

Avocado Production and Farmers Strategy for Earning Livelihoods in Njombe, Tanzania

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ABSTRACT

The avocado is a fruit with healthy and economic importance to smallholder farmers. As a crop, it is referred to as the green gold of Tanzania. This study investigates the contribution of avocado farming to farmers livelihood assets. The study was conducted in two wards in Njombe Town Council, namely Kifanya and Ramadhani. The study used mixed methods to collect the data including household surveys, focus group discussions and key informant interviews. A total of 180 avocado farmers were selected through simple random sampling. Quantitative data were analysed descriptively using the Statistical Package for the Social Sciences (IBM-SPSS version 20), while qualitative data were analysed through factual and logical interpretation of the findings. Pearson Chi-square was used to test the statistical significance of the variables. The results showed that avocado farming had a positive contribution to the farmers livelihood assets. The contribution was in terms of financial, social, natural and physical assets. Despite its contribution to livelihood assets, farmers reported various challenges, including pests and diseases, poor extension services, shortage of capital and climatic variations. This study recommends increasing the extension services provided to the farmers with respect to production and marketing processes.

Keywords: *Livelihood Framework, Livelihood Assets, Agriculture, Avocado Farming*

1. INTRODUCTION

The avocado (*Persea Americana*) is a nutritious healthy fruit, which originated in South Central Mexico (Chen et al., 2008). The cultivation of avocados was firstly reported in Mauritius in 1780, Florida in 1833, California in 1856 and Zanzibar in 1892. In the 1990s, many parts of the world had increased production of avocado (Radha and Mathew 2007).

The avocado production was estimated at 2.71 • 10⁶ metric tons worldwide in 2001, and which increased to 6.41 • 10⁶ metric tons in 2018 (Shahbandeh, 2020). Mexico is the leading avocado producer in the world. In 2018/2019, the country produced 34 per cent of the global avocados. It was followed by Indonesia, Colombia and Peru (Alves, 2020; Freshfruitportal, 2019; Walkman, 2019). Globally, avocado fruits are used as food and can be consumed as plain fruit, in salads or as juice.

In recent years, the consumption of avocado products has increased in many parts of the world, especially in Europe and Asia (Hancock, 2019). The avocado is now an important fruit in the world (Radha and Mathew, 2007). The increased consumption of avocados is mainly due to peoples increased awareness of the importance of eating healthy foods, the increased avocado esteem on social media and the enhanced convenience of ready-to-eat delicious avocados (Hancock, 2019; Shahbandeh, 2018).

Tanzania's economy heavily depends on small-scale agriculture, which has given employment to approximately 65 per cent of the labour force (Mutayoba and Ngaruko, 2018). The leading export cash crops include tea, coffee, tobacco, sisal and flowers, but the avocado is now part of such crops (URT, 2019). Avocado farming is viewed as a livelihood strategy among smallholder farmers. Tanzania produces a variety of fruits and has the potential to increase fruit production. The country has immeasurable arable land and suitable climate for horticultural activities.

The horticulture sector in Tanzania mainly produces spices, fruits and vegetables. The main producers are smallholder farmers who own less than 2 acres of land (Mkindi, 2011). The avocado is Tanzania's third largest net-export fruit; it is preceded by bananas and pineapples (Dube et al., 2018). The export of avocados to France and the United Kingdom is largely done by firms such as Africado and Serengeti Fresh (Dube et al., 2018).

The avocado fruit has gained much attention in recent years. Every so often, the crop has been referred to as the green gold of Tanzania. The avocado industry is one of the fastest growing sub-sectors in the horticultural industry in Tanzania. In 2018, avocados earned the country \$8.6 million (URT, 2019). According to Tanzania Horticultural Association (TAHA), the country produces about 7,000 tons of avocados annually.

The increased demand for avocados in the world market has made the crop contribute to foreign-exchange earnings and government revenue. The crop has now become a key export for Tanzania, making the country one of the leading avocado exporters in Africa; preceded by South Africa and Kenya (REPOA, 2018). New avocado farms have been opened in many regions in the country, including Njombe, Iringa, Geita, Arusha, Mbeya, Kilimanjaro, Songwe, Morogoro and Ruvuma. Most avocado farmers sell their produce to local buyers. Some of the avocados produced are exported to Kenya, which re-exports them to Europe and Asia (Juma et al., 2019). Avocados flourish in tropical and Mediterranean climates throughout the world. Hass, Fuerte and Pinkerton are higher-yield avocado varieties, which mature and produce fruits within three years (Linda, 2004).

This study adopted the Sustainable Livelihood framework, which was developed to understand and analyse the livelihoods of the poor. This model has its roots in Agenda 21 of the sustainable development paradigm that advocated the achievement of sustainable livelihoods as the main goal in poverty eradication, which holds that sustainable livelihoods could serve as "an integrating factor that allows policies to address development, sustainable resource management, and poverty eradication simultaneously" (Krantz, 2001).

Apart from improving the understanding of livelihoods, the approach may be used in planning new development activities and assessing the contribution of activities to livelihood sustainability (DFID, 2000).

Studies on SL done so far mainly focused on rural areas and situations where people are farmers or make a living from some kind of primary self-managed production. A sustainable livelihoods model provides a theoretical framework for understanding the causes of and intervention mechanisms against poverty (Ashley, 2000, DFID, 2000). The poor are vulnerable to various shocks and thus different livelihood strategies, including crop-farming and animal- husbandry, may be deployed to reduce poverty and improve peoples wellbeing (Figure 1).

In its anthropocentric (human- centred) approach, the sustainable livelihood framework puts human livelihoods first, prioritising their needs, aspirations and well-being. In 1987, the Brundtland Commission introduced SL in terms of resource possession and access to basic needs and livelihood security. Thus, sustainable livelihood is concerned with peoples capacity to maintain their means of living, and enhance their well-being and that of future generations. Therefore, this study used the framework to investigate the contribution of avocado production to farmers livelihood assets. People are always eager to develop thus, they engage in various activities.

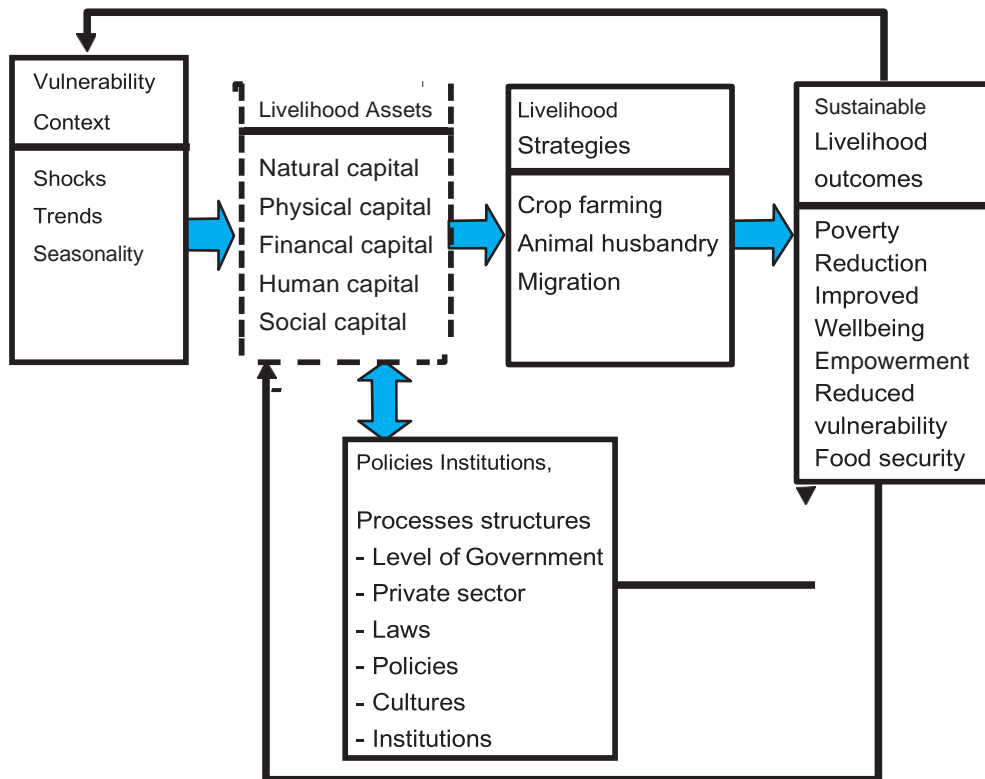


Figure 1: Sustainable Livelihood Framework

Source: Adapted from Serrat (2017)

Avocado production in Tanzania has been slightly investigated although it makes a great economic contribution to smallholder farmers. Studies by Tanzania Investment Centre (TIC) and East Africa Trade and Investment Hub (EATIH) in 2019 focused on avocado botany and its cultivation, crop producers and processors, and the nutritional value of the fruit. Many other studies on avocado production have focused on the opportunities avocado production offers at the national level and on its value chain (Juma et al., 2019; REPOA, 2018; Mwakalinga, 2014). Therefore, this study investigated the contribution of avocado farming as a livelihood strategy to peoples assets. It adopted the sustainable livelihood framework using the anthropocentric (human- centred) approach focusing on human, social, physical, financial and natural assets.

Over the years, agriculture has been the main activity among the majority of people in Njombe Town. Maize has been the main food crop in the area. In recent years, however, avocado farming has emerged as one of the livelihood options with vital economic value to farmers.

2. METHODOLOGY

This study was conducted in Njombe- Tanzania. The area was selected because it has a significant number of people who grow avocados. In addition, the region has prioritised avocados in its regional development plans. The council authorities support avocado production and the local government has invested in avocado production (Mwakalinga, 2014). Among the horticultural crops produced in the region, avocado is the leading crop with a huge contribution to peoples livelihood assets. In 2013, the region produced about 5000 tons of avocados (Mwakalinga, 2014).

This study used mixed methods, namely, qualitative and quantitative research approaches which were used to collect and analyse the data. These approaches were essential to ensure the reliability and validity of the data collected. The study used a case-study design in collecting qualitative and quantitative data. Primary data were collected through questionnaires, interviews, direct observation and focus group discussion. Secondary data were collected from government reports, census reports, journal articles and web-based materials. Both primary and secondary data were essential in answering the research questions.

The study area had 13 wards, two wards, which constituted 20per cent of the total wards, were selected. The wards included Kifanya and Ramadhani (Figure 2). The household involved in avocado farming formed the study unit. At least 10 per cent of the households were manageable and representative of the population. Therefore, a total of 180 avocado farmers were selected: 103 respondents from Ramadhani and 77 respondents from Kifanya. Descriptive statistics were run to get the frequencies of both multiple and single-response questions. In addition, cross-tabulation was undertaken to determine the relationship between the variables. Qualitative data were obtained through focus group discussion, key informant interviews and participant observation.

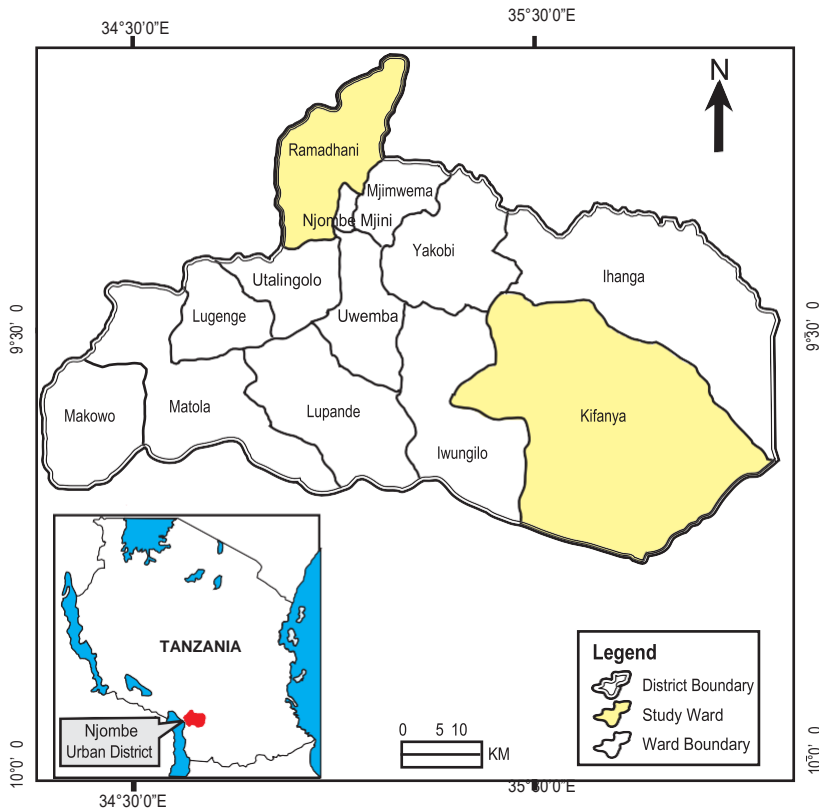


Figure 2: Location of the Area

3. RESULTS AND DISCUSSION

3.1 Avocado production in the area

Avocado production has gained much attention in recent years as a livelihood strategy. In the area, the majority of respondents (54.5%) mentioned being engaged in avocado production for between 5 and 9 years and some of the farmers reported having being engaged in avocado production for between 1 and 4 years (Table 1). By 2012, the leading cash crops in the area were tea, sunflower, flowers and coffee, but in recent years the avocado has joined this group (URT, 2014).

The majority (84.4%) of farmers reported and accounted for an increase of avocado production to various reasons including conducive climate (58%), the availability of a market (28 %) and the use of improved seeds (14%). between 2015 and 2018, the annual avocado production in the country is reported to have risen from 20,000 tons to 190,000 tons.

In the area, avocado farming was dominated by smallholder farmers with small pieces of land. About 64.4 per cent of the respondents reported having less than two acres of land. A similar situation was reported in Kenya by Amare et al., (2019), who observed that avocado farming was mainly undertaken by small-scale farmers who grew the crop for sale on the local and export markets.

Table 1: Avocado production trends and the size of farms

Variable	Response	Frequency	Percentage
Years spent growing avocados	Between 1 and 4 years	56	31.1
	Between 5 and 9 years	98	54.5
	Between 10 and 20 years	15	8.3
	20 years and above	11	6.1
	Total	180	100
Farm sizes	Less than 2 acres	116	64.4
	Between 3 and 5 acres	24	13.4
	Between 6 and 10 acres	18	10
	Between 11 and 15 acres	13	7.2
	More than 15 acres	9	5
	Total	180	100
Production trend	Increase	152	84.4
	Decrease	28	15.6
	Total	180	100

In many African countries, agriculture is mainly carried out by people with primary school education. However, in the study area, avocado production is carried out by farmers of different levels of education, including primary school education (57%) and tertiary education (14%) Farmers with tertiary education are usually employed in the formal sector, however, they engage in avocado farming. Furthermore, education increases farmers ability to access relevant information and improved farming technologies, thereby increasing agricultural yields (Usman et al., 2013). Most (76%) of the farmers with tertiary education bought their agricultural land, but 57 and 82 per cent of farmers primary school education and those without formal education respectively (had inherited land from their parents).

This practice has positive implications on avocado farming in the sense that those employed in the formal sector can buy their land for growing avocados, thus intensifying avocado production in the study area.

The results of a Chi-square test at 4 degrees of freedom showed a statistically strong relationship between ones level of education and the mode of land acquisition for avocado farming in the study area at a P value< 0.030 (Table 2). A similar observation was made by George et al. (2019), who revealed that most avocado farmers in Kenya had primary school education and that people with tertiary education also engaged in avocado production.

Table 2: Cross-tabulation between the level of education and means of land acquisition

Level of Education	Ways of Acquiring Land		
	Inherited n=84	Bought n=96	Total N= 180
No formal education	12 (86)	2 (14)	14 (100)
Primary school education	58 (57)	44 (43)	102 (100)
Secondary school education	8 (21)	31 (79)	39 (100)
Tertiary education	6 (24)	19 (76)	25 (100)
Total	84 (47)	96 (53)	180 (100)

$\chi^2 = 8.67, Df-4, P < 0.030$

Note: The figures in brackets are in percentage points.

3.2 The contribution of avocado production to livelihood assets

A livelihood comprises the capabilities, assets (human, social, physical, financial and natural capital) and activities for earning a living (Serrat, 2017). These five forms of capital have different features. Human beings always rely on various activities for their sustainable livelihood as described in the model. This study focused on avocado farming as a source of livelihood among smallholder farmers. The farmers described the ways through which they obtained various livelihood assets from avocado farming as shown below.

3.2.1 Financial assets

Avocado production had a positive contribution to one's income; the farmers sell avocados and earn money. The majority (84.4%) of respondents reported engaging in avocado farming to earn some income. The quantities of the outputs varied across wards.

In Ramadhani 79.6 per cent of the farmers produced less than 2 tons a year, while in Kifanya 66.2 per cent produced less than 2 tons. In addition, in Ramadhani 12.5 per cent produced between 3 and 6 tons and in Kifanya 20.8 per cent produced between 3 and 6 tons. Generally, Kifanya had more outputs than Ramadhani. These differences were the result of the differences in farming land sizes in the two wards.

In investigating the contribution of avocado production to financial assets, the respondents were asked to estimate the amount of money they earned a year. Accordingly, 62.8 per cent admitted earning between 1,000,000 and 2,000,000 shillings a year as the net profit. Only 5.6 per cent said they earned more than 10 million shillings a year (Table 3).

Table 3: The contribution of avocado farming to financial assets

Variable	Respondent		
	Ramadhani (n=103)	Kifanya (n=77)	Total (N=180)
Reasons for growing avocado:			
To get money	89(86.4)	63(79.7)	152(84.4)
To get food	6(5.8)	6(6.3)	12(6.1)
Both money and food	8(7.8)	11(14)	19(10.5)
(b) Quantity a year:			
Less than 2 tons	82(79.6)	51(66.2)	133(73.9)
Between 3 and 6 tons	13(12.5)	16(20.8)	29(16.1)
Between 7 and 14 tons	5(4.9)	8(10.4)	13(7.2)
More than 15 tons	3(3)	2(2.6)	5(2.8)
(c) Earnings a year (in TZS):			
Between TZS 1,000,000 and 3,000,000	68(66)	53(68.8)	121(67.2)
Between TZS 4,000,000 and 6,000,000	19(18.5)	14(18.2)	33(18.3)
Between TZS7,000,000 and 10,000,000	9(8.7)	7(9.1)	16(8.9)
More than 10 million	7(6.8)	3(3.9)	10(5.6)

Note: The figures in brackets are in percentage points.

323 Physical assets

Physical assets comprise the basic infrastructure required to support livelihoods in a given area. Basic infrastructure includes adequate water supply, environmentally-friendly sources of energy, secure shelter, and access to transport and communication facilities (Ndour, 2017). Avocado farming in Njombe Town gives farmers physical assets. About 54 per cent of the respondents reported having houses, cars, motorcycles, power tillers/tractors and shops, as shown in Figure 3. About 81 per cent of the respondents cited avocado farming as their main source of income, which has enabled them to own various physical assets (see Figure 4). Thus, avocado farming is a driver of economic growth and an important route out of poverty.

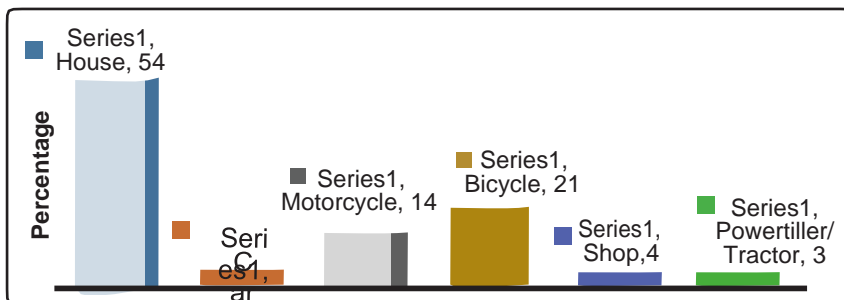


Figure 3: Farmers physical assets

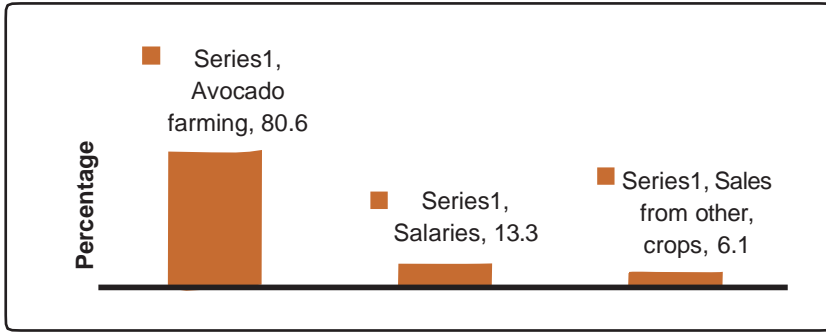


Figure 4: Farmers source of income

324 Social assets

Social assets comprise the social networks and associations to which a community belongs (George et al., 2019). Human beings are always interconnected. Social assets are resources for earning livelihoods, including social networks and connectedness. Farmers involvement in different farming cooperative groups was very low in the study area only 11 per cent being members of farming groups and 89 per cent reported not being members of any farming associations. These findings are different from the findings in a study by Malekela and Nyomora (2018), who found that most of the farmers in Dar es Salaam City were working in organised groups. Perhaps this variation is the result of the differences like the crops grown. For instance, most of the farmers who belonged to certain groups in Dar es Salaam produced cassava; they had to form groups so that they could be assisted by the government.

325 Natural assets

Avocado farming is of considerable importance in different parts of the world. The majority of households in Eastern and Southern Africa invested heavily in avocado production thus enhancing their livelihoods. Natural assets are naturally occurring assets, which are largely renewable (Nicholas et al., 2013).

Table 4: Land ownership in the study area

Variable	Respondent		
	Ramadhani (n=103)	Kifanya (n=77)	Total N=180
(a) Land ownership			
i. Yes	92(89)	71(92)	163(91)
ii. No	11(11)	6(8)	17(9)
(b) Means of obtaining money for buying land			
i. Avocado farming	68(66)	46(60)	114(63)
ii. Formal employment	18(17)	11(14)	29(16)
iii. Business	6(6)	6(8)	12(7)
iv. Avocado and other business	11(11)	14(18)	25(14)

The land is one of the natural assets, however, its ownership differs from community to community. In this study, the respondents were asked to indicate ownership of natural assets (land) other than avocado farms and the source of the money for purchasing such assets.

The findings showed that 63 per cent of the respondents cited avocado farming as a source of investment capital for the acquisition of natural land (Table 4). The money for buying portions of land was mainly obtained from avocado production.

3.3 The challenges facing avocado farming

About 92 per cent of the farmers reported the challenges they faced during the production of avocados. About 78 per cent of the farmers cited poor extension services. In each ward, there was only one extension officer although there were many villages and several avocado farmers in each ward. Similar results were also reported by Juma et al. (2019) who revealed that that avocado farmers in the Southern Highlands of Tanzania had limited access to the extension services. A study by George et al. (2019) in Kenya observed that the majority of avocado farmers lacked access to extension services, which affected avocado production.

About 55 per cent of avocado growers cited pests and diseases as some of the challenges facing farming of this crop. Avocado farming is susceptible to many biotic and abiotic constraints. The pests and diseases mentioned included anthracnose, bacterial blights, mealy bugs and insect borers. In South Africa, several diseases, including the *Cercospora* spot, anthracnose and stem-end rot affect the avocado fruit (Mavuso, 2015). According to Malekela and Kitali (2021), an increase in pests and diseases affected the quality and quantity of agricultural products. Also, according to Evans et al. (2010), pests and diseases could directly affect the avocado industry in terms of loss of sales, property damage and increased orchard management costs.

About 48 per cent of avocado farmers cited climatic variations as affecting their activities. Climate plays a significant role in avocado production. Severe drought, increased temperatures and other climatic parameters rigorously affect crop production. In Njombe, some of the challenges mentioned included unpredictable rainfall and temperature variations. During the dry season, avocado flowers and fruits normally drop, leading to the reduction avocado productivity. Weather conditions during the flowering of the avocado tree influence the progression and length of time during the flowering stages, stigma accessibility and fruit maturity. In different avocado-growing regions, climatic variations cause pests and diseases (Mavuso, 2015).

Table 5: Challenges facing avocado farming

Response	Frequency	Percentage
Pests and diseases	99	55
Climatic variation	86	48
Poor extension services	141	78
Shortage of capital	72	40

****Based on multiple responses***

About 40 per cent of the farmers reported shortage of capital for producing avocados as a constraint especially in sub-Saharan Africa. The farmers surveyed reported having little capital for meeting the high cost of growing quality avocados for export purposes. Similar results are reported by Mutero et al. (2016), who revealed that the majority of smallholder farmers do not have enough capital for investing in avocado farming despite that the crop is a key driver of African economies.

4. CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

This study investigated the contribution of avocado farming to livelihood assets. The study results have shown that avocado farming has gained importance in recent years because of its financial and social value. This study adopted the sustainable livelihood framework, which advocates for diversified strategies for peoples wellbeing. Avocado farming was reported to have a positive contribution to livelihood assets, including financial, social, natural and physical assets. Despite its contribution to peoples livelihood assets, farmers reported various challenges, including pests and diseases, poor extension services, shortage of capital and climatic variations as constraints against avocado farming.

4.2 Recommendations

The study recommends increasing extension services given to the farmers about the production marketing of avocado Credits should also be given to the farmers to enable engaged in large-scale farming for export purposes.

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