

Chapter 4

Rural Women Belief System and Attitude Toward Climate Change Mitigation and Adaptation Strategies in Nigeria

C.A.O. Akinbami, J.E. Olawoye, and F.A. Adesina

Abstract Climate change has affected both the natural and human systems, of which the women in the rural areas and their livelihood practices are the mostly affected. This study was conducted in some selected rural communities of Osun state in Southwest, Nigeria among women involved in different livelihood practices to find out issues about climate change impacts on the rural women such as: Are the rural women aware of climate change and its impacts? How prepared are they for climate change mitigation and adaptation strategies? Are there any socio-cultural barriers to combating climate change? The study therefore focused attention on their beliefs, attitude and perception about climate change. It also discussed the barriers their beliefs and attitude posed to the establishment and implementation of mitigation and adaptation strategies in the rural areas. Focus Group Discussions, in-depth interview and questionnaire were employed to capture awareness, actual beliefs and attitude, the effect of such attitude and beliefs on adopting mitigation and adaptation strategies. Data collected were analysed using Atlas.ti and SPSS. Most of the women in the rural areas are aware of the impacts of climate change in their environment, especially, on their livelihoods. However, the awareness level has not impacted on them positively to adopt any mitigation and adaptation strategies. This is due to their belief system that climate change is not a consequence of anthropogenic activities. Recommendations were made as to how these problems could be solved for the women in the rural areas to embrace mitigation and adaptation strategies.

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Introduction

Climate change affects every aspect and sector of the socio-economic development, thereby affecting the well-being and economic growth in the human system. The vulnerable including the socially marginalised—the poor, children, women, the elderly and the indigenous people especially in the rural environment are at great risks because of their weak adaptive capacities. In Nigeria, women especially those from the rural areas, are particularly vulnerable to the effects of climate change because they constitute the majority of the country's poor and are more dependent for their livelihood on natural resources that are threatened by climate change.

Studies (IPCC 2013) have shown in unequivocal terms that global climate is accelerating with rapidly increasing evidences. The Federal Ministry of Environment (FME 2014) reported that the scale of climate change will increase with high anthropogenic emissions, greenhouse gas (GHG) concentration, and average global temperature. Climate models suggest that Africa's climate will generally become more variable, with high levels of uncertainty regarding climate projections in the Africa Sahel zone. Evidences indicate that the world has already warmed by 0.8 °C since the pre-industrial era. Temperatures in West Africa, and particularly the Sahel, have increased more sharply than the global trend, and the average predicted rise in temperature between 1980/1999 and 2080/2099 is between 3 and 4 °C, which is more than 1.5 times the average global trend (IPCC 2007).

Nigeria is like any other country, experiencing the impacts of climate change. According to an assessment of Nigeria's climate over the period of 1941–2000 done by the Nigeria Meteorological Agency (NIMET 2008), it was observed that significant changes were taking place. It has been shown that there is a possibility of Sea Level Rise from 1990 levels to 0.3 m by 2020 and 1 m by 2050, and rise in temperature of up to 3.2 °C by 2050 under a high climate change scenario has been predicted (DFID 2009). The low estimate predictions are for sea level rise of 0.1 and 0.2 m by 2020 and 2050 respectively, and a temperature increase of 0.4–1 °C over the same time periods. Sea level rise of 1 m could result in loss of about three-quarters of the land area of Niger Delta in the country. According to NASA 2015, year 2014 is the hottest in recent decades indicating that it is hotter than 1998. The ice caps and glaciers in the cold regions are also melting.

All of these have serious environmental and economic implications and call for urgent and well-targeted actions to minimize the potential disasters that could attend a full-scale climate change. The report of Nigeria's Second National Communication on Climate Change (FME 2014) underscore the fact that climate change continues to have increasingly negative impact on agricultural productivity in Nigeria, with greater water stress experienced particularly in the Sudano-Sahelian region of the country. The changes in climate are further putting pressure on

fisheries and the rich biodiversity in the country impacting negatively on food security. It is obvious that these negative impacts are impeding the efforts of the Federal Government in striving to reduce poverty in the country.

The most affected are the women who according to 2006 census figures, make up 49 % of the total population in Nigeria (FRN 2007). At the global scale the pattern is the same Women who make up more than 60 % of the over one billion poorest in the world (UNDP 2006) are most affected by the impacts of Climate Change. In Nigeria, women have been known to be economic catalysts and that economic growth particularly in developing countries, can be stimulated through their involvement in various livelihood and enterprise practices, although, most women are involved in micro, small and medium scale enterprises (MSMEs) which incidentally contribute more than 97 % of all enterprises, 60 % of the nation's GDP and 94 % of the total share of national employment figure (Mayoux 2001; Ndubusi 2004).

Quite clearly, an effective response to the challenges of climate change must address the impact on all sectors particularly as it affects the women in the rural sector, who are among the most vulnerable groups. Their gendered divisions of labour often result in the overrepresentation of women in agricultural and informal sectors, and make them more vulnerable to disasters (WEDO 2008). These women are into various livelihood practices in their rural settings contributing to the economies of their communities, and as a result are considered agents of climate change response actions. In addition to their livelihood activities, they are also responsible for food production, water and energy supply for cooking to take care of their households (Enarson 2000). As climate change impact increases, these tasks become difficult to carry out (Patt et al. 2007).

The livelihoods of the rural indigenous people have become fragile because of their vulnerability not only derives from dependence on threatened ecosystems, but also on their comparatively limited access to infrastructure, services, and political representation to aid their preparedness for mitigation and adaptation strategies (Kronik and Verner 2010). Dependence of the rural people on cultural cohesion has also contributed to the vulnerability to climate change. To maintain their livelihood strategies, the indigenous people depend heavily on cultural, human, and social assets, including traditional knowledge systems and institutions that are now under increased stress (Salick and Byg 2007). Their knowledge systems which are based on experiments with nature and their ability to predict and interpret natural phenomena, including weather conditions, have been vital for their survival and well-being and have also been instrumental in the development of their cultural practices, social structures, trust, and authority.

The societal production of knowledge about nature's cycles has led to certain cultural practices. The practices, in turn, have resulted in the creation of cultural capital, which then is reproduced through practices and rituals. Cultural institutions are developed around these practices and rituals, serving to maintain, develop, and disseminate information. These cultural institutions thereby contribute to the social generation of knowledge. The cultural institutions strongly affect indigenous peoples' natural resource management, attitude, belief, health, and

coping abilities. In many societies socio-cultural norms prevent women from migrating to look for shelter and work when a disaster hits in their environment (Patt et al. 2007)

In order to help the rural women, it becomes important to know if they are even aware of the changes in climatic condition and its impacts on their activities. Some of the questions begging for answers include: How prepared are the rural women for climate change mitigation and adaptation strategies? Are there any socio-cultural belief and barriers affecting their attitude towards mitigation of and adaptation to climate change in the rural areas?

The objectives of this paper are to assess the rural women awareness of climate change in the study areas; evaluate the perceived impact of the belief system of rural women on climate change in the areas, and examine the mitigation and adaptation strategies in place.

Women Development and Climate Change

Climate change refers to a change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer (IPCC 2007). Climate change is one of the most serious environmental threats that can undermine the efforts to the achievement of both local and national governments as they strive to reduce poverty. Sustainable development goals negotiated at the UN in September 2015. It has impacts significant on agriculture, water resources and biodiversity as all of these are dependent on climate (e.g. Aydinalp and Cresser 2008; Speranza 2010). However, human activities through agriculture constitute a problem to the environment because about 20 % of the annual increase in anthropogenic greenhouse gas emissions through carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (NO) gas emissions, with methane having the highest global warming potential, which is about 300 times the potential of carbon monoxide (CO) and about 20 times that of NO, are from the agriculture facilities which the women are involved in. Livestock rearing which is one of the common livelihood practices in the rural areas alone accounts for 40 % of the world's agriculture gross domestic product and would generate approximately between 5 and 10 % of global emission of greenhouse gases (FAO 2006; Aydinalp and Cresser 2008).

Women function as change agents in community natural resource management, innovation, farming and care giving and hold the key to adaptation to climate change. Responsibilities in households, communities and as stewards of natural resources position them well to developing strategies for adapting to changing environmental realities under the new, different weather patterns and extreme weather events produced by change in the climate (Enarson 2000). Research has also shown that climate change affects women differently from men because women are often in charge of growing and preparing food, gathering firewood for

fuel, collecting water and caring for the ill in their families and communities, all of which tasks become more difficult and time consuming with the increased occurrence of floods and droughts associated with climate change (Ajani Onwubuya and Mgbenka 2013). But they lack means of dealing with climate change and more importantly, is the effect of the socio-cultural system on the women, which emphasis male dominancy in all respects. This also reflects in women under representation in policy and decision making processes around climate change at all levels, especially, at the local level (Brody et al. 2008; IUCN 2007).

This is a matter of concern not only because women comprise one of the most vulnerable groups of people, but also because they play an important role in the economy in terms of their contribution to the global and national economy. Most of the times, these roles are not fully acknowledged. For instance, women comprise 43 % of the agricultural labour force in developing countries, ranging from 20 % in Latin America to almost 50 % in some parts of Africa and Asia. In South and East Asia, the Middle East and North Africa, women's share of agricultural employment within total employment is higher than that of men. In rural areas with high levels of male outmigration, women's roles in agriculture are expanding, leading to dramatic changes in their responsibilities and tasks.

Sub-Saharan Africa is set to be one of the regions hardest hit by climate change for some reasons, which include the fact that 96 % of its population is dependent on rain-fed agriculture (World-Bank 2008) and the poor adaptive capacities of African countries which reflect in their general economic and technological under-development. Inhabitants in most African countries have poor or limited access to health services, they lack access to micro-finance support, have poorly developed transport systems and poor knowledge of the characteristics and dynamics of climate change especially among the women (IPCC 2007). The severity of climate change impacts on poor rural communities, whose incomes are mainly from subsistence agriculture, are not difficult to visualize. Successful adaptation actions are likely to be those that are finely tuned to the immediate needs of individual communities where local realities and social structures are taken into account. Adaptation to climate change may be described as activities that reduce the negative impacts of climate change and/or takes advantage of new opportunities that may be presented. In many cases, women and men have separate roles and different knowledge and a range of different coping strategies. Although various studies have focused on climate change impacts, gender relations and adaptation opportunities in Africa, there is the need to focus more on the perceptions, beliefs and attitude of the rural women towards climate change which determine their preparedness in terms of mitigation and adaptation strategies.

Theoretical Framework

The theoretical framework employed in this paper is the sustainable livelihoods approach (SLA). Livelihood studies were brought to the fore of development studies in the late 1990s and the beginning of the new millennium, when the

Sustainable Livelihood Framework was strongly promoted by the Department for International Development (DFID), the British state development cooperation agency. Chambers and Conway (1992) reported that “a livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with or recover from stress and shocks, maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation; and which contribute to net benefits to other livelihood at the local and global levels and in the short and long term.” However, Carney’s definition of livelihood which has become general currency built on the one from Chambers and Conway states that “a livelihood system comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. He further said that a livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base” (Carney 1998). It is important to note that “livelihoods rarely refer to a single activity. It includes complex, contextual, diverse and dynamic strategies developed by households to meet their needs” (Gaillard et al. 2009). The SLA evolved within the context of the intentional development approach by which development practitioners were seeking to maximise the effectiveness of their interventions to help the disadvantaged (Morse and McNamara 2013). It is in effect a diagnostic tool which provides a framework for analysis leading to concrete suggestions for intervention (Allison and Horemans 2006; Tao and Wall 2009). It was typically applied in poorer countries as part of a planning phase for an intervention via policy, a development project or perhaps as the basis for more in-depth research. In that sense the SLA is an analysis of peoples’ current livelihood and what is needed for an ‘enhancement’, and useful in avoiding the inappropriate interventions critiqued by the post-developmentalists.

The livelihood approach groups individuals into different livelihoods according to their access to assets (including both material and social resources) and their capabilities to combine them to livelihood strategies so that everyone will have the “opportunity to earn a sustainable livelihood”. The sustainable framework has been illustrated with a model that makes it easier to understand the different components and their interrelatedness (Petersen and Pedersen 2010). Figure 4.1 depicts the SLA model. The vulnerability context describes the external environment that the poor people live in. This includes critical trends, such as technological trends or population trends. It also includes shocks such as natural disasters or economic inflation, and seasonality which refers to the way prices, employment opportunities and production might shift with the seasons. All of these factors will affect the assets that people have and thereby the sustainability of their livelihoods. The sustainable livelihoods framework is built on the belief that people need assets to achieve a positive livelihood outcome. Transforming structure and process includes the institutions, organisations and policies that frame the livelihoods of the poor, and they are found on all levels—from the household to the international level. These processes and structures determine the access that people have to different kinds of

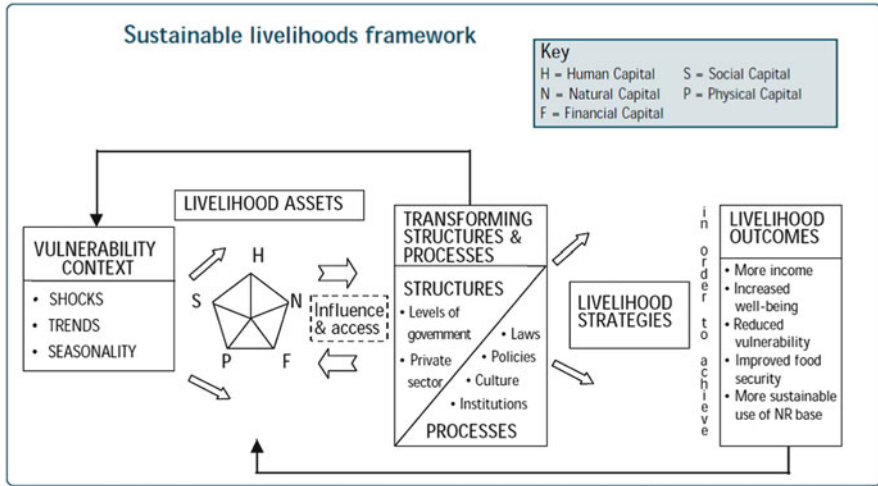


Fig. 4.1 An illustration of sustainable livelihoods framework (SLA) model. *Source:* (Petersen and Pedersen 2010; DFID 2000)

assets, and therefore the importance cannot be overemphasised. Examples of processes are international agreements, ownership rights and laws to secure the rights of the individuals, whereas structures might be the existence of ministries, banks that give credit to the farmers or self-help groups in the local community. Livelihoods strategies are the way that people act in order to achieve their desired livelihood. The access that people have to different kinds of assets affect the strategies that they employ, and the structures and processes in a given society also creates possibilities and constraints on the strategies that people are able to use. Finally Livelihood outcomes are the achievements of people’s livelihood strategies. However, outcomes are to be described by the local people themselves, since these include much more than income. For outsiders it can be difficult to understand what people are seeking and why, because this is often influenced by culture, local norms and values (Petersen and Pedersen 2010).

People have different kind of assets that they combine to help them achieve the livelihoods that they seek. These assets have been broken into five ‘capitals’, which are: human capital (e.g., education, health); natural capital (e.g., land); financial capital (e.g., access to credit); social capital (e.g., community networks); and physical capital (e.g., infrastructure like markets and roads) (See Fig. 4.1).

Human capital is one of these assets, and refers to the skills, knowledge, ability to labour and good health that enable people to achieve their desired livelihoods. Human capital is essential in order to use the other kinds of capitals that exist. Social capital refers to the social resources that people can get help from in order to achieve their livelihoods—this could be through networking, membership of formalised groups or mere trust between people that make them help each another. Natural capital is to be understood in a very broad manner, since it both covers tangible factors, like natural resources such as trees, land etc., and more intangible

products such as the atmosphere and biodiversity. Physical capital describes the basic infrastructure and producer goods that are needed to support the livelihoods that people seek. Financial capital is the financial resources that people can use to achieve the livelihoods that they are striving for. The ability to combine these assets to livelihood strategies is influenced by the prevailing transforming structures and institutions and the vulnerability context. The transforming structures and processes are the institutions, culture, environment, policies and legislation which determine access to the five different types of capital, terms of exchange between the different types of capital and the economic and other returns from livelihood strategies. The vulnerability context presents three main categories of vulnerability: trends, shocks and seasonality which affect assets and livelihood strategies and determine the level of (non) vulnerability (de Haan 2012).

The description of the model shows that the SL framework is a systemic and holistic way of describing the factors that affect the livelihoods of the poor. The framework is an attempt to understand poverty as a multifaceted concept, covering more than just economic growth (Krantz 2001). The framework emphasises that other aspects are important too, such as health, social status and natural resources. These factors have an impact on how people are able to take advantage of the economic opportunities, how they combine assets and thereby what livelihoods they can create. Moreover the description of the different factors show how important it is to include the poor, since they are the ones with the knowledge of the content associated with each factor, and of how the factors affect each other in positive or negative ways.

The livelihood approach became attractive because it has an open eye for the wider context in which the poor organise their livelihood strategies. The approach acknowledges that these strategies are embedded in structures and governed by institutions. This wider context is considered fundamental because an important part of the poverty alleviation policies and interventions is meant to aim at opportunities and constraints in these structures that would either enable or prevent the poor from organising effective livelihood strategies. If these policies and interventions could become more effective, it would bring the poor less vulnerability, more well-being and more sustainability. Therefore, notions like claims and access are considered key in the livelihood approach. These notions point at the possibility to call upon moral and practical assistance and to effectively use the resource in practice. Although the wider context or structure is not only regarded as a potential constraint to the livelihood strategies of the poor, the approach however also aims to stress the potential of livelihood strategies to influence and even to change structures. This attention for poor people's agency, as their capacity to integrate experiences into their livelihood strategies and to look for outlets of aspirations, ambition and solutions to problems, is prominent in the livelihood approach (Scoones 1998).

Applying Livelihood Profiles as Baseline for Vulnerability Analysis

The livelihood framework is increasingly influencing the approach of projects ranging from emergency response, to disaster mitigation to longer term. Livelihood Profiles are developed to serve as baseline information. The baseline information comprises a set of information dedicated to answering the fundamental question of how people survive in most years (Scoones 1998).

This study has used SLA to translate livelihoods analysis into practical, quantified information for decision makers with a practical geography attached. This model has also been used to link livelihood information to an analysis of the effects that a hazard will have on livelihoods and household income security especially as it relates to the rural women, their belief system and their economic empowerment activities. This study has also used the SLA as a holistic approach to get a comprehensive understanding of how people cope and how communities are internally differentiated in their response to climate variabilities.

Methodology

This study which was carried out in Osun state in the south-west of Nigeria. It precedes a bigger study which will cover several states in the various geopolitical zones of the country with different socio-cultural belief systems and vegetation zonation. Qualitative and quantitative methods were employed to gather the primary data. Both descriptive and inferential statistics were employed to analysis the quantitative data. The descriptive statistics involved the use of frequencies and percentages while the inferential statistics involved the use of bivariate level of analysis using chi square test at 0.01 level of significance. Furthermore, the Kendall Nonparametric bivariate correlations were employed to determine the significance and direction of association between the factors considered and awareness level. Atlas.ti software was employed to analysis the qualitative data. Atlas.ti was used to do the content analysis of responses by highlighting relevant quotes. The two communities were purposively chosen because of ease of entry into the areas. The communities were free of communal clashes as at the time of the study. However, the chosen communities have similar cultures and levels of development. The participatory research tools were employed to assess responses to climate change, awareness of and knowledge of climate change, and its impacts among the target groups in the communities.

Study Area

The study was conducted in two communities in Ile-Ife, Osun State. Ife Central, Ife East, Ife North, Ife South, are that make up Ile-Ife and its environ. Osun State is a landlocked state in South-western Nigeria and occupies a land mass of approximately 8602 km². It is known as the state of the living spring and is bounded on the west by Oyo State, in the east by Ondo and Ekiti States, in the north by Kwara State and in the south by Ogun State. The people of the state are Yoruba and trace their origin to Oduduwa and the town of Ile-Ife. The sub-ethnic groups comprise of Ife, Ijsha, Oyo and Igbomina. Osogbo is the capital of the state with a population of 2,203,016 (NPC 2010). The people of the state are mostly traders, artisans and farmers. The farmers produce food crops such as yam, maize, cassava, beans and cocoyam. The cash crops include cocoa and palm produce. The artisans make hand-woven textiles, tie and dye clothes, leather work, calabash carving and mat-weaving. For the purpose of this study Osun state was purposively selected due to ease of entry and suitability for this study. Osun state is dominated by rain forest climatic condition.

Sample and Sampling Techniques

The target population is the rural women who are into various livelihood practices: farming, food processing, and trading/artisans were sampled in the communities, because these are the prevailing business activities in the study areas. This study was conducted in two communities. In each community, one rural community was purposively chosen, that is, each from Ife Central and Ife East Local Government Areas (LGAs) of Osun state. The chosen communities serve as good representation where women experience the effect of climate change in the rural areas.

Research Instruments

Qualitative and quantitative approaches were employed to elicit responses from respondents. The qualitative approach involved the use of Focus Group Discussions among the women, in-depth interviews with community leader.

Sample Population (Sample Frame)

The two communities purposively selected for the study are Koola in Ife East LGA and Ilode in Ife Central LGA. The community in Ife Central LGA consists of a

group of 30 women who are into vegetable farming. They are gathered in the area because of the availability of a flowing river which is an asset to their occupation. Questionnaire was administered on 20 of them while the remaining 10 women participated in focus group discussion (FGD).

The second sample population from Ife East LGA was conducted among women who are into various livelihood practices such as palm oil processing, kolanut trading, plantain trading and fruit trading. Fifty women were involved in the quantitative method while another ten women participated in the FGD. The in-depth interview (IDI) was conducted on the community leader.

Results and Discussion

Socio-Economic Characteristics of Respondents

About half of the respondents (50%) were within the age range of 36 and above (Table 4.1). The mean age of the respondents was 32 years. This implies that most of the women were in their productive years. Hence their involvement in more than one livelihood activities. About 30% of the respondents are involved in other occupation for various reasons such as: the need to source for more income to diversify and the need to augment income from major activities. A greater proportion (70%) of the respondents were married. This again explains their involvement in more than one occupation. As married women, they have great responsibilities to cater for, which income from one occupation may not be sufficient to handle. Oberhauser and Pratt (2004) noted that married people have responsibility for provision of household needs of their families hence greater involvement in occupational diversification for economic empowerment.

The analysis of the educational level of the women revealed that about 83.4% of them went to school out of which 45.7% had primary education, that is, basic education; 25.7% possessed secondary while 1.4% had tertiary education where advanced skill acquisition could be acquired. This explains why most of the women in the rural areas in the study areas are mostly into farming and food processing activities. In this study, the respondents were also involved in farming (64.3%), vegetable farming (28.6%), livestock farming (5.7%) and artisan (1.4%). This result agrees with the submission of Ranjan (2006) which stated that level of education increases participation rate in occupations for rural women and that educated rural women are likely to possess skills which facilitate successful involvement in non-farm activities.

More than half (52.9%) of the women had over 10 years of work experience. This is one feature aiding diversification of activities among the women and this is of great importance in risk management. According to Ajani and Igbokwe (2012) rural women with many years of experience in farming are more likely to diversify

Table 4.1 Socio demographic characteristics

Age group	N = 70	%
16–20 years	4	6
21–25 years	9	13
26–30 years	11	16
31–35 years	11	16
36–40 years	18	26
41 years>	17	24
Marital status		
Single	7	10
Married	49	70
Widowed	6	8
Separated	4	6
Divorced	4	6
Educational status		
No primary education	19	27
Primary education	32	46
Secondary education	18	26
Tertiary education	1	1
Religion		
Christianity	54	77
Muslim	16	23
Major occupation		
Crop farming	46	66
Vegetable farming	20	29
Livestock rearing	4	5
Creation of business venture		
1–5 years	6	9
5–10 years	27	39
10 years>	37	52
Average monthly income		
<N2,500	1	1
₦2500–₦5,000	4	6
₦5000–₦10,000	25	36
₦10,000–₦15,000	23	33
₦15,000–₦20,000	9	13
₦20,000–₦30,000	5	7
₦30,000–₦50,000	3	4

Source: Field Survey (conducted in 2015)

into agricultural activities making use of wealth of experiences they have acquired over the years.

Over 35 % of the respondents reported to be generating average monthly income between ₦5000–₦10,000, 32 % fell between the range of ₦10,000–₦15,000 while about 8 % earned less than ₦5000 and the remaining 25 % claimed to earn more than ₦15,000. The mean income is about ₦8000. From their claim, it's obvious that

majority (67 %) of the women earn less than the approved minimum wage of ₦18,000 in the formal sector in the country. This again could be the reason why most of the women's livelihood practices remain at the micro level, since there seems to be lack of sufficient capital for expansion. Moreover, the study also found out that 60 % of the respondents have a household size of 6–10. The mean household size is 7. It can thus be interpreted that 7 people in a household would have to depend on ₦8000 in a month. This would lead to poverty being more entrenched in the rural areas, particularly among the women.

Awareness of Climate Change

All the respondents reported that they are aware of the changes that are taking place in the weather around them. According to the report from the FGD participants, it was stated by the participants that the changes had been observed as far back as 30 years' ago. This finding contradicts the notion stated by Egbe et al. (2014) that rural women are not aware of climate change. Though, the sufficiency of the awareness level may be queried because it is objective and not based on scientific evidence.

Their awareness cut across the elements of weather vagaries such as distortion of rainfall pattern, drought, sea level rise, temperature rise, and increase in humidity. More than three-fifths (62.9 %) indicated that there is less rainfall to give a good farm yield at the appropriate time, 11.4 % said that there is too much rainfall, that is, the few rainfall events experienced were heavy and had adverse effect on their farm products. More than a tenths (15.7 %) reported that there was more drought experienced and 10 % experienced more erosion. In the study areas, the women were able to monitor climate change trend. Figures 4.2a and b reveal the level of awareness in elements of climate change. The study reveals that rainfall, either the shortage or excess of it, is the most climate change effect being experienced by the women in the study areas (Fig. 4.3) since about 94 % of the women depend on rainfall for their farming activities.

During the FGD sessions, the women at Koola claimed that they have started to experience the instability in weather since 30 years ago and as a result, their livelihood had been grossly affected. Some of the respondents said:

'There has been too much of sunshine and lack of sufficient rain, thereby reducing the quantity of palm oil because the fruits would not be juicy due to lack of rain and too much of heat'. *Koola community, palm oil producer, 67 years.*

'Farm products are not doing well now because of lack of rain. The bunch of plantain harvested now cannot be compared with that of 20 years back. Now, they are smaller in size'. *Farm products seller, 55 years, Koola community.*

'In the olden days, when the harmattan season came at the appropriate time, it aided Kolanut production and they would be fresh during preservation. But now, there is much drought, as a result, kolanut fruits get burnt even while preserving them. And this leads to great loss for us because we have to pour the fruits away'. *Kolanut seller, 70 years, Koola community.*

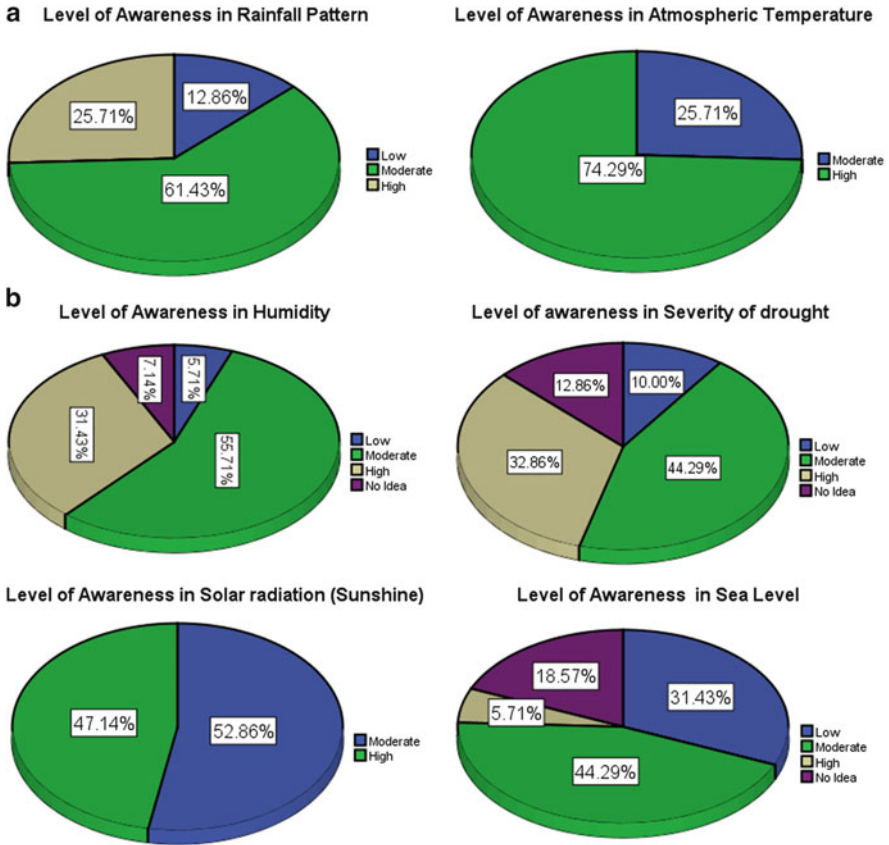


Fig. 4.2 a Level of awareness in elements of climate change. **b** Level of awareness in the elements of climate change

The situation was the same at Ilode, with the women who were into vegetable farming. They are aware of climate change and the effects on their livelihood practice. For them, there is too much of sunshine sometime and too much of rain some other time leading to flooding. They reported:

‘We have not had it this bad before. About 3 years ago, the vegetable was getting rotten when it was to blossom due to the effect of too much of heat’. *Vegetable farmer, 51 years with over 10 years of farming experience. Ilode community*’.

‘There has been too much of heat affecting the tender plant and sometimes we have to pour the vegetable away after harvesting and we have nothing to sell. Some other times, when it would rain, the rain would be too much causing most of the vegetable to be washed off by erosion’. *Vegetable farmer, 52 years with over 30 years of farming experience. Ilode community*’.

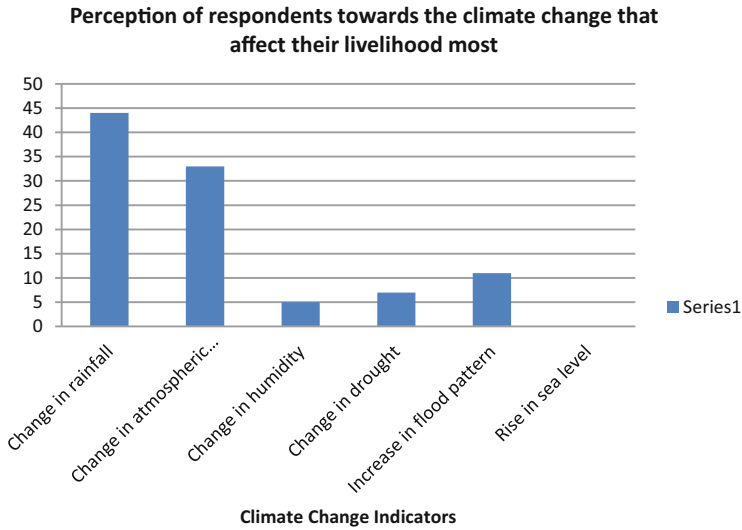


Fig. 4.3 Climate change element mostly affected by the women

Sources of Information

Information was sought from the respondents about their sources of information. Their responses revealed different sources of information, close to seven-tenths (65.7%) got their climate change information from personal experience, 14.3% from television, 11.4% from radio and 8.6% from fellow villagers. Though, personal experience may be taken as non-scientific and subjective, however, Salick and Anja (2007) brought out the importance of this type of information source. He stated that rural and indigenous people have developed knowledge systems which are based on experiments with nature (personal experience) and their ability to predict and interpret natural phenomena, including weather conditions. These have been vital for their survival and well-being and have also been instrumental to the development of their cultural practices, social structures, trust, and authority. They also possess the understanding of the relationship between society and nature and the notion that balances need to be maintained between the human, natural, and cosmological realms. So when changes occur, for example, in climatic conditions, people look to themselves and their social institutions and practices to see whether aspects of the way they lead their lives are causing imbalance and need to be rectified.

Attitude and Belief System of the Women Towards Mitigation and Adaptation Strategies

It is important to state that all of the respondents indicated that they did not receive any climate information from government officials. This is perceived to be a very serious issue among the rural women as it relates to climate change adaptation strategies. The women declared that they have been coping through prayers and use of charms. They perceived climate change as an act of God and not induced by the activities of man. They also said God has decided to punish man as a result of sin which is on the increase daily. This has affected their readiness and preparedness for mitigation and adaptation strategies.

'It is only the mercies of God that can help us out of this predicament. There is nothing that we can do'. *Chorus answer from the Koola women.*

From Ilode women:

'Our sins are too much and God is angry with us.'

The opinions of the community leader of Koola and the representative of the community leader in Ilode did not differ from the women'. Koola community leader said:

'Up to 10 years ago, the weather was normal, but things have changed so much since then and now. Rain does not fall as it used to, the sun is also too much. The climatic change has affected virtually all farm products in this community. No matter how hardworking and efficient the farmer may be, if there is no rain, there is nothing he can do. All these are as a result of our sins.' *Koola community leader. 72 years.*

Ilode community leader representative also said that:

'The women in this community are really suffering as a result of effect of erosion. When it rains, most of the houses are also flooded and the vegetable farms are badly affected. This is affecting the economic advancement of this community. We once called on the local government for help, our drainage system was widened but it has not totally helped. We pray that God will have mercy on us because we know that we have sinned'. *Ilode community leader representative. 50 years.*

At this point, this paper underscores the importance of training from the agricultural extension officers. If there has been continuous training programs organized to educate the rural women on the causes of climate change, how to control it, what activities they should stop carrying out, e.g., deforestation and activities to carry out e.g., afforestation and reforestation, the women would be well informed and have their belief and attitude changed positively. This attitude was seen to be having a negative effect on the mitigation and adaptation strategies they embark on. According to the women in Koola, the only form of mitigation strategy available in the community is ensuring that the drainage system in their individual compounds is always cleared of any debris for free flow of flood without affecting their houses. They remarked that:

‘There is nothing to be done to control the effects of climate change. When it pleases God, He will stop it’. *Kolanut seller, 67 years, Koola community.*

The quote above represents the general opinion of the women. Also, at Ilode, the only mitigation strategy in place was the building of drainage system. The study found that there were no planned adaptation strategies in place in the communities in spite of their experiences. Even though, there may be autonomous adaptation strategies being practiced which they are not aware of. One of the women reported:

‘Erosion disturbs us because this is river side area. It even gets to our houses often. We depend on the drainage as the saving grace. We also dug well in the farm to get water to irrigate our vegetable farm’. *Vegetable farmer, 36 years with over 9 years of farming experience. Ilode community.*

The above statement revealed the autonomous adaptation strategy being practiced against drought but which they are not aware of.

Factors Influencing Level of Awareness

The study further determined the relationship between factors that can influence awareness level of the respondents. This is presented in Table 4.2. The table reveals that there is statistically significant association between Level of education of respondents and Awareness level ($p < 0.01$). The Source of information was also found to be statistically significant with awareness level of the respondents about climate change ($p < 0.01$). The Kendall’s Non Parametric Correlations show that there is a significant positive association between level of education and awareness level ($r = 0.567, p = 0.001$) as well as between Source of information and awareness ($r = 0.391, p = 0.001$). This shows that increase in the level of education should enhance awareness level, however, it was discovered that respondents

Table 4.2 Factors influencing level of awareness

Variables	Awareness Level			χ^2 -value	p-value
	High	Moderate	Low		
Level of education					
No formal education	18 (78.3)	1 (2.4)	–		
Primary	–	32 (100.0)	–		
Secondary	4 (17.4)	9 (21.4)	5 (100.0)		
Tertiary	1 (4.3)	–	–	68.014	0.01**
Source of information					
Television	10 (43.5)	–	–		
Fellow villagers	–	6 (14.3)	–		
Radio	3 (13.0)	5 (11.9)	–		
Personal experience	10 (43.5)	31 (73.8)	5 (100.0)	28.11	0.01**

Source: Survey (2015)

**Significant at 0.01 level of significance

without formal education have the greatest awareness level. This is so because of the heavy reliance on personal experience stated earlier on by the respondents.

If acquisition of formal level of education is not having the desired impact on awareness level of respondents, then an intervention in form of training from agricultural extension officers needs be encouraged. Since the scarcity of appropriate information to these women will always position them at the low ebb of development. According to Morse and McNamara (2013) in order for the women to be able to recover from “*stress and shocks*”, low ebb development and poverty, they must be able to “*maintain and enhance*” capabilities and assets into the future. A central element in this ‘resilience’ to stress and shocks may well be the diversification of elements that comprise ‘livelihood’. But this study suggests that no matter how well women are involved in livelihood diversification, as long there is lack of useful information, such diversification will not be fruitful.

This lack of relevant information could be one of the major factors that make the rural dwellers especially the women vulnerable. In order to help them, the institutional and cultural context within which these women operate must be understood. Once this is understood then interventions can be put in place to enhance livelihoods and their sustainability. According to Morse and McNamara (2013) the process of understanding their current situations so as to develop suggestions for improvement must be based upon a participatory approach. This is deemed to be appropriate because it involves a bottom–top approach, where the rural dwellers are part of the decision process. This will make them to embrace whatever the outcomes of the process are.

Conclusion and Recommendation

Rural women were involved in various livelihood practices and these activities are being affected by the changes that are occurring in the global climate system. These women were not ignorant of the climate change and the effects on their livelihood practices. But the climate change has negative impacts on their economic activities, thus making them one of the mostly affected, since they depend on the natural resources for their survival. Furthermore, their belief system concerning climate change has affected their attitude negatively towards adopting mitigation and adaptation strategies. The study therefore concludes that for the fortune of these women to be changed positively which will enable them have sustainable livelihood practices and build their resilience to the adverse effects of climate change. It is recommended that there must be frantic effort on the part of the local government authorities in educating these women through the agricultural extension agents who are closer to the women in the rural areas, about the causes of climate change, activities to discontinue and the ones to imbibe. They should be educated on in-house mitigation and adaptation measures using locally available resources that address the climate change impacts in their communities and especially as

they affect their livelihood practices. This will help them to develop and embrace any mitigation and adaptation strategies in their communities.

Limitations of the Study

The present study did not cover all the vegetation zones in Nigeria. Much more work is needed to capture the national picture of the subject of interest here to be able to study the climate change impact on the rural women in other zones. Also, the socio- cultural and belief systems of other regions of the country were not covered.

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