
INTERNATIONAL JOURNAL OF SCIENCE ARTS AND COMMERCE

Perceptions of Smallholder Farmers on Land use Conflicts in Rufiji District, Tanzania

By
Peter Samwel Semiono¹ and Elliott P. Niboye²

Abstract

This paper is based on a study conducted in Rufiji district in Tanzania, where farmer-herder conflicts have been reported. The purpose of the study was to examine smallholder farmers' perceptions of the drivers of farmer-herder conflicts in view of adding empirical data to the existing political ecology and environmental/resource scarcity paradigms that explain the sources of such conflicts. The key respondents were smallholder farmers, agriculture extension workers, and ward executive officers in the Rufiji district. Primary data were collected using focus group discussions (FGDs), questionnaires, key informant interviews and non-participant observation. It was revealed that most farmers attributed farmer-herder conflicts to poor coordination in resettling in-migrants, corrupt tendencies among the local government officials, insecure land tenure, inadequacy of capacity of the local institutions, and sheer irresponsibility of the herders. The paper recommends that farmer-herder conflict resolution should not only be informed by resource scarcity paradigm but also by other socio-economic and political processes that perpetuate those conflicts.

Key words: Farmer-herder conflicts, smallholder farmers, local perceptions, political ecology, resource scarcity

1.0. Introduction

A conflict is perceived as a process that begins when one party perceives that another party has negatively affected something that the first party cares about (Robbins, 1994). For others, a conflict is construed as a social interaction in which a minimum of two parties strive at the same moment to acquire the same resources (Wallenstein, 1988; Mason and Mullaer, 2007). For

¹ Assistant Lecturer, Dar es Salaam University College of Education and Phd Candidate, University of Dar es Salaam, Dar es Salaam, Tanzania. Email: petersamwel@duce.ac.tz. or petersamwel45@yahoo.com

² Associate Professor, Institute of Development Studies, University of Dar es Salaam, Dar es Salaam, Tanzania. Email: epniboye@udsm.ac.tz.

natural resources which are often limited and scarce and peoples' need exceeds availability, their use leads to blocking behaviour when one party try to get more of the limited resources than the other (Idrissou et al., 2011). When one party is perceived to block the access to the resources of another, a conflict most likely ensues. Thus resource use conflicts occur when different categories of resource users have competing demands for shrinking resources and if they attach different values to the resource base (Kumar, 1998; Rurai, 2012). In scenarios that involve an array of culture, economic and political arrangements that may influence outcomes of the conflict process, resource use conflicts are rampant. It is for this reason that we witness resource use conflicts over land, water, wildlife and forestry (Ortiz, 1999; Hares, 2009; Idrissou et al., 2011).

In Sub Saharan Africa, the most frequently cited resource use conflicts involve farmers and herders competing for patchy multiple-use of land resources. Although in many instances the two groups are portrayed as protagonists, they are however both victims as resource use conflicts tend to vary in dimension and intensity and may take place at different levels, such as from within the household to local, regional and societal scale (Anyling and Kelly, 1997; Oviedo, 1999). This paper attempts to examine smallholder farmers' perceptions on drivers of farmer-herder conflicts. Understanding of such drivers of conflicts would positively contribute towards conflict resolutions and in the designing and implementation of sound agricultural and rural development interventions.

2.0. A Synopsis of Famer-Herder Conflicts in Africa

Farmer-herder conflicts have existed throughout the modern history of sedentary farming (Daramola, 2006; Tonah, 2006). However, since the beginning of the twentieth century the magnitude and impacts of the conflicts have been increasing (Blench and Dendo, 2003). The recurrence of farmer-herder conflicts in many parts of sub-Saharan Africa has been reported in various regions of sub-Saharan Africa including West Africa, Southern Africa, the Horn of Africa and East Africa just to mention a few (Shettima et al., 2008; Areas, 2003; Benjaminsen et al., 2009). Furthermore, farmer-herder conflicts in West Africa including conflicts between farmers and Fulani pastoralists in Ghana, Mali, Nigeria and Niger (Blench & Dendo, 2003; Turner, 2003) have been cited. According to Integrated Regional Information Network (IRIN), (2009) at least 3 people were killed and a number of pastoralists' settlements burned during farmer-herder conflicts in Plateau state of Nigeria in 2009. In the same year, another farmer-herder conflict led to the death of 32 people in Nigeria's Nasarawa State. Similarly, in the horn of Africa conflicts between farmers and herdsman have been reported in Ethiopia, Somalia and South Sudan. Farmer-herder conflicts in Ethiopia takes various forms including inter-group conflicts involving different ethnic groups and interstate conflicts involving different states (Wood, 2010).

In Tanzania farmer-herder conflicts have been prevalent since pre-colonial period. More recently, the clashes between farmers and herdsman have often posed a serious threat to livelihood security particularly in rural areas. Widespread conflicts between peasants and herdsman across different districts, such as Kilosa, Mvomero, Rufiji, Kiteto, Mbarali and Kilombero cannot be overemphasized but the conflict in Kilosa district in December 2000 deserves a special mention because an estimation of 38 people that included women and children died (Brehony et al., 2003). In another clash between farmers and herdsman that occurred in January, 2014 in Kiteto district, the death toll reached 10 people and 60 houses were burnt down. This clash was ignited by a dispute over community based natural resource management area set aside by seven villages in the district (Askew et al., 2016).

Although there is no clear consensus on who among the protagonists experiences greater losses, it is generally accepted that farmer-herder conflicts are now a serious national challenge that have had adverse impacts among the respective rural households (Mwamfupe, 2015; Saruni, et al., 2018). The impacts range from economic effects (such as declines in incomes, destruction of properties, yield losses) to social effects (such as death of family members and family disintegration). Also, it is obvious that the conflicts may perpetuate poverty which is already high in rural areas of Tanzania. The recurrence of these conflicts suggests that not much has been achieved with regard to identifying the root causes so as to establish the most effective ways of curbing the conflicts.

One among the commonly used strategy in curbing the farmers-herders conflicts is splitting of villages land into special areas for farmers and for pastoralists. Kambala village in Mvomero district offers a typical example for this strategy. In Kambala village the government of Tanzania split the village land into two parts, one for each of the major land use; crop cultivation and livestock rearing. Similar approach was employed in other districts such as Rufiji, Mbarali, Kilosa and Kilwa where different land users exist. Despite these efforts by the government, farmer-herder conflicts persist in many parts of the country and seem to spread to other parts of the country which had no history of farmer herder conflicts (Mwamfupe, 2015). This observation raises questions as to why such conflicts are recurring and sustaining. One among the possible explanations could be that the root causes of the conflicts have not yet been clearly identified and addressed or there are new drivers of such conflicts that keep cropping up. This is the entry point of this paper.

While there is a considerable literature on the drivers of farmer-herder conflicts, it is not known as to what exactly causes the recurrence of this situation. While scholars in the field of environmental security uphold the Malthusian perspective that the farmer-herder conflicts are driven by environmental scarcity (Bachler 1999; Bukari, 2017; Homer-Dixon 1999), political ecologists on the other hand do not subscribe to this notion. The argument shared by environmental scarcity perspective is that farmer-herder conflicts are rooted in declining

resource base as a result of population growth and climate change (Adano, Dietz, & Witsenburg, 2009; Brown & Crawford, 2008; Schilling, et al., 2012). Political ecologists reject this view and argue that the environment is an arena in which opposing interests manifest rather than being a cause of conflicts (Peluso & Watts, 2001).

Many studies on farmer-herder conflicts in Tanzania have been highly influenced by these two positions although the environmental scarcity perspective seems to lead dominant discourses on the topic. For instance, a number of studies have argued that competition over land and water resources has been the major reason for recurrence of farmer-herder conflicts (Odgaard & Maganga, 2007; Charles, 2008; Benjaminsen et al., 2009, Saruni, 2011; Makoye, 2014). While these arguments can to some extent explain farmer-pastoralist conflicts in some scenarios, the arguments cannot however adequately explain the dynamics of conflicts that occurs everywhere. One of the failures of the said perspective can be found in districts such as Kilwa and Rufiji where farmer-herder conflicts have occurred despite the districts having low population densities (National Bureau of Statistics [NBS] (2014) hence less pressure on land resource. Therefore, the assumption that scarcity of land leads to farmer-herder conflicts cannot be rationally explained. Political ecologists have argued that although it is logical to assume that increase in pressure on limited resources is a driving force for farmer-herder conflicts, this notion does not adequately explain these conflicts (Peluso and Watts, 2001; Turner, 2004). According to political ecologists, farmer-herder conflicts are caused by socio-political and structural factors that go beyond resource scarcity (Bukari, 2017; Hagberg, 2000; Moritz, 2010).

Other authors maintain that it is a combination of multiple ecological and political factors that drives occurrence of conflicts (Turner, 2004), for example, Basset (1988) observed that farmer-herder conflicts in Ivory Coast were not just about resource scarcity but also due to ineffective political policies by the government. Thus, farmer-herder conflicts should be viewed through the prism of broader framework of socio-economic and ecological environments (Turner, 2004). What emanates from the above discussion is the need for further empirical data on what drives farmer-herder conflicts. This paper is based on a study that sought to examine farmers' perceptions of farmer herder conflicts in Tanzania by specifically determining the underlying drivers of the farmer-herder conflicts.

3.0. Methodology

The study was carried out in Rufiji district where frequent farmer-herder conflicts recur hence the area is suitable for establishing the drivers of conflicts between farmers and herdsmen. Rufiji district was thought to be an ideal study area because historically the district had no pastoralists and thus farmer-herder conflict was non-existent before 2005. It was only after the government reallocated pastoralists who were evicted from the catchment areas of Mbarali district located in the Southern highlands of Tanzania that the farmer-herder conflict started. As such, Rufiji

district is suitable for understanding of new drivers of farmer-herder conflicts and the effectiveness of pastoral resettlement programmes in combating farmer-herder conflicts.

For purposes of data collection, the smallholder farmer households were used as sampling units and heads of households were drawn in the sample. A sample of 170 smallholder farmers was selected using purposive and snowball sampling. Both primary and secondary data were collected. Primary data were collected using questionnaires, in-depth interviews, Focus Group Discussions and non-participant observation. Secondary data were collected through documentary review. Descriptive statistics were used to analyse quantitative data that included nominal (e.g. gender), ordinal (e.g. level of education), interval (e.g. age groups) and ratio scale data (e.g. prices of inputs). For each type of data appropriate descriptive statistics were used. For example, ordinal and nominal data are not suitable for calculation of means or standard deviation thus the number of cases (frequencies) and percentages of cases that fall into each category were the appropriate statistics used. Content analysis was used to analyse qualitative data so as to establish associations, provide explanations and make conclusions.

4.0. Findings and Discussion

As pointed out in the previous section, the debate on the drivers of farmer-herder conflicts is dominated with two perspectives namely environmental scarcity perspective and political ecology perspective. As such, the findings are organised into two substantive parts reflecting the objectives of the paper. The first part presents findings on smallholder farmers' perceptions on the influence of environmental change/resource scarcity in farmer-herder conflicts while the second part presents data on the influence of socio-economic and political factors in farmer-herder conflicts. An assessment of how environmental change and resource scarcity drives farmer-herder conflicts in the study area is presented. Data on smallholder farmers' perceptions of resource scarcity and its impact on farmer-herdsmen relations are presented in order to provide the impetus for a discussion of how environmental changes are connected to said conflict.

4.1. Smallholder Farmers' Perceptions of Environmental Change and Resource Scarcity

Studies on rural livelihoods have increasingly recognized the importance of local knowledge including that of smallholder farmers. A need for new approaches and perspectives to understand the complex rural life because farmers have a good knowledge of their local environment and the changes that occur in it is found wanting (Legesse and Drake, 2005). Local knowledge has enabled smallholder farmers to deal with their natural environment and changes in weather and climatic conditions such as changes in rainfall and temperature patterns. Most of smallholder farmers' adaptation strategies to environmental changes are based on the accumulated knowledge and experience of their natural environment (Mertz, et al., 2009; Speranza, et al., 2010). Table 1 below presents smallholder farmers' perceptions of environmental change. The aspects that were cited by larger proportion of respondents include poor or stunted rain (96.5%),

late onset of rain season (94.1%), land degradation (93.5%), long dry spells (65.3%), shorter length of rain season (65.3%) and unpredictability of rain season (64.7%). It was also interesting to note that half of the respondents pointed out temperature and population increase to be some of the changes that the study area experiences.

Table: 1. Smallholder Farmers' Perceptions of Environmental Change

Environmental change	Frequency	Percent (%)
Poor/stunted rain	164	96.5
Late onset of rain season	160	94.1
Early session of rain season	10	5.9
Long dry spells	111	65.3
The weather is hotter than previously	85	50
Land has been degraded	159	93.5
Population is increasing rapidly	85	50
Rain season is shorter	111	65.3
Rain season is unpredictable	110	64.7

Source: Field Survey (2018)

From the findings, it can be observed that rainfall variability which includes components like onset (beginning) of the rainy season, cessation (end) of the rainy season and duration of the rain season was perceived to be the major environmental change reported by the farmers. During focus group discussions there were a number of common responses such as “rainfall is highly unpredictable”, “the rainy season is shorter” and “rain comes later or not at all” that indicated rainfall was variable. A large proportion of respondents reported that rainfall patterns have become unpredictable in the area than it was in the recent past. Data from interviews and FGDs showed that the onset of rainy season locally named *masika*³ starts between January and April while the cessation of rainy season occurs between April and June.

As regard to the duration of rain season, the farmers in the study villages observed that before the year 2000, the rains lasted longer than twelve weeks and with more precipitation at every rain event. But of late, the rains last less than four weeks and are of low intensity. Overall, 72.1% of the farmers observed that the amount of annual rainfall has decreased while 15.2% of the farmers observed that the amount of rainfall has increased. Only 12.7% of the respondents reported that they have not noticed any changes in the amount of annual rainfall. These findings corroborates with the findings of West, et al., (2008); Roncoli, et al (2011) and Yaro (2013), who found that rainfall variability was a major concern to farmers in West Africa.

³ A Swahili word for a long (main) rainy season

The second most important change pointed out by smallholder farmers was land degradation. Most of the respondents attributed land degradation to in-migration of herders into the villages. Farmers' narratives indicated that the formally productive plains were being degraded due to large herds of cattle that had settled in their area. This is true due to the fact that livestock grazing increases soil compaction and exposure to erosion especially by wind and running water. Compaction reduces air and water infiltration into the soil and restricts plant root growth both physically and biologically (Tisdale, et al., 1985). Despite of the differences in the perception and understanding of land degradation, it was evident that in all villages, farmers' were well aware of the causes and impacts of land degradation. Land degradation has also been a major impediment to agricultural productivity in the dry lands of central Tanzania (Kangalawe, 2012). Low crop productivity was attributed to various aspects of soil degradation like declining soil fertility, unreliable rainfall, and to a lesser extent, soil erosion. Other earlier studies by Dejene et al., (1997) in Kondo district observed that land degradation adversely affected agricultural production. There is need for policies that discourage environmentally damaging land use practices, such as uncontrolled extensification in communally-held land and pastoral areas.

In all study villages, a large proportion of farmers were aware of declining soil productivity associated with soil degradation, despite of the differences in awareness of soil degradation among the study villages. Overall results indicated that 72.7% of the respondents perceived soil degradation was increasing, 11.1% perceived soil degradation was decreasing while about 10.7% of the respondents reported that there were no changes in terms of the quality of the soil. Also 5.5% of the farmers were ambivalent such that to them, land degradation was caused by other than the named categories. These included smallholder farmers who were not aware of whether soil degradation is increasing or decreasing.

4.2. Smallholder Farmers' Perceptions of Socio-economic and Political Drivers of Farmer-herder conflicts

Political ecology does not simply associate environmental changes with farmer-herder conflicts but goes deeper into understanding the relationship between socio-economic and political factors with environmental issues and dynamics (Peet and Watts, 1969). Thus in political ecology the conflicts between farmers and herders are attributed to socio-economic and political process. Table 2 shows that smallholder farmers pointed out five major socio-economic and political drivers of farmer-herder conflicts. It was not surprising that herders' in-migration was perceived to be a major driver of farmer-herder conflicts by the majority of the respondents. This observation reflects the fact that herders started to migrate into the study area in 2006 when the government of Tanzania started to evict the herders from Ihefu catchment area in Usangu basin. The decision to evict the herders aimed at protecting the catchment area where the conflicts have been over the need to gain access to water and fertile land (Walsh, 2007; Ngailo, 2011; Mwamfupe 2015).

Table 2: Smallholder farmers' perceptions of socio-economic and political drivers of farmer-herder conflicts

Driver of farmer-herder conflicts	Frequency	Percent (%)
Policy weaknesses	21	12.4
Corruption	123	72.4
Irresponsibility of the herders	89	52.4
Herders immigration	162	95.3
Inefficiency of local leaders	143	84.1
Poor implementation of village land use plans	107	62.9

Source: Field survey, (2018)

Most of the evicted herders were resettled in Kilwa and Rufiji district. Relocation of the herders to Rufiji opened a new chapter of farmer-herder conflicts that did not exist before. It is indicated that the conflicts between farmers and herders began just within the first five years after resettlement of the herders in Rufiji district. A typical example of such clashes occurred in 2012 where one farmer died as a result of farmer-herder violence.

Inefficiency of local government leaders and rampant corruption among the decision making officials at the local level were also found to be most important drivers of farmer-herder conflicts. Local leaders particularly ward executive officers and councillors are blamed for their failure to design effective strategies or ineffective implementation of the existing strategies in order to address the conflicts between farmers and herders. On the question of corruption, smallholder farmers explained that local leaders receive bribes from the herders to have their court cases settled in their favour and allowing the herders to access pastures that are located in farmers' villages. This problem was also reported in Kilosa district in Tanzania where corruption perpetuated farmer-herder clashes that led into the deaths of people and destruction of properties (Benjaminsen et al., 2009). Similarly, the above observation is echoed by Mwamfupe (2015) who noted that corruption and 'politics of belly' are among the major drivers of farmer-herder conflicts in Kilombero, Kiteto, Rufiji and Kilosa districts in Tanzania. This situation has undermined people's trust in local leaders and the willingness of these leaders to prevent conflicts.

Poor implementation of village land use plans was another important driver of farmer-herder conflicts. It was evident during the study that the failure to have proper implementation of village land use plans is partly related to corruption and inefficiency of local leaders. For example, there is a tendency of failing to take timely action when village use plans are violated. In one of the focus group discussions, smallholder farmers explained that on several occasion pastoralists move their herds into farmers' villages contrary to land use plans and in most cases local authorities do not take timely decision to evict the herders until when the situation run out of control. Thus the drivers of farmer-herder conflicts are seem to be interlinked as suggested by

Askew et al., (2016) who assert that farmer-herder conflicts result from a combined effect of various factors which are interlinked to one another.

Herders' irresponsibility was cited as one among the important drivers of farmer-herder conflicts. It was revealed that most of the herders are indifferent to the welfare of smallholder farmers and don't care about the farmers crops. It was reported that it is not uncommon for herders to damage crops in the farms intentionally. This was found to be true through physical observation. During one of the farm visits by the researcher, a herd of cattle suddenly appeared without the herder. This was exactly what the farmers claimed happens almost on a daily basis. Furthermore, narratives from the study area showed that occasionally, the herders graze livestock in the farms and deliberately cause crop damage. This tendency of turning food crops into fodder has in most cases been the immediate cause of tensions and violence between farmers and herdsmen. In response, some smallholder farmers decide to keep watch over their farms so as to prevent their crop from being forage for the livestock. Nevertheless, these vigils have led to farmer-herder clashes especially if the herders trespass into the guarded farms. This is what happened on 6th November, 2016 at Kilimani Ward in Rufiji when a 22 years old farmer was killed when protecting his farm from herder incursion.

Policy weakness was another driver of farmer-herder conflicts mentioned by the respondents. Although as shown in table 2 above, a relatively small proportion of respondents mentioned policy weakness as a driver of farmer-herder conflicts, further probing indicated that most of those who mentioned policy weakness were smallholder farmers with post-secondary education who were very few. So although this could be a major driver of conflict, it was cited by few people in the study area because many smallholder farmers in Tanzania are not aware of the national policies that guide agricultural production or rural development *per se*. Generally, this observation is not unique to the study area as several other studies have identified policy gaps to be one among the major drivers of farmer-herder conflicts (Lugoe, 2011). For example, it has been noted that there is a contradiction between the National Land Policy (of 1995) and the Livestock Policy (of 2006) especially when the Livestock Policy recognizes transhumance as an important feature of pastoralism and encourages herdsmen in overgrazed areas to move to lower stocked areas, the National Land Policy on the other hand, discourages nomadic pastoralism and considers it as uneconomical.

4.3. Smallholder Farmers' Perceptions on the Link between Environmental Change and Farmer-Herder Conflicts

Theoretically, a decline of resources base for both pastoralism and crop cultivation is perceived as a primary cause of the farmer-herder conflicts. The common argument is that farmer-herder conflicts occur because the land resource is fixed while both human and livestock populations are increasing. In support of this argument, scholars have suggested that climatic changes have worsened the situation by causing droughts and hot conditions, leading to land degradation,

water scarcity and shortage of pastures for pastoralists (Scheffran, 2011; Intergovernmental Panel on Climate Change (IPCC), 2014). This situation creates a favourable situation for conflicts over scarce land resource to occur (Benjaminsen et al., 2009). A similar perspective is shared by Rurai (2012) and Idrissou, *et al.* (2013) who documented that farmer-header conflicts occur when different categories of resource users compete for scarce resources. Nevertheless, this environment-conflict nexus has been strongly criticized by political ecologists who claim that there is no enough empirical data to establish a direct link between environmental scarcity and farmer-herder conflicts.

This study found that many respondents affirmed that there is a connection between environmental change and farmer-herder conflicts although they categorically stated that environmental scarcity alone could not intensify farmer-conflicts in their area. The smallholder farmers opined that socio-economic and political factors have intensified farmer-herder conflicts in Rufiji district.

In smallholder farmers' opinion population growth was the most important cause of resource scarcity that prompted farmer-herder conflicts through shrinking land resource. As the population increase more land is cleared for cultivation thus pastoralists lose their traditional grazing land and migrate in search of pastures. This is congruent to Ayih (2003) who found that pastoralists were moving from Northern and Southern Nigeria into the Middle Belt region where population was relatively low and where there was vast land for pasture.

In order to ascertain the authenticity of smallholder farmers' opinions, assessment of land availability over two periods, prior the year 2000 and from year 2000 to date was done. This was based on the fact that many changes have taken place since the year 2000 when herders were displaced by the government from their traditional grazing lands. Furthermore, in some study villages like Mohoro and Chumbi, the first in-migration of herders was experienced less than fifteen years ago. Experiences from study area indicated that prior to the year 2000; arable land was fairly easily available. Currently, land is scarce than ever before, the main cause being increasing in population and in-migration of herders. Consequently, this has created land shortage in most of the villages. It was established that land sizes have significantly decreased over the last two decades in the district as most households own on average 3 acres of land compared to more than 5 acres during the 1990s. Population-induced land scarcity has led to continuous cultivation of the same piece of land resulting in declining fertility, and hence, yields. The current population projections in Tanzania suggest that continuous cropping is likely to increase in the future due to rapid population growth estimated at 2.7% per annum (NBS, 2014).

The findings of household interviews corroborate the results above, and further indicate that households that still practice fallowing have reduced fallow periods significantly partly due to land scarcity and pastoralists who are constantly looking for pasture land. Field observation

indicated that there were both large and small herds of cattle scattered across the terrain in every village understudy. Farmers claimed that the bush land was traditionally a land left to fallow for later agricultural purposes but with the arrival of the herders, the land is no longer available for farmers. Any attempt by the farmers to clear the bush land left to fallow is normally met with stiff competition from the herdsmen.

Smallholder farmers perceived climate change as another important cause for the decline of land resources. Farmers were aware of the degradation of pasture land to be associated with climatic changes a situation that forces the herders to move closer to crop cultivators. Originally, according to the respondents, the herders settled far from the farmers. The spatial distance between the two parties brought little social interaction between them but as time went on, the two parties came to share common amenities such as market, health facilities, mosques and churches. The increase in the number of cattle coupled with the increase in herder population resulted in competition for land and water. This is common in many places with similar situations in Tanzania (Mwakaje, 2009; Lynn 2010) and in other regions of Sub-Saharan Africa (Oppong, 2002; Tonnah, 2002; Brown, 2008). For instance, in Ghana, Tonnah (2002) maintain that the encroachment of Fulani cattle herders to crop cultivation regions is a result of climatic changes in the Sahelian region. The old patterns of transhumance practiced by the Fulani have had to change due to drying of pastures in their areas that was caused by climatic changes.

Tensions related to water use exist between herders and farmers in Rufiji district and this is supported by the local authorities in the district. Intriguingly, the local authorities believe that farmer-herder tensions are unavoidable because water resources are shared by farmers and herders. It was noted however that the magnitude of the conflict over water use is small because farmers mostly depend on seasonal rains for their crops. Nevertheless, the disputes about the use of the plains of Rufiji River and its tributaries that traverse the villages were very common. The plains were used for *kifuku* (dry season) cultivation of vegetables and during rainy season, paddy cultivation however, the herdsmen normally let their herds to loiter along the entire plain in search of water and pasture. This was also the case in Ghana's Volta Basin (Tonnah, 2006). The situation in Rufiji is not an isolated case, as the relationship between herders and farmers has, for centuries, been shaped by both cooperation and violence (Odgaard, 2006; Shettima and Tar, 2008) but problems like rapid population growth have increasingly challenged traditional resource sharing mechanisms and intensified competition for the scarce land resources (Fratkin & Roth, 2005; Herrero, 2006; ILRI, 2006; Mwamfupe, 2015).

The findings of the study indicated that land degradation was another important factor contributing to resource scarcity. A large proportion of smallholder farmers were aware of declining soil productivity associated with soil degradation. About 72.7% of the respondents thought that soil degradation was on the increase, while 11.1% perceived soil degradation was decreasing. Few (10.7%) were ambivalent as they saw no changes in terms of the quality of the

soil. Although there is not enough empirical data to substantiate the increase of land degradation in the study area, the reports from the farmers cannot be ignored. Nor should we ignore the testimonies of the farmers who admitted that soil productivity has been declining over years as a result of decline in soil fertility. During FGDs smallholder farmers clearly explained that land degradation tends to exacerbate farmer-herder clashes that occur when farmers decide to clear new land for cultivation. The clashes normally emerge when the pasture land and pastoral routes are blocked as smallholder farmers clear new land in response to land degradation.

5.0. Conclusion

The paper sought to present the smallholder farmers' perceptions on the drivers of farmer-herder conflicts in view of accentuating the applicability and the missing links of the resource scarcity and political ecology perspectives in explaining farmer-herder conflicts. It was revealed that smallholder farmers perceived the changing environment as directly affecting resource base and perpetuating farmer-herder conflicts over scarce land resources. Although these findings do not seem to be new with regard to the general theoretical debates about the drivers of farmer-herder conflicts, the findings however reveal some drivers of farmer-herder conflicts from the smallholder perspective that can inform both the environmental change/scarcity and political ecology paradigms and the policy at national and local levels. While perceptions of environmental change by farmers and how they impact on farmer-herder conflicts make sense to their understanding, it is evident that environmental change cannot be ignored in any meaningful analysis of farmer-herder conflicts. Further research is however needed to ascertain the authenticity of these perceptions since the drivers of farmer-herder conflicts are much more complex.

Based on the findings of this research it is recommended that multidimensional approaches informed by both resource scarcity and political ecology perspectives should be used in search for lasting solutions to resource conflicts in Tanzania. Most of the approaches that have already been implemented are skewed towards resource scarcity perspective that ignores some fundamental issues on farmer-herder relations. Some of the key issues to be addressed relate to better land use policy formulation and implementation, addressing corruption especially at local levels, participatory conflict resolution and promotion of cooperation between farmers and herders. In addition, the government should ensure that pastoral settlements are provided with the essential services such as water in order to minimize movement of their herds of livestock from their designated villages to other areas in search for water. Furthermore, appropriate measures should be taken to ensure that carrying capacity of pastoral lands is maintained in order to reduce pressure on available land resources.

Acknowledgements

This article is based on the research conducted in fulfilment of the requirements for the Doctoral degree at the University of Dar Es Salaam, Tanzania. The research was financially supported by

the Dar es Salaam University College of Education (DUCE) and Higher Education Students' Loans Board (HESLB) of Tanzania. The authors acknowledge all institutions and individuals that supported this study.

References

Adano, W. R., Dietz, T., Witsenburg, K., & Zaal, F. (2012). Climate Change, Violent Conflict and Local Institutions in Kenya's Drylands. *Journal of Peace Research*, 49(1), 65–80. <https://doi.org/10.1177/0022343311427344>.

Adisa, R. S. (2012). Land use conflict between farmers and herdsman: Implications for agricultural and rural development in Niger. In R. S. Adisa (Ed.), *Rural development - contemporary issues and practices* (pp. 99–118). Rijeka: In Tech. <https://doi.org/10.5772/1399>.

Anlyling, R and R. Kelly. (1997). Dealing with Conflict: Natural Resources and Dispute Resolution. *Commonwealth Forestry Review* 76(3): 182-185.

Areas, P. (2003). *Biodiversity and Protected Areas. Tanzania Biodiversity and Protected Areas – Tanzania*. Retrieved November 10, 2017, from www.vub.ac.be/klimostoolkit/sites/default/files/documents/tanzania_bd.pdf.

Askew, K., Maganga, F., and Odgaard, R. (2016). “Terms of Use of Land and Legitimacy: A Tale of Two Lawsuits of Land and Legitimacy.” *Cambridge Journal* 83:120-41.

Ayih, S. O. (2003). *Nasarawa State: Past and present*. Abuja: Umbrella Books.

Baechler, G., (1999). *Violence through Environmental Discrimination*. Dordrecht: Kluwer Academic Publishers.

Barnett, J. (2001). *The Meaning of Environmental Security: Ecological Politics and Policy in the New Security Era*. London: Zed.

Barnett, J. (2007). Environmental Security and Peace. *Journal of Human Security*, 3(1), 4–16. <https://doi.org/10.3316/JHS0301004>.

Bassett, T. J. (1988). The political ecology of peasant–herder conflicts in the northern Ivory coast. *Annals of the Association of American Geographers* 78 453–72.

Bassett, T. J. (1993). Land use Conflicts in Pastoral Development in Northern Cote d'Ivoire. In T. J. Bassett & D. Crummey (Eds.), *Land in African agrarian systems* (pp. 131–154). Madison: University of Wisconsin Press.

Bassett, T. J., and Turner, M. D. (2007). Sudden Shift or Migratory Drift? FulBe herd movements to the Sudano-Guinean Region of West Africa. *Human Ecology*, 35(1), 33–49. <https://doi.org/10.1007/s10745-006-9067-4>

Basset, J.B. (2008). The Political Ecology of Peasant-Herder Conflicts in the Northern Ivory Coast. Retrieved from: <http://www.jstor.org/stable/2563750>

Benjaminsen, T. A., Alinon, K., Buhaug, H., and Buseth, J. T. (2012). Does Climate Change drive Land-use Conflicts in the Sahel? *Journal of Peace Research*, 49(1), 97–111. <https://doi.org/10.1177/0022343311427343>

Benjaminsen, T. A., and Ba, B. (2009). Farmer-herder Conflicts, Pastoral Marginalisation and Corruption: A Case study from the inland Niger Delta of Mali. *Geographical Journal*, 175(1), 71–81. <https://doi.org/10.1111/j.1475-4959.2008.00312.x>

Benjaminsen, T. A., Maganga, F. P., and Abdallah, J. M. (2009). The Kilosa Killings: Political Ecology of a Farmer-herder Conflict in Tanzania. *Development and Change*, 40(3), 423–445. <https://doi.org/10.1111/j.1467-7660.2009.01558.x>.

Blench, R. and Dendo M. (2003). The Transformation of Conflict between Pastoralists and Cultivators in Nigeria. Paper in press for a special issue of the Journal Africa, Moritz, M. (ed.), Cambridge, September 13, 2004.

Brehony, E., Morindat, A. O., and Sakafu, A. (2003). *A Study on Conflicts between Pastoralists and Farming Communities, Kilosa District, Morogoro Region, Tanzania*. Report for Kilosa District Council, 16.

Brown, O., and Crawford, A. (2008). *Assessing the Security Implications of Climate Change for West Africa: Country Case Studies of Ghana and Burkina Faso*. Winnipeg: International Institute for Sustainable Development.

Brown, O. and Crawford, A. (2009). Climate Change and Security in Africa. International Institute for Sustainable Development, Kenya. pp 45-48.

Bukari, J. N. (2017). Farmer-Herder Relations in Ghana: Interplay of Environmental Change, Conflict, Cooperation and Social Networks (Doctoral dissertation). Retrieved from www.d-nb.info/1139170694/34.

Daramola, A. (2006). British Housing Act 2004, the Gypsy Nomads and the Rest of the World. Paper presented at the ENHR conference, "Housing in an Expanding Europe: Theory, Policy, Participation and Implementation", Ljubljana, Slovenia, 2- 5 July 2006.

Dejene, A., Shishira, E. K., Yanda, P. Z., and Johnsen, F. H. (1997). *Land degradation in Tanzania: Perception from the village* (World Bank technical paper; no. WTP370). Washington, D.C.: The World Bank.

Fratkin, E. (1997). Pastoralism: Governance and Development Issues. *Annual Review of Anthropology*, 26(1), 235–261. <https://doi.org/10.1146/annurev.anthro.26.1.235>.

Fratkin, E. and E.A. Roth (eds) (2005) *As Pastoralists Settle: Social, Health, and Economic Consequences of Pastoral Sedentarization in Marsabit District, Kenya*. New York: Kluwer Academic Publishers.

Hagberg, S, (2000). Strangers, Citizens and Friends: Fulbe Agro-pastoralists in Western Burkina Faso. In: Sten Hagberg and Alexis B. Tengan (eds). *Bonds and Boundaries in Northern Ghana and Burkina Faso*. Uppsala, Department of Cultural Anthropology: 159-180.

Hares, M. (2009). Forest conflict in Thailand: Northern Minorities in Focus. *Environmental Management* 43 (3): 381-395.

Herrero, M, Thornton, P.K, Gerber, P, Van der Zijpp, A, Van de Steeg, J, Notenbaert, A,M, Lecomte, P, Grace, D. (2010). The Way forward on Livestock and the Environment. In: Swanepoel F.J.C, Stroebel, A, Moyo, S. (Eds) *The role of livestock in developing communities: Enhancing multifunctionality*. CTA, Wageningen. Netherlands pp. 50-76.

Homer-Dixton, T. F. (1999): *Environment, Scarcity, and Violence*, Princeton: University Press.

Idrissou, A. L., A. Van Passen, N. Aarts and C. Leeuwis (2011). The Discursive Construction of Conflict in Participatory Natural Resources Management: The case of the Pendjari National Park (PNP) in Benin. *Forest Policy and Economics*. 27: 65-74.

Intergovernmental Panel on Climate Change (IPCC). (2014). *Climate Change 2014: Mitigation of climate change Working Group III contribution to the fifth assessment report of the Intergovernmental Panel on Climate Change*. New York NY: Cambridge University Press.

Integrated Regional Information Network (2009): "Nigeria: Curbing farmer-nomad clashes and protecting livestock routes", A publication of the Integrated Regional Information Networks

(IRIN) United Nations. Retrieved from at <http://www.preventionweb.net/english/professional/news/v.phd>.

Kangalawe, R. Y. M. (2012). Land Degradation, Community Perceptions and Environmental Management Implications in the Drylands of Central Tanzania. In Curkovic, S. (Ed.) *Sustainable Development – Authoritative and Leading Edge Content for Environmental Management*. p.p.539-560. INTECH Open Science-Open Minds, Rijeka, Croatia.

Kumar, P. (1998). Theories to Analyse Conflict Situations. Institute for Development and Communication. Cardigarh, Commonwealth Secretariat, in CWS. *Conflict Resolution Strategies and Skills*. 78 pp.

Legesse, B. and Drake, L. (2005). Determinants of Smallholder farmers' Perceptions of Risk in the Eastern Highlands of Ethiopia. Routledge Informa Ltd. UK. *Journal of Risk Research*.

Lugoe, F. (2011). Aligning and harmonizing the livestock and land policies in Tanzania. ESRF Discussion Paper No. 35. Economic and Social Research Foundation, Dar es Salaam.

Maganga, F.P., R. Odgaard and E. Sjaastad (2007). 'Contested Identities and Resource Conflicts in Morogoro Region, Tanzania: Who is Indigenous', in B. Derman, R. Odgaard and E. Sjaastad (eds) *Citizenship, Identity and Conflicts over Land and Water in Contemporary Africa*, pp. 202–14. London: James Currey.

Makoye, K. (2014). Tanzania Struggle to End Clashes between Farmers and Herders. IPS News Agency, Dar es Salaam. Retrieved from <http://www.ipsnews.net/2014/01/tanzania-finds-hard-stop-farmers-herders-fighting-resources/>.

Mason, S., and A. Muller (2007). Transforming Environmental and Natural Resource Use Conflicts in Mario-Cogoy and Karl W. Steininger (eds), *The Economics of Global Environmental Change*. Edward Elgar: Cheltenham, UK and Northampton, MA, USA, pp 225-272.

Mertz, O., Mbow, C., Reenberg, A. and Diouf, A. (2009). Farmers' Perceptions of Climate Change and Agricultural Adaptation Strategies in Rural Sahel. *Environmental Management*, 43(5): 804-816.

Moritz, M. (2010). Understanding Herder-farmer Conflicts in West Africa: Outline of a processual approach. *Human Organization*, 69 (2): 138–148.

Mwamfupe, D. (2015). Persistence of Farmer-Herder Conflict in Tanzania, *International Journal of Scientific and Research Publications*, Vol. 5, No.2, pp.1-8.

National Bureau of Statistics [NBS] (2013). Population and Housing Census. Dar es Salaam: NBS.

Ngailo. (2011). Assessing the Effects of Eviction on Household Food Security of Livestock Keepers from the Usangu Wetlands in South West Tanzania. *Livestock Research for Rural Development*, 23, 65.

Odgaard, R. (2006). Land rights and Land conflicts in Africa: The Tanzania case. Copenhagen, Danish Institute for International Studies.

Opong, Y. P. A. (2002). *Moving through and passing on: Fulani mobility, survival, and identity in Ghana*. London: Transation Publishers.

Ortiz, P. (1999). *Apuntes teorico process: practical el disenomo de una propuesta metolgica de manejo de conflictos socioambientales a traves de la foresteria experiencias y desffos en America Latina*. Ediciones ABYA-YALA: FAO FTTP, COMUNIDEC, Quito, Ecuador, pp 1-9.

Parit Luka Saruni, P., L., Urassa, J., K., Kajembe, G., C. (2018). Forms and Drivers of Conflicts between Farmers and Pastoralists in Kilosa and Kiteto Districts, Tanzania. *Journal of Agricultural Science and Technology A* 8 (2018) 333-349 doi: 10.17265/2161-6256/2018.06.001.

Peet, R. and M. Watts (eds) (1996). *Liberation Ecologies. Environment, Development, Social Movement*. London and New York: Routledge

Peluso, N. L. and Watts, M. (eds) (2001). *Violent environments*. Ithaka: Cornell University Press.

Robbin, P. (1994). *Managing Organisational Conflict: A Non-traditional Approach*. A Commonwealth Secretariat. Prince-Hall. Pp. 93-97

Roncoli, C., Orlove, B., Kabugo, M., and Waiswa, M., (2011). Cultural styles of Participation in Farmers' Discussions of Seasonal Climate Forecasts in Uganda. *Agric. Hum. Values* 28, 123–138.

- Rurai, M. (2012). Framing of Resource-use Conflicts in Loliondo Game Controlled Area: Wildlife Tourism, Conservation and Pastoralism Interface. MSc. Thesis. Wageningen University. Holland.
- Scheffran, J. (2011). Security risks of climate change: Vulnerabilities, threats, conflicts and strategies. In H. G. Brauch, Ú. S. Oswald, C. Mesjasz, J. Grin, P. Kameri-Mbote, B. Chourou, . . . J. Birkmann (Eds.), *Coping with global environmental change, disasters and security. Threats, challenges, vulnerabilities and risks* (Vol. 5, 735-756). Berlin: Springer.
- Schilling, J., Freier, K., P., Hertig, E., and Scheffran, J., (2012). Climate change, vulnerability and adaptation in North Africa with focus on Morocco. *Agriculture, Ecosystems & Environment* 156, 12-26.
- Shettima, A. G., & Tar, U. A. (2008). Farmer-Pastoralist Conflict in West Africa: Exploring the Causes and Consequences. *Information, Society and Justice*, 1.2, 163–184.
- Speranza, C.I., Kiteme, B., Ambenje, P., Wiesmann, U. and Makali, S. (2010). Indigenous knowledge related to climate variability and change: insights from droughts in semi-arid areas of former Makueni district, Kenya. *Climate Change*, 100, 295-315.
- Tacoli, C. (2009). Crisis or Adaptation? Migration and Climate Change in a Context of High Mobility. *Environment and Urbanization*, 21(2), 515–525.
- Tisdale, S.L., Nelson, W.L. & Beaton, J.D, (1985). *Soil Fertility and Fertilizers*. 4th Edition. New York: Macmillan Publishing Co.
- Tonah, S. (2002). Fulani Pastoralists, Indigenous Farmers and the Contest for Land in Northern Ghana. *Africa Spectrum*, 37(1), 43–59.
- Tonah, S.(2006). Migration and Farmer-Herder Conflicts in Ghana’s Volta Basin. *Canadian Journal of African Studies*, 40(1), 152–178.
- Tonah, S. (2006). Managing Farmer-Herder Conflicts in Ghana’s Volta Basin. *Ibadan Journal of Social Sciences* 4(1): 33-45.
- Turner, M. (2004) ‘Political Ecology and the Moral Dimensions of “Resource Conflicts”’: The Case of Farmer–Herder Conflicts in the Sahel’, *Political Geography*, 23: 863–89.
- Ubwani, Z. 2014. “Why Land Clashes Continue Unabated in Kiteto District.” *The Citizen* 23 (1): 71-4.

Wallesteen, P. (1988). Understanding Conflict Resolution: A Framework. *In Peace Research Achievements and Challenges. (Edited by Wallenstein, P.) Westview Press. London. Pp 120-124.*

West, C., Roncoli, C., F. Ouattara, F, (2008). Local Perceptions and Regional Climate Trends on the Central Plateau of Burkina Faso. *Land Degradation Development* 19: 289-304.

Wood, R. M. 2010. "Rebel Capability and Strategic Violence against Civilians." *J. of Pe. Res.* 47 (5): 601-14.