



# The vulnerability of women to climate change in coastal regions of Nigeria: A case of the Ilaje community in Ondo State

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## ABSTRACT

Values, patriarchal norms, and traditions related to gender and gendering are diverse among societies, communities, and precincts. As such, although climate change is expected to exacerbate vulnerabilities and deepen existing gender inequities and inequalities, the impacts will be unequally felt across geographical strata. This implies that the specificity of the vulnerability of women to climate change may also vary from community to community and society to societies. However, mainstream literature on the vulnerability of women to climate changes in coastal zones trivializes the plurality and nuances of different geographical contexts by universalizing context-specific vulnerability to climate change. Mindful of the limitations associated with the generalizing conception of women's vulnerability, this paper is therefore underpinned by the implicit assumption that a successful response to the vulnerability of women to climate change in coastal zone is forged in the nexus between contextual investigation of climate change parameters and a localized investigation of differentiation in gender roles, patriarchal norms and other unknown factors in a particular setting. Thus, this paper presents a case study of the contextual vulnerability of women to climate change in Ilaje coastal region in Nigeria. Examining the intersecting complex of contextual factors, the paper establishes that beyond patriarchal traditions and norms: economic, political, educational and environmental factors are at play in the vulnerability of women to climate change in Ilaje community. To this end, this paper posits that to alleviate the vulnerability of women to climate change in coastal zones, the understanding of contextual factors play a fundamental role.

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## 1. Introduction

Gender equality and its mainstreaming within all policies and programs is one of the fundamental aims of the United Nations (Roehr, 2007). Goal 5 of the Sustainable Development Goal (SDGs) demonstrates this aim within the international agenda for sustainable development (United Nations UN, 2019). Gender equality remains an active ingredient for achieving the SDGs, and it plays an irreducible role in fostering prosperous, peaceful and sustainable societies and the world at large (Monday et al., 2018). The urgency of climate change, however, has drawn significant attention to the vulnerability of women to the widespread impacts and how to

mainstream women participation into mitigation and adaptation processes. As such, a plethora of research perspectives has positioned women as the most vulnerable to the ravaging impacts of climate change. The vulnerability of women is argued to be due to their multi-dimensional role in the society which places them in a position of first-hand contact to environmental resources (Manata and Papazu, 2009; Sultana, 2014; Arora-Jonsson, 2011; Yadav and Lal, 2018; UNDP, 2009; Glazebrook, 2011; Boetto and McKinnon, 2013). In this regard, literature concerning the discourse of climate change gendering has operated under the universalization of the vulnerability of women while undermining the nuances presented by the differences in cultural tradition, political and economic situations in various contexts, especially in developing countries. The continued devotion to the idea of generalizing context-specific vulnerability has perhaps contributed to the lack of adequate response to the vulnerability of women to climate change, especially in developing countries. The reductionist approach has

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also limited the understanding of gendering to a partial one.

Against this background, this paper argues that gender roles, norms, and vulnerability have to be analyzed from a contextualized perspective. Societal role of women and their contact with the environment varies from community to community, region to region and country to country and therefore, the specificity of vulnerability may differ from community to community (Arora-Jonsson, 2011). The intangible cultural heritage, which among others, determines the roles and perception of women varies from community to community; thus, gender conceptions is equally diverse (UNESCO, 2015). Also, more importantly, the impacts of climate change have unequal effects in different societies, depending on – among others – the economic, political, and social structure of the society. Despite this awareness, however, only very scant studies are available, which illustrates the correlations between contextual factors and the vulnerability of women to climate change, especially in coastal regions of developing countries. Thus, this present paper argues that there is a need to contextualize the debates concerning the discourse of climate change and the vulnerability of women to the prevailing impact through a case study approach.

Mindful of the limitations of the existing approach to women vulnerability and gender equality in this context of climate change, this study aims to investigate the vulnerability of women to climate change in coastal regions of Nigeria. Underpinning the paper is the implicit assumption that a successful response to the vulnerability of women to climate change in the coastal zone is forged in the nexus between the contextual investigation of climate change impacts and the localized discourse of gender roles, values, and norms in a particular setting. To empirically locate the aim of the study, this paper discusses the underlining aim in relation to Ilaje community of Nigeria as a case study. Through an ethnographic methodological approach and by drawing on a critical review of existing professional perspectives, the paper investigates and analyses the multidimensional contextual factors at play in the vulnerability of women to climate change in this coastal region.

To structure the argumentations in the research, this paper is organized into seven main sections. Following this present section is the second section which presents a brief review of the existing perspectives on the discourse of climate change, women, and vulnerability. The section aims at presenting state of the art and the research lacuna which encouraged this research. Section three presents the framing of Ilaje and its geographical contexts as a coastal zone. Section four presents the methodology. Section five is the presentation of the data gathered through the methods described in the previous section. In this section, the various contextual factors affecting the vulnerability of women to the impacts of climate change in the coastal region are presented. This is followed by section six, which is the discussion of the data presented in section five. Also, section six presents the potential contribution of women to climate change mitigation and adaptation and the strategies to mainstream these potentials in this community. This is followed by recommendations based on the study of the factors affecting gender vulnerability. Lastly, this paper concludes by arguing that contextual analysis of local factors plays a fundamental role in positing a holistic framework for gendering climate change issues in coastal regions both in developed and developing countries.

## 2. Climate change and the vulnerability of women: a review

Climate change has grown to become a challenge of global concern due to the disastrous effects that it poses to society. Today, some of these effects have become common. Many world areas are already witnessing these adverse effects, which includes impacts

on agricultural production, food insecurity, human health, and migration patterns (Arora-Jonsson, 2011; Glazebrook, 2011). The prevailing impacts, however, disproportionately affects women more and exacerbate the inequalities between genders (Manata and Papazu, 2009; Arora-Jonsson, 2011). In many of these instances, women are more susceptible to climate change impacts compared to men (Arora-Jonsson, 2011). Glazebrook (2011) argues that they are more vulnerable because they make up a more significant proportion of the world's poor. The poor are vulnerable because of the inability to adapt to climate change (Arora-Jonsson, 2011). Manata and Papazu (2009); Easterling (2000) and Wisner et al. (2004) also argued that the vulnerability of women is driven by the differentiation in the division of labor social responsibilities among the sexes, which they assume, exacerbate the burden of natural resource management on the women and makes women evoke their adaptive capabilities more than men. World Health Organization (WHO, 2010) also explained that given the difference in social responsibilities, and the expected role of men as economic providers for their families, men are usually confronted with extra burdens in the aftermath of such events.

Aside the impact the differences in roles and activities men and women play in their vulnerabilities, Terry (2009) and Neumayer and Plumper (2007) suggest that women are generally more vulnerable to health implication of climate change due to social inequalities between genders. Neumayer and Plumper (2007) argued that the main health impacts are Sexual and Gender-Based Violence (SGBV) and trauma. The higher incidences of SGBV may increase the number of deaths and diseases among women. Furthermore, recurrent and costly disasters related to climate change can affect the social and health determinants of wellbeing (Nishat and Rahman, 2017). For example, cyclones and floods could damage the critical infrastructure, including health and learning institutions. Due to the destruction, girls have more likelihood to drop out of school to assist in domestic chores as the family tries to deal with the disaster than boys (Nishat and Rahman, 2017). Neumayer and Plumper (2007) argue that damaged infrastructure also impedes access to health resources. Pregnant women, for example, could be at a higher risk, thus leading to a rise in maternal death.

Moreover, Ishaya and Abaje (2008) explained that rising sea levels and salinization could also affect the health and mortality rate of women. With women usually responsible for collecting water, inadequate availability of clean water implies that women will take more time fetching water for their families. In the same vein, Sultana (2014) also explained that the gender implication of climate change in South Asia is particularly distressing, due to the patriarchal traditions and norms which often dictate the societal roles of men and women in a manner that fosters inequities, inequalities and differentiates the associations with the immediate environment. Furthermore, Yadav and Lal (2018) buttressed this assertion by opining that women are also vulnerable because they rely on natural resources threatened by disastrous impacts of climate change and they also experience socio-economic and political impediments that limit their ability to withstand climatic change. Therefore, due to this disadvantaged position of women, climate policies should not be gender-neutral (Lambrou and Piana, 2006).

Despite the disadvantaged position of women in the climate change discourse, their involvements in climate discourse in the developing world demonstrate a position of oppression and discrimination. For example, in Sub-Saharan Africa, women spend "40 billion hours per year collecting water, two to 9 h per day collecting firewood which is equivalent to a year worth of labor by the entire workforce of France" (Lenton et al., 2005 cited in UNDP, 2009: 32). It is envisaged that by 2025 two-thirds of the global

population will experience a shortage of water and an estimated one billion people will have restricted access to clean water (Brody et al., 2008: 5). This implies that the envisaged flood will increase the distance women and girls have to walk to reach water, thereby increasing their vulnerability to several vices like rape and a rise in water-borne illnesses (Manata and Papazu, 2009). Also, the challenge of finding firewood could lead to deforestation and pollution in homes which may pose severe health hazards to women (UNDP, 2009: 32).

Thus, in developing countries, especially in the coastal regions, due to the geographical location and the social and economic capabilities, women are more vulnerable to widespread impacts than the developed world (Manata and Papazu, 2009). Women in coastal and rural areas in developing states are particularly vulnerable because they are highly reliant on the coastal natural resources to sustain their livelihoods (Boetto and McKinnon, 2013). Manata and Papazu (2009) also opined that however, women of the third world are equipped with an untapped potential which is key to sustainable development and mitigation processes. At this point, it is imperative to mention that the literature overview in this section is not exhaustive; such would take a book-length treatment. Instead, the paper presents an appraisal of papers necessary to buttress the underlying assumptions of this paper.

However, the appraisal of the growing body of research concerning women vulnerability in developing countries demonstrates comparatively low attention has been drawn to the importance of contextual factors which may or may not induce the vulnerability of women in different local contexts. A considerable number of literature have been driven on the umbrella assumptions that women are vulnerable in all contexts, irrespective of socio-cultural, economic or political dynamics and nuances (Lambrou and Piana, 2006; Tirado et al., 2011; Enarson et al., 2007; Bradshaw and Fordham, 2015; B athge, 2010; Brody et al., 2008; Goh, 2012; Otzelberger, 2011; Schipper and Langston, 2014; Skinner, 2011; Nelson, 2011; World Health Organization, 2014 to mention a few). For example, Alam et al. (2015) generalized by stating that “[...] women – who constitute half the world’s population – bear severe gendered impacts of climate change” (2015, p. 11). In the same vein, World Health Organization (WHO, 2010) universalized the vulnerability of women by explaining that “Globally, natural disasters such as droughts, floods, and storms kill more women than men, and tend to kill women at a younger age” (2010, p. 3). Affirmatively, Onwutuebe (2019) also explained that “patriarchy paves way for high rate of exposure of women to adverse impacts of climate change. Patriarchy equips men with stronger adaptive capability, especially in the area of vocational flexibility and mobility” (2019, p.1) by drawing on a vast generalization of Nigeria as a whole. These example of studies operated on the assumption that women are vulnerable in all respects without paying attention to the particularity that several communities might bring in the context of vulnerability. However, a few case study research exists which argues the importance of contextual differences in the discourse of gender, vulnerability and climate change (Dankelman et al., 2008; Arora-Jonsson, 2011; David and Enarson, 2012; Sultana, 2014; LDC Expert Group, 2015; Bryant and Garnham, 2015; Yadav and Lal, 2018). Thus, this paper argues that, although explicitly, climate change is expected to change vulnerabilities and marginalization of women, its impacts will be unequally distributed across societal strata due to the social difference, the plurality of traditional norms and values, especially along with gender roles. As such, gender issues must be understood in contexts and specificities (Arora-Jonsson, 2011), the generalization of vulnerability will amount to a partial view of such a holistic and multifaceted concept like gender. Against this background, the next sections present the case study of the Ilaje community found in Ondo State of Nigeria, which

is among the coastal regions that are vulnerable to the vagaries of climate change. These subsequent sections seek to provide a detailed exploration of the vulnerability of women to climate change in this specific case and highlighting the ways that localized insights can better inform policies on mitigation and adaptation.

### 3. Setting the context: introduction to Ilaje Community

Ilaje is a Local Government Area in Ondo State, Nigeria. It occupies a lowland or coastal area. It has an area of 1,318 km<sup>2</sup> and a population of 336,740 at the 2011 census (City Population, 2015) with latitude 5° 50’N – 6° 09’N and longitude 4° 45’E – 5° 05’E). It is bounded on the south by the Atlantic Ocean (see Fig. 1). As such, in the extreme south of the communities, the undulating lowland surface is covered by silt, mud and superficial sedimentary deposits.

Generally, coastal areas are essential ecosystems for the sustenance of livelihoods (Danladi et al., 2017). Being a coastal area (see Fig. 2 and 3), fishing is the principal occupation of the Ilajes and the easy access to the sea enhances this. Boat making craft and mainstream agriculture is also another means of subsistence in Ilaje communities. Concerning the sociocultural aspect of Ilaje, the intangible heritage, which determines the patriarchal norms and traditions related to gender in the community is still resilient today, and it is strictly observed (Danladi et al., 2017). Consequently, women still adhere to their traditional roles as caregivers and mothers. Ilaje men can migrate to find economic opportunities, but women often remain at home to take care of children and other family members. Ilaje women often have the responsibility of ensuring that food, fuel, and water are available. During drought and low rainfall, Ilaje girls and women have to walk long distances and take more time collecting fuel and clean drinking water. Ilaje girls may also be compelled to drop from school to assist their mothers with such tasks (see Fig. 6).

### 4. Methodology

A qualitative research approach has been adopted given the qualitative nature of the research aim which is to investigate the contextual socio-cultural factors affecting the vulnerability of women to climate change in the coastal villages in Ilaje Local Government area in Ondo State. The background awareness of the qualitative nature of the research goal made it obligatory to adopt methods that permitted access to a diverse range of data sources so that the gathered data is verifiable for positioning them as



Fig. 1. Map showing the location of Ilaje district in Ondo State, Nigeria.



**Fig. 2.** Typical Vista of Ilaje communities along the Atlantic Ocean (Authors, fieldwork, 2017).



**Fig. 3.** Sea levels in the Atlantic Ocean along Ilaje (Authors, fieldwork, 2017).

qualitative evidence. Thus, first, a literature review was conducted, which was followed by fieldwork that included physical observations in selected coastal villages in Ilaje and semi-structured interviews with the inhabitants of the villages. Elaborations on the various methods are described as follows;

#### 4.1. Field research

The field research allowed for the application of every other method, including transect walks, participant observation, and semi-structured interviews. A total of ten communities namely; Igbokoda, Mahin, Ugbo-Nla, Idi-Ogba, Ayetoro, Ilowo, Obenla, Odo-Nla Ikuyinminu, and Awoye were iteratively visited, and the various methods were applied to gather the intended data. The selected sites are the representative coastal villages in Ilaje with flood risk, and other climate change associated risks which can induce vulnerability of women in the region. The field survey was accompanied by tools such as a camera for photographic documentation, writing tools, and diaries. The method applied for data collection through the field survey are as follows;

##### 4.1.1. Participant observation

Walliman (2016) suggests that the participant observation method involves recording conditions, events, and activities by looking rather than asking. Participant observation provides contextual experience and data that can be compared to what is seen, and such observation is said to enable accurate data interpretation (Low, 2002). In this regard, a total of ten communities namely; Igbokoda, Mahin, Ugbo-Nla, Idi-Ogba, Ayetoro, Ilowo, Obenla, Odo-Nla Ikuyinminu, and Awoye were visited, and

participant observation method was used to gather qualitative data regarding contextual factors affecting the vulnerability of women in these villages.

##### 4.1.2. Transect walks

A transect walk method is generally applied to record the tangible and intangible elements which the community consultant/participant describes and comments upon during a guided walk of the site (Low, 2002). The transect walk was conducted with two community members in each of the ten villages to inquire about the unknown from an indigenous point of view. This allows the community members to comment on community values that are important in the context of the oral history of women and their associated vulnerability.

##### 4.1.3. Interviews

The semi-structure interview in this study consisted of flexible questions with each addressing questions of research concern related to achieving the research aim. The interviews were developed using open-ended questions, aiming to find explanations for the following:

- Means of subsistence in the Ilaje villages
- Role of women in the community as regards subsistence
- The intangible heritage as regards to patriarchal norms associated with women and family hierarchy
- Political, institutional, and economic factors as regards women in the coastal communities.

The ensuring discourses generated were accompanied by a text synopsis of the interpretation deduced from the interview. The choice of interviewees was selected with the snowball method, interview schedule, and the determined number of interviews. The interview subcategories are stratified with regards to the position, roles, gender, experience, and level of education of participants in certain cases. A total number of 85 people were interviewed for the research. This comprises of people representing various backgrounds including, local heritage experts, traditional chiefs, and related stakeholders such as neighborhood association presidents, teachers, or principals in local schools and pastors. It also comprises of both males (50) and females (35), allowing mixed-gender perspectives and encouraging the diversity of opinion in the discussion. The names of the interviewees remain anonymous throughout the paper.

## 5. Results and analysis

### 5.1. Climate change and Ilaje coastal communities

From the participant observation conducted and the literature review, it is evident that the different Ilaje communities are vulnerable to extreme weather events, including floods, drought and rise in sea levels which owe its cause to a complex of factors among which anthropogenic activities is paramount (see Fig. 4). Its setting, especially the elevation and proximity to the Indian Ocean, makes its population vulnerable to climate change as demonstrated by Danladi et al. (2017). This is also in congruence with Danladi et al. (2017) who suggested that the changes in anthropogenic activities witnessed in Nigerian coastal areas during the last 44 years increase the vulnerability of coastal communities to extreme weather events. The study (Danladi et al., 2017) mainly established that during the last 44 years, the Nigerian coast had experienced significant erosion and flooding (for example, see Fig. 5). The Ilaje Community is vulnerable to climate change because they occupy this coastal area. Furthermore, there is the likelihood that the rise in



Fig. 4. Traditional anthropogenic activities in Ilaje (Authors, fieldwork, 2017).



Fig. 5. Erosion and Flooding in Ilaje (Authors, fieldwork, 2017).

sea levels could trigger floods that would displace the community (Xenarios et al., 2016; Bathi and Das, 2016). However, other factors will increase their vulnerability to these climatic changes.

Climate change influences the socio-environmental determinants of health, including safe drinking water, proper shelter, enough food, and clean air. The World Health Organization (2017) suggests that between 2030 and 2050, climate variability will lead to 250,000 more deaths every year (WHO, 2017). Given the poor economic capacity of the rural coastal villages, people who live in areas with feeble health infrastructure, like the Ilaje Community in Ondo State of Nigeria, will have the lowest capacity to cope unless they are helped to prepare and respond adequately. Also, climate change poses significant effects on freshwater resources, forests, and other vital resources, thus affecting water availability (Denton, 2002). Water is an essential resource for productive and domestic use. In the Ilaje Community, women and girls have the responsibility of fetching water for families. Ondo State has a scarcity of fresh drinking water, thus compelling women and girls to trek for long distances to get water (Babatunde, 2010). Due to water scarcity, the Ilaje Community is susceptible to higher incidences of diseases and deaths (Arora-Jonsson, 2011). It is because water obtained from distant sources may become contaminated along the way, thus increasing the vulnerability of the community to water-borne diseases.

Research highlights that women are 14 times more likely to become sick or die than men because of a disaster (Terry, 2009). According to Terry (2009), this effect reduces as the social inequalities between genders. Neumayer and Plümper (2007) contend that apart from high fatalities, Ilaje women may also

experience intangible losses and adverse health effects. The main health impacts are Sexual and Gender-Based Violence (SGBV) and trauma (Neumayer and Plümper, 2007). Higher incidences of SGBV may increase the number of deaths and diseases among women. Also, a rise in sea level will result in less land in Ondo State for living and less freshwater. Ilaje women are usually responsible for collecting water. Lower availability of clean water implies that women will take more time fetching water for families (Ishaya and Abaje, 2008). Also, when family members fall ill because of water-borne diseases caused by climate change, Ilaje women are responsible for taking care of them. They may find it difficult caring for themselves when they fall ill because of the same water-borne diseases (Uyigüe and Agho, 2007).

Furthermore, Ilaje women, particularly pregnant women, are vulnerable to the health effects of climate variability due to the numerous social and physiologic changes (McMichael, 2013). For example, climate-related exposures could result in adverse pregnancy, dehydration, malnutrition, respiratory, and gastrointestinal diseases in Ilaje women (Omonijo et al., 2012). They are also susceptible to temperature extremes, particularly dehydration that can lead to the release of hormones that induce pregnancy (Owombo et al., 2014). Moreover, in pregnant Ilaje women, extreme heat events can lead to adverse birth outcomes, including infant mortality and preterm birth. Floods could increase the exposure to mold and toxins, less access to food, and psychological distress (Uyigüe and Ogbeibu, 2007). For pregnant women, floods can expose them to anemia and spontaneous abortion risks. Finally, adverse climate change may lead to poor nutrition. Ominijo et al. (2012) contend that nutrition is vital for the health and social well-being of the entire family. Because of climate change, nutrition may be affected since there will be low food availability (Omonijo et al., 2012). Women, especially pregnant Ilaje women, are susceptible to climate-related effects, including the low nutritional value of foods, and food safety (Uyigüe and Ogbeibu, 2007). Poor nutrition leads to complications among women, including delivery problems and low birth weight. In other words, climate change increases the vulnerability of women to health problems and mortality rates.

## 5.2. Subsistence in Ilaje coastal communities

The transect walks provided insight that Ilaje is bordered to the South by the Atlantic Ocean and has numerous natural resources that the community relies on for life sustenance. The fieldwork also demonstrated that the main occupation and means of subsistence in Ilaje Community is fishing owing to its proximity to waters. Site visits also led to the inference that the other occupation is timber logging due to the proximity to rainforests. Also, Ilaje Community members are salt miners owing to the access and proximity to salty water. Based on observations, the proximity to these natural resources is crucial for the sustenance of livelihood for the Ilaje Community. Since women face numerous issues including the lack of power to influence decisions in the society, data obtained from the interviews demonstrated that they engage more in subsistence activities than men who are usually on the voyage in nearby cities. Data obtained also demonstrated that the majority of the Ilaje women actively took part in farming. Some of their roles in agriculture include production, distribution, planting, weeding, harvesting and as well as storage. By engaging in food production, including fishing, Ilaje women closely interact with the environment and particularly land (Ajayi and Olutumise, 2018; Tindall et al., 2003; Adebayo and Anyawu, 2005). Thus, they are victims of soil degradation and erosion (Fakoya et al., 2007). As such, assumedly, women are more vulnerable to changes in environmental conditions. Concerning the factors affecting the

vulnerability, the following data were equally gathered;

### 5.3. Factors affecting the vulnerability of women in Ilaje coastal community

#### 5.3.1. Economic factor

Generally, based on the data gathered from literature, it was established that women constitute the larger majority of Nigeria's poor (Usman, 2015). By extension, in Ilaje also, data obtained from the interviews demonstrated that the majority of women in Ilaje are more reliant on natural resources for survival compared to men. This is because the women population rely on natural resources for food, fuel, and water. Site visits also demonstrated that the role of Ilaje women is to fetch water and collect firewood that is obtained from the forest, rivers, and the ocean. Fig. 6 illustrates women on a search for water, fish, and other firewood in Ilaje. Comparatively, according to the interviews, most of the women have lower-incomes and have a higher likelihood of relying on their men. For instance, when extreme weather events threaten agricultural production, men may use their economic independence for investing in other sources of income (Alston, 2014). They can also use their savings to adapt to climate change. In events of food scarcity, data obtained from interviews suggested that Ilaje women tend to prioritize their husbands. Consequently, they tend to ensure that their men eat before they consider themselves. Studies highlight that after experiencing climatic disasters, poor women find it difficult to recover (Daramola et al., 2016; Ifegbesan et al., 2016).

#### 5.3.2. Educational factor

Ideally, education plays a crucial role in imparting knowledge and skills that can enable people to cope with the adverse effects of climate change (Muttarak and Lutz, 2014; Anyanwu, 2010). Based on data collected from the interviews, it was revealed that majority of the women in the Ilaje communities are illiterates and uneducated. Thus, this poor education potentially exacerbates Ilaje women's vulnerability to climate variability in line with the suggestion of Muttarak and Lutz (2014) and Anyanwu (2010). Furthermore, unlike men, the interviews led to the collection of data, which suggested that many women in Ilaje Community have substantially less access to critical information on weather alerts and fishing patterns. This limited information impedes them from responding effectively to climate change.

#### 5.3.3. Intangible cultural heritage: patriarchal norms and traditions

Onwutuebe (2019) explained that patriarchy put men in the position which equips them with stronger adaptive capability, particularly in the context of mobility vocational and flexibility. Alam et al. (2015) equally suggested that men and women are shaped by their societies and as such, societal expectations determine the roles women and men assume in the social spheres. In the Ilaje case, based on data gathered from interviews with traditional chiefs in the different villages, it was established that Ilaje communities still adhere, in fact, strictly to their intangible heritage. Consequently, in tandem with the positions of Alam et al. (2015) and Onwutuebe (2019) among others, the findings suggest that women still adhere to their traditional roles as caregivers and mothers in the society. The patriarchal norm in Ilaje also mandates women to be at the fore of providing for the family in certain instances. This places women in direct contact with the environment and thus, more prone to the adverse effects of climate change.

Furthermore, women are not allowed to participate in decision-making processes in society. On the other hand, men in the different communities generally migrate to find economic opportunities, but the majority of the women often remain at home to take care of children and other family members (see Fig. 6). Data



Fig. 6. Women on a search for fish, firewood and other materials in Ilaje (Authors, fieldwork, 2017).

obtained insinuated that a large percentage of Ilaje women have the responsibility of ensuring that food, fuel, and water are available. Climate change plays a critical role in securing food, fuel, as well as water (Alston, 2014; Danladi et al., 2017). In events of droughts and low rainfall, the participant observation approach also demonstrated that Ilaje girls and women have to walk for long distances and take more time collecting fuel and clean drinking water. Girls are also generally compelled to drop out of school to assist their mothers with such tasks. Dropping out of school consequently affected their education which could have empowered and lifted them out of poverty; a result that is in tandem with the findings by Muttarak and Lutz (2014) (see Fig. 7).

#### 5.3.4. Political factor: power and power relations

Owing to the patriarchal norms, Ilaje women lack the power to make autonomous decisions within the family and in society. For example, many of the Ilaje women expressed concern over the lack of control on the assets and finances of their families. Also, respondents demonstrated that only 6% of Ilaje women were represented in politics. This figure is comparatively low and below the recommended global average. This limits them from accessing material as well as financial resources. Thus, it equally limits the influence that women could have in the strategies adopted by the community to tackle climate change (Alston et al., 2013). Interviews also demonstrated that more representation could provide women with more impetus to offer solutions since they are the most vulnerable to climate change. In this regard, Alston (2014) also suggested that because of exclusion, many of the solutions do not prioritize the needs of women. In addition, the programs to



Fig. 7. Image showing women selling domestic items on the sea (Authors, fieldwork, 2017).

substitute traditional coping mechanisms with ones better suited for the changing environment only focus on the needs of men. Finally, the majority of the female respondents alluded that cultural restrictions impeded them from accessing services and information. The patriarchal norms also reject women relocating without the permission of male relatives even in the event of sudden climate events. Therefore, coupled with many other factors, women are more susceptible to climate variability.

### 5.3.5. Inequalities and inequities: complex of factors

Findings from the various methods demonstrated that gender inequality remains an elusive aspect. Responses obtained from the participants in the survey demonstrated that women are discriminated at every level, with the community denying them access to assets, land ownership, and education. This finding resonates with the results reported by Denton (2002) and Dankelman (2010) that women are also discriminated in education and skills development. According to the interviews, the dominant perception in Ilaje community is that women are inferior to men. The Federal Republic of Nigeria, Muhammadu Buhari worsened the aspect of discrimination recently when he said that his wife's role did not go beyond cooking and house cleaning. It is the epitome of the continued suppression and oppression of women, particularly in the Ilaje community (Ajibade et al., 2013). The respondents further suggested that Ilaje women have fewer chances to make decisions because of cultural inequalities. The destructive natural forces, coupled with rising global temperatures can be negative multipliers in a society like the Ilaje Community due to the problems associated with gender inequality (Ifegbesan et al., 2016). Droughts can lead to adverse water and food insecurity. Such impacts have a disproportionate effect on individuals with the least capacity to tackle the increased social strains like Ilaje women.

Gender inequality, therefore, acts as an impediment to equal resource sharing and decision-making (Chanamuto and Hall, 2015; Djoudi et al., 2016). In the face of climate change, it increases the susceptibility of Ilaje women to climate variability (Chanamuto and Hall, 2015). Expert interviews demonstrated that it is because they lack the skills, knowledge, experience, or power to cope with climate change impacts. The implication for this is that inequality impedes the social wellbeing of Ilaje women (Yadav and Lal, 2018). When Ilaje women's social wellbeing is limited, they become vulnerable to external shocks because of the lack of physical, mental, and psychological preparation (Chanamuto and Hall, 2015).

On the other hand, it was equally observed that Ilaje women could play a pivotal role in climate change by acting as change agents. Contrarily, Ilaje women are not included in the implementation of projects or policies which therefore results to an increase in the existing inequalities. Despite this, Ilaje women respondents reported that they played an important role in responding to climate change because of the local knowledge and leadership abilities. For example, the majority of Ilaje women stated that they engaged in activities that are geared towards sustainable resource management that can lead to sustainable practices at both the community and household level. It was equally observed that the participation of Ilaje women at the political level could lead to better responsiveness to the needs of citizens; an argument that correlates with the findings of Alston (2014) which suggested that equal participation can result in better cooperation and sustenance of peace. Equally, the United Nations Framework Convention on Climate Change (UNFCCC) recognizes the significance of involving men and women equally in developing and implementing national climate policies that respond to gender (Dankelman, 2010). Respondents suggested that women in Ilaje can contribute significantly to the agricultural sector, but they have limited access to resources and involvement in decision-making. Despite this

contribution, results obtained from the semi-structured interview highlighted that Ilaje women make up less than 10% of the total membership in local agricultural committees. Also, some of the interviewed women suggested that they can work collectively and submit petitions to enhance resource conservation. It is because they had a stronger link with the natural environment for many years and played a crucial role in the protection of the environment as it is a crucial aspect of their cultural values (Sayne, 2011).

Furthermore, women also play crucial roles in decision-making on management and consumption of household needs. Based on data collected from the interviews, it was established that some of Ilaje women understood climate change issues as well as global warming. Based on this awareness, Nzeadibe (2009) suggests that there is the likelihood that women engage in practices that conserve and protect resources. As such, women can participate in tree planting and management of forests. Ilaje women rely on natural resources for fuel, and intensive exploitation of these resources can result in air pollution, degradation of the soils and deforestation. Already, some of Ilaje women participate in managing forests through activities such as rehabilitation, planting of trees, and protection (Audu, 2013). They can also assume active roles in afforestation programs by providing seedlings within the nursery as well as flowers to enhance the beauty of the environment. Also, since their societal role ensures the women closely interact with the environment, they take part in environmental management, particularly in terms of waste disposal (Olanrewaju and Ilemobade, 2009).

## 6. Discussion and recommendation

### 6.1. Discussion

The Intergovernmental Panel on Climate Change (IPCC) identified Nigeria as a climate change hot spot which is likely to experience colossal shifts in weather conditions over the twenty-first century (Boko et al., 2007; Olukoya, 2016). Recent studies also demonstrated that climate change in Ilaje coastal zones had been underway over the last two decades or so and there are little efforts concerning mitigation on the part of the Local, State and Federal government levels. The above described economic, social, cultural, and political factors demonstrate the precarious position of women in Ilaje coastal communities in their ability to respond effectively to climate change impact. Given these factors, men are less vulnerable in Ilaje coastal village and thus, have higher chances of survival due to the different economic, social, cultural, and political factors which privilege the male population. Furthermore, it was observed that increased humidity amplified the incidence of malaria in the community.

According to literature, several physiological changes, including heat dissipation and higher exhaled breath, make pregnant women appealing to the female Anopheles mosquitoes that carry malaria (Ayeni, 2011). As such, women in various communities are more vulnerable to this indirect impact of climate change. The poor level of education among women also contributes to the early child-bearing, which limits the ability of women to earn money that can enable them to adapt to climate variability (Muttarak and Lutz, 2014). The economic dimension as regards to poverty, also makes women more vulnerable. Wuyep et al. (2014) reported that a larger proportion of Nigeria's poor are women. In the Ilaje case also, the majority of the poor population are women and have substantially less access to critical information on weather alerts and fishing patterns. This limited information impedes them from responding effectively to climate change. Also, concerning the patriarchal norms which determine the role of women in the society, it deepens the existing inequalities between men and women in the

society. Majority of the women respondents believed that the unequal participation of women in decision-making processes as well as labor markets create inequalities and usually deter women from contributing to climate change mitigation. For example, women cannot easily migrate even if there is a sudden climate event while it is common for men to always migrate to nearby communities. Given the existing challenges affecting women and their potential contribution to climate change mitigation, this paper, therefore, suggests the following recommendation for ameliorating their vulnerability to the actual and potential impacts of climate change in the coastal zones.

## 6.2. Recommendation

### 6.2.1. Women as agents of change

Audu (2013) suggested that women can play an instrumental role in protecting the environment by advocating for biodiversity conservation. Through their active participation, Ilaje women ensure sustainable use of resources. Moreover, Ilaje women also engage in water resource management (Fakoya et al., 2007). They are at the center of management of Ondo State's community water resources. For example, they always take control of the communal water points (Wuyep et al., 2014; Fakoya et al., 2007). Occasionally, they lock the taps to deter the children from causing damage to the water pipes. Also, women can play a crucial role in the 3R initiative. The 3R involves the concepts of reduce, reuse, and recycle. Reduce entails the use of fewer resources, and is the most effective among the 3Rs (Nzeadibe, 2009; Uyigüe and Agho, 2007). Through such initiatives, Ilaje women can play a leading role in ensuring that resources are used efficiently, effectively, and sustainably. Women also act as role models for children in reinforcing positive conservation habits (Adelekan, 2010; Saito, 2014). The knowledge that they have on the natural environment can be instrumental in reducing greenhouse gas (GHG) emissions (Iyun, 1998). Given this background, it is therefore suggested that women are prioritized in policy-making, and there is a need to adopt the HeForShe Campaign. HeForShe is a solidarity program for advancing women that was initiated by the United Nations' women (Bailliet, 2016). The primary objective is to attain equality through boys and men being the change agents and taking actions to eliminate detrimental inequalities that afflict women.

### 6.2.2. Increase participation of women

DeVoe et al. (2013) suggested that since women are the most affected by climate change, they need to adopt a leadership role. To enhance progress, there is a need for the government, civil society, scholars, and affected populations to take various proactive actions for Ilaje women. They should involve women in negotiations on climate change. To enhance the adaptation of Ilaje women, they should have a voice and the ability to engage in decision-making roles and leadership rather than merely assuming political office. Ilaje women should actively participate in planning and implementing programs that aim to enhance sustainable natural resource management (Alston, 2014). They should also participate in Disaster Risk Reduction (DRR) to enhance climate change mitigation (Daramola et al., 2016). Disaster Risk Reduction (DRR) involves the community systematically analyzing and mitigating the causes of disasters (Daramola et al., 2016). It includes minimization of exposure to hazards, reduction of the susceptibility of individuals, prudent land and environmental management and improvement of preparedness as well as an early warning for the adverse events (Daramola et al., 2016). This can only succeed when the community involves girls and women. It is consistent with the finding that climate adaptation becomes sustainable when the community involves Ilaje women in leadership roles. There is also a

need to ensure that the community strengthens the role played by Ilaje women (Dankelman, 2010). Many of them are under-represented in the process of decision-making about environmental conservation and governance (Boette & McKinnon, 2013). It is prudent to ensure that they are equally represented in the current decision-making structures for them to contribute their perspectives on climate change (Nelson et al., 2002). For example, Ilaje women in leadership positions at the community levels can make a significant difference in responses to natural disasters (Wuyep et al., 2014). As such, there is a need to enhance their participation in leadership and programs geared at climate change mitigation and adaptation. Women should be imparted with relevant skills, knowledge, and expertise to enable them to develop resilience for coping with climate change (Muttarak and Lutz, 2014). Ilaje women should particularly have equal access to credit, skill-development programs, and credit facilities to ensure that they fully participate in climate change initiatives (Yadav and Lal, 2018). The Ondo State government should, therefore, incorporate capacity building in its action plans, programs, and measures geared at sustainable development.

Lastly, the active involvement of Ilaje women in developing criteria and allocating resources for climate change initiatives is crucial at the local level (Alston, 2013, 2014). Also, gender analysis of financial instruments is vital to enhance gender-sensitive investments in activities for capacity building, mitigation as well as technology transfer. Furthermore, the community should embrace technological developments to harness the potential of Ilaje women mitigating climate change impacts (Nelson et al., 2002). The developments should consider the roles, needs, and priorities of Ilaje women. Climate change efforts need to use Ilaje women's knowledge, expertise, and skills, including traditional practices (Adebayo and Anyawu, 2005). The involvement of women in developing new technologies can be instrumental in ensuring that they are affordable, sustainable, and responsive to Ilaje community needs (Chanamoto and Hall, 2015). While considering women as change agents, the community should prioritize gender inequalities during the development of programs for mitigating climate change.

### 6.2.3. The dynamism of culture: the need for consideration

The cultural role of women which is determined by the intangible heritage in Ilaje gives impetus to every other factor which invigorates the vulnerability of women in Ilaje communities. Although the cultural heritage of a people is linked with their identity and peace, it is equally dynamic and thus subject to construction and re-interpretations of each generation. At this climate change phase in the history of the Ilaje communities, there needs to be a reconsideration of the role of women, such that it reduces their vulnerability to environmental changes. This is not an attempt to establish agitations against cultural heritage but to simply encourage the societies to allow culture adaptation as a means of solving contemporary generational problems.

### 6.2.4. Integration of mitigation and adaptation with health program

There is a need to combine climate change adaptation and conservation efforts with the health programming of Ilaje women. Nigeria should boost investment in meeting the current need for health services (McMichael, 2013). It is crucial for ensuring that the progress made in biodiversity conservation and environmental stewardship are preserved. Despite the recognition of the value of the role of voluntary family planning, it does not receive sufficient funding for climate change adaptation (McMichael, 2013). Adaptation strategies need to depict multi-sector approaches and offer funding to predictable approaches. More importantly, these efforts

should be founded on rights-based approaches. One of the promising strategies is the renowned population, health, and environment, PHE, approach (Daramola et al., 2016). It involves the linkage of efforts geared at improving climate adaptation and environment to the health of Ilaje women and family planning. The PHE approach can increase the participation of Ilaje women in natural resource management (Chanamoto and Hall, 2015). Perhaps, Nigeria can gain insights from Rwanda's project called Sustaining Partnerships to Enhance Rural Enterprise and Agribusiness Development (SPREAD). The project embeds health education that aims to reach farmers and empower women. However, during the implementation of such a project, there is a need to ensure that it is adapted to the local needs of Ilaje women. Finally, it is vital to incorporate women in creating policies for protecting the environment, resilience, food insecurity, and ensuring that energy poverty ends.

## 7. Conclusion

This study contributes to the scant literature, which adopts a case based approach to the investigation of the vulnerability of women to climate change in coastal zones. As demonstrated in the appraisal of the existing literature, most studies have been accomplished under the assumption that women are vulnerable in every context irrespective of the nuances of the values, patriarchal norms, environmental economic and sociocultural factors which determines the roles of women and their contact with the environment. Thus, this present study argues that among others, to scheme an adaptation framework cum policy to alleviate the vulnerability of women in a given setting, investigating and establishing the contextual factor plays an irreducible role. As such, the study set out to investigate the factors that can potentially or increase the vulnerability of women to climate change in Ilaje coastal region in Nigeria. To empirically locate this aim, the research adopted quantitative methods to collect data in ten coastal communities in Ilaje namely; Igbokoda, Mahin, Ugbo-Nla, Idi-Ogba, Ayetoro, Ilowo, Obenla, Odo-Nla Ikuyinminu, and Awoye.

The results demonstrated that firstly, extreme weather events had been underway in Ilaje since the last 44 years. This increases the vulnerability of coastal communities to extreme weather events especially significant erosion and flooding (Danladi et al., 2017) due to its proximity to the Indian Ocean (Danladi et al., 2017). However, the results also demonstrated that the impacts of climate change are experienced unequally among women and men in these communities. The main factors which were gathered to be affecting the vulnerability of Ilaje women in the coastal areas are economical; poor level of education; environmental (in the context of proximity to the water); sociocultural (in the context of intangible heritage and patriarchal stratification of the society) and lastly, political factors. Patriarchal division of the social roles which determined the social function of women in Ilaje communities has exposed the women more and furthermore put men in the position to better adapt due to their cultural rights to mobility, migration and political integration. The existing inequality suffered by women is further exacerbated by a continuum of economic factors, poor level of education, and poor access to information, among others. Also, marginalization from economic and political power impedes their ability to respond effectively to changes in environmental conditions. However, it was equally gathered that Ilaje women are custodians of local knowledge that is important for efforts geared at ameliorating climate change vulnerability. Therefore, Ilaje women possess potentials to participate in environmental conservation and protection programs, lead social and environmental movements, decision-making, and sustainable natural resource use. To this end, this paper posits that to reduce the vulnerability of Ilaje

women to climate change, the identified factors must be addressed and urgently.

Moreover, women role as stakeholders and change agents need to be strengthened, harnessed, and integrated into the mitigation and adaptation programs. Thus, as a recommendation for future research in this direction, a bottom-up climate change adaptation framework needs to be developed by drawing on the factors identified in this study. Such studies should also importantly incorporate women capacity building and empowerment as an active ingredient of a successful adaptation proposal.

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## Declaration of competing interest

The author declares that the review was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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