



URBAN RESILIENCE: ADAPTABILITY AND SUSTAINABILITY OF CITY TO DISASTER IN BIRNIN KEBBI, NIGERIA.

***TPL. OYELADE IMOLE AND **TPL. OYEDIRAN KAYODE.**

&*Department of Urban and regional planning, Waziri Umaru Federal Polytechnic, Birnin Kebbi, Kebbi state, Nigeria

ABSTRACT

The Research studied on urban resilience: adaptability and sustainability of city to disaster in Birnin Kebbi, Nigeria. The Aim of this study is to examine the resilience nature of Birnin Kebbi's city in Nigeria and establish the constituents of threats in the area. The Objectives are to identify the current environmental threats to the people living in the area; to examine possible governance failure towards building resilience in the study area and to identify some economic importance derived from building resilience. This study adopted both primary and secondary data. The primary data made use of questionnaires which were administered to 125 professionals in the built environment within the study area. Data Analysis was done using frequency, percentage and weighted Average. The Study revealed that Covid-19, flooding, and environmental degradation are the most common environmental threats posed within the study area, the failure of governance processes in areas such as regulatory challenge, financial challenge and socio-economic challenge among others while also identifying the benefits of building resilience. The study recommends promotion of green infrastructure; building institutions, government agencies, and civil society to strengthening the governance structure and at the same time promote good urban governance.

Key words; Urban; Resilience; Climate; Disaster; City and Shocks.

INTRODUCTION

Urban resilience performs a central role in the new urban policy agenda. This is evident in academic literatures on cities, urbanization and other links with disaster and climate change. Cities and urban areas are generally linked to be dense and complex systems of interconnected services. They also serve as

engines for economic advancement that offer privileges for growth and development and at the same time with myriads of challenges both internally and externally (Drobniak, 2012). These challenges are poverty, migrations, pollution, decay, natural disasters, and economic crisis among others.

Drobniak (2012) observe that there are emerging research focus on contemporary issues such as livable city, sustainable cities, smart and compact, eco city, competitive city, green city, creative city, attractive city, or ‘shrinking city’, there are limited and perhaps, poor scientific understanding of factors that explain the resilient ability of some cities to shocks whether or not using perceived external and internal problems. These had led to several attempts and initiatives across the globe to standardize and enhance the resilience of cities and communities (Sharifi, 2016).

UNDP (2004) sees disaster as a serious disturbance of the functioning of a society with broad human, material or natural misfortunes which surpass the capacity of the influenced society to manage utilizing as it were its possessed resources. Ammann (2012) asserts that cities often face challenges with expanding impacts of untold dangers from expansive scale disasters. This is often linked with the view of Boshier (2014) that explained that disasters occur because of failure or absence of risk reduction measures even if the awareness of the hazards and threats exist.

Bahadur et al. (2015) see resilience has been comprising ‘three A’s’ concepts; adaptive capacity, anticipatory capacity, and absorptive capacity from the occurrences of disasters. A Resilient city has the ability to withstand and recover quickly from any plausible shock and stress, and maintain continuity of services (UN-Habitat, 2015). Hence, resilient cities would become stronger by adapting to and learning from disasters (Godscalk, 2003). Meanwhile a city that is sustainable is also a resilient city (Beatley and Newman, 2013). The idea of resilience to urban and regional studies has been introduced by the debate about sustainable development along with adaptation to climate changes (Simme and Martin, 2009).

Urban resilience has the primary function of built environment professionals, such as architects, engineers, quantity surveyors, estate surveyor and valuer, and urban designers to protect and enhance life through disaster-resilient design and reconstruction activities (UN-Habitat, 2019). They are engaged in the design,

planning and construction of the totality of the built environment that comprises a town or city.

THE STATEMENT OF THE PROBLEM

Martín et al. (2018) explained that the intentional effort to better integrate the city's resilience planning with its state or other regional entities has resulted into only a handful of cases. Where present, this integration has often been tied to the release of funds or other incentives through regional solidarity or collaboration. The assessors have observed cases of deteriorating integration, in which the national government has played in politics to be elected in local planning instead of the professional participation in city resilience or where professionals are involved, it is often substandard project works as a result of insufficient funds. Staddon, *et al*, (2017) opined that over seven hundred thousand people have lost their lives, over 1.4 million have been injured, and approximately 23 million have been made homeless as a result of disasters. More than 1.5 billion people have been affected by disasters in various ways, with women; children and people in vulnerable situations disproportionately affected while the total economic loss amounting to more than \$1.3 trillion.

THE AIM AND OBJECTIVES OF THE STUDY

The Aim of this study is to examine the resilience nature of Birnin Kebbi's city in Nigeria and establish the constituents of threats in the area.

The Objectives are to;

1. identify the current environmental threats to the people living in the area
2. examine possible governance failure towards building resilience in the study area
3. identify some economic importance derived from building resilience

THE STUDY AREA

Kebbi state was established in 1991 from Sokoto state. Birnin kebbi is the state capital of the state. Birnin kebbi is found within the northwestern geopolitical zone of Nigeria. In 1991, the assessed populace of 150,520 (National Population Commission, 1991). In 2006, the city has an assessed populace of 268,620 (National Population Commission, 2006). Birnin Kebbi anticipated populace for 2020 is 361,264. Birnin kebbi is made up of ethnic bunch. The ethnic bunch

incorporates Hausa, Fulani, Dakarkari, Kambarawa, Gungawa and a modest bunch of Zambarawa inside the city. The city is additionally characterized with few yorubas and Igbos who moreover lived in it. The range suits admirers of Allah and so Islam forms the overwhelming devout practiced within the area with few Christians living within the region. Birnin kebbi is associated to Argungu by street within the north east, to bunza at the south west, to jega at the south east.



Figure 1. Kebbi state in National context

Source: Department of Urban and Regional Planning, Waziri Umaru Federal Polytechnic, Birnin kebbi, kebbi state.

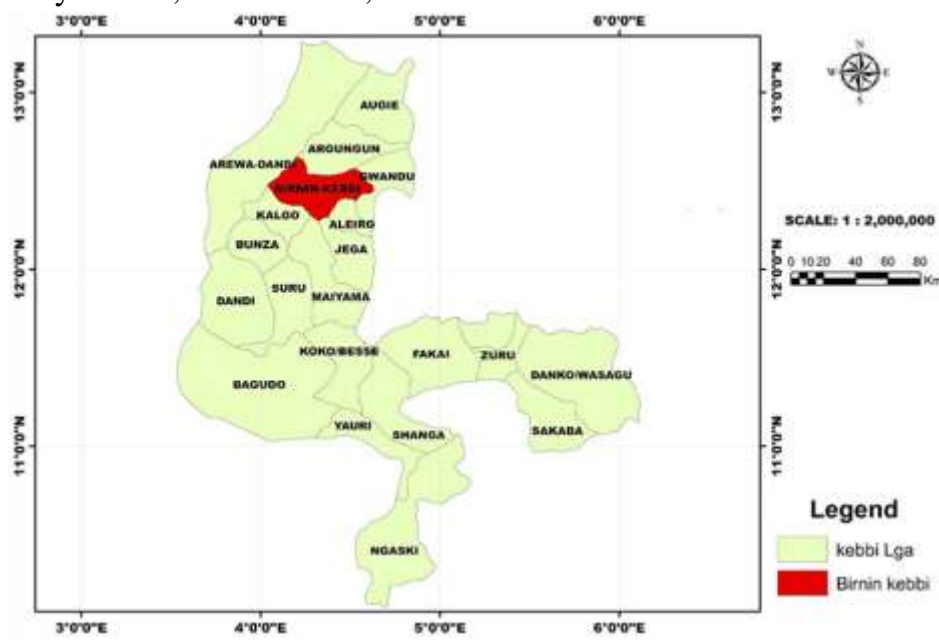


Figure 2. Birnin kebbi Local Government Area in State context
Source: Department of Urban and regional planning, Waziri Umaru Federal Polytechnic.

THE CONCEPT OF URBAN RESILIENCE

According to the Latin root word, resilience comes from “resilire” which mean to leap back or to rebound (Simme and Martin, 2009). The basic idea of resilience is the ability of an entity or a system to recover from disturbance and disruption of some kind. The concept of urban resilience had been linked to the attributes of the urban system and had over time being used to deal with environmental disasters, conflict and financial crises (Meerow et al., 2016).

Rockefeller Foundation (2015) sees “resilience as the capacity of individuals, communities and systems to survive, adapt, and grow in the face of stress and shocks, and even transform when conditions require it.” The Intergovernmental Panel on Climate Change (IPCC) attributes resilience to the ability of a system to respond successfully to climate variability and climate change.

Urban resilience is “the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow, no matter what kinds of chronic stresses and acute shocks they experience” (100 Resilient Cities). World Bank (2015), a resilient city can adapt to a variety of changing conditions and able to stand against shocks while still rendering essential services to its residents. Urban resilience can be perceived as a degree to which cities are able to absorb and tolerate disruption before adjusting and re-organising around new set of structures and processes (Drobniak, 2012).

THE BACKGROUND OF URBAN RESILIENCE

Galderisi (2014) expressed that the concept of resilience has evolved since the Fifties through different scholastic fields, from physics to psychology, from ecology to management science, which makes it difficult to get unanimous definition based on the different professional fields. The term comes from the physics to provide description on the strength of materials in face of external disturbances, their ability to elastically deform under load (Gordon, 1978; Galderisi, 2014).

According to Kelman (2008), resilience had been in this field since Fifties but found wide room in Ecology during the Seventies. Galderisi (2014) observed that in mid-nineties, “ecological” approach to resilience was promoted and propagated attention shifted from natural to socio-ecological systems and was then linked to close affiliations between human and natural components.

Drobniak (2012) observed that the concept of urban resilience was triggered by the major urban threats and disasters in few years ago. Some of these constituents are in the like of cases of terrorist attacks in New York, the Asian tsunami and Hurricane Katrina in New Orleans, or bombing attack in London. As a result of the growing phenomena of urbanization and climate change, the scale of these stresses and disruptions has increased and is expected to increase both in term of frequency and intensity, and even further in the future (Field et al., 2014).

Galderisi (2014) described resilience as a recent and fashionable term that has gradually spread into different disciplinary fields, including land use planning in the last decade. Hence, the use of the concept of urban resilience in the field of urban planning.

ENVIRONMENTAL AND ECONOMIC THREATS RESULTING FROM THE ABSENCE OF URBAN RESILIENCE

Climate change is one of the main environmental issues that cities have to face in the 21st century (IPCC, 2011). Natural and technological hazards constitute relevant threats for urban areas, often built up in natural hazards prone areas and whose development has undermined such threats. Guha-Sapir et al. (2012) observed that an increase in the number of reported disasters has been recorded from year 2000 due to a rise in the number of hydrological disasters such as avalanches and floods and climatological disasters like extreme temperatures, drought and wildfires.

70% of the world's population are more likely to be living in cities by 2050 due to the increase influx of population into the urban area and also economic development of the rural area. Climate change makes weather and natural resource distributions more volatile (i.e. more storms and droughts) while building resilience into our increasingly densely populated urban environments are important to the safety of life and property (Lloyd's Register Foundation, 2015; UNISDR, 2015; Staddon, *et al.*, 2017). According to UNISDR, 2015, disasters have continued to exact a downtrend and, as a result, the well-being and safety of persons, communities and countries have been immensely affected.

These downtrends involve sudden shocks or accumulating stresses that could lead to infrastructure failure, economic decline, or social breakdown (UN-Habitat, 2015). According to Lever (1987), serious problems of adaptation arising from resilience form features are in the areas of releasing large number of low qualified workforce, factories closedown, decrease of tax revenues, income polarization, living conditions polarisation along with unequal access to public services, de-urbanisation, lost of the socio-economic importance of a city

in a country and abroad, conversion of land use from existing land use especially within the city and slow recovery of such areas, because of these features.

The ongoing Covid-19 pandemic also exhibits these prevailing situations of economic losses across the globe and had been linked to the description of Hill et al., (2010) that cities may suffers from four kinds of shocks: global economic shock caused by downturn in whole world economy like financial crisis; national economic shock cause by downturn in the national economy; sectoral industry shock cause by downturn in particular industries that are important part of a city’s export base; other shocks cause by other external factors like natural disaster, movement of important firm or institution out of a city. These shocks are not mutually exclusive. So, an urban economy may experience more than one simultaneously. It is important to uphold that it is not all shocks that throw a city’s economy off its prior growth path.

METHODOLOGY

This study adopted both primary and secondary data. The primary data made used of questionnaires which were administered to 125 professionals in the built environment within the study area. The secondary data used include online Journals and textbooks. The study was conducted using 25 each of the professionals which include architects, civil/structural engineers, builders, quantity surveyors, and urban planners. The instrument of data collection was questionnaire administration and analysis was carried out using Frequency, Percentage and Weighted Average (WA). The Weighted Average is equal to the sum of the product of the weight factor multiplied by the Variable Numbers of Respondents divided by the total number of respondents or the sample size.

$$\text{Weighted Average (WA)} = \frac{\sum WF \times VNR}{(SS_0)}$$

$$\text{Weighted Average (WA)} = \frac{\text{Weight Factor X Variable Numbers of Respondents}}{\text{Sample Size } ((SS_0))}$$

Likert weighting from 1 to 5. Where 1= Strongly disagree, 2=Disagree, 3= Neutral, 4= Agree, 5=Strongly agree. Variable Numbers of Respondents (VNR) refers to the total number of responses for each grade and sample Size- is the total number of respondents considered for this study.

RESULTS AND DISCUSSION OF FINDING

TABLE 1: ENVIRONMENTAL THREATS AFFECTING THE RESIDENTS OF BIRNIN KEBBI

ENVIRONMENTAL THREATS	Strongly Agree (f)	Agree (f)	Neutral (f)	Disagree (f)	Strongly Disagree (f)	TOTAL F (%)	Mean
Flooding	41(32.8)	48(38.4)	18(14.4)	14(11.2)	4(3.2)	125(100)	3.864

Covid-19	48(38.4)	57(45.6)	17(13.6)	3(2.4)	0(0)		
Drought						125(100)	4.200
Wind storm	15(12.0)	47(37.6)	40(32.0)	21(16.8)	2(1.6)		
Environmental degradation						125(100)	3.416
Others	16(12.8)	39(31.2)	51(40.8)	17(13.6)	2(1.6)		
						125(100)	3.400
	25(20.0)	62(49.6)	26(20.8)	11(8.8)	1(0.8)		
						125(100)	3.792
	17(13.6)	45(36.0)	51(40.8)	10(8.0)	2(1.6)		
						125(100)	3.520

Source: Author's Field Survey, 2020

Table 1 is the description of the environmental threats affecting the residents of Birnin kebbi in Nigeria. A greater number of the respondents above 60 percent for flooding, Covid-19, Environmental degradation and others, all confirmed to the acceptance of strongly agree and agree in the study area while drought and windstorm are above 40% but less than 50% for both strongly agree and agree. What this implies is that using the weighted Average, the environmental threats in the study area have Covid-19 to be the highest and on the increase, flooding is the second, environmental degradation is the third, followed by others, then drought and windstorm.

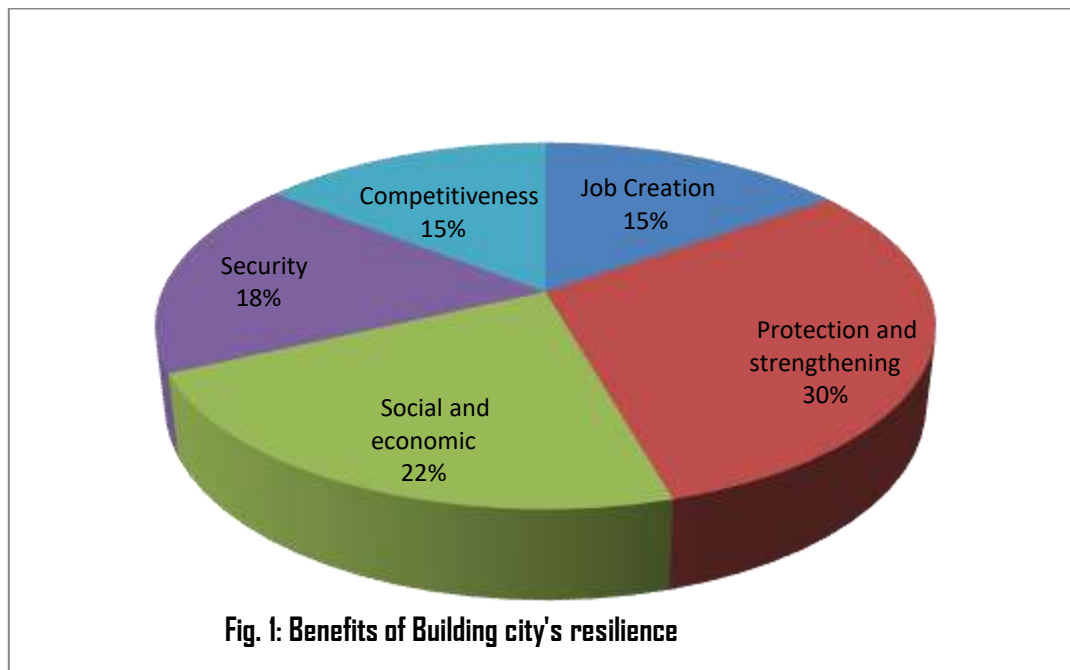
TABLE 2: POSSIBLE GOVERNANCE FAILURE TOWARDS BUILDING URBAN RESILIENCE

Possible Towards Resilience	Barriers Building	Strongly Agree (f)	Agree (f)	Neutral (f)	Disagree (f)	Strongly Disagree(f)	TOTAL F (%)	Mean
Regulatory Challenge		98(78.4)	23(18.4)	2(1.6)	1(0.8)	1(0.8)	125(100)	4.728
Standard Challenge		82(65.6)	36(28.8)	5(4.0)	1(0.8)	1(0.8)	125(100)	4.576
Socio-economic challenge		81(64.8)	39(31.2)	4(3.2)	1(0.8)	0(0)	125(100)	4.600
Financial challenge		88(70.4)	30(24.0)	5(4.0)	2(1.6)	0(0)	125(100)	4.632
Innovation challenge		54(43.2)	47(37.6)	10(8.0)	8(6.4)	6(4.8)	125(100)	4.080

Source: Author's Field Survey, 2020

Table 2 is a reflection of the possible barriers towards building urban resilience in the study area. Not less than 90% of the total respondents confirmed to agree

and strongly agree options that regulatory challenge, standard challenge, socio-economic challenge, financial challenge and governance challenge are all possible obstacles towards building urban resilience in the study area. Also 80% of the respondents both agree and strongly agree to the challenge of innovation as a barrier towards building urban resilience. The implication of this using weighted Average is that the respondents identified regulatory challenge to be the top most barriers towards building urban resilience. This is followed by financial challenge, then socio-economic challenge, next is standard challenge and last of all, is the challenge of innovation.



Source: Author's Field Survey, 2020

Figure 1 shows the benefits of building city's resilience by the respondents in the study area. 30% of the respondents say it gives rise to protection and strengthening of the community, 22% of the respondents say it has social and economic benefits, 18% of the respondents say it has security benefits while 15% of the respondents consent for competitiveness and the remaining 15% consent that it has opportunities to create jobs. It can be deduced therefore that the benefits that accrue to building resilience cannot be overemphasized.

CONCLUSION AND RECOMMENDATION

The research revealed that Covid-19, flooding, and environmental degradation are the most common environmental threats posed within the study area. The research revealed that the ineffectiveness of governance processes is regulatory challenge, financial challenge and socio-economic challenge among others. The Research identified protection and strengthening of the community, social and economic benefits, security benefits, competitiveness and job creation as the benefits of building city's resilience.

The Study recommends building institutions, government agencies, civil society, and other stakeholders to handle the failure of governance in the area. The research recommends the promotion of green infrastructure both for human and environmental use. It also recommends that the principle of good governance such as accountability, transparency, equity and fairness, security, political stability and others be deployed at the state and local government especially as it concerns budget allocation and resource distribution.

REFERENCES

- Ammann, W. J. (2012). Official Opening Statement. In: AMMANN, W. J., ed. International Disaster and Risk Conference, Integrative Risk Management in a Changing World - Pathway s to a Resilient Society, Davos, Switzerland. Global Risk Forum.
- Bahadur, A.V., Peters, K., Wilkinson, E., Pichon, F., Gray, K., & Tanner, T. (2015). The 3As: Tracking Resilience Across Braced. Overseas Development Institute, 1-57. <http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9812.pdf>. Accessed on 12 June, 2020.
- Beatley, T. and Newman, P. (2013). Biophilic Cities Are Sustainable, Resilient Cities. *Journal of sustainability* 5, 3328-3345.
- Bosher, L. (2014). Built-in resilience through disaster risk reduction: operational issues. *Building Research and Information* 42(2): 240–254.
- Brown, C., Shaker, R.R., Gorgolewski, M., Papp, V., & Alkins, S. (2016). Urban resilience in Canada: Research priorities and best practices for climate resilience in cities. [Technical Report]. <http://digital.library.ryerson.ca/islandora/object/RULA%3A4286>. Accessed on 12 June, 2020.
- Drobniak, A. (2012). The Urban Resilience-Economic Perspective; *Journal of Economics and Management; Volume 10, pages 6-20*, University of Economics in Katowice.

Field, C., Barros, V., Dokken, D., Mach, K., Mastrandrea, M., Bilir, T., . . . White, L. L. (2014). In IPCC, 2014: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. *Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Galderisi, A. (2014). Urban resilience: A framework for empowering cities in face of heterogeneous risk factors; *ITU, A/Z, (11)1*, pages 36-58.

Gordon (1978). In Galderisi, A. (2014). Urban resilience: A framework for empowering cities in face of heterogeneous risk factors; *ITU, A/Z, (11)1*, pages 36-58.

Godscalk, (2003). In Elimisiemon, M. and Kagai, K. (2016). Environmental benefits of green building: a review an article. *Journal of Environmental design and management*, 3(3), 36-58.

Guha-Sapir D, Vos F, Below R, Ponserre S. (2012), Annual Disaster Statistical Review 2011: The Numbers and Trends, Cred, Brussels.

http://reliefweb.int/sites/reliefweb.int/files/resources/2012.07.05.ADSR_2011.pdf

Hill E., Clair T., Wial H. et al. (2010): Economic Shocks and Regional Economic Resilience. George Washington, Urban Institute. Building Resilience Region Project. Conference on Urban and Regional Policy and Its Effects: Building Resilience Regions, Washington DC, May 20-21.

IPCC (2011). Special Report on Renewable Energy Sources and Climate Change Mitigation, Working Group III of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, UK, New York, USA. http://srren.ipccwg3.de/report/IPCC_SRREN_Full_Report.pdf

Kelman, I. (2008), Critique of Some Vulnerability and Resilience Papers. Version 2, 17, November 2008. <http://www.islandvulnerability.org/docs/vulnrescritique.pdf>

Lever W.F. (1987): Glasgow: Policy for the Post-industrial City. In: Managing the city. The Aims and Impacts of Urban Policy. Ed. Brian Robson. Barnes & Noble Books, New Jersey 1987, p. 42.

Lloyd's Register Foundation. (2015). Foresight review of resilience engineering: Designing for the expected and unexpected (No. 2015.2). London, UK.

Martín, C. *et al.* (2018). RESEARCH REPORT Institutionalizing Urban Resilience A Midterm Monitoring and Evaluation Report of 100 Resilient Cities , Washington, DC 20037.

Meerow, S., Newell, J.P. and Stults, M. (2016) 'Defining urban resilience: A review', *Landscape and Urban Planning* 147: 38–49.

National Population Census 1991, 2006.

Rockefeller Foundation (2015). In UN-Habitat (2015). Urban Resilience in Africa: Perspectives from experts and city officials. African Union – Addis Ababa, Ethiopia

Simme, J. and Martin, R. (2009). The Economic Resilience of Regions: Towards an Evolutionary Approach. *Cambridge Journal of Regions, Economy and Society*, 1-17.

Sharifi, A. (2016). A critical review of selected tools for assessing community resilience. *Ecological Indicators*, 69, 629-647. doi:10.1016/j.ecolind.2016.05.023

Sharifi, A., & Yamagata, Y. (2017). Towards an integrated approach to urban resilience assessment. *Asia Pacific Network Science Bulletin, Volume 7, Issue 1.*

Staddon, C., Vito L., ZunigaTeran, A., Schoeman, Y., Hart A. & Booth, G. (2017). Contributions of Green Infrastructure to Enhancing Urban Resilience; Agenda Setting Scoping Studies Summary Report.

UNDP. (2004). Reducing Disaster Risk. A Challenge for Development a Global Report. New York, United Nations Development Programme Bureau for Crisis Prevention and Recovery.

UN-Habitat (2015). Urban Resilience in Africa: Perspectives from experts and city officials. African Union – Addis Ababa, Ethiopia.

UNISDR (2015) Sendai Framework for Disaster Risk Reduction 2015 – 2030.

UN-Habitat (2019). Building Urban Resilience in the Face of Crisis; A Focus on People and Systems. Alliance Working Group 4 Members, United Cities and Local Governments.

World Bank (2015). In UN-Habitat (2015). Urban Resilience in Africa: Perspectives from experts and city officials. African Union – Addis Ababa, Ethiopia
[www.100resilientcities.org/resilience#/-_/_/](http://www.100resilientcities.org/resilience#/-/_/) Accessed on 12 June, 2020.