DonnishJournals

Donnish Journal of Geography and Regional Planning
Vol 4(1) pp. 001-006 November, 2023.
http://www.donnishjournals.org/djgrp
ISSN: 2984-8725

Original Research Paper

Climate Change and Children Vulnerability in Osun State, Nigeria

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Accepted 11th October, 2023.

Climate change is one of the greatest threats facing this generation, with 1 billion children at extremely high risk. Out of 163 countries, Nigeria ranked second in terms of risk that climate change poses to children. Yet, the outlook is dire, void of time sensitive redirection. This work is therefore a review of literature on the vulnerably of children to the effects of climate change with a focus on Osun State, Nigeria. Climate crisis is discovered to be a child rights crisis; it reduces quality of life of the children in Osun state, it cuts down food production, jeopardizes nutrition of children, it has implications on their psychology and safety, health and social cohesion and bonds with their loved ones. Climate change displaces children; their education is adversely affected and makes their future bleak, it ultimately leads to death of children. Implementing affordable, acceptable and workable, adaptation and mitigation measures by Osun state government in collaboration with other stakeholders is the way to go.

Keywords: Climate change, Children, Vulnerably, Mitigation and Osun state.

INTRODUCTION

Climate change has become a global public-health emergency and the greatest challenge of the 21st century threatening all aspects of the society World Health Organization WHO Report (2023). Across the globe, people face multiple climate- related impacts such as severe drought, flooding, air pollution, water scarcity, leaving their children vulnerable to malnutrition and disease. Almost every child on earth is exposed to at least one of these climate and environmental hazards. Without urgent action, this number will go up Vergunst and Berry (2021). The trends in climate change impacts, exposures, and vulnerabilities demonstrate an unacceptably high level of risk for the current and future health of children populations across the world Watts et al (2018).

Through its far reaching impact on all parts of society, climate change will challenge the very essence of children's rights to survival, good health, wellbeing, education, and nutrition as enshrined by the Convention on the Rights of the Child and emphasized in the UN Sustainable Development Goals. Climate change threatens to exaggerate the vulnerabilities of children and other populations are at risk and could substantially hamper future progress and possibly even reverse the improvements made in child survival and wellbeing during recent decades. The past few years have seen an accelerated momentum for studying the health effects of climate change Chang et al (2020). Despite the clear implications of climate change on child health, Sheffield and Akinbami noted in their (2019) review that there were strikingly few studies examining the possible pathways and mechanisms within this area, hence the significance of this work. The need for a comprehensive understanding of how children could be vulnerable to climate change and their short and long term impacts is the focus of this work to guide future research, policy, and practices that will alleviate the impact of the effects of climate change on the children spur the researchers to carry out this review.

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LITERATURE AND THEORETICAL UNDERPINNING

The meaning, causes, effects and trend of climate change

The change in the mean and spread of statistical properties of a climate system considered over a long period of time is referred to as climate change Akintomowa 2018. These changes are induced by both nature and human activities. When caused by nature, its results from variation in Earth's orbit, ocean circulation, solar radiation and albedo of the continents but when it is caused by human activities like deforestation, air pollution,

poor agricultural practices such as bush burning, excessive and wrong application of inorganic fertilizer, bush burning, burning of fossil fuels, urbanization, inefficient transportation system, among others introduced more compelling changes in the climate Cunsolo et al 2020. These forces so far surpass those of any other force that has transformed Earth's environment Cunsolo et al (2018) and Chang (2020).

Summarily, the fundamental cause of climate change is an increase in the concentration of greenhouse gases (GHGs) in the atmosphere, such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O). These gases trap heat from the sun and contribute to the greenhouse effect, causing global temperatures to rise. Most climate scientists agree the main cause of the current global warming trend is human expansion of the "greenhouse effect" warming that result when the atmosphere traps heat radiating from Earth toward space

Global surface temperatures have risen by 1.3 degrees Fahrenheit (ºF) over the last 100 years, Worldwide, the last decade has been the warmest on record, the rate of warming across the globe over the last 50 years (0.24ºF per decade) is almost double the rate of warming over the last 100 years (0.13ºF per decade), the evidence of climate change extends well beyond increases in global surface temperatures. It also includes, changing precipitation patterns, melting ice in the Arctic, melting glaciers around the world, increasing ocean temperatures, rising sea level around the world, acidification of the oceans due to elevated carbon dioxide in the atmosphere, responses by plants and animals, such as shifting ranges.

Changes in global climate patterns over a long period of time are proof of global climate change. Rising sea levels, altered precipitation patterns, an increase in the frequency and severity of extreme weather occurrences (such as heat waves, droughts, floods, and storms), and rising global temperatures are some of these trends. The effects of these changes on ecosystems, economy, and human populations are significant. The effects of climate change may differ regionally, having distinctive repercussions in various places. The availability of water resources, fluctuations in the growing seasons, and greater sensitivity to particular weather-related risks are only a few examples of regional trends. For determining the vulnerabilities of certain populations and creating focused adaptation measures, Although long-term magnitude and patterns of climate change are uncertain, projections suggest an increase of 2°C or more in the global average temperature could be realised by the end of this century, leading to crucial changes in Earth's geosphere, biosphere, cryosphere, hydrosphere, and atmosphere, with severe implications for human and planetary health.

Indeed, climate change will impact the health of children born today throughout their lifetime Akande, A. et al., (2017). In the 1970s the concept of vulnerability was introduced within the discourse on natural hazards and disaster by O´Keefe, Westgate and Wisner (O´Keefe, Westgate et al, 1976). In "taking the naturalness out of natural disasters," these authors insisted that socio-economic conditions are the causes of natural disasters. Illustrated by means of empirical data, occurrence of disasters increased over the last 50 years, paralleled by an increasing loss of life. The work also showed that the greatest losses of life concentrate in underdeveloped countries and among the children. Chambers put these empirical findings on a conceptual level and argued that vulnerability has an external and internal side. People are exposed to specific natural and social risks. At the same time people possess different capacities to deal with their exposure by means of various strategies and actions (Chambers, 1989). This argument was again refined by Blaikie, Cannon, Davis and Wisner, who went on to develop the Pressure and Release Model (PAR). Watts and Bohle argued similarly by formalizing the "social space of vulnerability", which is constituted by exposure, capacity and potentiality (Watts and Bohle, 1993). Cutter developed an integrative approach (hazard of place), which tries to consider both multiple geo-and biophysical hazards including climate change on the one hand as well as social vulnerabilities on the other hand Cutter, Mitchell et al. (2000).

Risk-Hazard (RH) Model

Initial RH models sought to understand the impact of a hazard as a function of exposure to the hazardous event and the sensitivity of the entity exposed (Turner et al., 2003). Applications of this model in environmental and climate impact assessments generally emphasized exposure and sensitivity to perturbations and stressors by the affected children (Kates, 1985, Burton et al., 1978) and worked from the hazard to the impacts (Turner et al., 2003). (Blaikie et al., 1994, Hewitt, 1997). This led to the development of the PAR model.

In basic terms, disasters manifest pre-existing conditions within the social, economic, physical, and environmental fabrics of a society. Infrastructure, services, organizations from the simplest to the most complex kind, and diverse systems are prone to be affected by a triggering event which could be associated with a natural phenomenon such as an earthquake, a flood, a landslide (WCH S) associated with climate change; or with a technical event such as an explosion, a fire, a spill, etc. A conclusion to be derived is the fact that a disaster is preceded by at least two predispositions: the possibility that the triggering event takes place, usually called a hazard at this potential state; and a preexisting vulnerability; the pre-disposition of individual, people, communities, processes, infrastructure, services, organizations, or systems to be affected, damaged, or destroyed by the event. A mathematical expression for risk in terms of hazards and vulnerabilities is represented as follows:

Risk = Hazard *Vulnerability

Where= *represents the function that describes the combination between the hazard and the vulnerability. An example of such a function is the simple product, as proposed by ISDR (2004): Risk = Hazard x Vulnerability (Alexander, 2000) defines risk as "the likelihood, or more formally the probability, that a particular level of loss will be sustained by a given series of elements as a result of a given level of hazard". Total risk would then consist of the sum of predictable casualties, damages and losses, represented via the equation:

Total Risk = (Σ elements at risk) x Hazard x Vulnerability

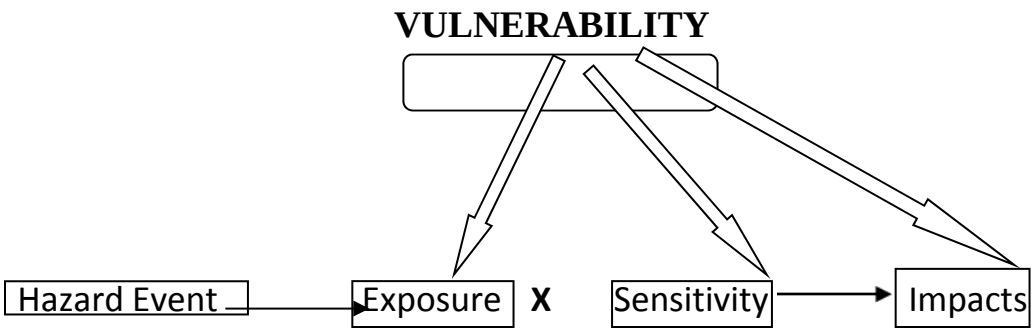

Fig.1: Risk-Hazard (RH) Model diagram after Turner et al., (2003), showing the impact of a hazard as a function of exposure and sensitivity. The chain sequence begins with the hazard, and the concept of vulnerability is noted implicitly as represented by white arrows.

More recent publications define risk incorporating such terms as coping capacity, exposure, and deficiencies in preparedness. For example, one typical relation employed by many agencies is:

$$= \frac{\mathrm{X}}{\mathrm{g}}$$

Pressure and Release (PR) Model

Blaikie et al. (1996) have proposed a Pressure and Release Model. The model defines vulnerability as the characteristic of a person or group of persons in terms of their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard. In addition, they propose the progression of vulnerability associated with root causes, unexpected changes, dynamic pressures, and unsafe conditions (Blaikie, 1996; Wisner et al., 2004). Unsafe conditions, which are manifestations of vulnerability in time and space in conjunction with the hazard in such issues as fragile local economy, lack of disaster planning and preparedness, and fragile environment. The strength of this approach resides on its capacity not only to define vulnerability, but to explain its generation as a three step process.

Vulnerability to Climate Change

When focusing on climate change, vulnerability is the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate variation to which a system is exposed; age, people's sensitivity; and their adaptive capacity. Exposure to vulnerability factors of geographical location, especially related to high exposure to risks (i.e., people living in the areas of natural disasters such as drought or coastal areas and river basins affected by floods). Sensitivity and adaptive capacity are context- specific and vary from country to country, from community to community, among social groups and individuals, and over time in terms of its value, but also according to its nature. A population could be considered sensitive based on their overall level of social development (i.e., age, a population containing people sick with, areas with rain-fed agriculture, limited access to resources for age migrants, widows, and disabled people with higher level of poverty and food insecurity).

Children vulnerability to the effects of climate change in Nigeria

According to UNICEF report launched on 20 August 2021, young people living in Nigeria are among those most at risk of the impacts of climate change, threatening their health, education and protection, according to a today. The Climate Crisis Is a Child Rights Crisis: Introducing the Children's Climate Risk Index is the first comprehensive analysis of climate risk from a child's perspective. It ranks countries based on children's exposure to climate and environmental shocks, such as cyclones and heat waves, as well as their vulnerability to those shocks, based on their access to essential services. Youth-led Global Climate Strike Movement report finds approximately 1 billion children – nearly half the world's 2.2 billion children – live in one of the 33 countries classified as "extremely high-risk". The findings reflect the number of children impacted today; figures likely to get worse as the impacts of climate change accelerate Akeh, G.I. and Mshelia, A.D. (2016).

Nigeria is ranked second among these countries, together with Chad, and just after the Central African Republic (ranked first). The report found Nigerian children are highly exposed to air pollution and coastal floods, but also that investments in social services, particularly child health, nutrition and education can make a significant difference in our ability to safeguard their futures from the impacts of climate change. "The climate crisis is a child's rights crisis," said Peter Hawkins, UNICEF Nigeria Representative. "Nigeria is not immune to the effects of climate change, but we can act now to prevent it from becoming worse. We need to invest in the services children depend on to survive and thrive – such as water, healthcare and education to protect

their futures from the impacts of a changing climate and degrading environment."

Climate Change and Children Vulnerability in Osun State

Osun State, in Southwestern Nigeria, has a tropical climate with distinct wet and dry seasons. Climate change has caused noticeable adjustments in temperature and rainfall patterns, perhaps leading to increased variability and more frequent extreme weather events. Flood is the most disturbing evidence of climate change in Osun State according to Meteorological Agency (NIMET), Osun State was identified as one of the flood-prone areas Osogbo, Ede, Ilesa, Ile-Ife, Olupona and other settlements in Osun the state experiences flood the Changes in rainfall patterns and extended droughts. For instance in Oshogbo, some residents of Testing Ground, Rasco, Oke-Onitea, Fiwasaye flood usually, Gbomi and Iludun face challenges of flooding and its associated problems is affecting children's health, education, disrupting access to clean water, sanitation facilities, harming children's health, hygiene practices as well as overall well-being.

Akuru et al. (2017) reported that the Children's Climate Risk Index (CCRI) reveals that globally: 240 thousand children in Osun state are highly exposed to urban flooding, 330 thousand children are highly exposed to riverine flooding; 400 thousand children in Osun state are highly exposed air pollution, 600 thousand children are highly exposed to vector borne diseases; all children are highly exposed to lead pollution in mining communities; most children are highly exposed to water scarcity Akinbami et al., (2019). The report also reveals a disconnection between where greenhouse gas emissions are generated, and where children are enduring the most significant climate-driven impacts. The 33 extremely high-risk countries - including Nigeria - collectively emit just 9 per cent of global CO_2 emissions. Conversely, the 10 highest emitting countries collectively account for nearly 70 per cent of global emissions. Only one of these countries is ranked as 'extremely high-risk' in the index.

Heat-related diseases and dehydration can occur when temperatures rise, especially in newborns and young children. It is reducing agricultural productivity, potentially leading to child food insecurity and malnutrition. Increased temperatures and polluted air leading to health problems such as asthma and other dangerous respiratory conditions. Climate change do have profound social and psychological impacts on children disruption of social networks, climate-related disasters is forcing migrations that lead to the dissolution of social networks, separation from family and friends, and the loss of community support systems, all of which have an influence on the social well-being of children.

Children are also vulnerable to extreme weather events, environmental degradation, and an unclear future as a result of climate change that have contributed to psychological stress, anxiety, and emotional distress in children. Natural habitats and shifting landscapes can weaken children's connection to their traditions and sense of identity. Climate change does pose significant challenges to children's education, affecting their learning opportunities and future prospects. Extreme weather disasters, such as floods which s the most frequent and wide spread climate change effect in Osun state, storms, and heat waves, that have resulted in school closures and the destruction of educational infrastructure, interfering with children's access to excellent education.

Children are also susceptible to displacement caused by climate change that uproot children from their communities, causing school interruptions, loss of social networks, and difficulties adjusting to new educational systems especially in food prone areas Increased absenteeism: Health consequences, such as heat-related illnesses and infectious diseases, might contribute to increased absenteeism among children, impeding regular attendance and educational advancement.

Climate change has significant implications for children's health, leading to various consequences including rising temperatures and heat waves causing heat exhaustion, heatstroke, and dehydration in children, especially those participating in outdoor activities Infectious Climate change has the potential to modify the distribution and prevalence of vector-borne diseases such as malaria, dengue and fever, putting children in Osun state. Poor air quality caused by increasing pollution and allergenic triggers can aggravate re respiratory disorders such as asthma, allergies, and respiratory infections in children. Climate change-induced disturbances in agriculture and food systems can result in lower crop yields, higher food prices, and limited access to nutritious food, all of which contribute to childhood malnutrition and stunting Akinbami et al., (2019).

Meanwhile, efforts to addressing children's vulnerability to climate change in Osun State includes implementation of climate-resilient infrastructure to improve the resilience of schools, healthcare facilities, and other critical infrastructure to climate-related hazards. Strengthening and enchantment of healthcare services to address climate-related health risks among children, for instance, both Oyetola and Adeleke governments renovated almost all the Primary Heath Centres in the state. Promotion of climate-smart agricultural practices and policies that support smallholder farmers, improving access to nutritious foods for children by various administrations in the past few years For instance, farm settlements in various locations across the state Disaster risk reduction and preparedness Enhancing community-based early warning systems, developing evacuation plans of Osun State Emergency Management Agency OSEMA. Integration of climate change education into school curricula, providing teacher training, and promoting awareness among children and their families about climate change impacts and adaptation strategies, empowering communities, including children, through awareness campaigns, community-based adaptation projects, and participatory decision-making processes Akinbami, et al., (2019).

"The frightening environmental changes we are seeing across the planet are being driven by a few but experienced by many," said Peter Hawkins. "Children know climate change is a threat to their future. So far, too little has been done, but we still have time. Compared to adults, children require more food and water per unit of their body weight, are less able to survive extreme weather events, and are more susceptible to toxic chemicals, temperature changes and diseases, among other factors Amadi, S.O. and Udo, S.O. (2015).

Climate change has further widened economic inequality imbalanced, distribution of income and opportunities in Osun state, it has been a major concern in across all towns Osogbo,

Ilesa, Ile-Ife and many other settlements across the state where people are trapped in poverty with few chances to climb the economic ladder. Economic inequalities lead to slow economic growth and development in Nigeria, food scarcity, poverty, unemployment, and insecurity with high rates of kidnapping, banditry, theft, and poor education. It is Cristal clear that climate change has resulted to economic inequality and it also has similar effects on society, especially on children. Although, children are not the cause of climate change and economic inequalities, but the impact on them is high in every aspect, the impact is even harder on children living with disabilities.

Gabriel Ewepu in The Guardian of 21 September 2022 published Children's Parliament press conference organized by Save the Children International, Nigeria, a child advocate of Save the Children International, Nigeria from Cross River State Children's Parliament, Abah Confidence, on behalf of the children said the impact of climate change and economic inequality on children in Nigeria is high while they are not the cause of climate change and economic inequalities. Confidence said: "There is no gainsaying in the fact that all over Nigeria, from the South to the North, children have been affected by economic inequality and climate change in many ways.

According to Amanuel Mamo, the Director, Advocacy, Campaign, Communication and Media, Save the Children International, Climate change reduces quality of life of children. The impact is of climate change in Osun is enormous on children as Climate affects food production in the Osun state, nutrition of children, and also displaces children, thereby their lives are lost, and their education affects and makes their future bleak. Increasingly, children are involved in social vices associated with poverty and unemployment; children are also exposed to trauma and limited ability to attain potentials; other areas children suffer are hunger and diseases." their challenges occasioned by Climate Change.

CONCLUSION AND RECOMMENDATIONS

The climate crisis is a child rights crisis; it reduces quality of life of the children in Osun State, it cuts down food production, jeopardizes nutrition of children, it has implication on their psychology and safety, health and social cohesion and bonds with their loved ones. Climate change displaces children; their education is adversely affected, impaction makes their future bleak. Climate change leads to loss of children. With due appreciation of some initiatives by Osun State government that has installed Solar Power System in all the 332 Primary Heath Centres across the state, the distribution of drugs as well as the newly approved welfare package for health workers being made by individuals, corporate organizations and development agencies aimed at mitigating the effects of climate change and economic inequality, we ask that those brilliant efforts be sustained.

Meanwhile, by implementing these adaptation and mitigation efforts, Osun State can enhance children's resilience to climate change and reduce their vulnerability. Continuous monitoring, evaluation, and adaptation of strategies based on local contexts and evolving climate change patterns are crucial for ensuring their effectiveness. Implement policies to prohibit indiscriminate tree felling; construction of drainages, bridges and dams to reduce the incidence of the flood; inclusion of awareness programme on climate change; enforcement of laws that will prohibit the building of houses along waterways; make social amenities like boreholes, hospitals, schools, good roads and transport systems available to ease human suffering and labour for daily survival. Special attention should be paid to children living with disabilities by providing inclusive and special education. The media need to intensify awareness of climate change and inequalities by using their airtime.

We must also urgently reduce greenhouse gas emissions and work as a global community to build a better world for all children." Without the urgent action required to reduce greenhouse gas emissions, children will continue to suffer the most. Planting trees, keeping drainages clean, ensuring proper waste disposal and taking actions to reduce harmful gas emissions in the atmosphere. Children should be allowed to talk about the things that are important to them and create positive change in their lives. The state government should collaborate and move fast to see how children could be protected from the devastating effects of climate change, children been the most vulnerable section of the society. Increase investment in climate adaptation and resilience in key services for children.

To protect children, communities and the most vulnerable from the worst impacts of the already changing climate, critical services must be adapted, including water, sanitation and hygiene systems, and health and education services. Provide children with climate education and greens skills, critical for their adaptation to and preparation for the effects of climate change. Children and young people will face the full devastating consequences of the climate crisis and water insecurity, yet they are the least responsible. We have a duty to all young people and future generations.

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