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Some Dimensions of Farmers'-Pastoralists' Conflicts in the Nigerian Savanna

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Abstract

The savanna ecosystem covers about 48.5% of Nigeria's land area. It is a national common for intensive cropping and extensive grazing. Fierce competition for land and water resources among the crop farmers and pastoralists is a common feature. This article shares insights from two separate, but linked, studies conducted in the Nigerian savanna on the livelihood and food security of the local peasant farming communities and the vulnerability of the settled Fulani agro-pastoralists' livelihoods. Household interviews, focus group discussions, and key informant interviews were employed among both the farming and agro-pastoralist communities. 191 respondents in 11 local farming communities and 201 households in 40 Fulani sub-communities (pastoral family steads locally referred to as "gaa") were sampled in Ogun, Oyo, and Kwara States. Evidence from the studies suggests that poor resource governance arrangment is a key factor of

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farmer-pastoralist conflict. Both the farmers and pastoralists are sufficiently aware of the threat of clashes to human insecurity in the region. Some of the communities are taking steps to build confidence and improve relationships with the agro-pastoralist communities. On the other hand, the Fulanis also have conflict resolution measures and collective actions to reach out to their host farming communities. The role of the government has not been very encourging. More concrete and proactive measures are required to improve resource governance in order to de-escalate the current levels of resource conflicts in the savanna.

Introduction

Access to natural resources is essential for livelihood production in rural areas of Africa. The most vulnerable tend to be people with poor access to natural resources upon which to build their livelihood strategies (Pasteur, 2011). Sustainable management of natural resources ensures that livelihoods are secure and sustainable in the long term. Poor subsistence farmers and pastoralists depend on the availability of usable land and pasture for their livelihoods. Sustained natural resources ensure sustainable livelihoods for these actors (Rennie & Singh, 1996). The nature of livelihoods in Africa is still poorly understood. Many aspects of rural livelihoods continue to be at conflicts with each other and the natural ecosystem. The question of ownership and right of access to natural resources may become more critical in densely settled rural landscapes where livelihoods and food security are substantially tied to these resources. Existing resource governance arrangements and frameworks will be critical to effective management of natural resources to prevent worsening resource conflicts and human insecurity.

The millennium development goals have committed the world's nations to improving food security, eradicating extreme poverty, and reducing environmental degradation. At the same time there is an increasing need to address multiple other social and environmental concerns including the impacts of conflicts related to natural resources on food security and rural poverty (Government Office of Science, 2011). Renewable natural resources play an essential role in enhancing food security by providing the ecosystem services that enable continued production or utilization of food and water (Millennium Ecosystems Assessment, 2005; Munang, Thiaw, & Rivington, 2011). The natural resources governance arrangement and initiatives at the local levels, where resource conflicts often play out, are important to determining how the local population perceives these resources and how much they appreciate the goods and services from the ecosystems. Recognition and empowerment of communities as stewards of ecosystem services are essential to strengthening their capacity to manage ecosystems sustainably for human well-being (Fabricus & Koch, 2004; Folke, Carpenter, Elmqvist, Gunderson, & Holling, 2002).

Resource conflict, a major output of poor resource governance, is a formidable threat to both natural resources and human security. It is also detrimental to rural livelihoods, food security, and social co-existence (Adisa & Adekunle, 2010; Daramola, 2005; Fasona & Omojola, 2005). Unhealthy competition for finite environmental resources, lack of management, divergent attitudes and beliefs, as

well as poor institutions trigger and exacerbate natural resource conflicts (Hellström, 2001). Bob and Bronkhorst (2010) posit that resource scarcity, whether perceived or actual, is a crucial component of environmental conflicts. Resource conflict problems are is likely to be aggravated when no institution appears to be in control, the extant regulations governing resource access and use are not enforced, or strategies for sustainable natural resources management are not translated into actions. This appears to be the challenge in the Nigerian savanna.

The savanna ecosystem is a national common which covers about 450,000km^2 (or 48.5%) of Nigeria's land area (Nigeria National Biodiversity Conservation and Action Plan, 2004) stretching from about latitude 7^{0}45' North to 14^0 North. It comprises the Sahel, Sudan, Guinea, and Derived (or Wooded) savannas. The Sahel savanna is found mainly in the northeast and along the northern border with the Niger Republic. In addition to grasses, shrub species (*Combretum spp.*), and acacias predominate. Forest cover rarely exceeds 10% except along seasonal watercourses. The Sudan savanna contains similar species to the Sahel zone with a greater frequency of *Acacia albida, Tamarindusindica,* and *Schelocaryabirrea*, and forest cover of up to 20% of the land area. The Guinea savanna is found in the middle belt of Nigeria, and is typified by open woodland with tall grasses and fire-resistant trees. African mahogany at one time was an indicative species of this zone. Tree cover varies between 15 to 25% in undisturbed areas. The Derived savanna is found further south and is a broadband that borders the remaining forest zone of the south. It is continuing to spread south as more forest land is degraded. Tree cover here is as much as 30% (Nigeria National Biodiversity Conservation and Action Plan, 2004). The Nigerian savanna generally typifies a densely settled zone (except in a few places around the Guinea savanna) where different social groups compete for access to finite natural resources that are constrained by the vagaries in the local climate across space and seasons (Fasona, Tadross, Abiodun, & Omojola, 2011). The two most visible actors are the sedentary peasant farmers and the settled and migrant pastoralists constantly in search of pasture, forage, and water for their herds.

Agricultural and pastoral lands are common pool resources in the Nigerian savanna. Although by virtue of the land use act all lands are vested in the hands of the government, in reality every community appears to be in charge of the lands in their domain. The land and the associated resources provide the basic means of livelihood to members of these communities. Sedentary small-holder rainfed cultivation is the major livelihood activities in the Derived, Guinea, and Sudan savanna. Farming activities are tied to seasons. Thus the rainy season (April to September) also doubles as the busy period for crop farmers. The dry season (October to March) is generally a low farming activity period except in limited places where the farmers have access to water for irrigation. On the other hand, the agro-pastoralists are constantly on the move in search of forage and pasture for herds. They hardly request any permission to move or stay around any community, and are thus regarded as invaders by the host communities. This perception creates a priori divide between them and the host communities. In the absence of dedicated grazing reserves, the agro-pastoralists are forced to move from place to place and

any location where the grasses and herbs are green, including the host communities' farms, is good enough for grazing. The natural result is constant tension and conflict between the herders and crop farmers.

Environmental conflict is likely to be worse where boundaries are not clear and there are competing claims over resources. In this article we discuss some of the peculiarities of farmer-pastoralist conflicts in the savanna, the existing resource governance arrangement, the vulnerabilty of both the farmers and agro-pastoralists, the likely role of climate change, and efforts from both the farming and pastoral communities to improve inter-relationships, resolve conflicts, and manage crisis. We argue that the poor resource governace arrangement is an impetus to resource conflicts in the Nigeria savanna.

Conceptual Clarifications

The conceptual foundation of this article rests on the value and importance of natural goods and services as they connect with human social economic and developmental activities, and the importance and implication of property rights and access to common pool resources. Nature has been the patrimony of natural resources and the source of goods and services and space in which society develops. When the natural characteristics of ecosystem structure and function are of interest in the development of human society, they are classified as natural goods and services (Gosselink, Odum, & Pope, 1973). Natural goods are tangibles derived from a natural resource to directly fulfill human livelihood. Land is a natural resource that supports cultivated crops for livelihood and food provision. It also supports the growth of pasture and forage for pastoral animals. On the other hand, natural services are derived from the natural characteristics of ecosystem structure and function and may include the flow of energy and materials, nutrient storage, distribution and cycling, provision of wildlife habitat, germplasm storage and evolution, biomass production, and flood control (Hufschmidt, James, Meister, Bower, & Dixon, 1983). In essence, these are intangibles that support the health of the natural resource in question and its continued provision of the direct or tangible goods. Unsustainable exploitation of natural resources may produce more natural goods in the short run, but will ultimately lead to declining services and deteriorating health of the resources and drastic reduction in the volume of natural goods produced in the long run.

A quality environment provides the necessary goods and services to satisfy life quality needs and mitigates the severity of a hazard. The concept of natural goods and services as stated by Lugo and Brinson (1979) also links the concept of natural resources with environmental and life quality and economic goods and services. Economic goods and services are the results of labor and the expenditure of capital to refine and convert natural resources to useful products, and to design and provide activities of public utility such as health, security, communication, and government services (Ehrenfeld, 1976). The natural goods and services may control ecosystem functioning. They are, therefore, important to a sustainable flow of economic goods or services. The benefit from the goods and services must flow and be enjoyed

across the different society strata or by all the actors that depend on the resource in one way or another. Conflicts often arise when the activity of a party or an actor in the common pool resource use theater severely compromises the quality or quantity of the common resource to the extent that the other actors cannot fulfil their livelihood or welfare aspiration. A situation where the part of a common pool resource being enjoyed by an actor is destroyed or compromised by another actor in the way to fulfilling its own livelihood aspirations is a recipe for human insecurity.

The sustainability of natural goods and services especially with regards to a common depend to a large extent on the ownership and access to common pool resources. This is where the role of a regulator (the government) in the resource governance becomes important. Grafton, Adadmowicz, Dupont, Nelson, Hill, and Renzetti (2004) in their book, *Economics of the Environment and Natural Resources*, posit that a property right exists over an asset whenever a recognizable entity is able to exclude, at least partially, others from either using it or enjoying a flow of benefits of its use. Property rights can be individual rights and can also be shared between individuals and groups. For example, despite the land use decree placing all lands in the hand of the government, land is communally controlled or held in common by the local communities in the savanna.

Who holds property rights over assets, especially natural resources and the environment, and the nature of these rights has very important implications in terms of environmental sustainability and outcomes. Public goods, unlike private goods, are inherently non rival in use, in other words, their use is mutually in-exclusive. This is particularly graphic in the savanna with very complex land-use practices. A piece of land that is a grazing area in the dry season may become a farmland in the wet season. Land and pasture, like many other environmental assets in the Nigerian savanna, are neither pure public goods nor private goods, but common pool resources where exclusion is difficult (but not totally impossible if the resource governance framework are well implemented), and their use is rivalrous. Although there is no exclusivity, one person's use of the resource reduces the ability of the other to either use or enjoy it. As mentioned earlier, this is one of the roots of violent resource conflicts in the savanna. Due to poor land management and lack of land administration procedures, property rights which come in the form of private rights for individual lands, community rights, state rights, or a mix of these right regimes are completely absent in the vast area of the Nigerian savanna. The result is a tragedy of the common where individual users consider only their private costs and not the costs their actions impose on other resource users. Thus, what results is pareto efficiency where it is not possible to make someone better off without making someone else worse off. In a densely settled agrarian rural landscape, violent conflicts and human insecurity are the natural outcome of such exclusivity.

Materials and Methods

The Study Area

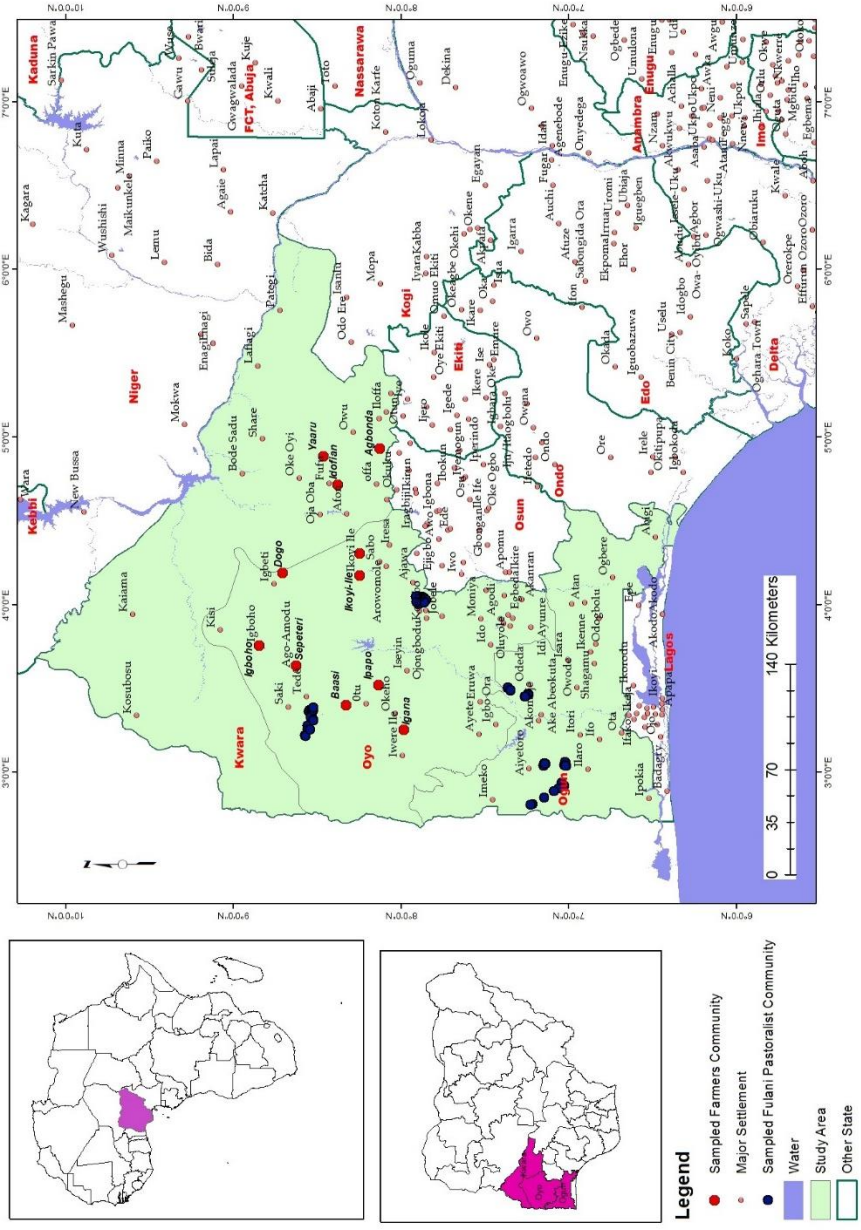
The study area is roughly defined by latitude 7^0 01' and 8^0 14' and longitude 2^0 45' and 4^0 15' covering principally the Derived (Wooded) savanna that is dominated by a mixture of forest and woodland interspersed with tall grasses and fire-resistant trees. It covers Ogun, Oyo, and Kwara States in southwest to west-central Nigeria (Figure 1). The study area is characterized by a sub-humid Koppen's *Aw* climate, an equatorial savanna where minimum precipitation is less than 60mm in the dry season (Kottek, Grieser, Beck, Rudolf, & Ru, 2006) and the average annual rainfall is about 1000mm. Rainfall is the limiting factor of crop cultivation and dictates the rhythm of life (Fasona, Tadross, Abiodun, & Omojola, 2013; Omotosho & Abiodun, 2007). The tree cover is as much as 30%, but the zone continues to expand into the southern rainforest zone as more forestland is degraded (Bucini & Lambin, 2002; Hoffmann & Jackson, 2000).

Population density is relatively high and survival for large rural communities depends on small-holder rain-fed agriculture. The area is inhabited mainly by the Yorubas, who are traditionally sedentary agriculturalists and traders. The zone is very suitable for crop cultivaion and is often referred to as the food basket of the nation. It is also suitable for pastoral production, except for the limitation imposed by customary property regimes on land use. The rich pasture undergrowth is a target for extensive grazing by agro-pastoralists. Because the region is more humid than the northern sahelian traditional home of the Fulani agro-pastoralists, a large population of the agro-pastorlists have found the region to be a "home away from home" and some of these have settled in the region for over 50 years (Fabusoro, 2006). The circuit movement of the "settled" agro-pastoralists coupled with the "invasion" of the region by the purely nomadic *Bororos* from the Sahel and upper Sudan zones around the months of September-October set the tone for resource conflicts. Pareto efficiency sets in when the herds of the Fulanis destroy the farmlands of the local sedentary crop cultivators. In essence, attempts to make the Fulanis better off also make the local farmers worse off which leads to conflicts.

Data Collection

The methodology consists of content review and evaluation of policy documents and participatory rural appraisal that include household interviews, focus group discussions (FGD), key informant interviews (KII), and engagement with officials of local councils and state governments. In addition, climate data (rainfall and temperature) from 1982 and 2010 were sourced and analyzed for trends in the study area.

Figure 1: The Study Area in the Derived Savanna of Western Nigeria.



Review of Policy Documents

The policy documents of the Federal Government of Nigeria on natural resources related areas including agriculture, forestry, environment, and energy were reviewed. The documents were analyzed with the view to establishing the policy objectives, strategies, and implementation framework with regards to natural resource governance and resource management and its impacts on rural livelihoods and resource conflicts, among others.

Household Survey

For the local communities, 191 households across 11 communities in Oyo and Kwara states participated in the survey conducted from February 5-9, 2012. The settlements include Yaaru, Idofian, and Agbonda (in Kwara state), and Orile-Igbon, Sepeteri, Iganna, Igboho, Dogo, Ipapo, Ikoyi Ile, and Baasi (in Oyo state). These communities were selected based on certain criteria including being a rural or semi-urban (based on the assumption that the natural resource capital is more important to livelihood and food security in rural and semi-urban areas than urban area) and not far away from a forest and woodlands (this makes it easy to connect livelihood to forest and woodlands). Actual household heads that participated in the interviews were selected based on simple random sampling around the communities. For the settled Fulani pastoralists' communities, four settled Fulani communities were selected. These were Alabata and Eggua (in Ogun State) and Irawo and Idode (in Oyo State). In these communities interviews were conducted with 201 households in 40 sub-communities (pastoral family steads locally referred to as "gaa"). The communities were selected based on a concentration of Fulani agro-pastoralists, size of the community, and years of settlement at the present location (Fabusoro, 2009). Due to the nature of the agro-pastoralits, the actual respondents were selected based on availability and willingness to cooperate with the research team.

Focus Group Discussions, Key Informant Interviews, and Government Officers' Engagement

In the local farming communities, FGD were conducted in five communities—Sepeteri, Igboho, Ipapo, Orile Igbon, and Baasi. Four traditional rulers were engaged in Iganna, Ikoyi Ile, Agbonda, and Yaaru. Local Government officers in charge of the environment and natural resources were engaged across nine LGAs (Atisbo, Oriire, Itesiwaju, Olorunsogo, Orelope, Iwajowa, Saki East, Ifelodun, and Irepodun) in Oyo and Kwara States. The key issue for the FGD and KII was to elicit information on resource governance and the role being played by different actors (communities, tiers of government, and other stakeholders) in natural resources management and resource conflict resolution and management. For the settled agro-pastoralists, focus group discussions were conducted in the four pastoralists' communities—Alabata, Eggua, Irawo, and Idode. Some of the issues raised during

the FGD included land accessibility, and conflicts and collective action for conflict resolution.

Climate Data

Rainfall and maximum temperature data from 1982 and 2010 were collected from the Nigerian Meteorological Agency (NIMET) from stations including Abeokuta, Ibadan, Iseyin, Shaki, Oshogbo, and Ilorin. The data was analyzed for climate trends and both spatial and temporal anomalies.

Data Analysis

The questionnaire for households and LGAs were coded and analyzed within the statistical package for social statistics (SPSS) software. Both descriptive and inferential statistics were employed to analyze the relationships between the different variables. The FGD and KII interviews were transcribed from audio and video. Qualitative information on key variables, issues, and perspectives were derived from the interviews.

Results

Natural Resource Governance in Nigeria

The governance or resource management regime in place has substantial influence on ownership or property right, access, use, and management of natural resources. As mentioned earlier, the Nigerian savanna is a common pool resources where nobody or no institution appears to be in charge. The Nigerian land use act vested all lands in Nigeria in the hands of the government. While lands in urban areas are vested in the hands of the state governor, all rural lands are vested with the local government. But in reality, individual communities take charge of the area considered to be their own community land and the traditional leader (in consultation with his chiefs) is informally vested with the right to allocate land to people from outside the community. Despite this, the government still has the prerogative to acquire land anywhere and in any community by overriding public goods. Table 1 shows the delineation of roles and responsibilities between the federal, state, and local governments and the private sector in the Nigerian policy on agriculture.

Clearly, there is very little on the use of common pool resources by different actors and stakeholders. Thus, there is no formal statement on the expected relationship between crop farmers and agro-pastoralists where the two groups have to use common or shared resources. The communities who are the primary custodian of the natural resources were totally excluded. The local government is the third tier of government in Nigeria and the closest to the local people. However, important responsibilities such as ensuring access to land, promotion of the production of inputs for crops, livestock, fish, and forestry, and grazing reserve

development, and creation of water access for livestock are vested with the state government. The state government is far from the grassroots and far from the theater of struggle for common pool resources at the local levels. The LGAs that are supposed to respond to such challenge has neither the legal backing nor the resources to prosecute such a challenge. They are poorly funded and with inadequate human and technical capacities.

Responses from LGA officials suggest that free range grazing by nomadic pastoralists remain a formidable threat to human security and is a common feature in all the communities. About 90% of the LGAs agree that clashes between the agro-pastoralists and sedentary crop farmers do occur regularly. Several community leaders and key informants were worried that conflict between farmers and agro-pastoralists has become endemic. Information also showed that many cases of cattle invasion of farmland leading to clashes have been reported at the LGAs and the LGAs attributed lack of grazing area for about 62.5% of the cases and deliberate destruction of farmlands by the herders at 25%. Almost all the LGAs believed that they presently lack the human capacity to meet the challenges of natural resources management in their domain and 55.6% categorically admitted that their current strategies for managing natural resources and resource conflicts were ineffective. Many of the LGAs have no personnel with direct responsibility for forest and ecosystems management or conflict management capabilities.

Responses from the Local Farming Communities

Resource conflicts between the settled and nomadic agro-pastoralists and the local crop farmers are a common feature in all the communities. Although funding was considered the most important problem to the households, many traditional rulers and key informants are worried about the conflict between the communities and the agro-pastoralists that has become endemic and a formidable source of human insecurity in the savanna. Apart from farmland invasion and destruction by herds, there are reports of nomadic agro-pastoralists setting the range on fire to enhance early forage undergrowth. This kind of uncontrolled fire often goes out of control to destroy small-holder cashew, mango, and citrus plantations owned by people in the host communities. The results are clashes (which are sometimes very violent and fatal) between the herders and the farmers. Reprisal attacks are also very common, with cattle rustlers taking advantage of the situation, thus aggravating the crisis situation. The comments in Box 1 capture the feelings and frustrations of some community leaders with regards to this issue.

Table 1: Roles and Responsibilities of Governments and the Private Sector in Sustainable Agriculture

Government/ Sector	Roles and Responsibilities
Federal	Provision of a general policy framework Rural infrastructure development Development of appropriate technology Coordination of agricultural data and information management systems Making periodic inventory of land resources and control of land-use and land degradation in collaboration with state and local
State	Provision of a virile and effective extension service Promotion of the production of inputs for crops, livestock, fish, and forestry Ensuring access to land Development and management of irrigation facilities and dams Grazing reserve development and creation of water access for livestock Training and manpower development Promotion of appropriate institutions for administering credit to smallholder farmers Investment in rural infrastructure Ownership, management, and control of forest estates
Local	Provision of effective extension service Mobilization of farmers through cooperative organizations, local institutions, and communities Provision of land for new entrants into farming
Private	Investment in all aspects of upstream and downstream agricultural enterprises and agribusinesses Agricultural input supply and distribution Production of commercial seeds, seedlings, brood stock, and fingerlings under government certification and quality control

Source: Federal Republic of Nigeria (2001)

Box 1: Stories of Struggle with Nomadic Herders in the Savanna

Community Leader in Baasi:
Whenever cattle destroys our farms and we go to the police to report the Fulanis, they [the police] will tell us they can't handle them. The Fulanis used to destroy our crops a lot, if government can help us in this area, it will be better.

Focus Group in Ipapo:
They [Fulani herders] are richer than us, when they destroy our crops and we go to police station, nothing will be done. Sometimes they offer compensation that are so ridiculous that you will have to leave the place in anger.

Focus Group in Orile-Igbon:
When cattle destroy your farm and you report them [Fulani herders] to the police nothing will be done. These people are richer than us. Even the value of one cow is more than what a farmer can make from his farm in a whole year.

The Traditional Ruler of Yaaru:
They perpetuate their act at night. They usually set their cattle free to feed on our farmlands thereby causing destruction of crops . . . It is a matter of concern to us in this community because these farmers sometimes borrow money from government and the activities of the herders usually result in debts. The Kwara State government has promised to get us together to discuss the matter but they [herders] will not respond.

Community Leader in Sepeteri:
It is impossible for farmers to be sleeping in their farm in order to secure their farm produce from these people [nomadic herders]. This problem is not new to us, it has been there for ages. Before now when these people bring their cattle to feed in the bush, the farmer will stay with them so that they will not destroy the crops that are planted. But now, they have devised a method whereby they feed their cattle at night when the farmer will not be around to oversee their activities. Some of these herders will set their cattle on farmlands to eat the crops. In fact some will go the extra mile of destroying the storages of farmers and eat their harvested farm produce. This is the problem we are facing here.

Responses from the Agro-Pastoralists' Communities

The Fulani agro-pastoralists are by nature migrants and they are basically of two stocks—the settled agro-pastoralists and the purely nomadic pastoralists. The settled agro-pastoralists migrated into the study area and then "settled" in a location. The word "settled" here implies that while they roam or move their herds about an area that may be more than 2500km^2 (or 50kmx50km) depending on the seasons, they do return to their base where they live in sub-communities and isolated steads ("gaa"). Some of these settled pastoralists have stayed in the same place for a long period, occasionally migrate out of the area either due to dwindling resources or outbreak of disease and may return some times (may be years) later to the same area, though not necessarily to the same spot. They often have good communication and relationships with their host communities and sometimes inter-marry with them. However, because they roam their herds sometimes far away from their home

stead and often distribute them among their young children, they often get involved in clashes resulting from invasion and destruction of farmlands by their herds.

The second stock is the purely nomadic pastoralists (referred to as *Bororo*). According to interviews with the settled pastoralists, the Bororos (which are often feared by even the settled pastoralists) migrate into the southern savannas from the Sahel and northern Sudan zones of the savanna. They often arrive with millions of cattle from late September to early October. They are very isolated and have little or no communication with the settled pastoralists and the local communities that are supposed to be their host. Although the "settled" pastoralists are also involved in clashes resulting from farmland destruction by herds, they are of the opinion that the *Bororos* are the major causes of conflicts and human insecurity in the savanna through massive destruction of croplands during herd movement.

Land Accessibility

The result of the study conducted among the settled agro-pastoralists shows that they have access to land and the most common land right owned is by rent (46.8%), by gift (32.8%), and outright purchase (11.9%). The land referred to here is not grazing land, but the land where they erect their stead and also do some supplementary crop cultivation.

Conflicts

Of the respondents, 51.7% reported conflicts, with Eggua (86%) and Irawo (73%) being the major hotspots of conflicts. This is not to say that conflicts do not occur in other areas but they are less frequent. These conflicts were reported to have occurred at least once in each study location with Eggua accounting for conflict occurring in their area five times in the last 10 years. The conflicts were attributed to destruction of croplands during cattle movement (87.5%) and cattle grazing in host communities' farmland (70.13%). Other causes included encroachment on the Fulani farmland, land tussle, and exploitation by host community (Table 2). This suggests that farm destruction and land accessibility are the main causes of conflicts.

Table 2: Causes of Conflicts

Causes of Conflicts (n=104)	Frequency	%	Rank
Land matter	19	18.3	4th
Encroachment into our farm	30	28.8	3rd
Cattle grazing in community land	73	70.1	2nd
Exploitation by host community	13	12.5	5th
Cattle destroy farm produce during movement	91	87.5	1st

The focus group discussions show that many of the conflicts occur during the transition from the wet to dry season (typically late September to November) when

the nomadic pastoralists (*Bororo*s) tend to migrate to the area for pasture and water. Loss/destruction of farm produce (91.3%) and seizure of cattle (22.1%) are the major consequences of the conflicts. Others include loss of human lives, loss of animals, loss of farmlands, and in some instances destruction of property and forced relocations.

The Climate Dimension

The relationship between climate change and conflict is an indirect one. Prolonged drying constrains the local farmers that depend on rainfed cultivation. It also reduced pasture, forage, and water for agro-pastoralists. For the agro-pastoralists, prolonged drying also means increased grazing distance. All these increase the chances of occurrence of violent conflicts. According to field sources, physiologically, both increases in rainfall and temperature are good for the health of the Fulani herds. But in terms of availability of pasture and water for herds, rising rainfall that is fairly distributed across the seasons is preferred. Increased warming, on the other hand, means less water for both pasture growth and animal watering. Rising temperature means a significant proportion of the water from rainfall is equally lost to evapotranspiration.

The trend analysis of rainfall suggests that the mean monthly rainfall has been increasing by about 6.5mm/month/decade from 1982 to 2010 (See Figure 2).

Further analysis suggests that while rainfall across seasons in the decade 1980s was generally below the long term seasonal average, the decade 1990s rainfall across seasons roughly equaled the seasonal average and the decades 2000s experienced a seasonal rainfall that was above the long term average. The increase in rainfall observed from the decades 1980 to 2000s is consistent with results of earlier studies conducted in the savanna region of Nigeria (Anyamba & Tucker, 2005; Chima, Ijioma, Nwagbara, & Nwaugo, 2011; Fasona & Omojola, 2005).

However, the pattern of rainfall and temperature appears to be going in the same general direction. The temperature has been rising at about 0.4^{o}C/month/decade (Figure 3). The rising temperature trend is consistent with the general global pattern of warming (IPCC, 2007) and the rising temperature for Nigeria in particular (Federal Government of Nigeria, 2003). Figure 4 shows the pattern for standardized anomalies of rainfall and temperature from 1982 to 2010. Deductions from Figure 4 suggest that for most of the years up to 2001 both average rainfall and temperature were below normal by between 1∂ and 2∂ in some cases. But rainfall in about the years 2002 to 2010 showed strong recovery. This is also accompanied by a very strong warming by as much as between 1∂ to 2.5∂ above normal in some cases. This climate signal, though consistent with other studies carried out in the savanna, presents an interesting scenario especially as it affects farmer and pastoral livelihoods and conflicts over resources.

Ordinarily, it can be assumed that the livelihoods of both the crop farmers and agro-pastoralists should fare better in the decades 2000s than in the 1980s and 1990s when rainfall was low with less pasture and water was presumably scarce. But the strong temperature profile that accompanied the rainfall recovery of the decades

2000s presents another dimension. There is a chance that the additional water needed (for both crop and pasture growth and animal watering) created by higher temperatures may not be met by the increase in rainfall.

Figure 2: Trend of Mean Monthly Rainfall in the Derived Savanna, 1982-2010

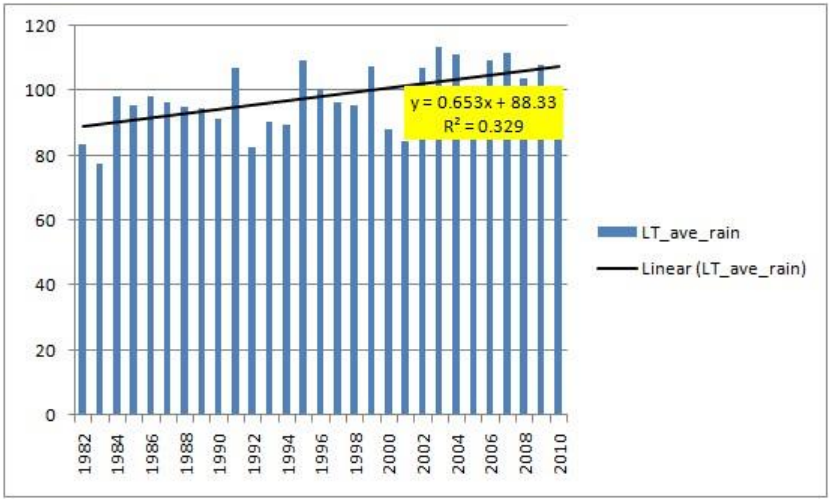


Figure 3: Trend in Mean Monthly Maximum Temperature for Derived Savanna, 1982-2010

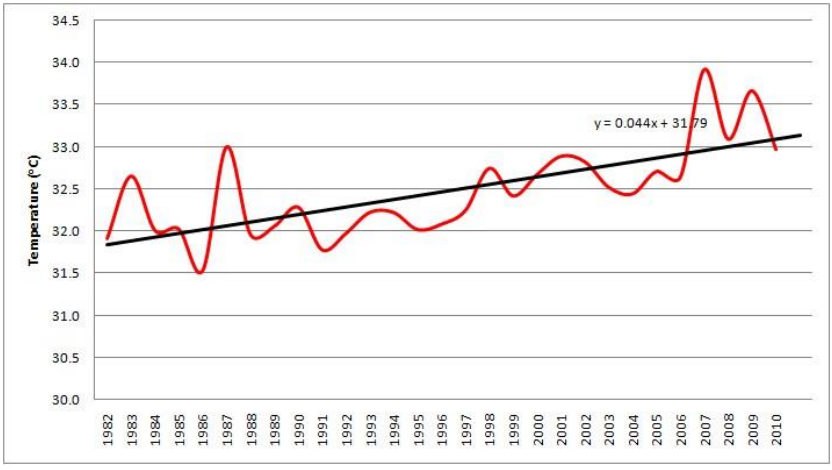


Figure 4: Pattern of Rainfall and Temperature Anomalies in the Derived Savanna, 1982-2010

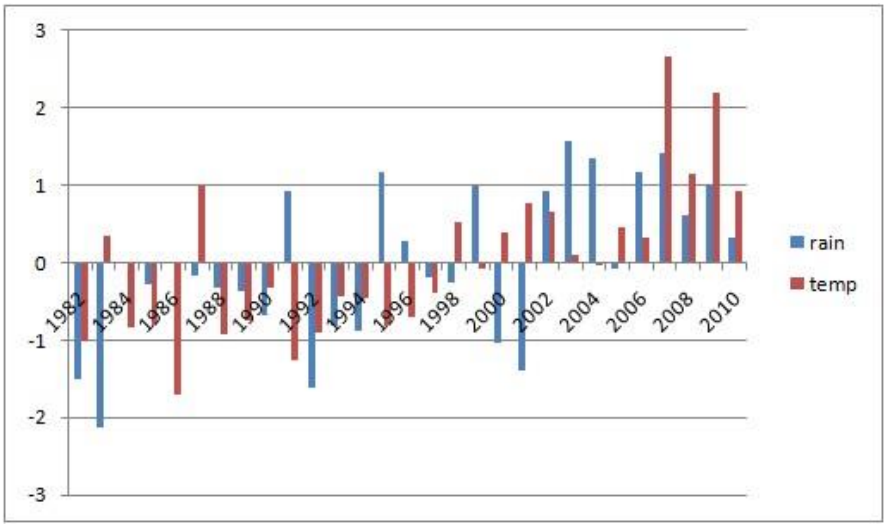
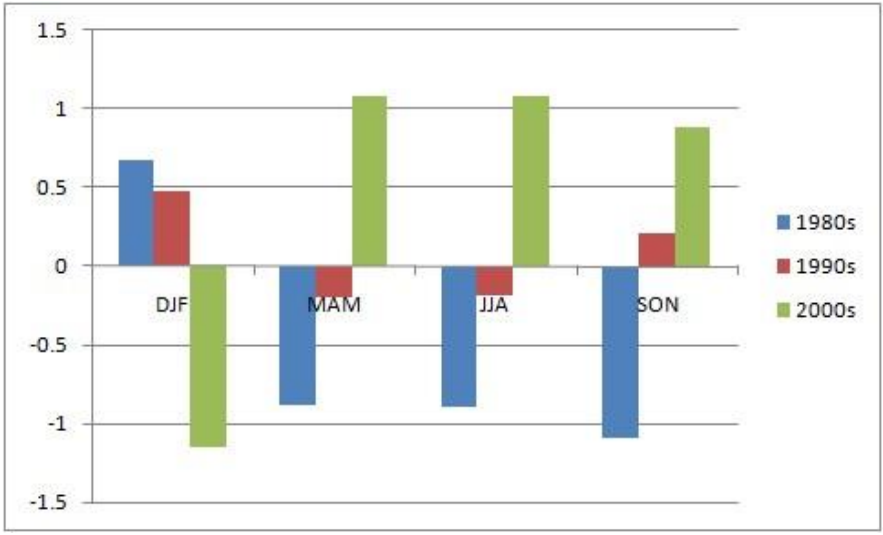


Figure 5: Standardized Seasonal Rainfall Anomalies for the Decades 1980s, 1990s, and 2000s



Thus, increased rainfall accompanied by increased temperature may neither result in cooling nor have any substantial positive effect on the growth of forests and woodlands. But it may aid the short-term growth of grasses and shrubs and forages which is good for herds. Hence the vulnerability of the Fulani pastoralists and their herds to climate change will depend significantly on the seasonal fluctuations in rainfall (i.e., how dry is the dry season and how wet is the wet season) which affects the growth of pasture and availability of water for animals and by extension, the grazing distance.

Figure 5 shows the standardized seasonal rainfall anomalies. The pattern suggests that in recent times (in decade 2000s), the dry season represented by DJF (December-January-February) is getting drier and the wet season (March to November) is getting wetter. This is unlike in the decades 1980s and 1990s when there was a general decline in rainfall in the wet season and some increase in the dry season. This suggests that the rainfall is not fairly distributed across the seasons. The implication of this is a possible increase in conflicts occasioned by reduced access to water and grazing lands in the dry season. Focus group discussions and key informant interviews conducted among the Fulani pastoralists and local farmers have confirmed that the frequency of conflicts in the study area in recent time increased dramatically during the dry season compared to the wet season.

Conflict Resolution

Responses from the Local Governments

The LGA officials suggest two major issues critical to resolving the perennial crises. These are creating and equipping dedicated grazing reserves for the agro-pastoralists and government intervention by constitutional enactment or policy directives spelling out the conditions for co-existence between the agro-pastoralists and host communities. While the first was part of the policy thrusts on agriculture mentioned earlier, there was no reference to the second in the policy statements. Other suggestions put forward include periodic training and enlightenment campaigns among the agro-pastoralists that highlight the need to:

- Respect the custom and traditions of local host communities;
- Entrust animals into hands of mature adults and prevent their children from moving cattle around;
- Cage herd animals while resting; and
- Avoid grazing on community farmland.

The local communities should be educated on the need to accommodate the herders and be friendly with them and report cases of destruction of farmlands to the appropriate authorities or the police. Farmers should not kill cattle belonging to the herders and should stay away from designated grazing zones.

The LGAs, despite being the closest arm of government to the theater of conflicts, generally lack the legal, technical, and human capacity to intervene and

solve the problem. They can neither create grazing reserves nor designate grazing routes. This makes the situation more precarious.

Conflict Resolution and Management Initiatives by the Local Communities

Conflicts between farmers and nomadic agro-pastoralists pose great danger to human insecurity in the host communities. Strategies to build confidence between the two groups are critical for peace and conflict resolution. Some of these communities are evolving innovative approaches to resolving conflict with agro-pastoralists. For example, in Sepeteri and Ikoyi-Ile communities, conflicts with herders are resolved through dialogue as narrated in Box 2 by the community leaders.

Box 2: Some Community Leaders Speak on Partnership with Fulani Herders

The Community Leader of Sepeteri

These things (conflict) have been happening for a long time now, in fact way back to the colonial era. [Communities in] the three neighbouring local councils—Saki West, Saki East, and Atisbo LGAs—align together to form "Ifedapo" and we formed a united security on this Fulani herders issue . . . The issue has aggravated to the level of (a) big dispute between the herders and the farmers in this area. However, we have formed a local committee that is overseeing matters regarding issues such as this. It is composed of the farmers, the Fulanis and the community leaders . . . Now whenever a new Fulani herdsman comes, they will first see the king and request that they want to settle down in our community. Their leader "Seriki" will now report to the king concerning the need to give a piece of land to a new person in their midst. Usually, they settle in the outskirts of the town . . . After we formed the committee about two months ago; we can notice that things have changed for the better. Before now, we cannot trace the offenders but now we can trace them easily.

Kabiyesi, Onikoyi of Ikoyi Ile

Yes there is a cordial relationship between the traditional leader and leaders of the Fulanis. This is because the Fulanis will not want to step on the traditional foot; they have respect for the traditional rulers unlike the police . . . and we cannot send them away since we are all Nigerians. They also have their own benefit to our community.

Kabiyesi, the Shabi-Iganna

I will work on it [partnership with the Fulani cattle rearers] immediately, in fact I will direct my chiefs to ensure that anyone identified as a Fulani herdsman should register with us immediately because we need to know the number of people within our territory . . . We will need to do this to fashion out better ways of solving any problem that may develop as a result of their activities.

Table 3: Conflict Resolution Methods Employed by the Fulanis

Conflict Resolution (n=104)	Frequency	%
By signing agreement	64	61.5
Government intervention	19	18.3
Release of seized cattle	30	28.8
Avoiding host community farmland	57	54.8
By forming committee	52	50.0
By being represented in the community decision making organ	86	82.7
Just tolerating	37	35.6
Accommodation	51	49.0
Segregation (stay on our own)	23	22.1
Payment for destruction made to farmland	89	85.6

Conflict Management Initiatives from the Fulani Agro-pastoralists

Payment for damage made to farms top the conflict resolution method employed by the settled Fulanis. They also made representation to the community decision making organ and sign agreements to maintain peace and harmony where necessary (Table 3).

Because of the scale and high frequency of violent conflicts between the farmers and pastoralists especially in the Eggua zone of Ogun State, the state government had to intervene in conflict management leading to the drafting of a Memorandum of Understanding (MOU) between the Fulani communities and their host communities. This was about to be signed as of the time of this study.

Based on Fabusoro and Sodiya (2011), collective action for land and conflict management is another method employed by the settled agro-pastoralists. Negotiation with the host communities ranks first in the order in which collective action is utilized (Table 4).

Table 4: Other Collective Actions Employed

Collective Actions for Land and Conflict Management	Frequency	%	Rank
Negotiation with host communities	194	96.5	1st
Land allocation for building pastoral camps	79	39.3	6th
Demarcation of pastures and forest land	43	21.4	8th
Demarcation of grazing routes	63	31.3	7th
Decision on free grazing on agricultural lands	15	07.5	10th
Participation in host communities' activities	88	43.8	5th
Payment of required royalties and dues	95	47.3	4th
Negotiation with local government	35	17.4	9th
Linkage with local extension and veterinary	98	48.8	3rd
Conflict management and resolution	160	79.6	2nd

Other actions include conflict management and resolution and linkage with local extension and veterinary officers and payment of required royalties and taxes, participation in host community activities and demarcating grazing routes, pastures, and forest land for themselves.

Conclusion

Results from this study suggest that the existing resource governance regime has very little impact on ownership and use of common pool resources with no specific rules of engagement between crop farmers and agro-pastoralists. The local communities who are the primordial custodian of the natural resources are almost totally excluded. Both the pastoralists and community leaders are worried that conflict with agro-pastoralists has become endemic. The farmer-pastoralist conflicts are presently beyond the capacity of the LGAs to handle. It thus appears no concrete plan of action is being pursued by the local councils. This is one of the effects of the concentration of key aspects of resource governance responsibility on the state government that is administratively far removed from the conflict theater. Both the settled agro-pastoralists and host communities are well aware of the danger posed by conflicts. Just like the local communities, the agro-pastoralists have instituted conflict resolution mechanisms and collective actions to settle transgression and misunderstanding with local communities. However, the invading nomadic *Bororos* remain a critical stakeholder that must be brought to the negotiating table. They bring along with them millions of cattle on their southward migratory drifts. They maintain little or no contact with the settled pastoralists and the local communities. In the absence of dedicated grazing reserves and well delineated grazing routes, their movement is likely to continue to orchestrate conflicts. The structure for a negotiation that involves the *Bororos* will transcend the receiving zones to the originating zones, and involve the federal and state governments with definite policy statements. Such statements must spell-out in details the roles and responsibilities of, and expectations from, the different actors. Only then can we hope for a permanent resolution of farmer-pastoralist conflicts in the savanna.

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References

Adisa, S. R., & Adekunle, O. A. (2010). Farmer-herdsmen conflicts: A factor analysis of socio-economic conflict variables among arable crop farmers in North Central Nigeria. *Journal of Human Ecology*, *30*(1), 1-9.

Anyamba, A., & Tucker, C. J. (2005). Analysis of Sahelian vegetation dynamics using NOAA AVHRR NDVI data from 1981–2003. *Journal of Arid Environments, 63*, 596–614.

Bob, U., & Bronkhorst, S. (2010). Environmental conflicts: Key issues and management implications. *African Journal on Conflict Resolution*, *10*(2), 103–119.

Bucini, G., & Lambin, E. F. (2002). Fire impacts on vegetation in Central Africa: A remote-sensing-based statistical analysis. *Applied Geography*, *22*, 27–48.

Chima, G. N., Ijioma, M. A., Nwagbara, M. O., & Nwaugo, V. O. (2011). Sensitivity of vegetation to decadal variations in temperature and rainfall over Northern Nigeria. *Journal of Soil Science and Environmental Management*, *2*(8), 228-236.

Daramola, A. (2005, March 2-3). Global climatic change, environmental resource and pastoral nomadic management in Nigeria. Paper presented at the IHDP conference on management of environmental commons, University of Ibadan, Ibadan, Nigeria.

Ehrenfeld, D. W. (1976). The Conservation of non-resources. *American Scientist, 6*, 648-656.

Fabricus, C., & Koch, E. (2004). *Right, resource and rural development: Community-based natural resource management in Southern Africa.* London, England: Earthscan.

Fabusoro, E. (2006). A study on property rights, access to natural resources and livelihood security among settled Fulani agro-pastoralists in Southwestern Nigeria. A project funded by International Foundation for Science, (IFS), Sweden and coordinated by United Nations University Institute of Advanced Studies, Yokohama, Japan; January 2005-June 2006.

Fabusoro, E. (2009). Use of collective action for land accessibility among settled Fulani agro-pastoralists in southwest Nigeria. *Sustainability Science, 4*(2), 199-213. doi: 10.1007/s11625-009-0082-4.

Fabusoro E., & Sodiya, C. (2011). Institutions for collective action among settled Fulani Agro-pastoralists in Southwest Nigeria. *The Journal of Agricultural Education and Extension*, *17*(1), 53-68. Retrieved from http://www.tandfonline.com/doi/abs/10.1080/1389224X.2011.536349#preview.

Fasona, M., Tadross, M., Abiodun, B., & Omojola, A. (2011). Local climate forcing and eco-climatic complexes in the wooded savannah of Nigeria. *Natural Resources, 20*, 155-166. doi:10.4236/nr.2011.

Fasona, M., Tadross, M., Abiodun, B., & Omojola, A. (2013). Some implications of terrestrial ecosystems response to climate change for adaptation in Nigeria's wooded savannah. *Environmental Development, 5*, 73-95. Retrieved from http://dx.doi.org/10.1016/j.envdev.2012.11.003.

Fasona, M. J., & Omojola, A. S. (2005, June 22-23). Climate change, human security and communal clashes in Nigeria. Proceedings of International Workshop on Human Security and Climate Change, Holmen Fjord Hotel, Asker, Norway. Retrieved from www.gechs.org/activities/holmen/Fasona_Omojola.pdf.

Federal Government of Nigeria (2003). Nigeria's first national communication under the United Nations Framework Convention on Climate Change. The Ministry of Environment of the Federal Republic of Nigeria Abuja. Retrieved from http://unfccc.int/resource/docs/natc/nignc1.pdf.

Federal Republic of Nigeria. (2001). The new Nigeria national policy on agriculture. Retrieved from www.nipc.gov.ng.

Federal Republic of Nigeria. (2001). Nigeria national policy on agriculture. Federal Ministry of Agriculture and Natural Resources. Abuja, Nigeria.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., & Holling, C. (2002). Resilience and sustainable development: Building adaptive capacity in a world of transformations. Scientific background paper for the World Summit on Sustainable Development, on behalf of the Environmental Advisory Council, Stockholm, Sweden.

Gosselink, J. G., Odum, E. P., & Pope, R. M. (1973). *The value of the tidal marsh.* Center for Wetland Resources. Baton Rouge, LA: Louisiana State University Press.

Government Office for Science. (2011). Foresight: The future of food and farming. Final Project Report. London, England: The Government Office for Science.

Grafton, R. Q., Adadmowicz, W., Dupont, D., Nelson, H., Hill, R. J., & Renzetti, S. (2004). *Economics of the environment and natural resources*. Malden, MA: Blackwell Publishing.

Hellström, E. (2001). Conflict cultures: Qualitative comparative analysis of environmental conflicts in forestry. Silva Fennica Monographs 2. Helsinki, Finland: The Finnish Society of Forest Science and The Finnish Research Institute.

Hoffmann, W. A., & Jackson, R. B. (2000). Vegetation: Climate feedbacks in the conversion of tropical savannah to grassland**.** *Journal of Climate, 13*, 1593-1602.

Hufschmidt, M. M., James, D. E., Meister, A. D., Bower, B. T., & Dixon, J. A. (1983). *Environment, natural systems and development.* Baltimore, MD: The John Hopkins University Press.

IPCC. (2007). Climate Change 2007: *Impacts, adaptation and vulnerability. The Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report.* Cambridge, England: Cambridge University Press.

Kottek, M., Grieser, J., Beck, C., Rudolf, B., & Ru, F. (2006). World map of the Köppen-Geiger climate classification updated. *Meteorologische Zeitschrift*, *15*(3), 259-263.

Lugo, A. E., & Brinson, M. M. (1979). Primary productivity in saltwater wetlands and its value. National Symposium on Wetlands. Fourteenth American Water Resources Conference.

Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-Being: Synthesis*. Washington, D.C.: Island Press.

Munang R. T., Thiaw, I., & Rivington, M. (2011). Ecosystem management: Tomorrow's approach to enhancing food security under a changing climate. *Sustainability, 3*, 937-954. doi: 10.3390/su3070937.

Omotosho, J. B., & Abiodun, J. (2007). A numerical study of moisture build-up and rainfall over West Africa. *Meteorol. Appl.*, *14*, 209–225. doi: 10.1002/met.11.

Pasteur, K. (2011). *From vulnerability to resilience* (V2R). Warwickshire, England: Practical Action. Retrieved from http://practicalaction.org/media/view/9654

Rennie, J. K., & Singh, N. (1996). *Participatory research for sustainable livelihoods*. Winnipeg, Canada: IISD.