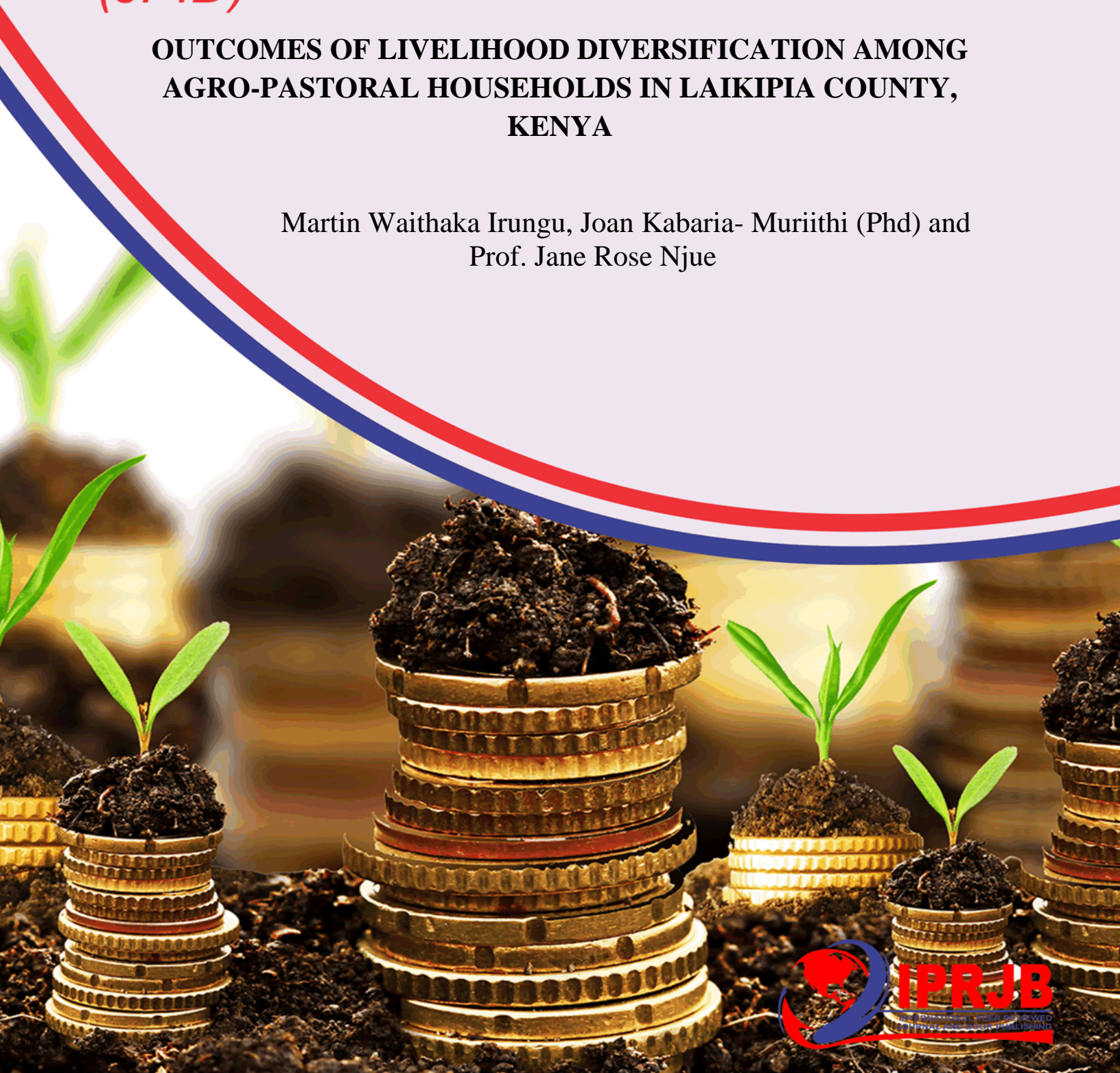


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OUTCOMES OF LIVELIHOOD DIVERSIFICATION AMONG AGRO-PASTORAL HOUSEHOLDS IN LAIKIPIA COUNTY, KENYA

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Abstract

Purpose: The purpose aimed to investigate livelihood diversification strategies and livelihood outcomes among agro-pastoral households in Laikipia North Sub-county, Kenya.

Methodology: The study adopted a cross sectional survey design where a sample of the population was selected, and from these individuals, data was collected to help answer the research questions. A total of 422 households were systematically sampled. Data were collected using two instruments; household interview guides and key informant interview guide. Data analysis was done using SPSS (version 20) computer software program. Frequency tables, pie charts and bar graphs are used to present the findings of the study. Descriptive statistics were presented using maximum, minimum, mean, percentage, and standard deviations. Significance correlation between descriptive variables was tested using Chi square test and Spearman correlation coefficient at 0.05 level of significance.

Results: The findings of the study revealed that there was a response rate of 90.3% with more than half of the respondents being household heads. The average number of years the respondents had lived in the area was 43. The researcher sought livelihood strategies pursued in the past, presently and enumerated the reasons for disparity where it existed. Climate change was cited as a major cause of disparity at 40.7% followed by increased levels of education, changing land use and need to increase income and availability of market in that order. Assets (physical, financial and social) were found to have a significant influence on livelihoods outcomes. Challenges the respondents faced however was found to have no significant influence on the livelihood outcomes ($\chi^2=1.017$, $df =1$, $p=0.313$). Finally, there was significant relationship between the adopted livelihood strategies and livelihood outcomes ($\chi^2=14.730$, $df =1$, $p=0.000$, $r=-0.197$).

Unique contribution to theory, practice and policy: The government should strengthen Cooperative Development and Trade and Industry to the ward level. Such efforts will enhance the formation and effective running of cooperative societies as well as equip local community members with skills of running profitable businesses.

Key words: *Livelihood Diversification Strategies, Livelihood Outcomes Agro-Pastoral Households*

INTRODUCTION

More than forty percent of the earth's surface is made of Arid and Semi-Arid Lands (ASALs) with its major inhabitants being pastoral and agro-pastoral communities (United Nations Development Programme, 2014). There is growing rates of poverty and depletion of natural resources in ASALs mainly due to climatic extremes attributed to climate change phenomena and human activities (Ning, Ismail, Joshi, Shao, Shreshtha & Jasra, 2014). The phenomena of climate change become a great concern and is one of the leading global crisis undermining sustainable development.

The world, through the agenda 2030, is committed to alleviating poverty with the recognition that "eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest challenge and an indispensable requirement for sustainable development". Sustainable Development Goal 1 (SDG1) specifically is focused on halving the proportion of men, women and children living in poverty in all its dimensions (UNDP, 2015). The Intergovernmental Panel on Climate Change (IPCC) report (2013) indicates that climate change is on the rise and remain a real challenge deepening poverty among ASALs inhabitants whose main livelihood source is agro-pastoralism. The report indicates that livelihoods of the poor especially in developing countries are most at risk (IPCC, 2013).

Livelihood diversification is defined as the attempt by rural households to develop diverse portfolio of activities and assets in order to survive and improve their living standards (Department for International Development, 1999). Individuals and households devise new means to generate income in order to overcome environmental risks brought about by environmental extremes (Eneyew, 2012). In Africa, there is unprecedented vulnerability among agro-pastoral livelihoods with rampant poverty manifested through persistent food insecurity. Poor infrastructure, scarce resources, conflicts and environmental degradation due to poor land use practices makes ASAL inhabitants even more vulnerable. (Ojwang, Agatsiva & Situma, 2010).

Pastoralists and agro-pastoralists inhabiting ASALs in East Africa are characterized by high poverty index and recurrent food insecurity which have been a focus for relief aid by governments and humanitarian agencies (Elhadi, Nyauki, Wasonga & Ekaya, 2012). Over 80% of Kenya landmass is ASAL with the main activity in the areas being pastoralism with over 60% of Kenyan livestock being in these areas. Pastoralism is the source of livelihood to approximately 90% of the ASAL population (GoK, 2008). However, there has been a growing trend in agro-pastoralism in the recent past where traditional pastoralists diversified into crop cultivation on the scarce arable land (Muho & Kosonei, 2013). Pastoralists and agro-pastoralists constitute over 70% of the approximate 18 million Kenyans living below poverty line, that is, less than \$1.25 a day (UNDP, 2013).

A study carried out in 2015 by Kenya Food Security Steering Group (KFSSG) in Laikipia County on livelihood sources found that the county is highly dependent on rainfall with the major livelihood activities being crop production and livestock rearing. The study also highlighted other factors contributing to livelihood vulnerability including; poor rains seasons, elevated food prices, crop pests and diseases, livestock diseases, and human-wildlife conflicts in areas bordering game reserves (KFSSG, 2015). These factors have triggered communities in

these areas to develop coping and adaptation strategies to counter livelihood vulnerability including diversifying their livelihood strategies by adopting alternative income generating activities (Kimani, Ogedi & Makenzi 2014). However, these alternative livelihoods have not been able to adequately address their vulnerability (Kimani, Ogedi & Makenzi 2014).

Statement of the Problem

Despite the existing efforts by the agro-pastoral communities to seek livelihood alternatives, they still encounter persistent livelihood insecurity (Kimani et al, 2014). The growing burden for humanitarian organizations need to address food scarcity among other issues facing this population reflects the inability of ASAL communities to survive without external aid (Wren & Speranza, 2013). For example, studies indicate that 80% of pastoralists and agro-pastoralists in East Africa ASALs depend on relief either as cash or food to meet their basic needs (Fitzgibbon et al, 2011; Wren & Speranza, 2013). This is an indication that livelihood and resource utilization in the dry zones are not sustainable and therefore cannot fulfill the living standards of the local communities (Kimani et al, 2014). There is need for intervention that aimed at strengthening livelihood diversification options that are more practical and sustainable in the ASAL context.

A study by Eneyew (2012) found that agro-pastoralists bows to the pressure of resource depletion drought, loss livestock, diminishing rangelands and cultivation land, loss of traditional governance, lacking market for their agro-pastoral goods, minimal amenities, social services, and water for animal and human consumption (Eneyew, 2012). Loss of vegetation and water resources in the rangelands as a result of droughts have led to loss of livestock and decline in arable land in ASALs. (Coppock, Tezera , Desta & Gebru, 2012). Other factors adding to the pressure include; increasing human and livestock population in the areas and land use changes. As a result, agro-pastoral communities are pressured to seek alternative livelihood options to maintain their daily living especially the ones that are not dependent on rainfall (Ayantunde, Turner, and Kalilou, 2015).

Even though alternative livelihoods are pursued, they are mostly not sustainable (UNDP, 2013). According to Laikipia County Integrated Development Plan (CIDP), for instance, activities such as sand harvesting, charcoal burning have been on the rise in the county. These activities have been reported to have adverse effects on the environment, increasing the risk of climatic extremes specifically droughts and further depleting the natural resource base thus pushing the inhabitants into further vulnerable state (CIDP, 2013). This study sought to explore livelihood diversification strategies pursued and the subsequent livelihood outcomes among agro-pastoral households in Laikipia County.

THEORITICAL REVIEW AND CONCEPTUAL FRAMEWORK

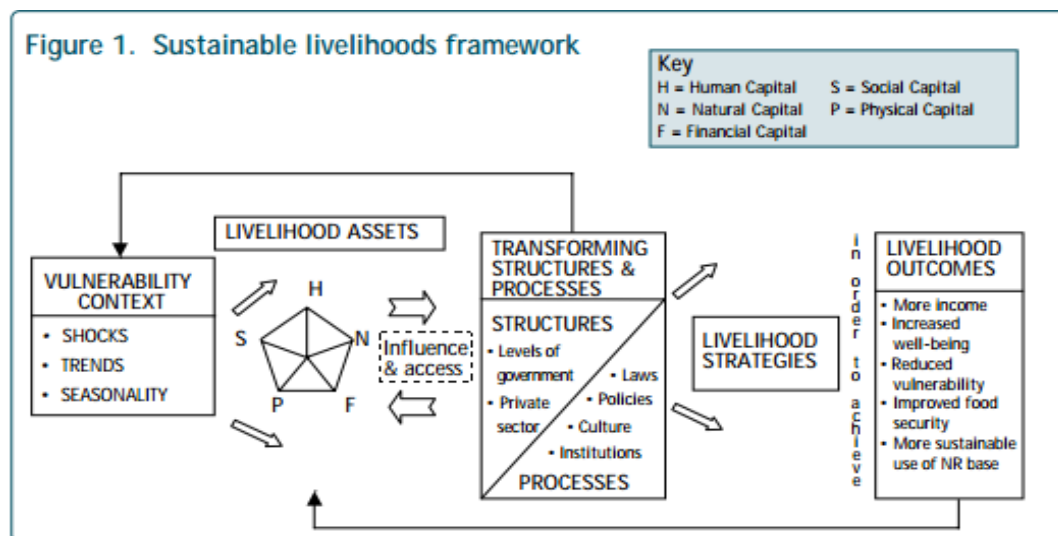
Theoretical Review

Theoretical background in which this study was based was the DFID Sustainable Livelihood Framework (SLF), a tool developed to improve understanding on livelihoods. The SLF is built on Chambers Conway's (1992) definition of livelihoods where a livelihood is said to be sustainable "when it can cope with and recover from stresses and shocks and maintain or

enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.” (DFID, 1999).

SLF illustrates that individuals and households live in vulnerable contexts with influence and access to various assets in several forms including social capital, natural capital, physical capital, human and financial capital. There is no single asset that can independently produce satisfying livelihood outcome people seek especially among the poor who have limited of these assets (DFID, 1999).

The interaction with the assets determines the livelihood strategies of individuals and households and consequently influence livelihood outcomes whether positive or negative (Kollmair et al., 2002; Globalization and Livelihood Options of People Living in Poverty, GLOPP, 2008). Individuals and households under SLF are given a chance to make choices, seize the existing livelihood opportunities and diversify livelihood approaches to achieve livelihood goals. Diversification not only entails people changing from one form of employment to another but a dynamic approach combination of various activities to meet their needs (DFID, 1999).



Conceptual Framework

The variables of the study were conceptualized as shown in Fig 1.1 below to illustrate the interaction of factors that influence livelihood diversification and the resulting outcomes. The model identifies two independent variables: livelihood characteristics and household assets. The intervening variables are livelihood diversification strategies and livelihood challenges that are pursued by households and interventions put in place by the community and government. The reciprocal arrows within these variables show their close relationship and ability to influence each other. The dependent variable is household livelihood outcomes in form of food security which is conceptualized as having three levels of low (survival), medium (security) and high (growth) in an increasing order according to McKee, (1989). Livelihood outcomes have significant effect either positive or negative on assets and therefore the feedback loop.

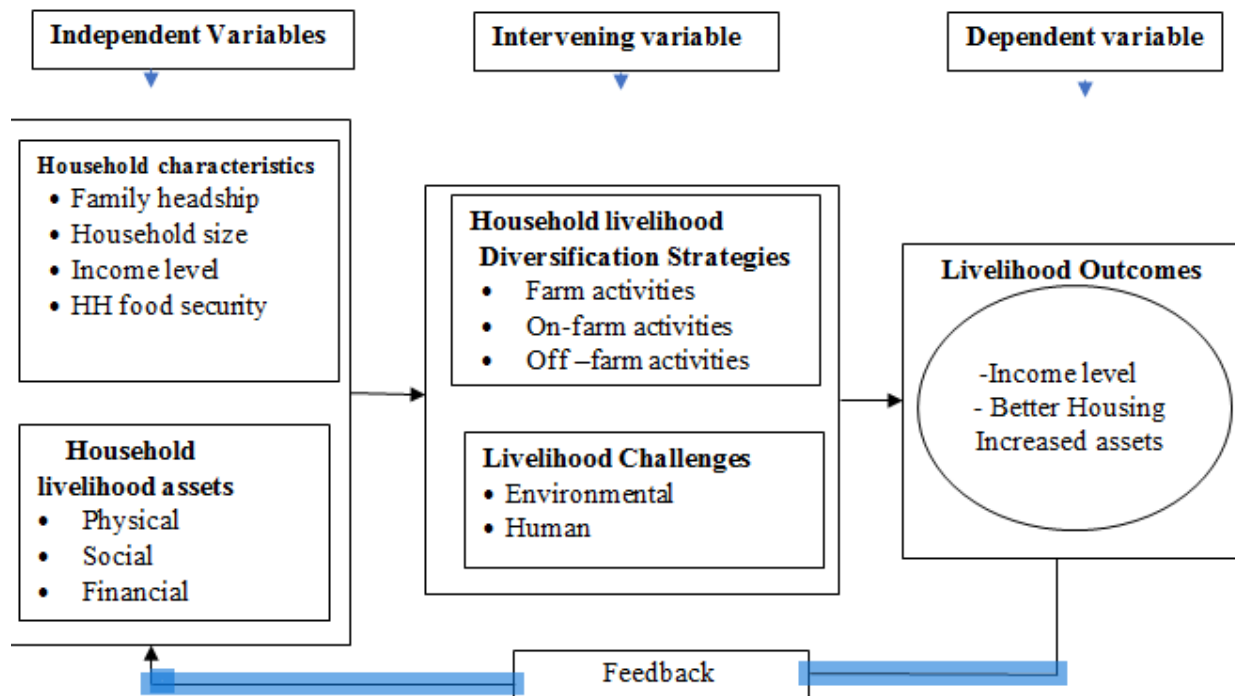


Fig 2: Conceptual Framework

METHODOLOGY

The study adopted a cross sectional survey design where a sample of the population was selected, and from these individuals, data was collected to help answer the research questions. A total of 422 households were systematically sampled. Data were collected using two instruments; household interview guides and key informant interview guide. Data analysis was done using SPSS (version 20) computer software program. Frequency tables, pie charts and bar graphs are used to present the findings of the study. Significance correlation between descriptive variables was tested using Chi square test and Spearman correlation coefficient at 0.05 level of significance.

4.0 RESULTS

4.1 Hypotheses Testing

Chi-square test of significance at $p < 0.05$ level of significance was used to investigate the relationship between the dependent and independent variables. It was preferred because both the dependent and independent variables were categorical and at ordinal scale of measurement. Spearman correlation coefficient was also used to determine the direction and strength of relationship considering that the data was in ordinal scale of measurement, there was presences of outliers and also, the data collected was nonlinear. The findings were as follow;

4.1.1 Household Assets and LVD Outcomes

Ho₁ There is no significant relationship between household assets and livelihood outcomes among agro-pastoralists in Laikipia North Sub-County.

The researcher was in pursuit for the presence of any relationship between availability of household assets and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. To this effect, the hypothesis was tested using chi-square test for independence in order to know if there is any relationship between physical assets, financial assets, social assets and LVD outcomes results were as follows.

4.1.1.1 Physical Assets and LVD Outcomes

Table 1. Chi-square tests for physical assets and LVD outcomes

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	18.922 ^a	1	.000		
Continuity Correction ^b	17.417	1	.000		
Likelihood Ratio	19.342	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	18.873	1	.000		
N of Valid Cases	381				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.69.

b. Computed only for a 2x2 table

Table 2. Spearman correlations coefficient for physical assets and LVD outcomes

		sum physical assets (Binned)	Sum of the extent of LVD outcome (Binned)
Spearman's rho	sum physical assets (Binned)	Correlation Coefficient	1.000
		Sig. (2-tailed)	-.223**
		N	.000
			381
	Sum of extent of the LVD outcome (Binned)	Correlation Coefficient	-.223**
		Sig. (2-tailed)	1.000
		N	.000
			381

** . Correlation is significant at the 0.01 level (2-tailed).

As manifested in Table 2 and Table 3, it is noticeable that there is significant evidence to show that availability of physical assets had a weak and negative relationship with the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. ($\chi^2=18.922$, $df =1$, $p=0.000$, $r=-0.223$), this value is statistically significant. Consequently, the null hypothesis is rejected and the conclusion is that there is a weak and negative relationship between availability of physical assets and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County.

4.1.1.2 Financial Assets and LVD Outcomes

The researcher sought to find out whether the type of credit finance institutions the participants used had any influence on their LVD outcomes. The results were as follows;

Table 3. Chi-Square tests for financial assets and LVD outcomes

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.637 ^a	1	.003		
Continuity Correction ^b	7.345	1	.007		
Likelihood Ratio	14.950	1	.000		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	8.615	1	.003		
N of Valid Cases	381				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.43.

b. Computed only for a 2x2 table

Table 4. Spearman Correlations coefficient for financial assets and LVD outcomes

		Correlations		
			Sum of extent LVD outcome (Binned)	Credit asset financial institution
Spearman's rho	Sum of extent of LVD outcome (Binned)	Correlation Coefficient	1.000	-.151**
		Sig. (2-tailed)		.003
		N	381	381
	Credit asset financial institution	Correlation Coefficient	-.151**	1.000
		Sig. (2-tailed)	.003	
		N	381	381

** . Correlation is significant at the 0.01 level (2-tailed).

As manifested in Table 3 and Table 4, it is noticeable that there is significant evidence to show that the type of credit asset finance institution (formal or informal) had a weak and negative relationship with the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. ($\chi^2=8.637$, $df=1$, $p=0.003$, $r=-0.151$), this value is statistically significant. Consequently, the null hypothesis is rejected and the conclusion is that there is a weak and negative relationship between the type of credit asset finance institution (formal or informal) used and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County.

4.1.1.3 Social Capital as Assets and LVD Outcomes

The researcher sought to find out whether belonging to a social group had any influence on the LVD outcomes of the participants. The results were as follows.

Table 5. Chi-square tests for social capital assets and LVD outcomes

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.103 ^a	1	.748		
Continuity Correction ^b	.014	1	.907		
Likelihood Ratio	.105	1	.746		
Fisher's Exact Test				.841	.465
Linear-by-Linear Association	.103	1	.748		
N of Valid Cases	381				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.79.

b. Computed only for a 2x2 table

From the Table 5, we can see that the participant's social capital had no significant relationship with their LVD outcomes. ($\chi^2=0.103$, $df=1$, $p=0.748$). Consequently, the null hypothesis is accepted for the reason that this value is statistically insignificant and the conclusion is that the participant's social capital had no significant relationship with their LVD outcomes.

4.2.2. Influence of Challenges faced on the LVD outcomes

Ho₂ There is no relationship between livelihood challenges and livelihood outcomes among agro-pastoralists in Laikipia North Sub-County

The researcher sought the influence of challenges faced and their influence on the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. Hence, the hypothesis was tested using Chi-square test for independence in order to know if there is any relationship between independent and dependent variables and the results were as follows;

Table 6. Chi-Square Tests for the relationship of livelihood challenges and LVD outcomes

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.017 ^a	1	.313		
Continuity Correction ^b	.690	1	.406		
Likelihood Ratio	1.040	1	.308		
Fisher's Exact Test				.375	.204
Linear-by-Linear Association	1.015	1	.314		
N of Valid Cases	381				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.83.

b. Computed only for a 2x2 table

As evidenced in the Table 6, the challenges that the participants faced had no significant influence on their LVD outcomes ($\chi=1.017$, $df=1$, $p=0.313$). Consequently, the null hypothesis is accepted for the reason that this value is not statistically significant and the conclusion is that the challenges that the participants faced had no significant influence on their LVD outcomes.

4.3.3. Influence of adopted LVD strategies on the LVD outcomes

Ho₃ There is no relationship between livelihood diversification strategies and livelihood outcomes among agro-pastoralists in Laikipia North Sub-County

It was crucial for the researcher to investigate the relationship between LVD diversification strategies and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. Thus, the hypothesis was tested using chi-square test for independence in order to know if there is any relationship between independent and dependent variables and the results were as follows;

Table 7. Chi-Square tests for LVD strategies and LVD outcomes

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.730 ^a	1	.000		
Continuity Correction ^b	13.255	1	.000		
Likelihood Ratio	24.056	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.691	1	.000		
N of Valid Cases	381				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.73.

b. Computed only for a 2x2 table

Table 8. Spearman correlations coefficient for LVD strategies and LVD outcomes

			Sum of extent LVD of outcome (Binned)
Spearman's rho	livelihood strategies in two categories	Correlation Coefficient Sig. (2-tailed)	1.000 -.197** .000
		N	381
	Sum of extent of LVD outcome (Binned)	Correlation Coefficient Sig. (2-tailed)	381 1.000 .000
		N	381

** . Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 7 and Table 8 it is noticeable that there is significant evidence to show that LVD strategies adopted had a weak and negative relationship with the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. ($\chi^2=14.730$, $df=1$, $p=0.000$, $r=-0.197$), this value being statistically significant, the null hypothesis is consequently rejected and the conclusion is that there is a weak and negative relationship between the adopted LVD strategies and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study was set to identify the demographic characteristics of the household heads among agro-pastoral households in Laikipia North sub-county. More than half of the participants were household heads, the rest were their spouses, offspring or relatives who had lived in the area of study for more than 18 years. Most of them were married, with less than six dependents and in monogamous family set up, though few belonged to polygamous families. The ratio of male to female participants was almost 1:1 since the male were 51% and female 49% of the participants. Majority of participants had up to primary school with very few having tertiary level of education yet some had no formal education. Most of them were either livestock or crop producers.

Livelihood outcomes

The researcher sought to investigate the livelihood outcomes among agro-pastoral households in Laikipia North sub-county. For increased income, increased stock of assets and coping with

shock, over 80% of participants indicated having medium livelihood outcomes in each case. However, outcomes for better housing, having three meals per day, food availability, access to safe drinking water and health care were also indicated to have medium attainment of livelihood outcomes ranging from 50% -79% of the participants.

Livelihood assets

The researcher was in quest for the influence of assets on livelihood outcomes and therefore, the availability of livelihood assets was first of all to be investigated before looking into their influence on the livelihood outcome. The assets were categorized as physical, financial, and social.

Regarding physical assets, land was very much available and to a large proportion of participants for crop and livestock production, as well as for leasing. Water well was however not available to a majority of them in spite of it being a source of water for domestic use, irrigation, watering animals and for development. Goats were available in excess to a few participants and in addition sheep, cattle and donkey were available to some extent. None the less, the oxen were not available to a majority of them. These livestock were used for food, sold for income or as store for wealth. Even so, all the equipment and facilities looked in to by the researcher were available to some extent in small proportions of participants to each equipment and facility ranging from 3.1% for axe to 42.3% for mobile phone. It was however intriguing to find out that all these equipment and facilities were also not applicable to large proportions of participants to each equipment and facility. Furthermore, transport assets were not applicable to most of the participants. However, a small proportion indicated that these transport assets were available to some extent; the null hypothesis was rejected since there was a weak and negative relationship between availability of physical assets and the LVD outcomes among agro-pastoralists in Laikipia North Sub-County. Meaning that, Participants with more physical assets had low LVD outcomes as compared to those with less physical assets.

Financial assets

In regard to financial assets, the researcher sought to investigate the main sources of finances usage of these finances and saving practices among the participants. The researcher also looked into why some of the participants did not have access to credit or did not engage in saving as a practice. Regarding their sources of financial credit, a majority of participants (64.0%) obtained their credit from associations of farmers or traders, village money lenders and NGOs each providing credit to some (12.3%) of the participants, banks gave 5.8% of the participants credits and 5.5% of them got credit from family and friends. The study found out that, in the past 12 months, the participants considered to mostly use formal credit institutions (collateral based) as opposed to informal sources. This could be attributed to the fact that these formal credit institutions are usually regulated by the country's reserve bank, there are no exploitations by the lenders and the cost of borrowing is usually more affordable.

About the purpose of the credit obtained, it is clear from the study that the majority of the participants obtained credit for the purposes of financing alternative livelihood strategies. Another significant segment of the participants obtained credit to finance household welfare such as health. Regarding savings, the study found out that approximately a third of the participants bought livestock as a way of saving their financial assets, 22.3% of them bought land and 17.8%

of the saved in microfinance institutions or banks. However, 29.13% of them did not save their financial assets at all.

Conclusions

From the findings of this study as well as the tests of hypotheses, several conclusions regarding the survey population are drawn; By adopting various alternative livelihood strategies, Laikipia North households had diversified their livelihood strategies to ensure survival and meet desired livelihood outcomes. Adoption of alternative livelihood strategies across Laikipia households varied depending on age of household head, location of the homestead as well as asset possession or reliance. Pursuit of alternative livelihood strategies was a struggle against various challenges, which needed households to devise solutions and coping mechanisms to guarantee better livelihoods outcomes. There was a significant association between increased vulnerability of a traditional pastoral livelihood strategy and pursuit of alternative livelihood strategies. Similarly, there was a significant association between practice of alternative livelihood strategies and livelihoods outcomes realized.

Recommendations to Policy and Practice

County government to facilitate deployment, equipping and funding extension officers in the study area households had adopted small-scale and large-scale farming. The officers will support the communities with knowledge, skills and augment research through testing contemporary agricultural practices and land preservation. The government should strengthen Cooperative Development and Trade and Industry to the ward level. Such efforts will enhance the formation and effective running of cooperative societies as well as equip local community members with skills of running profitable businesses. National and County governments to establish and improve existing infrastructure such as road network as the condition of roads were not favorable. Majority of the roads were seasonal and in wet weather, it was difficult to move people and goods from one area to another. When roads are improved and bridges constructed on most of the existing streams and rivers, movement of goods and people will be easy and this will affect prices of commodities positively. This will encourage the expansion of adopted small-scale microenterprises. Ministry of Agriculture, Livestock, Fisheries and Irrigation should focus on constructing water dams and pans in the area of study. Water dams and pans will ensure availability of water during drought and will help in developing the infrastructure for irrigation technology. Water will be available for crops, livestock and will encourage establishment of tree nurseries for planting soft wood trees and expand prospects in the sale of wood products. Parliament and county assemblies need formulate land use policies that empowers locals

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