

**ANALYSIS OF INFLUENCE OF LIVELIHOOD CAPABILITIES ON COFFEE
PRODUCTION AMONG SMALL-SCALE COFFEE FARMERS IN HAI AND
ARUMERU DISTRICTS, TANZANIA**

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**A THESIS SUBMITTED IN FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY OF SOKOINE UNIVERSITY OF
AGRICULTURE, MOROGORO, TANZANIA**

EXTENDED ABSTRACT

The livelihood of small-scale coffee farmers in Hai and Arumeru Districts depends on coffee among other economic activities. This study analysed influence of livelihood capabilities on coffee production among small-scale coffee farmers in Hai and Arumeru Districts. Specifically, the study intended to: examine the implications of livelihood capabilities on coffee production trends; assess the implications of livelihood capabilities on coffee farming inputs; determine the association between livelihood capabilities and access to extension services, and determine the livelihood capabilities diversification strategies among small-scale coffee farmers. A cross-sectional research design using a mixed methods approach was applied in this study to collect qualitative and quantitative data from 250 respondents using households' survey, key informant interview-(KII), focus group discussion-(FGDs) and documentary review. Qualitative data were analysed using content analysis while quantitative data were analysed using trend analysis, chi-square and cross-tabulation. The results indicate that the small-scale coffee farmers were categorized into four capability levels; no capability (9.2%), low capability (39.2%), moderate capability (18.4%) and high capability (33.2%) respectively. Coffee production and income generated from coffee have been fluctuating from time to time and therefore affecting the livelihood of small-scale farmers. It was revealed that the critical problem facing a small-scale coffee farmer was inputs un-affordability. Generally, lack of market and low coffee price, inadequate farming inputs and extension services have compelled small-scale coffee farmers to diversify their economic activities. Further, the study concludes that there is a critical shortage of coffee farming inputs and extension services among small-scale farmers which to a large extent has resulted into low coffee production. There is a need of small-scale coffee farmers to form groups in order to lay down strategies on how to improve coffee production and how to secure market. However, districts administrative authorities and AMCOS should collaborate to improve

the quality and quantity of coffee produced. This can be done by ensuring the timely availability of coffee farming inputs and extension services among small-scale farmers. In so doing, this will improve not only coffee production but also the livelihood capabilities among small-scale farmers.

DECLARATION

I, Prosper John Kimaro, hereby declare to the Senate of Sokoine University of Agriculture that this thesis is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted in any other institution.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASDP	Agricultural Sector Development Program
CARE	Co-operative Assistance and Relief Everywhere
CDP	Co-operative Development Policy
CRD	Community and Rural Development
DFID	Donated Fund for International Development
FAO	Food and Agriculture Organization
FGDs	Focus Group Discussions
FHPT	Farm Household Production Theory
HESLB	Higher Education Students' Loans Board
ICO	International Coffee Organization
IFAD	International Fund for Agricultural Development
MoCU	Moshi Co-operative University
NSGRP	National Strategy for Growth and Reduction of Poverty
PhD	Doctor of Philosophy
SDGs	Sustainable Development Goals
SLA	Sustainable Livelihood Approach

SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
TACRI	Tanzania Coffee Research Institute
TAP	Tanzania Agricultural Policy
TCB	Tanzania Coffee Board
TDV-2025	Tanzania Development Vision 2025
URT	United Republic of Tanzania
USD	United States Dollar

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

Coffee is one of the top commodities world-wide and the third most consumed beverage in the world after water and tea. It is the second most traded commodity after oil with about half a trillion cups consumed annually. Coffee beans are not only used for brewing a cup of coffee but also provide caffeine for beverages (Cola), pharmaceuticals and cosmetics (Hilary *et al.*, 2018). There are two main types of coffee commercially grown world-wide i.e. Arabica which accounts for 70% and Robusta which accounts for 30% of the world coffee and it is easier and cheaper to grow (TCB, 2017). It is estimated that over 90% of coffee production takes place in developing countries while consumption mainly happens in the industrialized countries (FAO, 2004). Based on its fundamental importance, tens of millions of small-scale producers in developing countries make their livelihood through growing coffee (Talbot, 2004).

Furthermore, Mussatto *et al.*, (2011) documented that more than 80 countries and more than 60 million people world-wide are engaged in coffee production, the top five main producers being Brazil (2 592 000 metric tons), Vietnam (1 650 000 metric tons), Columbia (810 000 metric tons), Indonesia (660 000 metric tons) and Ethiopia (384 000 metric tons) while the bottom five coffee producers are Paraguay (1 200 metric tons), Malawi (960 metric tons) Trinidad and Tobago (720 metric tons), Zimbabwe (600 metric tons) and Liberia (360 metric tons).

In East Africa coffee production also varies from one country to another. According to TCB (2019) Uganda is the leading producer with 288 000 metric tons per annum followed by Kenya 49 980 metric tons, Tanzania 48 000 metric tons, Burundi 15 000 metric tons

and Rwanda 12 000 metric tons. According to TCB (2017), Tanzania is in the 18th position among coffee producing countries world-wide and her production has always been fluctuating from time to time as a result of different factors but mainly due to the removal of subsidies in the agricultural sector where the majority of farmers are not able to acquire the right extension services and farming inputs using their own income.

According to Hillary *et al.*, (2018) despite the global and country specific initiatives aiming at improving coffee production; the sector has been encountering different challenges such as bad weather condition (drought) sometimes attributed to climate change and deforestation which are extremely detrimental to crops. A good example can be drawn from Brazil in 2013 where due to extreme drought; production was affected by more than 50%. Other global challenges towards coffee production include pests and diseases. In most cases, diseases and pests are always hovering and becoming more resistant to be controlled as a result, they affect coffee production particularly among small-scale farmers (Mmari, 2012).

According to Mhando *et al.*, (2013) and Maghimbi (2007) other challenge is market forces. Unlike other commodities, the often-sizeable price fluctuations have a greater impact on coffee production mainly among small-scale farmers. Additionally, there is lack of investment and infrastructure in terms of finance and education among the small-scale farmers hence causing serious problems in the coffee industry in the growing regions. Agricultural land itself has been passed down through several generations with coffee trees nearing to more than 80 years with very low annual produce. Hence, due to land use pressure and urbanization, some of the world best coffee growing land has been sold off and redeveloped for other socio-economic activities leading to uncertainty regarding the future of the coffee industry (Kana, 2012). As a way forward, to curb the above situation, greater education on how best to use the land and regenerate crops may

help to boost coffee production and livelihood capabilities among small-scale farmers in future.

In Tanzania, coffee is the second top ranked agricultural export product after tobacco providing direct income to more than 400 000 households which support the livelihood of some 2.5 million individuals and generate between USD 150 and 225 million per year of foreign exchange earnings (TCB, 2017). It accounts for nearly one-fifth of Tanzania's foreign exchange earning followed by cotton, cashew nuts, tobacco, tea and sisal in that order (Pyk & Hatab, 2018). Coffee has played a significant role to the livelihood of small-scale farmers' households. It has been a source of income for paying school fees, house construction, food, medical services and other socio-economic activities (TCB, 2017 & 2012).

Coffee production in Tanzania has encountered different problems both locally and internationally. These problems are assumed to have affected the livelihood of small-scale coffee farmers due to close linkage between livelihood and coffee production (Sambuo, 2017; Diyamett, 2007; Ludi, 2006; Bates, 2003). Coffee production in Tanzania has remained low over the years due to various natural and socio-economic factors hence leading to low livelihood capabilities among small-scale farmers (Hillary *et al.*, 2018). According to Andrew & Philip (2014), the introduction of economic liberalisation policy in the 1980s in particular, went hand in hand with the removal of subsidies in the agricultural sector. Consequently, some of the small-scale coffee farmers could not afford to have adequate and quality inputs (World Bank, 2014; Mhando, 2008; Bates, 2003). As a result, coffee production and livelihood capabilities of the small-scale farmers were affected.

Authors such as Lienert & Burger (2015); Valdes-Rodriquez & Perez-Vazquez (2011); Qinzilbash *et al.*, (2008); Sen (2005) have defined the concept of livelihood capability

differently. According to Valdes-Rodriquez & Perez-Vazquez (2011) the term livelihood refers to the way in which people earn income to effect for different basic needs such as clothes, food, shelter and medication. It also refers to a means of making a living which encompasses peoples' capabilities, assets, income and activities required to secure the necessities of life. At the same time, the term capability according to Lienert & Burger (2015) refers to the ability to achieve the functioning to constitute for the better life; it also refers to the reaction potential to challenges and crises which reflect to the power or ability to do something or state of being capable. Therefore, for the sake of this study the definition by Lienert & Burger (2015) ; Sen (2005) was adopted. Specifically, livelihood capability refers to the ability of a person to pay for different basic needs such as clothes, food, shelter and medication; in general, it refers to the ability or power of an individual in making a living. Hence, in this context, livelihood capabilities refer to the ability of small-scale coffee farmers in meeting their daily basic needs and their power in acquiring farming inputs, extension services and adopting diversification strategies.

A small-scale coffee farmer in the context of Tanzania refers to farmers cultivating a farmland of the size between 0.9 and 3 hectares per household (URT, 2006). In this study, small-scale coffee farmers were those who produced an average of 100 kg of coffee per year but less than that were not considered in this study as the production is assumed to be too minimal to cater for their livelihood requirements. According to TCB (2017), Hai and Arumeru Districts had a total of 2 509 small-scale coffee farmers producing an annual average of 100 kg of coffee. In this respect, Hai District had 1340 and Arumeru District had 1159 small-scale coffee farmers. According to TCB (2012), coffee is the main cash crop in both Hai and Arumeru Districts, grown mainly on the highland zone and intercropped with banana. Its production can be traced far back in the late 19th Century during German rule in East Africa. It has been pointed out by UNCTAD (2019); TCB

(2017); Mhando (2013) that coffee production has been falling in the recent years in many parts of the country including Hai and Arumeru Districts due to several factors such as high incidence of diseases, climatic change, falling in price, unfavourable agricultural policies and lack of interest in agriculture among youth.

Other factors include the land tenure system in Hai and Arumeru Districts which continuously reduce the land size for coffee production through annual re-divisions, lack of improved varieties and high production costs due to removal of subsidies in agriculture (Mhando, 2010). The decline in coffee production and low prices in Hai and Arumeru Districts are likely affecting the livelihood capabilities of coffee farmers, mainly small-scale farmers. In order to cope with the livelihood deterioration as a result of the decline in coffee production, small-scale coffee farmers in the study area have been divided to resort to other income generating activities such as dairy farming, petty business and vegetable production so as to meet their daily basic requirements.

The government of Tanzania so far has taken several initiatives to improve agricultural production and livelihood capabilities among small-scale farmers. The efforts made include adoption of the Agricultural Sector Development Programme (ASDP) in 2003, establishment of the National Coffee Research Institute (TACRI) in 2000, formulation of Tanzania Agricultural Policy (TAP) in 1997 and Co-operative Development Policy (CDP) in 2002. These efforts and many others were envisaged to improve farm production and the livelihood capabilities of both coffee and non-coffee small-scale farmers (Kana, 2012).

Unfortunately, the efforts have not improved farmers' condition and they still face several challenges including climate change, lack of subsidies, lack of farming inputs, decline in quality and quantity of the farm produce as well as general deterioration in their livelihood conditions (Sambuo, 2017). The difficulties are assumed to have dragged

small-scale coffee farmers to resort into various livelihood diversification strategies for their livelihood support (Mhando, 2013; Babatunde & Qain, 2009).

Mostly in the coffee farming countries like Tanzania the livelihood of small-scale coffee farmers depend on coffee among other income generating activities (Mmari, 2012). Despite the fundamental importance of coffee to the small-scale coffee farmers' livelihood, there has been a sharp decline in production. For example, in 1985 coffee production was 19.2 million tons while in 2010 only 2.5 million tons were produced. As a result, the income obtained by small-scale coffee farmers dropped for more than 80% (TCB, 2017 & 2012). This result is assumed to have hampered the livelihood of the small-scale coffee farmers in terms of on-farm, non-farm and off-farm activities. Therefore, this study analysed influence of livelihood capabilities on coffee production among small-scale coffee farmers in Hai and Arumeru Districts.

1.2 Statement of the Problem

Hillary *et al.*, (2019) reported that 90% of coffee farms in Tanzania are owned by smallholder farmers while the remaining 10% are owned by estates' growers. The coffee industry employs about 2.5 million people directly and indirectly (Ludi, 2006). However, the significance of coffee dates back to 1929 during the establishment of co-operatives in Tanzania. From the early 1960s to the mid-1980s coffee contributed significantly to the socio-economic well-being of the coffee growers (Pyk & Hatab, 2018; Maghimbi, 2007; Ludi, 2006). This signifies coffee being a source of livelihood for the majority of small-scale farmers' households.

From 1985 coffee production trends have not been impressive thus affecting the majority of small-scale farmers' livelihood capabilities particularly in acquiring basic needs such as education, health services and decent housing due to its socio-economic importance (Sambuo, 2017; TCB, 2012). Despite the government's efforts such as Agriculture First-

(*Kilimo Kwanza*), Agricultural Sector Development Programme (ASDP 1&2) and establishment of Tanzania Coffee Research Institute (TACRI) towards improving coffee production and small-scale farmers' income; influence of livelihood capabilities on coffee production among small-scale farmers is still an issue to be analyzed.

A number of studies on small-scale coffee farmers' households have concentrated much on the effects of agricultural policies, agricultural marketing reforms, analysis of agricultural marketing, coffee sector, fair trade in coffee production, coffee price, coffee production and climate change as well as coffee industry (Hillary *et al.*, 2019; Pyk & Hatab, 2018; Mhando, 2013; Diore, 1998). This implies that there is inadequate empirical evidence on coffee production, livelihood capabilities' and diversification strategies among small-scale coffee farmers' households. Understanding of coffee production dynamics is of importance since coffee production in Hai and Arumeru Districts is not promising. There is lack of morale among small-scale coffee farmers and small-scale coffee farmers are continuously uprooting coffee trees to pave way for other farming economic activities.

But at the same time, there is high degree of horticultural production among small scale coffee farmers in the areas where coffee used to be produced initially. In Hai and Arumeru Districts, small-scale coffee farmers are no longer relying on coffee alone for livelihood sustenance because of the low income generated from it. Therefore, this study analysed influence of livelihood capabilities on coffee production among small-scale coffee farmers and respective diversification strategies adopted in Hai and Arumeru Districts respectively.

1.3 Justification for the Study

The findings from this study are expected to be useful as an addition to the stock of knowledge to be used by researchers, academicians and the community at large.

Furthermore, the findings will be of vital use to the agricultural policy makers and hence beneficial to small-scale farmers' households particularly those who are engaged in coffee production by addressing contemporary challenges in coffee production and livelihood maintenance.

In addition, the findings are expected to contribute significantly to poverty reduction efforts in line with the Sustainable Development Goals (SDGs number one-end poverty in all its forms) and the Five-Year Development Plan- Phase 2. The study is also in line with Tanzania Development Vision 2025 (TDV-2025) which aims at ensuring high quality of livelihood, peace and unity, good governance, well educated people and learning society as well as creating a competitive economy. Therefore, the findings shall be of fundamental use in policy amendment, review and formulation about agricultural production in general and coffee production in particular among small-scale farmers.

Findings are ought to come up with plausible measures and recommendations on how agriculture and livelihood capabilities among small scale farmers can be improved in order to improve their total socio-economic status. As a result, this will improve not only per capita income among small-scale farmers but at large the national income will be improved. Moreover, the findings are expected to be useful in addressing different challenges facing small-scale coffee farmers' households in the process of maintaining their daily livelihood capabilities.

1.4 Study Objectives

1.4.1 Main objective

The main objective of the study was to analyse influence of livelihood capabilities on coffee production among small-scale farmers.

1.4.2 Specific objectives

The specific objectives of this study were to:

- (i) Examine the implications of livelihood capabilities on coffee production trends among small-scale coffee farmers;
- (ii) Investigate the implications of livelihood capabilities on coffee farming input accessibility, availability and affordability among small-scale farmers;
- (iii) Examine the association between livelihood capabilities and access to extension services among small-scale farmers; and
- (iv) Determine the livelihood capability diversification strategies among small-scale coffee farmers.

1.5 Research Questions

- (i) What are the implications of coffee production trends on livelihood capabilities among small-scale coffee farmers?
- (ii) What is the implication of livelihood capabilities on coffee farming input accessibility, availability and affordability among small-scale farmers?
- (iii) Is there any association between livelihood capabilities and access to extension services among small-scale coffee farmers?
- (iv) Are there livelihood capability diversification strategies adopted by small-scale coffee farmers due to uncertainties in coffee production?

1.6 Guiding Theories

The study was guided by four theories namely; Farm Household Production theory-(FHP) by Schultz, 1964), Sustainable Livelihood Approach-(SLA) by DFID, 1997), Diffusion of Innovation Theory- (DOI) by Rogers, 2003) and High Pay-off Input Theory – (HPOI) by Tagar & Levit, 2012) as depicted below. The main theory guiding this study was the Farm Household Production theory-(FHP) by Schultz, 1964). It was considered to be the main

theory in this case because the study is on production among smallholder farmers which is a central focus in Farm Household Production Theory. The rest of the theories (SLA by DFID, DOI and HPOI) were used to supplement the main theory. Furthermore, the use of four theories (FHP, DOI, SLA by DFID and HPOI) was motivated by different specific objectives covered in this study whereby, each of the specific objectives demanded its own theory.

1.6.1 Sustainable Livelihood Approach (SLA)

Sustainable Livelihood Approach is a framework which analyses factors that affect peoples' livelihoods. SLA helps in understanding the complexity of poverty and mainstreaming the rural poor at the center of web of inter-related influence that affect how these people create and improve their livelihood (Ellis & Allison, 2001). Different frameworks have been developed to deal with sustainable livelihood mainly in developing countries such as International Fund for Agricultural Development-(IFAD), Co-operative for American Remittances to Europe-(CARE), Food and Agriculture Organization-(FAO) and Development Fund for International Development-(DFID) (Dorward *et al.*, 2003; Hopley & Shields, 2000). The theory has proved to be useful for researchers, programme interventionists, policy formulators and implementers. The theory creates an understanding on the strategies small-scale farmers' households have adopted due to variability in production, income and livelihood capabilities (Dorward *et al.*, 2003).

SLA can be used to identify key constraints and opportunities for development intervention among small-scale coffee farmers. Further, it can be used to capture the cross-sectoral nature of small-scale coffee farmers' income generating activities and identify fundamental assets in livelihood, their trends over time and nature of its impact (Dorward *et al.*, 2003); DFID, 1997). However, it creates an understanding of the lives of the poor and marginalized people like small-scale coffee farmers as well as their linkage

to poverty reduction initiatives, food security and livelihood (Benett & Dearden, 2014; Karki, 2014; Kumar *et al.*, 2006).

In terms of strength, SLA helps in investigating the relationships between different activities that constitute livelihood and draw attention to social relations among people in the community. Unfortunately, SLA does not pay enough attention to the inequalities among people or group of people. Further, it underplays the fact that enhancing the livelihood of one group can undermine those of others. SLA appears to be fundamental in discussing sustainable agriculture in developing countries hence it caters for analysis of the influence of livelihood capabilities on coffee production among small-scale coffee farmers in this respect.

1.6.2 Farm household production theory

Farm Household Production Theory-(FHPT) examines the policy implication on production among small-scale farmers and different interventions that seek to increase the outputs of the agricultural sector (Schultz, 1964). This is done by raising farm output prices or by lowering the cost of variable inputs and hence predicting profit to be generated in a given production activity among small-scale farmers. The theory explains that smallholder farmers produce under a high level of uncertainty induced by natural hazards and man-made factors.

According to Schultz (1964): Taylor & Adelman (2003), there is a general perception that small-scale farmers in developing countries are very poor and inefficient in economic production related activities. As a result, for them to produce better and improve their general livelihood conditions, they have to be motivated in different dimensions. Evidence from different countries such as Ethiopia and Zambia show that majority of small-scale farmers have limited knowledge, capital, poor assets endowment and limited formal protection which limits their capability to invest (Taylor & Adelman, 2003). Farm

Household Production Theory has proved to be useful in analysing production, market, profitability, price and general sustainability among small-scale farmers in different developing countries (Proctor & Lucchesi, 2012; Kana, 2012).

In this respect, FHPT caters for small-scale coffee farmers as they are involved in the production process in order to meet their basic needs. Low income from coffee production among small-scale farmers is attributed to low production, inability to acquire different human basic needs, unemployment facing coffee producing households, loss of interest in coffee production and general deterioration in the livelihood status among small-scale coffee farmers. The theory provides insights into the way peasant households manage the trade-off between income risks and expected returns from the production process. Unfortunately, the theory fails to clearly depict where small-scale farmers could get support for their production related activities but it was useful in analysing the small-scale coffee farmers' livelihood capabilities and the diversification strategies in ensuring sustainable livelihood development.

1.6.3 Diffusion of innovation theory

This study was also guided by the Diffusion of Innovation Theory-(DOI) by Rogers (2003), the theory seeks to explain how, why and at what rate new ideas and technology spread among people or groups of people, in this case small-scale coffee farmers. The theory has so far been applied by different researchers in different fields such as agriculture, marketing, development intervention, social work and behavioural change and proved to be very useful (Zhang, 2015, Dearing, 2009). Therefore, it was applied in examining the implications of livelihood capabilities on accessibility of extension services among small-scale farmers.

The theory assumes that every farmer is an experimenter by him/herself and does not need experimentation stations to tackle problems. As a result, the theory has provided much of

intellectual foundations for the research and extension efforts in farm management and productivity. The theory further explains that the diffusion of better agricultural production knowledge and skills is a major source of productivity growth and profit maximization among small-scale farmers. The diffusion approach in agricultural development rests on the empirical observation of substantial differences in land and labour productivity among farmers and regions. In this view, the route to agricultural development can be attained through more effective dissemination of technical knowledge and narrowing of the dispersion of productivity among small-scale farmers in different locations (Tagar, 2012).

The theory stresses that the end result of diffusion is that people must adopt new idea, behaviour or product as a part of the social system. In this respect, a person must perceive the idea, behaviour or product as new or innovative. The theory assumes that all new methods are helpful and productive hence should be adopted and all adoptions of innovations produce positive results. Despite being such much useful, the DOI theory has failed to generate rapid modernization of traditional farms or rapid growth in agricultural output.

Further, the theory does not foster a participatory approach towards innovation adoption, does not take into account individual resources and differences or social support needed in order to adopt the new innovations. Further, it does not provide space to filter bad ideas from implementation because some innovation cannot fit the organization's culture, mission or values and so should not be adopted. But generally, the theory was good in examining the implications of livelihood capabilities and access to extension services among small-scale farmers as it explains clearly that in the contemporary time smooth DOI goes with the capabilities among small scale farmers in terms of financial and non-financial resources. Community members with high capabilities are more likely to get

more skills, more knowledge and more output from their farms other factors being equal.

1.6.4 High pay-off input theory

Additionally, the study was guided by High Pay-off Input Theory (Tagar & Levit, 2012) in explaining the implications of livelihood capabilities on coffee farming inputs among small-scale farmers. The theory focuses on two aspects i.e. how to create and provide farmers with the new high-pay-off technology embodied in capital equipment and other inputs as well as how to increase labor productivity among the farmers. The high pay-off input theory assumes that economic growth from the agricultural sector of a poor country depends predominantly upon the availability and price of modern high pay-off inputs.

Thus, the theory was useful in the study towards analyzing the distribution of inputs such as fertilizers, seedlings and pesticides in improving coffee farming and smallholder farmers' livelihood. Despite its usefulness, the theory has been criticized to have failed to explain where small-scale farmers shall obtain money or resources for acquiring high pay-off farming inputs. But generally, the theory appeared to be suitable in examining influence of livelihood capabilities on coffee farming inputs among small-scale coffee farmers as it focuses on central issue which every small-scale farmer is aspiring i.e. how to obtain the high pay off inputs on reasonable or low cost so that later can be able to maximize the profits.

1.7 Conceptual Framework

The background variables were age of respondents, education level of the respondents, marital status of the respondents, sex of respondents, family size, coffee plot size, coffee price offered, coffee farmers' attitudes and climatic condition for coffee production. The independent variable was livelihood capabilities with the following indicators: Household

head-(h/h) income level, h/h ability to own transport facilities, h/h access to information and communication, h/h ability to earn income apart from coffee (being employed), h/h ability to keep livestock, h/h ability to operate business, h/h head level of capital owned, h/h level of vulnerability, h/h ability to diversify economic activities and h/h level of morbidity and sanitation status. The intervening variable was agricultural policy (Kilimo Kwanza-Agriculture First). The dependent variable was coffee production with its indicators namely increased amount of coffee produced, increased income generated from coffee, enabling coffee farming inputs and extension services affordability, increased diversification, reduced level of h/h vulnerability, increased access to information and communication, increased access to livelihood support and market.

The key assumption on the above variables is that under normal circumstance, background variables such as education, marital status and climatic condition have an influence on the independent variables-(livelihood capabilities) such as ability ability to run business mainly small scale business and h/h head ability to diversify their economic activities. On the other hand, the independent variables have an influence on dependent variable- (coffee production such as increased amount of coffee produced and increased income). At the same time, the intervening variables- (agricultural policy has an influence on the livelihood capabilities and coffee production).

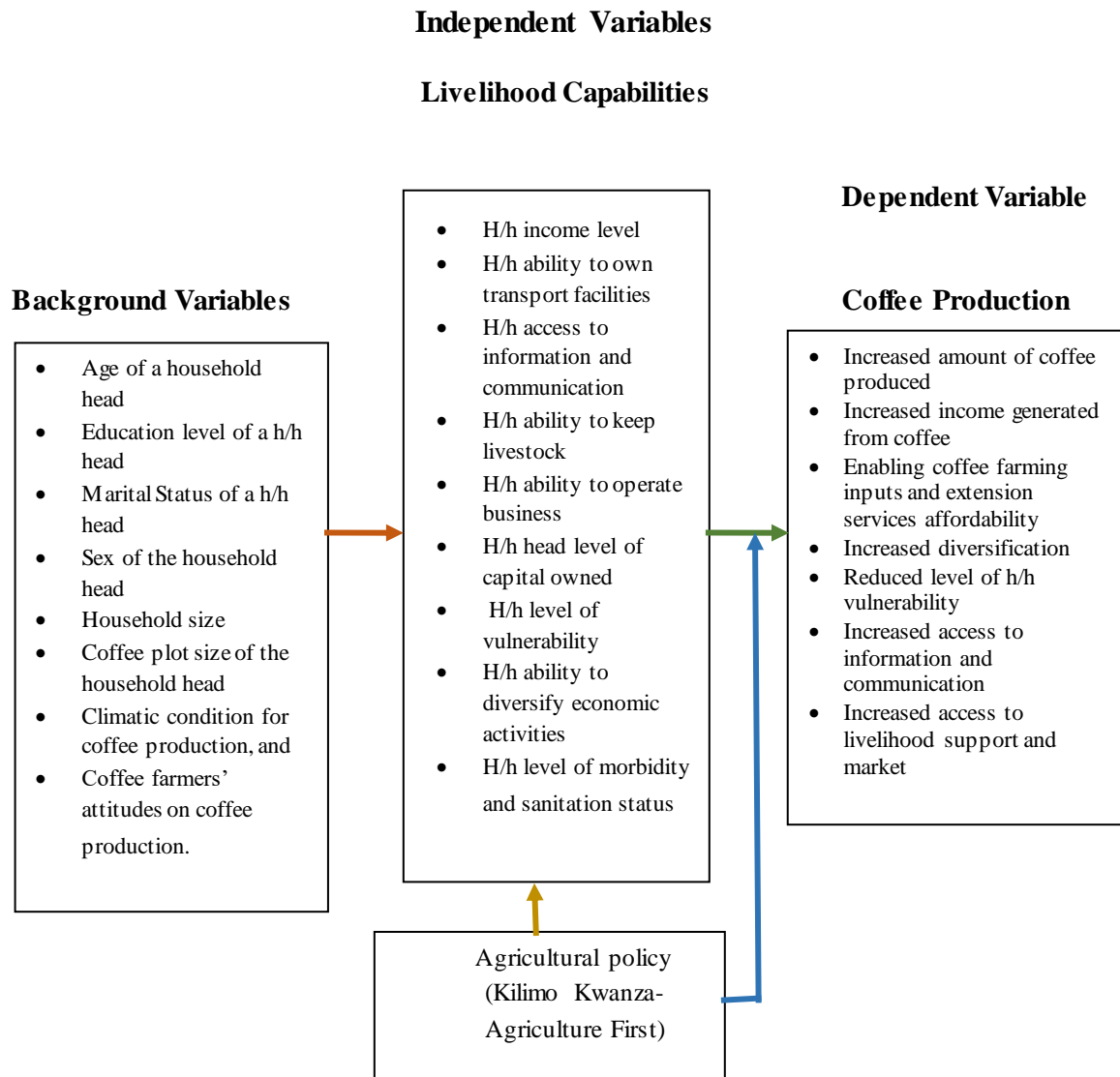


Figure 1: Conceptual framework on livelihood capabilities among small-scale coffee farmers

1.8 General Methodology

This section is considered as a general methodology because it describes the methodology for all manuscripts. Under general methodology, the following aspects were covered: description of the study area, research design and approaches, sampling procedures, methods and tools of data collection, data analysis and ethical consideration.

1.8.1 Description of the study area

The study was conducted in Hai and Arumeru Districts in Arusha and Kilimanjaro Regions respectively. The selection of the two districts was based on the history of coffee

farmers, climatic conditions and their long-time involvement in coffee production. In addition, deterioration in coffee production (around 20% in 2015 compared to 1990 production) which was depended on by nearly 50% of the population in the two districts necessitated this study to be undertaken (Craparo *et al.*, 2015; Kemantha, 2015; Maghimbi, 2012). The other reasons included the magnitude of the growth of horticultural activities among small-scale coffee farmers such as tomato production, vegetable production as well as dairy farming which currently has dominance over coffee production also called for this study to be conducted. Furthermore, another key reason was continuous uprooting of coffee trees among small-scale farmers to pave way for other economic activities in the area (TCB, 2017; Kizito, 2015; Maghimbi, 2012). Therefore, the fore-mentioned reasons prompted this study.

1.8.2 Research design and approach

The study adopted a cross-sectional research design which allowed data collection for multiple variables from a representative sample with varied characteristics to be examined at a single point in time in order to analyse variables' patterns of association (Labaree, 2009; Rindfleisch *et al.*, 2008; Olsen *et al.*, 2004; Bryman, 2008). Unlike other designs, a cross-sectional design was suitable based on the nature of the study as it required collection of data at once. Further, the design was chosen because it gave room for making comparisons among different groups of respondents to see how the dependent variable relates to the independent variables.

The study used a mixed methods approach which combined utilization of both qualitative and quantitative techniques in collection and analysis of the data in order to substantiate the findings as recommended by Saunders *et al.*, (2012). The key assumption for using a mixed methods approach of combining qualitative and quantitative techniques is that it provides a more comprehensive understanding of a research problem than when either of

the approaches is used alone (Mchopa & Jeckoniah, 2018; Creswell, 2014). Therefore, qualitative and quantitative methods were used simultaneously to enable the analysis and output to complement each other so as to reach the desired conclusions. A mixed methods approach has been recommended by Creswell (2014) as the best method since it enables a researcher to conduct a series of semi-structured interviews with a small number of respondents but also carries out a large-scale survey in order to confront the methodological pitfall emanating from the use of one approach.

1.8.3 Sampling procedures

The required sample size was calculated using Morris (1985) formula for known population. In this case the margin of error was 5%, confidence interval was 90% and the population size was 2 509 small scale coffee farmers. Morris (1985) formula states that:

$$\begin{aligned}x &= Z(c/N)^2 r(N-r) \\n &= N x / ((N-1) E^2 + x) \\E &= \text{Sqrt} [(N-n) x / n(N-1)]\end{aligned}$$

where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/N)$ is the critical value for the confidence level c . Therefore, the Morris (1985) formula was applied in this study to calculate a sample size of 250 respondents (small-scale coffee farmers). Only small-scale coffee farmers producing an average of 100 kg and above per year were considered in this study because if someone produces less than the fore-mentioned amount per year he/she could not be considered as a small-scale coffee farmer in this case because the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirements.

Two wards in each district and two villages in each ward were purposively selected i.e. Masama East and Roo Ndoo in Hai District and Nkwarisambu and Akyeri in Arumeru District (Appendix 6). Selection of the wards and villages was done purposively because not all areas (villages and wards) produce coffee in Arumeru and Hai Districts. After determining the sample size and accessing a register from the district co-operative officer containing a list of all small-scale coffee farmers producing an average of 100 kg and above per year, simple random sampling technique was used to get the respondents required for the study.

1.8.4 Methods and tools for data collection

The study was guided by a mixed methods approach-sequential transformative approach which encompasses the use of qualitative then quantitative or quantitative then followed by qualitative approach which allowed corroboration of the results within the study through the use of qualitative and quantitative methods and tools of data collection (Saunders *et al.*, 2012). The main method for data collection was household survey supplemented by focus group discussions, documentary review and key informant interviews. A total of 250 respondents from eight-(8) villages in Hai and Arumeru Districts were involved in a survey technique.

Quantitative data were collected mainly using a household survey and documentary review while qualitative data were collected using Key Informant Interviews (KII) and Focus Group Discussions (FGDs). Qualitative data were recorded using field note books and voice recorders after obtaining permission from the interviewees. A total of eight-(8) KII were conducted with key informants. The selection of the key informants was purposively done by considering their knowledge on livelihood capabilities, coffee production and small-scale coffee farmers in general. They included, village executive

officers (VEO), ward agricultural extension officers (WAEO), ward executive officers (WEO), district community development officers (DCDO) and district agricultural and livestock development officers (DALDO) were the key informants who took part in this study.

Furthermore, a total of eight-(8) FGDs were conducted with small-scale coffee farmers (one-1 FGD in each village). The selection of the participants for the FGDs was done through the guidance of the village leadership. The number of participants in FGDs ranged between six-(6) and eight-(8) as recommended by Bryman (2008). This number has been recommended because it gives room for all individuals (discussants) to participate fully in the discussion due to their smallness, it enables the researcher getting diverse information from the participants because when the number of participants is too big some of the members will not be able to get a chance to air out their views but when the group is too small (let us say below six-(6) participants) some useful information cannot be captured. The FGDs composed of males and females though the number of males was more than the number of females because the focus was on the heads of the households and the majority of the households' heads were males.

And, therefore participants between six-(6) and eight-(8) are sufficient to cater for a good focus group discussion. The composition of participants included men and women small-scale coffee farmers who were either heads of the households or their representatives. The FGDs provided vital information on coffee production trends, influence of livelihood capabilities on coffee farming inputs, extension services and livelihood capabilities diversification strategies among small-scale coffee farmers. This information complemented and supplemented the results obtained through household survey.

1.8.5 Reliability and validity

Reliability refers to the robustness of the questionnaire and in particular whether or not it

will produce consistent findings at different times and under different conditions such as with different samples or with different interviewers (Saunders *et al.*, 2012). The questionnaire was subjected to reliability test. A number of approaches are used for measuring reliability such as pre-test, internal consistency and alternative form. The study made use of internal consistency to measure reliability using Cronbach's Alpha which is one of the most widely used measures of reliability in social and organizational sciences (Bonnet & Wright, 2014). In this study, a reliability test consisting of nine-(9) items representing key variables of the study questionnaire and the Cronbach's Alpha of 0.82 was obtained which was above the acceptable range of 0.65-0.8 and most items in the questionnaire appeared to be worthy of retention as recommended by George and Malley (2003).

Validity is defined as the ability of an instrument to measure what it is supposed to measure (Blumberg *et al.*, 2014; Creswell, 2014). Validity tests are categorized into four types including content validity, face validity, construct validity and criterion related validity. Thus, this study resorted to content validity which refers to the extent to which measurement questions actually measure the presence of those constructs intended to be measured (Saunders *et al.*, 2012).

In order to ensure the validity of the data collected, the pre-testing of the questionnaire was done with 16 respondents in both Hai and Arumeru Districts (eight respondents from each district; four respondents from each ward and two respondents from each village) a month before actual data collection. The pre-testing was done in order to test the data collection instruments, assess time for data collection, check availability of the study population, see how research team work together, test procedures for data processing and analysis and check if the findings were relevant.

It was important to do so in order to be accurate and provide valid findings since short

findings would have been questionable as recommended by Forza (2002) that without assessing the reliability and validity of the research instruments, it will be difficult to describe the effects of measurement errors on theoretical relationships that are being measured. However, in order to concretize the findings, a thorough and extensive literature review was done on coffee production, livelihood capabilities and small-scale farming. In particular, annual, small, medium and long-term coffee production and livelihood capability reports among small-scale farmers from the World Bank, Tanzania Coffee Board, scholars and Tanzania Coffee Research Institute were reviewed in order to get the secondary data for the fore-mentioned subject matter.

1.8.6 Data analysis

Qualitative data were analysed using content analysis by putting together the themes which resembled that is emphasizes pinpointing, examining and recording patterns within data in order to describe phenomenon and how they are associated to a specific research question. Themes considered in qualitative data analysis among others were such as perception among small-scale coffee farmers (impossible to grow coffee, do not like coffee production, coffee production increases poverty and wrongly judged by other members in the community), attitudes (positive, negative and produce it as traditional crop), preferences (do not produce, coffee production discourages and emergency of other economic opportunities) and interest (not interested, highly interested, moderately interested and compelled to develop an interest). During analysis, data were transcribed, categorised coded and thereafter grouped into themes as proposed by Kolb (2012).

In order to analyse quantitative data, livelihood capability levels were developed. In order to have the livelihood capability levels; nine-(9) abilities were established through pilot study (household ability to own a house(s), household ability to buy clothes, household ability to have three meals per day, household ability to earn income apart from coffee,

household ability to pay for medical services, household ability to own transport facility, household ability to run business, household ability to own livestock and household ability to pay for children's tuition fees) as recommended by Lewis (2017); Anuja (2017); Lennart, *et al.*, (2013). The capabilities were then tested in the main data collection after assigning them scores on each capability.

The scores were Yes=1 and No=0. After the data entry, total scores obtained by each respondent established whereby the maximum score was 9 and the lowest score was 0. Basing on the scores, a median score was calculated to determine the group level formation. Finally, four levels established as depicted in Table 1.

Table 1: Livelihood Capability level

Levels	Frequency (n)	Percent (%)	Capability Index
No Capability	23	9.2	0.0
Low Capability	98	39.2	0.1- 4.44
Moderate Capability	46	18.4	5.0
High Capability	83	33.2	5.1-9.0
Total	250	100.0	

NOTE: No capability refers to the small scale coffee farmers who were found with very poor socio-economic situation and were unable to actively participate in coffee production; low capability stands for small scale coffee farmers with minimum ability to participate in coffee production and under normal circumstance, they need support on different issues; moderate capability refers to small scale coffee farmers with the required ability to participate in coffee production and they are able to produce adequately with or without any support while high capability means small scale farmers with higher economic status and they do not need any assistance so as to participate in coffee production.

Based on livelihood capability level results (Table 1), four (4) levels established that is no capability, low capability level, moderate capability level and high capability level. The mean score results were found to be between 4.4- 5.0 (18.4% of the respondents) which was at moderate level implying moderate livelihood capabilities among the small-scale coffee farmers in the study area. Zero (0) in the livelihood capability level implied no capability at all (9.2% of the respondents) and from 0.1-4.4 (39.2% of the respondents) implied low capabilities among small-scale coffee farmers. This is to say that many of small-scale coffee farmers in Hai and Arumeru Districts had low livelihood capability level. From 5.1 to 9.0 (33.2% of the respondents) had high livelihood capability level among small-scale coffee farmers.

Thereafter, chi-square and cross tabulation were used for showing the association between livelihood capabilities and coffee farming inputs; livelihood capabilities and extension services; livelihood capabilities and diversification strategies among small-scale coffee farmers. The results obtained are presented using tables and figures.

1.9 Ethical Consideration

In ensuring ethical consideration in research as recommended by Bryman & Bell (2007), the following were done: The researcher explained clearly to the participants about the essence of the research to himself and to small-scale coffee farmers. Participants were also assured to be free from any physical or psychological harm in the process of participating in this research. In the entire data collection process, the researcher observed high degree of respect to the participants by getting their consent prior to the study. In addition, participants were assured of high degree of confidentiality and privacy on the information provided. They were also warned of any deception or exaggeration about the aims and objectives of the research.

Furthermore, the researcher assured the respondents that all types of communication were done with utmost honesty and transparency by filtering out any misleading information as well as ensuring proper representation based on age, sex, gender, education, occupation and engagement in coffee production. As necessary as required, the researcher observed research guidelines and postgraduate guidelines. Data collection permit was obtained from MoCU, Regional Administrative Secretaries for Kilimanjaro and Arusha Regions respectively. The permit was presented to the District Executive Directors for Arumeru and Hai Districts. Finally, the local authorities (Ward Executive Officers and Village Executive Officers) were requested for permission for this study to be undertaken in their areas.

1.10 Organisation of the Study

This thesis presents four publishable manuscripts organised in four chapters. The entire thesis is organised in six chapters starting with an introduction. The introduction sets the background information to the thesis. Chapter two presents manuscript number one which focuses on examining implication of livelihood capability on coffee production trends among small-scale coffee farmers. Chapter three presents the second manuscript that deals with the implication of livelihood capabilities on coffee farming inputs accessibility, availability and affordability among small-scale coffee farmers.

Chapter four presents the third manuscript which examines the association between livelihood capabilities and access to extension services among small-scale coffee farmers. Chapter five presents the fourth manuscript that deals with livelihood capabilities diversification strategies among small-scale coffee farmers. In chapter six, the thesis presents a summary of the results and discussions from all the manuscripts, and finally draws out conclusions and recommendations for improvement.

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CHAPTER TWO

2.0 COFFEE PRODUCTION TRENDS AND THEIR IMPLICATIONS ON LIVELIHOOD CAPABILITY AMONG SMALL-SCALE FARMERS IN HAI AND ARUMERU DISTRICTS, TANZANIA

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2.1 Abstract

Coffee production has high potential in improving livelihood capabilities among small-scale farmers in Hai and Arumeru Districts. However, there have been numerous scholarly debates on the importance of coffee production for the livelihood of small-scale farmers. As a response to the debates, this paper examines coffee production trends and their implications on small-scale farmers' livelihood in Hai and Arumeru Districts in Tanzania. Specifically, the paper intends to: examine the association between socio-demographic characteristics and coffee production among small-scale farmers, examine coffee production fluctuation trends among small-scale farmers, examine small-scale farmers' opinions on coffee production for the past ten years (2005-2015) and determine the status of land under coffee production during the same period. The paper adopts trend analysis design in examining the trend of coffee production over time, price offered and income generated using secondary data. Further, a cross sectional research design was used in collecting primary data from 250 small-scale coffee farmers and 12 key informants. Qualitative data were analysed descriptively. The results show that coffee production among small-scale farmers had been dwindling from time to time and therefore affecting the livelihood capabilities of small-scale farmers. Socio-demographic characteristics of small-scale coffee farmers influence substantially the amount of coffee produced as well as the income obtained from coffee production. Conclusively, coffee

production trends in Hai and Arumeru Districts have been fluctuating from time to time. In Hai and Arumeru Districts there is low youth involvement in coffee production. Further, it can be concluded that land under coffee production has been decreasing from time to time due to different socio-economic activities. It is recommended that coffee production has to be improved by putting more emphasis on youth participation in coffee production due to its importance in their daily lives. In addition, small-scale coffee farmers can collaborate among themselves in handling problems which are within their reach. At village or ward level there is a need to have a demonstration farm “Shamba Darasa” where small-scale coffee farmers could go and learn how best to produce coffee.

Key words: *Small scale, Coffee farmers, Livelihood capability, Coffee production*

2.2 Introduction

Globally, coffee is one among the prominent cash crops for nations and the livelihood of farmers. According to recent statistics, coffee is estimated to be produced in more than 70 countries world-wide with Brazil, Vietnam, Colombia, Indonesia and Ethiopia being the main five global producers (ICO, 2015). Coffee in many parts of Africa and Tanzania in particular was originally cultivated by German missionaries and later on in the mid-1920s by small-scale farmers. Thus, in the mid-1920s and 1930s, local small-scale production was linked to the co-operative movement involving native cultivators (Mhando *et al.*, 2013). According to Kana (2012), coffee is mainly produced by small-scale farmers in most of the developing countries, including Tanzania. TCB (2019) point out that coffee production in Tanzania has always been fluctuating mainly to the negative side due to internal and external problems. For example, in 1980 Tanzania produced 19.2 thousand tons of coffee, about 13.4 thousand tons of coffee in 1990 while in 2000 the production was 5.2 thousand tons and in 2010 only 1.5 thousand tons was produced. Worse enough, the decline in the quantity produced was also associated with a sharp decline in price for

more than 30% which finally affected the livelihood of small-scale coffee farmers due to the failure to acquire basic human needs.

In Tanzania, coffee is the top ranked agricultural export product providing direct income to more than 0.4 million households which support the livelihood of some 2.5 million individuals and generate between USD 150 and 225 million per year of foreign exchange earnings (Tanzania Coffee Board-TCB, 2019 & 2017). It accounts for nearly one-fifth of Tanzania's foreign exchange earning followed by cotton, cashew nuts, tobacco, tea and sisal in that order. Coffee has played a significant role in improving the livelihood of small-scale farmers' households. It has been a source of income for paying school fees, house construction, food, medical services and other socio-economic needs (TCB, 2017; ICO, 2015; Diyamett, 2007; Bates, 2003).

Studies on livelihood among small-scale coffee farmers have become topical in the contemporary time. Authors such as Valdes-Rodriquez & Perez-Vazquez (2011), Qinzilbash *et al.*, (2008) & Sen (2005) have defined the concept of livelihood capability differently. According to Valdes-Rodriquez (2011) the term livelihood refers to the way in which people earn income to effect for different basic needs such as clothes, food, shelter and medication. It also refers to a means of making a living which encompasses peoples' capabilities, assets, income and activities required to secure the necessities of life. At the same time, the term capability according to Lienert & Burger (2015) refers to the ability to achieve the functioning to constitute for the better life. It also refers to the reaction potential to challenges and crises which reflects to the power or ability to do something or state of being capable. In this study the definition by Lienert & Burger (2015); Sen (2005) was adopted. Therefore, livelihood capability refers to the ability of small-scale coffee farmers in meeting their daily basic needs and their power in acquiring farming inputs, extension services and diversification strategies.

Small-scale coffee farmers in the Tanzania's context refers to farmers cultivating farmland of the size between 0.9 to 3 hectares per household, and this accounts for a larger share of the farm output (URT, 2011). In this study, a small-scale coffee farmer was defined as an individual producing an average of 100 kg of coffee per year. From the early 1960s to the mid-1980s, coffee contributed significantly to the socio-economic wellbeing of the coffee growers hence acting as a source of livelihood support for the majority of producing areas (Ludi, 2006). This implies that the livelihood of small-scale coffee farmers in Tanzania had a direct linkage with coffee production. Unfortunately, studies such as those by Mussatto., Machado & Martins (2011) have revealed that there is a very high degree of deterioration of the small-scale farmers' wellbeing in terms of livelihood.

Coffee production in Tanzania has encountered different problems both locally and internationally. These problems are assumed to have affected the livelihood of small-scale coffee farmers due to close linkage between livelihood and coffee production (Lienert & Burger, 2015; Kana, 2012; Ludi, 2006). According to Mhando *et al.*, (2013), the introduction of economic liberalization policy in the 1980s went hand in hand with the removal of subsidies in the agricultural sector. Consequently, since then, some small-scale coffee farmers could not afford to acquire adequate and quality coffee production inputs.

URT (2011) and Maghimbi (2007) studies indicate that coffee is the main cash crop in both Hai and Arumeru Districts, grown mainly on the highland zone intercropped with banana. Its production can be traced far back in the late 19th century during the German rule in East Africa. Coffee production has been declining in the recent years in many parts of the country including Hai and Arumeru Districts due to factors such as high incidence of diseases, climatic change, falling coffee prices, unfavourable agricultural policies and

limited youth participation in agriculture. Other factors include land tenure system in Hai and Arumeru Districts, lack of improved varieties and high production costs due to the removal of subsidies in agriculture generally and coffee production in particular.

So far, the government of Tanzania has taken several initiatives to improve agricultural production and livelihood among small-scale farmers. The efforts include establishment of policies and programmes such as the Agricultural Sector Development Programme in 2003, establishment of the Tanzania Coffee Research Institute in 2000, Tanzania Agricultural Policy, 1997 and Co-operative Development Policy, 2002. These efforts and many others were envisaged to help improve farm production and the livelihood of both coffee and non-coffee small-scale farmers (URT, 2008). Unfortunately, these government efforts have not performed well as farmers still face several challenges including climate change, lack of subsidies as well as inadequate access to farm inputs.

The difficulties are assumed to have forced small-scale coffee farmers to resort to various coping strategies for their livelihood support (Babatunde & Qain, 2009). For more than three decades (1980s - 2015), coffee production in many parts of the country has diminished. As a result, the income obtained by small-scale coffee farmers dropped by more than 80% (Maghimbi, 2007). This result is assumed to have hampered the livelihood capabilities of the small-scale coffee farmers in terms of on-farm, non-farm and off-farm activities (TCB, 2012). Therefore, this manuscript intends to examine the implications of livelihood capabilities on coffee production trends among small-scale farmers in Hai and Arumeru Districts, Tanzania.

Among small-scale farmers, coffee was pivotal to their livelihoods. Coffee has been a source of income to meet socio-economic needs such as shelter, food, clothes, education and major source of employment in Tanzania (Parrish *et al.*, 2005; Temu *et al.*, 2001). In Tanzania, about 90% of coffee farms are owned by smallholder farmers while the

remaining 10% are owned by estates' growers (TACRI, 2013). The coffee industry employs about 2.5 million people directly and indirectly (Ludi, 2006). However, the significance of coffee dates back to 1929 during the establishment of co-operatives in Tanzania. From the early 1960s to the mid-1980s coffee contributed significantly to the socio-economic well-being of coffee growers (Ludi, 2006).

This signifies that coffee is a source of livelihood support for the majority of small-scale farmers' households. From 1985, coffee production trends have not been impressive thus affecting the majority of small-scale farmers' livelihood particularly in acquiring basic needs such as education, health services and decent housing due to their socio-economic importance (Hoyt & McMillan, 2004). Despite the government's efforts in improving coffee production and small-scale farmers' income, livelihood of small-scale coffee farmers is still an issue to be analysed.

Studies in Tanzania have been conducted on coffee production including the effects of agricultural policies, agricultural marketing reforms, analysis of agricultural marketing, coffee sector and coffee industry (Mhando, 2013; Mmari, 2012; Maghimbi, 2007; ICO, 2005; Bates, 2003; Diore, 1998). Unfortunately, there is inadequate information on coffee production trends and their implications to the livelihood of small-scale coffee farmers. Moreover, most of these studies have produced contradicting results making the debate about the outcomes of coffee production trends against the livelihood capabilities among small-scale coffee farmers inconclusive, particularly where the link between coffee production trends and small-scale coffee farmers' livelihood capabilities is inseparable, which this paper is addressing.

The main research objective in this case is to examine the implications of livelihood capabilities on coffee production trends among small-scale coffee farmers. Specifically, the paper intends to: (i) examine associations between socio-demographic characteristics

on coffee production and livelihood capability among small-scale farmers (ii) examine coffee production fluctuations trend for 20 years (1998/99-2018-2019) and its effects on livelihood capability among small-scale farmers (iii) examine small-scale coffee farmers' opinions' on coffee production in relation to their livelihood capability for 10 years, and (iv) determine the current status of land under coffee production and livelihood capability of small-scale coffee farmers in the study area.

This study was guided by the Farm Household Production theory (FHPT) by Schultz (1964). The theory tries to examine the policy implications on production among small-scale farmers and different interventions that seek to increase the outputs of the agricultural sector. This is done by raising farm output prices or by lowering the cost of variable inputs and hence predicting profit to be generated to a given production activity among small-scale farmers.

The theory explains that smallholder farmers produce under a high level of uncertainty induced by natural hazards and man-made factors. According to Schultz (1964); Taylor & Adelman (2003), there is a general perception that small-scale farmers in developing countries are very poor and inefficient in economic production and related activities. As a result, for them to produce better and improve their general livelihood, they have to be motivated in different ways. Evidence from different countries such as Ethiopia and Zambia, shows that the majority of small-scale farmers have limited knowledge, inadequate capital, poor assets endowment and limited formal protection which limit their capacity to invest (Taylor & Adelman, 2003).

The FHPT has proved to be useful in analysing production, market, profitability, price and general sustainability among small-scale farmers in different developing countries such as Ethiopia and Zimbabwe (Kana, 2012; Proctor & Lucchesi, 2012; Hooton & Omore, 2007). In this respect, the theory was useful in explaining the implications of

coffee production trends among small-scale coffee farmers who are involved in the production process in order to meet their basic needs.

Low income from coffee production among small-scale farmers is attributed to low production, inability to acquire different basic needs, unemployment among coffee producing households, loss of interest in coffee production and general deterioration in the livelihood status among small-scale coffee farmers. Therefore, the FHPT is useful in analysing the coffee production trends among small-scale coffee farmers and their implications to their livelihood in ensuring sustainable development.

2.3 Methodology

The study was conducted in Arumeru and Hai Districts in Tanzania. The major economic activity in the study area is agriculture, mainly coffee production. Other activities include livestock keeping, vegetable production, banana production, irish potatoes and maize production. The selection of the two districts considered their geographical location, history of the coffee farmers, climatic conditions and their long involvement in coffee production. Another reason is the importance of coffee to the livelihood of the small-scale farmers in the two districts where more than 50% of the population depends on coffee for their survival and other socio-economic developments. At the same time in Kilimanjaro and Arusha regions, coffee production has been badly affected compared to other regions where many coffee trees have been uprooted to pave way for other income generating activities such as horticultural production.

A cross-sectional research design was used in this study to collect data from different groups of respondents at a time. The method gave room to make comparisons among different groups of respondents to see how the dependent variable relates to the independent variables. It further ensures a high degree of precision, reliability and validity on the data to be collected and at the same time, the method saves time and other

resources required to accomplish the study. The study population comprised of small-scale coffee farmers in Hai and Arumeru Districts who had a capacity to produce more than 100 kg per year. According to the 2016 coffee production report in Hai and Arumeru Districts there were 2 509 small scale-coffee farmers of which Hai District had 1 340 and Arumeru District had 1 159 small-scale coffee farmers.

The required sample size was calculated using Morris (1985) formula for known population. In this case the margin of error was 5%, confidence interval was 90% and the population size was 2509 small scale coffee farmers. Morris (1985) formula states that:

$$\begin{aligned}
 x &= Z(c/N)^2 r(N-r) \\
 n &= N x / ((N-1) E^2 + x) \\
 E &= \text{Sqrt} \left[\frac{(N-n) x}{n(N-1)} \right]
 \end{aligned}$$

where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/N)$ is the critical value for the confidence level c . Therefore, the Morris (1985) formula was applied in this study to calculate a sample size of 250 small-scale coffee farmers. Only small-scale coffee farmers producing an average of 100 kg and above per year were considered in this study because if someone produces less than the fore-mentioned amount per year he/she couldn't not be considered as a small-scale coffee farmer in this case because the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirements.

The unit of analysis was household head whereby both men and women were represented in this study. The essence of ensuring both men and women participated in this study was to capture opinions, perceptions and visions from both of them with regard to coffee production trends and their livelihood implications among small-scale coffee farmers.

Furthermore, the participation of men and women in this study was necessitated by the effect coffee production has on the livelihood of the entire community members. In each district two (2) wards were picked and in each ward two (2) villages were picked purposively. The main criteria for the selection of the districts and wards were the magnitudes of its involvement in coffee production and severity of coffee production in these areas such as level of uprooting of coffee farms. After the sample size was determined and accessing a list of small-scale coffee farmers' households producing 100 kg of coffee and above, a simple random sampling technique through the use of random numbers was used to obtain the respondents from specific coffee farmers' household which was the unit of analysis in this respect.

Both qualitative and quantitative data were collected. Data collection methods included household survey, focus group discussions (FGDs) and documentary review. Data were mainly collected from small-scale coffee farmers. In order to concretize the findings, key informants like extension officers, village leadership officials, Tanzania Coffee Board, district agricultural officers and leaders of secondary co-operative unions' officials were interviewed. The study mainly used secondary data to analyse the trends in coffee production and their implications among small-scale coffee farmers' livelihood. Primary data were collected from heads of the households among small-scale coffee farmers, FGDs and KII. Secondary data were collected from various institutions dealing with coffee in the country such as Tanzania Coffee Board-TCB, Tanzania Coffee Research Institute (TACRI), World Bank reports and other official government sources and publications in order to obtain information on various aspects related to coffee production trends.

Data from each questionnaire were cleaned, coded and entered in the Statistical Package for Social Sciences (SPSS). Trend analysis and descriptive statistics were used to analyse

the data to show production trends over different periods of time, price offered and income obtained among small-scale farmers, and their implications to households' livelihood. In particular, descriptive statistics such as percentages mean and frequencies were the outcomes of the analysed data. Finally, presentation of the findings was done using tables and figures (line graphs) as depicted in the results and discussion section.

In order to ensure the validity of the data collected, the pre-testing of questionnaire was done with 16 respondents in both Hai and Arumeru Districts (eight respondents from each district; four respondents from each ward and two respondents from each village) a month before actual data collection. The pre-testing was done in order to test the data collection instruments, assess time for data collection, check availability of the study population, assess how research teams work together, test procedures for data processing and analysis and check if the findings were sensible.

Reliability of the data collected was determined by calculating the Cronbach's Alpha which is a measure of internal consistence showing how closely related a set of items are as a group. Cronbach's Alpha is considered to be a measure of scale reliability. In this case, the reliability coefficient was $0.7674=76.74\%$ meaning the information collected was reliable because the optimum value is between 0.65 (65%) to 0.8 (80%) and the obtained reliability coefficient is within the acceptable range.

2.4 Findings and Discussion

This paper focused on different parameters like socio-demographic characteristics of the respondents, nation-wide coffee production trends, Hai and Arumeru Districts coffee production trends, amount of coffee produced, price offered and income obtained. Other parameters included small-scale coffee farmers' opinions on coffee production trend and status of land under coffee production and its influence on coffee production and livelihood capabilities among small-scale coffee farmers.

2.4.1 Socio-demographic characteristic of respondents

With regard to the socio-demographic characteristics of respondents, different variables such as age, sex, marital status, education level and the type of the household were examined in relation to coffee production and their implications among small-scale coffee farmers' livelihood in Hai and Arumeru Districts (Table 1).

Table 1: Socio-demographic characteristics of respondents

Variable	Category	Frequency (n=250)	Percent (%)
Type of Respondent	Coffee Producer	236	94.4
	Spouse of Coffee Producer	14	5.6
Sex	Male	166	66.4
	Female	84	33.6
Age	Minimum age	31	
	Mean (average age)	55.4	
	Maximum age	86	
Marital Status	Married	207	82.8
	Single	5	2.0
	Divorced/Separated	11	4.4
	Widow	21	8.4
Education Level	Widower	06	2.4
	No formal Education	29	11.6
	Primary Education	136	54.4
	Secondary Education	59	23.6
	Diploma Education	12	4.8
Type of Household	University Education	14	5.6
	Nucleated	206	82.4
	Extended	41	16.4
	Polygamous	03	1.2

According to the findings in Table 1, the respondents who participated in this study were coffee producers (94.4%) and spouses of coffee producers constituted only 5.6% of the total respondents. It was important to know the type of respondents involved in this study so as to determine how it influenced coffee production (either positively or negatively) among small-scale coffee farmers. During focus group discussions in Nkwarisambu village, discussants had the following opinions:

"...the type of respondent if it is male was found to have a positive impact on coffee production in particular... coffee farms which are under coffee producers themselves perform better than those which are under spouses of the coffee producers...as a result, better performance in coffee production was found to have

a direct implication in the entire livelihoods among small-scale coffee farmers in meeting their daily socio-economic requirements...” (FGD, Nkwarisambu village, 20th July, 2016).

Also, during key informant interview in Nkwarisambu village it was noted that coffee production is a male dominated economic activity. But in case for one reason or another husband is not at home then the production becomes under the supervision of his spouse in this case the wife. During household survey it was revealed that coffee farms which were under the supervision of men performed better than those which were under the supervision of their spouses.

This implies that coffee farms which are under the supervision of men were found to perform better than those which were under the supervision of women. This is from the historical point of view that traditionally, coffee production is a male dominated economic activity; hence, men possess more skills and knowledge on how to take care of their coffee farms. In contrast to men, women are not traditionally care takers of the coffee farms, and that is why when it happens, they are compelled by the circumstances such as death or absence of their husbands at home due to travel or non-farm employment elsewhere; the outcomes from their coffee farms are usually poor. In most cases, they have to move around the village looking for men who could assist in pruning and spraying of the pesticides. This process sometimes tends to make the matter worse as it requires money which is sometimes not available leading to the continuous decline in coffee outputs.

It was also found that, the majority of the respondents who took part in this study were men (64.4%) while women constituted 33.6% of the respondents. The general assumption here is that, if coffee production does well in the farms and in the market, then definitely the livelihood among small-scale coffee farmers for both men and women will

automatically improve, but if coffee production does not perform well then the livelihood of men and women who depend on coffee production as their major economic activity will be greatly affected. That is why it was important to ensure that both men and women were involved in this study. But of course, men were more than women because the study gave priority to the heads of the household in the first place and if men were not available for any reason then the chance was given to spouses of the head of the households.

In terms of the ages of the respondents who participated in this study, the minimum age for someone to be actively participating in coffee production was found to be 31 years. Below the age of 31 years, very few participated in coffee production. Of course, the participation in coffee production is tied up to the cultural norms in Hai and Arumeru Districts whereby a child is given a plot of land after marriage and allowed only to consume non-coffee products like banana and other food staff. Also, another good observation as to why individuals below 31 years of age did not actively participate in coffee production is due to the fact that the majority of young men and women seemed to be less interested in coffee production; they considered it as a last option activity after all other options had failed. Coffee trees take up to five (5) years to bear fruits and therefore this type of an economic activity needs tolerance but very unfortunately, the youth generation lacks patience. As a result, they prefer other economic activities like business and horticulture which pays in a shorter period of time compared to coffee.

From the results in Table 1, two things are very critical in the coffee production industry; one, there is late involvement in coffee production among the youth due to cultural norms and secondly there is an aspect of youth not be interested in coffee production probably due to the cost involved and limited income from the coffee business. As a result, this has led to low coffee production in both Hai and Arumeru Districts because the crop is produced by older people (more than 60 years) who are no longer economically

productive. Young generation perceive coffee production as an income generating activity among older people and therefore, they are even ready to remain idle and just loitering in the village instead of taking part in coffee production. This means a change in mindset among the youth towards coffee production is of crucial importance for maximizing coffee production and ensuring its sustainability.

Some of the participants who took part in this study were of advanced ages up to 86 years. During interviews, it was revealed that these older men and women were still controlling their coffee farms hence denying young men and women the chance to actively participate in coffee production. During a focus group discussion in Nkwarisambu village in Arumeru District, when older men (80 years and above) were asked as to when do they expect to retire from coffee production and leave the land for their children, they said:

“...whatever the little amount of money we are getting from coffee production, it is far better than begging from our children and relatives...the children will get the coffee farms after our death and not otherwise...” (FGD, Nkwarisambu village, 25th June, 2016).

Ownership and control of coffee farms by an older person (70 years and above) hinders youth participation in coffee production and results in low output from coffee farms because older producers are no longer capable of effectively and efficiently taking care of their farms. In the same scenario, it was found that the majority of community members who participated in coffee production were above 50 years of age. Some of these individuals were found to be those who had never been to school or with little level of education or retired from public or private sector employment. But furthermore, it also affects the sustainability of coffee production among small-scale farmers.

With regard to marital status of the respondents, 82.8% were married. This implies that community members of different marital statuses participated in coffee production among

small-scale farmers, basically due to the importance of coffee for their daily livelihood requirements. Small-scale coffee farmers have economic, social, and cultural needs which require money in one way or another and one way of getting money is through producing coffee. In order to get money to offset for different requirements they have to produce coffee. Small-scale coffee farmers in Hai and Arumeru Districts pointed out that from the historical perspective, coffee production has been the major economic activity and community members have relied on it as a major source of households' income. That is why it was found that community members regardless of their marital status were taking active part in coffee production so as to get income for their livelihood requirements.

Respondents in this study were in five different categories of education where some had no formal education, others had primary education, secondary education, diploma education and the rest had university education. In terms of respondents with regard to their education level, the majority of the respondents (54.4%) had primary education and only 5.6 % had university education. It was found that there is a very close connection between someone's education, amount of coffee produced and other households' assets possessed.

It was further revealed that the majority of small-scale coffee farmers were found to have multiple sources of income; that is income from coffee and from other different sources. By being economically capable it implies they were in a position to take all the necessary measures to ensure high production from their coffee farms irrespective of different coffee production related problems such as diseases, soil infertility and climate change. Of course, there were some few cases amounting to 16% where coffee production was not directly linked to the level of education possessed. In this case "experiences substituted education". For example, during a focus group discussion in Modio village, Hai District, Kilimanjaro Region, it was stated that:

“...we have very low education and the majority are with primary education and the rest are without formal education at all...but sometimes our production is higher than some of our neighbours with higher educational levels” (FGD, Modio village, 21st June, 2016).

This implies that despite the fundamental importance of formal education, there are small-scale coffee farmers who are producing very well just through their accumulated experiences in coffee production. But of course, small-scale farmers acknowledged the importance of education towards good performance in coffee production particularly when it comes to the selection of the right extension services and farming inputs.

With regard to the type of households, in both Hai and Arumeru Districts, households were not homogeneous. Some households were nucleated while others were extended and the remaining ones were polygamous in nature. According to the findings, 82.4% of all respondents were nucleated families with father, mother and a child or children while 16.4% were of extended type with father, mother, children, grandmother, grandfather, grandchildren and other close relatives. It was important to know the types of the families because the size of the family has an impact on coffee production, particularly in terms of labour power and coffee plot size. It may be argued that the more the family members, the less the farmland for coffee production and vice versa. If, for example, a family has two wives, it is expected that each wife will have her own home which means the land for cultivation will automatically be reduced to pave way for house construction.

It was revealed during a focus group discussion in Roo village Hai District that having many wives has a multiplier effect on land or coffee farms in terms of the number of children to be reproduced later on because when they grow up, they would be in need of land for house construction as well. The discussants argued as that:

“...many wives mean many children which imply continuous reduction of the same piece of land for different purposes hence reducing the area for coffee production...” (FGD, Roo village, 24th June, 2016).

This would reduce the land set aside for coffee production. That is why it was found that in Hai and Arumeru Districts, one among the factors for the decline in coffee production is pressure on land for other uses such as settlement establishment and horticulture. This is because the same land inherited from the ancestors is annually undergoing re-distribution among the family members.

2.4.2 Coffee production trend among small-scale coffee farmers in Tanzania

Coffee production national-wide has been fluctuating from time to time in all production zones in Tanzania. According to TCB (2019) report on coffee production in Tanzania, the variation in production from time to time is as indicated in Fig. 1.

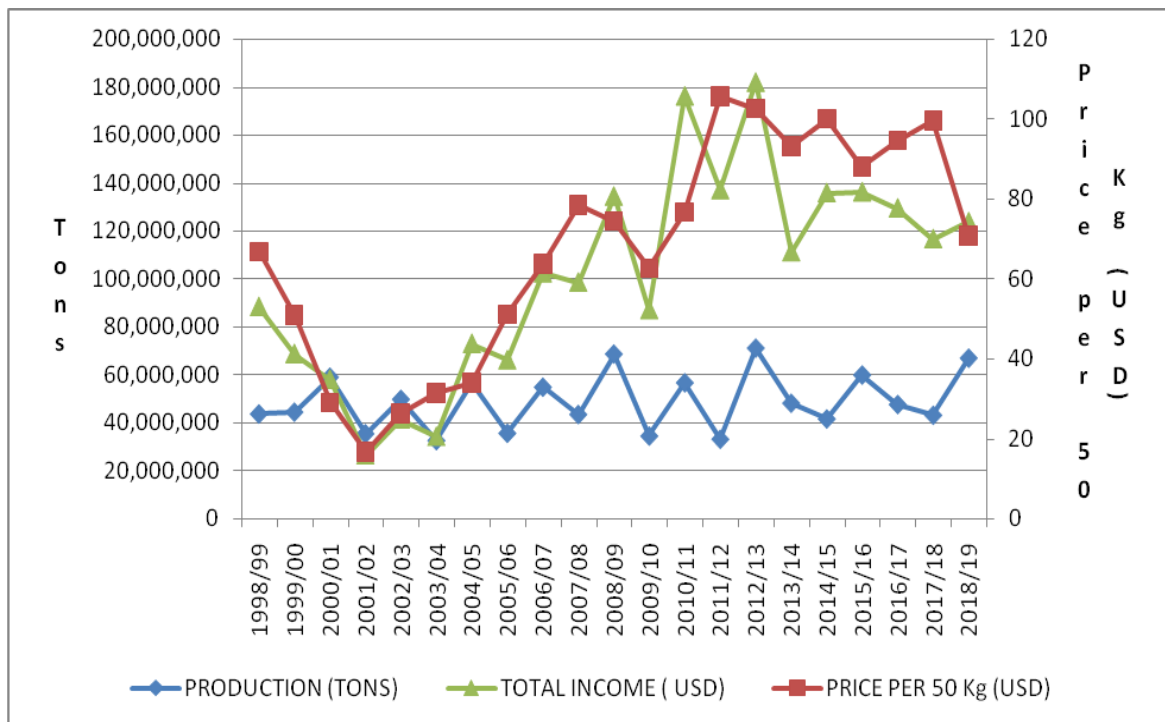


Figure 1: Nation-wide coffee production, price offered and income obtained trends from 1998/99-2018/19 crop seasons

Source: TCB (2019)

Figure 1 results depict that nation-wide, the highest coffee production occurred in the 2012/13 agricultural season when 71 007 thousand tons harvested followed by 2008/09 whereby 68 576 thousand tons obtained while the lowest production occurred in 2003/04 with a total of 32 714 thousand tons followed by 2011/12 when 33 305 thousand tons were obtained. Furthermore, it has to be noted that not only coffee production which has been fluctuating but within the same period of time price offered per 50 kg of coffee has been varying from time to time.

The highest price per 50 kg of coffee reached \$105.71 in 2011/12 followed by \$102.57 in 2012/13 per 50 kg of coffee. In the same scenario, the lowest price reached \$16.68 in 2001/02 for 50 kg of coffee followed by 2002/03 crop season when \$26.30 was offered to 50 kg of coffee. With regard to income obtained, the highest amount was marked in the 2012/13 agricultural season when \$181 795 thousand was obtained followed by 2010/2011 agricultural season with \$179 096 thousand. The lowest income was obtained in 2002/03 crop season with \$26 449 thousand followed by 2003/04 during which \$34 182 thousand obtained.

As depicted in Fig. 1, the fluctuation in coffee production, price offered and income obtained over time affects the livelihood of small-scale coffee farmers in Tanzania (more specifically Hai and Arumeru Districts) due to close linkage between coffee production and smallholder farmers' daily lives. It was noted during key informant interviews in both Hai and Arumeru Districts that before President John Pombe Magufuli declared free education from primary school to ordinary secondary school level in 2016; many rural families were failing to take their children to school due to inability to pay for school fees. But of recently, enrolment has increased and even student performance has improved tremendously because the little income parents have is now catering for other livelihood requirements including lunch in schools among students.

It was revealed during data collection that small-scale coffee farmers in the study area depend on income from coffee to cater for different requirements and, therefore, once production and price fluctuates to the negative their prior plans for the respective households are affected. As a matter of fact, that is why there has been a nation-wide outcry from small-scale coffee farmers, mainly due to the deterioration in price and outputs among themselves. In developed countries if production or income or both among small-scale farmers are affected by either outbreak of diseases or bad weather conditions, farmers are compensated so that they can continue producing and maintaining their livelihood. But in less developed countries like Tanzania (Hai and Arumeru Districts in particular) nothing does exist in a practical sense to assist small-scale farmers coping with unforeseen events like bad weather conditions or outbreak of diseases.

2.4.3 Coffee production, price trend and income obtained among small scale coffee farmers in Hai and Arumeru Districts

2.4.3.1 Hai District coffee production, price offered and income obtained 1998/99-2018/19

Coffee production, price offered and income obtained from Hai District have been fluctuating from time to time mainly due to natural and man-made factors. This fluctuation has not only affected coffee production itself but also the livelihood capabilities of small-scale farmers whose lives depend on coffee for their survival. Fig. 2 depicts clearly the trend of coffee production, price offered and income fluctuations for the past twenty (20) years (1998/99-2008/18) crop season.

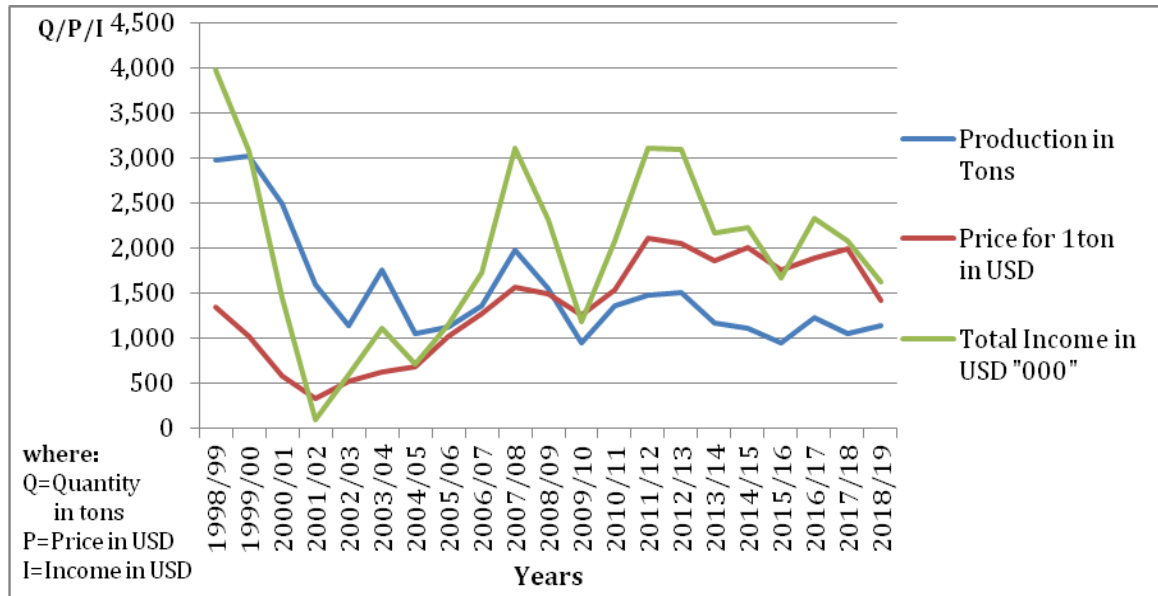


Figure 2: Coffee production, price and income trends from 1998/99-2018/19 for Hai District, Kilimanjaro Region-Tanzania

Source: TCB, (2019).

According to TCB (2019) report as presented in Fig. 2 on coffee production in Hai District, Kilimanjaro Region, it was revealed that the highest coffee production in Hai District took place in the 1999/00 crop season with a total of 3 020 tons followed by 1998/99 whereby 2 978 tons obtained while the lowest production occurred in the 2009/10 with 943 tons followed by 2015/2016 agricultural season when 949 tons of coffee were harvested. With regard to income obtained, the highest income was recorded in the 1998/99 crop season when \$3 980 thousands were obtained followed by 2007/08 crop season with \$3 102 thousands obtained and the lowest income obtained in 2000/01 when \$3 102 thousands obtained and the lowest income obtained in 2000/01 when \$96 thousand was obtained. In this scenario, the highest price offered was \$2 114 per 1 ton of coffee in the 2011/12 crop season followed \$2 051 in 2012/13 crop season. The lowest price was marked in 2001/02 where \$334 offered per 1 ton of coffee followed by 2000/01 when \$581 offered for 1 ton of coffee.

The description in Fig. 2 shows how production, price and income have been changing from time to time in Hai District as a result affecting the livelihood of the small-scale

coffee farmers who are depending on coffee for their survival. These changes have, therefore been affecting small-scale coffee farmers in one way or another. For example, if the output and price increase then the livelihood of small-scale coffee farmers will improve, but if vice versa is true then the livelihood of small-scale coffee farmers will be worse because they cannot be able to meet their daily usual requirements. Therefore, regular fluctuations in production, price and income have so far affected the livelihood of small-scale coffee farmers in Hai District in different ways to an extent that some community members fail to take their children to secondary schools as they used to do in the past or failing to acquire different household needs including descent meals, medical services, quality accommodation and shelter.

During key informant interviews in Hai District (Sawe and Mbweera villages) it was found that coffee production had declined tremendously. It was pointed out that in the previous years (before 1995); in one hectare a farmer was able to harvest more than 10 bags of clean dry coffee which is equivalent to 600 kg. But in the contemporary time, on the same land (one hectare), a farmer can harvest only about two to three bags of coffee if the farm is well maintained but if not, they can harvest even less than two bags.

The decline in coffee production after 1995 is linked to the removal of subsidies and other supports among small-scale coffee farmers (Bates, 2003). These results concur with the Theory of Farm Household Production by Schultz (1964) which explains that small-scale farmers are poor and inefficient and for them to produce better they have to be motivated through inputs, capital and extension services because of having limited capital, knowledge, assets and formal protection. Probably due to lack or inadequate of the fore-mentioned requirements in coffee production that is why production and income are dwindling hence affecting their livelihood conditions.

2.4.3.2 Arumeru District coffee production, price offered and income obtained 1998/99- 2018/19

Arumeru District coffee production, price offered and income generated do not differ much from Hai District or any other place in the country though there are some slight differences. In Arumeru District coffee production, price offered and income obtained have been fluctuating from time to time and therefore affecting in one way or the other small-scale farmers' livelihood capabilities. The fluctuations are as depicted in Fig. 3.

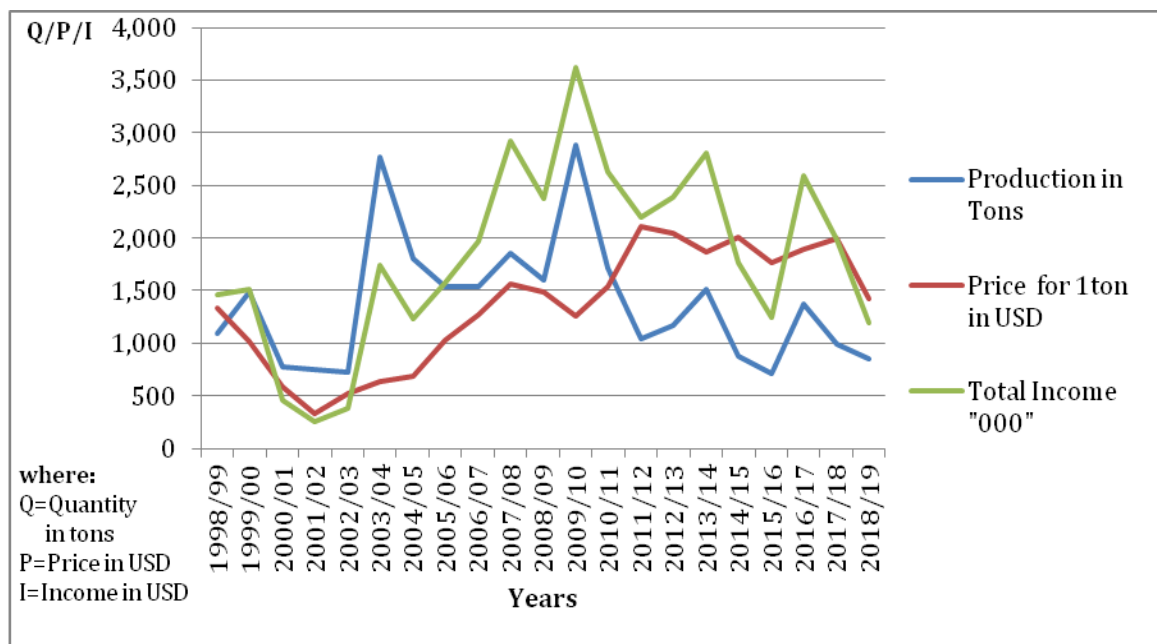


Figure 3: Coffee production, price offered and income obtained 1998/99- 2018/19 crop season in Arumeru District Arusha Region

Source: TCB (2019)

According to TCB (2019) report as presented in Figure 3 on coffee production in Arumeru District, it was revealed that the highest coffee production took place in the 2009/10 crop season with a total of 2 886 tons followed by 2003/04 where 2 775 tons obtained while the lowest production occurred in the 2015/16 with 708 tons followed by 2002/03 crop season when 729 tons of coffee were harvested. In this case, the highest price offered was \$2 114 per 1 ton of coffee in the 2011/12 crop season followed \$2 051

in 2012/13 crop season. The lowest price was marked in 2001/2002 where \$334 offered per 1 ton of coffee followed with 2001/02 whereby \$581 offered. With regard to the income obtained, the highest income occurred in the 2009/10 crop season when \$3 617 thousands were obtained followed by 2007/2008 agricultural season with \$2 917 thousands obtained and the lowest income obtained in 2002/03 amounted to \$383 thousand obtained followed by 2000/01 when \$451 thousand was obtained.

Comparatively between Hai and Arumeru Districts, price offered per 50 kg or 1 ton of coffee is more or less the same with very minimal variations among wards within a given district. However, the price trend is the same in both Hai and Arumeru Districts as depicted in Fig. 3 and 4 respectively. The two Districts experienced a highest price in 2011/12 crop season and lowest price in 2001/02 crop season. It was further revealed that generally, the coffee price offered is low in Hai and Arumeru Districts for many years mainly due increase in production in other coffee producing countries like Ethiopia and Brazil. If it happens that in a given year there is price increase, the increase is very minimal in such a way that the amount is not enough to cater for coffee production inputs and extension services as well as other household livelihood requirements such as food, medication, education and shelter. These findings concurred with what was narrated by discussants in Mbweera village, Hai District that:

“Coffee price is almost stagnant in our area...for about 20 years the price is almost the same and sometimes it goes down to almost half of the previous year while farming inputs, extension services and other households’ livelihood requirements are changing annually. Low price has made us unable to engage in coffee production seriously and some community members have pulled themselves out of coffee production due to low price and finally low income from the sales”

FGD, Mbweera Village, 20th April, 2016.

With regard to the amount of coffee produced between Hai and Arumeru Districts, there is a clear variation between the two Districts where in average production is higher in Hai District compared to Arumeru District. In this respect, the highest amount of coffee in Hai District was reached in 1999/2000 when 3 020 tons obtained while in Arumeru District the highest production took place in 2009/10 where a total of 2 886 tons of coffee obtained. This implies, the less the amount of crop produced, the less the income to cater for different livelihood requirements and vice versa. These slight differences in income caused by differences in production has led to differences in livelihood capabilities among small-scale farmers between the two districts in terms of their abilities to pay for education, medication and diversification into other income generating activities.

Within the same lines, Hai District income from coffee is higher than that of Arumeru District. This was revealed by the results in Fig. 2 and 3 which indicate the highest income in Hai from coffee was obtained in 1998/99 with \$3 980 thousand while in Arumeru District, the highest income was reached in 2009/10 whereby \$3 617 thousands obtained. Therefore, it can be concluded that variation in income from coffee between Hai and Arumeru Districts has created a variation in their abilities to acquire daily basic needs. But all in all, within Hai and Arumeru Districts, the amount of coffee produced, price offered per either 50 kg or 1 ton and income obtained have been fluctuating from time to time as a result affecting the livelihood capabilities among small-scale coffee farmers whose lives depend on coffee.

Based on the above observations, small-scale coffee farmers had different opinions with regard to the current coffee production situation in Tanzania (Fig. 4). As pointed out earlier by Schultz (1964): Taylor & Adelman (2003) in the Theory of Farm Household Production, small-scale coffee farmers are no longer producing the same way as they used to after the removal of subsidies in the agricultural sector. Most of them are demoralized

or no longer interested in coffee production contrary to the previous decades such as 1960s, 1970s and early 1980s when they used to receive support of different kinds.

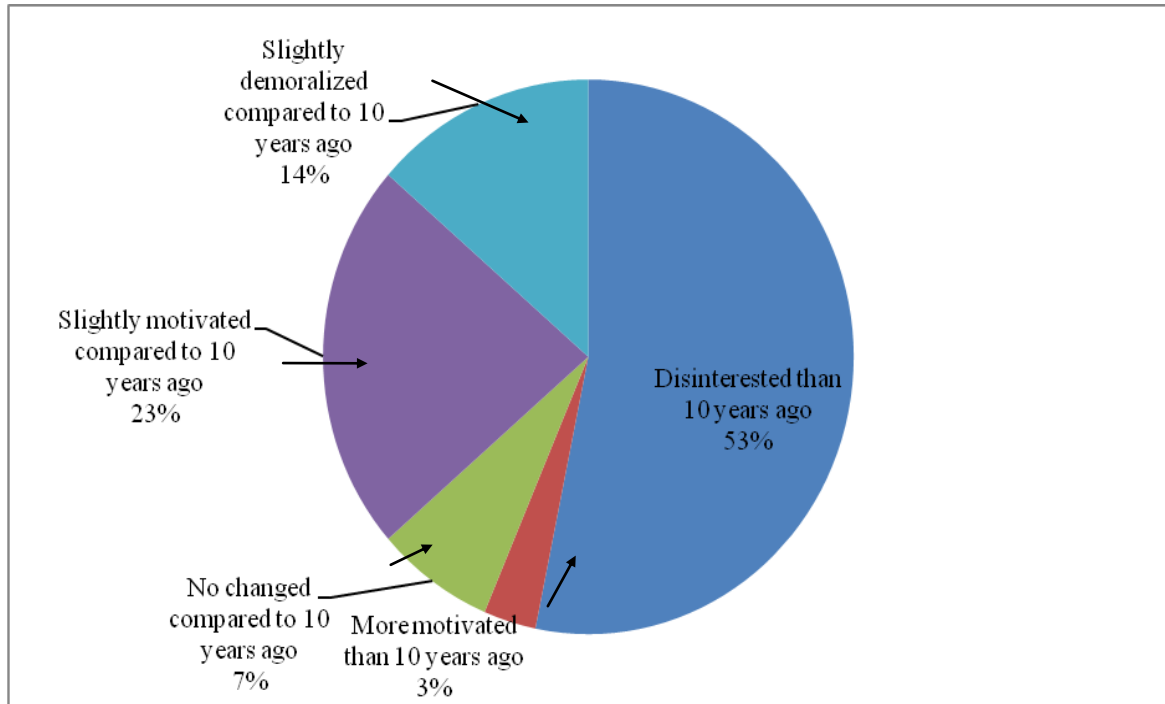


Figure 4: Small scale coffee farmers' opinions on coffee production

When small-scale coffee farmers were asked to give their opinions with regard to coffee production for a period of 10 years previously (2005-2015), fifty three percent (53%) of the respondents said that they were less interested and demoralised with coffee production as a viable economic activity for household livelihoods' dependency than 10 years previously. They further narrated that for the time being they could hardly emancipate themselves from socio-economic constraints through coffee production and that is why the majority of the young generation are hardly interested in coffee production. Of all respondents, only 3.2% said that they were more motivated today particularly on the existing freedom (free market for their coffee) than the way it used to be in the past when all coffee produced in all villages had to be marketed through specific primary co-operative societies in the respective villages and not otherwise. This category also composed of youth who just entered in the coffee industry.

With regard to the land size, status and ownership of land under coffee production, it was revealed that currently, the majority of the small-scale coffee farmers in both Hai and Arumeru Districts produce coffee on the land size ranging from 0.25 to 1.0 acres. This was a result of over fragmentation of land through inheritance and diversification of land use in terms of growing other crops which are said to pay better than coffee such as tomatoes, vegetables and irish potatoes. In terms of ownership of land, 94.3% of the total land used for coffee production is individually owned and acquired through traditional practices of land inheritance while 5.7% of the total land has been acquired through legal procedures, (Fig. 5).

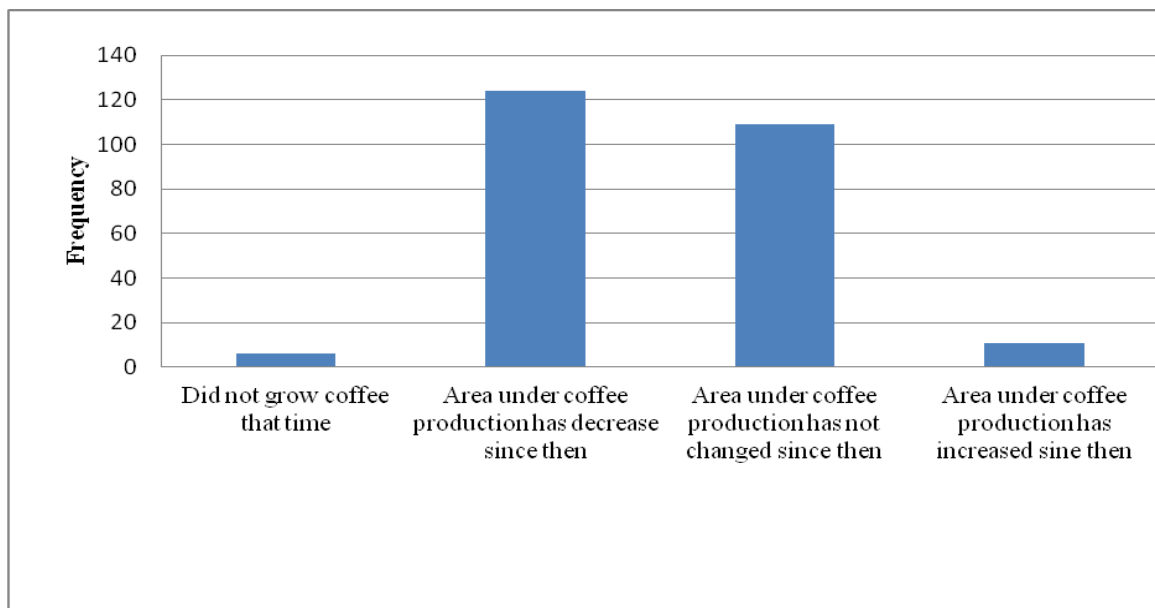


Figure 5: Status of land under coffee production among small scale coffee farmers

2008-2018

The findings in Fig. 5 show that 50% of the respondents contended that area under coffee production had not been the same compared to 10 years ago. This implies that the area under coffee production has drastically declined to even less than half of the level at which it was 10 years previously due to different land uses such as house construction for new homes and even abandonment of the coffee farms for different reasons such as old

coffee trees and economic incapacitation. During direct observation in Hai and Arumeru Districts, it was noticed that there were good numbers of abandoned and uprooted coffee farms which were previously used for coffee production. In Arumeru District these uprooted coffee farms were found to be used for Irish potatoes and carrots production while in Hai District they were found to be used for tomatoes and cabbages production.

There were also few cases (4.4%) of the total respondents who pointed out that the area under coffee production had increased, mainly due to sensitisation from the government and non-governmental organisations on the essence of growing coffee (Nation-wide Coffee Revival Strategy 2011-2021). This was noticed in Akheri Ward in Arumeru District where there are some Non-governmental organisations-NGOs such as Feed the Future which support small-scale coffee farmers by providing them with inputs and extension services in order to enable them to participate actively in coffee production and at the same time to attract the new generation to take part in the coffee industry. The amounts of coffee produced and sold in Hai and Arumeru Districts vary significantly as depicted in Table 2.

Table 2: Amount of coffee produced, sold and sales income in Hai and Arumeru Districts, 2016/2017 crop season

District		Frequency	Minimum	Maximum	Mean
Hai	Amount of Coffee produced in Kg	144	5	600	138.77
	Amount of Coffee sold in Kg	144	5.00	600.00	138.77
	Amount of money obtained from sales	142	10000.00	1500000.00	342368.31
Arumeru	Amount of Coffee produced in Kg	104	10.00	400	131.84
	Amount of Coffee sold in Kg	104	10.00	400.00	134.22
	Amount of money obtained from sales	98	30000.00	1600000.00	380590.82
Total Production and Sales	Amount of Coffee produced in Kg	248	2	600	135.86
	Amount of Coffee sold in Kg	248	5.00	600.00	136.86
	Amount of money obtained from sales	240	10000.00	1600000.00	357975.83

As it can be visualised in Table 2, in Hai District in the contemporary time, the minimum amount of coffee produced and sold per household is 5 kg and the maximum are 600 kg while the minimum amount of money obtained per household is TZS 10 000 and the maximum are TZS 1 500 000. But, in Arumeru District, the minimum amount of coffee produced and sold per household was 10 kg and the maximum were 400 kg while the minimum money obtained was TZS 30 000 and the maximum were TZS 1 600 000.

From the literature, like Tucker (2017), it is pointed out that Tanzania exports about 95% of its total coffee produced and consumes only less than 5% contrary to Ethiopia which consumes 95% and exports about 5%. A country which produces and consumes larger percent of its products creates possibility for production improvement as well as market expansion and vice versa. It can be argued that low production and low price per kilogram affect small-scale coffee farmers in both Hai and Arumeru Districts in the sense that farmers are not able to acquire various basic requirements as well as farming inputs and extension services.

2.4.4 Theoretical and contextual contribution of the study

The study findings are on the coffee production trends and their implications among small-scale farmers' livelihood which is compatible to the Farm household production theory by Schultz (1964) because some problems mentioned in the theory to limit production among small-scale farmers such as low capital, low skills and the effect of natural factors were also found hindering small-scale coffee farmers in the study area. So basically, the applied theory has enriched the findings significantly because both the theory and findings focused on small-scale farmers. In terms of contextual contribution of the findings, it has been revealed that sustainability of coffee production is in the hands of the young generation, but surprisingly the involvement of youth in coffee production in the study area and generally in the entire country at large is very limited.

Due to different reasons such as culture and tradition youth do not participate effectively in coffee production as a result, this limits coffee production expansion and sustainability hence affecting its role of livelihood maintenance in the study area. This implies that if culture and tradition of not involving youth in coffee production shall not change, then the sustainability of coffee production will be questionable simply because most of the farmers are very old and incapable to diversify or improve coffee production in this respect, and if coffee production is not improved, then the livelihood of small-scale coffee farmers will continue dwindling.

2.5 Conclusions and Recommendations

2.5.1 Conclusions

This paper examined coffee production trends and their implications on livelihoods among small-scale coffee farmers' households in Hai and Arumeru Districts. It is concluded that socio- demographic characteristics of small-scale coffee farmers to a large extent determine the amount of coffee to be produced and sold. In particular, education level of respondents, climatic condition for coffee production, income from other crops, income from non-farm activities, marital status and age of respondents do determine the amount of coffee produced in a given household. The study also concludes that, in the contemporary time youth below 35 years their participation in coffee production noted to increase when compared to the previous decades due to sensitization and this has increased the amount of coffee produced in Arumeru District household.

Furthermore, it is concluded that coffee production generally has not been constant; production has been varying from time to time due to several factors such as removal of subsidies among small-scale coffee farmers, unreliable coffee markets and climate change. Notably, the fluctuations in coffee production have been going down for more than three decades to date as a result, impairing the livelihoods of the small-scale coffee

farmers. Due to the decline in coffee production, the majority of small-scale coffee farmers have been unable to acquire quality basic needs as they used to in the past and others have abandoned coffee production and resorted to other agricultural activities as a diversification strategy. Majority of small-scale coffee farmers are currently disinterested in coffee production leading to almost permanent negative trend curve of coffee production. Their lack of interest came as a result of low price offered, poor marketing and finally little income obtained from coffee.

However, the decline in coffee production and income has also been caused by decline in coffee farming plots among small-scale coffee farmers due to different socio-economic activities which pay better than coffee. These activities include dairy farming, horticulture and settlement expansion.

2.5.2 Recommendations

Based on the findings obtained, the following recommendations are given in order to improve coffee production among small-scale farmers. There is a need to put more emphasis on youth to participate in coffee production in all two districts. In the contemporary time older small-scale coffee farmers are incapable of producing quality and quantity coffee and therefore, deliberate efforts are to be directed to youth by stakeholders like TCB, primary co-operative societies at village and ward levels, Agricultural Marketing Co-operative Societies dealing with coffee and TACRI. Youth growing coffee should be assisted to form clubs, and the club members could be assisted to move around and sensitize other youths on the economics of coffee production.

Additionally, the TCB could come up with an appealing slogan to entice youth to move into coffee production. In this way there should be a long-term farm development loans or special fund similar to the Small Enterprise Loan Fund (SELF) for funding youth coffee

producing areas. In so doing, it is possible for coffee production curve to change from negative to positive and in a larger spectrum the livelihood of small-scale coffee farmers be improved through coffee among other economic activities.

With regard to the coffee production fluctuations which is attributed to factors such as removal of subsidies among small-scale coffee farmers and unreliable coffee markets it is recommended to the Ministry of Agriculture to subsidize farm implements as it used to be in the past because under normal circumstances, small-scale coffee farmers are unable to keep the money from when they harvest their crops to the next crop season. This also has been stressed by Farm Household Production theory that for small-scale farmers to harvest quality and more yields they have to be empowered through farming inputs, extension services and markets. Furthermore, AMCOS should sensitize small-scale coffee farmers on best farming practices such as best farming inputs and ensure there is reliable market for their produce.

With respect to low price and unreliable markets for coffee it is recommended that deliberate efforts should be taken by the government in ensuring there are reliable markets and reasonable prices for farmers produce so as to attract more small-scale coffee farmers to invest in coffee in Hai and Arumeru District. As a result, this will improve not only coffee production but also livelihood capabilities among small-scale coffee farmers. For example, if small-scale coffee farmers are not getting extension services or subsidized farming inputs it appears as if the government has neglected them, but by providing small-scale farmers with the fore-mentioned services, it will revive their positive attitudes towards coffee production. In so doing, this will increase the output and income derived from coffee among small-scale farmers.

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CHAPTER THREE

3.0 IMPLICATIONS OF LIVELIHOOD CAPABILITIES ON COFFEE FARMING INPUTS AVAILABILITY, ACCESSIBILITY AND AFFORDABILITY AMONG SMALL-SCALE FARMERS IN HAI AND ARUMERU DISTRICTS, TANZANIA

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3.1 Abstract

The implications of livelihood capabilities on small-scale coffee farming inputs availability, accessibility and affordability is an under-researched area of the study in the Tanzanian context. This paper investigated the implications of livelihood capabilities on coffee farming inputs among small-scale farmers in Hai and Arumeru Districts, Tanzania. Specifically, the paper examined how livelihood capabilities of small-scale farmers influence coffee farming inputs availability, accessibility and affordability among small-scale coffee farmers. A survey using cross-sectional research design with a mixed method approach was applied to collect information from 250 respondents. Data collection methods included Household survey, key informants' interview, focus group discussion and documentary review. Data collection tools included questionnaire, focused group discussion checklist and interview guide. It was found that a livelihood capability among small-scale farmers is one of the aspects influencing coffee farming inputs availability, accessibility and affordability. The findings also revealed that input accessibility and availability among small-scale coffee farmers is not a big problem; the critical problem is affordability of these inputs due to low capability (3.689; $p=0.0296$ at 5%). Efforts by the Ministry of Agriculture targeting at improving agriculture such as input subsidization and

free input provision among small-scale farmers could be reflected in this direction so as to improve coffee production and livelihood capabilities. At ward and village levels, small-scale farmers by the help of their village and ward executive officers, have to establish a demonstration farm where farmers could go and learn best farming practices. Above all, nursery plots for coffee seedlings can be established at village and ward levels to overcome shortage or lack of improved coffee seedlings. In so doing, this will improve not only coffee production but also the livelihoods of small-scale farmers.

Key words: *Inputs, Accessibility, Availability, Affordability and Livelihood capability*

3.2 Introduction

Farming input is a very important factor for improving production among small-scale farmers who are invariably poor and risk averse (Chrispen, 2016; Mbowa *et al.*, 2014). As pointed out by Haggblade *et al.*, (2017); Gehring *et al.*, (2017), livelihood capabilities among small-scale coffee farmers determine substantially the ability to acquire farming inputs of the required standards. In many least developing countries (LDCs) like Tanzania there are several challenges inhibiting small-scale farming of which inaccessibility, unavailability and unaffordability of farming inputs may be one of the factors (Kato, 2016; Jerven, 2014; Padian *et al.*, 2014).

Studies on livelihood among small-scale farmers have become topical in the contemporary time. Livelihood capability has been defined differently by different authors focusing on the ability to acquire different basic needs, to convert income and commodities into valuable achievements and how well people are able to function with the goods and services at their disposal (Lienert & Burger 2015; Sen & Welch, 2005). In this study, livelihood capability is defined by focusing on the ability of small-scale coffee farmers to acquire three meals per day, quality of housing, quality of clothes, ability to pay for medical services, any household member being salaried or self-employed, ability

to pay school fees timely, ability to own livestock, ability to own private transport (bicycle, motor cycle or car) and ability to own a trade or business.

MacArther & MacCord (2017) and Sum (2017) pointed out that livelihood capability among small-scale farmers determine the quantity and quality of the products to be produced as well as the income and profits to be generated from a given production activity. Therefore, it is anticipated that there may be a close relationship between livelihood capabilities and the required quality and quantity of coffee farming inputs among small-scale farmers in terms of their accessibility, affordability and availability. Limited accessibility, availability and affordability to production inputs, credit facilities, marketing information and extension services among small-scale farmers may lead to low production and low income (Chesinga & Poulton, 2014; Andrew & Ephraim, 2011).

Agricultural prosperity among small-scale farmers in many developing countries highly depends on availability of affordable, quality and accessible farming inputs though this is not the real practice in many developing countries due to their low livelihood capabilities which incapacitate them in different ways (Otte *et al.*, 2018; Brenda., Ian & Rick, 2018; Monica *et al.*, 2018). As a result, due to inadequate farming inputs production still perpetuating poor among small-scale farmers making them unable to obtain their daily livelihood requirements through coffee, (Kinyondo & Magashi (2017); Sianjase, 2015; Jorge & Richard, 2007).

Scholars such as Scoones *et al.*, (2018): Kante *et al.*, (2016): Tanesse & Bahiigwa, (2015) have qualified farming inputs among small-scale farmers by focusing on credit facilities, farming facilities, agro-chemicals, extension services, knowledge and skills required in the production process while Peterman *et al.*, (2010): Sisay *et al.*, (2017) defined farming inputs by considering them as non-land farming inputs which

encompasses four components that is technological input resources (fertilizers, seedlings, pesticides and farming facilities), natural input resource, human input resource and social and political capital input resource.

In this study the definition by Peterman *et al.*, (2010) on technological input resource was adopted and thus, farming inputs refers to fertilizers, seedlings, pesticides and farming facilities required in farming activities due to their importance among small-scale farmers in the coffee production process. Studies such as Sheahan & Christopher (2017); International Food Policy Research Institute-IFPRI, (2015); Jayne & Rashid, (2013) have shown that different developing countries have undertaken deliberate efforts to ensure inputs availability, accessibility and affordability through policies such as inputs subsidization and free input provision so as to improve farming and livelihood capabilities among small-scale farmers but neither of the above policies became successful.

It has been noted that from 1985, coffee production in Tanzania has been fluctuating, for example, in the period 2012/2013 about 351 million kg were harvested while in 2016/2017 a total of 5 million kg were obtained (TCB, 2017). Due to the fluctuations in coffee production, majority of small-scale farmers' livelihood capabilities particularly in acquiring basic needs such as education, health services and decent housing were affected, (Uzuegbu *et al.*, 2015; Ngulube & Msofe, 2014; Evenson, 2014). Despite the government's efforts in improving coffee production through initiatives such as Agricultural Sector Development Program of 2003, establishment of the Tanzania Coffee Research Institute in 2000, Tanzania Agricultural Policy of 1997 and Co-operative Development Policy of 2002, the implications of livelihood capabilities on coffee farming inputs' accessibility, availability and affordability among small-scale farmers is still an issue to be resolved.

The coffee stakeholders are complaining for decline in coffee production and annual fluctuations by focusing on secondary factors such as market failure, small-scale farmers' attitudes and agricultural policies without taking into consideration the most important factor- livelihood capabilities of small-scale farmers in acquiring coffee farming inputs. Several studies such as the effects of agricultural policies, coffee farmers coping strategies, agricultural marketing reforms, analysis of agricultural marketing, coffee sector and coffee industry, have been conducted in coffee industry in Tanzania, but still there is a knowledge gap on the implications of livelihood capabilities on coffee farming inputs among small-scale farmers of which this study intended to address, (Mhando, *et al.*, 2013; Mmari, 2012; ICO, 2015; Maghimbi, 2007).

The aim of this research was to examine the implications of livelihood capabilities on coffee farming inputs among small-scale farmers focusing on availability, accessibility and affordability of farming inputs. This study was guided by High Pay-off Input Theory (Tagar & Levit, 2012) in explaining the implications of livelihood capabilities on coffee farming inputs among small-scale farmers. The theory focuses on two aspects i.e. how to create and provide farmers with the new high-pay-off technology embodied in capital equipment and other inputs and how to increase labor productivity among the farmers. The high pay-off input theory assumes that economic growth from the agricultural sector of a poor country depends predominantly upon the availability and price of modern high pay-off inputs.

Thus, the theory was useful in the study towards analysing the distribution of inputs such as fertilizers, seedlings and pesticides in improving coffee farming and smallholders' livelihood. Despite its usefulness, the theory has been criticized to have failed to explain where small-scale farmers shall obtain money or resources for acquiring high pay-off farming inputs. However, the theory appeared to be suitable in examining the implications

of livelihood capabilities on coffee farming inputs among small-scale coffee farmers in this respect.

3.3 Methodology

The study was conducted in Hai and Arumeru Districts in Tanzania. The selection of the two districts considered their culture, climatic conditions and their long-time involvement in coffee farming where more than 50% of the population depends on coffee for their survival and other socio-economic development (Mmari, 2007). The decline in coffee farming inputs provision among small-scale farmers in the recent years leading to low coffee outputs and income is one of the reasons which necessitated this study (Maghimbi, 2007). Further, Hai and Arumeru Districts are among the districts in Tanzania which were adversely affected by abolition of free farming inputs provision. As a result, this has drastically lowered coffee production among small-scale farmers in the area (Jayne & Rashid, 2013). Therefore, the fore-mentioned reasons necessitated this study to be undertaken in Hai and Arumeru Districts.

A cross-sectional research design through the use of mixed methods approach -sequential transformative approach which encompasses the use of qualitative then quantitative or quantitative then followed by qualitative approach was applied in the study on which this paper is based. This research design enabled data collection from different groups of respondents at a time. The method gave room to make comparisons among different groups of respondents to see how the dependent variable relates to independent variables. It further, ensures a high degree of precision, reliability and validity on the data to be collected, and at the same time, the method saved time and other resources required to accomplish the study.

The study used mainly primary data to examine the implications of livelihood capabilities on coffee farming inputs among small-scale coffee farmers. Therefore, data were mainly

collected from small-scale coffee farmers and various institutions dealing with coffee such as Tanzania Coffee Board (TCB) and Tanzania Coffee Research Institute (TACRI). The study population comprised small-scale coffee farmers in Arumeru and Hai Districts and the households was the unit of analysis.

The sample size was calculated using Morris (1985) formula for known population. In this case the margin of error was 5%, confidence interval was 90% and the population size was 2509 small scale coffee farmers. Morris (1985) formula states that:

$$\begin{aligned}x &= Z(c/N)^2 r(N-r) \\n &= N x / ((N-1) E^2 + x) \\E &= \text{Sqrt} \left[\frac{(N-n) x}{n(N-1)} \right]\end{aligned}$$

where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/N)$ is the critical value for the confidence level c . Therefore, the Morris (1985) formula was applied in this study to calculate a sample size of 250 respondents (small-scale coffee farmers). Only small-scale coffee farmers producing an average of 100 kg and above per year were considered in this study because if someone produces less than the fore-mentioned amount per year he/she couldn't not be considered as a small-scale coffee farmer in this case because the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirements.

Two wards in each district and two villages in each ward were purposively selected. After determination of the sample size, simple random sampling technique was used to obtain the respondents for the study on which this paper is based. The data collection methods

included survey, focus group discussions, direct observation on coffee farms, quality of their houses, business ownership and livestock owned, and documentary review on coffee production and input related information. Data collection tools included questionnaire, focused group discussion guide and key informant guide.

In order to have the livelihoods' capability levels; nine (9) abilities were established through pilot study (household head ability to own a house(s), household head ability to buy clothes, household head ability to have three meals per day, household head ability to earn income apart from coffee, household head ability to pay for medical services, household head ability to own transport, household head ability to run business, household head ability to own livestock and household head ability to pay for children's tuition fees). The capabilities were then tested in the main data collection after assigning them scores on each capability. The scores were Yes=1 and No=0. After the data entry, total scores scored by each respondent established whereby the maximum score was nine (9) and the lowest score was zero (0). Based on the scores, a median score was calculated to determine the group level formation. Finally, four levels established as depicted in Table 1.

Table 1: Livelihood Capability levels

Levels	Frequency (n)	Percent (%)	Capability Index
No Capability	23	9.2	0.0
Low Capability	98	39.2	0.1-4.4
Moderate Capability	46	18.4	5.0
High Capability	83	33.2	5.1-9.0
Total	250	100.0	

NOTE: No capability imply total incapacity to embark in coffee production due to extreme low economic conditions; low capability imply partly able to participate in coffee production but in most cases they need support such as subsidized farming input;

moderate capability mean averagely capable to embark on production without support from outside and high capability means having more and above what is needed for coffee production.

From the livelihood capability level (Table 1), the mean score results were found to be 5.0 (18.4%) which was at moderate level implying moderate livelihood capabilities among the small-scale coffee farmers in the study area. Zero (0) in the livelihood capability level implied no capability at all and from 0.1-4.4 (39.2%) implied low capabilities among small-scale coffee farmers. This implies the majority of small-scale coffee farmers in Hai and Arumeru Districts had low livelihood capability level. From 4.4-5.0 (18) implied moderate capability level. From 5.1 to 9.0 (33.2%) considered to be high livelihood capability level among small-scale coffee farmers. Thereafter, chi-square and cross tabulation were used for showing the association between livelihood capabilities and coffee farming inputs among small-scale coffee farmers. Results obtained were presented using tables and figures.

After the determination of livelihood capability levels, cross-tabulation was done for establishing the relationships among variables. This technique was found appropriate for showing the implications between variables that is livelihood capability levels against coffee farming inputs among small-scale coffee farmers as recommended by Field (2009). In this study, coffee farming input was measured by considering access, availability and affordability. Access refers to the opportunity or right to use.

Availability refers to the ability to be obtained or used while affordability means ability to manage getting something at a convenient price (Hornsby, 2012). Accessibility was measured by developing an index with four indicators namely seedlings accessibility, pesticides accessibility, fertilizers accessibility and farming facilities accessibility which

were assigned Yes=1 for accessibility and No=0 for inaccessibility. Then average score was calculated to establish access among small-scale coffee farmers.

The availability was measured by asking the small-scale coffee farmers if they were able to find inputs such as fertilizers and pesticides nearby their residences during the farming seasons. Farmers were to respond Yes=1 for availability and No=0 for unavailability.

Affordability was measured by focusing on 2 key inputs i.e. money spent to buy fertilizers and money spent to buy pesticides as recommended by Machimu & Kayunze (2016). Small scale coffee farmers were asked to provide estimates of the money spent on pesticides and fertilizers and thereafter a total estimated cost for two (2) items was calculated and finally an average cost was computed on each small-scale coffee farmer.

In order to ensure the validity of the data collected, the pre-testing of questionnaire was done with 16 respondents (eight from each district; four from each ward and two from each village) a month before actual data collection. Reliability of the data collected was determined by calculating the Cronbach's Alpha which is a measure of internal consistence that is how closely related a set of items are as a group. Cronbach's Alpha is considered to be a measure of scale reliability. In this case, the reliability coefficient was $0.7241=72.41\%$. The optimum value for the reliability ranges from 0.65 to 0.8 and the calculated results were 0.7241 which is within the acceptable ranges hence making the data collected reliable.

3.4 Results and Discussion

3.4.1 Availability, accessibility and affordability of coffee farming inputs among small scale farmers

In examining the influence of livelihood capabilities on coffee farming inputs among small-scale farmers, three major issues were considered namely availability, accessibility and affordability of farming inputs as depicted hereunder.

3.4.2 Livelihood capability levels against coffee farming inputs availability among small-scale farmers

The relationship between inputs availability and livelihood capability levels among small-scale coffee farmers is summarized in Table 2.

Table 2: Livelihood capacity levels against coffee farming inputs availability

Availability	Livelihood capability levels				Total
	No Capability	Low Capability	Moderate Capability	High Capability	
Not available	02 9.5%	08 38.1%	08 38.2%	03 14.3%	21 100%
Available	21 9.2%	90 39.3%	43 18.8%	75 32.8%	229 100%

Chi -square (0.368; p=0.943) likelihood ratio (0.395; p=0.941)

The results in Table 2 show that availability of coffee production inputs (fertilizers, pesticides, seedlings and farming facilities) were measured by considering whether they were available or not. There were two categories whereby one category admitted that coffee farming inputs were available and the other category pointed out that coffee farming inputs were not available. With regard to livelihood capability levels; four levels were examined that is no capability, low capability, moderate capability and high capability level respectfully. The results reveal that among the community members who pointed out that farming input were not available, 38.2% had moderate livelihood capability level while, those who said that coffee farming inputs were available, 39.3% had low livelihood capability levels. Despite having low livelihood capability level,

coffee farming inputs were within their reach though they cannot afford getting them mainly due to their low livelihood conditions. The chi-square results were (0.368; $p = 0.941$). This implies that there is no association between inputs availability and livelihood capabilities that is why the results are not statistically significant. The relationship between availability of farming inputs and livelihood capability level was stated by respondents in Modio village that;

“...in our village, distance is not a big determinant of availability...what matters is the relationship with the one selling coffee farming inputs...one may go as far as five kilometers away from his or her home provided there is a good relationship with the one selling inputs and if the money for purchasing inputs is available...”
(FGD, Modio Village, 20/04/2016).

This implies, given adequate income (livelihood capabilities), a small-scale coffee farmer may go to other villages or wards or districts looking for coffee farming inputs. But because their income is limited due to their low livelihood capabilities, they are compelled by the circumstances to produce without adequate and quality coffee farming inputs. As a result, it exacerbates the magnitudes of poverty and continues pressing them down into low livelihood capabilities.

3.4.3 Livelihood capabilities and coffee farming inputs accessibility among small scale farmers

In examining the implication of livelihood capability levels on coffee farming inputs' accessibility among small scale farmers, the following were noticed, (Table 3).

Table 3: Livelihood capabilities against coffee farming inputs accessibility

Accessibility Index	Livelihoods' capability levels				Total
	No Capability	Low Capability	Moderate Capability	High Capability	
Low Accessibility	07 10.4%	24 35.8%	14 20.9%	22 32.8%	67 100%
High Accessibility	16	74	32	61	183

8.7%	40.4%	17.5%	33.3%	100%
<i>Chi-square (0.735; p=0.865) likelihood ratio (0.728; p=0.867)</i>				

According to Table 3 findings, accessibility levels had two categories namely low accessibility and high accessibility while livelihood capability had four levels which were no capability, low capability, moderate capability and high capability level. Of those who responded that there is low coffee farming input accessibility, 35.8% had low capability. With regard to those who pointed out that they had high coffee farming input accessibility, 40.4% had low livelihood capability level. The chi-square results were (0.735; p= 0.865).

This implies that there is no association between inputs accessibility and livelihood capabilities and that is why the results are not statistically significant. The above results show that accessibility of coffee farming inputs is not limited to few or some individuals; it is open (accessible) to everyone provided he or she has adequate resources mainly in terms of money to acquire the required farming inputs. The same observation was revealed during focus group discussion in Akyeri village that;

“...many of us are struggling due to lack of money to buy coffee farming inputs...under normal circumstances one may strongly speak out that neither availability nor accessibility is a big problem to us...the critical problem which we are encountering is low economic capacity (low livelihood capabilities) which goes hand in hand with low purchasing power among ourselves...” (FGD, Akyeri Village, 20th April, 2016).

The above explanation implies that in the contemporary time small-scale coffee farmers are affected by neither availability nor accessibility of farming inputs. The great concern to small-scale coffee farmers lies on low economic capabilities partly attributed by low

income obtained from coffee, as a result making them unable to acquire adequate and quality farming inputs.

3.4.4 Livelihood capabilities against coffee farming inputs affordability among small-scale farmers

The relationship between inputs affordability and livelihood capability levels among small-scale coffee farmers is presented as summarized in Table 4.

Table 4: Livelihood capabilities against coffee farming inputs affordability

Affordability	Livelihood capability levels				Total
	No Capability	Low Capability	Moderate Capability	High Capability	
Not afforded	68 32.7%	81 38.9%	42 20.2%	17 8.2%	208 100%
Afforded	06 14.3%	04 9.5%	15 35.7%	17 40.5%	42 100%

Chi -square (3.689; p=0.0296) likelihood ratio (3.911; p=0.0271)

According to the findings in Table 4, there were two categories of affordability namely not affordable and not afforded while livelihood capabilities were categorized into four levels that is no capability, low capability, moderate capability and high livelihood capability. Of those who responded that coffee farming inputs are not affordable, 38.9% had low livelihood capability levels. This implies, the higher the livelihood capabilities, the higher the ability to afford acquiring coffee farming inputs among small-scale coffee farmers and vice versa. Of those who said coffee production inputs were affordable, 40.5% had high livelihood capability level. The chi-square results were (3.689; p=0.0296). This implies that there is an association between inputs affordability and livelihood capability levels and the results are statistically significant at 0.05 or 5% level.

As it can be depicted from Table 4 findings, there is a very close associations between the ability of small-scale coffee farmers to afford getting inputs and their livelihood

capabilities in such a way that the higher the livelihood capabilities the higher the degree of affording acquiring coffee farming inputs among small-scale farmers and vice versa. These results add to what TCB (2017) found with regard to the factors limiting coffee production among small-scale farmers that, unaffordability of coffee farming inputs has contributed to a large extent to the fluctuations in coffee farming in Tanzania. This study therefore, has come out with a very interesting aspect of livelihood capability as a major determinant factor for coffee farming inputs acquisition in Tanzania and elsewhere.

According to TCB (2017) report on coffee farming in Kilimanjaro and Arusha Regions, there have been fluctuations in production from one season to another. It was revealed that in 2008/2009 agricultural season a total of 1.87 million kg were harvested while in 2016/2017 agricultural season 1.72 thousand kg of coffee were harvested. The same thing has been happening nation-wide in such a way that in 2012/2013 agricultural season, 351.1 million kg of coffee were harvested while in 2016/2017 a total of 5.1 million kg were harvested. Due to lack of subsidised farm inputs and extension services as it was also revealed by Jayne & Rashid, (2013), buying inputs by using individual small-scale coffee farmers' income jeopardises their ability to meet other livelihood requirements such as education, modern housing and nutritional food. As a result, small-scale coffee farmers are compelled to rely on poor farming inputs which end up giving them poor harvests hence placing them into poor livelihood capability levels.

Generally, when small-scale coffee farmers were asked about whether they had obtained any form of coffee farming input credit in the near past (1990-2015) during Yes/No response, the majority (93.2%) said that for more than three decades they had not received anything while 6.8% mainly, from Akyeri village, pointed out that they were getting some coffee production inputs from NGOs such as Feed the Future and a private company

dealing with buying and selling of coffee under a special arrangement that when they harvest they would sell their coffee to them. For the small-scale coffee farmers who were under this arrangement the outputs from their farms were higher than for those who were not covered by this scheme.

These findings add to what Machimu & Kayunze (2016) found with regard to contract farming and livelihood outcomes in Kilombero-Tanzania among the small-scale sugarcane producers where small-scale farmers become very active and produce more once they get farming inputs support. The same findings were supported by discussants in Modio village during a focus group discussion as follows:

“...due to inadequate coffee farming inputs, our ability to produce and improve our economic condition is limited...most of us are with low level economic status (low livelihood capabilities) and hence to produce better we really need to be supported by either the government, non-governmental organizations or well-wishers who are economically capable...” FGD, (Modio Village, 22 June, 2017).

Furthermore, findings add to the High Pay-off Input Theory by Tagar (2012): Levit (2012) which states that output and profits maximisation depends on the quantity, quality and cost of input used in the farming process which again is determined by the livelihood capability levels among small-scale farmers to acquire them. Though generally, production among small-scale coffee farmers depend on the farming inputs availability, accessibility and affordability.

From the historical perspective, in the past (1961 to the mid-1980s) when coffee used to perform well and farming inputs were available for free use all the time; small-scale coffee farmers used part of the income obtained from coffee for other livelihood activities such as opening a small business, buying a means of transport or buying livestock (Jayne

& Rashid, 2013). But currently, all of these initiatives are inevitable as it was reported by respondents from Mbweera village that:

“...we managed to open up shops before 1980s using the money obtained from selling of coffee.... but after the removal of subsidies (after the mid-1980s) and be compelled to buy inputs by ourselves; production is small as a result, we are no longer capable to acquire different household’s livelihood requirements using money generated from coffee alone...” (Respondent, Mbweera Village, 27 April, 2016).

3.4.5 Theoretical implication of the findings

The findings on farming inputs’ accessibility, availability and affordability among small-scale coffee farmers confirms the assumptions of High Pay-off Input Theory by Tagar (2012): Levit (2012) which stipulate that production among small-scale farmers is affected by farming inputs unavailability, inaccessibility and unaffordability mainly due to their low capital, low skills, inadequate knowledge, low assets and lack of formal protection which as a result impair their ability to invest. Therefore, the findings have confirmed the theory to be quite true and applicable on the implications of livelihood capabilities on coffee farming inputs among small-scale farmers in Hai and Arumeru Districts, Tanzania.

Furthermore, findings have shown that livelihood capability levels determine substantially the affordability of coffee farming inputs and amount of coffee to be produced by small-scale farmers in the study area. Low livelihood capability level due to low production incapacitates small-scale coffee farmers to acquire different basic requirements such as medication, education, decent housing, business, means of transport and clothes. At the same time, selection of type, quality and quantity of coffee farming inputs is determined by livelihood capability levels among small-scale coffee farmers. Therefore, High pay-off

input theory is partly inapplicable among low livelihood capabilities levels (low income small-scale coffee farmers) because of having inadequate resources hence inadequate choices.

The findings obtained from this study are of its own uniqueness by addressing two critical issues which affect small-scale coffee farmers' livelihood capabilities and coffee farming inputs. There are several studies done in coffee industry on small-scale farmers but no study so far has been done to address the two aspects (livelihood capabilities and coffee farming inputs) discussed above. Coffee stakeholders have been complaining of the fluctuations in coffee production and downfall of the small-scale coffee farmers' livelihood capabilities; this is the study which has filled this gap by showing the interdependence and interrelationship between the two. In this respect, these findings have contributed to High pay-off input theory by adding to the existing body of knowledge the component of livelihood capabilities when making choice on the right farming inputs to use.

3.5 Conclusions and Recommendations

3.5.1 Conclusions

Generally, changes in livelihood capabilities among small-scale coffee farmers in the study area can be reflected in the changes in agricultural systems which are closely associated with the quality, quantity and cost of farming inputs (availability, accessibility and affordability) in relation to livelihood capability levels. In view of the implications of livelihood capability levels on coffee farming inputs among small-scale coffee farmers, it can be concluded that small-scale coffee farmers from the mid-1980s to date have been producing coffee under difficult conditions which have impaired their livelihood capabilities in one way or the other.

It is further being concluded that livelihood capabilities among small-scale farmers are among the factors associated with the acquisition of decent coffee farming inputs. It can therefore, be pointed out that coffee farming input is among the major factors that have led to the fluctuations in coffee production and therefore affecting the livelihood capabilities of small-scale farmers whose lives depends on coffee. In addition, it can be concluded that coffee farming inputs among small-scale farmers is a problem which requires prompt action. Furthermore, small-scale coffee farmers explained their great concern that for almost three decades they have not received either free or subsidised farming inputs from the government. As a result, small-scale farmers are compelled by the circumstances to acquire inputs through their own initiatives something which jeopardises their ability to acquire other livelihood requirements such as decent medical services and balanced diet.

3.5.2 Recommendations

Based on the above study findings, the following recommendations are given in order to improve coffee farming among small-scale farmers as well as their livelihood capabilities: With regard to coffee farming inputs among small-scale farmers, it is recommended to the government and other coffee stakeholders such as TCB and TACRI to undertake deliberate efforts to ensure coffee farming inputs are subsidized by 50% so as to enable small-scale farmers to acquire them in a reasonable price hence being able to participate fully in the farming process. This suggestion of 50% input cost reduction was noted during key informant interview whereby the interviewees pointed out that if farming input price is reduced to half of the current cost, majority of small-scale coffee farmers will be able to acquire them hence improving coffee production and their livelihood capabilities. It should be noted that even in developed countries subsidization of agricultural inputs is a common practice and that is why farmers are maximizing production and profits.

Furthermore, there is a need for more budget allocation in research, training and extension services so as to improve coffee farming input availability, accessibility and affordability as well as the livelihood capabilities among small-scale coffee farmers. According to TCB (2017) report, in every financial year budget there is an allocation for improving and modernizing agriculture, coffee farming included but still doubtful if real these resources usually perform the intended tasks. Therefore, close monitoring of the budget allocated to agricultural sector by the government and coffee stakeholders is unavoidable for the prosperity of coffee farming and livelihood of the small-scale farmers.

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CHAPTER FOUR

4.0 ASSOCIATION BETWEEN LIVELIHOOD CAPABILITIES AND ACCESS TO EXTENSION SERVICES AMONG SMALL-SCALE COFFEE FARMERS IN HAI AND ARUMERU DISTRICTS, TANZANIA

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4.1 Abstract

Extension services usage and livelihood capabilities among small-scale farmers are inseparable and the government efforts to provide free extension services are far from reality. This study intends to examine the association between livelihood capabilities and access to extension services among small-scale coffee farmers in Hai and Arumeru Districts, Tanzania. The study used a cross-sectional research design in collecting data through the application of a mixed methods research approach (sequential transformative approach which encompasses the use of qualitative then quantitative or quantitative then followed by qualitative approach). Data collection methods included household survey, key informants' interviews, focus group discussion and documentary review. Data collection tools included a questionnaire, a focused group discussion checklist and an interview guide. Wards and villages included in the study were selected using purposive sampling technique while respondents were selected using simple random sampling technique. The findings revealed that, for the previous five years, small-scale coffee farmers in the study area had not been provided with free extension services (26.171;p=0.0021 at 5%) . Further, the findings show that livelihood capabilities among small-scale coffee farmers are associated with availability and frequencies of getting extension services. Additionally, it was found that small-scale coffee farmers with high

livelihood capabilities were more capable in making their own arrangements on extension services acquisition, and outputs from their farms were higher than for those with no or low livelihood capabilities. The findings also revealed that small-scale coffee farmers with high livelihood capabilities and higher education were more knowledgeable on different agricultural extension related matters including selection of proper seedlings, fertilizers and pesticides for their farms (0.368;p=0.0231 at 5%). It is recommended to the government and stakeholders in coffee industry to ensure extension services are made available by increasing the number of extension officers at least one extension officer per village as well as finding ways and means of tackling different extension services related challenges facing small-scale coffee farmers. In so doing, production will improve tremendously and at the same time the livelihood of small-scale farmers will be improved.

Key Concepts: *Extension Services, Livelihood Capabilities, Availability, Affordability, Small Scale Coffee Farmers.*

4.2 Introduction

World-wide, nations provide extension services to their people in order to help them improve productivity and finally their standard of living (Wambura *et al.*, 2012). By 2010, extension services had covered more than one billion small-scale farmers globally (Isaya *et al.*, 2016). It should be understood that extension services promote the transition of new innovations into concrete benefits to poor farmers in developing countries (Hellin, 2012). Despite the provision of extension services to small-scale farmers, the agricultural sector generally in Africa and in Tanzania in particular has not shown significant improvement in production and bettering peoples' lives particularly in rural areas (Kasie *et al.*, 2012; Kyaruzi *et al.*, 2010).

The above concern was also explained by Ekou & Alungat (2015) that although various governance reform approaches have been adopted to improve agricultural extension

among smallholder farmers, still there is a major knowledge gap remaining regarding why desirable results have not been achieved in most developing countries. In East Africa for example, smallholder farmers face problems such as low productivity caused by lack of access to market, credit and technology compounded by volatile food and energy crisis and very recently, the past global financial crisis (Samson *et al.*, 2015).

As pointed out by Isaya *et al.*, (2016), small-scale farmers have a critical shortage of information, inputs and extension services, and therefore, if agricultural information (through extension services) are made available, affordable and community members are encouraged to use modern farming methods, their productivity and income may double. The same argument supported by Mwaseba (2005): Ogunlade & Fataki (2006): Jeannie (2012) that agricultural productivity among small-scale farmers cannot be improved if stakeholders are not aware of information sources and how these can be brought to their doorsteps.

According to Rwechungura (2017), the Tanzania economy's average growth rate is 7% per annum and the agriculture sector grows at less than 4% per annum hence, dropping to 5th place as a contributor to the Gross Domestic Product-(GDP). The government is trying to offer incentives to boost production but there is a critical lack of extension and advisory services on proper input usage. There is also a slow rate of adoption of technology innovations such as the use of improved seeds, fertilizers and post-harvest technologies due to partly lack of extension services where 60 to 70% of households in the country have no access to extension services. However, there is a sound policy framework to support quality extension services provision but there is inadequate public and private investment in training, research and extension to ensure availability and affordability of extension services among the farmers mainly small-scale farmers.

Authors such as Lienert & Burger (2015); Valdes-Rodriquez & Perez-Vazquez (2011); Qinzilbash *et al.*, (2008) : Sen & Welch (2005) have defined the concept of livelihood capability differently. According to Valdes-Rodriquez and Perez-Vazquez (2011) the term livelihood refers to the way in which people earn income to effect for different basic needs such as clothes, food, shelter and medication, it reflects to a means of making a living which encompasses peoples' capabilities, assets, income and activities required to secure the necessities of life.

At the same time, the term capability according to Lienert & Burger (2015) refers to the ability to achieve the functioning to constitute for the better life; it also refers to the reaction potential to challenges and crises which reflects to the power or ability to do something or state of being capable. Therefore, for the sake of this paper the definition by Lienert & Burger (2015); Sen and Welch (2005) was adopted where livelihood capability refers to the ability of small-scale coffee farmers in meeting their daily basic needs and their power in acquiring extension services of the required standards in terms of quality and quantity.

Agricultural extension refers to the process which facilitates transferring of knowledge and good practices to farmers (TCRA, 2011). In most developing countries, the available extension officers are fewer than the acceptable ratio to serve farmers. For example, in Kenya the ratio is 753 households: 1 extension officer while in Tanzania the situation is 1000 households: 1 extension officer (Lwoga *et al.*, 2011). According to URT (2017), Tanzania Agricultural Extension policy states that in every village there should be an extension officer but in 2013 the need for extension officers was 15082 and the available extension officers were 7974. Rutatora & Mattee (2001), extension services are essentially made to cater for farmers' problems and needs. Under the Local Government (District Authorities) Act Chapter 287, R.E. 2002, the responsibility for implementing

extension services lies with the local government authorities. But to what extent this service is currently available in a sustainable manner in Tanzania still questionable.

Extension services in developing countries and Tanzania in particular are being more dependent on donor funds through the Ministry of Agriculture or NGOs. As the government continues to face severe financial difficulties; funds for support services to agriculture including inputs and extension services are diminishing. But of recent, the landscape is changing in the provision of extension services in terms of key actors, approaches and management (Rutatora & Mattee, 2001). In this respect, provision of extension services in Tanzania can be categorized into three phases i.e. Post-independence (1961-1966): post Arusha declaration (1967-mid 1980s) and the economic liberalization era (mid 1980s to date).

During the first two periods, efforts were aimed at transforming peasant agriculture to large scale and improve agricultural productivity and the government was the sole provider of all extension services under the so called “public services”. From the mid-1980s public sector has been withdrawing from direct production and provision of goods and services which has led to the increase of private sector and NGOs participating in the production and marketing of agricultural produce including coffee (Sanga *et al.*, 2013).

As a result, from the 1980s Tanzania has experienced different extension services providers who can be categorized into two groups namely; public extension services providers (Ministry of Agriculture and Local Government Authority under the Ministry of Regional Administration and Local Government) and private extension services’ providers (private agribusiness, Community Based Organizations-CBOs through farmers’ groups, associations, co-operative societies and networks). The remaining extension services provider (donor supported projects) can play part for both public and private extension services’ providers (TCRA, 2011; Lwoga *et al.*, 2011; Isinika *et al.*, (2005).

As stated by Tchouawou (2014), many developing countries' rural population is heavily dependent on agriculture as well as different social services for their livelihood support. Yet availability of adequate knowledge, improved technologies, inputs, financial services and other relevant services among small-scale farmers remains to be a critical issue. As a result, there are still significant challenges in providing extension and advisory services such as insufficient funds in supporting public extension, poor resourcing, poor infrastructures, limited involvement of rural poor farmers, lack of appropriate strategy for effective research and adequate extension methods (World Bank, 2010).

According to Coulson *et al.*, (2018): Mwamakimbula (2014), Sanga *et al.*, (2013) and Isinika *et al.*, (2005), provision of extension services and inputs in Tanzania among small-scale farmers has not been smooth for three decades. The process has been facing several challenges such as few numbers of extension officers, limited required resources, extension staff not paying adequate attention on participatory approaches to problem solving, extension officers' poor communication, lack of leadership and critical thinking skills hence becoming ignorant of experiential approaches in solving problems. Other challenges are such as poor support from the government to the extension sector which lowers the effectiveness of extension agents and distance of extension officers' residences to their working stations. In most cases, extension officers live far from their working stations due to lack of decent accommodation and other basic needs within or nearby their working stations.

The study aimed at examining the association between livelihood capabilities and access to extension services among small-scale coffee farmers in the study area. Specifically, the study intended at examining the relationship between livelihood capabilities level and extension services for the past five years, and the type of extension service required against livelihood capabilities level among small-scale coffee farmers.

The study was guided by the Diffusion of Innovation Theory-(DOI) by Rogers (2003). The theory seeks to explain how, why and at what rate new ideas and technology spread among people or group of people in this case small-scale coffee farmers. The theory has so far been applied by different researchers in different fields such as agriculture, marketing, development intervention, social work and behavioral change, and proved to be very useful (Zhang, 2015; Dearing, 2009). Therefore, it was applied in examining the association between livelihood capability and access to extension services among small-scale farmers in this context.

The theory assumes that every farmer is an experimenter by him/herself and does not need experimentation stations to tackle problems. As a result, the theory has provided much of intellectual foundations for the research and extension efforts in farm management and productivity. The theory further explains that the diffusion of better agricultural production knowledge and skills is a major source of productivity growth and profit maximization among small-scale farmers. The diffusion approach in agricultural development rests on the empirical observation of substantial differences in land and labour productivity among farmers and regions. In this view, the route to agricultural development can be attained through more effective dissemination of technical knowledge and narrowing of the dispersion of productivity among small-scale farmers in different locations (Tagar, 2012).

DOI stresses that the end result of diffusion people must adopt new idea, behaviour or product as a part of the social system. In this respect, a person must perceive the idea, behaviour or product as new or innovative. Despite the being such much useful, DOI has failed to generate rapid modernization of traditional farms or rapid growth in agricultural output. Furthermore, the theory does not foster a participatory approach towards

innovation adoption, does not take into account individual resources and differences or social support needed in order to adopt the new innovations but generally, the theory was good in examine the association between livelihood capabilities and access to extension services among small-scale coffee farmers in this respect.

4.3 Methodology

The study was conducted in Hai and Arumeru Districts in Tanzania. Hai and Arumeru Districts were selected due to their geographical conditions, long time involvement in coffee production, dependency on coffee by more than 50% of its households as a cash crop and major source of income and extreme deterioration in coffee production compared to other districts nation-wide (Coulson *et al.*, 2018). During data collection, a cross-sectional research design was used as the method which allowed data collection from different groups of respondents at a time, gave room to make comparisons among different groups of respondents to see how the dependent variable related to the independent variables. The approach saved time and other resources required to accomplish the task.

In this study, a mixed method approach applied to collect both qualitative and quantitative data on the association of livelihood capabilities and extension services among small-scale coffee farmers from primary and secondary sources.

The required sample size was calculated using Morris (1985) formula for known population. In this case the margin of error was 5%, confidence interval was 90% and the population size was 2509 small scale coffee farmers. Morris (1985) formula states that:

$$\begin{aligned}
 x &= Z(c/N)^2 r(N-r) \\
 n &= N x / ((N-1) E^2 + x) \\
 E &= \text{Sqrt} [(N-n) x / n(N-1)]
 \end{aligned}$$

where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/N)$ is the critical value for the confidence level c . Therefore, the Morris (1985) formula was applied in this study to calculate a sample size of 250 respondents (small-scale coffee farmers). Only small-scale coffee farmers producing an average of 100 kg and above per year were considered in this study because if someone produces less than the fore-mentioned amount per year he/she couldn't not be considered as a small-scale coffee farmer in this case because the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirements.

In each district, two (2) wards and four (4) villages were purposively selected. After sample size determination and accessed the register containing a list of small-scale coffee farmers, a simple random sampling technique was used to obtain the respondents. Methods of data collection included documentary review on extension services provision, focus group discussion and survey using questionnaire.

In order to have the livelihood capability levels; nine (9) abilities were established through pilot study and the following abilities were assessed: household head ability to own a house(s), household head ability to buy clothes, household head ability to have three meals per day, household head ability to earn income apart from coffee, household head ability to pay for medical services, household head ability to own transport, household head ability to run business, household head ability to own livestock and household head ability to pay for children's tuition fees. The capabilities were then tested

in the main data collection after assigning them scores on each capability. The scores were Yes = 1 and No = 0. After the data entry, total scores scored by each respondent established whereby the maximum score was nine (9) and the lowest score was zero (0). Basing on the scores, a median score was calculated to determine the group level formation. Finally, four levels established as depicted in Table 1.

Table 1: Livelihood Capability levels

Levels	Frequency (n)	Percent (%)	Capability Index
No Capability	23	9.2	0.0
Low Capability	98	39.2	0.1-4.44
Moderate Capability	46	18.4	5.0
High Capability	83	33.2	5.1-9.0
Total	250	100.0	

NOTE: No capability means total incapacitation to take part into coffee production; low capability means minimum ability which requires support in order to participate actively in coffee production; moderate capability means averagely capable of participating in coffee production either with or without support and high capability means over and above ability to participate in coffee production.

From the livelihood capability level (Table 1), the mean score results were found to be 5.0 (18.4%) which was at moderate level implying moderate livelihood capabilities among the small-scale coffee farmers in the study area. Zero (0) in the livelihood capability level implied no capability at all and from 0.1-4.4 (39.2%) implied low capabilities among small-scale coffee farmers. From 4.4 to 5.0 implied moderate livelihood capability level. This implies majority of small-scale coffee farmers in Hai and Arumeru Districts had low livelihood capability level. From 5.1 to 9.0 (33.2%) considered to be high livelihood capability level among small-scale coffee farmers. Thereafter, chi-square and cross tabulation were used for determine associations between livelihood capabilities and extension services among small-scale coffee farmers. Results obtained were presented using tables and figures.

Thereafter, a cross-tabulation was used to show the association between livelihood capability levels and extension services availability and affordability as recommended by Field (2009). Extension services were measured by considering two aspects i.e. availability of extension services and affordability of extension services whereby, Yes =1 implying available and No = 0 implying not available while the affordability was determined over 5 years period, whether they had acquired extension services or not; Yes = 1 if acquired (affordable) and No = 0 if not acquired (not affordable).

In order to ensure the validity of the data collected, the pre-testing of questionnaire was done with 16 respondents in both Hai and Arumeru Districts (eight respondents from each district; four respondents from each ward and 2 respondents from each village) a month before actual data collection. The pre-testing was done in order to test the data collection instruments, assess time for data collection, check availability of the study population, assess how research team work together, test procedures for data processing and analysis and check if the findings make sense. Reliability of the data collected was determined by calculating the Cronbach's Alpha which is a measure of internal consistence that is how closely related a set of items are as a group. Cronbach's Alpha is considered to be a measure of scale reliability. In this case, the reliability coefficient is $0.6835=68.4\%$. The optimum value for the reliability ranges from 0.65 to 0.8 and the calculated results were within the acceptable ranges hence making the data collected reliable.

4.4 Findings and Discussions

4.4.1 Status of extension services for the previous five (5) years in relation to the livelihood capabilities

The findings in Table 2 show the status of extension services for the previous five (5) years in relation to the livelihood capabilities among small-scale coffee farmers.

Table 2: Livelihood capability levels in relation to extension services provision in the past five years

Never received extension services in the past 5 years	Livelihood Capability Levels				Total
	No Capability	Low Capability	Moderate Capability	High Capability	
Strongly Agree	01 2.5%	15 37.5%	06 15.0%	18 45.0%	40 100.0%
Agree	00	00	00	00	00
Undecided	05 9.3%	13 24.1%	19 35.2%	17 31.5%	54 100.0%
Disagree	00 0.0%	00 0.0%	02 66.7%	01 33.3%	03 100.0%
Strongly Disagree	17 11.1%	70 45.8%	19 12.4%	47 30.7%	153 100.0%

Chi-square (26.171; p=0.0021) likelihood ratio (25.746; p=0.0021)

According to the findings in Table 2 with regard to whether community members had not received extension services in the past 5 years, small-scale coffee farmers were required to disagree strongly, disagrees, be neutral, agree or strongly agree. The livelihood capability levels were in four categories i.e. no capability, low capability, moderate capability and high capability level respectfully.

Of those who strongly agreed to have acquired extension services for the past five years, 2.5% had no capability at all, 37.5% had low capability, 15% had moderate capability and 45% had high livelihood capability levels. The chi-square results were 26.171; $p=0.0021$. This implies that there is an association between extension service provision and livelihood capabilities among small-scale coffee farmers and the results were statistically significant at 0.05 or 5% level. For those who were undecided on whether they had received extension services for the past five years, 9.3% had no capability at all, 24.1% had low capability, 35.2% had moderate capability and 31.5% had high capability levels. Further, another category of respondents disagreed to have received extension services for the past five years where 66.7% had moderate capability and 33.3% had high capability levels.

In addition, there were also respondents who strongly disagreed to have received extension services for the past five years where, 11.1% had no capability at all, 45.8% had low capability, 12.4% had moderate capability and 30.7% had high capability levels. As it can be visualized from the above results, community members with high livelihood capability levels agreed strongly to have received extension services in the past five years. It was later learnt that some small-scale coffee farmers used their own income to acquire extension services as it was reported by discussants in Mbweera Village during a focus group discussion that:

“...in most cases extension services are not available but at the same time, the advice from extension officers is very fundamental for us small-scale farmers...as a result, we are obliged to pay for extension services so that we can be properly directed on what to plant, when to plant, how to take care of the crops, how to harvest and finally how to store the produce...” FGD, Mbweera Village, 17th April, 2016.

The above narration implies that there is a critical shortage of extension services among small-scale coffee farmers which hinders smooth production and profit maximization. As a result, the output from the farm is always small, hence affecting other livelihood requirements such as health and education services acquisition. These findings concurred with TCRA (2011): Lwoga, *et al.*, (2011): Coulson *et al.*, (2018) who found out that in Tanzania extension services is among the critical challenges facing small-scale farmers where farmers are producing very little not because they want but because they are compelled by the prevailing circumstance.

During the interview it was revealed that the majority of small-scale coffee farmers were not aware on different agricultural extension related issues such as proper pesticides use, fertilizers application or seedlings selection. From the results, it was revealed that more

than 70% of the respondents were not aware on agricultural policies because they were not informed by either the government or non-governmental organizations. Farmers only observed, price going down or going up but had no explanation. For the past couple of years, for example, people have been talking of “*Kilimo Kwanza*” initiative but community members declared to know nothing about it. It was further learnt that only a quarter (25%) of the respondents were aware of some extension services related policies such as the right of small-scale farmers to be provided with advisory services, fertilizers, pesticides and acquisition of farming facilities as well as abolition of farming subsidies.

It was also found out that those who were aware had higher livelihood capabilities or higher educational levels i.e. secondary education and above. On the other side, the findings show that there is a very close connection between community members’ awareness on agricultural extension policies and their levels of education or livelihood capabilities. During a focus group discussion in Sawe Village, discussants reported that;

“...we are just seeing changes happening in terms of price or input provision but we do not know why all these changes...at the same time, nobody is around to clarify for us on what is happening, why it is happening and how are we going to benefit or be affected by the changes...worse enough, some of us don’t know how to read and write...we have heard also some information is aired out through TV and Radios but we do not have these facilities and therefore, we are victims of the circumstance...” FGD, Sawe Village, 23 May, 2016.

Through the researcher’s personal observation, it was revealed that few small-scale coffee farms which were performing well are those from the families which could pay for extension services and able to acquire the required farm inputs but majority of coffee farms in Hai and Arumeru Districts are not performing well and the output is not

impressing. During a focus group discussion in Modio Village it was further stated by discussants that:

“...in a period of five years we may be visited once or not visited at all...if visited by an extension officer or any public official there must be a very strong reason hidden behind the scene apart from providing extension services to farmers such as the time approaching election or national torch rallies...” FGD, Modio Village, 20 April, 2016.

This implies that in the contemporary time small-scale coffee farmers are producing without the guidance of extension officers or public officials. As a result, the output is always small to cater for their daily basic requirements such as food and health services. From the historical perspective, small-scale coffee farmers have been receiving regular advices from agricultural officers and extension officers. This has enabled them to maximize production, profits and managing their daily livelihood requirements through coffee.

4.4.2 Type of extension services required by small-scale coffee farmers against the livelihood capability levels

The Table 3 present the findings on the type(s) of extension services required by small-scale coffee farmers against the livelihood capability levels in order to improve their productivity.

Table 3: Type of Extension Service Required against Livelihood Capability Level

Type of Extension Service Required *multiple response		Livelihood Capability Levels				TOTAL
		No Cap.	Low	Moderate	High	
Better production methods	Count	23	89	42	80	234
	Percent	9.8%	38%	17.9%	34.2%	100%
Seedlings caring	Count	11	65	31	36	143
	Percent	7.7%	45.5%	21.7%	25.2%	100%
Marketing information access	Count	8	41	25	28	102
	Percent	7.8%	40.2%	24.5%	27.5%	100%
Pesticides usage	Count	15	58	30	46	149
	Percent	10.1%	38.6%	20.1%	30.8%	100%

Fertilizer usage	Count	15	46	24	33	118
	Percent	12.7%	39%	20.3%	28%	100%
Coffee processing	Count	00	00	00	01	01
	Percent	0%	0%	0%	100%	100%

Chi-square (0.368; $p=0.0231$) likelihood ratio (0.395; $p=0.0231$)

The findings in Table 3 show that 47.8% of the respondents with no and low livelihood capabilities were in need of better methods of production so as to improve their productivity. With regard to seedlings, likewise 53% of respondents among small-scale coffee farmers with no and low livelihood capabilities were critically in need of this service in order to modernize their production and hence maximizing the profits. In addition, 49% of small-scale coffee farmers with no and low capability were in need of marketing information access while 38.6% of small-scale coffee farmers with moderate livelihood capabilities were in need of pesticide usage extension services.

Furthermore, 51.1% of the respondents among small-scale coffee farmers with limited and low livelihood capabilities were in need of fertilizers usage extension services. The chi-square results were found to be 0.368; $p=0.0231$ meaning that there was a very close association between the livelihood capability level among small-scale coffee farmers and the type of the extension services required in order to improve their productivity and maximizing the profits, and the results were statistically significant at 0.05 or 5% level.

Therefore, as it can be depicted from Table 3 results; for small-scale coffee farmers to produce better, maximize the profits and being able to meet their basic requirements they have to be provided with better production methods, seedlings caring skills, marketing information access, better pesticide usage knowledge, fertilizers application knowledge and coffee processing skills. In the current situation, in most cases to obtain the above services a small-scale farmer has to carter for the cost though at the same time ability to effect for the cost depends on livelihood capabilities of the respective small-scale coffee

farmer. Hence, there is a very close relationship and interdependence between the type of extension service needed and the ability of the one who is in need of that service.

Due to their low economic situation (low livelihood capabilities), majority of small-scale coffee farmers are incapable of paying for extension services even if these services are available. During a focus group discussion in Modio village, it was stated as follow;

“...frankly speaking extension services in general are rarely available...free extension services are no longer in existence practically and to make the situation worse majority of us have limited income to cater for extension services’ costs and other daily basic needs for our survival....last month every household paid ten thousand (10, 000/=Tsh) to the extension officer under the so called fuel cost so that he could come to our farms and give us advice...” FGD, Modio Village, 4th April, 2016.

From the above narration, it can be vividly seen that small-scale coffee farmers are encountering a critical lack of extension services which limits their productivity and profitability at large. The findings have shown that the situation is more alarming among poor families but for the families with better income they do acquire extension services using their own sources. In other words, livelihood capabilities among small-scale coffee farmers determine substantially the acquisition of extension services. In all villages visited during data collection, there were no extension officers.

Through key informants’ interview and the researcher’s personal observation in both Hai and Arumeru Districts, it was revealed that extension officers were placed in ward headquarters and assigned other duties such as acting as ward executive and wards development officers leaving aside their primary role of providing extension services to farmers. This tendency has made some extension officers to be uninformed, ineffective

and inefficient when it comes to problem solving among small-scale coffee farmers mainly due to lack of experiences and exposure on farmers problems.

It was also learnt during focus group discussion that there is a continuous tendency of transferring extension officers after every one to three years of their appointment which limits their creativity and problem-solving skills through experiential approach. As a result, the situation has continued placing small-scale farmers in low livelihood capabilities in acquiring different basic needs such as decent medical services and nutrition due to low harvests and income obtained from their farms.

4.4.3 Theoretical implications of the findings

The findings on the association between livelihood capability and extension services availability and affordability among small-scale coffee farmers confirm the DOI theory to be quite true and very much applicable towards improving productivity and livelihood capability among small-scale farmers. The DOI theory stipulates that it is easier for innovation and technology to spread among the people provided there is a starting point. Small-scale farmers are experimenter by themselves and therefore if enabled it is possible to imitate production skills and technology from nearby farmers.

The findings have shown that livelihood capabilities determine substantially the type and quality of extension services among small-scale coffee farmers. Hence if small-scale farmers are enabled, diffusion of innovation theory is very much applicable despite the majority having low skills, low knowledge, low assets, low education and low livelihood capability levels which partly hinder them from adopting new innovations as recommended by DOI.

The findings obtained from this study have their own uniqueness because they address two critical issues which affect small-scale coffee farmers' livelihood capabilities and

access to coffee farming extension services. There are several studies done in the coffee industry on small-scale farmers but no study so far addresses the two aspects (livelihood capabilities and access to extension services among small-scale farmers) mentioned above. Coffee stakeholders have been complaining for fluctuations in coffee production and downfall of the small-scale coffee farmers' livelihood capabilities; this is the study which has filled this gap by showing the interdependence and interrelationship between the two. In this respect, these findings have contributed to DOI theory by adding to the existing body of knowledge the component of livelihood capabilities when adopting the right extension services (innovation) among small-scale coffee farmers.

4.5 Conclusions and Recommendations

4.5.1 Conclusions

The study findings were on the implications of livelihood capabilities and access to extension services among small-scale coffee farmers in Hai and Arumeru Districts. Based on the findings, the following conclusions were drawn. Livelihood capabilities among small-scale coffee farmers in the contemporary time are substantially associated with the quality and quantity of extension services. Therefore, small-scale farmers with high livelihood capabilities have a greater chance of improving their coffee production compared to those with low livelihood capabilities because they can acquire the extension services through their own initiatives.

Those with moderate and high capability receive extension services mainly through their own private arrangements using their own sources of income. From the findings, it is concluded that the majority of the small-scale coffee farmers who have higher livelihood capabilities have also higher education levels, and therefore, they are more knowledgeable on extension related matters than the rest of the community members and of course the production from their farms were promising.

4.5.2 Recommendations

Based on the findings and conclusions, the following can be recommended in order to ameliorate the extension services related problem among small-scale coffee farmers in Hai and Arumeru Districts. First and foremost, it was pointed out that there is an acute shortage of extension services which not only lowered the output from the farms but also reduced the small-scale coffee farmers' livelihood capabilities. Therefore, there is a need for the government and other stakeholders dealing with coffee production to ensure small-scale farmers are provided with extension services so that they can actively and profitably take part in the agricultural production activities.

In addition, at ward and village level there should be a demonstration plot “*shamba darasa*” where small scale farmers should go and learn new farming skills. In the demonstration plots farmers may be involved in learning by doing exercise so that later on they may go and apply the acquired skills and knowledge. In so doing, this will improve not only production and profitability but also the livelihood capabilities of small-scale farmers.

The local government should ensure its commitment in the extension service policy provision by providing one extension officer per village is implemented. Above all, extension officers should not be re-categorized to perform other duties and leaving small-scale farmers without any advisory service; instead, they have to be allowed to stay longer in one area so as to gain experiences and understanding on different small-scale farmers' problem(s) so as to address them appropriately.

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CHAPTER FIVE

5.0 LIVELIHOOD CAPABILITIES DIVERSIFICATION STRATEGIES AMONG SMALL-SCALE COFFEE FARMERS IN HAI AND ARUMERU DISTRICTS, TANZANIA

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5.1 ABSTRACT

As the time went on the level of livelihood complexities as a result of low earning and income among small-scale coffee farmers is increasing. To ameliorate this situation, small-scale coffee farmers are compelled to adopt different livelihood diversification strategies. This study aimed at assessing the determinants of livelihood capabilities diversification strategies adopted by small-scale coffee farmers as a result of fluctuation in coffee production and income in Tanzania. Specifically, the paper examined types of livelihood capabilities diversification strategies adopted by small-scale coffee farmers and assesses obstacles encountered by small-scale coffee farmers towards adopting livelihood capabilities diversification strategies. A cross-sectional research design using a mixed methods approach was adopted in this paper for surveying a sample of 250 respondents and the coffee farmers household was the unit of analysis in this case. Data were collected mainly using a household survey, a focus group discussion and key informant interview. The findings reveal that shortage of capital and available economic opportunities are among the determinants of small-scale farmers to adopt new livelihood diversification strategies. As a diversification strategy to coffee production, community members were found dealing with livestock keeping, vegetable production, small and medium businesses while others were taking part in formal and informal employments. It is concluded that adoption of livelihood diversification strategies has been necessitated

mainly by falling in income generated from coffee. The paper recommends that credit sources with affordable conditionality should be made available and affordable by microfinance institutions. Furthermore, the paper recommends to local administrative authority (wards and villages leadership) in collaboration with extension officers to take a deliberate initiative in mobilizing small-scale coffee farmers towards exploiting the available economic opportunities such as loans from microfinance institutions like Savings and Credit Co-operative Societies and Village Community Banks where they can get capital for embarking into livelihood diversification strategies. In so doing, this will improve not only production among small-scale coffee farmers but also livelihood capabilities in meeting their daily lives and in adopting diversification strategies.

Keywords: *Diversification Strategies, Livelihood Capabilities, Small Scale, Coffee Farmers*

5.2 Introduction

Livelihood diversification strategy among-small scale coffee farmers is a critical mechanism for improving production, income and profits from non-coffee economic activities (Rusike & Chrispen, 2016). Over the past three decades coffee farming as a primary source of income has failed to guarantee sufficient livelihood support for most of farming households in developing countries and at the same time, agricultural development policies have largely produced little improvement especially in Sub-Saharan Africa (Tsehaye, 2017). As a result, diversification into off-farm, on-farm and non-farm activities has become the norm (UNDP, 2016; Jolliffe, 2014).

In Tanzania, the earnings from traditional cash crops such as coffee have been decreasing annually due to the fall in price in the world market and heavy taxes on the export crops (URT, 2012). Similarly, the fall in export earnings is also attributed to the decline in product quantity and quality which also leads to low prices and low incomes and therefore

worsening the livelihood capabilities of small-scale coffee farmers hence necessitating them to think of other livelihood capabilities diversification strategies (Farzana *et al.*, 2014; IFAD, 2007).

Authors such as Lienert & Burger (2015); Valdes-Rodriquez & Perez-Vazquez (2011); Qinzilbash *et al.*, (2008) & Sen (2005) defined livelihood capability differently. Valdes-Rodriquez (2011), define livelihood as the way in which people earn income to effect for different basic needs such as clothes, food, shelter and medication. It then reflects to a means of making a living which encompasses peoples' capabilities, assets, income and activities required to secure the necessities of life. At the same time, the term capability according to Lienert & Burger (2015) refers to the ability to achieve the functioning to constitute for the better life. It also refers to the reaction potential to challenges and crises which reflects to the power or ability to do something or state of being capable. In this study the definition by Lienert (2015; Sen 2005; Dorward *et al.*, 2003) was adopted whereby, livelihood capability mean the ability of small-scale coffee farmers in meeting their daily basic needs and their power in adopting different livelihood diversification strategies which reflects to the ability or power of an individual in making a living.

Livelihood capability diversification strategies among small scale farmers in developing countries has been and still is a workable mechanism for emancipating community members from different socio-economic hurdles (Rakotobe, 2016; Coulibay, 2015). Different authors have defined livelihood capability diversification strategies differently focusing on diverse of economic activities and social support required to improve their standard of living (Mulinya *et al.*, 2017; Samson *et al.*, 2015 & Ellis, 2007). Others have considered livelihood capabilities diversification strategies based on gender of the households' members, soil fertility as well as frequency and magnitudes of crop failure.

Livelihood capabilities diversification strategy in this study refers to the totality of initiatives, efforts, approaches and methods of production adopted in order to improve production so as to meet the daily basic requirements and improve the total socio-economic wellbeing of the community members among small-scale coffee farmers (Faustine, 2016; MacArthur and John, 2013). According to Mulinya *et al.*, (2017) the adoption of different livelihood capabilities diversification strategies is not a smooth process or over-night decision as it needs capital, individual's readiness, information and knowledge among other ingredients.

Despite the government and non-governmental organizations' efforts in assisting small-scale farmers such as Agriculture First (*Kilimo Kwanza*), National Strategy for Growth and Poverty Reduction-(NSGPR), Agricultural Sector Development Program (ASDP 1&2) and establishment of Tanzania Coffee Research Institute (TACRI) in 2000. All of these efforts aimed at improving agricultural production, maximizing profits and improving the general small-scale farmers livelihood capabilities but still there had been a deterioration in their livelihood capabilities in managing their daily lives hence necessitating them to think on how to emancipate themselves through adopting different livelihood capabilities diversification strategies (TCB, 2017: Mussatto *et al.*, (2011).

Scholars such as Lienert & Burger, (2015): Mulinya *et al.*, (2017 & Coulibay, 2015) acknowledge the importance of small-scale farmers in developing countries adopting livelihood capabilities diversification strategies as the best practices in overcoming problems related to crop failure, price fluctuations, low incomes and climate change. For example, Rakotobe (2016) and Dorward (2003) described that as a livelihood diversification strategy; small-scale farmers in developing countries raise cattle or poultry on small plots or produce charcoal for sale in urban areas.

In other places if production of ordinary food or cash crop fails, as a livelihood capability diversification strategy, small-scale farmers grow cassava and yams to overcome the situation. However, for the past three decades there has been increasing evidence that small-scale farmers in developing countries rarely rely on agriculture alone. As a result, they often maintain a portfolio of incomes in which off-farm activities are important component which accounts for 35% to 50% of the total household income, and 58% globally (UNDP, 2016; Piotr & Anna, 2014; MacArthur & John, 2013; Haggblade *et al.*, 2010).

Furthermore, Farzana *et al.*, (2017): Faustine (2016): UNDP (2016) argue that, apart from coffee, small-scale farmers in Tanzania grow variety of crops as a livelihood capabilities diversification strategy due to the fluctuations in coffee production and deterioration of their livelihood conditions. Despite the government's efforts in improving coffee production and small-scale farmers' income; livelihood capabilities' diversification strategies among small-scale coffee farmers is still an issue to be resolved. In Tanzania, studies on small-scale coffee farmers have concentrated much on the effects of agricultural policies, agricultural marketing reforms, analysis of agricultural marketing, coffee sector and coffee industry (Faustine, 2016; TCB, 2012).

Therefore, the study at hand examines the livelihood capabilities diversification strategies among small-scale coffee farmers' household as a result of fluctuating in income obtained from coffee in terms of its adequacy and sustainability. Specifically, the study assessed types of livelihood capabilities diversification strategies adopted by small-scale coffee farmers in the study area and examine obstacles encountered by small-scale coffee farmers towards adopting different livelihood capabilities diversification strategies.

The study was guided by Sustainable Livelihood Approach-(SLA) by DFID (1997) and supplemented by Farm Household Production Theory by Schultz (1964). Sustainable

Livelihood Approach is a framework which analyses factors that affect peoples' livelihood. SLA helps in understanding the complexity of poverty and mainstreaming rural poor at the center of web of inter-related influence that affect how these people create and improve their livelihood (Ellis & Allison, 2001).

Different frameworks have been developed to deal with sustainable livelihood mainly in developing countries such as International Fund for Agricultural Development-(IFAD), Co-operative for American Relief Everywhere-(CARE), Food and Agriculture Organization-(FAO) & Department for International Development (DFID) (Dorward, *et al.*, 2003; Hopley & Shields, 2000). The theory has proved to be useful for researchers, program interventionists, policy formulators and implementers. The theory creates an understanding on the strategies small-scale farmers' households have adopted due to variability in production, income and livelihood capabilities mainly among small-scale farmers.

The approach has been applied by different researchers such as Serrat (2017); Morse & Nora (2013); Herold *et al.*, (2013 & Vipins (2013) in different countries such as Zimbabwe, Bangladesh, Zambia, Ethiopia, Lesotho and India in dealing with rural economy, rural poverty, rural livelihood, rural development, livelihood diversification and sustainable livelihood, and proved to be very useful hence, it was proper for it to be used in examine livelihood capabilities diversification strategies among small-scale coffee farmers in this case.

The SLA can be used to identify key constraints and opportunities for development intervention among small scale coffee farmers (Dorward, *et al.*, 2003). However, it creates an understanding of the lives of the poor and marginalized people like small scale-coffee farmers as well as their linkage to poverty reduction initiatives, food security and livelihoods (Kumar *et al.*, 2015; Benett, 2010). Despite the SLA being unable to explain

procedures relevant to be undertaken to improve livelihood capabilities among small-scale farmers but the approach appears to be fundamental in discussing livelihood capabilities diversification strategies among small-scale coffee farmers in this respect and of course that is why the approach was chosen.

5.3 Methodology

The study was conducted in Hai and Arumeru Districts in Tanzania. The selection of the two districts was based on their geographical location, culture/history of the coffee farmers, climatic conditions and their long-time involvement in coffee production. In addition, deterioration in coffee production (around 20% in 2015 compared to 1990 production) which was depended by nearly 50% of the population in the two districts prompted this study to be undertaken (Craparo *et al*, 2015; Kemantha, 2015; Maghimbi, 2007). Other reasons included the magnitude of the growth of horticultural activities among small-scale coffee farmers such as tomato production, vegetable production as well as dairy farming also prompted this study (TCB, 2017; Kizito, 2015; Maghimbi, 2007). The other key reason was the uprooting of coffee trees to pave way for other economic activities in the area. The fore-mentioned reasons compelled this study to be undertaken in Hai and Arumeru Districts, Tanzania.

The study used a mixed methods approach to collect qualitative and quantitative information. During data collection, a cross-sectional research design was used to collect qualitative and quantitative information on livelihood capabilities diversification strategies among small-scale coffee farmers from primary and secondary sources. The research design was chosen because it enabled collection of information from different groups of respondents at once, gave room to make comparisons among different groups of respondents to see how dependent variable relates to independent variables and the method saved time and other resources required to accomplish the task. The main method

of data collection was household survey through the use of structured and semi structured questionnaire. Other methods included focus group discussion by the use of a checklist and key informant interview using interview guide were also used to collect the information which could not be collected otherwise.

The sample size was calculated using Morris (1985) formula for known population. In this case the margin of error was 5%, confidence interval was 90% and the population size was 2509 small scale coffee farmers. Morris (1985) formula states that:

$$X = Z(c/N)^2 r(N-r)$$

$$N = N_x / ((N-1) E^2 + x)$$

$$E = \text{Sqrt} \left[\frac{(N-n) x}{n(N-1)} \right]$$

where N is the population size, r is the fraction of responses that you are interested in, and $Z(c/N)$ is the critical value for the confidence level c . Therefore, the Morris (1985) formula was applied in this study to calculate a sample size of 250 respondents (small-scale coffee farmers). Only small-scale coffee farmers producing an average of 100 kg and above per year were considered in this study because if someone produces less than the fore-mentioned amount per year he/she couldn't not be considered as a small-scale coffee farmer in this case because the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirements.

In each District, two wards and four villages were purposively selected i.e. Masama East and Roo Ndoo in Hai District and Nkwarisambu and Ndoombo in Arumeru District. Selection of the wards and villages were done deliberately because not all areas (villages and wards) producing coffee in Arumeru and Hai Districts. After sample size

determination and accessed a list of all small-scale coffee farmers producing an average of 100 kg and above, a simple random sampling technique was used to obtain the respondents required for the study.

The main method of data collection was household survey supplemented by focus group discussions and key informant interviews. A total of 4 (four) focus group discussions were conducted: One (1) focus group discussion with eight (8) respondents (male and female) in each ward. Furthermore, in order to get a deeper understanding of the subject matter, a total of six key informant interviews were conducted. A key informant interviews involved 2 (two) district agricultural officers and 4 (four) ward executive officers from the fore-mentioned districts who initially were employed as extension officers but later recategorized.

Qualitative data were analysed using content analysis by putting together the themes which resembles that is emphasizes pinpointing, examining and recording patterns within data in order to describe phenomenon and how are they associated to a specific research question. In order to have the livelihood capability levels; nine abilities were established through pilot study (household head ability to own a house(s), household head ability to buy clothes, household head ability to have three meals per day, household head ability to earn income apart from coffee, household head ability to pay for medical services, household head ability to own transport, household head ability to run business, household head ability to own livestock and household head ability to pay for children's tuition fees). The capabilities were then tested in the main data collection after assigning them scores on each capability. The scores were Yes = 1 and No = 0. After the data entry, total scores scored by each respondent established whereby the maximum score was nine (9) and the lowest score was 0. Basing on the scores, a median score was calculated to determine the group level formation. Finally, four levels established as depicted in Table 1.

Table 1: Livelihood Capability levels (n=250)

Levels	Frequency (n)	Percent (%)	Capability Index
No Capability	23	9.2	0.0
Low Capability	98	39.2	0.1-4.44
Moderate Capability	46	18.4	5.0
High Capability	83	33.2	5.1-9.0
Total	250	100.0	

NOTE: No capability level are the small scale coffee farmers who are completely incapacitated to take part in coffee production and ant the same time they are incapable to have basic needs; low capability are community members with minimum ability to participate in coffee production and are highly in need of support on different aspects; moderate capability means community members are able and averagely capable to participate in coffee production with or without any support while high capability means community members with over and above what is needed to participate in coffee production and in most cases this category do not require any support.

The findings in Table 1 indicate that the mean score was 5.0 (18.4%) which was at moderate level implying moderate livelihood capabilities among the small-scale coffee farmers in the study area. Zero (0) in the livelihood capability level implied no capability at all and from 0.1-4.4 (39.2%) implied low capabilities among small-scale coffee farmers. From 4.4 to 5.0 implied moderate livelihood capability. From 5.1to 9.0 (33.2%) considered to be high livelihood capability level among small-scale coffee farmers. This implies the majority of small-scale coffee farmers in Hai and Arumeru Districts had low livelihood capability level. Thereafter, chi-square and cross tabulation were used for showing the association between livelihood capabilities and diversification strategies among small-scale coffee farmers, and results obtained were presented using tables and figures.

In ensuring content validity for the data collected, the pre-testing of questionnaire was done in order to test the data collection instruments, assess time for data collection, check availability of the study population, test procedures for data processing and analysis and check if the findings make sense. The pre-testing of the questionnaire was done with 16 respondents in both Hai and Arumeru Districts (eight respondents from each district; four respondents from each ward and two respondents from each village) a month before actual data collection. Reliability of the data collected was determined by calculating the Cronbach's Alpha which is a measure of internal consistence that is how closely related a set of items are as a group. Cronbach's Alpha is considered to be a measure of scale reliability. In this case, the reliability coefficient was 0.68. The optimum value for the reliability ranges from 0.65 to 0.8 and the calculated results are within the acceptable ranges hence making the data collected reliable.

5.4 Findings and Discussions

5.4.1 Type of livelihood diversification strategies among small-scale coffee farmers

Livelihood capability is a result of multiple livelihood activities performed by small-scale farmers in their daily lives. It also encompasses assets and income owned by small-scale coffee farmers. Small-scale coffee farmers have so far adopted different livelihood diversification strategies so as to meet their basic requirements such as food, shelter and education due to the fluctuation in coffee production and decline in income generated from coffee. Table 2 presents the findings on livelihood capability diversification strategies adopted by small-scale coffee farmers in the study area.

Table 2: Diversification strategies against livelihood capabilities level among small-scale coffee farmers

Diversification Strategies	Livelihood Capability Levels in Percentages (%)				Total
	No capability	Low capability	Moderate capability	High capability	
Livestock keeping	9.2	39.2	18.4	33.2	100
Vegetable/Horticultural Production	10.4	39.8	19.9	29.9	100
Small and Medium Businesses	0.0	18.8	25.0	56.3	100
Formal and Informal Employment	0.0	50.0	12.5	37.5	100

Chi-square (12.161; p=0.0041) likelihood ratio (15.746; p=0.0041)

The livelihood diversification strategies among small-scale coffee farmers included livestock keeping, horticulture, small and medium businesses as well as formal and informal employment such as casual or part time labor. The findings from Table 2 show that 39.2% of the respondents who were found taking part in animal keeping as a diversification strategy had low livelihood capability. With regard to vegetable production, of all respondents 39.8% had low livelihood capability. Furthermore, the results show that 56.3% of all respondents who participated in small and medium businesses as a diversification strategy to coffee production had high livelihood capabilities.

It should be noted here that business requires capital and high capability means high capital and other economic potentialities required for investment to take place other factors being equal. However, among small-scale coffee farmers with formal/informal employment, 50% had low capability. Chi-square results were 12.161; p-value of 0.0041. This implies that there is a close association between the type of diversification strategies and livelihood capability levels among small-scale coffee farmers that is why the results are statistically significant. It was learnt that for small-scale coffee farmers with no

capability at all, it is harder for them to adopt a diversification strategy compared to other livelihood capability levels.

Other livelihood capability levels (low capability, moderate capability and high capability) are aspiring for livelihood improvement but the no capability category is dormant. For example, according to TCB (2017), the price for coffee has been almost stagnant for about twenty years. In 1995 one kilogram of coffee was sold between 1 500Tzs to 2 500Tzs whereby, in 2017 (almost 22 years later) the price ranged between 2 000Tzs to 2 500Tzs. Therefore, if small-scale coffee farmers could not adopt diversification strategies, their livelihood conditions could be in shamble due to yearly raising in cost of living and cost of production while the income generated from coffee is almost constant and sometimes declining. The same findings were corroborated by discussants in Ndoombo Village during a focus group discussion session as follows:

“...truly, since we diversified our economic activities, we have improved our income tremendously...we are getting little income from coffee, dairy farm, poultry and horticulture...Indeed, we are no longer facing minor common financial constraints...we are paying school fees for our children, building modern houses and owning other household assets...for sure, our lives are better after the adoption of livelihood diversification strategies to coffee production...” (FGD, Ndoombo village, 19 June, 2016).

This implies that livelihood diversification among small-scale coffee farmers has enabled them not only improve their households' income but also the general livelihood conditions by being able to acquire their daily basic needs at the required quality and quantity. These findings are in line with Babatumbe and Qain (2009) and Barrett *et al.*, (2011) in their discussion on income diversification and household livelihood strategies, they found out that in order for small-scale farmers to thrive well economically they have

to diversify their economic activities so that in the event of falling in price or output they will be able to maintain their livelihood status for obtaining their usual basic needs such as health services and food.

During key informant interviews in Ndoombo and Nkwarisambu wards, it was also noted that the betterment of small-scale coffee farmers' livelihood depends on how they are capable in diversifying their economic activities. It was found that small-scale coffee farmers in the study area have diversified their economic activities by embarking on small and medium businesses such as buying and selling of second hand clothes "*biashara ya nguo za mitumba*", opening up small shops, acting as middle men by buying agricultural produce from the farmers and selling them to the markets, operating motor cycle businesses "*biashara ya boda boda*" while others were found dealing seriously with horticulture "*(Kilimo cha matunda na mbogamboga)*"

5.4.2 Livelihood capabilities diversification strategies per district

Small-scale coffee farmers in Hai and Arumeru Districts have adopted different livelihood diversification strategies due to the decline in coffee production, income accrued from coffee, profitability and livelihood capabilities in terms of food, education and health services (Table 3).

Table 3: Livelihood capabilities diversification strategies per district between Hai and Arumeru

Livelihood Capability Indicator	Pooled Data		Arumeru District		Hai District	
	n	Percent	n	Percent	n	Percent
Livestock Keeping	250	51.1	105	40.0	145	42.0
Vegetable Production	211	43.1	103	39.0	108	28.7
Small Business Venture	150	49.0	54	14.0	96	25.0
Renting Land for other activities	08	1.6	00	02	08	2.9
Formal and Informal Employment	04	0.8	00	06	04	1.4
Total	619	100	259	100%	361	100%

In principle, small-scale farmers in both Hai and Arumeru Districts have adopted various livelihood capabilities diversification strategies due to different problems emanated from coffee production such as falling in price and yearly price fluctuations. Despite Hai and Arumeru Districts adopting different livelihood capabilities diversification strategies there are some slight differences in terms of the adoption process and magnitudes of its adoption. It was noted that small-scale coffee farmers diversified from coffee production to animal keeping (diary production), vegetable production, small business, renting land to other users and casual labor.

The findings in Table 3 show that in Hai District 42% of the respondents explained their great concern that they are now dealing with animal keeping instead of coffee production as it pays more regularly and profitably while in Arumeru District it was 40% of the respondents. Vegetable production as a livelihoods' diversification strategy was more profound in Arumeru District than in Hai District. Furthermore, the findings indicated that in Hai District only 28.7% of respondents were dealing with vegetable production as a diversification strategy while in Arumeru District 39% were found actively dealing with vegetable production. With regard to small business venture, the variations were significant in Hai compared to Arumeru District. It was found out that 25% of the respondents in Hai District were dealing with small business ventures while in Arumeru District it was only 14% of the respondents.

Livelihood diversification strategies differ from one district to another depending on factors such as weather condition, knowledge, soil, pests, capital and available avenues. The dominant or major activities which were found in Hai and Arumeru District include among others animal keeping, vegetable production and small business ventures while the minor ones were renting land and casual labour respectively which accounted for less than ten percent of the respondents across all districts as indicated in Table 3. These findings

concluded with the URT, (2012); Maghimbi (2007) who found out that coffee farmers in Kilimanjaro have changed the pattern of 100% reliance on coffee by diversifying into other economic activities such as horticulture, maize and rice production for their livelihood improvement and sustenance.

When community members were asked if their livelihood status was attributed to coffee production, (63%) said their status was attributed to other economic activities apart from coffee. They pointed out that they had adopted livelihood diversification strategies which have enabled them to embark on off-farm, non-farm and on-farm activities which pay better than coffee production in terms of profits and livelihood support. These results concurred to TCB (2017) who found out that one of the major factors for the decline in coffee production in Tanzania is the adoption of different livelihood diversification strategies among smallholder farmers who used to produce nearly 90% of the entire coffee in the country before economic liberalization. However, the remaining portion (37%) of respondents agreed their livelihood to rely on coffee and they are not thinking of adopting any livelihood capabilities diversification strategy. This category composed of elderly people mainly over 65 years. During a focus group Discussion at Sawe Village, discussants stated that:

“...we are very old and therefore it is difficult for us to deviate from what we have been doing for more than 40 years.... we don't want to be mentally disturbed by the newly emerged economic opportunities such as vegetable production.... we managed to care for our families through coffee sales and hence, we will continue producing it and not otherwise even if the price fluctuates...” (FGD, Sawe Village, 20 May, 2016).

This implies despite the livelihood challenges and decline in income from coffee, there is a significant percent (37%) of small-scale coffee farmers who are still relying on coffee

production as their major source of income and of course they are not intending to forego it. However, it was evidenced that small-scale coffee farmers who are still seriously and rigorously embarking on coffee production are of advanced age mostly above 65 years and assumed to be not easy to diversify their economic activities.

Further, small-scale coffee farmers pointed out that indeed, despite the ups and downs in coffee prices, it has played a great role in improving their household income as well as their livelihood capabilities in acquiring basic needs such as education, food and shelter. About 76.1% of the respondents agreed to have been supported by coffee in one way or the other in their life time. They insisted that they will continue producing coffee despite so many hurdles.

Income from coffee tends to supplement the total household income and therefore, enabling small-scale coffee farmers to deviate into other economic activities though by no means always a reliable source of income. It was also revealed that about 23% of the respondents pointed out that coffee production is not contributing anything to their income. But it was learnt later that this category is made up of individuals without coffee plots at all or those who have pulled away from coffee production completely. As a result, their livelihood depends on other economic activities such as business or horticulture for their survival.

The influence of coffee production on savings and adoption of livelihood diversification strategies among small-scale coffee farmers cannot be underestimated. Saving is a very important component in the livelihood diversification process. The more the savings, the more the chances for adopting new livelihood capabilities' diversification strategies, business certainties, prosperity and business expansion.

It was revealed that about 66% of the respondents pointed out that coffee production has not contributed to their savings while the remaining 34% of the respondents confirmed

their savings which has enabled them to effect for different livelihood requirements to be attributed by coffee production. Savings from coffee has enabled small scale coffee farmers to diversify their economic activities through adoption of different livelihood diversification strategies.

Irrespective of the source(s) of money to be saved, saving is useful to cater for anticipated and unanticipated livelihood needs. During a focus group discussion in Mbweera village it was stated as follow:

“...savings from coffee had enabled us to be how we are...through savings, we managed to build houses, opening up small shops and embarking on other income generating activities ...currently, we have diversified our economic activities but these new activities have their origin from coffee savings...and in the contemporary time many people are admiring our economic progress...” (FGD, Mbweera village, 20th June, 2016).

This means that community members still admit the importance of saving from coffee towards diversification into other economic activities and livelihood improvement. Savings provide capital necessary for diversification of our day to day economic activities. And, in so doing, it improves our livelihood capabilities.

5.4.3 Constraints encountered by small-scale coffee farmers towards livelihood diversification strategies

Adoption of new livelihood capability diversification strategies among small-scale coffee farmers is hindered by different factors such as capital, knowledge and skills, individual readiness, climatic condition and prevailing socio-economic and political environment. These factors are however very fundamental prerequisite for someone to adopt new livelihood diversification strategies among small-scale coffee farmers as elucidated in Fig. 1.

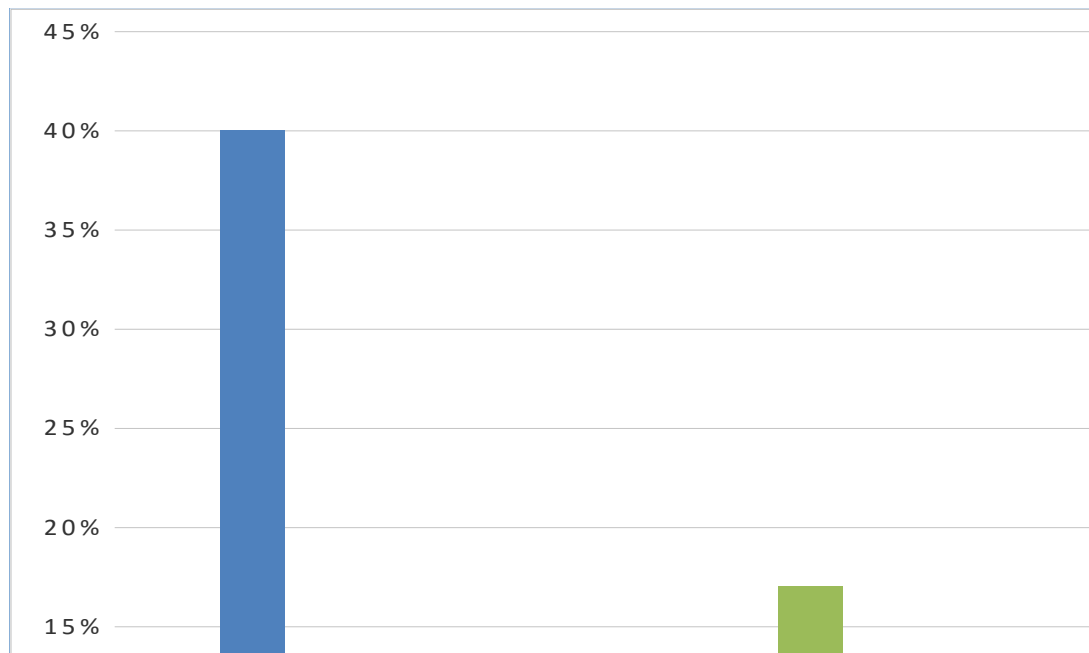


Figure 1: Constraints encountered by small scale coffee farmers towards adopting livelihoods' diversification strategies

The findings in Fig. 1 show that there are several constraints which limit small-scale coffee farmers in adopting different livelihood diversification strategies. The findings reveal that 40% of the respondents are not able to adopt livelihood diversification strategy simply because of the limited or lack of capital. Capital is very important for investment other factors being equal. In this respect, the findings show that the majority of small-scale coffee farmers are critically encountering lack of capital problem. As a result, this incapacitates them from adopting livelihood diversification strategies. It was further explained by discussants during a focus group discussion in Sawe village that:

“...we are ready and willing to adopt new livelihood capabilities diversification strategies because of little income from coffee but the critical problem is how and where to get capital for investment...sometimes we may know where to get the capital or credit support but we do not have the necessary qualifications and that is why we are still relying on a single product because of the prevailing constraints in such as capital...” (FGD, Sawe village, 28th May, 2016).

On the other hand, the findings show that 17% are not able to diversify their economic activities due to lack skills and knowledge on how to go about. During key informant interview in Masama East ward in Hai District, it was revealed that some small-scale coffee farmers are read to diversify their economic activities but the key obstacle to them was lack of adequate skills and knowledge. Furthermore, the results revealed that 15% of the respondents explained their great concern with regard to livelihood diversification strategies to be deterioration of soil infertility and frequently outbreak of diseases and pesticides. Due to continuously cultivation mainly caused by intercropping of other crops such as maize, banana and horticulture in the coffee farms, soil fertility has been diminishing but at the same time frequently occurrence of pests and diseases are demoralizing small scale coffee farmers from diversifying their economic activities.

Most of the soils in Hai and Arumeru Districts have been overcultivated as a result, the soil fertility has been exhausted and diseases and pests have become resistant to be controlled. These problems are the limiting factors for small scale coffee farmers to adopt a livelihood diversification strategy in the study area. A good number of respondents (13%) expressed their concern for not being able to adopt livelihood capability diversification strategies to be the existing socio-economic and political environment. In addition, a small number of respondents (5%) explained their great obstacle being the existing agricultural policies. After the removal of subsidies in agriculture in the mid-1980s, small scale farmers were badly affected because some of them cannot afford buying farming inputs by themselves. But also, in the contemporary time agricultural extension services are far from the reach of many small-scale farmers. Therefore, those who are diversifying or intending to diversify are not getting adequate support from the extension officers. “This was noted during key informant interview in Nkwarisambu in Arumeru District and in Masama East ward in Hai District respectively.

These findings contradict with Farm Household Production Theory by Schultz (1964) which stipulates that for small-scale farmers to adopt a new livelihood diversification strategy and produce better they have to be enabled in terms of capital, inputs and extension services. But to a large extent the availability of capital, inputs and extension services among small-scale coffee farmers is limited or not existing. Hence, as a result, this limits small-scale coffee farmers from adopting different livelihood diversification strategies.

The findings also concur with key informant interview in Masama East ward that the majority of small-scale coffee farmers want to diversify and adopt new livelihood diversification strategies but due to low socio-economic status, the majority of them are not able to do so.

5.4.4 Theoretical implications of the findings

The findings obtained from this study are in agreement with the assumptions from the SLA by DFID (1997) and farm household production theory by Shultz, (1964) which stipulates that production among small-scale farmers is affected by their inability to adopt new livelihood diversification strategies due to their low capital, poor skills, inadequate knowledge and low assets which altogether impair their ability to invest profitably. This study is a unique as it addresses two aspects at the same time (livelihood capabilities and diversification strategies) among small-scale coffee farmers.

Therefore, the findings have confirmed the SLA by DFID (1997) to be quite useful and very much applicable on the diversification strategies on livelihood capabilities among small-scale coffee farmers in Hai and Arumeru Districts. The findings have shown that in order for small-scale coffee farmers to improve their livelihood capabilities; adoption of livelihood diversification strategies through embarking into varieties of economic activities is inevitable. Despite the theory being useful in this context, so far, no study has

been conducted directly on livelihood capabilities diversification strategies among small-scale coffee farmers in Tanzania and hence this study has addressed that gap.

5.4.5 Contributions of the findings to knowledge

As propounded by Kaleshu (2013), contribution of research findings to the existing body of knowledge is among the fundamental essence of embarking into research. In this case, livelihood capabilities diversification strategies among small-scale coffee farmers have not been adequately studied and this created a dearth of literature in the country and elsewhere in the world. Many studies on small-scale coffee farmers in Tanzania have concentrated much on marketing of coffee, pricing, farmers' attitudes and coffee farming inputs but so far, no study has examined livelihood capabilities diversification strategies among small-scale coffee farmers as a result of deterioration in coffee production and income generated from coffee. The study at hand has managed to address that gap as it juxtaposes three aspects i.e. livelihood capabilities, livelihood diversification strategies and small-scale coffee farmers.

Furthermore, study contribution elucidate that there is a close association between livelihood capabilities, coffee production and livelihood diversification strategies among small-scale coffee farmers such as an association between livelihood capabilities and type of livelihood diversification, association between adoption of livelihood capabilities diversification strategies and the prevailing socio-economic constraints, the influence of income on livelihood capabilities diversification strategies and the association between livelihood diversification strategy and saving among small-scale coffee farmers. Therefore, the fore-mentioned are some of the contributions of this study to the existing body of knowledge.

5.5 Conclusions and Recommendations

5.5.1 Conclusions

Based on the findings, the study concludes as follows: Adoption of livelihood capabilities diversification strategies among small-scale coffee farmers has been necessitated primarily by falling in income generated from coffee production, hence forcing them to improve and adopt livelihood diversification strategies in order to increase productivity and maximize profits hence being able to meet their daily basic requirements such as health services and education. Among other economic activities performed by small-scale coffee farmers, coffee production still plays a fundamental role as a source of savings for other economic occupations aiming at improving livelihood capabilities through adopting different livelihood capabilities diversification strategies.

In addition, small-scale coffee farmers encounter several constraints in the process of adopting livelihood diversification strategies such as limited maximum amount of credit offered, lengthy application procedures, high interest rate, inability to repay credit on time, unawareness of credit sources and unavailability of credit sources. Hence, removal of constraints and expansion of opportunities for diversification are very fundamental in giving individual and household members more capabilities to improve livelihood and therefore raising the standard of living, maximizing profits and improving income.

5.5.2 Recommendations

In order to ameliorate the situation of small-scale coffee farmers not being able to adopt diversification strategy mainly due to low livelihood capabilities, the paper recommends the following measures to be taken into consideration: Diversification of economic activities among small-scale coffee farmers is very fundamental and unavoidable for easy adoption of new livelihood capabilities diversification strategies. It is recommended to small-scale coffee farmers at village and ward level to be proactive, ready and willing to

adopt livelihood capabilities diversification strategies as a tool for emancipation from different economic constraints emanating from coffee production.

The adoption of livelihood diversification strategies can easily be done by soliciting capital which is very fundamental for economic production. Finally, it is recommended to microfinance institutions to widen the sources of credit and improve conditions for its acquisition in order to be more user friendly hence enabling more small-scale farmers to acquire and embark on different livelihood occupations which generate more profits hence ultimately improving their livelihood conditions in obtaining their daily basic requirements.

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CHAPTER SIX

6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Findings and Conclusions

6.1.1 Coffee production trends and its implications on livelihood capabilities among small-scale farmers

Views of coffee production trends and its implications on livelihood capabilities among small-scale coffee farmers in Hai and Arumeru Districts are discussed in chapter two to address the first objective of the thesis. The chapter examined the implications of coffee production trends on livelihood capabilities among small-scale farmers. Among other issues, the chapter discusses in detail the influence of socio-demographic characteristics on coffee production among small-scale coffee farmers, examine coffee production fluctuation trends nation-wise and in Hai and Arumeru Districts in particular, examine the average amount of coffee produced and sold in Hai and Arumeru Districts, examine small-scale coffee farmers' opinions on coffee production for the previous ten years (2005-2015) and finally determine the status of land under coffee production during the same period (2005-2015).

The findings revealed that coffee production trends have been fluctuating from time to time in Hai and Arumeru District from the late 1980s to date which has necessitated prices offered and income generated to change accordingly. According to the findings, socio-demographic characteristics are associated with the amount of coffee produced in a given area. For example, it was found out that people who were more educated used to harvest more than those with less or no education. The big family size was found to have an influence in the amount of coffee produced because of the land declining annually for house construction and other land use purposes hence making the amount of coffee diminishing from time to time. Age of a coffee producer was found to be one among the key determinants for coffee production fluctuation.

The majorities of coffee farmers were found to have an advanced age and were no longer capable to engage rigorously in coffee production. In both Hai and Arumeru Districts youth were hardly found taking part in coffee production. This tendency affects not only coffee production at the moment but also the sustainability of this noble economic activity among small-scale farmers. Old people are not ready to release their coffee farms to young generation under the allegation that this is the only income generating activity they are depending on and if their coffee plots are taken by youths, they are going to be baggers of their own properties. Therefore, less youth participation in coffee production is mainly attributed by two key factors such as youth uninterested in the coffee industry calling it unprofitable particularly in a short run and tediousness involved in the entire production process but at the same time old men are not ready to give their coffee farm plots to the young.

The results depicted that the highest coffee production nation-wide occurred in 2012/2013 crop season whereby, 71,007 thousand tons harvested while the lowest production occurred in the 2003/04 whereby only 32,714 tons harvested. However, with regard to income obtained, the highest was marked in 2012/13 with \$181,795 thousand and the lowest income was obtained in 2002/03 with \$26,449 thousand. It was further found out that the highest sale price was obtained in 2011/2012 with \$105.57 per 50 kg of coffee while the lowest sales price was obtained in 2001/02 with \$16.68 per 50 kg. With regard to income obtained, the highest amount was marked in the 2012/13 agricultural season when \$181,795 thousand was obtained followed by 2010/2011 agricultural season with \$179,096 thousand. The lowest income was obtained in 2002/03 crop season with \$26,449 thousand followed by 2003/04 whereby \$34,182 thousand obtained.

With respect to the production in Hai District, the findings reveal that the highest production occurred during the 1999/00 agricultural season with a total of 3,020 tons

while the lowest was in 2009/10 when 943 tons were harvested. In this case, \$2,114 per 1 ton of coffee obtained while the lowest price offered in 2001/02 with \$334 per 1 ton of coffee. The highest income in Hai District obtained in 1998/09 with \$3,980 thousand and lowest income was attained in the 2001/02 when \$96 thousand obtained. Comparatively, in Arumeru District, the highest production took place in 2009/10 when 2,886 tons obtained while the lowest production happened in 2015/2016 crop season with 708 tons of coffee. At the same time, the highest price offered per 1 ton of coffee was in 2011/12 where \$2,114 was given to small-scale coffee farmers while the lowest price per 1 ton of coffee was given in 2001/02 when \$334 paid. With regard to the income obtained from coffee in Arumeru District, the highest income was attained in 2009/10 when \$3,617 thousands was given to small-scale coffee farmers while the lowest income was obtained in 2002/03 with \$384 thousand.

The reply from the respondents on coffee production trend over the previous ten years (2005-2015) was that about 53% stated that they are currently disinterested with coffee production than 10 years ago while others are slightly demoralized (14%), slightly motivated (23%), no change and more motivated all together constituted 10% of the respondents. The status of land under coffee production were found to have changed over time; about 50% of the respondents stated that land under coffee production has changed while 45% said area has not changed since then. Only few cases mentioned that the area under coffee production has increased for the past 10 years, and of course this category composed of the youths who had just ventured into coffee industry.

Based on the findings, it is concluded that socio-demographic characteristics of small-scale coffee farmers such as education level, marital status and age of respondents are associated with the amount of coffee produced in the households, at district, regional and national levels. In the contemporary time youth participation in coffee production is on an

increase compared to the previous decades due to nation-wide sensitization. The study also concludes that coffee production nation-wide has not been constant; production has been varying from time to time and from place to place due to factors such as removal of subsidies, unreliable coffee markets, climate change and losses of morale among small-scale farmers.

Due to the frequent fluctuations in coffee production, the majority of small-scale coffee farmers have been unable to acquire quality and quantity basic needs as they used to in the past and others have abandoned coffee production and resorted to other income generating activities such as horticulture. This was noted in both Hai and Arumeru Districts during coffee farm visits whereby there were several uprooted coffee farms in order to pave way for other income generating activities deemed to be more profitable.

6.1.2 The implications of livelihood capabilities on coffee farming input accessibility, availability and affordability among small-scale coffee farmers

The influence of livelihood capabilities on coffee farming input among small-scale coffee farmers in Hai and Arumeru Districts, Tanzania is discussed in chapter three to address the second objective of the thesis. The findings revealed that livelihood capabilities among small-scale farmers is among the aspects associated with coffee farming inputs availability, accessibility and affordability by impairing the abilities of farmers in getting adequate and quality farming inputs.

It is further concluded that input accessibility and availability among small-scale coffee farmers is not a big problem; the critical issue is affordability of these inputs due to the fact that the majority of small-scale coffee farmers have low livelihood capabilities hence unable to acquire inputs by themselves. For example, of those who said coffee production inputs were affordable, 40.5% had high livelihood capability level. The Chi-square results were (3.689; $p=0.0296$). This implies that there is an association between inputs

affordability and livelihood capability levels and the results were statistically significant at 0.05 or 5% level. Therefore, the higher the livelihood capabilities, the higher the possibility of small-scale coffee farmers to acquire farming inputs of the required quality and quantity.

Changes in livelihood capabilities among small-scale coffee farmers in Hai and Arumeru Districts can be reflected in the changes in agricultural systems which are closely associated with the quality, quantity and cost of farming inputs (availability, accessibility and affordability) in relation to livelihood capability levels. In view of the implications of livelihood capability levels on coffee farming inputs among small-scale coffee farmers, it can be concluded that small-scale coffee farmers from the mid-1980s to date have been producing coffee under difficult conditions which have impaired their livelihood capabilities in one way or another

It is concluded that livelihood capabilities among small-scale farmers are among the factors associated with the acquisition of proper coffee farming inputs. It is therefore pointed that coffee farming input affordability is among the major factor that have led to the fluctuations in coffee production and therefore affecting the livelihood capabilities of small-scale farmers whose lives depend on coffee. In addition, coffee farming inputs among small-scale farmers is a problem which requires prompt action. Furthermore, small-scale coffee farmers explained their great concern that for almost three decades (1980s-2015) they have not received either free or subsidized farming inputs from the government. As a result, small-scale farmers were forced by the circumstances to acquire inputs through their own initiatives something which jeopardized their ability to acquire other livelihood requirements such as decent medical services and balanced diet.

6.1.3 Association between livelihood capabilities and access to extension services among small scale coffee farmers

The implication of livelihood capabilities on extension services among small-scale coffee farmers in the study area is reported in chapter four, which covers the third objective of the study. The chapter examines how extension services among small-scale coffee farmers are associated with livelihood capabilities. The results show that, for the past five years (2010-2015), small-scale coffee farmers in the study area had not been provided with free extension services. Further, the findings show that livelihood capabilities among small-scale coffee farmers substantially determine availability and frequencies of getting extension services.

Additionally, it was revealed that small-scale coffee farmers with high livelihood capabilities were more capable of making their own arrangements on extension services acquisition, and the outputs from their farms were higher than for those with no or low livelihood capabilities. The findings further revealed that small-scale coffee farmers with high livelihood capabilities and higher education (secondary education and above) were more knowledgeable on different agricultural extension related matters including selection of proper seedlings, fertilizers and pesticides for their farms.

Based on the findings, the study concludes that livelihood capabilities among small-scale coffee farmers in the contemporary time are substantially associated with the quality and quantity of extension services in terms of availability and affordability.

Therefore, small scale farmers with high livelihood capabilities have a greater chance of improving their coffee production compared to those with low livelihood capabilities because they can acquire the extension services through their own initiatives. Moreover, the majority of small-scale coffee farmers with no capability and low capability confirmed

to have not being visited or obtained any extension services for more than five years ago mainly for the reasons beyond their knowledge.

Those with moderate and high capability usually do receive extension services mainly through their own private arrangements using their own sources of income. Despite unavailability of extension services, small-scale coffee farmers in the study area acknowledged the importance of extension services in their day to day farming activities. They further pointed out various challenges which they were encountering for not having extension services such as inability to have proper seedlings, fertilizers and pesticides. It is concluded that the majority of the small-scale coffee farmers who have higher livelihood capabilities also have higher education levels, and therefore, they are more knowledgeable on extension related matters than the rest of the community members and of course the production from their farms is promising.

6.1.4 Livelihood capabilities diversification strategies among small-scale coffee farmers

The livelihood capabilities diversification strategies among small-scale coffee farmers as a result of fluctuations in coffee production quantity and income accrued from it is discussed in chapter five to address the fourth objective of the study. The chapter assessed different options adopted as diversification strategies by small-scale coffee farmers in order to maintain their livelihood hence being able to meet their daily basic requirements such as food, shelter, medication and education.

The results revealed that credit facility (capital), production technologies and available economic opportunities are among the determinants enabling small-scale farmers adopting new livelihood diversification strategies. As a diversification strategy to coffee production, community members were found dealing with livestock keeping, vegetable production, small and medium businesses while others were taking part in formal and

informal employment. It was also noted that in the process of acquiring credit facility for livelihood diversification strategies due to fluctuations in coffee production, community members encountered challenges such as unavailability of credit sources, unawareness of credit sources, lengthy application procedures, inability to repay the credit on time and limited maximum amount of credit offered.

Based on the objectives and the findings, the study concludes that adoption of livelihood capabilities diversification strategies among small-scale coffee farmers has been necessitated primarily by falling in income derived from coffee production which compelled them to improve and adopt livelihood diversification strategies in order to increase productivity and maximize profits therefore enabling them to meet their daily basic requirements such as health services and education. Among other economic activities performed by small-scale coffee farmers, coffee production still plays a fundamental role as a source of savings for other economic occupations aiming at improving livelihood capabilities through adopting different livelihood capabilities diversification strategies.

Moreover, small-scale coffee farmers encounter several constraints in the process of adopting livelihood diversification strategies such as limited maximum amount of credit offered, lengthily application procedures, high interest rate, inability to repay credit on time, unawareness of credit sources and unavailability of credit sources. This implies that the removal of constraints and expansion of opportunities for diversification are very fundamental in giving individual and household members more capabilities to improve their livelihood and therefore raising the standard of living, maximizing profits and improving income.

6.1.5 Theoretical reflections

Farm Household Production theory holds that in developing countries small-scale farmers are producing under difficult conditions, they are very poor and inefficient in economic production related activities, have limited knowledge, low capital, poor assets endowment and limited formal protection which limit their ability to invest hence impairing their capabilities in meeting daily basic requirements. As a result, for them to produce better and improve their general livelihood conditions, they have to be motivated in different dimensions in terms of capital and knowledge. In this respect, the theory was potential to qualify the implication of coffee production trends, influence of coffee farming inputs, access to extension services and livelihood diversification strategies among small-scale coffee farmers who are involved in the production process in order to meet their basic needs.

The theory has shown how low income, inadequate inputs and extension services impair production and livelihood capabilities among small-scale coffee farmers. Low income from coffee production among small-scale farmers is attributed to low production, inability to acquire different human basic needs, unemployment among coffee producing households, loss of interest in coffee production and general deterioration in the livelihood status among small-scale coffee farmers. Therefore, the farm household production theory was useful in analysing the implications of livelihood capabilities among small-scale coffee farmers in the process of ensuring sustainable development. The theory tries to show the root cause of inefficiency among small-scale coffee farmers which is primarily entrenched in their incapability.

Similarly, the theory assumes that small-scale coffee farmers' livelihood depends on livelihood capabilities based on the prevailing social organizations and processes as drawn from SLA holds the true (DFID, 1997). The results indicate that there is a close

relationship between the capabilities of small-scale farmers, input and extension services acquisition as well as adoption of livelihood diversification strategies. Therefore, in this respect, the findings have confirmed the theory to be quite true beyond reasonable doubt. Further, DOI by Rogers (2003) seeks to explain how, why and at what rate new ideas and technology spread among people or groups of people, in this case small-scale coffee farmers.

The theory stresses that the end result of diffusion is that people must adopt new ideas, behavior or product as a part of the social system hence improving productivity and profitability. The theory has provided a good trajectory for maximizing production and profits among small-scale coffee farmers only and only if there will be readiness, awareness, skills and resources for DOI to take place. As a result, the theory was suitable towards examining the implications of livelihood capabilities on extension services availability and affordability among small-scale coffee farmers in this respect.

Moreover, High Pay-off Input Theory (Tagar, 2012 and Levit, 2012) focused on two aspects i.e. how to create and provide farmers with the new high-pay-off technology embodied in capital equipment and other inputs and how to increase labor productivity among the farmers. The high pay-off input theory has proved that economic growth from the agricultural sector of any country depends predominantly upon the availability and price of modern high pay-off inputs. In this respect, if small-scale coffee farmers are to maximize productivity and profitability, selection of high pay-off inputs is unavoidable. This has been confirmed by the findings that community members were found producing poorly and unprofitably due to inadequate or lack of proper farming inputs. Thus, the theory was useful in the study towards analyzing the distribution of inputs such as fertilizers, seedlings and pesticides in improving coffee farming and smallholders' livelihood.

6.2 Recommendations

6.2.1 Implications of livelihood capabilities on coffee production trends

It is recommended that there is a need to put more emphasis on youth participation in coffee production. In the contemporary time older small-scale coffee farmers are incapable of producing quality and quantity coffee and therefore deliberate efforts are to be directed to youth by stakeholders like Tanzania Coffee Board, Agricultural Marketing Co-operative Societies dealing with coffee in particular.

Youth engaged in coffee production should be assisted to form clubs and the club members could be supported to move around and sensitize other youth on the economics of coffee production. Agricultural Marketing Co-operative Societies (AMCOS) could come out with an appealing slogan to entice youth to move into coffee production. In this process, there should be long-term farm development loans or special loan fund similar to the Small Enterprise Loan Fund (SELF) for funding youth coffee production projects. In so doing, it is possible for coffee production curve to change from negative to positive and in a larger spectrum the livelihood of small-scale coffee farmers could be improved through the income generated from coffee production.

The study further recommends that with regard to the coffee production fluctuations attributed to factors such as removal of subsidies among small-scale coffee farmers and unreliable coffee markets, Ministry of Agriculture should subsidize farm implements as it used to be in the past simply because under normal circumstances, small-scale coffee farmers are unable to keep the money from when they harvest their crops to when needed let say five months later or next season. Furthermore, AMCOS and extension officers available have the role of sensitizing small-scale coffee farmers on how to improve coffee production, how to acquire best inputs and reliable market for their produce.

So far small-scale coffee farmers in Hai and Arumeru Districts have highly been demoralized by lack of agricultural inputs, extension services and reliable market making them to develop negative attitudes towards coffee production due to the reason that coffee production is no longer a paying economic activity. Therefore, the study recommends deliberate efforts to be taken by the government and local authority administrative machinery (at village and ward levels) so as to build trust (positive attitudes) among small-scale coffee farmers by ensuring affordability of farming inputs and extension services, reliable markets as well as reasonable prices among small-scale coffee farmers in Hai and Arumeru Districts. This will improve not only coffee production but also livelihoods of small-scale farmers in the fore-mentioned districts.

6.2.2 Implications of livelihood capabilities on coffee farming inputs

In order to improve coffee farming among small-scale farmers as well as their livelihood capabilities the following are recommended. With regard to coffee farming inputs among small-scale farmers, it is recommended to the government and other coffee stakeholders such as TCB and TACRI to undertake deliberate efforts to ensure coffee farming inputs are subsidized by 50% so as to enable small-scale farmers to acquire them at a reasonable price hence being able to participate fully in the farming process. It should be noted that even in developed countries subsidization of agricultural inputs is a common practice and that is why farmers are maximizing production and profits.

Furthermore, there is a need for more budget allocation in research, training and extension services so as to improve coffee farming input availability, accessibility and affordability as well as the livelihood capabilities among small-scale coffee farmers. According to TCB (2017) report, in every financial year the national budget contains an allocation for improving and modernizing agriculture, coffee farming included but it is still doubtful if these resources usually perform the intended tasks. Therefore, close monitoring of the

budget allocated to agricultural sector by the government and coffee stakeholders is unavoidable for the prosperity of coffee farming and livelihood of the small-scale coffee farmers.

6.2.3 Association between livelihood capabilities and access to extension services

Based on the findings and conclusions the following are recommended in order to ameliorate the situation of coffee farming extension services shortages or unaffordability and unavailability; First and foremost, it was pointed out that there is an acute shortage of extension services which not only lowers the output from the farms but also reduces the small-scale coffee farmers' livelihood capabilities. Therefore, there is a need for the government and other stakeholders dealing with coffee production to ensure small-scale farmers are provided with extension services so that they can actively and profitably take part in the coffee farming.

The government in collaboration with local government authorities should ensure its commitment in the Extension Service Policy Provision of having one extension officer per village is implemented. Besides, extension officers should not be re-categorized to perform other duties and leaving small-scale farmers without any advisory service but instead, they have to be allowed to stay longer in one area so as to gain experiences and understanding on different small-scale farmers' problem(s) so as to be able to address them accordingly.

6.2.4 Livelihoods capabilities diversification strategies among small-scale coffee farmers

In order to ameliorate the situation, the study recommends the following measures to be undertaken. Adoption of new production skills and technologies among small-scale coffee farmers is very fundamental for easy adoption of new livelihood diversification strategies. It is recommended that small-scale coffee farmers should be proactive in acquiring new

skills and technology because these are the working tools for livelihood diversification process. Therefore, agriculture extension officers in a specific district should be in the front line in ensuring relevant production skills and knowledge are provided to small-scale coffee farmers.

Small-scale coffee farmers in collaboration with the responsible Local Government Authority and AMCOS in their areas should be willing and ready to engage in varieties of economic activities so as to maximize their profits and improve their livelihood requirements. More emphasis by the government on coffee production is highly needed since it is one among the critical sources for livelihood diversification strategies and improvement among small-scale farmers in the coffee growing areas. Finally, microfinance institutions (MFIs) are advised to widen the sources of credit and improve conditions for its access in order to be more user friendly hence enabling more small-scale farmers to embark on different livelihood occupations which generate more profits.

6.3 Contribution of the Research

Livelihood capabilities among small-scale coffee farmers have much potential for improving coffee production and livelihood conditions. However, there have been scholarly debates on the fluctuations in coffee production and downfall in small-scale farmers' livelihood capabilities. This study has provided empirical and theoretical results on the association between livelihood capabilities, coffee production trends, coffee farming inputs, extension services and livelihood diversification strategies among small-scale coffee farmers.

As a result, the study has provided plausible factors for falling in coffee production, inadequate coffee farming inputs and extension services as well as the measures (diversification strategies) undertaken by small-scale coffee farmers to cope with the situation. Among other things, livelihood capability of small-scale coffee farmers is the

major determinant for coffee production, inputs and extension services availability and affordability as well as for livelihood diversification strategies. Further, the researcher has published two papers which can be used as a source of literature review for other researchers working on the same or related research issue.

6.4 Suggested areas for further research

Livelihood capabilities have been explained to be an important practice and engine for improving not only livelihood among small-scale coffee farmers but also coffee production and income in developing countries at large. Livelihood capabilities among small-scale farmers depend in many cases on type of crop (s) and location. This study was confined to Hai and Arumeru Districts in Kilimanjaro and Arusha regions respectively, but it did not cover other coffee producing areas in Tanzania. Issues related to livelihood nationally and internationally for example, assessment of government policy on coffee production trends should be examined in order to generate more solutions for improving coffee production and small-scale farmers' livelihood conditions. Still this study finds important the government policy component to be studied in the process of improving livelihood, income and the amount of coffee produced among small-scale farmers in Tanzania.

APPENDICES

Appendix 1: Household Survey Questionnaire

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PRELIMINARY INFORMATION

S/No	Item	Details/Responses
1	Questionnaire number	
2	Date of Interview	
3	Name of an interviewee (optional)	
4	Ward Name	
5	Village Name	
6	Hamlet Name	
7	Experience in coffee farming in years	
8	Respondent's Contact Details (optional)	

Socio-demographic characteristics of respondents

1. Type of respondents-----

1. Coffee producer
2. Spouse of coffee producer
3. Grown up child
4. Parent of a coffee producer
5. Others (Specify)

2. Sex of the respondent-----

1. Male
2. Female

3. Type of a household-----

1. Nucleated
2. Extended
3. Polygamous

4. Age of respondent-----

5. Educational level of respondent-----

1. No formal education
2. Primary education
3. Secondary education
4. Diploma education
5. University education

6. Marital status of respondent-----

1. Married
2. Single
3. Divorced/Separated
4. Widow
5. Widower

7. Size of the household-----

8. In your view, what can you say about the attitude of small-scale coffee farmers?

1. They are currently highly disinterested/demoralized than 10 years ago
2. They are more motivated today than 10 years ago
3. There is no any change to date compared to 10 years ago
4. They are slightly motivated compared to 10 years ago
5. They are slightly demoralized compared to 10 years ago

9. Relationship of the respondent to the household head.....

1. Household head
2. Spouse
3. Child
4. Nephew/niece
5. Brother/sister
6. Mother/father

7. In-law
8. Grand child
9. Others (Specify)
- 10 What is your main occupation?
 1. Farming
 2. Employment on farm
 3. Employment off farm
 4. Own business
 5. Casual labor
 6. House keeping
 7. Others (Specify)
10. Does the household pay for school fees, books and uniforms of school going members of the household?
 1. Yes
 2. No
11. If yes, how much do you pay per year?
12. Where do you source money for paying school expenses?
13. What is the attitude of small-scale farmers towards coffee production?

	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
	(5)	(4)	(3)	(2)	(1)
It is impossible to produce coffee now					
Do not like coffee production activity					
Do not produce coffee because it will make me poor					
Do not produce coffee because the community will judge me wrongly					
There is favoritism in getting inputs					
Do not produce coffee because it will not make any changes in my livelihood					
Coffee production activity is useless					
Coffee production is a risky business					
Coffee production is male dominated					

Coffee production dominated by elderly					
Extension workers are not encouraging					
Leaders and Board members in AMCOS are not friendly and encouraging					
Too much corruption in coffee marketing					
Do not produce coffee because of the poor market performance for the past 30 years					

14. What is the average size of the land under coffee production do you own?
15. Where do you get inputs for your coffee production?
1. Own stock
 2. Used own money
 3. Cash/loan from a co-operative
 4. In kind from a co-operative
 5. Relatives
 6. Government subsidy program
 7. NGOs
 8. Another source (Specify)
16. What can you comment on the average size of the land under coffee production in the most recent season compared to the time when the household was formed?
1. Did not grow coffee at that time
 2. Area under coffee production has decreased since then
 3. Area under coffee production has not changed since then
 4. Area under coffee production has increased since then
 5. Difficult to determine the changes
17. During the most recent season what was the variety of coffee you planted in your farm?
1. I have never planted coffee
 2. Traditional variety
 3. Improved variety

4. Difficult to identify
18. How did you acquire (get hold of) coffee seedlings you planted in your farm in the most recent season?
 1. Own stock (home garden)
 2. Other farmers/neighbors' gardens
 3. Purchased from a primary co-operative society's garden
 4. From TACRI-Lyamungo
 5. From extension officers/NGOs or other organization(s)
 19. What type of fertilizer do you normally apply in your coffee farm?
 1. Artificial/industrial fertilizer
 2. Farm yard manure
 3. Composite manure
 4. Cow dung
 5. I do not apply fertilizer at all
 20. If you do apply artificial fertilizer, how much money do you spend in one season?
 21. In your opinion how do you comment on the pesticide's availability and sustainability?
 1. Pesticides are available all the times
 2. Pesticides are rarely available
 3. Pesticides are freely provided by either government or NGOs
 4. Pesticides are sold at a very exorbitant price
 5. Pesticides are sold at a subsidized price
 22. What do you comment on the quality in relation to coffee production?
 1. The soil quality has decreased
 2. The quality of the soil has increased
 3. The soil quality has not changed

23. In your opinion, do you think global climatic change has affected coffee production in one way or the other?
1. Climate change has created marginal effect on coffee production
 2. It has created tremendous effect on coffee production
24. Have you received advice from extension staff (government) at any time for a period of 5 years ago?
1. Never
 2. Regularly
 3. Rarely
25. If you have received advice from any extension service, did you pay for the service?
1. Yes
 2. No
26. Do you at present obtain any form of agricultural input credit?
1. Yes
 2. No
27. What kind of services are you getting from extension officers?
1. Training on better coffee production methods
 2. Inputs such as seedling, fertilizers and pesticides
 3. Marketing information
 4. Any other service (specify)
28. What is the status of the land you are cultivating coffee today?
1. Individually owned by farm household
 2. Use right allocated by communal /clan/government authority
 3. Rented/borrowed

29. In the past 10 years, have you experience any severe constraints in producing coffee?
1. Yes
 2. No
30. If yes, mention the severe constraints you experienced
1. Low soil fertility
 2. Pests and diseases
 3. Lack of improved variety
 4. Extreme weather changes
 5. Small land and holding
 6. Others (Specify)
31. If you encountered constraints, what assistance did you receive?
1. None
 2. Loan
 3. Cash donation
 4. Food donation
 5. Donation of farm input
 6. Donation farm tools and implements
 7. Extension advice
 8. Training
 9. Others (Specify)
32. If you received any assistance, what was the source of the assistance?
1. None
 2. Producer organization
 3. AMCOS
 4. SACCOS

5. Community/fellow villagers

6. Local government

7. NGOs

8. Others (Specify)

33. Type of crops grown last season

	Amount harvested in units	Amount sold	Market value
Maize			
Bananas			
Beans			
Coffee			
Tea			
Potatoes			
Sunflower			
Vegetables			
Tomatoes			
Onions			
Paprika			
Trees			
Others; Specify			

Coffee Marketing

34. Have you ever failed to get market for your coffee?

1. Very seldom
2. Very often
3. Every season

35. Did you sell or intend to sell coffee in the most recent season?

1. Yes
2. No

36. What was the total amount of coffee sold or planned to be sold after the most recent harvest?

37. What was the highest price you received following the most recent season in This?

38. What is your main coffee market outlet?

1. At the farm gate
2. In the primary co-operative societies
3. Farmers group/organizations

4. Village marketing board
 5. Others (Specify)
39. Since you formed your household, how has the amount of coffee you sold changed?
1. Less coffee sold now
 2. No significant change
 3. More coffee sold now
40. In your view, has access to market for coffee changed for the past five years?
1. Market access is worse now
 2. Market access unchanged
 3. Market access is better now
41. In 2005 how does the price of coffee you received differ compared to the one you receive today?
1. Worse price today (price has decreased)
 2. No significant price changes
 3. Better price today (price has increased)
42. Are there times where coffee market not available at all?
1. Yes
 2. No
43. Are you regularly getting marketing information?
1. Yes
 2. No
44. If yes, how do you get marketing information?
1. From the radio, newspapers, or televisions
 2. From Co-operative society notice board
 3. From extension officers

4. From non-governmental organizations
 5. Any other source (specify).
45. If you sell coffee through a co-operative, are there benefits that you enjoy?
1. Yes
 2. No
46. If yes in question 13 above, what are the benefits?
1. Quantity/volume related benefits
 2. Marketing cost related benefits
 3. Payment terms related benefits
 4. Quality related benefits
 5. Storage related benefits
 6. Price related benefits
 7. Others (Specify)
47. If you sell coffee through a co-operative, are there constraints that you face?
1. Yes
 2. No
48. If yes, what are they?
1. Quantity /volume related constraints
 2. Marketing cost related constraints
 3. Payment terms related constraints
 4. Quality related constraints
 5. Storage related constraints
 6. Price related constraints
 7. Others (Specify)

49. Do you access market information?

1. Yes
2. No

50. If yes in question 49 above, what is your most reliable source of information?

1. AMCOS
2. SACCOS
3. Radio
4. Mobile phone messages
5. Newspapers
6. Neighbors/friends
7. Open market
8. Ward/village office
9. Adverts in the churches/mosques
10. Others (Specify)

51. Did you experience any severe constraints in marketing your crop?

1. Yes
2. No

52. If yes in question 51 above, what were the severe constraints in marketing your crop?

1. Poor roads
2. High transport cost
3. Low prices
4. Low demand
5. Poor storage facilities
6. Lack of market information
7. High post-harvest losses
8. Late payment after sales

9. Others (Specify)

Agricultural Policies on Coffee Production

53. For a period of ten years, are there some agricultural policies which in one way or the other might have affected coffee production?

1. Yes
2. No

54. If yes in question 1 above what are they?

1. Production related policies
2. Marketing related policies
3. Input provision related policies
4. Extension services provision related policies
5. Any other policy (Specify)

55. Where are these policies coming from?

1. All are internally originated
2. All are externally originated
3. They are both internal and external
4. Any other source (Specify)

56. In your view, how have these policies affected coffee production?

1. They have created adverse effect to farmers
2. They have created very little adverse effect to farmers
3. They have not created any effect
4. They have led to the improvement in coffee production
5. None of the above

57. From the late 1980s the government of Tanzania abandoned free agricultural input provision to farmers, has this decision affected coffee production among small scale farmers?

1. Coffee production was badly affected
2. The decision had no significant effect
3. Farmers were very little affected by the decision
4. The decision has led to the improvement in coffee production

58. After the adoption of free market economy, are you still getting free extension education services?

1. Yes
2. No

59. If yes, what type of extension education are you getting?

1. Crop production
2. Crop processing
3. Group dynamic and leadership
4. Farm business and entrepreneurship
5. Crop marketing
6. Crop Storage
7. Any other training (Specify)

60. In the era of economic liberalization policy, who normally provides training to farmers in your area?

1. AMCOS
2. SACCOS
3. Government office responsible for agriculture
4. NGOs
5. Private company

6. Training institutions eg MoCU

7. Other (Specify)

Coffee Farmers Livelihood Capabilities

61. Do you think coffee production has improved your understanding in agricultural production technologies?

1. Yes

2. No

62. If yes, how?

1. Increased knowledge and skills on how to produce better

2. Increased marketing skills

3. Increased negotiation skills

4. Increased methods of production

5. Others (Specify)

63. Is the current status of your wellbeing attributed to coffee production?

1. Yes

2. No

64. Has coffee production improved your household's income?

1. Yes

2. No

65. Has coffee production increased your savings?

1. Yes

2. No

66. What other economic activities are you dealing with apart from coffee production?

1. Animal keeping

2. Vegetable production

3. Small and Medium Entrepreneurship

4. Formal employment

5. Others (Specify)

67. What is your comment on household assets today compared to ten years ago in relation to coffee production?

1. Household assets have improved

2. Household assets are the same

3. There is a decrease in household assets

68. Assets owned by household

Assets	Number	Cost	Asset	Number	Cost
Radio			Television		
Mobile Phone			Refrigerator		
Bicycle			Watch		
Oxen Cart			Non-mobile phone		
Tractor			Motorcycle		
Oil milling machine			Milling machine		
			Vehicle		

69. In your opinion, how can you comment about the yields among small scale coffee farmers?

1. Yields has increased

2. No substantial increase in yields

3. Yields has decreased

70. In the entire process of coffee production as an income generating activity, what makes you happy so that you can sustainably continue with production?

Happiness indicators	Strongly agree 5	Agree 4	Undecided 3	Disagree 2	Strongly disagree 1
Income obtained from coffee is reasonable					
Market for coffee is reliable					
Good price offered per kilogram					
Extension services are readily available					
Reliable and quality inputs available					
Coffee has enabled paying school fees					
Coffee has enabled house construction					
Coffee has enabled paying for health services					
Coffee has enabled acquiring transport					
It has enabled acquisition of h/h facilities					
Coffee has generally improved my livelihoods					
Land for coffee production is sufficient per h/h					
Favorable climatic condition for its production					

71. Did you or any other member of your household borrowed money in the last 10 years?

1. Yes
2. No

72. If yes, what was the source?

1. VICOBA
2. SACCOS
3. Community Bank
4. Co-operative Bank
5. Commercial Bank
6. NGOs
7. Government
8. Relative and friends
9. Other sources (Specify)

73. If you borrowed, what was the purpose?

1. Purchase food
2. School fees
3. Buy crop inputs
4. Buy livestock inputs
5. Purchase household assets
6. Invest in business
7. House construction
8. Others (Specify)

74. Did you experience any severe constraints in accessing credit?

1. Yes
2. No

75. If yes, what were the severe constraints your household faced in accessing credit?

1. Credit source not available
2. Not aware of credit sources
3. Long application process
4. High interest rate
5. Long distance to credit source
6. Failed to repay credit on time
7. Limited maximum amount of credit offered
8. Other (Specify)

76. Have you made any cash savings in the past five years?

1. Yes
2. No

77. If yes, where saved?

1. Home
2. VICOBA
3. SACCOS
4. Community Bank
5. Co-operative Bank
6. Commercial Bank
7. Others (Specify)

78. Which materials make up the walls of your living house?

1. Mud poles un-plastered
2. Stones
3. Cement bricks
4. Sun dried bricks
5. Timber and iron sheets

6. Poles and mud
7. Timber
8. Any other (Specify)
79. What is the floor of your living house made of?
1. Cement floor
 2. Rammed earth/sand
 3. Animal dung
 4. Ceramic tiles
 5. Palm bamboo
 6. Other (Specify)
80. What is the roof of your living house made of?
1. Iron sheet roof
 2. Leaves thatched
 3. Mud and leaves
 4. Plastic/box
 5. Concrete
 6. Tiles
 7. Others (Specify)

77. In your opinions, what makes small scale farmers satisfied with coffee production?

Reasons for being satisfied	Strongly agree 5	Agree 4	Undecided 3	Disagree 2	Strongly disagree 1
Different supports from the government and NGOs					
Good price offered per kilogram					
Income obtained from coffee					
Timely availability of extension officers' services					
Ready market for coffee					
Coffee has improved my life					
Ability to pay for school fees					
Ability to pay for medical services					
Ability to build modern house					
Ability to have personal transport					
General improvement in wellbeing					
Coffee is my traditional cash crop					

Appendix 2: Focus Group Discussion Guide

1. Do you currently get more or less coffee from a given size of land compared to the time before economic liberalization/free market economy?
2. Have you ever applied chemical fertilizer in your coffee farm? If no, why? If yes, to what extent, where and how do you acquire it?
3. How do you acquire pesticide for your coffee farm?
4. For the past 10 years ago are there some agricultural policies passed by the government with regard to coffee production? If yes, to what extent have these policies affected you?
5. In your opinion, do you think there is a need to evaluate agricultural policies so they can be more user-friendly and hence promoting coffee production? If yes, what do you think can be done?
6. In your view, what can you say about the coffee market before and after economic liberalization?
7. To what extent has coffee production improved the livelihood capabilities of the small-scale farmers?
8. What other economic activities are small-scale coffee farmers engaged in to supplement the income obtained from coffee?
9. Do socio-demographic factors have any impact on coffee production and household livelihood capabilities?
10. To what extent have natural factors such as soil and climate affected coffee production and income among small-scale farmers?

Appendix 3: Key Informant Interview Guide

1. How are the small-scale farmers engaged in coffee farming?
2. How is livelihood capability defined in your village/ward/district?
3. How do you define livelihood capability among small scale coffee farmers?
4. Which factors determine livelihood capability among small scale coffee farmers?
5. What do you think are the factors hindering prosperity of coffee farming and livelihood capabilities improvement among small-scale coffee farmers?
6. Are there policies which in one way or the other have affected small-scale coffee farming in your area?
7. What is your opinion(s) with respect to coffee production trend, coffee farming inputs, extension service and livelihood diversification strategies among small-scale coffee farmers in your area?
8. If there are challenges associated with the issues mentioned in question no. 7 above, what do you think can be done to ameliorate the situation so as to have sustainable development among small-scale coffee farmers?

Appendix 4: Data collection clearance from MoCU

**Appendix 5: Data collection permits from the Kilimanjaro and Arusha Regional
Administrative Secretaries**

Appendix 6: Data collection permits from Hai and Arumeru Districts

Appendix 7: Sample size details and sample size breakdown

The required sample size was determined using Rule of the Thumb approach by Al-Bayyati (1971). The approach states that a sample size of 30 respondents and above is statistically accepted for data analysis. According to TCB (2017) report on coffee production, Hai and Arumeru Districts had 1670 small-scale coffee farmers. In this respect 925 and 745 in Hai and Arumeru Districts respectively. Therefore, the Rule of the Thumb Approach was applied in this study to estimate a sample size of 250 respondents (small scale coffee farmers). Only small-scale coffee farmers producing an average of 100kg and above per year were considered in this study because if someone produces less than the fore mentioned amount per year, the income generated from the sales cannot be sufficient to cater for his/her daily livelihood requirement.

Sample size breakdown

Ward	Number of Villages	Selected Villages	Number of Participants	Total
Masama East	2	Sawe Mbweera	20 35	55
Roondoo	2	Modio Roo	30 45	75
Nkwarisambu	2	Nkwarisambo Ndoombo	35 25	60
Akyeri	2	Akyeri Sing'isi	40 20	60
Total	8		250	250