



Defying the odds: Climate variability, asset adaptation and food security nexus in the Delta State of Nigeria



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ABSTRACT

There is overwhelming evidence to suggest that the adverse impacts of climate variability and change is making it increasingly difficult for the poor rural populations, particularly in sub-Saharan Africa (SSA) to continue engaging in meaningful agriculture and obtain secure livelihoods. This is, partly, because agricultural productivity in SSA is highly dependent on rainfall. Thus, the slightest variation in climatic conditions has the potential of subjecting a large proportion of the rural poor to increased poverty and misery as the ability to obtain their livelihoods can be compromised. Despite the effects of climate variability on rural livelihoods, the rural poor are not passive actors. They are actively and consistently involved in adapting and modifying their asset portfolios to reduce the impacts of climate variability, and consequently, build their adaptive capacity and resilience. Drawing on a recent field-based research conducted in the Delta State of Nigeria and using the participatory climate change adaptation appraisal, this paper discusses the various asset adaptation strategies employed by the rural poor in building their adaptive capacity and resilience to climate variability. These issues have been explored in the broader theoretical debates revolving around climate change adaptation and food security in countries of the developing South.

1. Introduction

There is now overwhelming evidence to suggest that global climate change is occurring at unprecedented levels [1,2]. Climate change has been observed to negatively affect the environmental, social, economic and agricultural sectors in various parts of the world especially in less economically developed countries because of high levels of poverty, limited technological advancement and adaptive capacity both at the grass-root and national levels [3,4]. It is, however, argued that no sector has been more adversely affected like agriculture [5,6]. This is, in part, because a vast range of agricultural activities that people in developing countries engage in are predominantly dependent on rainfall [7–9]. Thus, the slightest variation in rainfall patterns can have devastating impacts on agricultural yields and productivity [10]. The Intergovernmental Panel on Climate Change (IPCC) [1] has reverberated that the changes in climatic conditions are partly responsible for the increased difficulties preventing the poor in sub-Saharan Africa (SSA) from engaging in more meaningful food production practices. It has also been argued that the vulnerability of the poor people in many rural spaces in SSA to climate variability and change is exacerbated by

limited technological advancement, low levels of education, rapid population growth, high rates of poverty, lack of social safety nets, and weak institutional setup and policy frameworks [1,3,11,12].

Nigeria, like many other countries in SSA has had its share of the impacts of climate variability on agriculture, a sector that contributes approximately 20% to the nation's Gross Domestic Product (GDP), thereby making it the mainstay of the economy after crude oil [13,14]. Furthermore, it is estimated that 66% of the nation's labour force are actively involved in agriculture, making it the largest contributor to employment in the country [15]. Within the Nigerian context, agriculture plays a crucial role in the survival of many rural households, as it forms the basis for income generation as well as myriad sources of livelihoods that are available to the rural people. In the rural Delta State, for instance, about 90% of all households are rigorously involved in food production [16,17]. However, the changes in climatic conditions, which have been observed in the form of rising temperatures, erratic rainfall patterns, and seasonal flooding [18–21], have become a serious cause for concern among the rural poor mainly because the expected crop production output can no longer be guaranteed. This was vividly illustrated by a farmer in her late 60's from the Igbide

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community in Isoko South Local Government Area (ISLGA) in the Delta State when she stated that:

In the past, this community used to receive enough rainfall between March and May of every year to cultivate and produce enough food. But nowadays, like this year (2015), for example, things were different. There was not enough rainfall and we were unable to produce enough food as we normally did in the past. See what is happening now. We are in July and it is raining constantly. But we cannot afford to plant now because our farmlands, which are low-lying, will be flooded anytime from now. So we have to harvest our farm produce before this happens.

Within the literature on climate change in Nigeria, there is a recognition that the impacts of climate variability and change are undermining the efforts of many rural poor households to engage more meaningfully in agricultural production [18–21]. It is argued that climate variability has the tendency to compromise the ability and potential for rural agriculture to contribute enormously to economic growth and national development of the Delta State [see, e.g., [11,22,23]]. In view of the above arguments, there is an urgent need to identify avenues to build the resilience and adaptive capacity of rural population in Nigeria and SSA as a whole in order to minimise the adverse impacts of climate variability on the lives of the poor. These avenues include; educating and information dissemination on climate change, planting early maturing and drought tolerant crops, alternating planting dates, engaging in off-farm activities [24,25], migration [26], development of strong social networks, the sale of assets, use of early warning and monitoring systems, irrigation of farmlands, establishments of climate change safety nets, insurance of crops, and construction of dykes [3,27], to mention but a few.

Some authors have also argued that if policy developers utilise the asset-based adaptation framework developed by Moser and colleagues, it will be relatively easy to identify appropriate policy intervention entry points necessary to build the resilience and adaptive capacity of the poor [28,29]. The framework is premised on the assumption that individuals, households and communities are not passive, but active actors who possess resources that they deploy to respond to emergencies such as extreme weather conditions [28,30]. These resources, in the context of asset adaptation, are referred to as asset portfolios, bundle of assets, capital assets or endowments and entitlements. It comprises the human, financial, physical, natural and social assets. It is against this background that this paper seeks to understand how the rural poor households in ISLGA draw on their asset portfolios to build their adaptive capacity and resilience to the impacts of climate variability and change in order to ensure household food security.

2. Assets and food security nexus in a changing climate: realities of the developing world

It is argued that future impacts of climate variability and change will be particularly severe for about 80% of the rural people in the developing world whose primary source of livelihoods (agriculture) are overwhelmingly dependent on rainfall [36,37]. Without putting effective adaptive measures in place, climatic impacts will likely impede the ability for the present and future generations to produce more food locally and sustainably [40]. This will exacerbate the food insecurity situation and challenges in the developing world and SSA in particular, a region already classified as food insecure [38]. The impacts of climate change will not only be felt in rural areas but also in urban areas since it is estimated that 60 – 80% of the food consumed in the urban spaces of the developing world are produced by the rural people [39]. With the global population expected to reach 9 billion by 2050, the ability to produce more food could be further compromised due to stiff competition for viable farmlands [40]. This observation, therefore, entails the need to develop adaptive measures that will build the resilience of rural population in order for them to win the fight in becoming food secure

and ensure sustainable development.

Seeking solutions to ensure food security in the context of developing countries that are already adversely affected by climate change is not an easy task. Many of the developing countries are beseeched by a number of vulnerabilities and deprivation markers among which include; high levels of poverty, unemployment, high mortality rates, low levels of education, increased levels of environmental degradation and a prevalent disease environment, which makes the formulation of any policy intervention measures a mammoth task. Simatele and Simatele [29], however, argue that policy makers and development professionals should develop systems and mechanisms of identifying key assets¹ that people use as production assets. This process would then enable them to develop appropriate intervention measures that would be aimed at prioritising and enhancing the most important assets that the poor households use to build their adaptive capacity and resilience against the impacts of climate change [28,41]. Several pieces of literature have illustrated how the poor actively engage their critical assets in order to continue in food production and ensure household food security in the face of climate variability.

In Jamalgonj Upajila, under the province of Sunamgonj in Bangladesh, for example, Al Mamun and Al Pavel [42] pictorially captured how the poor drew on their human and natural assets² to continue in food production on their flooded farmland. The farmers practiced heap adaptation method whereby they firmly place a tukri³ on the heaps of the water weed that usually pile on the apex of the waterlogged farmlands. Next, they constructed a platform using bamboo sticks adjacent to the heaps in order to allow creeping plants thrive. In a related case study, Motsumi et al. [44] highlights how the poor in Ngamiland district in Botswana who practiced flood recession farming (locally known as *molapo* farming) employed their human capital to produce food. In the face of frequent episodes of desiccation as a result of the receding flood water from the farmland, the people in Ngamiland maximise the moisture left by the receding flood water by planting crops like maize, millet and sorghum that mature within a short timeframe. To maximise output, they ploughed the regions in their fields where the grasses were tall, an indication of good quality soil for optimal food production.

A remarkable feature of the two case studies, however, is that they illustrate carefully crafted adaptive measures by individuals with low levels of formal education. Low levels of education have been identified to contribute to low levels of adaptive capacity of individuals and households to climate change. A study carried out by Loevinsohn [45], for example, concluded that a combination of low levels of education and climate variability were, in part, responsible for a crisis of social reproduction that culminated in low agricultural productivity vis-à-vis a famine that later ensued in Malawi. On the contrary, other scholars have argued and demonstrated how the poor draw on their portfolio of assets and indigenous knowledge to minimise the impacts and implications of climate variability on food production [46,47].

Although many of the rural poor households use a combination of assets to deal with both internal and external stressors, social capital have been identified as one of the most important assets that they employ to build their resilience and adaptive capacity against climate variability [29,48,49]. Social capital refers to those social networks and ties that people build by living together in a community and the interactions that ensue thereof. At its core are issues of trust, reciprocity, mutual understanding, shared norms and values, as well

¹ Assets (capitals) refer to resource endowment and capabilities that people have to sustain their livelihoods and enhance their welfare [34].

² Human capital refers to level of education, health status, nourishment, skills and attributes embodied in an individual that promotes the creation of personal, social and economic well-being. Natural capital refers to resources drawn from nature such as soil, grass, trees, etc. [28,43].

³ Tukri refers to a bamboo basket where soil has been immersed in it as well as the seedling and cow dung.

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