

**URBAN ENVIRONMENTAL SECURITY IN DEVELOPING ECONOMY MEGA-CITY:
A CASE STUDY OF LAGOS, NIGERIA**

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ABSTRACT

The paper assesses urban environmental security in developing economy mega-city using Lagos, Nigeria as a case study. It identifies urban environmental security as one of the current discussions in the world for environmental sustainability and peace. The paper traces the urban evolution of the mega-city and identifies indicators for its urban environmental security. It concludes by suggesting appropriate ways of achieving urban environmental security in developing economy mega-cities.

Keywords: Urban Environmental Security, Mega-city, Developing Economy, Lagos, Environmental Sustainability

INTRODUCTION

The world's rapid urbanization has recently been given special attention by scholars and policy makers because of its security implications, among others. This is not only due to state security, as always expected, but mostly urban environmental security, which could undermine state security. Urban environmental insecurities may affect human securities, which may ultimately affect the security of the state. Thus, scholars and policymakers are under the increased pressure of rapid urbanization and finding ways of ameliorating the effects of urbanization on growing urban centers. This increased pressure to formulate solutions is because "urbanization and urban growth continue to be a major trend since the urban population increased from 200 million (approximately 15% of world population) in 1900 to 2.9 billion (approximately 50% of world population) in 2000" (McGranahan, Marcotullio, Bai, Balk, Broga, Elmqvist, Rees, Satterthwaite, Songsore, Zlotnik, Eades & Ezcurra, 2005).

The world population is projected to increase by 2.5 billion passing from 6.7 billion to 9.2 billion between 2007 and 2050 (United Nations 2008), while having a large percentage living in the urban areas. This will invariably increase the population of urban areas of the world from 3.3 billion in 2007 to 6.4 billion in 2050 (United Nations, 2008). It is thereby inferred that the world urbanization is growing faster than the total population of the world (United Nations, 2004).

It is stated that 90% of the entire global population growth, between 2000 and 2025 1.7 billion people, will take place in the urban areas of developing economies (Brockerhoff, 2000, in Lundqvist, Appasamy and Nellyyat, 2003). Rapid urbanization in developing countries has correspondingly given rise to the growth of cities and mega-cities.

Mega-city, as an expression, was muted towards the end of the twentieth century with the understanding of a continuous growth of urban centers. This word was coined based on population increases of existing cities. A mega-city is defined as a city with a population of at least five to ten million inhabitants (Varis, Biswas, Tortajada, & Lundqvist, 2003.; Gilbert, 1996; Planetearth, 2005; United Nations, 2001, in Gubry & Huong, 2002; Klein, 2003; ADB, 1997, in Gubry & Huong, 2002; UN-Habitat, undated). Mega-cities are now home to almost one out of ten people of the world's urban population (Globescan & Hazel, 2007). Along with UNDIESA and UNU, Gilbert (1996) notes that the world was expected to have at least 28 mega-cities by the year 2000.

It is noted that mega-cities are growing slowly, but with the fastest growth in the developing world (Globescan & Hazel, 2007). Furthermore, the environment is very much affected by rapid urbanization, which, in turn, has implications on the environmental security of urban areas (Lundqvist et al, 2003). The paper shall analyze developing economy mega-cities in relation to their urban environmental security. The paper has different sections. The first section will relate urban environmental security to security and environmental concepts. The second will analyze the evolution of the mega-city in a developing economy. The third section will identify the indicators of urban environmental security in developing economy mega-cities, with emphasis on the case study. The conclusion shall suggest ways of achieving urban environmental security in the developing economy mega-city.

URBAN ENVIRONMENTAL SECURITY

Urban environmental security is a new developmental security concept that came into view to preserve urban settings, especially with the expected continuous urban growth of the 21st century. As a branch of environmental security, it is a process of creating environmental sustainability and peace in an urban setting. It is different from the conventional security discussion of state security, which permeated the world before and during the Cold War between the two world super powers (USA and USSR) in the 1980s, which focused on threats to the state.

The environmental security discussion became prominent after the Cold War, focusing on global and ecological conditions to advance the global environmental sustainability and peace. Environmental security could be defined as the “implications of environmental degradation, scarcity, and stress due to disasters, migration, crises, and conflicts and on the resolution, prevention, and avoidance of environmental damage” (Kreimer, Arnold & Carlin, 2003). Environmental security advocates for the security of man/woman in relation to his/her environment. Urban environmental security is a section of environmental security which focuses on urban areas and cities and is defined as the “reasonable assurance of protection against threats to physical and mental health of urban residents, life support systems, and urban, social, and economic sustainable development” (Zhao & Yang, 2007). Therefore, urban environmental security is a process of focusing on the total well-being of urban dwellers through prevention and management of urban ecological degradations and ensuring the provision of sustainable ecological services to urban communities.

In the assessment of urban environmental security of urban areas or cities, the focus expands to all the components of environmental security, which includes water security, food security, health security, global environmental change, and

socioeconomic security of the urban setting. All these different forms of securities are symbiotic and complementary, in nature, and in the process of achieving human security. The next section will trace the evolution of a mega-city in a developing economy.

EVOLUTION OF A MEGA-CITY IN A DEVELOPING ECONOMY

The section shall analyze, through a historical perspective, the evolution of Lagos, a mega-city in Nigeria. Like other developing economies in Africa and Asia, Nigeria is currently witnessing urban population growth. Data, given by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, reported that the Nigeria urban population was almost 3.5 million in 1950, rose to about 78.8 million in 2010, and is expected to increase to about 217 million in 2050 (United Nations, 2008). The estimate implies that by the year 2050, about seventy-five percent of the Nigerian population will reside in urban areas. The most staggering evidence of this projection can be seen in the continuous population growth of Lagos.

Lagos was the capital city of Nigeria until 1991, when it was moved to Abuja. However, Lagos still remains the industrial and commercial center of Nigeria (Adelakun, 2009). This industrialization and commercialization might have encouraged the influx of people to the city to gain economic security.

This section is tracing the history of urban growth in Lagos within three historical periods: pre-colonial, colonial, and post-independence (Afon, 2007). The three historical periods could further be identified, with the evolution of Nigerian cities, as: the pre-colonial or 1800 period; the 19th century, which entails the colonial period before independence in 1960; and the post independence era (Olukoju, 2004).

Cities in the pre-colonial days were administrative centers of kingdoms with modest sizes and were defended by traditional walls and/or moats, whose growth increased with local, regional, and international trading (Olukoju 2004). There were no overstretched facilities in pre-colonial cities, so it could be assumed to be a planned urban setting.

Olukoju (2004), in his article, *Nigeria Cities in Historical Perspectives*, attributed the fall and growth of urban centers in Nigeria to the abolition of the trans-Atlantic slave trade, the cease of the Sokoto jihad and civil and inter tribal wars. He asserted that urban centers were the forces of colonization, which were essentially for trade and administrative purposes. The southern cities of Nigeria grew up within the pre-nineteen century Yoruba empires of administrative centers for the Yoruba kingdom, while Lagos cities grew out of the need for defense (Jarwon, 1988).

Lagos is located on the coast line of the Atlantic Ocean, making it an ideal place for international trade. Lagos was favored by advantageous, physical resources and was a distribution and commercial center for foreign countries (Jarwon, 1988). Lagos was an administrative and institutional center during the pre-colonial and colonial days and was the capital city of Nigeria before and after independence. Throughout pre- and post- independence, Lagos still had the busiest sea ports (Tin Can Island and Apapa) and air-ports in Nigeria. It is believed that:

[...] decolonization and development of [the] independent nation-state had large influences on urbanization levels for Africa and much of Asia, in part as controls on the rights of the inhabitants to live in or move to urban centers were dismantled, and in part because the building of the institutions for independent governments increased urban employment (McGranahan, et al., 2005).

The population of Lagos grew from 665,246 in 1963 to 7,800,781 in 1991 (Bamgbose, Arowolo, Oresanya & Yusuf, 2000). The economic, administrative, social, and institutional growth made Lagos an attractive place to settle for rural migrants. The city is currently believed to have a population of the 17 million people, with an estimated growth rate that is ten times faster than that of New York and Los Angeles (Lagos State Government, 2009). It is expected that the population of Lagos mega-city will be 24.4 million by 2015, making it the world's third largest city, after Mumbai, with 27.4 million, and Tokyo, with 28.7 million (George, 2010). The next section shall identify indicators of urban environmental insecurity in the development of mega-cities.

INDICATORS FOR URBAN ENVIRONMENTAL SECURITY IN A DEVELOPING ECONOMY MEGA-CITY

This section identifies some of the indicators for environmental security in the developing economy mega-city. Several environmental components could reveal the environmental security and insecurity of urbanized areas and cities. Such urban environmental security components are interrelated and, at times, assist one another to bring about an effect. For example, water insecurity may also lead to health and social insecurity. The following sub sections shall analyze urban environmental security components in the broad areas of water security, health security, environmental change, socio-economic security, urban ecology, and food security.

WATER SECURITY

Water security is important in every urban area and city. The Ministerial Declaration at the World Water Forum (2000), held in the Hague on water security in the 21st century, emphasized that “water is vital for the life, the health of the people, and ecosystems, and a basic requirement for the development of countries. But around the world women, men, and children lack access to adequate and safe water for most basic needs.” This section looks at water security in the vein of potable water for consumption and the threat of water related risks such as in flooding and water borne diseases. This is in line with Schultz & Uhlenbrook (2007) definition of water security, which he said is “the sustainable use and protection of water systems, the protection against water related hazards (floods and droughts), the sustainable development of water resources, and the safeguarding of (access to) water functions and services for humans and the environment”. This definition aligns with Grey and Sadoff's (2007) definition which refers to it as the “availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems, and production, coupled with an acceptable level of water-related risks to the people, environments, and economics”.

Applying these two definitions to the topic of mega-cities in Lagos depicts the notion of water insecurity pervading the urban center. The article titled, *The water Challenges of Mega-City*, by Biswas, Tortajad, Lundqvisit and Varis (2004) reiterated that “rapid growth of mega-cities of the developing world has posed major water planning and management changes”. This

is in line with the Lagos experience where the rapid growth has caused potable water shortages due to rapid urbanization, which has affected the planning and management changes. The Lagos Water Corporation, who is the sole agent to provide potable water in the mega-city, has a capacity, from all water plants, of 150 mg/d (million gallons per day), but with a production capacity of 130 mg/d (George, 2010). Even further, this capacity cannot meet up with the current projected demand for water in Lagos of 650 million gallons per day (George, 2010). This makes the citizens having to search for alternatives in wells, boreholes, and bottled water for their daily needs. Moe and Rheingnans (2006), in their article titled *Global Challenges in Water, Sanitation and Health*, said the water supply only covers 35% of the Lagos population, with 60% of water produced lost through leaks and illegal connections. The paper mentioned that the other 65% of the population relies on other sources of water from the Lagos Water Corporation (Moe & Rheingnans, 2006). The idea of sourcing water from extra sources to get water by residents, under such circumstances, may lead to additional cost for the citizens (Lundqvist et al, 2003). This, invariably, will have more economic implications on the poor and down trodden. The alternatives sources available, especially the use of wells and boreholes, may create issues of concern because of the fear of pollution, as sewage and wastewater are still disposed in septic tanks or soakaways.

Lagos, at present, has no central waste water collection system, leaving most waste water to go to a storm water drainage system and lagoon (World Bank, 2000, in Moe & Rheingnans, 2006). Also, the industrial nature of the city is an object of concern to its water security. The solid waste disposal technology of Lagos utilizes landfills. The landfills (dumpsites) in Lagos were not engineered, but are borrowed pits that, at present, are surrounded by residential houses. These houses may get their water supply through wells and boreholes, increasing the fear of leachates contaminating the water.

Water security could be examined as an issue of water-related hazards, such as floods, as defined by Schultz & Uhenbrook (2007). Water and wetlands cover over 40% of the total land area of Lagos with additional 12% subject to flooding, which is very serious because of poor drainage systems, poor wastewater disposals (drains are blocked by refuse, silt, sludge, etc.), and other sanitation practices (Iwugo, Arcy, & Andoh,, 2003).

HEALTH SECURITY

The foundation for globalization, which most mega-cities thrive on, could only be assessed by the veritable health security of the residents. The Deutsche Bank Research (2008) reiterated that mega-cities are “largely the result of an increase in life expectancy and a decrease in infant mortality, in other words, medical advances and better hygiene.” Even though this was supposed to be true, the reality proves contrary in the developing economy where, “much of the growth of mega-cities is in the slum and squatter settlements, which are particular challenging to services” (Moe & Rheingnans, 2006). Health service challenges are connected with the developing economy mega-city.

Most developing economy mega-cities are growing in a condition that may be affecting their health security. The growth of slum areas and squatters continues to become a concern to health security in most developing economy mega-cities, because “scarcity of land in the city centers also results in amenable living conditions becoming unaffordable to many people” (Deutsche Bank Research, 2008). Furthermore, “the rate of urbanization has often exceeded the capacities of the national and local government to plan and manage the demographic transition efficiently, equitably, and sustainably” (Biswas, Trotajad,

Lundqvist, & Varis, 2004). The health maintenance facilities are, at most times, unable to meet the needs of the ever-increasing population. Kriimer and Khan (2010), in their article titled *Global Challenges of Infectious Disease Epidemiology*, said that,

[...] the clean water supply may be insufficient, particularly in the marginal settlements, or slums, and available water can be heavily contaminated by infectious agents, due to discharge of untreated industrial wastes, leaching from wastes dumps into surface and water, inadequate treatment of sewage, and poor solid waste management.

Clean water, for consumption and sanitation, is paramount in the prevention of waterborne diseases. WaterAid (2009) reiterated, in their briefing on *Urban Issues in Nigeria's Water and Sanitation Sectors*, that rapid urbanization in the urban areas of Nigeria is not commensurate to infrastructure development, which has disastrous public health implications.

It was found, through research in the meg-city of Lagos, that an increased human population results in ecological changes that create more breeding places for vectors, which “had exerted its toll on human health, most especially on the incidence of malaria over the years” (Oyewole & Awolola, 2006).

ENVIRONMENTAL CHANGE AND CLIMATE CHANGE

The most identified environmental change worldwide, at present, is climate change. Climate change is, predicted by researchers, to have impacts on human security. This is an additional impact on developing economy mega-cities, with their supposedly negative impacts from the swollen population. Lagos is believed to be built in a location that is not suited for a city, since the growth of the city was not anticipated by the colonial master (Satterthwaite, Huqs, Pelling, Reid, & Lankao, 2007). The lack of adequate city planning for the excessive growing population makes it vulnerable to natural disasters. In fact, the International Panel on Climate Change recognizes the Nigerian coast lines as one of the low-lying coasts in West Africa, making it vulnerable to floods (Adelakun 2009), especially since the sea level rise is one of the expected effects of climate change. Lagos has, overtime, experienced flooding at the Bar Beach coast line (Atlantic Ocean). It is inferred that climate change is threatening the existing infrastructure in Lagos (Lagos State Government 2009).

McGranahan, et al. (2005), in his article titled, *Urban Systems*, reiterated that urban development has been an integral part of the climate change or environmental change processes. The paper reiterated that “all urban centers are engaged, to some degree, in the production and consumption of internationally traded goods and in contributing to globally burdensome wastes, such as greenhouse gases, persistent organic pollutants, and Ozone-depleting substances” (p. 816).

Mega-cities, generally, consume large amounts of ecological goods and services because of their high populations with expected impacts on climate change, through industrialization, waste generation, transportation, housing, and other energy systems, with the production of greenhouse gases. Greenhouse gases have been implicated in global warming, which is a precursor to all other effects of climate change.

Also, the temperatures of mega-cities may be higher because of the urban heat island (UHI) effect, which is an occurrence whereby cities are expected to be hotter than the surrounding suburbs and, thereby, larger cities of about 10 million residents, having a mean temperature 4°F (degrees Fahrenheit) higher than the surrounding rural periphery (Ayodeji, 2009). It is noted that the temperature of Lagos, a tropical mega-city, is expected to be higher with a growing population, coupled with global warming.

URBAN ECOLOGY AND FOOD SECURITY

Continuous urban growth heavily impacts the ecosystem and biodiversity of urban areas and cities. This is because increasing urbanization necessitates a demand for land for accommodation, institutional offices, and social infrastructure (Ayodeji, 2009); this includes agricultural lands, which have already been transformed to built-environments. This makes the Lagos mega-city depend on other parts of Nigeria for food supplies, with its industrial and technological growth, because the built environment has taken over the whole land space that could be utilized for farming.

The article titled, *Environmental Threats to the Development of Aquaculture in Lagos State, Nigeria*, by Adewolu., Akintola, Jimoh, Owodehinde, Whenu, & Fakoya (2009), reiterated that there is limitation to aquaculture development in Lagos because of urbanization and industrialization. It associated this to the Lagos lagoons serving as sinks to both domestic and industrial pollutions (Anetekhai, Akin-Oriola, Aderinola & Akintola, 2007, in Adewolu, et al., 2009). This urbanization, accompanied with industrialization in the Lagos mega-city, may have an impact on its food security.

The cities also threatened biodiversity, “not simply because of amount of habitat that is directly converted to road or building, but the effects these human disturbances have on the larger landscape” (Foreys & Allen, 2005). It is surmised that urban development fragments, “isolates and degrades natural habitats; simplifies and homogenizes species composition; disrupts hydrological systems; [and] modifies energy flow and nutrient cycling” (Ayodeji, 2009). Apart from the terrestrial ecological impact expected through urban development in Lagos, the aquatic life could be impacted in the streams, rivers, lagoons, and the Atlantic Ocean (Lagos being on the coast). The ecosystems of the water bodies of the mega-city have been threatened by domestic waste discharges, which cause an increase in the microbial load in water bodies, nutrients, enrichment pollution of the soil, and aquatic environment (Oyelola & Babatunde, 2008, in Adewolu, et al., 2009).

SOCIO-ECONOMY SECURITY

Socio-economy security has been adduced in different literatures as one of the reasons people migrate to the urban centers or cities. It is noted that urban migrants regard cities as the center of economic growth, but it has not always resulted in prosperity of every city dweller; instead the rich-poor gap becomes wider (Brown & Kristiansen, 2009). The Lagos mega-city continuous rural-urban migration may be traced to aspiration of economic security by migrants, since it’s the “hub of business and economic development in Nigeria” (Adelakun, 2009).

At times, the socio-economic security is not met by the urban rural migrant, but instead, they are overshadowed by urban poverty, which, at most times, locates them in shanties and slums in cities and urban centers. The estimated poverty level of

Lagos was 70% (Ministry of Economic Planning and Budget, 2004, in Adedokun, 2009). The growth of slums and shanties in mega-cities could be associated with the level of poverty in the expected economically, globalized community.

It is posited that “the numbers of slum dwellers is increasing at almost the same rate as city populations” (UN-HABITAT, 2006, in Brown & Kristiansen, 2009). In the case of the Lagos mega-city, it is believed to have 42 slums, which the systems have not guaranteed distribution of basic services (The Punch, 2008). It is, therefore, implied that the urban environmental insecurity may be more costly to the poor in the Lagos mega-city than the wealthy.

CONCLUSION AND RECOMMENDATIONS

The study describes the indicators of the urban environmental security, which has not allowed for the environmental sustainability of the mega-city, even with its expectation of continuous the expansion and growth in population due to its attractiveness to rural-urban migrants, as the nation’s economic nerve center.

Practically, it may look impossible to achieve a sustainable mega-city with the level of complexity, heterogeneous, and ecological disorderliness being experienced in the mega-city; but the consciousness of environmental degradation, through understanding and practice of tenets of urban environmental security, may assist in reshaping the existing conditions.

The sustainable urban environmental security policy and framework should be formulated and implemented. This should be an integrated approach. The formulation should be based on contributions and participations of all urban stakeholders, which include the general public, governmental agencies, community-based organizations, faith based organizations, labor organizations, and nongovernmental organizations. The mega-city should be identified by its governance as a system, since all of its urban environmental security components interact. This makes the integrated approach a necessity to achieve urban environmental security through the formulation and implementation of the sustainable urban policies.

Environmental knowledge groups should not be put aside in the policy formulation, but should be included to increase the environmental knowledge base of the stakeholders. Active social movements, whose foundational roots are in the communities of the mega-city, should be encourage since they can bring to the notice of the mega-city government the impending environmental needs and problems of their communities.

Mega-city environmental education is a primary tool for urban inhabitants and governments in achieving environmental sustainability. This education will enlighten city dwellers, planners, environmental managers, and all stakeholders on sustainable environmental practices that will ensure urban environmental security. The environmental education needs to be done with all the available information machineries that will make the information available to the mega-city dwellers and stakeholders.

With a good understanding of mega-city environmental security issues and the implementation of the sustainable urban environmental security policy and reforms, the mega-city will move towards achieving a better living condition for its urban dwellers.

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