Effects of Persistent Negative Externalities on Urban Communities in Bauchi, Nigeria

Muhammad Yahaya Ubale
Real Estate Department, School of Environmental Technology (SET),
Abubakar Tatari Ali Polytechnic (ATA-POLY), PMB 0094,
Wuntin Dada, Jos Road, Bauchi, Nigeria.
myubale@yahoo.com

Dr. Noralfishah Sulaiman
Department of Real Estate and Facilities Management
University Tun Hussein Onn Malaysia
Parit Raja, Batu Pahat, Johor Bahru, Malaysia
nora@uthm.edu.my

ABSTRACT
The consequences that emerged as result of negative externalities among others include frequent collapse of residential and other buildings that woefully claim millions of innocent lives despite ruining billions of naira; Problem of access road in case of fire outbreak or any emergency that may need the assistance of heavy trucks. These impacts cannot be overemphasized as the magnitudes are now felt globally. Objectives of this article are: To examine the repercussions of the negative externalities in Bauchi, Nigeria; To investigate the positive externalities in Bauchi, Nigeria; To evaluate measures that will reduce the impact of negative externalities in Bauchi, Nigeria. The methodology employed secondary data where articles, conference proceedings, seminar papers and literature materials were adequately used. This article discovered that 5.7 million U.S. families were affected by negative externalities, where poor housing conditions cause significant illness, injury and eventual deaths. In the study area, life expectancies at birth are half of those cities that were not so affected by the negative externalities. Moreover, one in every ten children dies before the age of five.

Keywords: *Negative externalities, positive externalities, residential buildings, commercial buildings and internalities.*

1.0 INTRODUCTION

Nigeria is the largest country in Africa, and the largest cluster of black people in the world with a land area of about 923,768 square kilometers, which is about 92,376,800 hectares and a population of about 167,470,000 people which will reach 390 million by the year 2050 and 730 million by the year 2100 (UNHDP, 2006; NCHH, 2008; UN, EST. 2011; UNFPA, 2011; UNCED, 2012; Kikuchi, 2013). Frequent collapse of residential and non-residential buildings as a result of the use of inferior technology and substandard building materials caused the loss of many lives (Nwaka, 2005 and NAN, 2013). The areas of negative externalities in Nigeria are very extensive, the institutions for urban development, where they existed, were very preventive and narrow-minded, especially in the critical areas of land-use control, planning, and provision of infrastructure and services (Alejendro & William, 2005; Chirisa, 2008).

2.0 CONCEPT OF EXTERNALITIES

The physical or tangible effect of an activity or a transaction between two parties that affect a third party who is not part of that activity or a transaction is known as an externality. Activities of the urban informal sector that woefully affects the whole community can be termed as an externality (Laffont, 2008). An externality is defined as an effect from one activity of one segment of the society which has consequences for another activity but is not reflected in the market prices. Externalities can be either positive, when an external benefit is generated, or negative, when an external cost is generated from a market transaction. **Table 1.0** shows both positive and negative externalities affecting social, economic and development aspects (Laffont, 2008).

The activities of the urban informal sector generate these negative externalities and therefore can be tie down to this definition. However, informal developers build houses informally with inferior technology and substandard building materials which has a corresponding effect particularly on the users of such properties. This effect is not in either way reflected in the whole transaction and affects them negatively. Example include air pollution, water and noise pollution, indiscriminate waste and sewage disposal, haphazard defecation and construction of substandard houses that collapse and claim innocent lives apart from ruining colossal amount of money.

3.0 NEGATIVE EXTERNALITIES PRODUCED BY INFORMAL ACTIVITIES

Technicians in the building team claim expertise and constructs structures using inferior technology. Informal residential and or other properties are prone to successive collapses that claim lives of millions of its inhabitants and wrecks huge wealth. Buildings collapsed usually break already buried utility lines water pipes, gas pipes and electric cables. The recent collapse of Bangladesh eight storey factory building housing many firms for making clothes in Dhaka claimed about 160 lives (BBC, 2014). The recent collapse of three storey building in Lagos, Nigeria where six die including a couples, a baby was among the dead (Nwaka, 2005 & BBC, 2014). Some of the prone practices of this informal sector that generate negative externalities include the following:

(1) Absence of Road Network, Building Setbacks, Standards and Layout Design

Informal houses encroach upon right of ways (ROW) and hinder future road expansion especially in estates that such roads were not yet developed (Nwaka, 2005). Lack of access is one of the most common problems caused by and experienced by residents in the informal settlements. Because there are neither the layout plans nor the regulatory machinery, residents tend to build to almost 100 per cent of their plot size. It has become impossible to provide access roads to these areas as there is no space for this. Likewise, no area is left open for social services like schools, hospitals, children's play grounds, etc. Consequently, people and service movement in these areas is very restricted and residents have to walk long distance to obtain services like health, education, transport and the like (Gerber, 2007).

(2) Special effects as a Result of Using Low-grade Technology

Substandard residential and other properties claimed millions of lives upon frequent collapse in many parts of the world. The urban informal sector performs its activities in violation of all the formal processes mentioned, and the repercussion of which claim lives whenever building collapses. Its ultimate goal is to satisfy the need of the common man. Properties so developed were directly put to the market for the common man. A residential formation built without legal permits to utilize the land or located outside of an urban development scheme is known

as an informal settlement, according to the United Nations Economic Commission for Europe. In most cases, housing has been improvised and lacks basic infrastructure such as sanitation. Approximately one billion people or one in six people live in informal settlements or slums worldwide, according to UN Habitat (1996). Numerous socio-economic factors underlie the growth of informal settlements globally.

In the takeoff of any informal residential property development, the processes that are accordingly carried out prior to formal residential property development are all shunned (Adeyinka & Sani, 2003; Cole, 2000). For instance, no any preliminary application meeting(s) carried out, there were no site analysis conducted to determine development feasibility before the takeoff of the development, timeline for the development process is never established. Building Permits and detailed building plans are not available. The structures are constructed in violation of the International Building Code Series (IBCS). Preliminary subdivision, zoning request, and annexation documents for seeking the consent and approval of the Planning Department are also absent. City Council that could have taken preliminary action upon the construction is not aware of the development. Park and Open Space Dedication Committee requirement is the substantive requirement that is deliberately overlooked because most of informal developments make use of any available open space illegally and takes pride in blocking parks, junctions and intersections without sparing cul-de-sacs (Adeyinka & Sani, 2003). Substandard residential properties so produced have flooded the residential property market (Cole, 2000).

(3) Special effects Because of Avoiding Architectural Design and Foundation Standards

The success of any design guidelines is measured by the degree to which they provide exact, practical, spatially based recommendations for health-oriented design (CDCP, 2012; IM, 2012). Centres for Disease Control and Prevention, (CDCP, 2012) and the Institute of Medicine, (IM, 2012), have established that good architectural design help in promoting health status of the community including environmental sustainability, safety, educational attainment, and community development (CDCP, 2012; IM, 2012). For example, the open floor plan of the kitchen and cafeteria promotes engagement thereby increasing the potential for healthy food that augment educational opportunities.

(4) Special effects Because of Avoiding Structural Design and Reinforcement Standards

Reinforced concrete structures are one of the most popular structure systems that serve as the framework structure in any building. They serve the function of a typical skeleton of a human body without which the whole body will never stand (Kang, 2002). Thus, any informal or even formal development that is not supported by the structural design is deemed to collapse (Kang, 2002). Every part of a building is subject to the effects of outside forces like gravity, wind, earthquakes, and temperature changes. Throughout history, people have constructed buildings that have withstood these forces over a long period of time, primarily using rules of thumb derived from their own experiences and those of their predecessors. In recent centuries, the scientific and industrial revolutions introduced analytical approaches that allowed developers and designers to go beyond empirical limitations and predict the behavior of building systems and components that existed only in their imaginations (John & Schmidt, 2010). This gave rise to the formalization and specialization of the modern engineering profession, which in turn led to more accurate, designs that when abide by, will prevent buildings from cracks and eventual collapsing. Today the individuals responsible for ensuring that buildings will remain standing while carrying out their intended functions are at liberty

(John & Schmidt, 2010). **Figure 1.0** below shows how negative externalities affect the urban community especially the low income category (Herrnstein et al. 1993; Laffont, 2008; Nyong, 2012; UNEP, 2013).

4.0 PERCEPTION OF INTERNALITIES

In contrast to negative externalities, those types of activities or behaviors that impose invisible intangible costs on a person or a community in the long-run that are not taken into account when making decisions in the present is referred to as internality (Herrnstein, et al. 1993). The practice of the classical economics depresses government from making regulation that target on internalities, since it is expected that the consumer takes individual expenses into account when disbursing for the good that causes the internality (Herrnstein, et al. 1993).

5.0 THREATS POSED TO THE URBAN COMMUNITY

Table 2.0 shows the three aspects of the urban informal housing sector and probable hazard they woefully generate. The informal sector creates a nasty sequence, being unable to collect taxes from the informal sector; the government may be delayed in financing public services, which in turn makes the sector more attractive.

(1) Social externalities stained with intangible internalities

A social problem or a social ill is an issue that relates to people's personal lives situations. Social issues are moral problems that affect a member or members of a society directly or indirectly. Some of the important issues include life threatening activities; dangers and or hazards pose on people's lives. Social issues are matters that can be explained only by factors outside an individual's control and immediate social environment (Marois, 2012; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011; UNCED, 2012). In sociology, social behavior itself means an animal-like activity lacking social sense. In a sociological order, social behavior is followed by social actions, which is directed at other people and is designed to make a response. Furthermore, along this rising scale are social dealings and social relation. Social behavior, however, is a process of interaction (Marois, 2012).

Therefore, social aspect provides a better understanding of the behavioral mechanisms of choice in decision making for housing users and housing developers (Marois, 2012). It as well encompasses the hazard, jeopardies and dangers pose directly or indirectly to the lives of urban community. In essence, the activities of the local or unqualified housing developers have largely posed hazards to the lives of the urban community. The world health organization estimates that about two million people from developing countries die regularly from the activities of these local housing developers which inevitably poses indoor air pollution caused by the burning of biomass and coal in leaky and inefficient household cooking stoves, for example (NCHH, 2008; GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011; UNCED, 2012).

Marois, (2012) and Guy, (2006) in their theory of social behavior contended that individuals in the local firm, have a better understanding of the behavioral mechanisms of choice in decision making for housing; Griffin, (2006), hold that people opt for informal properties knowing fully, the jeopardies that encircle their act, but just because of minimizing cost and maximizing benefits, they involved in such transaction; while Blanchard, (2011), argued on factors that affect the decisions made by individuals based on their income status, that only permanent income have large effects on consumer spending behavior. The local firms therefore resolved to develope substandard structure because of the timely benefit they wanted thereof, inconsiderate of the jeopardies of their action to the entire community (Marois, 2012; Griffin, 2006; Blanchard, 2011).

Major dangers that affect the social aspect include: health hazards like respiratory and cardiovascular diseases from indoor air pollution; attached to these illnesses is the inevitable death that may result from extreme temperatures. Other devastating consequences include spread of communicable diseases as a result of poor living conditions (GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011; UNCED, 2012). In the ill-constructed housing, poor ventilation is also associated with a high level risk of airborne infectious disease transmission, including tuberculosis as well as the accumulation of indoor pollutants and dampness. All these are factors that lead to the development of allergies and asthma. These also intensify health impacts from exposure to temperature extremes, which are occurring most frequently due to climate change (GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011; UNCED, 2012).

(2) Economic externalities stained with intangible internalities

In his cogent attempt to explain the economic externalities, Griffin (2006) held that people opt for informal properties knowing fully, the dangers that encircle their act, but because they want to minimize cost and maximize benefits, they woefully get involve into such transaction. But Blanchard (2011) argued extensively on factors that affect the decisions made by individuals based on their income status, that only permanent income have large effects on consumer spending behavior. In the same vein, Klaes (2008) described a transaction theory cost as a cost acquired in making an economic transaction. It is the cost of participating in a property market or any other economic exchange. The term was first believed to have been coined by Ronald Coase, who used it to develop a theoretical framework for forecasting, when certain economic tasks would be performed by firms and individuals. Transaction cost, however, include costs of search of a housing or any other property and or information costs incurred in determining that of other required goods as available in the market which has the lowest price. It also involves cost of bargaining which is equally essential to arrive at an acceptable bargain with the other party to the transaction (Klaes, 2008). Conversely, when it involves a residential property and or asset markets, the transaction cost relies on the disparity regarding price of that property between the buyer and seller. Certificate and the right of occupancy (C of O) is the valuable document that signifies formal ownership of either a bare land and or a developed land. Hence, cost of legal search of the validity and authenticity of the property in making sure that the other party adhered to regulations and the terms of the contract is also included in the transaction cost (Martens, 2005; Guy, 2006; Griffin, 2006; Klaes, 2008; Blanchard, 2011).

The local sector housing developers shun adherence to market conditions, zoning regulations, land use planning, tax and levies in their attempt to make huge profits and minimize construction cost. They locate housing illegally on disaster prone zones and use inferior technology thereby ignoring the services of the construction experts (GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011). Locating informal housing units on disaster prone zones like areas liable to flooding, areas liable to volcanic eruption and earthquakes, hill and mountain slopes, under high tension electric towers, on airport strips and run ways, on road right of ways (ROA) and highway setbacks, just to maximize profits. These informal activities cause a high level risk of airborne infectious disease transmission, including tuberculosis as well as the accumulation of indoor pollutants and dampness. All these are factors that lead to the development of allergies and asthma. These dangers are all as a result of building informal housing units on disaster prone zones which also intensify health impacts from exposure to extreme temperatures, which are occurring most frequently (GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011).

(3) Expansion of externalities stained with intangible internalities

This aspect encompasses the hazards that directly affect the building or the structure itself. The most vulnerable effect is that of residential housing collapse (Azzan et al 2005; Gerber, 2007; Chirisa, 2008). Informal housing units constructed informally collapses regularly and claim innocent lives (Azzan et al 2005; Gerber, 2007; Chirisa, 2008). Azuma, (2008), advocates in his functional theory, that local housing developments are a short-term by-product of migratory flows of unqualified labor that have been set in motion by prompt urbanization and quest for more housing development. The causal notion for the informal housing activities is the absolute elimination of the formal sector (real estate surveyors and valuers) from modern development and economic opportunities due to rapid population growth and the growth of advanced technology as well as modern industrial employment structure and economic opportunities (ILO, 2002; Wiego, 2012).

Reasons for the frequent collapse of the informal housing units among others include the use of inferior building technology, lack of adherence to planning standards, building setbacks, architectural design, structural and engineering designs, substandard construction materials, inexperience personnel and their quest for higher profit margin. Other reasons include building of informal residential housing units on swampy plains, hill slopes, foot of mountains, high way right of ways, fringes of run ways, under high tension electric towers, areas earmarked for major vulnerabilities and volcanic radius where foundations are too shallow (GHF, 2010; WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011). Sometimes, rock boulders move downhill and destroy informal houses located at the foot of the mountain; rise of sea level in other words known as tsunamis that destroys all the houses informally located on the flood plains (UNFPA, 2011; World Bank, 2011; UNCED, 2012).

6.0 ILLEGAL STRUCTURES CLASSIFIED BASED ON THEIR THREATS

According to Chirisa, (2008), urban informal housing is divided into the unplanned and hazardous or unsafe groups. However, informal housing classified according to level of their dangers. Unplanned represents 60% of all urban development in Cairo and 1% development are unsafe or inhabitable. As of May 2011, there were about 383 unsafe informal residential properties categorized according to their risk and levels of threat to lives and wealth.

(1) First level were located on disaster prone areas and hence relates to life-threatening effects to the inhabitants due to the risk of land slides, flood or rail accidents.

(2) The second level consists of areas where buildings are not physically solid due to being built using scrap materials or due to poor or inferior architecture.

(3) The third level is areas where inhabitants are exposed to health hazards like industrial pollution, lack of proper drainage and sewage systems.

(4) The last level is buildings on government land without right of ownership.

The average population density is 200 persons per acre with structures rising only one or two floors. These areas require instant intervention. The problem with government intervention is that it rarely considers the socio economic factors at play. Residents of informal housing whether planned, dangerous or unsafe; typically resist being relocated due to the fact of the advantages of being in close proximity to the city and their places of work. The size of the urban informal sector housing leaves no option than to be recognized and upgrade to formal housing. Removal or relocation of inhabitants is an approach destined to fail (Chirisa, 2008).

7.0 PROCEDURES FOR SUPRESSING NEGATIVE EXTERNALITIES Repercussions of the activities of the local sector developers identified can be address using the responses of the government agencies and the following remedies to develop a model to achieve an innovative residential environment free from the negative externalities. This will reduce the

acute loss of lives and properties. **Table 3.0** below shows how these negative externalities can be curbed to achieve a new urban residential setting.

(1) Adherence to formal procedures, planning layout design and building regulations
Control measures to ensure limited access to the hazardous prone areas will be ascertained (Imura, 2013). User charge and property right shall also help in restricting the use of the dangerous zones (Imura, 2013). These zone will consist some mediocre that will vehemently purify and accordingly scrutinize the informal residential properties considering the real life situations. The term of reference shall be; to out rightly reject all life threatening properties. No substantial consideration on aesthetics from the initials, but as the actors deem conversant with the system, other important scale and yard sticks will be appropriately imposed (Adeyinka & Sani, 2003).

(2) Framework to lessen the effects of the negative externalities
The idea of the provider model is that the authorities should provide homes for the poor sector of the population. So, public authorities and private developers should control the production of houses (Hamdi, 1995; Onatu, 2010). Onatu, (2010) argued that the problem of the urban informal sector can best be addressed by supplying a large amount of houses the formal sector (real estate managers), by speeding up the construction, centralized and combined industry. This is based on mechanization, mass production, standardization and prefabricated houses. This form of production should encourage consumption and fuel the economy, create employment, generate profit and generally improve the standards of living. The provider model has been successful in places like Sweden when one million units were produced within ten years (Hamdi, 1995; Onatu, 2010).

The informal supportive model has generally been a strategy initiated by John Turner in the 1960s. He had a strong impact on the international housing debate. This model, that is equivalent with the enabling strategy, implies that the authorities should identify and support the informal sector's efforts of building homes, rather than providing the houses. The production of houses should be decentralized, with the residents as an important actor and increasing the involvement of small, local builders and ordinary people.

The fast production can still be achieved but with incremental growth instead of instant provision of full housing units. The growth should not follow master plans; but the needs of the inhabitants. Positive outcomes of the model are that the communities reflect variety and local adaptation since there is no standardization of the houses. Supporters emphasizes the importance of managing the resources, of allocating the resources for the people to organize their own house construction and to ease the access to building material, cheap credit, better utilities and easier transportation. As argued by the supporters; "building houses has little to do with solving the housing problems". Houses become an integrated part of a larger system of urban development (Hamdi, 1995; Onatu, 2010). Refer to **figure 2.0** below. Upon scrutiny, new urban residential environment free from the effects of the urban informal sector will be accordingly achieved, where only standard purified residential properties are constructed.

Preliminary meeting with the proposed residents and all the stake holders in the building industry will be conducted to ascertain the interest of the probable residents. Onatu (2010) rightly observed that for any housing development to be effective and viable there is a need for collaborative involvement of the beneficiaries. Assimilation with social and cultural ethics can then be accomplished through suitable housing development strategies. There is a need for teamwork between the public and private sector developers in suppressing informal housing task especially in developing countries. Identification of formal development

processes and the needs of the local authorities should be harmonized accordingly. When all is done, selection of suitable site bearing the interest and need of the residents should be addressed. The team should identify the source of funds for the construction and develop environmental impact assessment report (EIA). Final meeting with all stake holders including the residents should be held to furnish them with the resolution of the professionals and explain where and how there interest has been harmonized in correspondence to the formal development processes (Onatu, 2010). Construction of the houses now begins and must not compromise any of the resolutions attained. Property managers should be assigned and charge with the periodic up keeps of the newly developed property. Accordingly, a new residential setting free from the effects of the urban informal sector would be achieved.

7.0 CONCLUSION

In an attempt to suppress the menace of the consequences of the urban informal sector, a tracking zone would be established where all formal procedures, processes and checks be applied to particularly residential properties illegitimately developed in Bauchi Nigeria to suppress the negative effects of externalities on the urban communities in Bauchi, Nigeria. The propelled idea of the formal provider model which entails that the authorities should provide homes for the poor sector of the population (Hamdi, 1995; Onatu, 2010) shouldalso be considered. On the other hand, the informal sector model suggests an enabling strategy, which implies that the authorities should identify, formalize and support the informal sector's efforts of building homes at cheaper rates for the poor (Nwaka, 2005).

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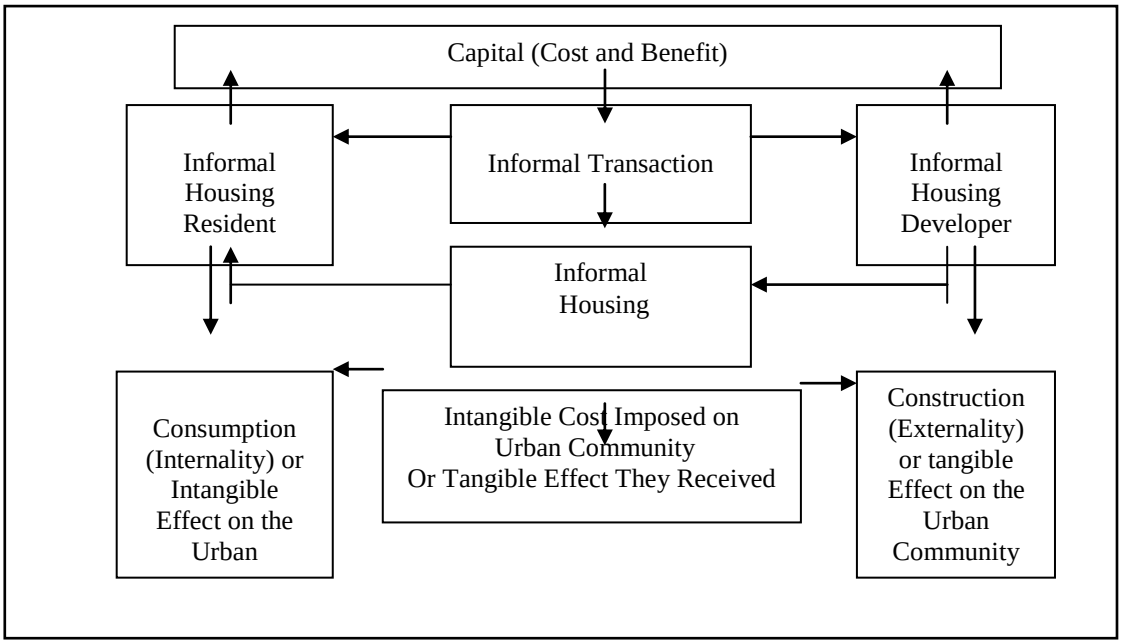

Figure 1.0 Informal externality and internality on the urban community
(Author from: Herrnstein et al. 1993; Laffont, 2008; Nyong, 2012; UNEP, 2013)

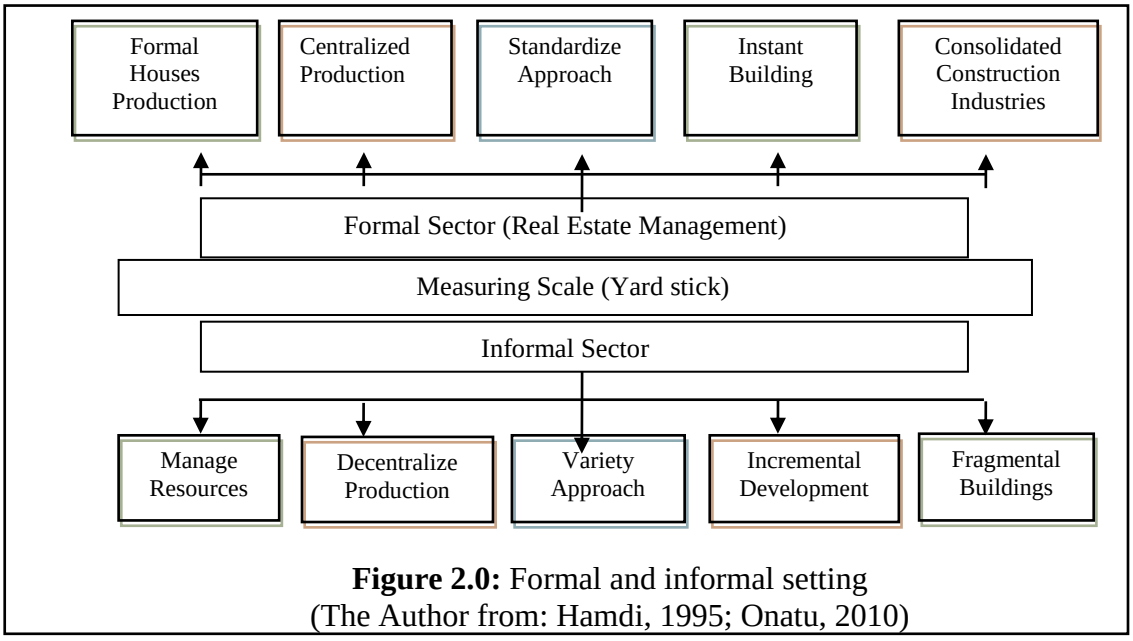

Figure 2.0: Formal and informal setting
(The Author from: Hamdi, 1995; Onatu, 2010)

POSITIVE AND NEGATIVE EXTERNALITIES	
(1) EXTERNALITIES ON SOCIAL ASPECTS	
Externalities (Positive)	Externalities (Negative)
(1) Health benefits	Congestion (Sulaiman, 1999)
(2) Racial integration	Neighborhood composition (Sulaiman, 1999)
(3) Employment opportunities	Fiscal effects (Sulaiman, 1999)
	Forced eviction and rent increase (UNEP, 2013)
	Civic unrest and violence (Aliyu et al. 2012)
	Smokes from indoor cooking (NCHH, 2008; UNEP, 2013)
	Fear of man induced disasters (UNEP, 2013)
	Haphazard defecation (NCHH, 2008; UNEP, 2013)
	Uncontrolled waste disposal (NCHH, 2008; UNEP, 2013)
	Insecurity (NCHH, 2008; UNEP, 2013)
	Depression (NCHH, 2008; UNEP, 2013)
	Fear of collapse of building (NCHH, 2008; UNEP, 2013)
	Outbreak of diseases (NCHH, 2008; UNEP, 2013)
(2) EXTERNALITIES ON ECONOMIC ASPECTS	
Positive Externalities	Negative Externalities
(1) Cheap housing	Incompatibility of uses (Sulaiman, 1999)
(2) Free plot of land	Cost of facilities, utilities and services (Sulaiman, 1999)
(3) No processing cost	Environmental effects (Sulaiman, 1999)
	Locating housing on disaster zones (NCHH, 2008; UNEP, 2013)
(3) EXTERNALITIES ON DEVELOPMENT ASPECTS	
Positive Externalities	Negative Externalities
	Building collapse (UNCHS, 2002; NCHH, 2008)
	Using inferior technology (UNCHS, 2002; NCHH, 2008)
	Substandard building materials (UNCHS, 2002; NCHH, 2008)

Table 1.0 Positive and negative externalities
(The Author from: Sulaiman, 1999 & Nwaka, 2005)

Aspect	Externalities/ Internalities	Causes	Author (Year)
Social	Health Effects Like Respiratory Diseases, Cholera, Typhoid Fever And Diarrhea	Indoor Cooking, Indiscriminate Waste Disposal And Uncontrolled Defecation	(UNCHS, 2002; NCHH, 2008; UNCED, 2012 and UNEP, 2013).
Economic	Locating Houses On Disaster Prone Zones, Shunning Building And Subdivision Regulations, Planning And Guidelines.	Profit Maximization, Greediness And Lack Of Knowledge And Information.	(NCHH, 2008; UNCED, 2012; Mokhtari & Ashtari, 2012; UNEP, 2013 and Kikuchi, 2013).
Development	Building Collapse, Cracking, Tilting And Sinking Of Buildings.	Using Inferior Technology And Substandard Building Materials	(NCHH, 2008; UNCED, 2012; UNEP, 2013 and Kikuchi, 2013).

Table 2.0: Hazards generated by negative externalities
(The Author from: UNCHS, 2002; NCHH, 2008; Mokhtari & Ashtari, 2012; UNCED, 2012; Kikuchi, 2013 and UNEP, 2013)

Effect	Solution	Author (Year)
Social	Tracking zone to ensure adherence to the set out WHO guidelines, UNCED, NCHH, UNCHS, and UNEP.	(Author's study, 2015)
Economic	Tracking zone to ensure adherence to subdivision and zoning regulations, planning and design standards.	(Author's study, 2015)
Development	Develop a framework model to curb and guide the informal sector development activities.	(Author's study, 2015)

Table 3.0: Solutions to the negative externalities
(The Author from WHO, 2010; UN Est. 2011; UNFPA, 2011; World Bank, 2011; UNCED, 2012)