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THE DOMESTIC ARCHITECTURE IN BENIN, A GOOD PLACE FOR BUILDING RESILIENCE

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ABSTRACT

The domestic architecture in Benin has undergone an elastic process evolution from the pre-colonial period to the post-independence period. This is so because the people of Benin developed a social system which resulted in a transition process of traditional values that are firmly rooted in the past that will not endanger the future. The paper identified key concepts of resilience/vulnerability in the context of community vulnerable to the built environment, using a case study of Benin domestic architecture as methodology. The case study focuses on the resilience of core area houses to the influence of modern building styles while considering climate change on the city in the last few years as it affect resilience to core area planning and core area building materials within city. The result of the findings showed the core area buildings are vulnerable to change due to urbanization and climate change issues but at the time the building quite resilient and adaptive to transformation issues due to some factors which are outside the scope of this study.

KEYWORDS: Domestic Architecture, Building Resilience, Vulnerability, Climate Change, Urbanization

INTRODUCTION

Benin City started as a cluster of thirty-one villages which were aggregates of family units (Osadolor, 2001). These villages are now quarters of a traditional Benin City as shown in Figure 1. The thirty-one villages grew into an informal settlement, then to an urban centre and became a metropolis. Benin which once had recognizable architecture style was burnt down during the 1897 punitive expedition. The traditional city of Benin that was well fortified with wall and moats dogged around the inner city because of their warlike nature became vulnerable. The traditional architecture became vulnerable to transformation to colonial/western architectural influence, since the houses (Domestic Architecture) in the city have been burnt down. But due to the people affinity for the culture and traditions, they were resilient to the colonial influence especially in the city core, that why the traditional architectural pattern and style are still found in the core zone of Benin. Although, the city was burnt down, the architectural landscape was altered and the colonial masters influenced the Benin architectural landscapes with their styles of architecture. However, some of the buildings that were burnt were re-built and can be found standing the core zone of the city.

Dealing with change or loss is an inevitable part of life. At some point, everyone experiences varying degrees of setbacks. Resilience does not eliminate stress or erase life's difficulties. Instead, it gives people the strength to tackle problems head on, overcome adversity and move on with their lives. Resilient people are able to utilize their skills and strengths to cope and recover from problems and challenges. UN/ISDR, (2004)define resilience as: 'the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structuring. This is determined by the degree to which the social system is capable of organising itself to increase its capacity for learning from past disasters for better future protection and to

improve risk reduction measures'. The Resilience Alliance, (2002) identifies three defining characteristics: The amount of change the system can undergo and still retain the same controls on function and structure, or still be in the same state, within the same domain of attraction; The degree to which the system is capable of self-organisation; and The ability to build and increase the capacity for learning and adaptation. It is suggested that a resilient community, like ecosystems can better withstand 'disturbances' and adapt to change when required (Walker & Salt 2006).

The concept of resilience has been widely used by various authors concerned with people-nature interactions (Adger, 2000; Berkes et al., 2003; Brooks et al., 2005; Folke, 2006; Glavovic, et al., 2002; and Walker, et al., 2002). The factors that make up the vulnerability context such as shocks and seasonality are important because they have a direct impact on buildings, and farmlands. Thus, the probability of a given shock, trend or seasonal variation occurring is an important consideration (Manyena, 2006). Jordan, (2009) asserted that climate change is just one of the many 'layers of vulnerability' the poor face, they are exposed to a variety of social, economic, political, ecological and other 'disturbances', that vary in intensity, scale, frequency, location, duration and character. He further stressed that these 'layers of vulnerability' are intertwined; for example, salinity intrusion is caused by shrimp cultivation, embankment projects and climatic factors. This highlights the difficulty for communities to adapt to climate change and the need to focus attention not just on climatic factors, but also on non-climatic influences and indirect and direct impacts of climate change.

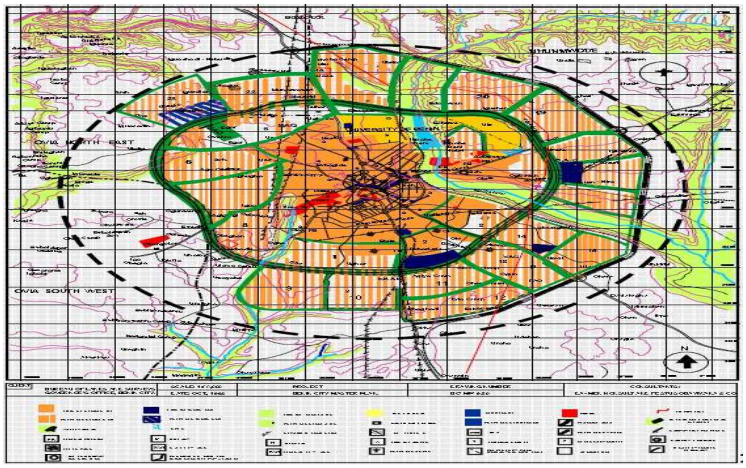
BENIN CITY "A HISTORIC CITY IN TRANSITION"

Benin City is located at latitude 06°19IE to 6°21IE and longitude 5°34IE to 5°44IE with an average elevation of 77.8 m above sea-level. Benin City is a pre-colonial city, the capital of defunct Bendel State and the present day Edo State. Benin City is underlain by sedimentary formation of the miocene-Pleistocene-age often referred to as the Benin formation (Atedhor, et al, 2011). The city is located in the humid tropical rainforest belt of Nigeria with a population of 762,717 according to the 1991 national population census with a projected population of 1.3 million by 2010 at 2.9% growth rate. Benin City belongs to Af category of Koppen's climatic classification. The rainy season in Benin begins in March/April and ends in October/November. Rainfalls are of high intensity and usually double maxima with a dry little spell in August usually referred to as 'August Break'. Apart from demographic transmutation, Benin City has witnessed, rapid territorial expansion mainly due to rapid rural-urban migration.

The transition process in Benin domestic architecture can best be capture in periods/timelines. The Edos developed a social system which resulted in transformation process of traditional values that are firmly rooted in the past that will not endanger the future (Aimiuwu2005). It was this sense of common identity based on history, tradition, and beliefs of the society that may have spurred the transition towards the formation of a state and resulted in socio-cultural change, upon which structures of social and political organization began to emerge. This developmental pattern characterized the settlements at different phases of their evolution. In the study of Benin as an urban Centre, suggests that two major factors were involved in its development. First, the natural environment of Edos supported human settlements and second factor was the integration of large political systems into a centralized one (Ekhaese and Ediae 2014). Based on this, the need to co-ordinate the socio-economic and political activities of the centralized political system from one point led to the development of Benin as the capital. Thirty-one villages grew into quarters in an informal settlement, then to an urban centre, and now a traditional Benin metropolisas shown in Figure 4.

However, Benin because of "Renaissance City Pattern" (i.e. wide, regular, radial and circumferential streets forming concentric circles around a central point with other streets radiating like spokes in a wheel, see figure 1),

it was ease for Benin to grow from cluster of villages into a metropolis without distorting the zoning pattern, transition process and domestic architectural periods (Ekhaese and amole 2014).The core area today is the kings square in Benin City i.e. central business district (includes, Oba's palace, Oba's market, house of assemble complex, central hospital, churches, banks and publishing house) as shown in figure 1. In this paper the evolution of Benin Domestic Architecture was grouped under two major timeline which are, i) the pre-colonial timeline (i.e. pre-colonial architecture period and colonial architecture period) and ii) contemporary timeline (independence architectural periods and the post-independence architectural periods). The process resulted in identifying several house types across four residential zones of the city which are arranged along the four timelines.



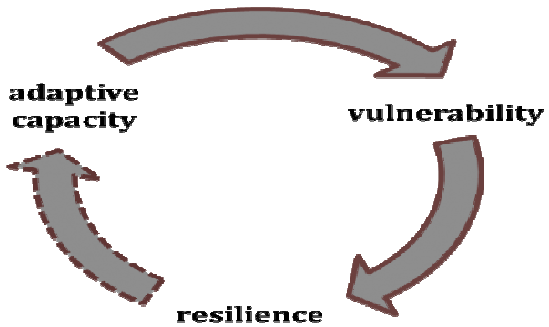
Source: Abakare, (2013)

Figure 1 : The Benin Masterplan

THEORETICAL/CONCEPTUAL BACKGROUND

From Vulnerability to Resilience

The Benin Experience Resilience's main issue amongst several others is the relation between vulnerability and resilience as shown in figure 1. The objective of the concept is to stimulate multidisciplinary academic research on resilience linked to the issue of sustainable development. The task was achieved with explicit theoretical bases and the research is the basis for the concept's definition and its implication to "socio-ecological system" (McManus, et al, 2008) & (Gunderson, Holling, 2002). To give resilience an operational, intelligible and intuitive definition, the resilient alliance working with other research groups chose to define resilience as the "flip-side" of vulnerability i.e. resilience is the antonym of vulnerability, it positive counterpart (Folke, *et al*, 2002). The resolve to produce positive aspect of resilienceis truly linked to a search for application, while vulnerability pertains to a negative connotation (incapacity); resilience becomes a system's desirable property (Klein, Nicholls, & Thomalla, 2003).



Source: Rufat, (2008)

Figure 2: The Concept: From Vulnerability to Resilience

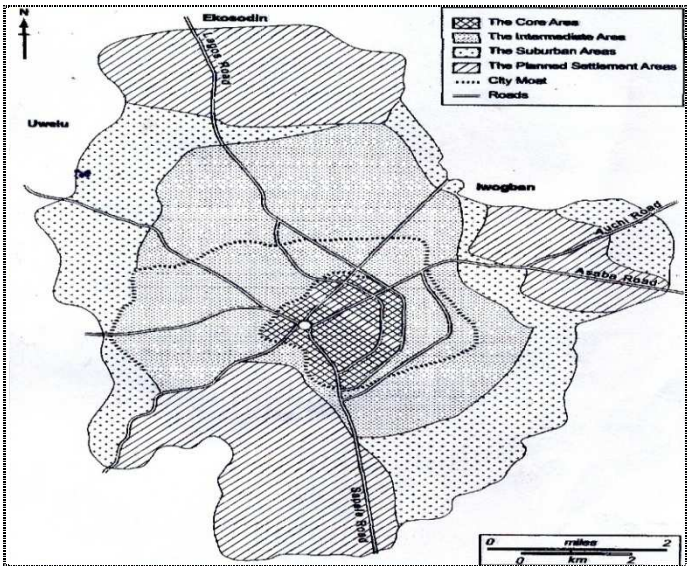
The truth is,it is possible to be vulnerable to an impact while being perfectly resilience but it is impossible to systematically oppose vulnerability and resilience. This is especially obvious with cities where, however vulnerability is defined (as a damage potential, a degree of exposition, incapacity to face an impact) a multiplicity of examples of cities exposed to hazards, hit by disasters are observed, hence vulnerability that yet manage to rebound, recoup and reconstruct, to come-back to an equilibrium, to normality, etc. Vale and Campanella, (2005) wondered over the remarkable resilience of cities, since history only relates the definitive disappearance of a few cities while urban disasters are innumerable. It could be said that it is because one is vulnerable that one can be resilient but in strictest meaning, there can only be resilience if there is an impact and a disruption, which analytically implies vulnerability. It is because a society or a territory is vulnerable that it will suffer crises and that it will have to face up to adapt and to learn from the disaster. The more crises a system suffers, the better it can show resilience. The problem then lies in hazard acceptance, not as fatalism or as the acceptance of the disaster, but as the price that a society is willing to pay when this society takes a risk. Further more, because of its technical aspect, we tend to associate vulnerability with materials structures. But in this context, associating vulnerability and resilience becomes an aporia.

If we keep the buildings, forms and structures, resilience means maintenance of service, the possibility to function, even in a diminished state and speedy reconstruction. But an exact reconstruction of what was, even if it allows the maintenance or the reconstruction of functions constitutes a problem because it doesn't account for the crisis, nothing is learned from it. To put it another way, the system remains as vulnerable as it was which is in opposition to the idea that resilience is desirable. Conversely, a reconstruction that aims to adapt the system to disaster is also problematic because it can affect the system's functioning, which leads to a structural change and no longer to resilience. The concept from vulnerability to resilience cannot be limited to a simple semantic shift.

The two terms are not interchangeable and the continuum question has to be explored as for what would make it possible to go from one to the other "resiliency vulnerability" (Provitolo 2012). An inversion of the term is even less desirable considering certain tendency to use vulnerability's analysis methods on resilience, which basically comes down to shifting those methodological issues without solving them. Thus, the pertinence of the indicators that would allow measuring a system's adaptive ability or the analytical approaches' limits stays questionable (Hamilton, 2005). Moreover, it is not enough to transpose vulnerability's factors into resilience's field to understand hazard dynamics because a vulnerability factors can also be a resilience factor. Kobe after the 1995's earthquakeMenoni, (2001)or Manhattan after 9/11UNISDR, (2011)showed that the concentration of strategic functions in large cities is a powerful damage factor and hence a vulnerability factor but that it is also a formidable stimulant for a speedy ,reconstruction and a return to "normality"

Using Domestic Architecture of Benin as case study of "from vulnerability to resilience" would explain resilience from heuristic perspective which mirror the pre and post crisis temporalities and to combine cyclic and linear times. The pre-colonial architectural period in Benin, Nigeria started in 40B.C. heralded the Benin domestic architecture. It remain desirable until the colonial architectural period which started with the punitive expenditure 1897, where the existing symbol of Benin traditional architecture, the Oba's (king's) palace along with some traditional residential houses in core was burnt down, representing the period of crisis (i.e. period of vulnerability of Benin traditional architecture). Since resiliencies is the "flip-side" and also a positive response to vulnerability and with the help of builder's guild existing in Benin, the form, structure and pattern of the Benin traditional architecture (i.e. the Oba's palace and some traditional residential houses in city core) were restored and speedily reconstructed, showing how resilient the people, their culture and the architecture can be. However, the other three residential zones in city began to experience the influence of colonial

architectural style, and as a result of that the architecture began to adopt the adaptive strategies by taking in some of characteristics of colonial architectural style while trying to retain features of the Benin traditional architecture as shown in figure 3. This in a nutshell sum up Benin domestic architecture experience of "from vulnerability to resilience"



Source: Ekhaese, (2011)

Figure 3: Map Showing Residential Zones in Benin-City

Benin Domestic Architecture

The transformation process of the domestic architecture described in this paper shows that it is not simply the changing arrangement of spaces, but the interaction between the spaces and its activities within the domestic environment that can define the new spaces. There is an indigenous concept of level-distinction involved in the process. Guided by these underlying forces, the evolution of the houses in Benin followed topological paths to adapt the old inherited properties to the new physical environment, and the user's attitudes and responses shows that these values do persist through the recognized changes. Transition in domestic space though interesting and gradual but understanding this usually depends on definite factors and physical observations. These factors and observations frame our imaginations, comprehension of reality and history; determine the process, rate and directions (Dynes, et al 2000).

The cultural significance of the transition in/of spaces is determined by climate change, technological development, socio-economic and socio-political characteristics of the people; the extent of depth of domestic space in culture is perhaps best measured by its transition. Furthermore, it was observed that the continuity of domestic space exists as an integral part of contemporary Benin culture, no longer controlled by religious or cultural ideologies, making a prototype used by anyone who finds it useful and in certain ways might be considered a model, this in itself reflects adaptability and some form of resilience. The symbolic value of continuity of domestic space in contemporary house design has been reduced by increasing cultural illiteracy (Kazimee, Bashir and Mcquillan, 2002).

However, in Contemporary house design in Benin, there have not been issues of cultural significance yet contemporary issues such as durability, aesthetics and class have limited our attention, it might be possible to adapt continuity of domestic space. The domestic spaces are now modified with durable and aesthetically pleasing materials and since culture is significant, spaces still have to be created and continued. It was discovered that shortly after Nigeria's independence (i.e. the 1960s), the target of the Contemporary Architecture Period in Benin was to modernise and enhance the people's living. For some architects, the old domestic culture was regarded as out-dated, unhealthy and not suitable for

the contemporary way of living; hence it is expected that contemporary house-types from the West should enclose the western style of living and jettison the existing traditional style of living in Benin. For instance, in the contemporary plans, the bathroom and kitchen are at the same level with the living room, and heaters were provided in the bathrooms (Ekhaese and Ediae, 2014).

Evolution of Domestic Architecture in Benin from Pre-Independence to Contemporary Period

An Overview the whole process of evolution, would allow for a summary of some important points. The Pre-Colonial Architectural Period (40 B.C. - 1890 A.D**)** in Benin, south of Nigeria had a recognized architecture that was compared to architecture in Amsterdam, Netherlands (Aisien 2001).According to Dapper, (1686) (as cited in Ekhaese and Amole 2014) the architecture was a large complex of homes in coarse mud, with hipped roofs of shingles or palm leaves which had sequence of ceremonial rooms, and was decorated with brass plaques. These architectural pattern and style are still found in the core zone of Benin. The colonial architectural period in Benin (1897 A.D. – 1950 A.D), the period experienced the 1897 British punitive expedition which affected the cultural and architectural foundation of the City. After the symbol of city was burnt down, the architectural landscape was altered and due to colonial influence the Benin architectural landscapes were dotted with colonial/foreign/western styles of architecture. Places like the Government Reservation Area (G.R.A), legislative quarters, doctors' quarters and Nigerian prisons workers' barracks among others emerged around the intermediate and suburban zone of Benin.

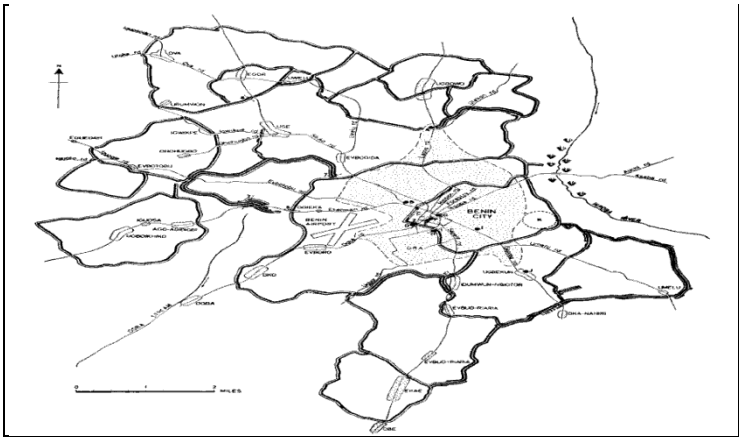
The Independence Architectural Period (1960 A.D. - 1979 A.D) observed majorly government housing schemes for workers at both state and federal level. There was the emergence of institutional house types, the long central corridor house type ("face me, I face you"), detached and semi-detached bungalow house type in government acquired areas known as quarters, estates and government reservation area (GRA) located around the intermediate and suburban zones. The Post-Independence Architectural Period (1980 A.D – Till Date) the types of domestic architecture observed in Benin during the period are more contemporary designs which are inclined towards Western style. This is so because it is the only architectural style being taught today in Nigerian schools of architecture and it is status symbol for the elites, example are bungalows, maisonette, duplexes and villas. These designs are found the city peripheries enclosed in the planned estate zone of Benin. The traditional connection of the essential spaces are still preserved in the detached houses of the 1950s and 1960s, but when it comes to the contemporary houses all the relationships are re-arranged, and the courtyard disappears leaving small fragmented spaces to preserve some of its activities.

The only indication that suggests the initial system structure is the adjoining space between the main bedroom and the living room, which, like a rule, appears in every typical plan. The central lobby emerges as a universal solution for circulation in the contemporary house in Benin, and it connects the three remaining important spaces which are living room, bedroom and kitchen. The function of courtyard therefore has been transposed to the *ugha*, and central lobby/ies. Through the space-activity interactions, the most activity-depleted space is the main bedroom, which implies that it lost its traditional meaning as the most important space for the whole family.

The change in status of the kitchen, toilet and bathroom status is remarkable; they are the only spaces that have successfully crossed the conceptual boundary between the 'dirty low-level zone' and the 'clean high-level zone'. If the *oto-eghodo* and the *ugha* were regarded as two discharges of public activities in the past, then the terrace, ante-room, living room and dining replace them in the contemporary houses. The most remarkable change is the transformation of courtyard, the multiple role of this outdoor space has been successfully re-distributed into the six newly emerged spaces in the contemporary house. This includes utility room, balcony, ante room, lobbies, dining and laundry and central lobby is

now supporting its function as a circulation core. Interestingly, what have been transferred from the courtyard are not just the activities it enclosed, but the structural concept of the courtyard itself. Except for the central lobby that succeeds only the positional role of the courtyard as a circulation core; those new spaces have all become a clean living zone in the upper level.

The mud floor of the traditional house, which was originally designed for cooling, is now constructed with newer building materials in the contemporary houses. The initial function is now totally lost, but the secondary function, the clean-dirty distinction that was 'acquired' through long practice, has been transferred to contemporary homes. Therefore, the evolution process of Benin Domestic Architecture has shown a progressive process across the cross-section of Benin-City.



Source: Ekhaese, (2011)

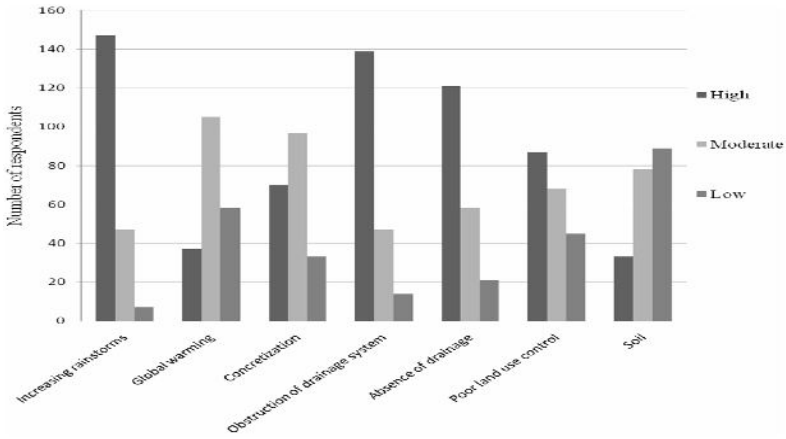
Figure 4: Map of Benin and its Surrounding Villages

METHODOLOGY

The study was conducted from 2013- 2015, in Benin City, Nigeria. 2013 was committed to understanding the flood prone areas, the cause and impact of flooding on human habitations, their resilience and adaptive. Data collected from the field were used for the study (i.e. physical observation, in-depth interviews, closed group discussions and deductions from other secondary sources). Locations of significantly flooding were identified, so that informants would have been affected by flooding or are likely to have some awareness of the event in their 'local community". Flood endemic streets identified during the rainy season/flooding period of 2013 were Ugbowo, Uselu, Urubi, Oliha and Ogbelaka Quarters.

Finding and Results

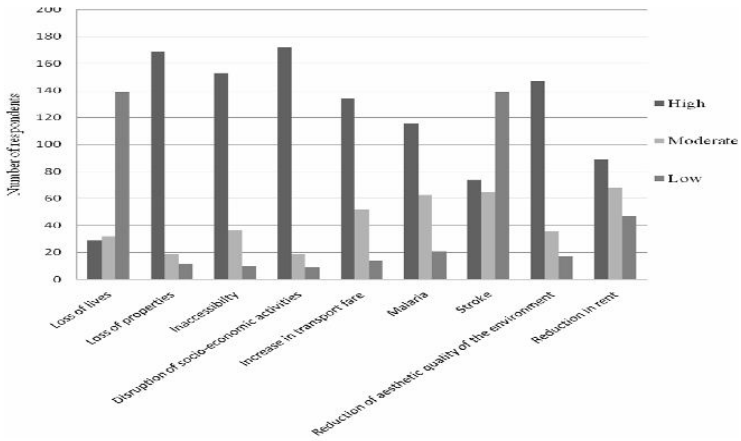
With respect to resilience to climatic changes in Benin a survey research recently conducted by Atedhor, Odjugo, and Uriril, (2011) was adopted for this paper. Figures 5 and 6shows the outcome of the survey with increasing rainstorms due global warming because more carbon dioxide and other forms of environmental pollutions are released into the atmosphere. The issue of obstructions or blockages of drainage systems was another major factor to flooding in Benin which the respondents vividly pointed out. The local government councils must see to the collection and disposal of refuse in order to overcome this challenge of having refuse blocking drainages whenever there is a heavy rainstorm in the city.



Source: Atedhor, et al, (2011)

Figure 5: Causes of Flood in Benin City

Figure 5 shows the results of the survey where the respondents indicated causes of flooding in Benin to be due first to increasing rainstorms, then followed by obstruction to drainage system, thirdly, the absence of drainage. Other causes of flooding in Benin were poor land use control in the city, the use of concrete in construction i.e. concretization, global warming and the soil type in the city. The major causes to flooding from this result cannot be separated from climatic changes and also lack of planning and the provision of drainage systems. Blockages of drainages with refuse is a social problem in Nigeria as a whole, in which the government needs to do more work in social orientation of the people with particular reference to how to properly collect and dispose refuse without leading to blockages of drainage systems.



Source: Atedhor, et al, (2011)

Figure 6: Effects of flood in Benin City

Impacts of Flooding in Benin

Investigations revealed that motorists traveling from east to Lagos were held up in Benin as a result of flood which covered Ikpoba bridge while traffic both into and outside Benin were also heap up for hours. In recent times residents of Benin and other erosion prone zones of Edo State as well as the flood disaster victims, have been at the forefront of calls for the utilization of the N200 million ecological funds released to the federal Government for the purpose of de-flooding the state capital and other zones (Ilaboya, et al 2011). Floods not only damage building and endanger lives, but have other effects as well (Ezemonye, & Emeribe, 2014). Figure 6 reveals that flooding has impacted adversely on people in Benin City mainly leading to disruption of socio-economic activities, loss of lives and houses, soil erosion and sediment deposition problems down stream, delay traffic and economic use of lands, inaccessibility and reduction of the aesthetic quality of the environment. Other impacts of floods in the selected areas of this study are increase

in transport fare, malaria, decrease in rent and increases health issues (stroke). Based on field observations, houses in Ogiso area, Ewa road areas and upper mission area were flooding resulting from rainstorms. Buildings owners in the flood areas died of stroke due to the trauma occasioned by the loss of their properties as shown in figure 7

Source: EDSG (2009)

Figure 7: Impacts of Flooding in Benin City

Adaptive Strategies

Due to the adverse effects of flooding, different adaptive strategies were observed to have been adopted by the people who live in the selected flood areas of Benin City. These adaptive strategies show the resilience of the people to challenge of flooding that they often face particularly in the raining season. Where the floors of buildings are permanently covered with flood water, occupants are forced to relocate out of the flood area and where adjoining streets are flooded, wooden narrow bridges are constructed over the flood. Embankments are also constructed to prevent water from entering residential houses. These types of embankments are either concrete or sandy. Due to the vulnerability of earthen materials to erosion, residents also use old vehicle tires filled with sand to create raised platforms through which they get into their homes. Windows and in some cases doors were coveredwith nets in the flood areas to prevent mosquitoes from getting into houses. According to some of the respondents who operate shops in the flooded areas, while floods have hindered normal patronage of some goods and services, increase in sales of rubber footwear have been experienced. This high patronage is because rubber footwear is more suitable for flood environments compared to leather footwear which easily wears out when exposed to water.

Source: Atedhor, et al, (2011)

Figure 8: Raised Walkway with Old Vehicle Tires as a Strategy for Resilience to Flooding

CONCLUSIONS

Resilience has proven its efficiency as it forces victims to reflect on the pre and post crisis temporalities and urges them to take into consideration the disaster memory by developing diachronical comparisons to combine/fit together/confront the temporal and spatial scales. The deliberate use of notion makes it possible to historicise resilience, compare discourse and reactions of different societies confronted with disasters, in other to understand resilience change. Traditional courtyard houses that shaped the Benin typical home for centuries is being replaced by contemporary houses today. Surface morphology, showed that the two house types are so different that there seems to be no gradual process for the transition.

However the study reveals that there were continuous and deliberate efforts to re-adapt the traditional living into the new contemporary space. From the result of findings, it can be seen that changing rainfall interfaced with anthropogenic factors such as non-expansion of drainage network, obstruction of drainage system, and poor land use control, are responsible for the increasing incidence of flooding in Benin City. Also flooding has impacted negatively on people in the flood prone areas, resulting in disruption of socio-economic activities and damage of houses.

Therefore, affected persons have adapted strategies/some forms of resilience to flooding challenge faced during the raining season. It is recommended forthwith that government should carry out rapid drainage redesigning and expansion in Benin City to meet the prevailing challenges of climate change and its resultant increase in rainstorms. In addition, proper land use control should be enforced to prevent people from building on flood prone areas. Finally, the domestic culture that engaged a fast and intense transition process still tries to preserve, underneath its surface, its old inherited value and in the course of change there exist conscious and unconscious efforts to direct it properly.

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