A FRAMEWORK FOR UNDERSTANDING SUSTAINABLE HOUSING FOR POLICY DEVELOPMENT AND PRACTICAL ACTIONS

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ABSTRACT

Although there is increasing knowledge on sustainable development globally, one critical dimension of urban housing problems is that sustainable housing is yet to gain its widely acknowledged importance in developing countries. This is due to the lack of understanding of the social, economic, cultural and environmental components of sustainability in housing development. This paper is aimed at developing a framework for understanding the different facets of sustainable housing to aid sustainable housing policy formulation and practical actions. Drawing on a systematic review of published literature, this paper asserts that sustainable housing can be achieved at the levels of housing process, products and services. The proposed framework shows that at the centre of sustainable housing are sustainable housing polices and programmes, which must address social, cultural, economic and environmental facets of sustainability in an integrated fashion. It also highlights the role of sound management skills and robust resources base of housing developers and managers to successfully implement and evaluate sustainable housing policies and programmmes. The paper concludes by identifying some practical steps and strategies that can be engaged in achieving sustainable housing. Chief among these is the will by all stakeholders in the housing sector, including architects and other built environment professionals to imbibe the sustainability ideology and practices in the entire lifecycle of housing projects.

Keywords: Sustainable development; Sustainable housing, Housing policy; Systematic review

1. INTRODUCTION

Today, housing is no longer regarded as simply a roof over one's head, but it is known to play a crucial role in achieving integrated physical and economic development, natural disaster mitigation, employment generation, wealth creation and sustainable development. The UN-HABITAT (2012) has noted that among other things, where homes are located, how they are designed and constructed, and how well they are integrated with the existing environmental, social,

cultural and economic fabrics of communities influence the daily lives of people, their health, security and wellbeing. This simply means that housing is at the centre of sustainable development as encapsulated in the idea of sustainable housing.

Sustainable housing has been defined as housing must be economically viable, socially acceptable, technically feasible and environmentally compatible (Choguill, 2007). The UN-HABITAT (2012) noted that sustainable housing consists of socially-enhancing and environmentally-friendly residential practices integrated into the wider settlement systems. These two definitions suggest that sustainable housing deals with the sustainability of housing process, products and services. Despite the strong link between housing and sustainable development, it has been observed that one critical dimension of urban housing problems is that sustainable housing was yet to gain its widely acknowledged importance in developing countries (UN-HABITAT, 2012). This view was corroborated by Ihuah *et al*. (2014) who noted that in a developing country like Nigeria, the concern for sustainable housing is still in its infancy. Therefore, Chiu (2003) has argued that until all the facets of sustainable housing are adequately researched and understood, it would be very difficult to define a sustainable development path for housing. Bhatti (2000) has also noted that in relating sustainable development and sustainability to housing, a framework is more useful than a specific definition. Moreover, authors have criticized the United Nation's concept of sustainable development for failing to reverse the trends in unsustainable initiatives (Hugentobler, 2006). Consequently, Hugentobler (2006) and Turcotte and Ken (2010) have suggested the adoption of systematic frameworks for improving our understanding of the social, economic, and environmental objectives of sustainable development equally and in an integrative fashion.

It was on this premise that this paper sought to better our understanding of the social, economic, cultural and environmental facets of sustainable housing. It develops a comprehensive framework for understanding the multidimensional strands of sustainable housing to aid in the development of sustainable housing policies and taking practical actions toward achieving the goals of sustainable housing. We argue that there is the need for an in-depth understanding of the concept of

sustainable housing to effectively and synergistically address issues that are direct consequences of lack of access to sustainable housing by a majority of urban residents in developing countries. This paper seeks to make contribution to the current discourse on housing and sustainable human settlements. It presents a framework that can aid practical actions towards achieving healthy residential neighbourhoods and sustainable cities in Nigeria and other developing countries.

2. THE CONCEPT OF SUSTAINABLE HOUSING

The origin of sustainable housing ideology can be linked to the 1987 Brundtland report (WCED, 1987) and the 1992 Rio Earth Summit definition of sustainable development that views sustainable development as "*meeting the needs of the present generation without compromising the ability of future generations to meet their own needs*". According to the UN-HABITAT (2012), this definition sees sustainable development as a multidimensional concept that links environmental protection with economic, social and cultural issues with emphasis on the need for people to preserve the environment for future generations. Drawing on the above definition Mitlin and Satterthwaite (1996) described sustainable housing as:

"*shelter that is healthy, safe, affordable and secure within a neighbourhood with provision of piped water, sanitation, drainage, transport, healthcare, education and child development. It is also a home protected from environmental hazards, including chemical pollution. Also important are to meet needs related to people's choice and control, including homes and neighbours which they value and where their social and cultural priorities are met (*p31-32*)".*

Sustainable housing has also been defined in terms of the quality of construction, social and economic factors such as affordability, and psychological impacts, and eco-efficiency (e.g. use of non-renewable resources (VROM, 2005). Further, the UN-HABITAT (2012:9) described sustainable housing as residential environment that is (i) healthy, durable, safe and secure, (i) affordable for the whole spectrum of incomes (iii) using ecological low-energy and affordable building materials and technology, (iv) resilient to sustain potential natural disasters and climatic impacts (v) connected to decent, safe and affordable energy, water, sanitation and recycling

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facilities, (vi) using energy and water most efficiently and equipped with certain on-site renewable energy generation and water recycling capabilities (vii) not polluting the environment and protected from external   pollutions (viii) well connected to jobs, shops, health- and child-care, education and   other services (ix) properly integrated into, and enhancing, the social, cultural and economic fabric of the local neighbourhood and the wider urban areas; and (x) properly run and maintained, timely renovated and retrofitted. Put succinctly sustainable describes homes with the following attributes: decency, security, privacy, spacious, healthy, affordable, legally secured tenure, habitable, accessible, and appropriately located with services and infrastructure

From these foregoing descriptions, it is evident that sustainable housing is that which incorporates economic; social and environmental dimensions of sustainable development at three interrelated levels. These are housing process, houses products and housing services as shown in Figure 1. Therefore for housing to be described as sustainable, all the three levels identified in Figure 1 must be given adequate consideration in a holistic manner.
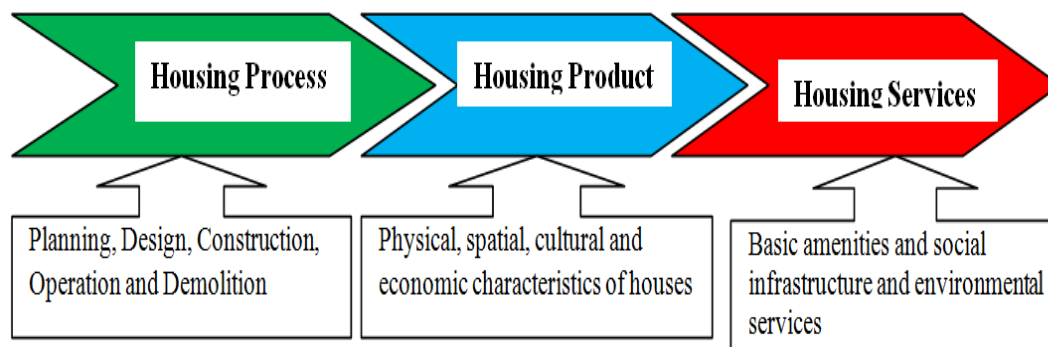

Figure 1: Levels of Housing Sustainability

3. BENEFITS OF SUSTAINABLE HOUSING

The UN-HABITAT (2012) has observed that if housing is planned and built within an integrated economic, social, cultural and environmental sustainability framework, it will not only be more accessible to low-income households, but will also respond to their diverse needs and will have multiple positive outcomes for people's physical and mental health and safety, for economy, and

the environments. To this end, the benefits of sustainable housing have been identified to include (i) improvement of the quality of life and dignity of residence, (ii) enhances access to affordable housing (iii) improved health and lower incidents of illness, fatalities and material losses, better labour productivity (iv) ensures better conditions for human development, employment, creativity and economic growth (v) promotes durability and low maintenance cost (vi) protection against natural hazards (vii) engenders improved efficiency and savings on the use of energy, water and other physical resources (viii) better environmental protection and sanitary conditions (ix) contributes towards climate adaptation and mitigation; (x) promotes more sustainable and socially inclusive urban growth; and social cohesion and political stability (UN-HABITAT, 2012).

It was on the basis of the above that Ibem and Aduwo (2013) noted that the role of sustainable housing in achieving economic development (e.g. poverty alleviation), social development (e.g. social equality; improved quality of life) environmental sustainability (e.g. mitigating of effects of climate change, urbanization, slums; access to sustainable energy), cannot be over emphasized. Therefore, sustainable housing is seen as a key strategy for improving quality of life, combating exclusion and discrimination as well as strengthening social cohesion in households, communities and nations

4. FRAMEWORK FOR UNDERSTNDING SUSTAINABLE HOUSING

From the foregoing, it was possible to develop a framework for understanding and evaluating the key components of, and strategies for achieving sustainable housing. Figure 2 is a graphic illustration of the framework developed in this paper. Examination of Figure 2 will reveal that the framework is made up of the four facets of sustainable development; namely, social; economic; cultural and environmental; sustainable housing policies and programmes as well as management and resources capacity of housing developers and managers. It shows the various components of sustainable housing and proposes that at the centre of sustainable housing delivery are housing

policies and programmmes, which need to incorporate economic, social, cultural and environmental dimensions of sustainable development. In addition, Figure 2 also indicates that the formulation and development of sustainable housing policies and programmes do not necessarily translates to suitable housing without the engagement of sound implementation strategies by housing developers and managers in both the private and public sectors. This underscores the vital role of robust management and resource capacity of housing developers and managers in the successful implementation of sustainable housing policies and programmes.
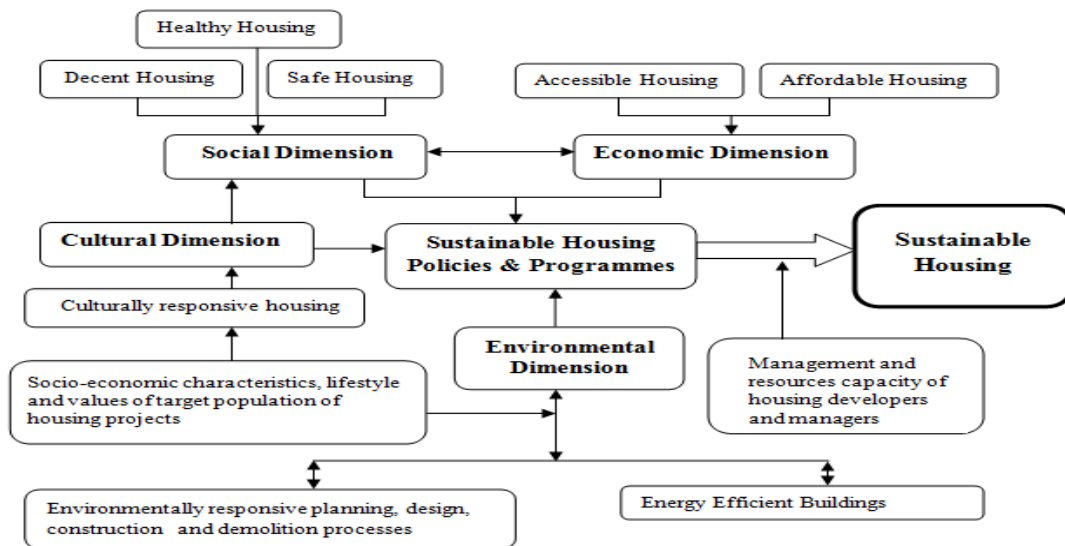

Figure 2: The Framework for understanding Sustainable Housing

In the preceding section, we examine the key components of sustainable housing as presented in Figure 2.

4.1 Social Dimension of Sustainable Housing

The social dimension of sustainable housing principally refers to the impact of housing on people's quality of life, now and in the future. According to the UN-HABITAT (2012), social sustainability in housing encompasses creating affordable, good-quality, inclusive and diverse (mixed-tenure and mixed-income), secure and healthy dwellings, residential areas and communities, which are well-integrated into the wider socio-spatial systems of human settlements. This implies that housing is said to be socially sustainable when it is decent, safe/secure, healthy, inclusive, mixed tenure and

properly integrated with the other fabrics of human settlements. Therefore, the next paragraphs are devoted to brief descriptions of what constitutes decent, safe and healthy housing.

4.1.1 Decent Housing

Most housing scholars and researchers use the phrase ''decent housing'', without any attempt to explore the meaning of decent housing. In fact, Bailey and Spendolini (1977) have noted that although the ultimate goal of housing projects is to provide decent housing, there are no acknowledged criteria for defining and measuring decent housing. Nevertheless, Onibokun (1985) defined decent housing as adequate housing, while Housing Support Unit (2000) described a decent housing as one that meets the four criteria of (i) habitability standard based on health and safety, (ii) a reasonable state of repair, (iii) has reasonably modern facilities and services (e.g. kitchen, bath room, WC), and (iv) provides reasonable degree of thermal comfort and noise insulation.

Habitable housing in this context means a dwelling that is fit for human habitation in terms of (i) structural soundness (ii) free from repair (iii) free from dampness prejudicial to health of occupants, (iv) adequate provision for lighting, heating and ventilation, (v) satisfactory facilities for the preparation and cooking of food, (vi) suitably located water closet for the exclusive use of the occupants (vii) suitably located fixed bath or shower and wash-hand basin with each provided with satisfactory supply of hot and cold water for the exclusive use of the occupants (viii) adequate supply of wholesome water and (ix) efficient system for draining of foul , waste and surface water (Krieger and Higgins, 2002) . On the other hand, a sound state of repair describes a situation where the key components of houses are in good condition, require no major immediate repair, and have potential safety implications (Housing Support Unit, 2000). This means that decent housing is that which is fit for human habitation habitability with good access to basic social amenities, visual and thermal comfort as well as protection against noise pollution.

4.1.2 Safe Housing

Across all human cultures the desire for security of lives and property is a natural; and is given priority attention by individuals, households and communities. Awotona (1982) observed that housing occupants need protection not only from rodents, and dangerous animals but also from human intruders. Besides, UNCHS (2000) has noted that unsafe housing may contribute to social and political instability which is inimical to physical and economic development. This implies that housing planned, design, constructed and managed in such a way that it protects occupants from dangers and discomfort of the ambient environment and injuries can be described as sustainable housing.

Kawash (2000) described the concept of safe housing as a combination of social formation and architectural design principles and a melting pot of security and architecture. He further explained that safe housing consists of internal safety and external security of the residential environment. Regarding safety of housing occupants from human intruders and harmful objects, Mitchell (1976) contended that if spaces where crime and accidents most frequently occur in the home are eliminated, safety would improve in homes. This line of thinking is consistent with the Crime Prevention through Environmental Design (CPTED) ideology. According to Atlas (1999), the CPTED ideology is primarily based on the notion that human settlements can be better secured and safe if adequate attention is given to using the design of the environment to deter domestic accidents and crimes. This was corroborated by Lipnickey (2004) who noted that CPTED does not seek to stop crime but rather seeks to use planning and architectural design principles to create psychological obstacles as deterrent of crime in housing environment. Hence Lipnickey identified four components of CTPED to include (i) territorial definition using landscaping, paving, fencing and lighting (ii) surveillance by placing windows in a manner that allows residents to survey the public spaces adjacent to and surrounding their individual residences (iii) adopting building forms that establish an image of security and (iv) locating residential developments in functionally compatible urban areas adjacent to non-threatening activities or hazards prone areas. Other

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elements are electrical installation, location of parking spaces, egress location and design as well as the introduction of barriers at openings (Mitchell, 1976 and Atlas, 1999).

Atlas (1999) also explained that internal safety in homes can be achieved by giving adequate attention to such issues like fire safety, structural stability, adequate lighting of interior spaces, stair condition and proportions as well as railing design. There is also the need to consider the type of building materials to be used. This is because the UN-HABITAT (2012) has observed that the physical quality of houses determines how well they will be able to withstand adverse environmental conditions and disasters and, consequently, how well they can protect the life and health of households and communities. Therefore internal and external safety and security of residential environment can be achieved by the application of sound planning, architectural design and construction principles that preclude all forms of danger and threat to lives and property within and homes.

4.1.3 Healthy Housing

According to the Committee on Hygiene of Housing of the American Public Health Association, a healthy housing is one that meets four categories of needs, namely: (i) physiological needs (e.g. good indoor air quality, thermal comfort, adequate lighting, noise insulation and close and safe play lots for children and adults) (ii) psychological needs (e.g. privacy, accessibility to place of worship, schools, recreational facilities and public spaces for community life) (iii) protection against contagion (e.g. communicable diseases, diseases vectors); and (iv) protection against accidents (e.g. fall, fire hazards, structural stability). Thiele (2002) noted that the health aspect of housing requires that places of abode to be habitable in providing residents with adequate space, and protecting them from cold, damp, heat, rain, wind, or other threats to health, structural hazards and disease vectors. This may help to explain why the UN-HABITAT (2012) has described houses as the 'biological' extensions of people who use them as they represent a 'third skin' having the same functions of protection, insulation, breathing, regulation and communication; suggesting that

just as health depends upon a healthy 'first skin', so does it depend upon a healthy homes.

Following from the above, Krieger and Higgins (2002) have suggested that in order to achieve healthy homes, the following should be taken into consideration (i) the availability of safe drinking water in the building (ii) presence of efficient waste disposal system (iii) protection against disease vectors such as insects, rats, cockroach (iv) adequate provision of facilities for storing, preparing and storing of food (v) good occupancy rate (vi) protection from dampness, cold, moulds (viii) absence of structural defects and leaking pipes (ix) good indoor air quality; and (x) provisions for sidewalks, bike paths and recreational areas. Other are (i) non-segregated housing based on income status (ii) sound building fabric (e.g. absence of peeling paints, cracks in walls and ceiling) (iii) adequate power supply (iv) adequately maintained physical structure of the building and its environment (v) appropriately designed and well layout of houses in housing estates (vi) adequate sizes of interior dwelling spaces (vii) good relationship of interior spaces; and (viii) adequate thermal and noise insulation. This was corroborated by the UN-HABITAT (2012) who noted that the health and safety aspects of sustainable housing that need to be recognized and given adequate attention are: (i) physiological hazards (e.g. damp and mould, smoke, excess cold or excess heat, building-related pollutants such as asbestos and radiation) (ii) psychological hazards (e.g. crowded space and lack of security, lack of light or excessive light and noise) (iii) infection-related hazards (lack of hygiene, sanitation and drainage, water supply contamination, infectious diseases) (iv) accident-related hazards (falls on and between the levels and on the stairs, electrical hazards, fires, burns, scalding, collisions, cuts and strains); and (v) environmental hazards (landslides, earthquakes, tsunami, and air pollution).

From the foregoing, it seems evident that the perquisites for achieve healthy housing, is a need to guard against every form of hazards that can constitute health risks to individuals, households and communities in the planning, building design, construction, operation, refurbishment and demolition stages of housing. This implies that for us to achieve healthy homes there is a need for

the synergistic adoption of design principles, construction materials and techniques to promote physical, mental and psychological wellbeing of housing occupants.

4.2 Cultural Dimension of Sustainable Housing

A survey of the existing literature reveals that most of authors usually lumped together the cultural facet with the social dimension of sustainable housing. Consequently, the UN-HABITAT (2012) has observed that a lack of attention to the cultural dimension of sustainability has been one of the challenges facing what has been considered as highly successful large-scale low-cost housing development and slum resettlement programme in a developing country like Ethiopia.

Broadly speaking, cultural sustainability deals with cultural worldviews and values, norms and traditions, as well as lifestyles and behaviours of people, communities and society, that supports the dignity of communal life (UN-HABITAT, 2012). Therefore, culturally sustainable housing must be a reflection of traditional, indigenous and local knowledge and support sustainable values, norms and behaviours and engender efficient energy consumption, communal living, good place maintenance practices, and building resilience human settlements. In addition, the planning, design and construction of houses and their surrounding environment should also be responsiveness to occupants' needs, cultural values, and lifestyles. It was on this premise that Ibem and Azuh (2011) noted that to ensure culturally sustainability of housing projects, architectural design and construction of houses and planning of the surrounding environment should be a reflection of the cultural values of residents; and the unique historical and cultural context of host communities.

4.3 Economic Dimension of Sustainable Housing

The economic dimension of sustainable housing has become a very popular subject in housing literature in the last few four decades for a number of reasons as explained by the UN-HABITAT (2012). However, the two key aspects of economic sustainability of housing that have continued to

receive attention are housing accessibility and affordability. Therefore, in this paper, the focus is on accessible housing and affordable housing as shown in Figure 2.

4.3.1 Accessible Housing

The accessibility component is very crucial in measuring sustainable housing. This is because from the social perspective of housing provisioning, all categories of people are expected to have access to housing irrespective of their socio-economic background or status in society as captured in the Universal Declaration of Human Rights and the charter of the International Covenant on Economic, Social and Cultural Rights (Thiele, 2002). As Okewole and Aribigbola (2006) rightly observed, this is important in ensuring that housing provision is not focused on some 'chosen' segments of the society rather all members of the community have equal opportunity to choose their own accommodation according to their means or affordability. Therefore, housing provision that ensures social equity and generates good quality and affordable housing as well as allocates its benefit equitably to all socio-economic groups is referred to as accessible or inclusive housing.

The foregoing suggests that accessible housing is one that is physically available and economically accessible by all segments of the society; meaning that housing is said to be accessible if every home seeker irrespective of social-economic class, age, education or sex has equal opportunity of gaining access to the preferred type of housing based on one's income. This implies that the twin issues of availability and affordability must be simultaneously addressed in other to achieve sustainable housing.

4.3.2 Affordable Housing

Closely related to accessible housing is affordable housing. Affordable housing connotes different things to different people. For instance, some authors (Bassey, 1988 and Nelson, 1994) have associated affordable housing to low-cost housing, social housing (Carter, 1997) and low-quality housing (Quigley and Raphael, 2004). Bassey (1988:19) specifically defined affordable housing

as one which has a general price range at or below the average price of new housing in a particular market area. Also in the published literature, affordable housing refers to that which does not cost more than between 25 percent and 30 percent of the household's gross income (Quigley and Raphael, 2004; Onyike, 2007). This simply means that affordable is most often defined in the context of the proportion of household's or individual's income spent on housing ; meaning that when households pay more than the bench mark of 30 percent of their total income on rent and utilities, mortgage, and housing related insurance and taxes such is considered as not affordable housing. It can be inferred from here that the essence of affordable housing is to ensure that the cost of housing do not impose an unreasonable pressure on the household's income to the extent that families cannot afford other basic necessities of life.

The UN-HABITAT (2012) has highlighted the contributions of affordable housing to economic development. It further explained that affordability is not enough in the achieving sustainable housing development, because affordable homes cannot be considered sustainable if they create negative impacts on the environment or social life. Hence, Salama (2006) and Onyike (2007) were of the view that issues of affordable housing should be addressed within the context of process, product and socio-cultural situation of targeted population. It was on this premise that the UN-HABITAT (2012:48) noted that housing affordability can be improved by (i) regulations and providing incentives for the construction and real estate markets (ii) the provision of subsidies and other types of housing assistance to low-income earners (iii) the development of affordable mortgage market and alternative housing finance systems; (iv) provision of public land and infrastructure for housing development (v) provision of incentives to support community-based, cooperative, non-profit and rental housing programmes(vi) regulating and stimulating self-help housing and housing upgrading schemes (vii) reviewing the existing building codes, regulations, bye laws and procedures to reduce housing compliance costs (viii) promoting partnerships between governments, private companies and other not-for-profit organizations to realise housing projects in local communities (ix) strengthening house-building industry and affordable building material

markets; and (x) encouraging the use of local building materials, techniques and processes. These imply that only multi-sectoral approaches can be applied in achieving affordable housing provision.

4.5 Environmental Dimension of Sustainable Housing

The environmental aspect of sustainable housing is concerned with the impacts of housing on the environment as well as the impacts of the environment on housing itself (Ibem and Azuh, 2011). The UN-HABITAT (2012) has identified three types of the relationships between housing and the environment. These are (i) drawing of the different environmental resources, such as building materials, water, energy and land in the course of housing design, construction and operation (ii) direct ecological impacts on local areas in terms of air and water pollution, waste and damage of natural ecosystems resulting from residential activities in human settlements; and (iii) the exposure of houses and their occupants to various environmental hazards, which may emerge due to human activities (e.g. air and water pollution, lack of sanitation), due to natural factors (e.g. landslides, vector-borne diseases such as malaria), or due to the combination of natural and human-made factors (e.g. climate change).

Current trend on environmental issues associated with housing has shown greater focus on thermally efficient design, sustainable building materials; energy efficiency, renewable energy options, sustainable water and sanitation systems and waste minimization and recycling (Chen *et al*., 2005). In line with this, the UN-HABITAT (2012) was of the view that in order to achieve environmentally sustainable housing, there is a need a minimize energy demand and carbon footprint in the entire life cycle of residential buildings. To achieve this, Golubchikov (2009) has suggested that the following steps be taken: (i) planning and optimising the orientation and interrelation of buildings in space, as well as optimising walls' and roof's colours and textures in order to use the opportunities offered by passive heating, lighting and active shading, (ii) better insulating the structural elements of houses - walls, windows, doors, roofs - in combination with a

better ventilation (iii) installing energy efficient appliances for heating, cooling, cooking and lighting and ventilation (iv)improving the efficiency of utilities supplying houses with electricity, gas, water, heating (v) developing local low-carbon power plants servicing housing (e.g. district heating and cooling based on combined heat and power generation, renewable electricity generation) (vi) Equipping houses with renewable electricity sources (vii) reducing energy-intensive building materials and technologies used in homebuilding (ix) incentivizing and disciplining households through energy metering and billing (x) capacity building activities to raise awareness of the importance of energy savings and how it can be achieved; and ensuring a good network of green spaces in the neighbourhoods so as to mitigate environmental hazards, while also protecting biodiversity and improving the health and quality of life of the residents.

It is therefore evident from the above that housing can provide an important means for addressing local and global environmental concerns as they relate to public health, energy, water and material efficiency and carbon emission, waste production and recycling, climate adaptation and environmental hazards mitigation measures (Chen *et al*., 2005).

5. CONCLUSION

In this paper, we have developed and discussed a framework for understanding sustainable housing issues to aid policy makers in the development of sustainable housing policies and programmes and for taking concrete steps towards achieving the goals and objectives of sustainable housing provision. It is obvious from this paper that achieving sustainable housing delivery requires adequate understanding of the economic, social, cultural and environmental facets of sustainability as they apply to housing process, products and services in the entire lifecycle of housing projects from planning to demolition. In addition, our framework shows that at the centre of sustainable housing are sustainable housing policies and programmes as well as the right management skills and robust resource base to support their successful implement. Although different strategies for

achieving sustainable housing has been identified, the onus in now on all stakeholders in the

housing sector, to develop the will to adopt the sustainability ideology and practices at the

planning, design, construction, operation and demolition stages of housing projects.

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