

LEVELS AND DRIVERS OF VULNERABILITY TO CLIMATE CHANGE BY IFAD-VCDP FARMERS IN NORTH CENTRAL NIGERIA

*Sallawu, H., Oha, E., Barnabas, C., Oyebisi, K. L., Oyelami, S. O., Mohammed. U. S., Coker, A. A. A. and Nmadu, J. N.

¹Department of Agricultural Economics and Farm Management, Federal University of Technology, Minna, Nigeria.

*Corresponding author: Email: halima.sallawu@futminna.edu.ng +2348034532845

Abstract

Although a number of studies have been carried out on climate change but the levels of vulnerability of farmers and factors affecting vulnerability of the farmers to this topical issue have not been sufficiently determined in the study area, giving rise to this study. The study was conducted in Benue and Niger States involving 483 IFAD-VCDP farmers. A total of 500 questionnaires were distributed, however only 96.6% were completed and returned. As such the data analysis was based on 483 farmers under International Fund for Agricultural Development (IFAD) – Value Chain Development Programme (VCDP) from 10 participating Local Government of the two States. Both primary and secondary data were utilized for this study. The primary data were collected via questionnaire administered by trained enumerators, while the secondary data were collected from Food and Agriculture Organization (FAO) and Nigerian Meteorological Agency (NIMET). The data were analysed using descriptive statistics, vulnerability index and Beta regression model. The farmers were aware of eighteen climate change variables with assorted levels of occurrences. There was moderate vulnerable to climate change in the study area necessitating the need of enhanced awareness and capacity building to upgrade their home-grown adaptation strategies. Poverty status (3.0) was found to increase vulnerability while adaptive capacity (-23.8), age (-0.1), education (-0.7), gender (-2.8), distance to market (-0.1), livestock ownership (-0.4), social amenities (-1.9), total livelihood activities (-2.4) and membership of association (-3.8) decreased vulnerability by the percentages indicated in parenthesis. The study therefore recommended that the level of literacy among farm households and availability of social amenities should be critical issues when formulating climate adaptation policies and developmental issues. Government and NGOs should install processes that can enhance the adaptive capacity of the farmers.

Keywords: North Central Nigeria, IFAD-VCDP, Climate change, Vulnerability index, Adaptive capacity.

Introduction

The VCDP is a six-year development initiative of the Federal Government of Nigeria (FGN) and International Fund for Agricultural Development (IFAD) that is aimed at improving and addressing the constraints along the cassava and rice value chains for smallholder farmers in the six states of Anambra, Benue, Ebonyi, Niger, Ogun and Taraba. VCDP is well anchored in Nigeria government's vision for agricultural transformation through commodity value chain approach, with emphasis on productivity enhancement and markets access for rice and cassava smallholder farmers. The programme takes a holistic and demand-driven approach to addressing constraints along the cassava and rice value chains. It does so through an inclusive strategy, strengthening the capacity of actors along the chain including producers and processors as well as public and private institutions, service providers, policy-makers and regulators. At the same time, the programme strongly emphasizes the development of commodity-specific Value Chain Action Plans at the local government level, which serve as the basis for rolling out sustainable activities to reduce poverty and accelerate economic growth. The objectives of the programme is to sustainably enhance rural incomes and food security. The target groups include 15,000 smallholder farming households, 1,680 processors and 800 traders (VCDP, 2016).

Climate change and development connect in an iterative style. Climate change and effects impact possibilities for advancement, and thus, improvement decisions and choices impact a nation or region's future ability to adjust (Bizikova *et al.*, 2007). The antagonistic impacts of climate change are now clear in developing nations like Nigeria where population growth, food insecurity, and other socioeconomic factors exacerbate families' vulnerability to impacts. In the available literature, climate changes have been seen to have at any rate had three fundamental effects on the country poor and their occupations: Increasing environmental risks, reducing livelihoods opportunities and in consequence stressing existing social institutions (Intergovernmental Panel on Climate change (IPCC), 2007). In addition to other things, climate change and the decrease in ecological assets brought about by anthropogenic and different components have had the joined impact of making many households vulnerable. In that capacity, households in certain parts of the world, for example those in developing world, have to depend on their capacity to adjust to life under the states of declining availability of natural resource and a consistently evolving climate change.

Adaptation to climate change is defined by IPCC (2014) as human systems in response to actual or expected climatic stimuli or their effects, which moderates harm change, either in anticipation of (proactive adaptation) or in reaction to (reactive adaptation) external processes of change. While there are numerous angles that determine adaptive capacity at different levels, adaptive capacity is understood to be existence of preconditions that a vulnerable entity (individual, community, society, an institution, a system-natural or social or a country) possesses in creating ability and a base from which it can adjust itself (execute adaptation interventions) in response to a stimulus (Ozor *et al.*, 2010). Furthermore, much as this is the overall comprehension of the idea, it is important to take note of that preconditions for determining adaptive capacity certainly vary, contingent upon numerous variables including time, space, level of the vulnerable entity as well as intensity of the stimuli or hazard. For example, there are required various preconditions to be accessible at the national level contrasted with the household level (Berrang-portage *et al.*, 2011). Notwithstanding, the essential preconditions incorporate accessibility of sufficient monetary assets, the degree to which the entity is organized, institutional equity in terms of resources distribution, levels of knowledge, awareness, information access and sharing as well as availability of appropriate technologies options, such as appropriate early warning systems (IPCC, 2014).

Africa, despite everything, encounters and is undermined by presence of various socio-economic stresses which may interact with climate change impacts to increases vulnerability and reduce adaptive capacity. These contribute and intensify the effects of current climate change in Africa, and having negative effects on the continent's ability to cope with climate change. Such stresses include rampant poverty, various political, ethnic and economic conflicts, ignorance, lack of skills, low level of technological advancement, weak institutional capacity, limited infrastructure, lack of technology, lack of information, and poor access to resources by majority (Conway and Schipper, 2011). The vulnerability of developing countries like Nigeria especially the North Central region is worsened by heavy reliance on renewable natural resources for livelihoods, employment and incomes. Climate change is and will interact with every one of these factors to additionally keep the region at an elevated level in terms of vulnerability at the same time eroding its little capacity to adapt.

Climate change likewise has direct antagonistic consequences for humankind (particularly poor people) by restricting the plausible monetary exercises in various geological regions occupied by individuals thereby perpetrating reduced livelihood opportunities (IPCC, 2014). The way that the practices and livelihood pattern of rural households often impact negatively on their immediate natural environment and the regional/global climatic patterns cannot be denied. For most rural households, disturbances in farming frequently lead to critical misfortunes or significant losses of income and decreased standard of living or even neediness. Poverty (low degrees of living) has been connected to a low ability to adapt to ecological pressure and climatic changes (Defiesta and Rapera, 2014).

Climate change is a serious challenge to human livelihoods especially in the developing world because it increases food insecurity, accelerates health risks like spread of malaria and other diseases related to disasters such as cholera and it builds water shortage just as builds plausibility of contentions over assets

Additional livestock decreased vulnerability by 0.4%. Farmers acquire livestock mainly as asset and store of value, which can be used as a coping strategy at the time of need, rather than indulging in livestock farming as agribusiness. The benefits of keeping some livestock also include the ability to generate off-farm income as well as a source of food. They also obtain manure and can use the animals for power. This result is in line with Inayatullah *et al.* (2012), who opined that educational level, age of household head, job experience of household head, number of employed members of household, index of livestock holding and per capita income of household affect vulnerability status of households.

A change in the poverty status of the household head was found to increase vulnerability by 3.0% implying that poor households are more vulnerable to the effects of climate change than non-poor households because they may lack the resources to adapt and cope with the phenomenon. This result is in accordance with the findings of Majahodvwa *et al.* (2013) who affirmed that factors that contribute to vulnerability include rapid population growth, poverty and hunger, poor health, low levels of education, fragile and hazardous location.

Coefficients of access to social amenities ($p < 0.1$), total livelihood activities ($p < 0.05$) and membership of association ($p < 0.01$) were also found to decrease vulnerability. According to Deressa *et al.* (2009), fixed assets of farmers such as physical capital (agricultural machineries, agricultural infrastructure such as roads) are significant economic components that form local source of vulnerability. Furthermore, engaging in different livelihood activities serves as a coping strategy to the mitigate climate change effects. In addition, being a member of a farmer group or a commodity association would afford them to learn about certain adaptation strategies to climate change through their interaction with other members as highlighted by Adzawla *et al.* (2020) as they affirmed that farmers who are members of a farmer association have a higher probability of becoming less vulnerable to climate change.

Conclusion and Recommendations

This study found that farmers were aware of eighteen climate change variables with assorted levels of occurrences but they are moderately vulnerable to climate change. The households under study would need enhanced awareness and capacity building to upgrade their home-grown adaptation strategies. Adaptive capacity, age of the household head, level of education of the household head, gender of the household head, distance of farmer's home stead to the market, livestock ownership, poverty status of the household, access to social amenities, total livelihood activities and membership of association/cooperative were the factors affecting vulnerability to climate change. These complex and inter-related factors needs a more coordinated policy strategies to ensure that the level of vulnerability is kept very low among the farmers. Particularly, farm households should diversify their sources of livelihood so as to reduce their vulnerability and improve resilience to climate change. Government and NGOs should assist in providing the enabling environment that makes it easy for the farmers to enhance their adaptive capacity, as such help fine tune and upgrade the existing local homegrown strategies. The level of literacy among farm households and availability of social amenities should be looked into when formulating climate change adaptation policies and developmental issues. This done tends reduce vulnerability to climate change. Finally, government and NGOs should help develop effective and responsive risk insurance programme with immediate claim payments so as to encourage greater investment.

Acknowledgement:

This study was conducted with a grant from funding support of TETFUND Institutional-Based Research Intervention (IBRI) FUND. Grant No. TETFUND/FUTMINNA/2016-2017/6th BRP/08.

Conflict of interest:

The authors have declared no conflict of interest.

References

- Adger, W. N. and Kelly, M. (1999). Social vulnerability to climate change and the architecture of entitlements. *Mitigation and Adaptation Strategies for Global Change*, 4(1): 253-266.
- Adzawla, W., Azumah, S. B., Anani, P. Y. and Donkoh, S. A. (2020). Analysis of farm households perceived climate change impacts, vulnerability and resilience in Ghana. *Scientific African*, 8(1), 1-10.
- Ardakani, S. R., Ansari, A., and Ardakani, M. R. (2012). Organizational climate and commitment. *Research*, 4(12): 1-3.
- Berrang-Ford, L., Ford, J. D. and Paterson, J. (2011). Are we adapting to climate change? *Global Environmental Change*, 21(1): 25-33.
- Bizikova, L., Robinson, J. and Cohen, S. (2007). Linking climate change and sustainable development at the local level. *Climate Policy*, 7(4): 271-277.
- Blaikie, P., Cannon, T., Davis, I. and Wisner, B. (1994). *At risk: Natural hazards, people's vulnerability and disasters*. London: Routledge.
- Conway, D., and Schipper, E. L. F. (2011). Adaptation to climate change in Africa: Challenges and opportunities identified from Ethiopia. *Global Environmental Change*, 21(1): 227-237.
- Defiesta, G., and Rapera, C. L. (2014). Measuring adaptive capacity of farmers to climate change and variability: Application of a composite index to an agricultural community in the Philippines. *Journal of Environmental Sciences and Management*, 17(2): 48-62.
- Deressa, T. T., Hassan, R. M., Ringler, C., Alemu, T., and Yesuf, M. (2009). *Analysis of the determinants of farmers' choice of adaptation methods and perceptions of climate change in the Nile Basin of Ethiopia*. International Food Policy Research Institute. Washington, DC.
- Dietz, T. (2015). *Environmental value handbook of value: Perspectives from economics, neuroscience, philosophy, psychology and sociology*, Pp 329.
- Dow, K. (1992). Exploring differences in our common future(s): The meaning of vulnerability to global environmental change. *Geoforum*, 23(1): 417-436.
- Food and Agricultural Organization of the United Nations (FAO) (2016). Diversification strategies and adaptation deficit: Evidence from rural communities in Niger, by Asfaw, s., Palma, A. and Lipper, L. ESA. *Working Paper No. 16-02*. Rome.
- Food and Agricultural Organization of the United Nations (FAO) (2019). Food and agriculture data. Available at: www.fao.org/faostat/en/. Accessed on 1st July, 2019.
- Garba, B. I. (2018). Determinants of climate change adaptation strategies used by rice farmers in Kontagora local government area, Niger State. Unpublished B.Tech project submitted to Department of Agricultural Economics and Extension Technology, Federal University of Technology Minna, Nigeria.
- Inayatullah, J., Munir, K. K., Khan, M. A., Shakeel, H. and Tariq, R. (2012). Factors affecting rural livelihood choices in Northwest Pakistan. *Sarhad Journal of Agriculture*, 28(4): 681-688.
- Intergovernmental Panel on Climate Change (IPCC) (2001). Contribution of working Group II. *Climate*