Ritchie, H., & Roser, M. (2019, June). *Gender Ratio*. Retrieved from Our World in Data: https://ourworldindata.org/gender-ratio

Sustainable Development. (2019). Retrieved from UNESCO: https://en.unesco.org/themes/education-sustainable-development/what-is-esd/sd

Sustainable Development Goals. (2020). Retrieved from United Nations: https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Weale, S., & Barr, C. (2018, August 10). *Female scientists urge research grants reform to tackle gender bias*. Retrieved from The Guardian: https://www.theguardian.com/education/2018/aug/10/female-scientists-urge-research-grants-reform-tackle-gender-bias

Women in Science. (2019, June). Retrieved from UNESCO Institute for Statistics: http://uis.unesco.org/sites/default/files/documents/fs55-women-in-science-2019-en.pdf

13 reasons why girls are not in school on International Day of the Girl Child. (2017, October 11). Retrieved from Their World: https://theirworld.org/news/13-reasons-why-girls-are-not-in-school

Asset-based Approach for Measuring Socio-Environmental Vulnerability of An Indigenous City of Ile-Ife, Nigeria

Grace OLOUKOI, PhD

Department of Environmental Management and Toxicology

Lead City University, Ibadan, Nigeria

oreofeadeniji@yahoo.com

+234 806 368 5892

Abstract

Using an asset-based approach to generate the Socio-environmental Vulnerability Index (SEVI) for inner part of Ile-Ife, an indigenous city in the South West Nigeria, this study examines some socio-economic and

environmental components that could make the study population vulnerable in the face of hazardous events. The study made use of both qualitative and quantitative data which were captured during the Osun State Urban renewal Project for Ile-Ife based on a spatial delineation of 1 km radius of the inner area of the town using the palace as the center. Measurable indicators were evolved to calibrate the data based on the UN-Habitat acceptable benchmarks for access to services in human settlement. Aggregate weighted averages of all indicators generate the SEVI for the study area. Outputs from the qualitative sources were also integrated into thematic discussion of data analysis. Overall, the SEVI value of 43.6% is obtained; this means close to half of samples are vulnerable. It also implies that the multiplier effect of any hazard event might impact the whole area given the compactness of buildings and population density. Specifically, Socio-Economic Status Index and Housing Quality Index (which account for 9.37% and 21.18% respectively) are critical components that may trigger the vulnerability of the area. The study concludes that availability of enormous social and cultural capital as evident in Ile-Ife without improved access to basic rights such as quality environment and opportunity for economic advancement would keep the area more vulnerable in event of social and environmental hazard.

Word Count: 248
Keywords: Asset, Vulnerability, Environmental hazard, Community facilities, Ile-Ife

Introduction

Globally, more attention is now directed towards reducing urban risk where socio-ecological succession and decadence are emerging because of the rate of urbanization that is more than the available resources. Presently, two third of the world population will live with estimation that close to 7 billion people will live in urban areas based on the existing growth rate 2050 (Ritchie, 2018. Approximately, 1.84% per year is expected between 2015 and 2020 and 1.63% per year between 2020 and 2025, and 1.44% per year between 2025 and 2030 and with (WHO, 2020). As good as the population growth is, cities are consistently at risk of environmental hazards and their vulnerability is not just

about the intensity or the frequencies of the hazards but the availability of assets that can enable urban dwellers to adequately respond and adapt to the impacts of these hazards. Climate change poses serious social risks, and already-vulnerable populations will be the most heavily impacted.

Urban slums which are mostly found in the core/inner parts of the city (Oloukoi *et al.,* 2017) is one of the top social risks zones (Cities at Risk, 2020); and that cities are expecting to feel the full force of climate change and vulnerability impacts in the coming years (IPCC, 2018). To build a resilient city in this regard, vulnerability assessment is important in order to understand, identify and quantify the security vulnerabilities in an environment and to plan a reactive solution accordingly. In environmental risk studies, vulnerability measurement is done to systematically evaluate the damage that could be caused by a potential disaster, the severity of the impact, and the available medical resources during a disaster to reduce population vulnerability and increase the capacity to cope with disasters whenever it comes (Du et al., 2015).

In climate change and developmental studies, vulnerability assessment incorporates a range of social and biophysical parameters by identifying key elements that can be categorized as adaptive capacity such as social capital, economic, and other assets (Adger, 2003; 2006). In Luers et al., 2003, Vulnerability measurement was done with consideration of agricultural yield in Mexico; which could be generalized for an equation that can be used to measure disease prevalence, mortality and income of households. In the Intergovernmental Panel on Climate Change (IPCC) reports, vulnerability is considered as the degree to which a system is susceptible to or unable to cope with, adverse effects of extreme weather events, climate change/variability and other risks (McCarthy et al., 2001; IPCC, 2018). Vulnerability therefore is a function of not just the magnitude of the stress/risk but the adaptive capacity of the system which is the function of all available assets spatio-temporarily.

In Nigeria, many studies have been done to show the state of inner city in terms of poverty prevalence and poor socio-economic characteristics (Fabiyi, 2013), insecurity of tenure (Agbola and Agunbiade, 2007), poor access to basic services (Adeniji and Ogundiji, 2009), crime and other forms of social insecurity during natural disasters such as flooding (Adelekan and Gbadegesin, 2005). Some other studies have considered vulnerability of some regions and correlate

them with livelihoods adaptation (Fasona *et al.,* 2011; Olukai *Et al.,* 2014), indicating that inner city areas are vulnerable to both natural disasters and social risks (Raheem, 2010, Oloukoi *et al.,* 2017). From these studies and some other national reports, there is aggregate data on national and regional vulnerability, but there is a need for specific micro-scale vulnerability assessments especially at community level of an urban setting with the use of indicators. The reason for urban contextualization is necessary because urban vulnerability is formed by different factors than rural vulnerability and this should be understood for sustainable urban development policies.

The present study therefore is set out to address this research gap by identifying some asset-based conditions available in the inner part of Ile-Ife and to examine how these conditions contribute to the vulnerability of the residents. Specific objectives of the study include: Identification of the socio-economic characteristics of the residents; determining the Socio-Economic Status Index (SESI) of residents and evaluating the assets-based components of the residents and using the aggregates to generate the Socio-Environmental Vulnerability Index (SEVI) of the inner city.

The paper has five sections. Section one is the introduction, followed by a brief literature review which provides some conceptual issues in section two. Section three explains the data and methodology approach. The fourth section focuses on the data analysis and discussion of findings while the last section provides a conclusion with highlights of recommendations based on gaps identified in the study findings.

Literature Review

Interest in the concept of vulnerability has arisen from the need to address the increasing numbers of people who have been affected by natural or man-made disasters. The United Nations Development Programme (UNDP) Human Development Report (2014) captured a global perspective of the challenge. Vulnerability was a concept used first by engineers to assess risk of building collapse and other problems, but today the concept is much more widely used, and can be taken to represent:

> '*A set of conditions and processes resulting from physical, social, economic and environmental factors which increase the*

susceptibility of a community to the impact of hazards' (UN-International Strategies for Disaster Reduction, ISDR, 2005:24).

Wratten (1995) mentioned that urban vulnerability has many dimensions: environmental, health risks, social and hazard-of-place. Socio-environmental vulnerability provides a linkage between the place (a geographic location) and the socio-economic conditions. This is represented as the social, economic, demographic, and housing characteristics and living conditions that influence a community's ability to respond to, cope with, recover from, and adapt to environmental hazards (Cutter, 1996).

In the literature, vulnerability assessment with the use of a composite index approach is proposed. This can explicitly incorporate indicators which combine factors that capture a country's proneness to shocks and its ability to recover from shocks (Dutta, 2010; Wim et al., 2009). Indicators have been used for policy making since the 1920s, (Fischer et al., 1996) because they have been recognized as important in providing quick understanding of the complexities associated with environmental management.

Indexing poverty and vulnerability have been used by development agencies especially at the international level to provide understanding to spatial distribution and mapping of vulnerability. An example of the index approach is provided by the Water Poverty Index (WPI) (Sulivan and Meigh, 2005), Climate Vulnerability Index (Sullivan, 2010) and Water Vulnerability Index (WVI) (Oloukoi, 2014). Wilches-Chaux (1989) identifies 11 different forms of vulnerability, including natural, physical, economic, social, political, technical, ideological, cultural, educational, ecological and institutional vulnerability (Wilcher-Chaux cited in Bankoff et al., 2004:11) which could be examined singly or in combinations.

In particular, the assets-based vulnerability framework was developed by Moser (1998) and it includes: labour, human capital and health status, productive assets, household relations and social capital. Moser applied this asset framework in a comparative urban communities study in Zambia, Ecuador, the Philippines and Hungary. The asset framework goes beyond a static measuring of the poor, toward classifying the capabilities of poor populations to use their resources to reduce their vulnerability (Moser 1998:14) but with

focus on livelihood vulnerability based on available capitals (Sime and Aune, 2019).

Makoka and Kaplan (2005) identified some other models measuring vulnerability. These include:
The Economics Approach: developed by the United Nations University-WIDER (2008);
The Environmental and Development Approach: of importance is *the* Commonwealth Vulnerability Index (CVI), developed in 2000;

*The Environmental Vulnerability Index (*EVI) was developed by the South Pacific Applied Geoscience Commission (SOCAP) and the United Nations Environment Programme (UNEP);
Prevalent Vulnerability Index: The Prevalent Vulnerability Index (PVI) was developed by the Inter-American Development Bank.

Other models include: Environmental health indicators and poverty-housing indicators, which monitor housing conditions of poor people and how they affect and are affected by their poverty/vulnerability situations.).

Data and Methods

The study area

Ile- Ife is an indigenous town in Osun State of Nigeria. It is otherwise regarded as the cradle of the Yoruba race. It is about 100 kilometres from Akure, the Ondo State capital, 200 kilometres from Lagos the commercial nerve of Nigeria, and about 56 kilometres from Osogbo, the Osun State Capital. The town lies between latitude 7^{0}.0N and 7.^{0}35'N and Longitude 4^{0}.20'E and 4^{0}.45'E of the Greenwich Meridian (Figure I). Ile-Ife has an average maximum/minimum temperature of 29^{0}C/24^{0}C; average annual rainfall of about 1800mm and the relative humidity at dawn is about 75 percent (Oloukoi et al., 2014).

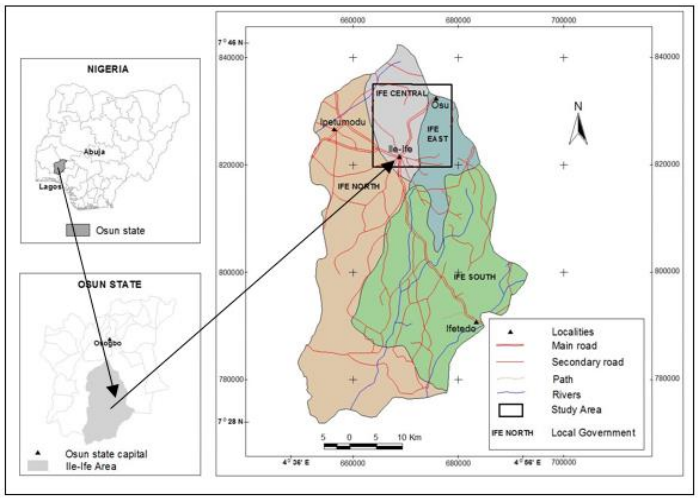

Figure I: The Study Area

Source: Oloukoi *et al*. 2014:132

Historically, there exist many versions of the evolution of Ile-Ife as the seat of the Yoruba race who migrated from the far-east led by Oduduwa. The present day Ile-Ife has about thirteen village communities each of these communities was in existence with their rulers presiding over them and wearing beaded crowns (Akinjogbin, 1992). The village settlements were located within a splendid valley surrounded by steep sided hills. With time and due to the disappearance of a central defense system, the villages are almost annexed with the main town providing a form of urban sprawl (Ikhuoria, 1999).

Demographically, National Population Commission Census report (NPC, 2006) indicated the population of Ile-Ife was at 355,341, a figure derivable from the two local government areas (Ife Central and Ife East) that make up the urbanized area of Ile-Ife. Using an interpolation of 2.8% annual growth rate, the city has a population of 523,057 in 2020. The built-up areas have also increased by average change of 4.65 Km^2 per year between 1986 and 2009 (Oloukoi *et al*. 2014)

Data Types and Sources

The base map for the delineation of the study area was generated from the aerial photograph of Ile-Ife which was produced by the Osun State Government in 2011. The Urban Renewal Committee of Ile-Ife demarcated one (1) kilometre radius with the Enuwa's Palace of the Ooni of Ife as the centre. This is adapted

after Abumere (2006) that slum areas of inner city are within 1 km radius. The delineated area of one-kilometre radius covers part of Ife Central and Ife East Local Government Areas (Figure II).

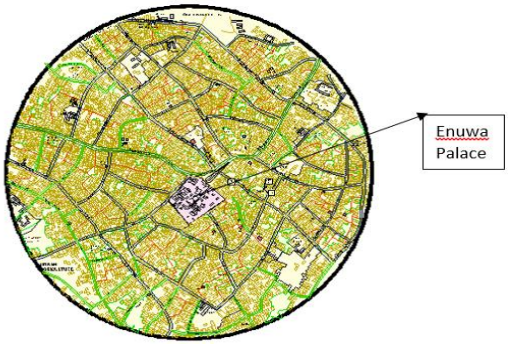

Figure 2: Delineated area of 1 Km Radius of the inner city of Ile-Ife
Source: Osun State Urban Renewal Project for Ile-Ife, 2013.

Data capturing and Sampling Procedure

In the field of Sustainable livelihoods, Social scientists in particular derive metrics for vulnerability across space and time particularly at national level (Cutter et al., 2003; Adger, 2006). Research in vulnerability mapping uses triangulation of data from qualitative and quantitative for a more robust policy oriented analysis (Brooks *et al.,* 2005). In this study, the triangulation approach was adopted where the survey provided the quantitative data and observation and stakeholders' forum was used to generate qualitative data.

This study used the base data of the socio-economic survey of the Urban Renewal Project of Ile-Ife which was done in February and March 2012. The pre-survey exercise includes annotation of existing housing units based on the livability criteria (such as building structures that are being inhabited by at least one person) was done. A total of 1,401 units were identified and numbered. The socio-economic survey was based on 100 percent purposeful sampling of the existing housing units in the study area.

Household Survey

The survey targeted one household within each housing unit while the household heads were the respondents. Where it was impossible to get the

household heads, the most elderly person within the housing unit was considered. Study variables in the questionnaire include: demographic information, residents' access to services, housing and environmental conditions, governance and availability and usability of cultural facilities.

Data Analysis

Descriptive analyses include use of percentage and frequencies for all variables. The frequencies on the socio-demographic data provided information for the determination of the Socio-Economic Status Index (SESI). Spearman correlation was used as the inferential statistics to correlate the SESI and SEVI. The SESI forms the independent variable while the SEVI is the dependent variable. The SESI is derived from Adeniji and Ogundiji (2013), Fernald (2007). SESI is defined as the mean value of (1) the percentage of the workforce employed in the quaternary (Information based) sector (professional, managerial, technical, and administrative jobs) plus (2) the percentage of the population with University education and (3) the percentage that earn more than the national minimum wage.

Socio-environmental Vulnerability Index (SEVI) is the weighted average of the entire asset index. The UN-Habitat (2003b) indicators for housing quality and slum assessment were used to determine the acceptable benchmarks which indicate the percentages of the households that are enjoying certain services.

Based on literature, the composite of the following indicators are used to measure SEVI of the study area:

Social Capital Index: this includes participation in community association, contribution to community development, opportunity and nature of relationship that can help members to respond to disaster in that these factors are primary affiliation for social capital development.

Housing Quality Index: this includes materials for building structure, building conditions, building density and air space between buildings.

Environmental Quality Index: condition of the living environment, location of residences, sources of energy for cooking and lighting, waste disposal and access to water and sanitation.

Socio-economic Advancement Opportunity Index: availability of services such as market, transportation, communication, education *(*access, utilization and quality of education services, distance of schools to residences), security facilities (availability and accessibility) and health care (availability and distance of medical care centres to residence) in the community.
The Cultural capital Index was limited to the presence and functionality of historical and cultural facilities.

In this study, the methodology framework based on the concepts of assets, vulnerability and risks is presented in figure 3. Here, livelihood assets are linked to the vulnerability indexes, the magnitude of the shocks are also linked with the available assets and the vulnerability index of a locality. Again, policy and institutions have influences on available assets and the vulnerability outcomes.

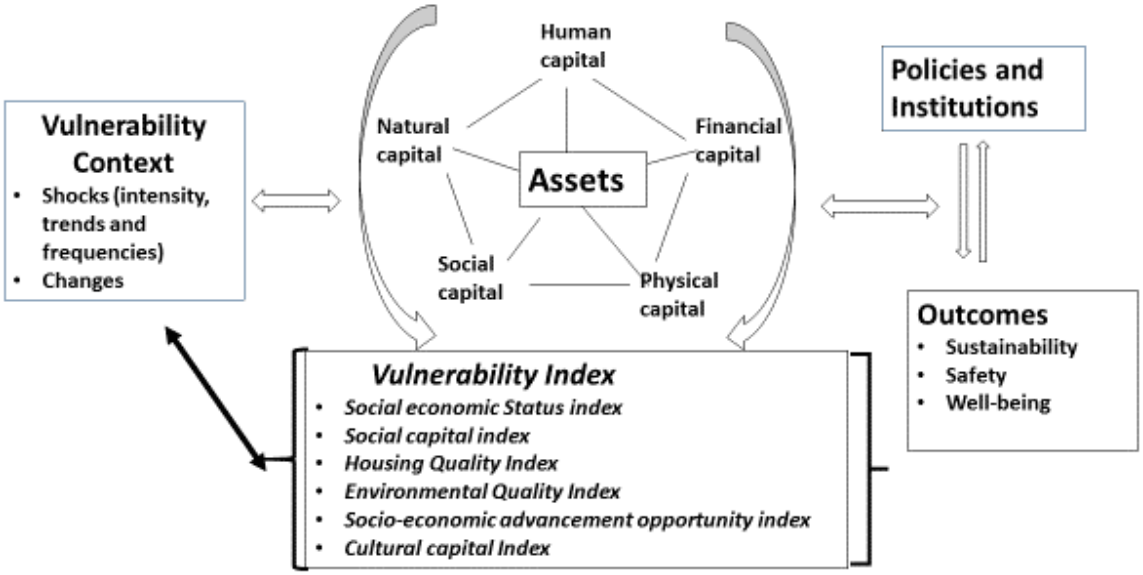

Figure III: Conceptual Framework for asset-based vulnerability study in a local context
Source: Author's Conceptualization, 2020

I. Results and Discussion

Socio-economic Characteristics of the Respondents

Table I: Socio-demographic profiles of respondents

Variable	Value Labels	Percentages (%) N=1260
	Male	45
Gender	Female	55
	Less than 18	0.9
	18-30	13.7
	31-40	65.2
	41-50	11.3
Age (years)	50^{+}	8.8
	Single	7.5
Marital Status	Married	70.8

	Widowed	19.7
	Separated	2
	Primary	34.3
	Secondary	29.9
	Tertiary	6.9
Education status	No formal education	28.9
	Christianity	68.1
Religion Affiliation	Islam	23.4
	Traditional	3.8
	Others	4.7
	Public sector Employment	20
	Farming	20
	Craftsmanship/artisanship	11.9
	Trading	44.5
Occupational structure	Private sector Employment	3.6

Socio-Economic Status Index (SESI)

Research Question: What is the Socio-economic status index of the study population?

The analysis is done in order to achieve objective 2 and to answer the research question stated above. The aggregate mean value of the SESI value of 9.37% (Table 4.2) indicated that more than nine tenths of the population has low socio-economic status.

Table II: Derivative of the Socio-Economic Status Index (SESI)

Variables	Occupation (1) (quaternary)	Education (2)	Monthly Income (per household) (3)	Mean of % (1), (2) & 3
Percentages	12.1 %	6.9 %	9.12 %	9.37 %

Note: Occupation: percentages of households working in the non-primary economy, education: percentages of households with post-secondary school certificate, Income: The National Minimum Wage of N19, 000 is the reference point for income analysis.

Based on the results shown, the population's socio-economic status is low. They do not have the financial capability to cope with occurrence of hazard in the community. It is also clear that the coping capacity of the people would be far below the severity of any environmental damages. In a country such as Nigeria where adaptation to hazards is mostly autonomous, the effects of such hazards could make the people more vulnerable, not just because of the degree of the event, but because the people are already incapable of coping with the shocks and the uncertainties.

Asset-based Conditions in the Inner City of Ile-Ife

Research Question Four: *What are the asset-based factors available in the inner city of Ile-Ife?*

To answer the above question, sub-components of asset-based vulnerability indicators are discussed in the following subsections:

1. Housing Quality Index (HQI)

Analysis of building characteristics in the study area (Table 4.3) shows that 76.5% of the houses are Brazilian face-to-face. 20.2% are compound houses while only 2.9% are storey buildings. 34.4% of the houses are inhabited by a single household, 15.8% have 6 households. Most of the buildings are very old with more than 70% having ages above 55 years. Also, the study revealed that 27.2% of the houses are occupied by at most 6 persons, 10.2% by 10 persons and 11% by more than 10 persons. In some buildings, most rooms are not inhabited leaving the houses with minimal number of occupiers which may result in low population density. Housing density analysis shows that 47.2% of the buildings occupy more than 70% of the plot areas. 39.2% occupy between 60 and 69 percent (Table 4.3).

Table III: Building Characteristics

Variables	Value label	Frequencies	Percentages	% within the acceptable line
No of floors	1	885	85.8	
	2	128	12.4	
	3	19	1.6	
Nature of occupancy	Owner-occupied	816	64.9	
	Rented	438	34.8	
	Free lease	4	0.3	
Materials used for wall	Mud	987	82.6	16.1
	Sandcrete	192	16.1	
	Others	16	1.3	
Materials for decking	Concrete	196	31.6	31.6
	Plank	320	51.5	
	Others	105	16.9	
Roofing materials	Aluminium	55	4.6	4.6
	Asbestos	28	2.3	
	Corrugated sheets	1,111	93.1	
Wall finishes	Plastered	822	66.1	16.3
	Plastered and painted	202	16.3	
	Not plasted	219	17.6	
Wall condition	Cracked	686	56.0	28.9
	Fairly Good	354	28.9	
	Dilapidated	186	15.1	
Needs of repair	None	323	25.1	25.1
	Major	612	47.5	
	(redevelopment)	295	37.4	

	Minor (rehabilitation)			
Air space in between buildings(metres)	Less than 1m	545	43.4	37.2
	1-4m	244	19.4	
	5-9m	390	31.0	
	10m and above	78	6.2	
Land coverage ratio (%)	Less than 50	121	9.6	9.6
	50-59	50	4.0	
	60-69	493	39.2	
	70-79	594	47.2	
Average of the percentages of variables within the acceptable line				**21.18**

Note: The Acceptable line is based on the benchmark of the UN-Habitat, 2003

A deduction from this analysis is that the study area exhibits high housing density. Many of the buildings have less than one metre air space in between buildings while only 31% have 5 metres and 19.4% have 1 to 4 metres of air spaces (Table 4.3). High housing densities with inadequate air space that are evident in the study area have implications for propagation of urban slum, crimes and public ill health. Averages of acceptable values of the variables in Table 4.3 indicated that the housing quality index of the inner city of Ile Ife is 21.2 %. This implies that one –fifth of the houses in the study area are not at risk in case of any hazard and that the occupants of about 80 % of the houses are vulnerable.

2. Environmental Quality Index (EQI)

This section covers residents' access to sanitary facilities, energy for cooking, water supply and waste disposal methods.

The main source of water supply for drinking and other households are hand activities dug wells which accounts for 95.9%, 76.1% of which travel at most 500 m for water collection. The discussion at the Stakeholders Forum revealed that the electric supply is very erratic. The implication of this is that the source of livelihood for the informal service sector in the study area is already collapsing. Charcoal and firewood are the major sources of energy for cooking, and this has implications on the woodlands in the study community

and also constitutes a form of indoor pollution which has implications for the health of the residents.

The survey and the observation indicated that the physical environment of the study area is very poor, dirty and risky to healthy city conditions. 13.2% respondents point out that there have been occurrences of communicable diseases in their areas which are mostly caused by poor drainage (53.5%), dirtiness (27.6%) and overcrowding (8.2%).

The aggregate mean value for the Environmental Quality Index is 44.8 % which captures water and sanitation issues, environmental conditions and energy usage. By this analysis, the condition of environmental sanitation of the study communities is very poor and this may have a serious implication on the environmental health status of the residents of the neighbourhoods and the entire Ile-Ife region by a cause-effect scenario. The average environmental health index for the inner city of Ile-Ife is low.

3. Socio-economic Advancement Opportunity Index (SEAOI)

To calculate SSAI for the study area, variables such as availability and distance covered to enjoy health care services, educational (schools and training centres), service roads and drainages, cultural and recreational services are considered.

Majority (58.5%) of the respondents indicated that there are adequate retails shops and markets in the area. Most residents (87%) are within 200 meters to retail shops while 45% are within 750-1000 meters to the main city market. The weighted average for access to transportation and retail services is 45.8%.

The study area has collector roads which are particularly used as service roads, access roads are not visible and where they exist because of roadside trading. The communities use open drainage systems, many portions of which are blocked with debris of solid wastes. This affects the flow of run-offs and may trigger flooding during the rainy days. The weighted average score is 45.8%.

Apart from security services provided by the Nigeria Police Force, there are a number of community vigilante groups which serve about 78.8% houses in

the locality. Services provided by this community police scheme are rated by the respondents in which 44.6% indicated that the services are very effective. 40.3% are of the opinion that the services are fairly effective and only 4.1% indicated that the services are not effective. Generally, individual households and the local government authority pay for the Vigilante's security service accounting for 90.8% and 8% respectively. In the light of this finding, it is important to strengthen the community security service scheme. There are no fire services within the study neighbourhoods. 37.6% respondents indicated that the existing fire service station in the town is about 1 to 2 km to the study area.

The weighted average for access to security services is 60%

Some residents, (40.2%) respondents indicated that there is a postal agency in the neighbourhood. For the electronic medium of communication, radio dominates. 99.2%. Access to television sets is also very high with 93.1% households in possession of the gadget. In the view of one of the participants of the Stakeholders' forum, the importance of access to mobile telephone in this decade by most Nigerian is actually a means of supporting retail services, forming a form of service industry itself but has influenced a reduction in interpersonal interaction. Average aggregate for access to communication services is 95%. The implication of this finding is that the people can easily be networked during information sharing and it could be possible to provide early warning systems during disaster emergencies by using the mobile telephone services.

There were a number of education facilities in the study area. These include nursery, Primary, Secondary and tertiary institutions. The accessibility (that falls within the acceptable benchmark of the population to these facilities gives a weighted average of 62.9%. In the survey, households'' access to health care services were captured. The result shows that various hierarchies of health care facilities are available comprising primary health care centers, general and teaching hospitals within the town. The percentage of population that can access health care services within the minimum range is 54.5%. The discussion at the Stakeholders' Forum however revealed that services at the higher order health care services are not affordable and also not accessible especially during labour crises. To determine the value for Socio-economic Advancement

Opportunity Index (SEAOI), weighted average for access to transportation and retails services, communication services, security services, health and education services A composite value of 63.6 is obtained for the SEAOI.

Table IV: Composite Value for Socio-Economic Advancement Opportunity Index

Indicators	Percentage value
Access to retails and transportation services	45.8
Access to communication services	95.0
Access to security services	60.0
Access to health care services	54.5
Access to educational services	62.9
Weighted Average	**63.6**

4. Cultural Capital Index

Recreation facilities in the study area include a museum which is owned by the public sector and a sport centre which is also owned by the public. 75 % of the respondents indicated that they have ever visited some of the available cultural and historical sites such as. With multiple options, the following were selected: Ife Museum (68.2%), grove (2.5%), shrine (41.9%), historical buildings (10.4%), tombs and grave (37%), Average of Access to cultural services is 31.5%.

More revelation into the value-based relationship between the people of the residents of Ile-Ife and cultural heritage was provided during the Stakeholders' Forum. Many of the participants indicated that the land is rich with many historical and cultural resorts in which they will not want a redevelopment that will displace such. For instance, some participants advocated that burial grounds of their ancestors are legacies that weld the past with the present; they wished such are not tampered with in case the government is planning to rehabilitate the inner city.

The value judgement of the people is essential and it carries more weight especially in the need to have participatory planning for human development and aesthetic environment.

5. Social Capital Index

The survey shows that 50.9 % of the respondents are in one voluntary organization or the other. These are *Egbe Omo Ibile* (14.3%) and Trading Associations (85%). During the Stakeholders' forum, it was revealed that the residents of Ile -Ife expect the local government in particular to rise to the provision of basic services. Hence, the Social Capital Index of 50.1 % is yet to be mobilized as a coping capacity for urban revitalization.

Summarily, the asset-based conditions in the study area include, socio-economic capacity, access to housing and environmental quality, access to socio-economic improvement opportunities, social networks and cultural facilities.

Determining the Socio-environmental Vulnerability Index (SEVI) for the study area

Research Question Four: How do these conditions contribute to socio-environmental vulnerability of the study area?

Table V: Aggregate value of Socio-Environmental Vulnerability Index of Inner City of Ile-Ife (SEVI)

S/N	Components	Sub-components	Index value
1	Socio-Economic Status Index	Income, employment and educational status	9.37
1	Housing Quality Index (HQI)	Building materials and conditions	21.18
2	Environmental Quality Index	Access to water, sanitation, location of building etc	44.8
3	Socio-economic Advancement Opportunities Index (SEAOI)	Access to communication, security, health, education, retails and transportation	63.64
4	Social Capital (SCI)	Availability and functionality of social networks	50.10
5	Cultural Capital Index (CCI)	Availability of cultural and recreational facilities	95.00
Weighted average			47.4

Note: the less the percentages, the higher the contribution of the component to the severalty of the vulnerability

The summary of aggregates that were generated for all the subcomponents of the SEVI indicated a weighted average of 47.4 % (Table 5). The implication of this result is that more than half of the population in the study area is vulnerable to some hazards in case of eventuality based on their asset-based analysis. For a neighbourhood that is compact, it can be concluded that all the population are vulnerable because of the high spread effect of any hazard especially health-risks, flooding and fire outbreak.

This result also indicates that socio-economic status, housing quality and environmental quality are the critical components that contribute more to the vulnerability of the study area. This implies that intervention to reduce the vulnerability of the population in the inner city must target improved socio-economic status, improved housing services and environmental quality.

Conclusion

The weighted average of 47.4 % is obtained for the SEVI. The implication of this result is that more than half of the population in the study area is vulnerable to some hazards in case of eventuality based on this asset-based analysis. For a neighbourhood that is compact as we have it in the inner part of the indigenous town of Ile-Ife, it can be concluded that all the population are vulnerable because of the high spread effect of any hazard especially health-risks, flooding and fire outbreak. This result has implications for a quick revitalization of the study area in order to safeguard the inner city especially towards improved socio-economic status, better quality of life in relation to housing and environmental conditions. Residents' access to quality housing and a quality environment is low. This means that until these basic services are provided for, other forms of investments may not yield significant improvement in building resilience of Ile-Ife. The study therefore recommends the followings:

a) Policy Entry Point: The United Nations document E/C.12/2002/11 produced by the Committee on Economic, Social and Cultural Rights, Geneva, November 2002, established the international position on the right to quality housing water and sanitation. Osun State of Nigeria and the Local Government areas in Ile-Ife must rise to this policy implementation at community level.

b) Community Engagement: On the part of the residents of the inner city of Ile-Ife, a behavioural shift towards a sustainable environmental sanitation is essential in order to improve the quality of the environment. Open defecation, indiscriminate dumping of refuse should stop. Areas with dilapidated structures are reportedly to be hideouts for operators of social vices. It is important that such areas are opened up and turned to an open space if the concerned families are not responding to rehabilitate them.

c) Economic Revitalization: Improving the socio-economic status of the residents may include absorption of many of the youths into informal trading services and encouraging them to get involved in some of empowerment projects that are in place in Osun State. It is possible that once the population is economically productive, income level will increase and this may enable some of them to pursue additional educational degrees towards improving their socio-economic status.

As shown in this paper, location-specific social and environmental vulnerability is important in order to pursue sustainable adaptation at local level. At a micro-level, this assessment is also needed so that policy focus should be shifted to the assets of the people rather than the hazard because there is a strong correlation between socio-economic status of the people, the level of their access to livelihood assets and their capacities to cope with a disaster once it takes place.

References

Adelekan, I. and Gbadegesin, A.S. (2005). Analysis of the perception of climate change issues in an indigenous Africa City. *International Journal of Environmental Studies* 62(1)115-224.

Adeniji, G. and Ogundiji, B. (2009). Climate Adaptation in Nigerian Cities: Regularising Informal and Illegal Settlements in Ibadan. *Paper presented at the 5th Urban Research Symposium,* Marseille, France, June 28-30, 2009.

Adger, W.N., Brooks, N., (2003). "Does global environmental change cause vulnerability to disaster?" in: Pelling, M. (ed.), Natural *Disasters and Development in a Globalizing World*. London, Routledge, pp. 19-42.

Adger, W.N. (2006). Vulnerability. *Global Environmental Change*. 16, 268-281.

Agbola, T. and Agunbiade, E. M. (2007). *Urbanization, Slum Development and Security of*

Tenure: The Challenges of Meeting. Paper presented to the PRIPODE workshop on Urban Population, Development and Environment Dynamics in Developing Countries, Nairobi.

Akinjogbin, I. A. (1992). "The growth of Ife from Oduduwa to 1800" in Akinjogbin, I. A. (ed.), *The Cradle of a Race: Ife From the Beginning to 1980*, Sunray, Lagos, pp. 96-121.

Bankoff, G., Frerks, G. and Hilhorst, D. (eds.) (2004). Mapping Vulnerability, Disasters, Development and People. Mapping Vulnerability. *Disasters, Development and People*. London, Earthscan. 10.4324/9781849771924.

Batty, M, Xie, Y, & Sun, Z (1999). The Dynamics of Urban Sprawl. ,. (L. Centre for Advanced Spatial Studies (CASA), Ed.) *CASA Working Paper Series, Paper 15*.

Bryman, A. (2008). *Social research methods*. 3rd Edition. Oxford University Press, Oxford.

Cannon, T. (2006). "Vulnerability analysis, livelihoods and disasters' in Ammann, Dannenmann and Vulliet (eds.), *Risk- Coping with risks due to natural hazards in the 21st century*. London, Tylor & Francis group, pp. 41-49.

Cities at Risk (CDP, 2020). Cities at risk: dealing with the pressures of climate change. Available at https://www.cdp.net/en/research/global-reports/cities-at-risk. Acced on June 3, 2020.

Cutter, S.L. (1996). Vulnerability to environmental hazards progress. *Human Geography,* 20, 529-539.

Du, Y., Yibo Ding, Zixiong Li, and Guangwen Cao (2015). The role of hazard vulnerability assessments in disaster preparedness and prevention in China, *Military Medical Research*. 2015; 2: 27. doi: 10.1186/s40779-015-0059-9

Dutta, I., Fosta, J., Mishra, A. (2010). On Measuring Vulnerability to Poverty. *Seminar Paper on Social Vulnerability*. University of Oxford, United Kingdom.

Eric Tate (2013) Uncertainty Analysis for a Social Vulnerability Index, Annals of the Association of American Geographers, 103:3, 526-543, DOI: 10.1080/00045608.2012.700616

Fabiyi, O. (2013). Analysis of spatial concentration of community poverty in Kwara State, Nigeria: Regionomics or small area analysis. *A seminar paper presented at the Regional Centre for Training in Aerospace Surveys*, Ile-Ife, Nigeria, Nov 13.

Fasona, M., Tadross, M., Abiodun, B., & Omojola, A. (2011). Local climate forcing and eco-climatic complexes in the wooded savannah of Nigeria. *Natural Resources*, *20*, 155-166. doi:10.4236/nr.2011.

Fisher, J. A., Patenaude, G., Meir, P., Nightingale, A.J., Rounsevell, M.D.A., Williams, M. and Woodhouse, I.H. (2013). Strengthening conceptual foundations: analysing frameworks for ecosystem services and poverty alleviation research. *Global Environmental Change*, 7(12), 15-31.

Fisher, B., R.K. Turner, P. Morling (2009). Defining and classifying ecosystem services for decision making. *Ecology Economics*, 68 (3) (2009), pp. 643-653

Füssel, H. and Klein, R. (2002). Assessing vulnerability and adaptation to climate change: an evolution of conceptual thinking. *Paper presented at the UNDP Expert Group Meeting on 'Integrating Disaster Reduction and Adaptation to Climate Change'*,

Havana, Cuba, 17-19 June.

Ikhuoria, I.A. (1999). SPOT satellite detection and analysis of urban spatial growth regimes in a pre-colonial African city. *Geo Carto International,* 4:49-52. Intergovernmental Panel on Climate Change (IPCC, 2018). Summary for Policymakers. In: Global Warming of 1.5°C. *An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways in the*

context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.). In Press.

Luers, A.L., Lobell, D.B., Sklar L.S., Addams, C. L. and Matson, P.A. (2003) A method for quantifying vulnerability, applied to the agricultural system of the Yaqui Valley, Mexico. *Global Environmental Change,* 13 (4):255-267.

Makoka, Donald & Kaplan, Marcus. (2005). Poverty and Vulnerability - An Interdisciplinary Approach, *MPRA Paper*. University Library of Munich, Germany Moser, Caroline O. N. (1998). The asset vulnerability framework: re-assessing urban poverty reduction strategies. *World Development,* 26(1), 1-19.

National Population Commission (NPC, 2006). *Population Census final results*. Federal Republic of Nigeria, Official Gazette 2009, 96(2), 41-42.

Naude, W., Santos-Paulino, A. and McGillivray, M. (2009). Measuring Vulnerability: An Overview and Introduction. *Oxford Development Studies*. 37. 183-191.

Oloukoi, G. (2014). Application of the Water Vulnerability Index in Oke-Ogun region, Nigeria. *African Journal of Sustainable Development (AJSD),* 4(2), 199−216.

Oloukoi, G., Adeoye, N. Adeboyejo, G. and Emmanuel, O. (2018). Perspectives on the vulnerability of inner cities in Sub-Saharan Africa: Is SDG-11 a reality? In. Oredein, A. Robbin, A and Ola, T. (Eds.), *Education and International relations for National Development.* College Press and Publishers, Ibadan, Nigeria. Pp 405-423

Oloukoi, J., Oyinloye, R. and Yadjemi, H. (2014). Geospatial analysis of urban sprawl in Ile-Ife city, Nigeria. South African Journal of Geomatics, 3(2), 128-144. *DOI: http://dx.doi.org/10.4314/sajg.v3i2.2*

Osun State Urban Renewal (2013). *Final Report on Urban Renewal Project of Ile-Ife City,*

Osun State Government Urban Renewal Committee. Unpublished.

Raheem U.A. (2010). Global environmental change and human health: A thought on the

African inner city. *Global Environmental Change Update*, 10 (5), 2-13.

Ritchie, H. (2018). Urbanization, *Published online at OurWorldInData.org.* Available at https://ourworldindata.org/urbanization. Accessed August 17, 2020

Sime, G and Aune, J. B (2019). Rural livelihood vulnerabilities, coping strategies and outcomes: a case study in central rift valley of Ethiopia. *African Journal of Food, Agriculture, Nutrition and Development,* 19(3), 14602-14621

Sullivan, C and Meigh, J. (2005). Targeting attention on local vulnerabilities using an

integrated index approach: The example of the Climate Vulnerability Index. Water science and technology: a journal of the International Association on Water Pollution Research. 51. 69-78. 10.2166/wst.2005.0111.

Sullivan, C.A. and Meigh, A.M. (2003). The water poverty index: Development and

application at the country scale". *Natural Resources Forum, No.* 27, 189-199.

Sullivan, C.A. (2011). Quantifying water vulnerability: a multi-dimensional approach. *Stoch Environ Res Risk Assess*25, 627-640.

United Nations Development Programme (UNDP, 2014). *The 2014 Human Development*

Report - Sustaining Human Progress: Reducing Vulnerabilities and Building Resilience. Retrieved from http://hdr.undp.org/en/2014-report (accessed on February, 10, 2015).

UN-Habitat (2003a). *Guide to Monitoring Target 11: Improving the Lives of 100 Million*

Slum Dwellers, UN-HABITAT, Nairobi.

UN-Habitat (2003b). *The challenge of slums: Global Report on Human Settlements*.
London, Earthscan Publications Ltd.
United Nations International Strategies for Disaster Reduction, UN-ISDR (2005). Hyogo
Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. Hyogo: UN-ISDR.
Wilches-Chaux, G. (1989). *Desastres, ecologismo y formación profesional*.
Colombia:
SENA, Popayán.
Wim Naudé, Amelia U. Santos-Paulino and Mark McGillivray (2009). Measuring Vulnerability: An Overview and Introduction, *Oxford Development Studies*, 37(3), 183-191, DOI: 10.1080/13600810903085792.
Wisner, B., Blaikie, P., Cannon, T. and Davis, I. (eds.) (2004). *At risk: natural hazards,*
people's vulnerability and disasters. 2nd ed., London, Routledge.
World Commission on Environment and Development, WCED (1987). *Our common future*
(The Brundtland Report). Oxford University Press, Oxford. Available at http://www.worldinbalance.net/pdf/1987-brundtland.pdf. Accessed on November 7, 2011).
World Health Organization (WHO, 2020). Urban population growth. Available at https://www.who.int/gho/urban_health/situation_trends/urban_population_growth_text/en/. Accessed August 17, 2020.
Wratten, Ellen (1995). Conceptualizing urban poverty. *Environment and Urbanization,* 7(1),
11-37.
Yamin, F., Rahman, A. and Hug, S. (2005). Vulnerability, adaptation and climate disasters: a conceptual overview". *IDS Bulletin*, 36(4).

Cultural Capital as a Facilitator of Career Success for Women in Nigeria