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Challenges Facing Smallholder Farmers in Mono Cash-crop Production in Tanzania: Are Adaptation Strategies Towards Livelihood Diversification a Panacea?

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Abstract

Smallholder farmers are those engaged in agricultural activities that include livestock rearing and food crops production in rural areas. This study was carried out in three districts in Tanzania—Newala, Bukoba and Moshi Rural—to look into the challenges facing such farmers who specifically deal with mono cash-crop production. Using a descriptive survey design, data collection involved the use of questionnaires, focus group discussions, interviews, field observation and documentary reviews. Systematic random sampling was used to select 300 respondents in the three districts. The study found that smallholder farmers in the study areas practise both extensive and intensive farming systems; and use both tractors and hand hoes. Production is affected by changes in weather patterns, lack of inputs (fertilizers, insecticides, pesticides, and poor infrastructure), inadequate extension services, inadequate information, lack of trust in some cooperative leaders, land scarcity, fall in the prices of cash crops, and pests and diseases. The farmers adapt to these challenges through livelihood diversification, use of alternative inputs, farming intensification, application of indigenous farming systems, use of cooperative unions, reliance on social networks, brewing local alcohol, making furniture, and use of hired labour. These coping strategies differ among smallholder farmers of mono cash-crops depending on their social-economic status, education, marital status, skills and income levels. The study recommends that measures and strategies aimed at improving sustainable livelihoods among smallholder farmers in mono cash-crop production should address the whole range of issues leading to poverty and exposure to disparities within the communities.

Keywords: *adaptation, livelihoods, mono-cash crop, smallholder farmers, Tanzania*
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1. Introduction

Despite the diversity of smallholder farmers of mono cash-crops in rural population, livelihood insecurity is a common feature shared by many households globally (URT, 2014; Vorley, 2002; Carney et al., 1999). These households are involved in agriculture as a key livelihood strategy to earn their living. Estimates show that between one-quarter and one-fifth of the world's population derive their livelihood from small-scale agriculture (Soini, 2005). Agriculture in Africa is the main economic activity that greatly depends on the climate (Likinaw et al.,

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2022). It also absorbs a huge rural labour force, and generates a significant share of the gross domestic product (GDP).
Farmers in Africa live on small farm holdings that are becoming smaller given the increasing rural population. Most of these people are members of peasant farm households or, in other words, they are dependent upon the activities carried out on peasant farms (World Bank, 2007; Stifel, 2010). It should be noted that all households have links with agriculture through the food they consume, but poorer people spend more of their income on food. As such, agriculture is an important source of livelihood for the majority of rural people in the developing world. Thus, given the large numbers of rural population who are involved in smallholder agriculture, it is necessary to understand the dynamics of the people, their smallholdings and their livelihoods (Soini, 2005; Kalinga et al., 2019). This understanding is imperative because of three main reasons: (i) poverty is comparatively more predominant in rural areas than in urban settings in the developing world; (ii) smallholder agriculture is important in national development in terms of its contribution to the production of food and industrial raw materials; and (iii) many of the rural poor depend directly or indirectly on peasant agriculture.

Historically, small-scale producers in Tanzania grow cash crops such as coffee and cashew-nuts for sale and for their own consumption (Smith, 1987). Crop production depends on the availability of resources such as land, good weather, enough labour and capital. On the other hand, decision on resource allocation is basically done by smallholder rural dwellers for steady production. For example, in 1980s, the production of coffee in Moshi rural, and cashew-nuts in Newala, increased fivefold. This was a result of good climatic conditions, fertile soil, enough labour and the availability of requisite farm inputs (Martin et al., 1997; Yeboah et al., 2020). Both coffee and cashew-nuts are grown between trees that act as shade and wind breakers (Smith, 1987). In Moshi Rural and Bukoba districts, coffee is planted amidst trees because of land shortage associated with the increase in population. Smith (ibid.), and Soini (2005), noted that the fragmentation of farms thwarts efforts to increase crop productivity. Thus, to augment agricultural productivity, it is imperative to propose some strategies for enhancing sustainability of farming in rural households (Asmah, 2011; Maharjan, 2014; Yeboah et al., 2020).

Though agriculture in Tanzania employs more than 70% of the rural population, the sector is still very much underdeveloped (URT, 2014, 2022). Poor extension services; inadequate agricultural inputs, such as improved seeds, herbicides and fertilizers; coupled with poor road and rail infrastructure and marketing systems: all have impacted negatively on agricultural improvements in rural Tanzania (Devereux et al., 2006; Raphael, 2018). Mounting evidence on the factors leading to poor livelihood outcomes at individual, household and community levels show a big contradiction between the eco-environment endowment and resource demand-dominated livelihood strategies (Gentle & Maraseni, 2012; Ferrol-Schulte et al., 2013; Tanner et al., 2015; Kalinga et al., 2019). Thus, this called for the need to investigate the challenges facing rural farmers in view to identifying possible policy

interventions for enhancing the productivity of mono cash-crops by small-scale holders, thereby also improving their livelihoods over time and space.
This article sought to establish the characteristics of livelihood systems of smallholder farmers involved in cashew-nuts and coffee cultivation in the rural areas. It also examined the challenges facing smallholder farmers of mono cash-crops and the strategies they employ in enhancing their livelihoods in the study areas. As such, this study is important in several ways. First, since smallholder farmers in rural dwellings suffer from low productivity of cash crops, low levels of investment in the agricultural sector, and livelihood insecurity, it is expected that its findings will assist in instituting measures and policies that can assist overcome the challenges. Second, the study results will add to the literature on the challenges facing smallholder farmers of mono cash crop farming, and open avenues for further inquiries on the subject matter.

The article is divided into five major sections. Following this introduction in section one, is section two that dwells with the methodology and materials, while section three is on the results. Section four is on the discussion, followed by the conclusion and recommendations in the last section.

2.Methodology and Materials
This study was guided by the sustainable livelihood framework (SLF). The model explains the processes and mechanisms exercised during livelihood alteration. This framework is the best to study dynamics of people's livelihoods when subjected to scarcity of resources. The SLF (Figure 1) is relevant in this case because of its emphasis on the household as an epic centre for the deployment of initiatives to thwart predicaments brought by challenges in mono cash-crop production.

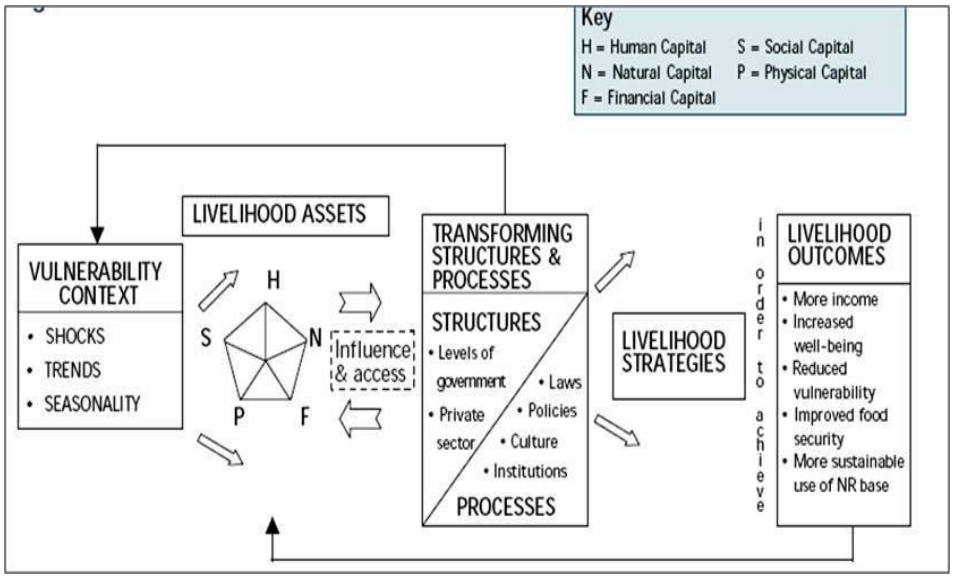

Figure 1: Vulnerability and Livelihood Assets nexus Parameters

Source: Adapted from DFID (1999)

The framework is based on the argument that, normally, people operate in a context of vulnerability, and availability of their assets is affected by critical trends as well as by shocks and seasonality over which they have limited or no control (DFIDs, 1999). These factors make up the vulnerability context which has a direct impact upon people's asset status and livelihood outcomes. The SLF shows that household assets gain meaning and value through prevailing institutional frameworks which can either inhibit or foster attainment of livelihood outcomes.

In the SLF, the power dynamics are clearly indicated showing its influence in livelihood assets, structures and processes, strategies, outcomes and vulnerabilities. The differences in interests, conflicts and tensions within and between communities are addressed within the SLF, which suggests that poor communities within communities have least access to assets, scant influence over structures and processes that govern their lives, and thus face the greatest vulnerability to shocks of all kinds. The model clearly depicts analysis of relations between households, community institutions, immediate structures (local government, market organizations), and other external relations that are important in analysing livelihoods.

Furthermore, an understanding of political processes and power dynamics in areas with challenges associated with mono cash-crop production like Newala, Moshi Rural and Bukoba districts will disclose information about the kind of struggles experienced by agricultural communities. Limited access to resources, lower rates of pay and their reproductive duties tend to make women more vulnerable than men in normal times and during emergencies (Makete et al., 2002). In the analysis of mono cash-crop production dynamics in Newala, Moshi Rural and Bukoba districts, gender dimension is considered by incorporating gender issues in the model in accessing household assets and benefits from different livelihoods. Thus, the framework fits the study on community livelihood dynamics in the study areas.

2.Methodology and Materials

The study applied both qualitative and quantitative methods. A descriptive survey design was chosen because it could be applied in collecting data on people's beliefs, attitudes, behaviours, habits, and any other social issues like the targeted community's livelihood adaptation strategies. In the research design, a cluster sampling of smallholder farmers was carried out based on their engagement in mono cash-crop production in the study areas to get the sample frame for the study, i.e., those small farmers who grew cashew-nuts (Newala - Mtwara), and coffee growers (Moshi Rural, Kilimanjaro; and Bukoba, Kagera). In each of these districts, a random sample of households engaged in mono cash-crop production was selected for an interview. Sub-village leaders were identified with the help of ward and village leaderships; from which a purposive random sample was obtained to include different smallholder farmers who had had better harvest in

the past season. Nachmias and Nachmias (2000) argue that for a sample to be representative enough for statistical analysis, it is recommended that at least 10% of the entire population be studied. This study drew a sample of 10% of the 3,000 households living in the aforementioned study districts. Thus, a total of 300 households were selected to represent the entire study population (NBS, 2014).

Quantitative data was analysed using the Statistical Package for Social Sciences (SPSS) software version 20 to process the coded data and derive tables of frequencies and percentages. Moreover, cross-tabulation was done to establish the relationship between the households' adaptation strategies and the spatial variation in the mono crop cash production in the study areas. The data was presented in terms of tables, pie charts and bar graphs. Thematic analysis was employed to analyse qualitative data from key informant interviews (KII), focus group discussions (FGDs) and field observation (FO). This qualitative information was grouped into themes and sub-themes for further content analysis, to derive remarks and conclusions on the subject matter under study.

3.Results and Discussion

3.1 Socio-economic Characteristics of Smallholder Farmers

The socio-economic characteristics of the surveyed population in the rural settings are central to the understanding of the livelihood systems of smallholder farmers in mono cash-crop production. The main parameters of the socio-economic characteristics discussed included age and sex, marital status, education level, and income. These socioeconomic parameters are closely related to livelihood systems based on agriculture and non-agricultural activities.

3.1.1 Age and Sex

Age and sex are important variables in studying livelihood systems of smallholder famers because the needs and demands of different age-groups and gender of smallholder farmers of cashew-nut and coffee cultivation and management vary over time and space. Table 1 show the age and sex distribution in the selected study areas. Table 1 also indicates the percentages of respondents in each age and sex group. The findings reveal that at age 36–60, the number of both male and female respondents is more than a half (52.5%). This group indicates labour force availability during production in mono cash-crop areas. Labour availability has implication on crop cultivation: the higher the availability of labour, the higher the crop yields. The increase in the crop yields also increases household income, and also the demand for land for production. This implies that in the long-run, most of the land will be converted into farms, which will ultimately create land scarcity for other land uses.

Table 1: Age and Sex of Respondents

	Gender		Total(%)
	Male (%)	*Female (%)*	
18-35	8.1	4.8	12.9
36-60	26.9	25.6	52.5

61+	25.0	9.4	34.4

Source: Fieldwork data (2021)

The big investors who invested in coffee plantations and cashew-nuts in the study areas had acquired huge pieces of land for production purposes. It was also noted during in-depth interviews with the key informants that the customary land tenure triggered household land scarcity for mono cash-crop production. This is because due to customary land inheritance rights to sons from their fathers, this has led to further farmland fragmentation and changes of land use from cultivation to settlements to accommodate new households. Contrary to what has been observed in the study areas, Börjeson (2004) associated land scarcity in mono cash-crop areas in Mbulu Highlands with the occurrence of pests and diseases, as well as policy changes.

3.1.2 Marital Status

According to Umberson (2004), marital status of household members is an important aspect in defining social and gender roles that are useful in livelihood sustainability. As indicated in Figure 2, the majority of the respondents (76.8%) were married, 9.8% were widows, 4.9% were single, 4.6% were divorced, and 3.9% were widowers. The marital status of the respondents revealed that more than three-quarters (76.8%) were in the married category (Figure 20).

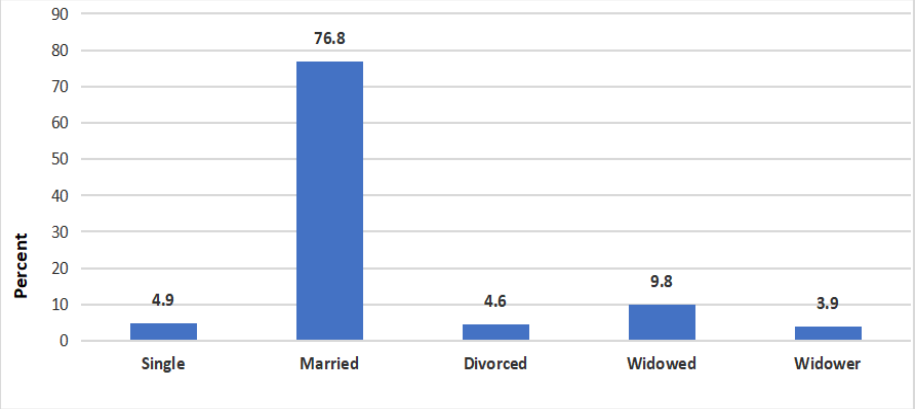

Figure 2: Marital Status of the Respondents

Source: Fieldwork data (2021)

This implies that most of the households interviewed had a minimum of two people, who in one way or another might have been depending on land resources for their daily livelihoods. This has some implications on the livelihood of smallholder farmers and the division of labour for production purposes. For example, in Moshi Rural district, women and children are responsible for farm cultivation, and taking care of the coffee and livestock. This situation leaves women with very little time for leisure and other productive activities. On the

other hand, men have the role of managing farm activities in general, engaging in negotiations (both social and political), and carrying out petty businesses.

3.1.3 Education Levels

Table 2 shows that over three-quarters of the respondents (79%) had primary school education, about 15% had been to secondary school, and 3.3% had never been to school. Almost three percent (2.7%) of the respondents had attained tertiary education. According to the focus group discussions (FGDs), the education level determines the occupation of a household because education determines who will be employed in the formal sector, who will find employment and livelihood in agricultural activities (farming and livestock keeping), and who will engage in non-agricultural activities (small businesses). It is argued that the more a household is employed in the formal sector, the less its overdependence on agricultural activities.

Table 2: Levels of Education of Respondents

Education level	Percent
Primary	79
Secondary	15
Tertiary	2.7
Non-formal education	3.3
Total	**100**

Source: Field data (2021)

The education offered in the study areas was either formal or informal. The level of education has several direct and indirect impacts on agricultural production and to the livelihood systems of rural communities. Directly, non-formal education levels allow most people to be employed in agriculture, such as in farming and livestock keeping, thus determining an individual's type of occupation. On the other hand, people with formal education are employed in the public or private sector. These receive monthly salaries, making them less dependent on agricultural activities for their livelihoods.

3.1.4 Household Levels of Income

Household standards of life are usually determined by the type of employment and income an individual is likely to receive. This can easily be known through household levels of income. From the household interviews, income was categorized into four main levels: less than average, low, middle, and above the national minimum wage. Table 3 shows that the majority of the households interviewed (66%) earned less than TZS199,000 per month. This is even less than the national minimum national wage, which is TZS200,000. The majority of such respondents were from Newala district (26%), followed by Bukoba district (25%), and then Moshi Rural district (15%). On the other hand, 20% earned between TZS200,000 and TZS399,000, just above the national minimum wage. The majority of these were from Moshi Rural. Eight percent (8%) of the respondents earned between TZS400,000 andTZS599,000; and of these five

(5%) were from Moshi Rural, and 3% were from Bukoba district. There was no response from Newala district in this category. It was also noted that very few respondents earned above TZS600,000 per month; the majority (4%) of whom were from Moshi Rural. During an in-depth interview with one government officials in Moshi Rural, in October 2021, it was indicated that wages in the public sector ranged between TZS150,000 and TZS170,000 per month; while in the private sector the minimum wage was TZS150,000 per month.

Table 3: Households Levels of Income

Household Average	**Districts (%)**			
Monthly Income/(TZS)	***Newala***	***Bukoba***	***Moshi Rural***	**Total (%)**
> 199,000	26	25	15	66
200,000–399,000	4	6	10	20
400,000–599,000	0.0	3	5	8
Above 600,000	0.0	2	4	6
Total	**30**	**31**	**39**	**100**

Source: Field data (2021)

During the interviews with household heads, low income was associated with poor harvests and price fluctuation of crops and livestock, both at the local and international markets. Again, low levels of education, poor access to credit institutions caused by land scarcity and tenures: these further aggravated the situation. During the high peak season from June to August, bananas and beans were normally sold at a high price leading to high income in both areas cultivating bananas as a staple food-crop and coffee as a mono cash-crop. This was associated with good climatic conditions and improved inputs in Bukoba and Moshi Rural districts. On the other hand, low income was associated with poor harvests and fluctuation in the prices of agricultural products at the local and world markets.

Well over two-thirds (69.7%) of the respondents reported that they sold crops as a source of income, almost 11% dealt with petty business, 8.5% sold livestock, and 7.3% supplied labour to their neighbours in activities related to farming. The rest engaged in formal employment (1.3%), got aid from their children (1.3%), dealt in mechanics and sold local beverages (0.8%) (Figure 3). Lyimo (2013) argues that income determines the level of access to resources and capacity to address social, economic and environmental needs. While formal occupation has security in terms of wage payment, informal occupation has no security; and most of those with informal occupation depend on land resources for their livelihoods. These formal and informal occupations were the sources of income at the household level over time and space in the study areas.

From the foregoing, it is clear that, household livelihood in mono cash-crop communities depends on the selling of crops and livestock, and doing petty businesses to pay for social services and other basic needs.

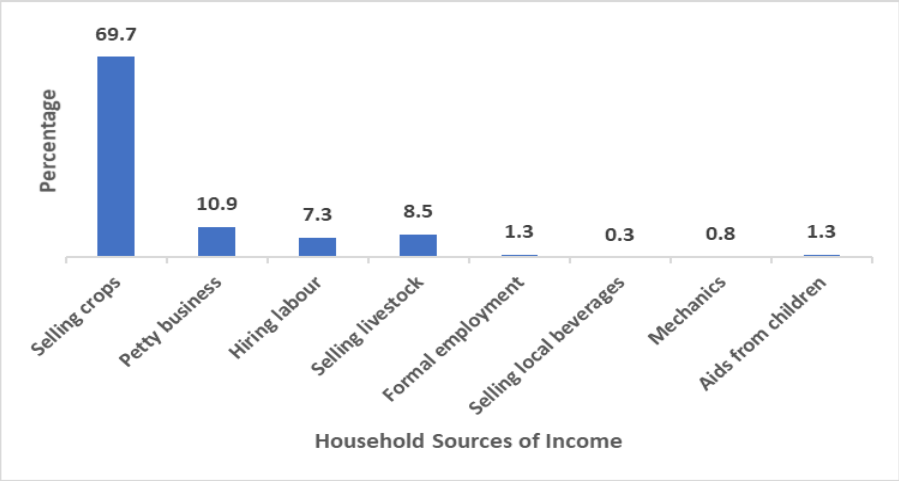

Figure 3: Main Household Sources of Income

Source: Field Data (2021)

Asmah (2011) noted that, in the long run, such livelihoods that depend on mono cash-crop might have some implications on smallholders' livelihoods in rural settings. If a farmer spends more time in farming with less returns, this might obviously increase the risk of the decline in crop productivity, and an increase in more investments in non-agricultural activities.

3.2 Smallholder Farmers and Mono Cash-crop Farming Practices

Smallholder famers in rural areas practice both extensive and intensive farming systems in mono cash-crop production. They mostly use tractors and hand hoes in land cultivation. This was affirmed by one of the male key informants, aged 63 in Bukoba district, Kahororo ward, who gave the following comment:

> *"Always, farmers in Bukoba use tractors in cultivating their farms. They also use hand hoes during weeding. They plant improved seeds and apply fertilizers to their farms before planting and after weeding. The farmers depend on rainfall for the growth of their crops, especially cash crops. With adequate rainfall, the production of crops increases; while production declines in low rainfall areas. This variability in rainfall has resulted into a decline in farm productivity: from 30 to 50 bags per acre annually in the last 30 years, to 10 bags in 2021."*

This decline in productivity led the communities in the study areas to change their farming practices from growing cash crops to food crops such as cassava, maize, sweet potatoes and beans. The introduction of these new types of crops demanded more soil fertility to improve farm productivity. This led to the introduction of livestock keeping activities in the study areas for the purpose of getting manure. Thus, the introduction of new crops and livestock keeping

activities forced farmers to divide their farming land into three main portions: one portion for cash-crops; another for food-crops; and the third for grazing purposes. This fragmentation led to the decline in the acreage (land) for cash-crop production. Consequently, this has discouraged smallholder farmers' intentions to produce cash crops; and instead made them resort to migration to other areas as a means of coping with land crumbling. Otieno (2019) also witnessed that the discouragement of smallholder famers dealing with mono cash-crop production is evident in some parts of Mbeya region.

3.2.1Challenges Facing Mono cash-crop Farmers

As mentioned earlier, smallholder farmers were facing challenges because of dealing with mono cash-crops in the study areas. Moreover, farmers lacked access to financial assistance from the banks to buy inputs, machines, and to pay for services provided by extension officers. As it was explained by Boto (2014), these challenges made most rural communities diverge from the production of cash-crops to food-crops. The change was also associated with increased population, which increased the demand for more land for food production, settlements and infrastructure development. During the field study, it was further noted that the lack of access to credit was one of the main factors reducing the amount of coffee production in Moshi Rural district. This challenge was also associated with the lack of honesty and trustfulness on the part of some farmers in the area, which contributed to low productivity.

On the other hand, the conversion of farm land into settlements and bare land in Bukoba and Newala districts resulted into environmental challenges such as soil erosion and the exacerbation of land degradation (Table 4). This has made smallholder farmers abandon their land and engaged in other activities such as petty businesses and rural-urban remittances. However, it is worth noting that despite the considerable loss of land to other land use types caused by settlements in Newala district, the return of the abandoned areas of cashew-nut farms back to farmers minimized the challenge of land scarcity in the area.

Table 4: Challenges of Mono Crop Production in the Study Areas

District	Soil Erosion	Lack of Access to Credit	Urban Sprawl	Population Growth and Land Scarcity	Difficultness of Getting Inputs	Change of Weather	Lack of Inputs	Low Income	Infertile Land	Low Price	Total
Newala	38.4	10.9	0	0	42.1	8.4	50	33.4	0	0	15.9
Bukoba	46.2	7.3	100	57.1	47.4	83.3	50	33.3	100	50	44.2
Moshi rural	15.4	81.8	0	42.9	10.5	8.3	0	33.3	0	50	39.9
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Field Study (2021)

In coffee production areas like Bukoba, land shortage, coupled with inherent poor soil fertility and continuous land fragmentation, have been said to be the most critical constraints in the production of the main cash-crop, i.e., coffee. During an

in-depth interview with one female extension officer, aged 40, in Magoti Village, Kibeta ward, in Bukoba district, the respondent gave the following statement:

> *"The fragmentation of land into small portions to the members of the households was linked to the change in land ownership from community (common land) to private land tenure*."

Change in land ownership has some implications on the management of land and its use. Private land ownership tends to be friendly to the environment and production systems compared to communal ownership. The same assertion was made by one of the key informants, aged 70, in Luchingu village, Newala district, thus:

> *"In our village, yields are higher in land which is owned privately, compared to land that is owned communally. This is because of the serious land management measures and great care given to the former; unlike with the communal land ownership where land management practices are poor. In the latter, land is free to every member of the community; so people feel less responsible to ensure nutrients are replenished*."

In relation to the market, almost half (47.9%) of the respondents in Moshi Rural claimed that high prices of agricultural inputs reduce the rate of production. Also, about 41.4% were of the opinion that unreliable market for their produce was a major hindrance in the production of cash crops. According to information from one key informant in Kibosho East ward, in Moshi Rural district, the marketing of coffee from smallholder farmers and coffee estates is normally coordinated by cooperative unions which are also responsible for processing and selling the crop. During FGDs, one of the graduate male respondents, aged 65 years, shared the following observation:

> *"The Tanzania Coffee Board (TCB) deals with marketing issues. A farmer takes his/her crops to a cooperative union, from where the union collects coffee from different people. After the collection of the produce, they send the crop to the TCB through one Urafiki Company. This company, under the TCB guidance, then engages in the processing and exportation of the coffee to the world market."*

This implies that cooperatives act as middlemen between farmers and other buyers by handling marketing and procurement procedures to both farmers and buyers. During the field study, it was noted that almost a half (49%) of the respondents who were farmers used cooperative unions for the marketing of their crops; just over a quarter (26.3%) sold their harvest through individual networking; while just below a quarter (24.7%) took their produce straight to the market.

Accepting farmers' crops was at the discretion of cooperative unions who sometimes refused to accept the produce if deemed to be of below standards, which affected the morale of the farmers. Initially, farmers sold their crops to the unions, after which the unions gave the farmers money and retained some to buy agricultural inputs for future distribution to farmers for use in production. However, the farmers later decided to take all their money without leaving some aside for buying inputs for the subsequent season, as explained by a female respondent, aged 61 years, during FGDs:

> *"Initially, farmers surrendered some amount of money to the cooperative unions for buying inputs, but in 1992 some of the government leaders (for political popularity) intervened and convinced farmers to take all their money from the unions, ignoring any reservations to buy inputs. This distorted the whole situation of coffee production because during the production cycle of the following season, farmers were bankrupt as they had already spent all their money for other needs; and hence could not afford agricultural inputs."*

The situation led to a decline in coffee production. More than half (51%) of the respondents said they were reluctant to grow coffee as they felt that it was a waste of time because of low returns. Smith (1987) noted that households may normally withdraw some of their resources from agricultural activities that do not have returns to them anymore. At the individual level, they may also divert to other informal sector activities such as brewing local beer, operating *bodaboda* and other petty businesses, and doing crafts to improve and sustain their livelihoods.

The decline in the production of mono cash-crops by smallholder farmers in the study areas was also associated with climatic related shocks. About one-third (31.7%) of the respondents opined that the decline in cash crop production was due to prolonged droughts;17% thought it was due to excessive rainfall; 24% said it was because of strong winds; while 14.3% said it was due to severe cold. Additionally, some associated the decline in production with shortage of rainfall (about 6%), crop diseases (3%), natural disasters (2.7%), and destructive animals (1.3%) (Table5).

Table 5: Causes of Decline in Mono cash-crop Production

	Reasons for the Decline in Production	No. of Respondents	Frequency (%)
1.	Prolonged drought	95	31.7
2.	Excessive rainfall	51	17
3.	Strong winds	72	24
4.	Disaster	08	2.7
5.	Severe cold	43	14.3
6.	Crop diseases	9	3
7.	Shortage of rainfall	18	6
8.	Destructive animals	4	1.3
	Total	**300**	

Source: Field study 2021

The effects of climate change, as noted during the FGDs, have resulted into the drying up of streams and some rivers such as Rau River in Kilimanjaro region, and Nkenge River in Kagera region. The climate change impacts also forced some people to migrate to other areas like Dar es Salaam, Arusha and Mwanza in search of greener pastures. Since labour is one of the major factors of production in rural agriculture, rural-urban migration reduces household labour, which results into labour shortage in the farms, and hence a decline in farm productivity.

This shortage of labour was affirmed by one key informants during FGDs, who gave the following comment:

> *"Household size is the major determinant of household labour. Recently, household labour has declined because of the outmigration of household members to seek new life opportunities. This situation has resulted into the shortage of labour and low farm-based income. To address this challenge, households engage in labour-sharing, sell and hire labour, and engage in off-farm activities so as to improve household livelihood."*

These findings show that the causes of the decline in the production of mono cash-crops in the study areas were social, economic, biological and political in nature. For example, the villagization programme affected the production of cashew-nuts in the Mtwara study area. The programme intended to bring rural people together within a registered village (*ujamaa village*) so that they could easily be provided with social services, agricultural inputs, schools, health facilities, and clean water. This forced most farmers to leave their original productive land to settle in new areas, which were sometime infertile, and this resulted into poor crop yields. When asked about this, one male, aged 75 years, gave the following account:

> *"Though the main objectives of* ujamaa villages *were to provide social services and communal farms or block farms, these were not successfully attained as most of the peasants returned to their individual plots from block farms. This caused conflicts on land occupancy, and poor land management. The conflicts occurred between the majority of youths who were allocated land under the villagization programme, and elders who wanted to reclaim their former land."*

Kikula (1997) noted that the movement of farmers in cashew-nut areas during villagization made most of them abandon their land. During in-depth interviews, the abandonment of land was mainly explained as the major factor that had forced farmers to engage in non-farming activities like petty business, hair dressing and fishing. Obviously, such a shift in activities resulted into a decline in cash crop production. Rehabilitated land from abandoned farms allowed the production of other crops such as cassava, maize, groundnuts and pigeon peas for food and for selling.

3.3 Smallholder Farmers Adaptation Strategies for Livelihood Diversification

In coping with the challenges facing smallholder farmers, most households reported that they had to engage in agricultural intensifications as indicated in Table 6. This practice was adopted by 73% of the farmers in Newala, 53% in Bukoba, and 58% in Moshi Rural. Agricultural intensification practices identified in the mentioned areas included the use of inputs such as pesticides, insecticides and improved seeds. Such practices were introduced due to a decline in the quality and quantity of the mono cash-crops in the areas.

Table 6: Smallholder Farmers Adaptation Strategies and Livelihoods Diversifications

	Agricultural Intensification	Decrease Consumption	Relying on Social Networks	Sell Livestock or Grains	Use of Improved Seeds	Expand Farm Size	Horticulture	Others	Total
Newala	73	3	3	14	0	6	1	0	100
Bukoba	53	20	6	17	0	2	1	1	100
Moshi	58	17	4	7	4	1	6	3	100

Rural									
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Field Study (2021)

Selling livestock or grains was the second most popular strategy used by smallholder farmers to cope with climate and market shocks to supplement income from mono cash-crops in the areas. In the study area, 14% of the households from Newala mentioned the strategy as second to intensification, and 17% from Bukoba engaged in the selling of livestock. Additionally, decreasing household expenditure was mentioned as one of the adaptation measures to the adverse impacts of climate changes on agricultural production. This was mentioned by 20% of the respondents from Bukoba, 17% from Moshi Rural, and 3% from Newala. The least used adaptation strategies in all the study areas included reliance on social networks (13%), farm expansion (9%), and horticulture (8%). This observation shows that there was a variation in the coping mechanisms between one region and another. This means that adaptation strategies are location-specific, and depend mostly on the social and environmental aspects of smallholder farmers.

Intercropping was also said to be another means of coping with food insecurity. This system of crop production is common in rural communities where there is land scarcity. The system enhances soil fertility in cultivated land, particularly in mono cropping areas. As it was observed during the field survey, smallholder farmers used to intercrop coffee with bananas, beans and maize in Moshi Rural district (see Photo 1). In some areas, coffee was planted with trees as wind breakers; and the trees were later used as building materials.

Photo 1: Intercropping of Coffee with Bananas, Maize and Beans to Improve Soil Fertility

Source: Field Study 2021

The intercropping strategy improves soil fertility, farm productivity and household income, especially for those who solely depend on agriculture. This view is also supported by Makate et al. (2016), who opined that intercropping systems help in sustaining smallholder households in mono crop production areas as it provide families with diet options, improves purchasing power, and build resilience as regards climate change and variability effects. The strategy also improves various livelihoods of a community due to the fact that after harvesting the intercropped crops, households earn some money from cash crops and trees.
In high prime areas—such as Moshi Rural and Bukoba district—the expansion of farm lands converted most of the land into farms, which ultimately created land scarcity for other land uses. For instance, changes in land use from mono crop cultivation encouraged smallholder farmers to diversify their livelihoods from agriculture to livestock keeping (25.3%), petty business (37.7%), bee-keeping (0.7%), tourism (10.3%) and into dependence on remittances from family members (26%) (Figure 3).

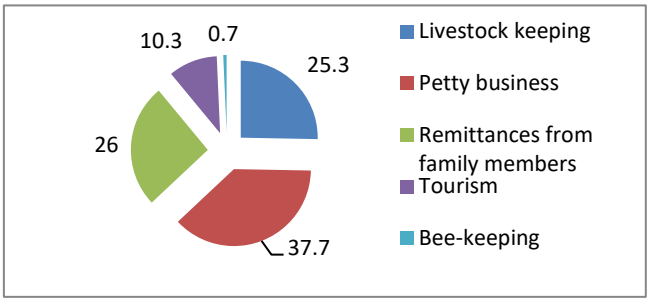

Figure 3: Smallholder Household Livelihoods Diversification Categories
Source: Field survey (2021)

In most rural Tanzania, animal husbandry has been the dominant form of livelihood activity after crop farming. As noted in Ellis and Freeman (2005), livestock keeping is an important source of income and food for households, and normally it is an outlet for household livelihood diversification. According to the study findings, animal husbandry in the area were grouped into two main categories: animal kept for food purposes (cattle, goats, sheep and pigs); and animals kept for transportation and farming (beasts of burden - donkeys and oxen). During the in-depth interviews, one of the farmers in Moshi rural district informed that most of the manure and mulch in their farms came from animals kept in their homesteads. This manure helps to improve soil fertility, preserve moisture, and reduce soil erosion.

Almost two-thirds (64%) of the households interviewed practiced zero-grazing as a major form of livestock keeping, in the study areas. Just over a quarter (26%)

practice free range grazing; 6% practice homestead and seasonal grazing as well as nomadic grazing; while only 4% knew nothing about livestock keeping practices. Raphael (2018) noted that livestock practices have a relationship with smallholder farming activities in two ways. Initially, the activities took place in mountainous areas, plains, rift valleys, hills and escarpments. In the valley bottoms these physical features provided pasture and water for livestock, domestic use and for crop cultivation. This type of landscape has some implications on the types of animals that can be fed in each type of land unit. For example, the area around the homestead is used to feed weak, lactating or pregnant cows in the morning and evening. Secondly, livestock keeping is a source of manure to increase soil fertility (Photo 2). It was also pointed out during FGDs that communities in the study areas also depend on residues from crops as animal fodder.

Photo 2: Zero Grazing for Environmental Conservation and Manure Production

Source: Field observation (2021)

Paavola (2001) noted that crop residues used in feeding livestock during zero grazing are essential for sustainable livestock keeping. Most rural communities depend on livestock for food, income and manure. This observation is supported by Gaiballah and Abdalla (2016), who noted that most rural African communities depend on livestock keeping to earn their living when crop farming fails. This type of livelihood diversification is ecologically useful, less costly and reduces agricultural uncertainty resulting from climate changes and variations, pests, diseases and droughts.

Furthermore, as stressed by Jha et al. (2011), livelihood diversification through the efforts of the government and the private sector in smallholder farmer areas may influence social, natural, physical, human and built capital assets at household or individual levels. These may help smallholder farmers to store, accumulate and generate flows of incomes and profits. As noted by Likinaw et al. (2022), these livelihood assets result into more income, increased wellbeing and more sustainable use of land. The assets also make smallholder farmers be buffered against sudden shocks such as drought, fluctuation of prices, and crop diseases as indicated in the model that guided this study.

4. Conclusion and Recommendations

Studies in adaptation strategies towards livelihood diversification have been highly useful in designing conceptual and theoretical frameworks for crop production. It is evident from this study that mono cash-crop growers have ample knowledge of their agricultural land that has supported their livelihoods over centuries. They know their farm requirements, values, as well as threats and possible alternative solutions for any emerging challenge, to enable the diversification of livelihoods. They have adapted through the use of traditional systems of agricultural land classification, and a good understanding of the use of such land on agro-biodiversity. For the case in point, their landscape assessments were used as indicators for verifying their knowledge against improved knowledge on mono cash-cropping and land resources management.

Moreover, the findings of this study show that involvement of local people in cooperative unions in the study area has been useful in the improvement of their daily livelihoods. This is due to the fact that cooperative unions have had a big role in collectively bargaining for better prices of their produce compared to independent markets that are guided by economic principles of demand and supply.

The study further noted that the communities in the study areas developed various adaptation strategies, such as crop diversification and engaging in non-farming activities like conducting petty businesses. Nevertheless, the pathways to sustainable livelihoods among smallholder farmers of mono cash-crops vary from one household to another depending on its social-economic status, education, marital status, skills and income levels. It could be concluded that the pathways to enhancing livelihoods sustainability among smallholder farmers of mono cash-crops is considered sustainable when it can cope with, and recover from, stresses and shocks; and maintain or enhance its capabilities, assets and entitlements, without undermining the natural resources base. The study recommends that policies and strategies aimed at improving sustainable livelihoods among smallholder farmers of mono cash-crops should address the whole set of issues leading to poverty and exposure to disparities within communities in Tanzania.

Declaration of Competing Interest

The author declares that there is no known competing financial interests or personal relationships that could have appeared to influence the work reported in this study.

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