lagos are the main centers for industrialization, business and foreign trade in their countries. The cities have massive populations and they are so called mega-cities. Mexico City has the biggest population of 18 million. Even the populations of Bangkok and Lagos are high they are four million lower than the population of Mexico City. The population density is extremely high in Lagos, 20,000 persons per km² and due to this housing conditions in the city are very poor. The population density in Lagos is many times the density in other cities. In Bangkok the population density is lowest 3,700 persons per km² and in Mexico City more than 6,600 persons per km².

Over-population in the cities is mostly caused by uncontrolled migration from rural regions. Due to strong urban pull and rural push people continue to move to the cities. Push factors are deforestation, loss of biological diversity, soil erosion, flooding, constructions, diminution of arable land per farmer, water shortages and other natural resource related problems. The main pull factor is the attraction of the mega-cities. As big commercial centers they attract people in the search of better live, better services and health care. They seem very exquisite and full of opportunities for poor people.

The cities are all located in the tropical zone but their average annual rainfall varies from highest 1532 mm in Lagos to lowest 850 mm in Mexico City. In all the cities domestic and industrial water supplies are provided by combination of groundwater and surface water. The water consumption in Mexico City is highest of the study cities, 2.4 billion m³. Due to this high demand and location of the city, water supply of Mexico City is not adequate and water has to be pumped from other areas. In Bangkok the demand of water is 2.1 billion cubic meters and it is also highly dependent of groundwater. In Lagos the water demand is only 79 million m³.

The piped water service is relatively well organized in the case study cities. The service is highest in Mexico City, where about 94 per cent of the residents in metropolitan area enjoy piped water. In Bangkok the service is lowest, about 66 per cent of the population has piped water connection or standpipes. In Lagos 85 per cent of households have access to safe water. Even though the percentages are relatively high there are differences in reliability of the service, quality of water and type of the service.

Wastewater treatment is very poor in all the cities, at highest 10 per cent of the effluents are treated. This has resulted to the decreased quality of the surface and groundwater. The situation is worst in Lagos were only a few per cent of the city’s wastewater is treated. Solid waste disposal is organized better in these cities. In Bangkok the service is highest, 84 per cent of the wastes are collected. In Mexico City the percentage is 75 and in Lagos only 66 per cent. Still in all the cities some solid waste is left on the streets, which has caused health problems and unpleasant odor, especially in Lagos garbage piles in the backyards are a common sight.

Flooding is a big problem in all the cities, especially in Lagos the situation is really bad and water rises often to the streets and house levels. Flooding is nuisance during the monsoon seasons in all the cities. Other big problem is the land subsidence. Due to excessive extraction of groundwater, water levels in the wells have been declining rapidly and the ground level has subsided. This has happened both in Bangkok and Mexico City. In Bangkok subsidence has been more than 0.5
meters. Mexico City is an extreme case where the city has sunk 10.7 meters during the past 70 years due to the enormous water demand.

City planning is poor in all the cities, especially in Lagos and Bangkok. In Bangkok the average occupation of the room is around 6 persons and in Lagos more than 5 persons. The lack of housing facilities in Lagos is severe due to high population density in the area. The poor and even the middle-income people have to live in very crowded accommodations. The situation in Mexico City is not so bad than in other case study cities. The average occupation per room is 1.1 persons.

Traffic congestion is every day life in the case study cities. The problem is due to poor infrastructure, uncontrolled automobile growth, lack of effective mass transit system, inadequate road networks and private car oriented traffic system. Due to massive traffic, air pollution and noise bother the lives of the inhabitants. Especially in Lagos situation is terrible and it is said to be the dirtiest city in the world.

![Figure 7.2](image)

<table>
<thead>
<tr>
<th>Population (million)</th>
<th>Bangkok</th>
<th>Mexico City</th>
<th>Lagos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pop. Density persons/Km2</td>
<td>3700</td>
<td>6600</td>
<td>20,000</td>
</tr>
<tr>
<td>Average annual rainfall (mm)</td>
<td>1482</td>
<td>850</td>
<td>1532</td>
</tr>
<tr>
<td>Annual water use (m³)</td>
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<td>2.4 billion</td>
<td>79 million</td>
</tr>
<tr>
<td>Piped water service (%)</td>
<td>66</td>
<td>94</td>
<td>85</td>
</tr>
<tr>
<td>Waste water treatment (%)</td>
<td>10</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Solid waste disposal (%)</td>
<td>84</td>
<td>75</td>
<td>66</td>
</tr>
<tr>
<td>Persons per room</td>
<td>6</td>
<td>1.1</td>
<td>&gt;5</td>
</tr>
</tbody>
</table>

Although the cities are different they are all facing similar problems. In all the cities the population growth has surprised the infrastructure. The housing facilities, water supply, road space, transport, solid waste disposal and piped water service are unable to keep up with the high speed of growing urbanization. The problems are sharpest in Lagos because of the high population, population density, lack of finance and poor infrastructure. Due to these matters the air and water pollution and environmental deterioration in the city are enormous. Especially the very low wastewater treatment in Lagos has a great impact on the water quality and human health.

The main problems in Bangkok and Mexico City are also related to water supply, housing and environmental deterioration. The water demand is very high in the cities, especially in Mexico City. This has led to groundwater over-use and land subsidence. The land subsidence has a strong effect on houses and other infrastructures. The quality of water has also decreased due to low wastewater treatment. Flooding is also big problem in the cities again due to failed infrastructure planning.