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# Farmers-Herdsmen conflicts: Effect of Resilience Strategy on Arable crop Productivity in the Ogbomoso Agricultural Zone of Oyo State

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## Abstract

Over the years, contests over land for crop production and pasture for animals among crop farmers and herders have been a subject of concern. The study therefore examine the effect of resilience on arable crop productivity after farmers-herdsmen conflicts in the Ogbomoso Agricultural Zone of Oyo State. A multistage sampling technique was used to select 270 arable crop farmers, which is about 29.4% of the 919 registered arable crop farmers for the study, using a structured questionnaire to obtain primary data. Data collected was analysed using descriptive statistics like tables, percentages and inferential statistics such as ordinary least square regression to analyse the effect of resilience strategy to shocks of conflict anticipation cost and arable crop productivity. All analyses were tested at a 5% level of significance. The result of the OLS regression analysis model for the effect of resilience techniques on arable crop productivity indicated that years spent in school (p = 0.97), size of farm (p = 0.006), hired labour after conflict (p = 0.000), transformative index (p = 0.000), absorptive index (p = 0.008) and adaptive index (p = 0.008) were significantly related to arable crop productivity. The transformative, absorptive, and adaptive resilience strategies significantly influenced arable crop productivity after farmers-herdsmen conflicts in the study area. The study concluded that adhere to the rule and regulations of the community serve as a means of preventing conflicts between farmers and herders, Further increasing farm size requires more commitment from the farmer and thus becomes more attached to the farm materially, physically and emotionally. The study recommends that the resilience strategies employed by the respondents should be investigated and adopted by appropriate authorities in order to mitigate the regular conflicts between farmers and herders in Nigeria.

**Keywords:** Farmers; Resilience Strategy; Herdsmen; Arable Crop Productivity; Ogbomoso Agricultural Zone

## 1. Introduction

Nigeria, with a populace of around 190 million people, occupying a land area of 923,773 square kilometers continues to benefit immensely from agricultural production activities. And with about 82 million hectares of arable land, out of which only 42% is so far cultivated, agriculture (crop and animal production) contributed between 31.2% and 39.2% of total GDP between 1986 and 1995, and over 40% 1999 and 2006 (National Economic Intelligence Unit, 2006). Dwindling economic fortunes, the need to reverse high food importation bills and the ever increasing demands for food and raw materials continue to exert more pressures on the arable lands which, incidentally, are required by both farmers and cattle herdsmen for their production activities. It has been illustrated that increasing population growth rate has continued to exert great pressure on available land resources with varying environmental and socioeconomic

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implications (Dietz, Ruben and Verhagen, 2001; Tarhule and Lamb, 2003; Fiki and Lee, 2004). The necessity to provide food of crop and animal origin, as well as raw materials for industry and export in order to meet ever growing demands, has led to both "intensification and extensification" of land use (Nyong and Fiki, 2005). It is probably unarguable that resource ownership and utilization have directly and indirectly defined the dimensions of most conflicts involving man since time immemorial. Of all resources, however, land has remained an overwhelming source of conflicts among various user groups as well as individuals at varying thresholds. In particular, conflicts between farmers and herdsmen in the use of agricultural land are becoming fiercer and increasingly widespread in Nigeria, largely due to 'intensification and extensification' of production activities that are necessitated by increasing human population (Gefu and Kolawole, 2005; Fasona and Omojola, 2005; Eastwood *et al*., 2007). The past few decades have witnessed devastating resurgence of nomadic herders and rural farmers' violence in some parts of Nigeria. This stimulates a number of debates on strategies to mitigate rural vulnerability.

Resilience strategy is a process of absorption, adaptation and transformation in the face of shocks. It is a process of developing a set of skills, capacities, behaviours and actions necessary when dealing with adversity (IFPRI, 2013). One of the widely used definitions of resilience is: "The capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, feedbacks, and identity. Resilience strategy of farms is understood as covering buffer capability, adaptive capacity and transformative capability (Darnhofer, 2014). Capability in farm resilience is the ability of farmers to identify opportunities, mobilise resources, implement options and develop learning as part of an iterative and reflexive process.

### 1.1. Statement of the Problem

Currently and in the recent time, there have been a number of conflicts between farmers and herdsmen throughout Nigeria which have culminated into violent conflicts and the loss of lives and properties. This came to a serious head in the North Central (Benue State) and South western Nigeria (Oyo State), where farmers alleged that herders have been destroying their farms with their cattle, raped women in the area and have attacked and killed farmers in the area resulting in the killing of numerous farmers since 2000-2010 (REGSEC report, 2010). Conflict between arable crop farmers and cattle herdsmen over the use of agricultural land is still pervasive in Nigeria, and portends grave consequences for rural development. It has demonstrated great potential to affect various aspects of rural life. The conflicts had far reaching economic, production and socio-psychological effects on the households of most respondents. Hence, it is important to note that these conflicts have direct impact on the lives and livelihoods of those involved. They also disrupt and threaten the sustainability of pastoral production and agriculture in West Africa (Moritz, 2010). These conflicts reinforce circles of extreme poverty and hunger, and destroy social status, food security and affect mostly the most marginalised groups that include women and children. This affects education of children leading to obstacles in their development and mass displacement. Consequentially, this debilitates the once mutually existing farmer-pastoralist relationships. This awful situation becomes worst, especially when either the farmer or the pastoralist is categorised into a group relating to religion, tribe or region. From the foregoing, it is discernible that there is a compelling need to continue to find lasting solutions to the problems posed by farmer herdsmen conflicts. The extent to which resilience Strategy can influence arab crop productivity after farmers-herdsmen conflicts in the Ogbomoso Agricultural Zone of Oyo State worthy of an exploration. This study remain germane by examine the effect of resilience strategy on arable crop productivity after farmers-herdsmen conflicts in the Ogbomoso Agricultural Zone of Oyo State.

### 1.2. Research Hypothesis

$H_0$: There is no significant relationship between the resilience strategy to shocks of conflict and arable crop productivity in the study area.

## 2. Literature Review and Conceptual Explanation

### 2.1. Overview of conflicts

Main stream conflict theory views constant antagonism over scarce resources as the fundamental cause of conflict between economic agents (Tonah, 2006). All conflicts share common qualities. The first is that there is a kind of contact between the parties that are involved; secondly, the parties in conflict perceive conflicting views; and finally, one of the parties always wants to redress existing contradictions, (Vanderlin, 2005; Ekanola, 2004). Every farming system such as nomadic cattle herding has a boundary, which separates it from the larger system, which make up the environment. The boundary represents the limits in the larger system. Farmers increasingly compete with nomadic herders for farmland, pastures, water, trees and the use of rangeland in general (Akpaki, 2002).

There is clear demarcation between different types of conflict in farmer-nomadic herder relations. He differentiates between disputes among individuals and groups, conflict of interest and violent conflicts. While dispute refers to disagreement between two or more persons or groups, a violent conflict involves mayhem, the destruction and killing of persons and livestock, arising from a dispute (Tonah, 2006). A conflict of interest, on the other hand, is seen as the adoption of opposing views and concerns by different actors, which usually takes the form of non -violent competition, for control of resources in a given area. Farmer herder differences are not only seen as resources conflict but are also sometimes represented as ethnic conflict involving the two groups. Since herder and farmer groups have very different values, customs, physical and cultural characteristics, disputes between them are frequently characterized as ethnic conflict (Tonah, 2006).

### 2.2. Conflict Assessment

The need to support a Strategic Conflict Assessment (SCA) was agreed by donors in December 2001, and supported by President Obasanjo. The central guiding principle was that the SCA process should be led by the national Institute for Peace and Conflict Resolution (IPCR), in the Presidency. Local ownership and capacity building were considered key to achieving credibility and sustainability. Technical and financial support was provided to IPCR and local stakeholders by some of Nigeria's major international donors: DFID; UNDP; USAID; and the World Bank, who formed an SCA Advisory Group to IPCR. The Advisory Group proved to be a vital structure for collective decision-making.

Pastoralism is economically viable to the extent that it contributes significantly to the economy of many developing countries despite continued underinvestment (Hatfield and Davies, 2006). It contributes largely to the growth of local economies, and a cumulative contributor to the nation's GDP and plays a major role in providing on-demand protein to the wider population. In this part of the world, where inland fish is meagre and offshore fishing have not been well explored to provide sea food as part of a diet, meat, milk as well as butter are the major sources of protein. In addition, thousands of Nigerians make a daily living from the sale, transport, processing and marketing of livestock products that include meat, milk, butter, hides and skins, bones and as ploughing power to farmers. In the Federal Capital Territory (FCT) alone, 4,000 goats and over 400 cattle supplied by the Fulbe are slaughtered every day (Okello, 2014). In Yola town, north-east of the country, over 160 cattle, 600 sheep and 450 goats supplied by the Fulbe are slaughtered every day (informant interview). Cattle owners are the only people paying the Jangali (per head cattle levy) to the government since prior to independence (Adebayo, 1995). This tax, being an additional taxing system imposed by the British colonial system still exists (Okello *et al.,* 2014). There is no doubt that the economic importance of pastoralist is significant to the Nigerian economy. Hence, the conflict between the farmers and pastoralist require a lasting solution to maintain and improve on the contributions of this sector of agriculture. The resultant increase in competition for arable land has often times led to serious manifestation of hostilities and social friction among the two user-groups in many parts of Nigeria. The conflicts have not only heightened the level of insecurity, but have also demonstrated high potential to exacerbate the food crisis in Nigeria and other affected countries due to loss of farmer lives, animals, crops and valuable properties (Cotula *et al.,* 2004).

From the foregoing, it is discernible that there is a compelling need to continue to find lasting solutions to the problems posed by farmer herdsmen conflicts. Particularly, it is apt to conduct further actor analysis studies into the variables of farmers and herdsmen that are associated with their mutual conflicts. The respective perspectives, peculiarities and production variables of each group are crucial to the understanding of the management imperatives of farmer-herdsmen conflicts. Without prejudice to the plights of herdsmen in their conflicts with farmers for the use of arable land, the focus of this investigation is on the conflict factors from the perspectives and peculiarities of arable crop farmers. This becomes necessary due to the fact that arable crop farmers constitute the vast majority of agricultural producers in the study area (and Nigeria in general).

Hence, it is important to note that these conflicts have direct impact on the lives and livelihoods of those involved. They also disrupt and threaten the sustainability of pastoral production and agriculture in West Africa (Moritz, 2010). These conflicts reinforce circles of extreme poverty and hunger, and destroy social status, food security and affect mostly the most marginalised groups that include women and children. This affects education of children leading to obstacles in their development and mass displacement. Consequentially, this debilitates the once mutually existing farmer-pastoralist relationships. This awful situation becomes worst, especially when either the farmer or the pastoralist is categorised into a group relating to religion, tribe or region. Abbass (2012) warned that the disharmony in pastoralism and sedentarism reflect enhanced sedentarisation and increased pastoralism leading to constant conflict with the agrarian societies. In order to bring about co-existence between crop farmers and Fulani herdsmen, several measures has always been put in place. As observed by Olaosebikan, (2009), most times Fulani herdsmen are asked to pay compensation or in case of excessive damages the state or local government comes in aid of the crop farmers who are mostly affected.

Sedentarisation is another method used by governments to resolve the farmer-pastoralist conflict. However, Recaniger (2009) shows that pastoral systems are 20% more productive than sedentary animal rearing. The reasons are that sedentarisation require intensive maintenance of field bio-mass to avoid depletion. Of course, even governments in developed countries would find it difficult to provide basic requirements that will encourage pastoralists to settle in designated areas. Others measures put in place as identified by the authority includes: restriction of grassland for cattle, construction of homes/settlement for herdsmen and peace-talk initiatives through stake-holders meeting. However, all these policies are often short lived, hence the conflict abates, and it is therefore pertinent to note that, this type of conflict can hinder the attainment of the 10percent growth rate in the agricultural production proposed by the federal government in Vision 2012. Similarly, the Nigeria's land tenure system which has serious implications for land acquisition by the peasant and the lower class, who are mostly farmers, has serious implication for conflict re-emergence. From the foregoing, it is pertinent to adopt sustainable structure to mitigation into the conflict farmer-herdsmen conflicts in Nigeria. The respective perspective, peculiarities and production variables of each group are crucial to the understanding of management practices of farmers herders conflicts.

### 2.3. Impacts of the allocation of land to migrants on farmers

The impacts of the allocation of land to migrants on farmers who were autochthonous to the locality was both a blessing in some respect and a recipe for land contestation between autochthons and chiefs at the community level and the abandonment of individual responsibility to relations at the lineage level. The alienation of land to migrants in the first place opened up new opportunities for both chiefs and their subjects. On the part of the chiefs, they amassed enormous wealth in the form of tributes, rents and large acreage of cocoa plantations under sharecropping arrangement without directly investing in labour. Sharecropping arrangements also enabled chiefs to desist from the outright sale of land to purchasers but rather developed new arrangements in which lands were released to labourers in exchange for a share of the produce or farm. With sharecropping arrangements gaining popularity, it led to the emergence of disguised land sale whereby both town chiefs and farmers could engage in the sale of land without been challenged by the paramount chief or members of the lineage as a violation of custom (Amanor, 2008).

However, the negative impacts of these tenure arrangements equally abounded. In the first place, alienation of land to migrants resulted in land shortage. The shortage of land was more pronounced among local youth who could not have access to land. This led to the resentment of migrant population by local youth who challenged their legitimacy to land. In some situations, the chiefs were able to manipulate local youth resentment of migrant to serve as catalyst to expel them if they refuse to comply with the directives given by the chiefs on the grounds that the migrants have abused the hospitality accorded them (Amanor, 2006, 2008, Boni, 2005). Again, the alienation of land to migrants led to a growing sense of insecurity on the part of local youth as they saw their position been undermined among the rural poor. The willingness of sharecrop tenants to offer their services at low wage rate made them a preferable option to local youth. This situation created the condition for more demands to be made of local youth and played off by family members against sharecrop tenants if they were unable to comply with the demands of work expected of them. As a result, local youth become increasingly insecure and their participation in family cocoa production became increasingly minimal.

### 2.4. Conflicts over land

Conflicts over land are precipitated by a number of factors namely chieftaincy disputes, changing demographic conditions of agricultural and pastoral encroachment, availability of natural resources and land alienation. The reasons why these conflicts emerge are diverse and underpinned by different historical, economic, political and demographic factors. Whereas some of these conflicts are occasioned by reforms that seek to transform and integrate traditional farming practices into the market under the capitalist system, others arise as a result of competing livelihood survival strategies and the quest to establish and legitimize one's claim and authority.

Conflicts over land occur where autochthonous groups feel their right to land has been denied them in favour of migrants. The opening up of the cocoa frontiers in the late nineteenth century led to the rise in the value and commercialization of land. This development led to the shortage of land which made it difficult for local youth to access land. As a result, they resented migrants for usurping their birth right (Amanor, 2008, Berry, 2001). For instance, in Sefwi Wiawso in the Western Region in the 1980s, the youth of the area who had difficulty in accessing land accused migrants in the area for acquiring large tracts of virgin forests which they have not utilized and had the audacity of subletting such lands to other migrants (Boni, 2005).

According to Traoré (2002), this intensified the competition for land between pastoralists and farmers leading to a breakdown in the consensus that governed cultural and transhumance cycles‖ as a result of the liberty people had in settling wherever they liked. In addition, Shettima and Tar (2008) asserted that conflicts over land may arise out of the changing demographic condition of an area. Using the work of Blench (2005) in Nigeria as a reference point, they argued

that the population of Nigeria which stood at 140 million as of 2006 if projected back to the pre-colonial era would be as low as 10 million in the 19th century which would not result in competing interest in land use. However, the increase in the population of Nigeria as of 2006 has led to a considerable demand in land use limiting the area of land available to both pastoralists and farmers resulting in conflicts between the two groups. Moreover, David heiser and Luna (2008) contends that conflicts over land especially between farmers and pastoralists have been occasioned by changes in land tenure regime and the deliberate attempt of intervention and legislation that were based on western models to increase production output and market integration. They argued that farmers and pastoralists have shared complementary roles in their production systems. However, the introduction of land reform schemes based on European models aimed at sedentarising pastoralists and privileging cash crop farming practices above animal husbandry has in the process undermined the symbiotic relationship existing between the two groups and increased the demand for natural resources. This has made land more desirable and scarce and therefore made conflicts between farmers and pastoralists inevitable. Conflicts between farmers and pastoralists occur when pastoralists destroy the crops of farmers. This comes about as both farmers and herders try to take advantage of the favourable conditions the residual plains along the banks of rivers offers. Whereas farmers depend on the residual plain along the banks of the Volta Lake for example, for vegetable farming, herders are equally interested in accessing the water point on the Volta Lake to refresh their herds. This inevitably result in conflicts between herders and farmers as cattle consume and destroy the seed crops of farmers coupled with the burning of bushes by herders in order to obtain fresh grace in the dry season. These competing livelihood strategies between farmers and herders engenders conflicts (Tonah, 2006, 2002). In addition, conflicts over land may also be motivated by political and economic reasons. This occurs when rival claimants to a land try to establish their control over a particular territory by imposing taxes and levies on the inhabitants of an area. Establishing one‘s claim over a territory gives him or her access to natural resources which he or she can use to his or her advantage. Politically, it also legitimizes one‘s authority to govern an area.

### 2.5. Conflict Resilience

The term agricultural resilience had emerged as a novel term in recent scholarship to understand salient strategies for crisis and disaster reduction. Agricultural resilience is both confronted and challenged by a number of threats such climate change, food crop disease infestation, high cost of agricultural materials, food security, farming security, vulnerability, limited availability of land ,poor energy supply and similar issues associated with farm imputes. The United Nations International Strategy for Disaster Reduction (2004), underscores the linkages between environment and disasters as both are mutually reinforcing particularly among rural areas whose livelihoods derive from the natural environment. This has pointed to the need for farmers' resilience dynamics.In recent decades, agricultural resilience has emerged to offer a direct and serious challenge to rural farmers' vulnerability and wider security threats (World Bank, 2012). The core issues in agricultural resilience is to maintain system functionality and effective food system outcomes. A resilient agriculture as Bennett *et al*. (2014) put it; is one that meets both food and development needs over both the short and very long-terms, from local to global scales, without destabilizing the Earth system. The World Bank (2012), defines resilience as the ability to withstand, recover from, and reorganize in response to crises so that all members of society may develop or maintain the ability to thrive.

Although agricultural resilience focuses almost entirely on alternative strategies against threats to agriculture, it has not been given sufficient policy attention in most poor societies in the global South. This does not only make this paper a critical re-engagement on novel theorizing of agricultural resilience, rather it suggests that many practices designed as resilience strategies have not been effective particularly in most rural areas leading to debates that argue for participatory resilience involving the local people directly through a bottom top approach. Studies on security and rural agricultural development typically depend on a seemingly blur perspective that are often problematic and fails to substantially identify distinct dynamics of rural vulnerability. This superficiality divides rural agriculture and resilience into discrete, and contradictory domains without exploring robust indicators that suggest the intensity of such conflicts. This dichotomy points out much of the theoretical and empirical impasse that creates various analytical difficulties in grappling with the problems of rural farmers and their vulnerability particularly in development contexts. This scant study has made the human security framework inevitable in exploring the rural farmers and insecurity nexus.

Conflict can be a major shock that affects communities and undermines resilience. Conflict, particularly violent conflict, can directly undermine wellbeing through its impacts on physical and psychological health, basic service provision and livelihood security. It can increase people's exposure to other hazards, for example, by displacing whole communities into unsafe areas, such as densely-populated camps (DFID/Christian Aid (2012). Conflict can drive individuals to sell assets, and undermine social networks that help people manage other risks, such as drought, disease, etc. However, prior to this study, the socio-economic cost of farmer-pastoralist conflict to households has been studied and understood, but there is none on the resilient capacities built by rural households to face the shock caused by resource-use conflicts. Violent conflict between farmers and pastoralists over scarce natural resources in the South-east region

of Nigeria has trapped communities in a cycle of insecurity and underdevelopment. For some time now, conflict has impeded the economic growth of the region and the country, as well as the financial health of households. As one recent study showed, households would increase their income by at least 64%, and up to 210%, if farmer-pastoralist violence were to reduce to near zero (Mercy corps, 2015). Conflict destroys livelihoods and leads to displacement; conversely, livelihood insecurity induces migration, which in some cases creates disputes over land and leads to violent conflict (Mercy corps, 2015). Households and communities would not continue to suffer and therefore need to be helped to adjust, cope and withstand these situations. Building capacity mechanism toward solving conflict becomes imperative.

### 2.6. Theoretical Review

Looking at the several theory of conflict, The construct of this present study will based on structural theory, Eco-violent theory and Resource -Access Theory. The adoption of Structural structural theory is based on the stresses on the immediate and underlying factors that could cause conflict, and presents a number of factors that are responsible for the emergence and escalation of conflict. Eco-violent theory assumes that the competition over scarce ecological resources triggers violent conflict. Resouce Acess Theory emphasis that the need for people to legitimise their rights and access to natural resources has remained central in competition and contestation for natural resources. In relation to this my study, the conflicts between farmers and herdsmen in the use of agricultural land have risen in recent time mainly due to increased production activities that are necessitated by increasing human population. The inability of the Fulani herdsmen to have unhindered access to grazing areas or reserves is largely responsible for why they often go into conflict with host communities and farmers in Nigeria. The theory sees access to a resource as the main cause of conflict and violence.

### 2.7. Empirical review

Amao, Adeagbo, Olojede, Ogunleye and Ogundoyin (2018) examined the effects of Fulani herdsmen conflict on productivity of arable crop farmers in Ibarapa areas of Oyo state, Nigeria. Interview schedule was used to extract information on socio-economic characteristics of affected and non-affected arable crop farmers, productivity differentials and effects of Fulani herdsmen conflict on productivity of arable crop farmers from 315 respondents using a multi-stage sampling technique. Data obtained were analyzed using frequency counts, percentages, mean, standard deviation, t-statistics and Tobit regression. Findings revealed that Fulani Herdsmen conflict has a negative significant influence on farmers' productivity. Rashid (2011) assessed Land use conflict between farmers and herdsmen – Implications for Agricultural and Rural Development in Nigeria. The main thrust of this chapter is to analyze conflict actors' coping strategies and the implications for rural development in Nigeria. Specifically, this study investigated the personal and occupational characteristics of conflict actors, effects of conflict on rural household welfare, types of coping strategies used by conflict actors, factors influencing the use the coping strategies and theoretical considerations. The study was conducted in Kwara State, Nigeria. Four-stage cluster random sampling procedure was used to select 360 respondents (300 farmers and 60 herdsmen) for the research. In all, 360 respondents were selected for the quantitative data collection. Relevant data were collected with the aid structured questionnaire. The Test-retest method was used to determine the reliability of the instrument. This was carried out among 20 respondents that would not be included in the research sample. The value of coefficient of correlation "r" was found to be 0.89, which implied that the instrument was reliable. Coping strategies of respondents were measured with 20 items on a 4 point Likert-type scale. Findings revealed that the conflicts had far reaching economic, production and socio-psychological effects on the households of most respondents, and farmers generally tended to use problem-oriented strategies, herdsmen basically used emotion-oriented strategies. The use of emotion-oriented strategies among herdsmen, however, decreased with increasing educational status. Thus, the tendency to be emotionally 'attached to the cattle' diminished with increasing years of education among herdsmen.

Ibrahim *et al.,* (2015) examined the argument of land use conflict as the major cause of farmer-pastoralist conflict in Nigeria. Pastoralism in Nigeria faces challenges and these hampers the productivity that consequentially affect the Nation's economy. Available grazing lands are diminishing at an alarming rate and livestock pathways are blocked through land use, urbanisation and frontiers. The old grazing routes that existed for centuries are almost gone. Only 2.82% of the grazing reserves have been acquired and these are poorly managed. The increase in population, drying of waterholes, shifting in rainfall pattern leading to drought as a result of the changing climate affects both pastoralists and farmers. Hence, they compete over land leading to conflict, and embedded within these are growing form of capitalists land tenure and delay in the justice system that exacerbates the situation. The Nigerian Forestry Management Evaluation and Coordinating Unit (FORMECU) land use and land cover (LULC) dataset and published articles of previous farmer-pastoralist conflicts in the country are used. Results show that between 1976 and 1995, all land uses gain, attesting to the increase in population and competition over dwindling resources. However, overlap maps show intensive crop farming has expanded into grazing lands in many areas over these years. These areas of encroachment agree with most of the conflict points recorded. For a lasting solution, we propose a possible revisit of symbiotic

engagements between farmers and pastoralists. The full engagement of communities, Non-governmental Organisations (NGOs), Alternative Dispute Resolutions (ADRs) and government as overseers are suggested. Eniang *et al.,* (2011) examined assessment of Human-Wildlife Conflicts in Filinga Range of Gashaka Gumti National Park (GGNP) was conducted in two support zone villages of Gashaka and Mayo Yum using a set of Structured Questionnaires complemented with Field survey, Focus Group Discussion and In – depth interview. Two group discussions were conducted in the two villages. Data collected were analyzed using descriptive statistics in form of percentages, frequencies of counts and charts. Crop raiding and animal depredation at different levels were sources of conflict in GGNP. Maize was the most affected crop while poultry was the most affected livestock. Cultivation of Cassava has become seriously reduced due to the impact of Baboon.

Ofem and Inyang (2014) examined the negative approach of Nomads to crop farmers in the Yakurr region of Cross River State Nigeria, through the overgrazing of farmlands, contamination of streams and the harassment of female farmers which resulted to rape causing conflict in the study area. The work observes the inevitability of conflict and the inestimable values placed on economic resource which value have directly and indirectly defined the dimensions of most conflicts involving man since immemorial. Of all resources however, land has remained an over whelming source of conflict among user and individuals at varying level of thresholds. In Nigeria, conflict between farmers and Fulani herdsmen over the use of land and agricultural produce has become a threat to peace in most part of the country, particularly in the Guinea and Savanah regions of the country due to the intensity of production activities that are propelled by increasing demand for land for various purposes. The production potential of grassland and livelihood in the arid and semi-arid region is constrained by low and variable rainfall. Therefore, there is a need for grazing cattle to access pasture resources across regions in order to ensure food security for the herds. In view of this, the paper recommends that, nomadic education and the mechanism tagged local development plans be adopted by extension agencies to minimize conflict in rural areas where grazing of cattle is inevitable. Sulaiman and Ja'afar-Furo (2010) examined the economic effects of farmer-grazier conflicts in the fadama areas of Bauchi State in Nigeria. Bauchi State occupies total land area of 492,359 $km^2$ and has human population of 4,696,465. Using multistage random sampling technique a total of 60 fadama farmers were randomly selected from 60 Fadama Users Associations (FUA) and a corresponding 60 pastoralists randomly selected from 60 fadama communities where the selected FUAs resided. Primary data were collected using structured questionnaire administered through individual personal interviews. The data were analysed using the descriptive statistics, t-test and alternative cost technique. Findings revealed that the farmer-grazier conflicts have had negative economic effects on both the families involved and the nation in terms of the huge resources lost. It is therefore, strongly recommended that the government should put appropriate measures towards curbing the occurrence of such conflicts for the benefit of all.

Menale *et al.,* (2008) investigated the empirical evidence of production risk impact on sustainable land- management technology adoption, using two years of cross-sectional plot-level data collected in the Ethiopian highlands. Moment-based approach was used, which allowed a flexible representation of the production risk. Mundlak's approach was used to capture the unobserved heterogeneity along with other regressors in the estimation of fertilizer and conservation adoption. The empirical results revealed that impact of production risk varied by technology type. Production risks (variance and crop failure as measured by second and third central moments, respectively) had significant impact on fertilizer adoption and extent of adoption. However, this impact was not observed in adoption of conservation technology. On the other hand, expected return (as measured by the first central moment) had a positive significant impact on both fertilizer (adoption and intensity) and conservation adoption. Economic instruments that hedge against risk exposure, including downside risk and increase productivity, are important to promote adoption of improved technology and reduce poverty in Ethiopia.

## 3. Methodology

The study was carried out in the Ogbomoso Agricultural Zone of Oyo State, Nigeria. Ogbomoso Agricultural Zone is divided into five local government areas (LGAs), namely Ogbomoso North LGA, Ogbomoso South LGA, Ogo-Oluwa LGA, Oriire LGA, and Surulere LGA. Farming is the major occupation of the people in the area. Most of the people there are Yoruba-speaking people. However, over the years, these areas have witnessed consistent conflicts between herders and farmers, resulting in the loss of lives and properties worth millions of naira. According to Hammed et al. (2019), the crime victimization against farmers and their properties on farms has been identified as being on the high side, with over 70% of all respondents in the sample survey responding that they had experienced one or more forms of crime victimization. The population of the study included all the arable crop farmers in the Ogbomoso Agricultural Zone, Oyo State, Nigeria. A multistage sampling technique was adopted to select the respondents for this study. The first stage involved the selection of Surulere, Oriire, and Ogo-Oluwa Local Government Areas out of the five (5) Local Government Areas that constitute the zone. The next stage involved the election of forty (40%) of the total number of cells in each of the selected local government areas (blocks). That is, five (5) cells were selected each from Surulere and Oriire, each

with eleven (11) cells, while four (4) cells were selected from Ogo-Oluwa with ten (10) cells. A total of fourteen cells were considered for this study. Thereafter, one village was randomly selected from each of the selected cells, and this resulted in a total of fourteen villages for the study. The final stage involved proportionate sampling from the list of the registered crop farmers from the selected villages to make a total of two hundred and seventy (270) arable crop farmers as presented in table1. Data collected was analysed using descriptive statistics like tables, percentages, and inferential statistics such as ordinary least square regression to analyse the effect of resilience strategy on shocks of conflict anticipation cost and arable crop productivity. All analyses were tested at a 5% level of significance.

**Table 1 T**he number of respondents selected for the study

| Selected LGAs (blocks) | Number of cells | Selected cells | Selection of villages | Numbers of registered crop farmers | Selected number (29.4%) |
|---|---|---|---|---|---|
| Surulere | 11 | 5 | Ajinapa | 86 | 25 |
| | | | Oloke | 57 | 16 |
| | | | Aje | 74 | 22 |
| | | | Olode | 80 | 24 |
| | | | Ayekale | 121 | 36 |
| Subtotal | 11 | 5 | 5 | 418 | 123 |
| | | | Abogunde | 140 | 41 |
| | | | Alayin | 41 | 12 |
| | | | Alagbon | 82 | 24 |
| | | | Atere | 21 | 6 |
| Oriire | 11 | 5 | Samon | 29 | 9 |
| Subtotal | 11 | 5 | 5 | 313 | 92 |
| | | | Kajola | 35 | 10 |
| | | | Pontela | 44 | 13 |
| | | | Alagbon | 47 | 14 |
| Ogo-Oluwa | 10 | 4 | Idi Oro | 62 | 18 |
| Subtotal | 10 | 4 | 4 | 188 | 55 |
| 3 | 32 | 14 | 14 | 919 | 270 |

## 4. Results and discussion

### 4.1. Descriptive Analysis of Causes of conflicts between farmers and herdsmen in the study area

Analyis presented in Table2 reveal the distribution of respondents on causes of conflicts between farmers and herdsmen. Based on the finding, 85.2% of the respondents claimed that burning of rangelands and fadama settlement was the major cause of conflict in the study area. About 84.1% of the respondents identified decline in internal discipline and social cohesion as the cause of conflict. Moreover, 81.1% of the respondents implicated diminishing land resources as the cause of conflict in their areas while 80.9% of the respondents indicated water scarcity as the cause of conflict between herdsmen and farmers. In the same vein, 75.2% of the respondents reiterated that inequitable access to land had been the cause of conflict while only few (9.6%) of the respondent's adduced antagonistic perceptions and beliefs among farmers and herdsmen, policy contradictions, and non-recognition of rights of indigenes as the cause of conflict in the study area. The findings therefore indicate that majority of the farmers identified several causes of conflicts but burning of rangelands and fadama settlement was the major causes of conflicts between farmers and herdsmen in the study area .This issue of burning of rangelands and fadama settlement almost common during dry season when the

herdsmen set their grazing land on fire in order for the grasses to bring new shoot in the cause of doing this the fire will enter into the land cultivated by farmers thereby causes conflicts between farmers and herdsmen. Also diminishing land resources causes between farmers and herdsmen. Frequent passing or walking of cattles on the land will reduce growth of grasses and weeds thereby leading to diminishing of the resources on the land. Decline in internal discipline and social cohesion, diminishing land resources and water scarcity were the major causes of conflicts between farmers and herdsmen. Water had always been the major resource for day to day activities especially for the survival of human and livestock. Similarly, other researchers (Odoh and Chigozie, 2012; Abbass, 2012) relate the causes of conflict to the global climate change and the contending desertification and aridity that has reduced arable and grazing lands, forcing pastoralist to move southwards in search of pasture for their livestock.

**Table 2** Distribution of respondents according to causes of conflicts between farmers and herdsmen in the study area

| **Causes of conflict** | **Frequency*** | **Percentage** |
|---|---|---|
| Water scarcity | 217 | 80.9 |
| Inequitable access to land | 203 | 75.2 |
| Diminishing land resources | 219 | 81.1 |
| Burning of rangelands and Fadama settlement | 230 | 85.2 |
| Decline in internal discipline and social cohesion | 227 | 84.1 |
| Antagonistic perceptions and beliefs among farmers and herdsmen, policy contradictions, and non-recognition of rights of indigenes | 26 | 9.6 |

Source: Field Survey, 2021

### 4.2. Descriptive Analysis of Preventive Strategies used against invasion of herders

**Table 3** Distribution of respondents by preventive strategies against invasion of herders

| **Preventive strategies** | **Very often** | **Often** | **Rarely** | **Not at all** | **WMS** | **Rank** |
|---|---|---|---|---|---|---|
| Keeping farm area clean always | 203(75.2) | 38(14.1) | 29(10.7) | 0(0.0) | 2.64 | 1st |
| Fencing farm area | 118(43.7) | 8(31.1) | 58(21.4) | 10(3.7) | 2.15 | 6th |
| Barricade of routes leading to farm area | 109(40.4) | 66(24.4) | 85(31.5) | 10(3.7) | 2.02 | 7th |
| Employment of charms | 36(13.3) | 30(11.1) | 31(11.5) | 173(64.1) | 0.74 | 12th |
| The use of scare scroll | 126(46.7) | 53(19.6) | 56(20.7) | 35 (13.0) | 2.00 | 8th |
| drainage system construction around the farm area | 67(24.8) | 97(35.9) | 73(27.0) | 33(12.2) | 1.73 | 10th |
| Physical combat | 33(12.2) | 58(21.5) | 58(21.5) | 121(44.8) | 1.01 | 11th |
| Personal intervention | 142(52.6) | 86(31.9) | 38(14.07) | 4(1.5) | 2.36 | 4th |
| Intervention of community leaders and traditional leaders with the local government | 167(61.9) | 57(21.1) | 45(16.7) | 1(0.4) | 2.44 | 3rd |
| Changing the routes of herding | 101(37.4) | 49(18.2) | 115(42.6) | 115(42.6) | 1.91 | 9th |
| Police/court | 129(47.8) | 78(28.9) | 51(18.9) | 12(4.4) | 2.20 | 5th |
| Adherence to community rules and regulations | 152(56.3) | 97(35.9) | 19(7.0) | 2(0.7) | 2.48 | 2nd |

Source: Field Survey, 2021; WMS = Weighted Mean Score

Table 3 presents the distribution of respondents by preventive strategies used against invasion of herders. The preventive strategies in the rank order include keeping farm area clean always(WMS = 2.64), adherence to community rules and regulations (WMS = 2.48), intervention of community leaders and traditional leaders with the local

government (WMS = 2.44), personal intervention (WMS = 2.36), police/court (WMS = 2.20), fencing farm area (WMS = 2.15), barricade of routes leading to farm area (WMS = 2.02), the use of scare scroll (WMS = 2.00), changing the routes of herding (WMS = 1.91), construction of drainage system around the farm area (WMS = 1.73), physical combat (WMS = 1.01) and employment of charms (WMS = 0.74). The findings therefore revealed that keeping farm area clean always was the most selected preventive strategies among others, when the cultivated area is well clean and free from weed will prevent herder with their cattle to entering into the cultivated area. Follow by, adherence to community rules and regulations (WMS = 2.48). A community that has well define rule and regulations will prevent the community from many dangers. When a community people were adhere to the rule and regulations of the community will not allow any strangers to enters into the community. Thereby serve as a means of preventing conflicts between farmers and herders. Thereafter, intervention of community leaders and traditional leaders with the local government. A community that had well discipline and respected people can pose sanction on any deviant from the rule that govern the community. By so doing this will prevent conflict between farmer and herder. This finding agreed with that of Olaosebikan (2009) which observed that community leaders/security agents most times asked the herdsmen to pay compensation or in case of excessive damages, the state or local government comes in aid of the crop farmers who are mostly affected in order to resolve the conflict.

### 4.3. Effects of Resilience Strategy Variables on Arable Crop Productivity

**Table 4** Result of OLS regression analysis showing factors influencing arable crop productivity

| **Productivity** | **Coef.** | **Std. Err.** | **T-value** | **P>\|t\|** |
|---|---|---|---|---|
| Age | 0.034254 | 0.0340971 | 1.00 | 0.316 |
| Married | -0.4873 | 0.4138003 | -1.18 | 0.240 |
| Years spent in school | 0.1296 | 0.0777387 | 1.67* | 0.097 |
| Years of Experience | 0.0336 | 0.0401204 | 0.84 | 0.403 |
| Size of farm | 0.1167 | 0.0422509 | 2.76*** | 0.006 |
| Agrochemicals | 2.6132 | 0.000025 | 0.01 | 0.992 |
| Hired labour after conflict | -0.000014 | 2.81e-06 | -5.10*** | 0.000 |
| Transformative index | 1.706189 | 0.44316 | 3.85*** | 0.000 |
| Absorptive index | 1.37331 | 0.5131751 | 2.68*** | 0.008 |
| Adaptive index | 1.505708 | 0.5641292 | 2.67*** | 0.008 |
| _cons | 4.898979 | 2.184147 | 2.24 | 0.026 |

***Significant at 1% level; **Significant at 5% level; *Significant at 10% level; Prob > F = 0.0000; Adj. R-squared = 0.5671; Root MSE = 3.9205;
Source: Author's Computation, 2020.

The result of the OLS regression analysis model in the Table 4 showed that the adjusted $R^2$ (coefficient of variation) of 0.5671 implied that about 57% of variation in arable crop productivity were explained by explanatory variable that is independent variables contained in the model. From the result the explanatory variables were statistically significant and they include years spent in school (t = 1.67*), size of farm (t = 2.76***), hired labour after conflict (t = -5.10***), transformative index (t = 3.85***), absorptive index (t = 2.68***) and adaptive index (t = 2.67***). The coefficient of years spent in school, size of farm, transformative index, absorptive index and adaptive index are positively related to arable crop productivity. However, hired labour after conflict was significant and inversely related to arable crop productivity.

The implication of this result was that an increase in the years spent in school will increase arable crops productivity. Also, an increase in the size of the farm will increase the productivity, Also, The transformative index is the most selected among resilience technique. The commitment of farmer to new innovation and supporting practices go a long way and have great impact on production because the farmer has the broad knowledge on what to do in other for them to adjust on the effect cause by conflicts between farmer and herder. The positive coefficient of transformative index of resilience, it means increased productivity when there is an increase in the transformative measures to resilience. Follow by, adaptive measure to resilience the positive coefficient of adaptive index implied that as the farmer seeking assistance from government, diversified their income to other things that can bring increment to production and flexibility in their decision making all these make farmers to learn from shocks and their positive plan to overcome the effect of conflicts

bring increment to production. Thereafter, absorptive index to resilience, the adjustment of farmer to production of high value added crops like cocoa, cashew etc. rather than arable crops and skill training and other acquisition opportunities increased productivity of farmer. There was a positive significant relationship between size of farm and arable crop productivity. This implies that as the size of farm increases there will be increases in arable crop productivity by 11.67% at 1 percent level of significance. This implies the higher the farm size the higher the productivity of the farmers in the study area. This is similar to the study carried out by Adisa, (2012) in Land Use Conflict Between Farmers and Herdsmen – Implications for Agricultural and Rural Development in Nigeria, that increasing farm size requires more commitment from the farmer and he thus becomes more attached to the farm materially, physically and emotionally.

## 5. Conclusion

Based on findings, the study concluded that adhere to the rule and regulations of the community serve as a means of preventing conflicts between farmers and herders through frequently employed resilience by the respondents such as seeking assistance from government (adaptive capacity), skills/training acquisition opportunities (absorptive capacity) and access to market for business transaction (transformative capacity). Keeping farm area clean always was the major preventive strategy employed against invasion of herders. Also resilience strategies applied significantly influenced arable crops productivity after farmers-herdsmen conflicts in Ogbomoso Agricultural Zone of Oyo State because increasing farm size requires more commitment from the farmer and thus becomes more attached to the farm materially, physically and emotionally.

### *Recommendation*

The study recommend that the resilience strategies employed by the respondents should be investigated and adopted by appropriate authorities in order to mitigate the regular conflicts between farmers and herders in Nigeria.

## Compliance with ethical standards

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No conflict of Interest.

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