THE IMPACT OF IN-MIGRANT PASTORALISTS ON LIVELIHOOD OUTCOMES OF THE NATIVES IN RUFIJI DISTRICT, TANZANIA

By

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Abstract

The concept of livelihood is about individuals, households or groups making a living or attempting to meet their various consumption and economic necessities. Livelihood in many rural areas of the world is complex, dynamic and poses a lot of human life outcomes. Perhaps it is only the day-to-day uncertainty of survival that remains to be constant. In this paper we examine the natives' livelihood challenges as caused by in-migrant pastoralists in Rufiji District, Tanzania. Data were collected using a questionnaire which was administered to 200 respondents in five villages. Data analysis involved generation of descriptive statistics for quantitative data and use of content analysis for qualitative data. Multiple linear regression was used to determine the impact of in-migrant pastoralists' characteristics and natives' livelihood outcomes. The findings showed that 69.5% of the respondents reported that there were livelihood challenges which had resulted from the arrival of pastoralists in the study area. Further, from the model, out of the eight factors analysed, four of them were found to have statistically significant impact ($p< 0.05$) in affecting natives' livelihood outcomes. The four factors were: newly introduced economic activities ($p < 0.05$), presence of investors ($p < 0.05$), new agricultural systems and techniques introduced after the arrival of pastoralists ($p < 0.001$) and change in land uses ($p < 0.05$). Among these, only land use change had negative influence on the livelihood of the native communities while the remaining three showed positive influence. The study concludes that the livelihood outcomes of the natives have been affected by the coming of the pastoralists. The study recommends that there is a need for relevant stakeholders, working as inter-sector teams, to strengthen the identified positive livelihood effects and take all negative effects as challenges for improvement.

Key words: *Livelihood, Livelihood Outcomes, Pastoralism, Agro-pastoralism, Natives.*

1.0 INTRODUCTION

Pastoralism is an ancient form of human activity, and present-day pastoral people carry forward an array of diverse cultures, ecological adaptations and management systems that have changed with modernity. Pastoralism is one of the agricultural production systems in the continent. Sub-Saharan Africa is home to more than 25 million pastoralists whose livelihoods depend on mobile livestock keeping and over 200 million agro-pastoralists who combine mobile livestock keeping with crop cultivation (SNV, 2012).

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Although there is no updated and clear statistics on the total population of pastoralist communities in Tanzania, Jode and Hesse (2011), provided an estimate population of 1.5 million pastoralists to be found in Tanzania. Moreover, it was reported that Pastoralists and agro-pastoralists represent over a quarter of the total population in Africa and occupy 43% of the continent's total land mass (SNV, 2012). Pastoralism and agro-pastoralism represent the traditional herd owned by small scale farmers and account for 98% of total cattle herd in Tanzania (Mlote et al., 2013). Moreover, pastoral livestock production remains the predominant system in Africa, making significant contributions to both rural livelihoods and the wider national economies of the continent.

Pastoralism is a dominant life form and production system in semi-arid parts of Tanzania. In these areas, livestock production contributes to sustainable livelihoods and security of the rural poor. It exploits natural resources including rangelands and pasture to generate food and other goods such as meat, milk, hides and skin, and financial resources cash, savings, credit, insurance, gifts, and remittances. Through these ways, social resources (traditions, prestige, insurance, identity, respect, friendship, marriage dowry, festivity) are promoted and sustained (Yanda and William, 2010).

One of the characteristics of pastoralism in Tanzania and elsewhere is that of migration. Pastoralists who have their origin in the northern parts of Tanzania (Mwamfupe, 2015) migrated to other regions of Tanzania which had no pastoralists before. For example, after a number of years of migration, the pure pastoral Maasai and Barbaigs from the northern parts of the country and, Sukuma agro-pastoralists from the lake zone are eventually found in the southern highlands and southern regions of Tanzania after taking different routes. Such in-migration undoubtedly creates livelihood-based influences to the communities in pastoralists' destination areas.

According to Barrett and Swallow (2006), De Haan and Zoomers (2005) the concept of livelihood is about individuals, households or groups making a living, attempting to meet their various consumption and economic necessities, coping with uncertainties and responding to new opportunities. Moreover, Muhammad et al (2017), explained that livelihoods of the rural households in the developing regions are still dependent on farm and off-farm economic activities and this approach emerged from a range of efforts to understand how the people survive in a particular area.

Ellis and Freeman (2004) explained that a livelihood comprises assets (natural, physical, human, financial and social capital), activities, and access to these (mediated by institutions and social relations) together determine the living gained by the individual or household, thus influencing livelihood outcomes. Most rural people in the developing world work in agriculture or get off-farm job opportunities only seasonally and often part time (Ahmed,2009). Individuals and households create a living from various sources: production (farming, local craftwork, small-scale industries), own labour, trading, transfers (grants and remittances).

Livelihood outcomes are achievements of livelihood strategies such as income levels, well-being, vulnerability levels, food security, and access to natural resources and this can be categorized under three headings: economic, biological and social. Food and income security, i.e. the ability to acquire sufficient food and income to meet basic needs, is essentially an economic outcome (Muhammad et al (2017). Hansen and DeFries (2004) described that human well-being (including livelihoods) may be affected either positively or negatively by

various changes and with intended and unintended consequences, which may potentially enhance and/or erode the benefits and economic gains derived from such changes. Again livelihood is utilized as opposed to work or even wellspring of wage.

Tanzania is experiencing pastoralists' migration from their traditional grazing areas or from other areas where they formerly in-migrated for pastoral activities but which have previously been used solely or predominantly for crops production. One of such areas is Rufiji district in Coast region. In-migrant pastoralists were first seen in Rufiji District in the year 2000, and a big influx was observed in 2007 following pastoralists' eviction from Kilombero District, Kilosa District and Usangu basin in Mbarali District by government order through the office of the Vice President (Walsh, 2012). However, there are no clear records of the exact number of pastoralists and agro-pastoralists that have entered the district before and after the eviction order.

The advent of pastoralists among the peasants community induced various changes. Social and economic networks between the two groups increasingly became so complex with their economic interests becoming so interlinked despite various conflicts between them. Bianco (2006) described that exchange between agro- pastoralists and agricultural communities have been instrumental not only in satisfying the growing need for food, but also income for both populations. The author also noted the potentiality of barter trade between the two communities as well as exchange of mechanisms for starch based staples such as cereals grains for milk and meat. IMM et al. (2005) noted that awareness of local markets and the role they play in the viability and sustainability of new livelihood strategies becomes relatively good through inter-sector linkages created by in-migration, although too many people become involved in new or same activities thereby creating competition and even conflict. In this case, therefore, each group has a reason to be interested in the well-being and functioning of the other because of the various factors which cause the inter-linkages to exist.

Several previous studies on pastoralists' migration (for example; Maswaga, 2013; and Ngailo, 2011; Ngailo, 2013) revealed that the in-migrants have a fully mobile livelihood strategies which in turn influences native communities' livelihoods. Still there is a need for scholars to establish the nature and consequences of such linkages to the livelihood of the natives among which in-migrants settle because of the limited information in the literature. However, this has not been well established, specifically in Rufiji District. The main objective of this paper was to analyse the coming of pastoralists in Rufiji District and its impacts on the livelihoods of the natives. Specifically, the paper identifies livelihood outcomes among the natives as triggered by the coming of pastoralists. The assumption made in this study is that the coming of pastoralists in the area has affected natives' livelihood outcomes either negatively or positively.

The study was guided by the Boserup (1965) theory who explored the role of population as an independent variable that influences both the development of agriculture and technology which, in turn, shapes the productive capacity of resources, not only positive attributes but there are also negative ones. Boserup seems to be biased only on the positive directions of population growth influences. Boserup stressed the potential catalyst effects of population growth on agricultural and other technologies, resulting in intensification of the agricultural systems. Boserup argues that intensification is an induced response to population growth. She argues that increasing population pressure provides a primary stimulus for innovation and intensification. Therefore, the Boserupian model suggests that population pressure stimulates innovation, and agricultural intensification leads to reduced fallow and technical change.

This study makes use of the idea from Boserup and argues that pastoralists' in-migration into the study area has caused population increase, and this has had various direct and indirect effects on the livelihoods of the natives. In this case the increased population in the area is assumed to have brought positive and negative effects to the natives'. This is due to the fact that Boserup did not make clear what driver of population growth was responsible between migration and natural increase. Her arguments also were based only on agricultural innovations without considering other attributes including the negative ones that may change as a result of population growth.

2.0 METHODOLOGY

2.1 The study area and design

This paper is based on a survey study that was conducted in Rufiji District. The study area was chosen because of its historical backgrounds of pastoralists activities. First the district was formally not experiencing and influx of pastoralists since before 2000s so it was necessary to understand the existing variations after the pastoralists' arrival. Secondly, it is among the areas identified by the government to receive pastoralists and agro-pastoralists evicted from Mbarali, Kilombero and Kilosa Districts since 2006 and it received a large number of livestock and livestock keepers than any other districts in the Coast Region. A cross-sectional research design which allows the collection of data once at a time was applied during the study.

2.2 Sampling and data collection

Five (25%) out of 20 villages which received pastoralists were selected. The kth factor formula was applied to pick the sampled villages. The total of 20 villages which received pastoralists was subjected to the formula. To get the first village, the sampling fraction was used; other villages were selected basing on the fourth village which the fraction obtained. Basing on the purpose of the study, the sample size of 200 respondents was adequate. The respondents of target were those of at least 30 years of age in 2013-2014 and must have lived in the village since or before 2000. Data were gathered by administering a questionnaire, while a checklist of items was used during interviews and FGDs. Both qualitative and quantitative data were collected.

2.3 Data analysis

Content analysis was used for qualitative data analysis whereby data were summarised by their themes, and comparing and contrasting arguments given during interviews and discussions. Descriptive statistics were used to analyse quantitative data. Multiple regression was ran to test the null hypothesis that the arrival of pastoralists in Rufiji District do not have significant impacts on livelihood outcomes among the natives. The model was used to determine the impact (negative and positive) of the independent variables on the natives' livelihood outcomes at both household and community levels.

The livelihood outcome was measured by developing a livelihood outcome index. The index assessed whether the native respondents were able to build modern houses (iron sheet roofed and cement blocks constructed houses), change agricultural production systems and techniques, improve food security, involved in resource use conflicts, adopted newly introduced cash and food crops, engaged in production of newly introduced livestock, prepare village sustainable land use plans, increase and improve sources of income, improve access to social services, witnessed an increase in population and growing social interactions. The response weights were yes = 1 and no = 0. Thereafter, each livelihood outcome was assigned points, and all the points were added up to get the overall scores on livelihood outcomes. The

overall scores ranged from 0 to 11 attainments as measured using the total number of livelihood outcomes.

Before running linear regression, the independent variables and the dependent variable were checked for normality by determining their normal curves, which were then checked visually to find whether they were normally distributed. Checking normality was done because linear regression requires all variables to be normally distributed across the sample. Brayman and Bell (2011) emphasized that any variable that does not have a normal distribution should be transformed into a normal distribution. All the variables were found to be normally distributed; therefore they were not transformed.

All the independent variables were also checked for multicollinearity. Multicollinearity is an undesirable condition whereby two or more pairs of variables have so much linear relationship that inclusion of both variables reduces the quality of the results (Brayman and Bell, 2011). Multicollinearity was checked by computing Variance of Inflation Factors (VIFs) and tolerances of independent variables during regression analysis. Ringle et al. (2014) explained that the VIF is a more rigorous check for collinearity than the correlation coefficient. The VIF of an explanatory variable measures the inflation of the variance of the variables' regression coefficients relative to a regression where all the explanatory variables are independent. VIFs are inversely related to tolerances with larger values indicating involvement in more severe relationships. According to the rule of thumb, VIFs above 10 or tolerances below 0.1 are seen as a cause of concern (Ringle et al., 2014). All the tolerance values of collinearity which were greater than 0.1 and VIF values of collinearity which were less than 10 show that there was no multicollinearity. The multiple linear regression model used to test the hypothesis was specified as follows:

$Y= a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + ...b_8x_8 + e$……...……1

Where:

Y= total number of natives' livelihood outcome attainments (continuous variable)

a=Constant or Intercept of the equation

$b_1 ... b_8$ = Regression coefficients,

e = Error term representing a proportion of the variance in the dependent variable that was unexplained by the regression equation.

X_1 = New economic activities, X_2 = Number of years a pastoralist has lived in a village, X_3 = Number of received pastoralists, X_4 = Presence of investors, X_5 = New agricultural systems and techniques, X_6 = population change, X_7 = Change in land use, X_8 = Availability of market facilities and services.

3.0 RESULTS AND DISCUSSION

3.1 Pastoralists' challenges and impacts on the natives' livelihood

The findings in Table 1 indicate that 69.5% of the respondents reported the emergency of livelihood challenges which they associate with the arrival of pastoralists whereas 30.5% reported that there were no challenges. The challenges mentioned included: prevailing conflicts, emergence of new businesses, and destruction of crop farms, cultural interactions and natives' land invasion. Furthermore, 55.4% of respondents reported that the challenges were positive (like introduction of new food and cash crops) while 44.6% said that the challenges were negative (like destruction of crops in the farms). By positive means that the challenges had been advantageous to the livelihoods of the natives while the negative response means there were disadvantages after the arrival of pastoralists. These were also

observed by Mwambene *et al.* (2014) who did a study in Ruvuma and Lindi Regions about livelihoods challenges of the Ihefu evicted pastoralists and found that the coming of the pastoralists had positive and negative challenges on the livelihoods of both the natives and the new comers themselves. The authors also revealed that pastoralists brought such issues like resource use conflicts, land degradation, improved milk and meat, and availability and increased social interactions among the new comers and the natives in the regions.

Table 1: Distribution of responses on livelihood challenges

Presence of livelihood challenges (n=200)	Frequency	Percent (%)
Yes	139	69.5
No	61	30.5
Livelihood challenges position (n=139)		
Negative	62	44.6
Positive	77	55.4

The variations in the responses on the livelihood consequences from people of the same place are due to non-homogeneity livelihood conditions among the respondents. It is most likely that those who responded that pastoralists' arrival has disadvantageous implications are those whose livelihoods were mainly based on crop production and those who responded to have experienced advantageous influence were those whose livelihoods depended on fishing and business vending. This is because some of the pointed out problems were destruction of crops by livestock and occurrence of conflicts between pastoralists and crop producers. This was also pointed out by Mwamfupe (2015) and Makoye (2012) that among the negative impacts of the in-migrant pastoralists in Rufiji District is the prevalence of land use conflicts. Another challenge is the existence of corrupt leaders. Respondents mentioned increased corruption among village leaders.

In the FGD at Nyamwage village, it was said"*.....Leaders are sometimes making decisions which are in favour of pastoralists when we bring our complaints concerning their livestock invading our farms and destroying of our crops…this is because they are bribed by the pastoralists so that they make decisions in their favour…*" (FGD, Nyamwage). This statement reveals that corruption has been a challenge, especially on matters related to farm invasion by livestock whereby accusations of the natives against pastoralists are judged in favour of the pastoralists.

However, the advantages are related to business vendors and fish hawkers as well as crop producers. These include: improved food security, emergence of new business opportunities, availability of meat and milk, introduction of ploughing techniques and the use of oxen for land cultivation. It was also mentioned that pastoralists have been involved in a variety of livelihood strategies, unlike the local people. This becomes a catalyst to the natives to learn more from the newcomers on various livelihoods. These findings support those by Omondi *et al.* (2008) who described about the livelihood and food security among the in-migrants and receiving communities at Kajiado County in Kenya.

One elder at Muhoro village said *"….since we started receiving pastoralists, we have advantages like eating beef and drinking milk…… we hire their oxen for land cultivation which makes farm preparation to be faster than the use of the hoe……it is true that they destroy our crops in the farms and sometimes fight us…. but we cannot complain that we have not benefitted from them….*" (FGD, Muhoro). This suggests that, when pastoralists enter an area, the receiving communities either benefit or lose from their presence. The farmer's statement also implies that there are such kinds of food security in terms of the increased varieties of food they take as introduced by the new comers.

Furthermore, the introduction of new food crops and cash crops was mentioned as one of the positive impacts of the pastoralists' arrival in the area. Formerly, natives were not producing crops like sweet potatoes, sorghum, green pigeons and millet, but the coming of the agro-pastoralists has influenced them to produce such crops for both consumption and for the market when they have been produced in surplus. It was also mentioned that agro-pastoralists have introduced crops like sweet potatoes and

new land management practices like ridging because potatoes are mainly grown on ridges. This has contributed to adoption of new agricultural practices by the native. Findings by Mbonile and Mwamfupe (1997) in Usangu plains also showed that in-migrant pastoralists may have led to the introduction of new crops and the strengthening of small-scale cultivation. Ridge farming was uncommon in the study area before the arrival of agro-pastoralists. These findings support Boserup's idea (1965) that population increase leads to improved innovations.

Table 2 presents the most common livelihood outcome attained as experienced by the natives in the study area. The findings show that the most common livelihood outcome is the occurrence of resource (land use) conflicts (10.8%), followed by the introduction of new crops (9.5%) and followed by the introduction of exotic livestock (9.3%). The new livestock include donkey and oxen for farm tilling and carrying farm products. The lowest noted experienced livelihood outcome challenge was the growing social interactions (8.5%). Other livelihood outcomes as identified from this study include: construction of modern houses (iron sheet roofed and cement blocks), establishment of village sustainable land use plans, introduction of new sources of income, population increase, change in agricultural systems and techniques, increased access to social services and improved food security. The findings are similar to those by Maswaga (2013) who found that in-migration of pastoralists contributed to improved food security, increased availability of meat and milk, and growing social interactions among them and the native farmers. The findings imply that the most detrimental livelihood outcome challenge is the land use conflicts occurring between various parties in the study area.

Table 2: Livelihood outcomes experienced by the natives (n=200)

Livelihood challenges	Number of responses	Percent (%)	Rank
Resource use conflicts	152	10.8	1
Introduction of new crops	134	9.5	2
Introduction of new livestock	131	9.3	3
Improved food security	127	9.0	4
Change of agricultural systems and techniques	125	8.9	5
Construction of modern houses	125	8.9	5
Improved access to social services	124	8.8	6
Preparation of sustainable land use plans	123	8.7	7
Improved and increased sources of income	123	8.7	7
Population increase	123	8.7	7
Growing social interactions	119	8.5	8
Total	**1406**	**100.0**	

3.2 Livelihood outcomes among the natives

The findings shown in Table 3 show that the mean score of the livelihood outcome after the arrival of pastoralists among the natives was found to be 6.2, which were at the high level as the moderate mean score was 6.0. The findings furthermore indicated that 49.5% had high level of livelihood outcomes, 28.5% had moderate and 22% were found to have low livelihood outcomes as a result of the coming of pastoralists. The findings imply that, generally, the natives could be categorized in high livelihood outcome level due to the influence from in-migrant pastoralists. Nevertheless, the study did not establish the baseline livelihood outcome level among the natives before the arrival of pastoralists; this makes it difficult to conclude from the findings that the current livelihood situation is either at an improvement level or otherwise. The findings are in line with those by Bianco (2006) who found that peoples' livelihoods can be better because of social and economic interactions between the pastoralists and agricultural communities. Such interactions, among others, can

increase the demand for food as well as income for both communities. These findings are confirmed by those indicated in Table 1 whereby 55.4% of the respondents stated that the coming of pastoralists in the district has resulted in positive impacts on the livelihood outcomes of the natives in the area.

Table 3: Natives' Livelihood outcome score as influenced by pastoralists (n=200)

Level of livelihood outcome	Range scores	Frequency	Percent (%)
High scores	6.1-8	99	49.5
Moderate score	6.0	57	28.5
Low scores	1.0-5.9	44	22.0
Total		**200**	**100.0**

3.3 Pastoralists' impacts on the livelihood outcome of the natives

To determine the impacts of pastoralists on the local people livelihood outcome attainments at household and community levels, multiple regression was applied whereby β-coefficients were computed to obtain the directions and significance of the predictors as indicated in Table 4. The overall model fit containing all the pastoralists' effects was statistically significant ($p = 0.000$), indicating that the model was able to predict the impacts of pastoralists arrival on natives' livelihood outcomes.

The coefficient of multiple determinations (R^2) was 0.386 implying that the independent variables entered in the model explained only 38.6% of variance in the respondents' livelihood outcome effects. The findings in Table 4 show that four (new economic activities, number of identified present investors, new agricultural systems and techniques and land use change) out of eight independent variables had a significant relationship with the natives' livelihood outcome effects in the study area while the other four were statistically insignificant at the 5% significance level.

Table 4: Pastoralists impacts on natives' livelihood outcomes (n=200)

	Unstandardized Coefficients		Standardised Coefficients			Collinearity Statistics	
Independent variables	**B**	**S.E**	**Beta**	**T**	**Sig.**	**Tolerance**	**VIF**
(constant)	7.755	2.572		3.015	0.003		
New economic activities	0.737	0.327	0.157	2.256*	0.025	0.974	1.026
Pastoralist years in a village	-0.020	0.173	-0.008	-0.113	0.910	0.972	1.028
Received pastoralists	0.023	0.028	0.059	0.848	0.397	0.959	1.042
Presence of investors	0.879	0.372	0.033	2.317*	0.018	0.977	1.024
Agricultural techniques	1.859	0.512	0.251	3.629***	0.000	0.973	1.028
Change in population size	0.320	0.278	0.079	1.153	0.250	0.972	1.029
Change in land use	-1.448	0.652	-0.251	-2.484*	0.036	0.974	1.026
Availability of market facilities and services	0.036	0.055	0.045	0.651	0.516	0.996	1.004
R Square	0.397						
Adjusted R Square	0.386						
F ratio	3.930						

Dependent variable: Livelihood Outcome attainment score. Note: ***$p \leq 0.001$ and *$p \leq 0.05$

The findings show that the number of newly introduced economic activities had a positive β coefficient (0.737) at $p \leq 0.05$ implying that the variable had a significant positive influence on the livelihood outcome. This is partly attributed to the fact that the majority (67%) of the respondents who were representing their households agreed to have experienced a number of new economic activities, while 33% constituted the group of respondents who had not experienced and were not sure of the new socio-economic activities. The findings are in line with those by Maswaga (2013) who found that a positive influence of the coming of pastoralists can be found in Madaba, a small town in Ruvuma

region with high business dynamics. The findings explain the importance of the economic activities introduced after the arrival of pastoralists or the establishment of economic activities by other groups, including the natives as influenced by in-migrant pastoralists.

In addition the presence of investors was found to have a positive β coefficient (0.879) and to significantly influence livelihood outcomes at $p \leq 0.05$. In the study area, it was explained that there had emerged poultry investors after the arrival of pastoralists and other investors who established small scale milk processing factories. There are also those who have invested in guest house businesses. For example, Maswaga (2013) described that as a result of investors in Madaba Ruvuma Region who have invested in transport facilities and few in milling machines there is creation of investment opportunities in the area. This implies that the emergence of investors and consequent formation of socio-economic interactions between pastoralists and the natives impacts the natives' livelihood positively through, among others, introduction of various socio-economic activities and cultural opportunities like goods vending, attracting livestock products investors. These interactions create formal and informal employment opportunities among the natives. The findings, moreover, imply that the more the investors come in an area and through their socio-economic interactions with the pastoralists and the natives, the more the livelihoods of the local people are impacted positively.

The findings further indicate that the new agricultural production systems and techniques had significant impact with a positive β coefficient (1.859) at $p \leq 0.001$. This implies that the variable substantially impacts the natives' livelihood outcomes. The new agricultural systems and farming technologies mentioned include ridges cultivation and the use of oxen and ox-plough for land cultivation. It was reported that the majority of the natives were not familiar with ridges cultivation and few managed to hire tractors for land cultivation before the arrival of pastoralists. Regarding the use of ox-ploughing technique in land cultivation, natives' can now hire oxen, locally termed as "*maksai*" from the pastoralists who cultivate for them and hence fastening the land cultivation processes.

One interviewee at Chumbi A said *"…we normally hire them to cultivate our farms by using their oxen and ox-ploughs and in return we are paying them between Tanzanian shillings 50 000/= and 70 000/= per acre. The price is negotiable…but not all the natives can afford to hire the ploughs at that price; hence some still prepare their farms using the hoes…"*(Interview, Chumbi A). This statement implies that there are benefits which are obtained by the natives' as a result of the pastoralists' arrival in the area.

On the other hand, the findings in Table 4 indicate that changes in land use had a significant negative β coefficient (-1.448) at $p \leq 0.05$. This implies that changes in land use by communities in the study area result in negative impacts to the livelihood. It was stated that there are new land uses like livestock keeping and introduction of new settlements in areas which were formerly not intended for those purposes. The land use change in the study area also included encroachment into protected land including forests and water sources. This implies that land which was previously regarded as farmland or protected land has now been turned into grazing and settlement land due to increased demand for pastureland and human settlements. This has resulted in invasion of water sources, thus influencing negatively the socio-economic transformation among the natives. These findings are similar to that by Walingo *et al.* (2009) who showed that there are land use changes on the slopes of Mount Kilimanjaro which included expansion of cultivation to more marginal land down the slopes, disappearance or extreme fragmentation of bush land and expansion of settlements.

Although it was mentioned that there are increased accessibility to market services and facilities as mentioned by respondents, this variable in the model had statistically insignificant (0.516) impact on the livelihood outcome of the natives. These findings are contrary to the findings by Santiphop *et al.* (2011) who described factors affecting agricultural land use patterns and livelihood of farm households in Kanchanaburi Province, Thailand. The authors mentioned, among other factors, the

market facilities (number of market centres and distance to the market centres) as factors having significant effects on people's livelihoods by either accelerating or hindering livelihood of the communities.

In an FGD at Muhoro village, it was reported that: "…*accessibility to market services has increased; the weekly cattle auction provides opportunities to sell our goods and access goods which formerly were sourced from distant areas away from the villages*…" (FGD, Muhoro). This quotation implies that, in the study area there has been emergence of newly established marketing centres hence enabling the natives and in-migrants pastoralists to access services as well as selling their agricultural products and livestock products respectively.

4.0 THEORETICAL CONTRIBUTION OF THE STUDY

The study was guided by the Boserup migration theory. The central thesis of the theory is an argument that *intensification is an induced response to population growth which is either occurring naturally or through migration processes*. The study has shown that in-migrants cannot only bring about innovations in the destination areas as suggested by Boserup, but also can bring changes to people's livelihoods. As far as this study is concerned, the changes can be both negative and positive. The findings have also shown that population growth in a certain area cannot only influence innovation (as a positive attribute) as argued by Boserup, but also may lead to conflicts over existing resources in an area as a result of increased resource use demand.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The livelihoods of the natives in Rufiji district have been transformed through influences from in-migrant pastoralists. These effects are on the aspects of the livelihood outcomes. The study focused on the direction these effects have taken (negative or positive) as well as on general pastoralists' factors affecting the livelihood outcomes of the natives. Indeed, the livelihoods of natives in the study area have been affected, and the effects are both positive (advantageous) and negative (disadvantageous). The knowledge generated through this study provides insights that can be used during formulation of appropriate interventions to improve the livelihoods of the natives in the study area and in other areas in Tanzania with similar conditions. It is also concluded that apart from the challenges caused by pastoralists, there are potential opportunities that may arise from interactions between pastoralists and crops farming communities.

Based on the conclusions, it is recommended that there is a need for relevant stakeholders such as government agencies and non-governmental organizations at different decision making and operational levels to strengthen the identified positive livelihood effects caused by pastoralists, while the negative livelihood effects should be taken as challenges for improvement, especially in terms of making the best use of socio-economic opportunities that have emerged after the arrival of pastoralists. These may include encouraging the natives to engage in mechanised agriculture as well as in livestock keeping in a more environmentally friendly and livelihood improving ways. The study also recommends the need for an inter-sectorial approach in dealing with challenges facing the migrant pastoralists and the receiving communities in the destination areas whereby all stakeholders from various sectors should be included in the management and control of the pastoralists' migration as well as establishing properly planned receiving mechanisms for pastoralists in the destination areas.

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