On Pastoralism and Climate Change

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Introduction

Africa is most likely the continent in the world with the highest vulnerability to climate variations, and agriculture is one of most vulnerable sectors. Vulnerability in this sector is manifested through occurrence of extreme events such as increased drought, flood severity, intense storms, shifts in the timing and distribution of rainfall and warmer temperatures. There are secondary effects such as increased pest and disease pressure. Pastoralists face a number of challenges that constrain their livelihoods and stifle their ability to adapt to changes in the external environment. In Nigeria, despite the important role of pastoralism in supporting the local livelihoods and its contribution to national and regional economies, pastoral families face a lot of insecurities brought by the complex property right systems, political and economic marginalization, inappropriate development policies, increasing resource competition, and on top of these, the severe climate change (Fabusoro et al., 2008).

In central Nigeria where a large population of pastoral Fulani have migrated into and settled for over a century, their livelihood system depends mainly on the condition of their herd, which in turn, relies on the availability and quality of rangeland for grazing. The herd must have access to dispersed, ecologically specialized and seasonally varied grazing lands and watering holes to provide for the distinct foraging needs of different livestock species and to afford a margin of safety against the normally erratic pattern of rainfall (Nori et al., 2005). The health and wealth of the cattle herd depends largely on availability of, and access to, forage pastures and water.

Although pastoralists have lived with challenges of climate variability for millennia and they are known to be highly resilient to erratic weather and climate conditions, the unprecedented rate and scale of recent climate change is beginning to post problems on them, especially in places like Nigeria where social, political and economic factors are inimical to their lifestyles. Apart from exposure to climate alterations, frequent conflicts arising from competition for common resources and land tenure system in central Nigeria has further positioned the Fulani pastoralists as a highly vulnerable group of people.

Vulnerability

The term vulnerability has yet a universally accepted definition, largely because different disciplines use the term diversely to explain their areas of concern. Some of the disciplines include finance, security, public health, economic development, natural hazards and, of course, climate change. However, this diversity generates problems for the development of a consistent definition and its

implementation in assessment practice (Preston and Stafford-Smith, 2009).

Different models of analysis exist in the field of vulnerability studies, such as risk-hazard, pressure and release, political economy, hazard-of-place, ecological resilience and coupled vulnerability framework (place-based model), among others (Kasperson et al., 2005; Adger, 1996; Turner, et al., 2003; Cutter, 1996). In studying vulnerability brought by climate change, researchers study exposure and sensitivity, defined as the degree to which a system is affected by, or responsive to, climate stimuli. Researchers also study resilience, which is the ability to bounce back or to maintain stability despite disturbances. Adaptation strategy, the ability to cope with disturbances, is also a major concern of researchers. According to Intergovernmental Panel on Climate Change (IPCC, 2007), vulnerability is the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extreme weathers. Vulnerability is most often represented by a suite of socio-economic, political and environmental factors that represent the sensitivity and exposure of a population to climate hazards (Brooks et al, 2005).

Among the various methods, the coupled vulnerability (place-based model) framework of Turner et al. (2003) makes obvious the need to find methods to operationalized vulnerability that are useful for the specificity of place, and for directing attention to the condition of coupled human-environment system. Other methodological approaches relevant for the study on African pastoralists include semi-quantitative typologies, such as degradation syndromes, complex indicator approaches, integrated modeling and simulation techniques and statistical downscaling. The coupled human-environment system provides a good potential of understanding the vulnerability of pastoralists in central Nigeria and identifying critical interactions in the human-environment system that would suggest appropriate response opportunities for decision makers.

Pastoralists in central Nigeria

Morton (2008) views pastoralists as people who depend on livestock or the sale of livestock products for most of their income and consumption, where livestock is mainly grazed on communally-managed or open-access pastures, and where there is at least some tendency for households or individuals to move seasonally with livestock. The pastoral Fulani in Africa believe that animal reproduction does not depend on the fecundity of the breed, but rather on proper nutrition. Providing the herd with excellent nourishment is thus considered the most important task of a serious herder. The decision to migrate or settle, choice of settlement location and length of stay in a particular site are all part of the nutritional strategy of the herd. All livestock in pastoralist herds are kept at night in fenced enclosure to prevent from wandering into crop fields. Depending on the time of the year herding is done by different members of the household men and boys. Cattle and sheep are usually herded together while goats are kept separately.

The pastoral Fulani in Nigeria, same as other nomadic pastoralists in Africa in general, have for several centuries concentrated their activities in

the dry savanna and arid regions where farming activities were limited and competition for resources with other forms of land use were practically non-existent. During the twentieth century, Fulani herders in Nigeria began to migrate through and settle in whole zones that were previously inaccessible to pastoralists. Ecological change and population increase has reduced the tsetse challenge for the non-trypanotolerant cattle owned by Fulani. This has removed the major barrier that stopped their southern expansion in previous era (Blench, 2001). The conventional stereotype of the Fulani as living in Northern Nigeria is becoming less and less true, year after year. Now it is not surprising to find Fulani pastoralists settling even in the coastal states in southern Nigeria.

Regarding central Nigeria, the exact date when the pastoral Fulani first reached the region was unknown (Nadel, 1942). It was estimated that nomadic pastoralists made their appearances for dry season pastures at an early stage, but long-term settlement probably did not take place until much later (Johnston, 1967). Based on available records (Fu, 2013), the migration of pastoralists to central Nigeria dated back to the seventeenth century. The expansion of the Sokoto Caliphate in the nineteenth century provided the political protection that enabled the migration drift of pastoral Fulani. Following the establishment of the Fulani Empire in the nineteenth century, pastoral Fulani began to settle in central Nigeria for long-term stay. Over the years, therefore, the pastoralists have integrated into the sociocultural system of the region (Fu, 2019).

Seasonal variability in availability of grazing pasture in central Nigeria areas are not critical as in the northern arid zones. Herd movement from one location to another within the grazing orbit is therefore to take advantage of the spatial and nutritional diversity of the pasture and fodder resources. The grazing route could be circular, triangular or semi-circular depending on physical structure such as hills, mountains, rivers or a nearby urban or village area posing as restriction to grazing orbit (Fu, 2018). The distance of grazing depends on the time of the year and the various stages of growth of pasture within and outside the settlement area. During the rainy season the grazing herds move within a small area around the settlement, which is often less than 5km in distance, but in the dry season, the distance of daily travel is easily beyond 15km or much further (Fu, 2013). Herd mobility could be seen as a way of assuring full and timely exploitation of the fodder resource to optimize the nutritional status of the herd. Some of the land use practices of pastoral Fulani include seasonal bush burning along grazing route, periodic movement of huts within the settlement area, intensification of land use, and shifting cultivation with short fallow period. Despite the capability of African pastoralists to compromise the integrity and resilience of the ecosystem, they are sometimes blamed for their lack of commitment to invest in long-term land improvement initiatives such as incorporation of leguminous species into pasture or grazing land. Cattle movement may also reduce land cover denudation and cause loss of biodiversity

Climate change and pastoralism

Pastoralists have from ancient times been able to exploit a great deal of opportunities that linked mobility to alternative forms of land use. Mobility

as an ecological rationality in arid and semi-arid lands is a response by herders to variable range production and animal nutritional needs. It relies on herder knowledge and local institutions for making decisions. It forms part of the genres and folklores of society and serves as a source of memory about the past grazing patterns. Herding mobility is therefore an embodiment of time and space. The evidences provided by Rutherford et al., (1999) show that grazing pressure has less effect on soil nutrients than other drivers. Site factors pointed to far greater effects on soil nutrient variability than that caused by grazing pressure despite the often claims that associated livestock grazing with processes of desertification. When rainfall is sufficient, some level of grazing even promote plant productivity. Rahlao et al. (2008) who have been working on vegetation protection for sixty-seven years reached to the conclusion that grazing control has far more benefits for biodiversity conservation than often acknowledged.

Climate change reduces available land for livestock production purposes at 350,000 hectares per annum as estimated by IPCC (2007). Perhaps the Fulani pastoralists of Africa are one of the few groups of people that are actually knowledgeable and have taken decisive actions about climate change (Nori, 2007; Omotayo, 2003; Blench, 2001), as Omotayo (2010) claimed that pastoralists in southwest Nigeria were once transhumance or nomads but their seasonal movements have stopped, which made many of them either semi-sedentary or fully sedentary with a changing lifestyle. The livelihood patterns of pastoral community hinge upon strategies that continuously adapt to a limited, highly variable and often unpredictable resource endowment (Davies and Nori, 2008). The range of strategies that pastoralists use results from the larger geo-political system. The adaptive capacity of pastoralists is what has made them so resilient throughout history and has enabled them to sustainably exploit their natural environment. Their adaptive management skills enabled them to create and maintain biodiversity in many environments of extraordinary natural beauty. Yet pastoral development over the past century has been characterized by the loss of this adaptive capacity, and the outcome has been a vicious cycle of impoverishment, resource depletion and environmental degradation, which further erodes their adaptation.

Changing environment may provide suitable conditions for an expansion of pastoralism, as the flexibility and mobility afforded by pastoralism can increasingly provide security where other more sedentary models fail (Davies and Nori, 2008). More than once in history, pastoralism provided a mean through which sedentary populations could adapt to survive in the face of deteriorating climatic conditions. Archaeological evidences indicate that pastoralism in Africa was developed about six thousand years ago in direct respond to long term climate variability, and then spread throughout the northern Africa as a mean of coping with the increasingly unpredictable and arid climate. Current climate changes are predicted to bring rising temperatures and erratic precipitation, which increase the occurrence of both drought and flood. Pastoralism has traditionally been better adapted to these changes compared with any other rural land use systems.

Many agencies that work closely with pastoralist

groups around the world feel that the challenge of climate change seems insignificant to many pastoralists who are faced with extreme political, social and economic marginalization. The general consensus is that if these constraints are relaxed, their adaptive strategies may enable pastoralists to manage climate change better than many other rural inhabitants. The vulnerability that is associated with climate change in some pastoral environments has its root in the restriction of tried and tested pastoral coping strategies, including the ability to move through different territories, to access critical livelihood resources, to trade across borders, to benefit from appropriate investments, and to participate in relevant policy decision making (Nori and Davis, 2007). As often the case in developing regions, the main concern for pastoralists is the accessibility rather than the availability or variability, of resources.

It would be wise not to overstate the importance of traditional coping strategies, since some of them may have become permanently out of reach for pastoralists. Growing population pressure, together with the shrinking of effective rangelands, pose a critical challenge to the sustainability of pastoral livelihoods, and place constraints on one of the most familiar pastoral coping strategies: the migration into new regions. The scale of movements that some pastoralists have made in the past, to cope with climate change, insecurity and other challenges, are no longer possible in many countries and many pastoralists must be enabled to identify new coping strategies that are appropriate to their current situation. However, the technical possibilities for raising productivity in the rangelands are limited and tend to be more resource-degrading than in higher rainfall areas, which compound the challenge of population growth for pastoralists.

Pessimistic views of pastoralism in the face of climate change are particularly rife in Africa south of the Sahara, where food insecurity is widespread and where many pastoral communities are regularly confronted with drought, which is said to be increasing. Yet it is important to examine the drought more closely before it is simplistically attributed to climate change. Scientific predictions and computer simulations suggest that in the short term the Sahel might actually benefit from climate change, through a greening of the Sahel and southern Sahara. Additionally, rather than facing meteorological drought, many pastoralists may be faced with a form of agricultural drought, a phenomenon that is evidently man made and is influenced by poor policy and mismanagement (Nori and Davis, 2007). In reality, climate change will not favor pastoralists if they do not recover the ability to adapt. Policies and investments frequently favor crop growers over livestock keepers, particularly in the drylands where crops are being made more and more resistant to drought. The land rights of crop growers are usually more secure than those of livestock keepers, and the tendency over the past few decades has been incursion of cultivators into grazing lands (Fabusoro et al., 2008). Even if the projected “greening of the Sahara” does take place, under the current conditions it is likely to be crop growers that benefit at the expense of pastoralists.

Climate change will therefore affect pastoralists diversely in different part of the world, according to the extent of their marginalization and under-development. Although pastoralists may cite other

threats to their livelihood as of greater importance, there are good reasons to be concerned about the risks that climate change presents, and to assist them to be aware of those risks and to develop new adaptive strategies. Above all, the rate and the scale of ongoing climate change is likely to increase the failure of their livelihood adaptation, with huge social and environmental costs. Pastoralists already face an overwhelming challenge to adapt to an array of forces that threaten their livelihoods, and their means of adaptation must change to keep up with times. Whilst the dominant discourse remains on their vulnerability, there is a slow but steady shift in emphasis towards their capabilities. This shift in emphasis is critical if the benefits of pastoralism with regard to climate change are to be realized. By focusing on building capacities and empowering people, pastoral development can ensure that poverty is reduced and capacities for sustainable natural resources management are strengthened within the rangelands.

Pastoralist resilience depends heavily on indigenous knowledge, of the environment and of the production system, and the customary institutions that enable pastoralists to capitalize on this knowledge (Davis and Nori, 2008). Strong social organization and customary institutions are common features of many successful pastoral societies and have been critical for the effective management of unpredictable environments. These institutions enable herd mobility, pooling of labour for production or security, and spreading of risk through systems of reciprocity and obligation. The perception of pastoralism as intrinsically self-destructive led to efforts to introduce modern systems of governance and natural resource management, which have deliberately or inadvertently eroded traditional governance structures and have undermined the fabric of pastoral society and the foundations of the pastoralist economy. Faced with growing external interference and a rising pressure on the fragile environment, pastoral societies have become increasingly unable to retain control over resources.

Different Scenarios of climate change impacts on pastoralism

Observed climatic changes show that overall Africa has warmed by 0.7°C over the twentieth century, which is a 0.05°C warming per decade. Projected warming for Africa ranges from 0.2°C per decade (low scenario) to more than 0.5°C per decade (high scenario) (Hulme et al., 2001; IPCC, 2007). UNOCHA (2009) illustrated three possible scenarios on the current and potential impacts of climate change on pastoralists in Central and East Africa. They represent well the ongoing debate on the possible impacts of climate change on pastoralism.

The first scenario is more reoccurring. It argues that climate change will have significant negative consequences for pastoralists. These will include loss of livestock through heat stress, more frequent agricultural encroachment as variation in rainfall may raise the productive potential of arid areas, increase in frequency of flooding, spread of human and livestock diseases that thrive during the wet season, and when rainfall decreases or becomes more erratic the quality of grazing lands will decrease. All these will impoverish pastoralists further. It is expected that this scenario will be more prevailing in the Horn of Africa and the arid zone.

The second scenario argues that climate change on its own will not have a negative impact on pastoralists. The argument is that pastoral production system is already an adaptation to hostile environment. Nevertheless, pastoralists face more severe challenges, such as political and economic marginalization, inappropriate development policies, and increasing resource competition. All these hinder their way of life and adversely affect their social cohesion. These challenges will stifle their ability to adapt to changes in their external environment. It is estimated that this scenario will be appliable to the semi-arid zone, and is more relevant to the situation of central Nigeria.

The last scenario presents a hopeful picture. It argues that pastoralists could actually benefit from climate change, as more rainfall can result in more dry season pasture and prolong access to wet season pasture. It can also result in less frequent drought, which may mean more time for people to rebuild their assets between lean times. Climate change conversely, could conceivably lead to the creation of more dry land resources that are suited to pastoralism, thus creating new opportunities for pastoralists. This scenario is applicable to areas which are relatively humid, which were formally inaccessible to pastoralists because of Trypanosomiasis. Climate change will work indirectly in breaking through the ecological barrier for pastoralists.

Whichever position is subscribed to, there is a common thread that runs through all the scenarios, which is the issue of preparedness. There is an urgent need to invest in disaster risk reduction measures and climate change adaptation. A study from southern Ethiopia showed three most important direct effects of climate change are droughts, flooding, and diseases and pests (UNOCHA, 2009). Other indirect impacts are sometimes harder to link directly to climate change, since these factors are mostly a combination of both climate change and other factors. However, it can be said that climate change has a compounding effect on the already difficult circumstances for communities that live in the arid and semi-arid zones of Africa.

Research on the way

In order to understand how the Nigerian pastoralists perceive climate changes and how changing environment have affected their livelihoods, vulnerability and adaptive strategy, fieldwork based research is being carried out on the way to collect data and narratives directly from pastoralists. Studies have been conducted among semi-settled and nomadic pastoral Fulani in Niger State, central Nigeria. The study area is located in the so-called “Middle Belt” which stretches across central Nigeria longitudinally between the eighth and the twelveth parallels north. The Middle Belt is populated largely by minority ethnic groups and is characterized by a heterogeneity and diversity of peoples and cultures. Ethnical conflicts have been increasing over the past years in places like Kaduna, Bauchi and particularly Jos, where followers of Islam and Christian live relatively close to one another. The vegetation of the study area belongs to the Guinea Savannah zone. Among the three scenarios projected by UNOCHA mentioned above, the circumstances of the second and the third scenarios are expected to be more significant. Surrounded by River Niger and other river channels, the area is suitable for agricultural

production, especially during the dry season, the river floodplains turn into key resources for the large population of cattle migrating from the dry far north. The major inhabitants of the area are the Nupe, who are traditionally sedentary agriculturalists. Pastoral Fulani have settled in the area for over a century. With the Sahel region in the north becoming drier under the influence of climate change, a large population of new pastoral Fulani groups has begun to infiltrate and settle into the region since couple of decades ago (Fu, 2019). Pastoralists from different lineage groups and social status have been selected for the study for the purpose of comparison and to identify if there are any differences among their adaptive strategies and level of vulnerability. The fieldwork results will be analyzed to provide evidences of actual situation at ground level and perceptions from the very people at stakes.

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