Commercialization of Smallholder Agriculture in the Southern Highlands of Tanzania

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ABSTRACT

Tanzania seeks to achieve a semi-industrialized economy by 2025. In this envisioned economy, commercialization of smallholder agriculture, which provides the necessary raw materials and a market for industrial products is key. However, commercialization of smallholder agriculture remained a challenge. As such, it was not clear regarding how do smallholders commercialize, which smallholder farmers commercialize and to what extent, and what are the drivers of change. This study sought to understand processes of commercialization of agriculture among smallholder farmers. The specific objectives were fivefold: first, to identify smallholder farmers' asset ownership characteristics; second, to find out smallholder farmers' agricultural production practices; third, to analyze existing models of commercialization of smallholder agriculture; fourth, to analyze existing linkages between smallholder farmers and medium and large scale farmers and agro-industries; and, fifth, to examine smallholder farmers' perceptions on commercial agriculture. The study was conducted in eight villages of Kilolo and Iringa Districts in the southern highlands of Tanzania. A survey of 206 smallholder farmers, eight Focus Group Discussions (FGDs) and six Key Informant Interviews (KIIs) were conducted. Quantitative data were analyzed using descriptive statistics, linear regression and Exploratory Factor Analysis (EFA). Qualitative data were analyzed according to emerging themes looking for patterns across groups and key differences or unexpected findings. The study established that men dominate in crops that are produced for commercial purposes. Most of smallholders own rudimentary farm equipment mainly a hand hoe. More youth than adults are engaged in commercial agriculture. The engagement of energetic youth in commercial agriculture is likely to be a viable approach to enhance productivity, value addition and competitiveness of the sector. Traditional surplus selling, farmer groups, middlemen, and contract farming as well as individual farmers' commercial production are the most common models of commercialization. Smallholder farmers are not necessarily producing for the market but sold any accrued surplus to meet their basic requirements hence, having one foot in subsistence and another foot in the market. In

terms of linkages with medium and large-scale producers and processors, smallholder farmers prefer direct linkages through direct selling, contract farming, and brokers. Most of such linkages are common at initial stages of investment but gradually fade away as investors start to produce their own inputs or raw materials. Given the opportunity, some smallholder farmers were willing to quit their own farming activities to provide labor to medium and large-scale producers and processors. Quitting their own farming over employment is viewed as a positive move among smallholders. This implies that smallholders did not consider farming as a business, which is deterrent to commercialization efforts. Despite the potential for commercialization, access to capital and extension services are the main challenges facing smallholder farmers. The study recommends for continued emphasis to enhance smallholder farmers' access to farm technology, affordable capital as well as extension services. Also, efforts of the government to enhance commercialization of smallholders should identify farmers with market orientation who are ready to go commercial. Smallholders who are willing to quit their own farming if alternative employment opportunities were available are not the kind of farmers to target the interventions if true commercialization is to take place.

IKISIRI

Kilimo biashara ambacho hutoa malighafi muhimu na soko la bidhaa za viwandani ni muhimu katika mpango wa Serikali wa kufikia uchumi wa viwanda. Walakini, kilimo biashara hasa kwa wakulima wadogo bado ni changamoto. Katika hali hii, haikuwa wazi ikiwa wakulima wadogo wanafanya kilimo biashara, au ni aina gani ya wakulima wanafanya kilimo biashara na kwa kiwango gani, na ni nini sababu za mabadiliko? Utafiti huu ulilenga kuelewa michakato ya kilimo biashara miongoni mwa wakulima wadogo. Malengo mahsusi yalikuwa matano: kwanza, kutambua hali ya umiliki wa mali kwa wakulima wadogo; pili, kutambua aina ya kilimo cha wakulima wadogo; tatu, kuchambua miundo iliyopo ya kilimo cha kibiashara kwa wakulima wadogo; nne; kuchambua uhusiano uliopo kati ya wakulima wadogo na wakulima wa kati na wakubwa na viwanda vya kusindika bidhaa zitokanazo na kilimo; tano, kutathmini mtazamo wa wakulima wadogo kuhusu kilimo cha kibiashara. Utafiti huu ulifanywa katika vijiji vinane vya Halmashauri za Wilaya ya Kilolo na Iringa za nyanda za juu kusini mwa Tanzania. Utafiti ulihusisha wakulima wadogo 206, majadiliano ya vikundi (FGDs) *manane, na mahojiano ya kina* (KIIs) *sita. Matokeo ya utafiti yanaonyesha kuwa wanaume hutawala katika mazao ambayo yanazalishwa kwa sababu za kibiashara. Wakulima wadogo wengi wao wanatumia vifaa vya kawaida vya shamba haswa jembe la mkono. Vijana zaidi kuliko watu wazima walikuwa wakifanya kilimo cha kibiashara. Ushiriki wa vijana wenye nguvu katika kilimo cha kibiashara unaweza kuwa njia inayofaa ya kuongeza tija, kuongeza thamani na ushindani wa sekta ya kilimo. Uuzaji wa ziada ya mazao, vikundi vya wakulima, udalali, na kilimo cha mkataba na vile vile uzalishaji wa kibiashara wa mkulima mmoja mmoja ilikuwa ni baadhi ya njia za kuendesha kilimo cha kibiashara. Wakulima wadogo hawazalishi kwa ajili ya soko lakini wanauza ziada inayopatikana ili kukidhi mahitaji yao ya msingi kwa hivyo, kuwa na mguu mmoja kwa kujikimu na mguu mwingine sokoni. Kwa upande wa uhusiano na wazalishaji wa kati na wakubwa na wasindikaji, wakulima walipendelea uhusiano wa uuzaji wa moja kwa moja kwa wanunuzi, kilimo cha mkataba, na madalali. Uhusiano baina ya wakulima wadogo na wakubwa au wasindikaji*

unaonekana zaidi katika hatua za awali za uwekezaji lakini polepole hupotea wakati wawekezaji wanaanza kuzalisha malighafi zao wenyewe. Wakulima wengine walionyesha kuwa wakipata fursa wapo tayari kuacha shughuli zao za kilimo ili kuajiriwa na wazalishaji wa kati na wakubwa au wasindikaji. Kwa ujumla, wakulima wadogo waliona kuwa kuacha kulima wenyewe na kuajiriwa mahali pengine ni jambo zuri. Hii inamaanisha kuwa wakulima wadogo hawakuchukulia kilimo kama biashara. Licha ya uwezekano wa kilimo biashara, upatikanaji wa mitaji na huduma za ugani ndizo changamoto kuu zinazowakabili wakulima wadogo. Utafiti unapendekeza kuendelea kuongeza upatikanaji wa teknolojia ya kilimo kwa wakulima wadogo, mitaji au mikopo ya riba nafuu pamoja na huduma za ugani. Pia, juhudi za serikali katika kuimarisha kilimo biashara zinapaswa kuwatambua wakulima wenye mwelekeo wa soko ambao wako tayari kulima kibiashara. Wakulima ambao wako tayari kuacha shughuli za kilimo kama fursa mbadala za ajira zitapatikana sio aina ya wakulima wanaopaswa kulengwa katika kukuza kilimo biashara.

ABBREVIATIONS

AMP	Agricultural Marketing Policy
ASDP II	Agricultural Sector Development Program – Phase II
CIAT	International Center for Tropical Agriculture
DC	District Council
DOI	Diffusion of Innovation
EFA	Exploratory Factor Analysis
FGD	Focus Group Discussion
FYDP II	Second National Five Year Development Plan 2016/17-2020/21
KII	Key Informant Interview
LGA	Local Government Authority
NAP	National Agriculture Policy
NGO	Non-Governmental Organization
NSGRP	National Strategy for Growth and Reduction of Poverty
OECD	Organization for Economic Cooperation and Development
PCA	Principal Component Analysis
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
SAGCOT	Southern Agricultural Growth Corridor of Tanzania

SNV	Netherlands Development Organization
TDV	Tanzania Development Vision 2025
VEO	Village Executive Officer
VIF	Variance Inflation Factor
WFP	World Food Program

1.0 INTRODUCTION

According to the Tanzania Development Vision (TDV) 2025, the country aspires to have a diversified and semi-industrialized economy that is comparable to typical middle income countries (URT, 2000). This was expected to be achieved by, among other things, transforming the economy from subsistence to commercial agriculture with high productivity which generates high incomes and ensures food security (URT, 2000). To this end, several policies, strategies and plans such as the National Trade Policy 2003; National Strategy for Growth and Reduction of Poverty (NSGRP, 2010); Agricultural Marketing Policy (AMP) 2008; National Agriculture Policy (NAP) 2013; and the second National Five Year Development Plan (FYDP II) 2016/17-2020/21 have been developed. Despite its role on industrial development, commercialization of agriculture remains to be a challenge (Mpogole *et al*., 2012; Mpogole, 2013; Mbegallo, 2016). Also, rural poverty reduction continues to present daunting challenges (Kawa and Kaitira, 2007; Wolter, 2009; Mpogole, 2013; Ochieng and Hepelwa, 2018).

Tanzania has a potential of becoming a major food producer, able to feed itself and the whole of East Africa (URT 1997; OECD, 2008; URT, 2009), but it struggles to meet its own food requirements due to low productivity and the predominance of subsistence farming (Wolter, 2009; Mpogole, 2013; Mbegallo, 2016). Food insecurity and poverty levels are highest among people who depend on agriculture as their main source of livelihood (WFP, 2016). Rural areas constitute low-income households where there is high reliance on agriculture for subsistence (CIAT/World Bank, 2017). Only a few smallholder farmers in rural areas understand how markets work, and even if they do, they do not have the information they need to participate effectively (Kawa and Kaitira, 2007). One of the viable approaches of improving income and livelihood of rural people is commercialization of agriculture especially food crops, in which the majority smallholder farmers are engaged in (Wolter, 2009; Wiggins *et al*., 2013; Ochieng and Hepelwa, 2018).

Commercialization of subsistence agriculture is an indispensable pathway towards economic growth and development for agriculture dependent developing countries (Omiti *et al*., 2006; Zhou *et al*., 2013; Mitiku, 2014). Existing literature shows that there is a link between commercialization of smallholder agriculture and income levels of rural population (Jaleta *et al*., 2009; Wiggins *et al*., 2013; Mitiku, 2014; Ochieng and Hepelwa, 2018). Given the opportunity to produce for markets, smallholder farmers are often able to intensify their production of crops for sale, hence raising their incomes and increasing local demand for hired labor, use of purchased inputs and mechanization (Wiggins *et al*., 2013; Mitiku, 2014; Ochieng and Hepelwa, 2018). According to Wiggins *et al*. (2013), smallholder farmers with a commercial orientation have more land, assets and access to credit or savings than other farmers.

While the outcomes of commercialization of agriculture are clear, smallholders face many institutional, environmental and individual constraints to commercialize (Zhou *et al*., 2013). Moreover, there is an ambiguity in terms of the place of smallholder farmers in the envisioned semi-industrialized economy by 2025. For instance, will smallholders commercialize in their current micro state? Will large scale ventures be promoted at the expense of smallholder farmers? What models of commercialization work for smallholder farmers in a Tanzanian context?

1.1 Problem Statement and Justification

In Tanzania, commercialization of agriculture has been mentioned in several strategies, plans and policy documents as a means of improving production, income and livelihoods of smallholder farmers. Some of the strategies, plans and policy documents that mention about aspects of commercialization of smallholder agriculture include: (NSGRP (URT, 2005); TDV 2025 (URT, 2000); National Trade Policy 2003 (URT, 2003); AMP 2008 (URT, 2008); NAP 2013 (URT, 2013); FYDP II (URT, 2016a); and ASDP II (URT, 2016b) to mention but a few. For instance, NAP 2013 aims to transform agriculture from subsistence farming towards commercialization and

modernization through crop intensification, diversification, technological advancement and infrastructural development (URT, 2013). Also, AMP 2008 among other things, aims at promoting commercial agro-processing firms in rural areas by putting in place special programmes and incentives to investors (URT, 2008). Despite these efforts, commercialization of agriculture in Tanzania remains to be marginal (Wolter, 2009; Mpogole *et al*., 2012; Mpogole, 2013; Mbegallo, 2016). It has been estimated that less than one third of farmers' produce reach commercial markets (Mbegallo, 2016).

According to Gabagambi (2009) and Mpogole (2013), policy response to agriculture has, for the most part, been a shortcut. They cite examples of banning cross border trade of major staples as a strategy of ensuring food security arguing that such government interference is contrary to its own policy, which seeks to commercialize smallholder production by facilitating access to both internal and external markets. Also, existing literature on commercial agriculture is fraught with ideological debates of what works and what doesn't (Diwan *et al*., 2013).

There are different models of commercialization such as large-scale capital endowed investors versus smallholder centered business models (Diwan *et al*., 2013); small-scale out-growers, medium-size commercial farms and a large estate (Hakizimana *et al*., 2017); plantation, contract farming and medium-scale commercial farming (Yaro *et al*., 2017); growth corridors, plantations, contract farming, out-grower schemes, and cooperatives (Diwan *et al*., 2013); and, commercialization of small-scale farming within existing farming systems (Wiggins *et al*., 2011; Wiggins *et al*., 2013).

However, in Tanzania there is no clear strategy of which models of commercialization will be followed nor how farmers will be integrated in the industrialization process. As such, the aforementioned questions as well as the important questions posed by Wiggins *et al*. (2013), such as how do farmers commercialize, which smallholder farmers commercialize and to what extent, and what are the drivers of change remained unanswered. This study sought to understand commercialization of agriculture in the

light of prospects and challenges that smallholder farmers are likely to face in the realization of the industrialization agenda in Tanzania. This will help planners to develop appropriate and inclusive policies and strategies for smallholder farmers.

If smallholder farmers are left out to continue in their current state, the established small, medium and large scale agro-industries will not operate to their full capacity due to shortage in supply of raw materials, most of which are agricultural products. This may encourage the established agro-industries to import raw materials from outside the country as it was the case with edible oil subsector (see *e.g*. SNV, 2012; Kombe *et al*., 2017; Balchin *et al*., 2018).

1.2 Research Focus and Objectives

The overall objective of this study was to investigate commercialization of agriculture among smallholder farmers. The study focused on different pathways of agricultural commercialization (see *e.g*. Hakizimana *et al*., 2017) and the perceptions of smallholder farmers. This study serves both descriptive and normative purposes. Firstly, this study aimed at advancing knowledge on the body of literature on commercialization of smallholder agriculture. Secondly, this study aimed at generating evidence-based recommendations on commercialization of smallholder agriculture to support the government efforts in transformation of subsistence production. The specific objectives are fivefold:

i) To identify smallholder farmers' asset ownership characteristics.
ii) To find out smallholder farmers' agricultural production practices.
iii) To analyze existing models of commercialization of smallholder agriculture.
iv) To analyze existing linkages between smallholder farmers and medium and large scale farmers and agro-industries.
v) To examine smallholder farmers' perceptions on commercial agriculture.

1.3 Research Questions

The study was guided by five core questions as follows:

i) What are the smallholder farmers' asset ownership characteristics?

ii) What are the smallholder farmers' agricultural production practices?

iii) What are the existing models of commercialization of smallholder agriculture?

iv) How do smallholder farmers link to medium and large-scale farmers and agro-industries?

v) How do smallholder farmers perceive commercial agriculture?

2.0 LITERATURE REVIEW

Commercialization of agriculture has been defined differently by different authors (Jaleta *et al*., 2009). Some authors define commercialization from the input side as the increased use of purchased inputs, while others define commercialization from the output side as increased marketed output (Mpogole, 2013; Wittich, 2015). Defining commercialization of agriculture from either side limits our understanding of the entire spectrum of decision making processes that farmers undergo before deciding to remain subsistent or to go commercial or both.

This study adopted the definition provided by Wittich (2015), that agricultural commercialization is the transition of smallholders from subsistence-based to commercially-oriented livelihoods, on the basis of changing farm and non-farm decisions and practices. This understanding links the debate on smallholder commercialization with discourses on livelihoods (Wittich, 2015).

In this section, the theories underpinning commercialization of smallholder agriculture, empirical studies and conceptual framework are discussed.

2.1 Theoretical Framework

Commercialization of smallholder agriculture can be explained by a number of theories. This study combines several theories from which commercialization of smallholder agriculture can be anchored.

2.1.1 Profit and utility maximization

For a smallholder farmer, profit maximization and utility maximization are the same thing (Ellis, 1988). The theory of profit maximization treats the smallholder farmer as farm firm, operating in fully formed and competitive input and output markets. Utility is solely a function of income, and it coincides with profit maximization. Profit maximization predicts a positive response by the farmer to market price changes, *i.e*. an

increase in the real price of output results in higher input use, higher output, and higher net income. Ellis (1988) further argues that the profit maximizing hypothesis does not require the existence of profit in the form of a sum of money. What it requires is the existence of adjustment of inputs or outputs which would give the farmer a higher net income, whether measured in monetary or physical terms (see *e.g*. Mpogole, 2013).

According to Nyikai (2003), the famer is assumed to be a profit maximizer but subject to minimum subsistence production (see also the farm-firm theory (Omiti *et al*., 2006)). In this regard, given a set of available crops, a farmer is expected to grow crops that subject to probabilities, promise to yield the maximum profit. Such a farmer is also expected to allocate more acreage to more profitable crops (Rudra, 1983). The profit maximization assumption of farmers is also consistent with the current government effort of commercializing smallholder production (URT, 2000; URT, 2008; URT, 2013; URT, 2016a; URT, 2016b).

2.1.2 The new institutional economics

Literature on smallholder farmer associations generally falls under the New Institutional Economics of transaction costs (Hu *et al*., 2005; Poole and de Frece, 2010). Although there are debates about the effectiveness of farmer associations, North (1990) as cited by Poole and de Frece (2010; 19), argues that the historic development has proceeded most effectively where economic activity has been supported by an institutional framework of incentives. According to the New Institutional Economists, it is the lack of institutional development that has characterized the low level of economic development in developing countries. Markets in developing countries are often characterized by a weak institutional environment which means high transaction costs, significant business risks, weak information flow, and poor infrastructure (Valentinov and Baum, 2008). In this case, third sector organizations such as cooperatives and associations are important in addressing market failures in rural areas. This theory is important in this study because cooperatives have been mentioned as among models of

commercialization of smallholder agriculture (see e.g. Diwan *et al*., 2013; Mpogole, 2013).

2.1.3 Diffusion of innovation

According to Wittich (2015), in development practice, a popular approach to analyze dynamics within social systems is linked to the Diffusion of Innovation (DOI) theory. Citing Rogers (2003), Wittich (2015; 18) defines an innovation as "an idea, practice, or object that is perceived as new by an individual or other units of adoption." Thus, a policy promoting agricultural commercialization could potentially be understood as a set of innovative ideas and practices (Wittich, 2015). Conversely, the transition from subsistence to commercial agriculture itself can be interpreted as the adoption of an innovation. The DOI theory suggests that the adoption of a new idea or practice by a social unit depends on multiple, interlinked dimensions, including the innovation itself, the communication channels, the social system, and time (Wittich, 2015).

The adoption of commercial agriculture comprises the exchange of information between a knowledge-holder or communicator (such as NGO, government or extensions officer, community leader, or neighbor) and a farmer. According to the DOI theory, communication between homophilous individuals (people with similar attributes in terms of mindsets, social background, and language) is more likely to lead to attitudinal and behavioral change than the one between heterophilous ones (people with different attributes) (Wittich, 2015).

In this study, it is assumed that smallholder farmers are more likely to transition from subsistence to commercial agriculture when influenced by peers or people who understand their situations than imposition from outside. Moreover, it is assumed that smallholder farmers' decision to transition from subsistence to commercial production cannot be solely explained with respect to the market (Beckford, 2002; Mpogole, 2013). According to Beckford (2002), sometimes smallholder farmers consider other factors that are perhaps more important than the market.

2.2 Views on Commercialization of Smallholder Production

Studies on commercialization of smallholder agriculture fall under two schools of thought namely, proponents of smallholder farmers and proponents of large-scale investors (Diwan *et al*., 2013). Proponents of large-scale investments argue that smallholders left to their own devices simply lack the capacity, finance and technical know-how to commercialize agriculture in any significant way (Diwan *et al*., 2013). Smallholders have not chosen to be entrepreneurs but are farming by default on small and fragmented plots and are struggling to meet their own food requirements, let alone producing a surplus (Wolter, 2009; Collier & Dercon, 2013). According to Collier and Dercon (2013), it is risky to leave the agricultural sector to peasants as it will threaten the performance of agriculture, limit growth, and exacerbate poverty.

Proponents of smallholder farmers, on the other hand, argue that given the opportunity smallholder farmers can commercialize. Such studies argue that "small is beautiful" and that the best way to commercialize agriculture is to provide small atomistic farmers with the right institutional and material support so they can connect directly to markets without "predatory" intermediaries (Schumacher, 1989; Diwan *et al*., 2013). According to Diwan *et al*. (2013), proponents of this view contend that colonial farming models such as plantations result in exploitation, land grabs and marginalization of smallholder farmers. Since in developing countries, including Tanzania, smallholders represent 70 to 80 per cent of producers in the sector, smallholder-centered farming is inevitable. Even though Africa has more than half of the world's uncultivated land, most of this land would require huge investments to make it economically viable. In the face of land scarcity, land sale and ownership tend to be highly emotive subjects and large-scale farming is perceived as a threat to farmers' livelihood and property rights (Diwan *et al*., 2013).

It is believed that when properly positioned in their right business ecologies, smallholder farmers can be equally effective at commercializing agriculture. However,

they are constrained by a number of challenges, including inadequate access to capital. What is needed is to establish models of commercialization of smallholder agriculture that relax those constraints (Diwan *et al*., 2013).

As aforementioned, there are several models of commercialization of agriculture such as smallholder centered business models (out-grower schemes, contract farming, and cooperatives); commercialization of small-scale farming within existing farming systems; growth corridors such as SAGCOT; medium-scale commercial farming; and, large-scale capital endowed investors such as plantations (see *e.g*. Berdegué *et al*., 2008;Wiggins *et al*., 2011; Diwan *et al*., 2013; Wiggins *et al*., 2013; Hakizimana *et al*., 2017; Yaro *et al*., 2017). This study explored the pros and cons of those models in a Tanzanian context in order to provide evidence-based recommendations on commercialization of smallholder agriculture.

There are a number of factors affecting commercialization of smallholder agriculture namely, external and internal factors. The external factors are beyond the demographic change such as cultural and social factors, property rights and land tenure, agro-climatic conditions, technological change and introduction of new commodities, input and output markets, development of new infrastructure and market institutions, development of the non-farm sector and the broader economy, rising labor opportunity costs, macroeconomic, trade and sectorial policies affecting prices and other driving factors (Hagos and Geta, 2016). On the other hand, internal factors such as resource endowments including land and other natural capital, labor, physical capital and level of education and other demographic factors affect smallholder commercialization (see *e.g*. Namwata *et al*., 2010; Zhou *et al*., 2013; Hagos and Geta, 2016; Mbegallo, 2016; Abdullah, *et al*., 2017; Kilelu *et al*., 2017).

2.3 Measurement of Commercialization of Smallholder Production

Transitioning from subsistence to commercial agriculture is generally seen as a key for development and economic growth in developing countries (URT, 2008; Wolter, 2009;

Jaleta *et al*., 2009; Mpogole *et al*., 2012; Diwan *et al*., 2013; Mpogole, 2013; Wiggins *et al*., 2013; Mitiku, 2014; Abdullah *et al*., 2017; Carletto et al., 2017; Ochieng and Hepelwa, 2018). A number of studies such as Mpogole *et al*. (2012), Mpogole (2013), Ochieng and Hepelwa (2018) and Carletto *et al*. (2017) have measured the extent to which smallholder farmers were market oriented by using commercialization index. However, commercialization index is measured with respect to a specific crop either from the input or the output side (von Braun and Kennedy, 1994; Strasberg*et al*., 1999; Mpogole *et al*., 2012; Mpogole, 2013). For instance, Mpogole *et al*. (2012) establish that the commercialization index of smallholder farmers with respect to round potato in the Southern Highlands of Tanzania is 88%, implying that round potato production was highly commercialized. Similar measurements have been conducted by Ochieng and Hepelwa (2018) in Liwale District in Lindi Region showing a commercialization index of 66%. Carletto *et al*. (2017) show that the levels of commercialization in Tanzania, Malawi and Uganda are as high as 90%, even among the poorest and smallest landholders.

Measuring commercialization of smallholder farmers with respect to a specific crop may not provide an indicative measure of the overall market orientation of smallholders (Jaleta *et al*., 2009). Moreover, existing literature shows that smallholder farmers produce crops mainly for food but sell some surplus to meet their immediate needs (Mpogole, 2013). According to Mpogole (2013), smallholder farmers have one foot in subsistence and another foot in the market. Nonetheless, the practice of smallholder farmers to occasionally sell some surplus cannot make them to be regarded as commercial oriented farmers. Thus, a measurement beyond the commercialization index is needed to fully understand the commercialization processes of smallholder farmers. According Jaleta *et al*. (2009), there appears to be no well accepted and comprehensive definition that could give a multidimensional view to the concept of commercialization of agriculture so that one can easily judge to what extent a given

smallholder farmer is commercialized in its overall production, marketing and consumption decisions.

Simple measurements of extent of commercialization with respect to specific crop and determination of demographic factors affecting it, may not provide useful recommendations for policy decisions and planning processes. For instance, several studies such as Zhou *et al*. (2013), Hagos and Geta (2016), Abdullah *et al*. (2017), Mbegallo (2016), and Ochieng and Hepelwa (2018) focus on determinants of commercialization of agriculture. Some of those studies determine that age and sex of household heads and household size affect commercialization decisions at household level. However, those studies are short of practical policy recommendations that is necessary to enhance commercialization of smallholder production. According to Achandi and Mujawamariya (2016), the ability of smallholder farmers to commercialize is dependent on personal as well as institutional factors. Therefore, this study sought to provide a better understanding of commercialization of smallholders by exploring various pathways.

3.0 METHODOLOGY

This study was conducted in Kilolo and Iringa Districts in Iringa Region located in the southern highlands of Tanzania. The two Districts have several agro-ecological zones and agrobiodiversity that support diverse crops and livestock. Both Kilolo and Iringa Districts have smallholder farmers engaged in various crops such as tomato, onion, round potato, maize, wheat, rice, fruits, and other vegetables as well as livestock and poultry. Also, the two Districts have medium and large-scale investors, some of whom practice out-grower schemes/contract farming as well as nucleus farms. This diversity provided a great potential of learning the prospects and challenges in commercialization of smallholder agriculture in the study areas.

3.1 Research Approach and Design

Both quantitative and qualitative approaches have their own inherent strengths and weaknesses. In order to maximize the strengths of each and minimize their weaknesses, a mixed methods approach was used (Creswell, 2003). In this situation, the advantages of collecting both closed-ended quantitative data and open-ended qualitative data proved advantageous to best understand the research problem. In this way, quantitative and qualitative approaches used together can be viewed as complementing rather than opposing each other (Mpogole, 2013).

Within the qualitative approach, participatory Rapid Rural Appraisal (RRA) methods were used to assess the various constraints in the production and marketing of some important agricultural commodities in the study areas (see *e.g*. Omiti *et al*., 2006; Wittich, 2015). According to Omiti *et al*. (2006), study findings demonstrate the relevance of participatory methodologies in investigating pertinent issues in agricultural commercialization in rural settings. Also, within the quantitative approach, a survey design was used.

3.2 Units of Analysis and Sampling

The units of analysis were the smallholder farmers who produced food crops such as maize, rice, legumes, round potato, horticulture and dairy. Identification of smallholder farmers was done in collaboration with Village Executive Officers (VEOs) and Village Chairpersons basing on volume of production. Also, medium and large-scale farmers were included to better understand their linkages with smallholder farmers and their perceptions on the place of smallholders in commercial agriculture. Also, medium and large-scale farmers and processors and LGA officers including extension officers were included to understand their views on how they saw a smallholder farmer in the commercialization process and what efforts are being undertaken to ensure smallholders are not left out.

The study adapted a village selection matrix (Omiti *et al*., 2006). Villages were prioritized based on access to market (bad or good) and integration into commercialized food systems (low or high). Four villages were selected in each of the two Districts making a total of eight villages as shown in Table 1.

Table 1: Village selection matrix

Volume of production of particular crops, dairy, *etc.*	Market access/integration into commercialized food systems	
	Low	High
Low	Type one (2 villages)	Type two (2 villages)
High	Type three (2 villages)	Type four (2 villages)

Source: Adapted from Omiti *et al*. (2006; 23)

3.3 Data Collection Methods

Both survey and PRA methods were used to collect data from farmers. PRA was used through participatory Focus Group Discussions (FGDs). Each FGD consisted of 8 to 12

smallholder farmers. A FGD checklist consisting of: 1) general information on the level of commercialization in respective villages; 2) commercialization with respective to specific crops, livestock, dairy or poultry; 3) linkages with medium and large-scale farmers and agro-industries; 4) production and marketing constraints; and, 5) desired policy changes was used. In each selected village one focus group discussion (FGD) was conducted, making a total of eight FGDs.

Semi-structured key informant interviews (KIIs) were used to collect data from LGA officers and medium and large-scale farmers and processors. In total there were six KIIs. Quantitative data were collected mainly through a survey questionnaire with smallholder farmers who were identified as commercial oriented and medium and large-scale farmers and processors.

3.4 Data Analysis Methods

Collected data was cleaned and verified before analysis. Both quantitative and qualitative approaches were used. Results from the survey, KIIs, and FGDs were triangulated so that the analysis compared findings across the two methodologies. KII and FGD results were analyzed according to the research themes looking for patterns across groups and key differences or unexpected findings. Results were underscored by illustrative quotes that conveyed the depth and texture of responses.

Quantitative analysis included descriptive statistics as well as a linear regression model and Exploratory Factor Analysis (EFA). The regression model (Equation 1) was used to determine factors for commercial orientation of smallholder farmers.

$$Y = \propto_0 + \sum_{i=1}^{6} \propto_i X_i + \varepsilon \qquad (1)$$

Where:

i) Y is the commercial orientation of a smallholder farmer measured as a Likert scale item (1 = not sure, 2 = not at all, 3 = to a small extent, 4 = to a moderate extent, 5 = to a great extent).
ii) X_1 is the sex of the respondent (1 = male, 2 = female).
iii) X_2 is the age of respondent in years.
iv) X_3 is the land owned by a respondent in acres.
v) X_4 is the access to extension to services (1 = if have access, 0 if otherwise).
vi) X_5 is the household size of the respondent.
vii) X_6 is the level of education of the respondent (1 = no formal education, 2 = primary education, 3 = secondary education, 4 = post-secondary education).
viii) $\propto_0$ is a constant.
ix) ε is a stochastic error term.

EFA was used as a method for generating a rudimentary explanatory theory of commercialization decision or perceived commercial orientation of smallholder farmers (Haig, 2005). Based on 27 Likert scale attitudinal items, EFA was performed with a purpose of reducing the items to smaller set of summary variables and to explore the underlying theoretical structure of an unknown scale. EFA is particularly used when there is *a priori* hypothesis about factors of measured variables. In this case, the study adopted an exploratory approach, experimenting with different numbers of factors until a satisfactory solution was found (Tabachnick and Fidell, 2007; Pallant, 2013).

4.0 RESULTS AND DISCUSSION

4.1 Demographic Characteristics of Respondents

The study involved 206 respondents from 8 villages with different characteristics as shown in Table 2. To understand characteristic of this population, this study sought the background information of respondents regarding their level of education, age, sex, and marital status. Table 2 shows characteristics such as the size of a household, educational and literacy levels, age and gender of the household head that may determine a household's decision to participate in commercial agriculture as well as in determining the type of crops that households commercialize.

Table 2: Demographic characteristic of respondents in % (n=206)

	Village Name								Total
Variable	Ihemi	Ilula	Isimani	Kisinga	Luganga	Lulanzi	Mbigili	Tanangozi	
Sex									
Male	47.4	96.6	65.5	41.4	93.8	68.0	93.1	56.7	69.9
Female	52.6	3.4	34.5	58.6	32.0	6.2	6.9	43.3	30.1
Age (years)									
18 - 35	31.6	31.0	34.5	13.8	20.0	50.0	72.4	36.7	35.9
36 - 45	15.8	62.1	10.3	24.1	36.0	25.0	17.3	23.3	27.2
46 - 60	36.8	6.9	41.4	55.2	32.0	25.0	3.4	36.7	29.6
Above 60	15.8	0.0	13.8	6.9	12.0	0.0	6.9	3.3	7.3
Education									
None	10.5	3.4	0.0	10.3	12.0	0.0	0.0	6.7	5.3
Primary	78.9	86.2	82.8	82.8	76.6	56.2	62.1	70.0	75.2
Secondary	0.0	6.9	10.3	3.4	8.0	31.2	34.5	20.0	14.1
Post-secondary	10.5	0.0	6.9	3.4	4.0	6.2	0.0	0.0	3.4
Tertiary	0.0	3.4	0.0	0.0	0.0	0.2	3.4	3.3	1.9
Marital status									
Married	63.2	86.2	89.7	79.3	88.0	87.5	79.3	66.7	80.1
Single	15.8	13.8	6.9	10.3	8.0	12.5	20.7	20.0	13.6
Divorced/ separated	5.3	0.0	0.0	3.4	4.0	0.0	0.0	6.7	2.4
Widowed	15.8	0.0	3.4	6.9	0.0	0.0	0.0	6.7	3.9

The sex composition of respondents varied among villages. As shown in Table 2, about 70% of respondents involved in the study were male. The highest male composition was recorded in Ilula (96.6%), Luganga (93.8%) and Mbigili (93.1%). Those villages with higher male than female composition had specific crops produced mainly for

commercial purposes including tomato in Ilula and Mbigili and rice in Luganga. According to Mpogole *et al*. (2012), males are likely to take over crops that are considered as commercial. Female involved in the study were about 30% of which majority were from Kisinga village in Iringa DC (58.6%). About 80% of all respondent were married and 13.6% were single. Only a handful of respondents (2.4%) were either divorced or separated. Regarding education level, about 75% of respondents had primary education with comparatively large proportion in Ilula (86.2%) and a small proportion in Lulanzi (56.2%). Only about 14% of respondents had secondary education with highest proportion in Mbigili (34.5%) and lowest in Ihemi (0.0).

4.2 Ownership of Assets and Access to Extension Services

Ownership or access to different assets and infrastructure determines to a large extent the livelihood of households (Mpogole, 2013). Households which own different resources such as land, production machinery, and have access to communication networks such as roads and other forms of infrastructure have a broader range of economic opportunities compared to those with less access, who may be limited to agricultural activities for subsistence. Access to infrastructure, as a proxy for access to input and product markets, may also positively influence the type of agricultural activity.

To understand the extent of livelihood of households involved in the study and their engagement on commercial agriculture, data on the ownership and access to different assets including land (natural capital), machinery (physical capital), labour force/number of persons in the household (human capital), transport infrastructure, extension services, communication services (public capital), and linkages between small households and medium/larger farmers and agro-industries (social capital) were collected and analyzed. In this subsection, we present and discuss results of ownership of production machinery, access to communication services such as TV and radio, and

access to extension services. Other issues such as household size, transport infrastructure, and linkages are discussed in subsequent sections.

4.2.1 Ownership of production machinery

Nearly 70% of respondents involved in the study owned a hand hoe as the highest valued asset with the highest proportion in Ihemi (94.7%) and Tanangozi (80.8%) and the lowest proportion in Kisinga (51.7) as shown in Table 3. About 25% owned oxen plough/ox cart with the highest proportion in Kisinga (48.3%) and the lowest in Ihemi (0.0). Only a few respondents owned a tractor (5.1%) and others owned a power tiller (1.0%). Other farmers rented tractors or power tillers from within or outside their villages, when needed. In either case, this indicates that the level of mechanization is still limited in the study areas. Heavy reliance on rudimentary technology is a deterrent factor to meaningful commercial production.

Table 3: Highest valued asset owned by the farmer/HH (n=198)

Village	Hand hoe	Oxen plough	Power tiller	Tractor	Other tools
Ihemi	94.7	0.0	0.0	0.0	5.3
Ilula	74.1	7.4	0.0	18.5	0.0
Isimani	58.6	34.5	3.4	3.4	0.0
Kisinga	51.7	48.3	0.0	0.0	0.0
Luganga	70.8	25.0	4.2	0.0	0.0
Lulanzi	62.5	31.2	0.0	6.2	0.0
Mbigili	60.7	32.1	0.0	7.1	0.0
Tanangozi	80.8	15.4	0.0	3.8	0.0
Total	**68.2**	**25.3**	**1.0**	**5.0**	**0.5**

4.2.2 Ownership of radio/TV

Findings in Table 4 show that a few farmers (40.6%) had both radio and television sets of which majority were from Ilula (72.4%) and Mbigili (55.2%). Only 20.3% had neither radio nor TV with the highest proportion in Luganga (43.5%) and the lowest in Ilula (3.4%). The findings depict that information asymmetry is relatively low in the study areas. Information asymmetry is cited as one of the major reasons for presence of

middlemen who take advantage of farmers because of lack of information about markets and prices (Mpogole, 2013).

Table 4: Ownership of radio/TV Household (n=202)

Village	None	Owns a radio	Owns a TV set	Owns a radio and a TV set
Ihemi	10.5	36.8	5.3	47.4
Ilula	3.4	13.8	10.3	72.4
Isimani	20.7	27.6	10.3	41.4
Kisinga	17.2	62.1	6.9	13.8
Luganga	43.5	34.8	4.3	17.4
Lulanzi	13.3	53.3	0.0	33.3
Mbigili	20.7	20.7	3.4	55.2
Tanangozi	31.0	31.0	0.0	37.9
Total	**20.3**	**33.7**	**5.4**	**40.6**

4.2.3. Access to extension services

Findings in Table 5 show that about half (51.3%) of farmers indicated that they had access to extension officers within the village. Villages located within the main roads such as Isimani, Kisinga, Ihemi, Lulanzi, Ilula na Mbigiri had higher access to extension services than others. Also, 47.6% of respondents had no access to extension officers. The findings suggest that delivery of advisory services and diffusion of technology is somehow moderate and that more efforts are needed to improve the situation, simply because agricultural extension services are integral to the success of commercial agriculture as it helps in technology diffusion. It accounts for the transfer of improved agricultural technologies and information at the farm levels.

Table 5: Access to extension service (n=191)

Village	Have no access to extension officer	Have access to extension officer within the village	Have access to extension officer within the ward
Ihemi	47.1	52.9	0.0
Ilula	53.8	42.3	3.8
Isimani	11.5	88.5	0.0
Kisinga	21.4	75.0	3.6
Luganga	76.2	23.8	0.0
Lulanzi	50.0	50.0	0.0
Mbigili	57.1	42.9	0.0
Tanangozi	69.0	31.0	0.0
Total	**47.6**	**51.3**	**1.0**

4.3 Agricultural Production Practices of Smallholder Farmers

4.3.1 Crops produced

As expected, a majority of respondents interviewed mentioned maize as one of the common crop they produced. Maize was the dominant annual crop grown in the study area. Other respondents (28.8%) mentioned tomatoes. Very few (2.9%) said that they produced onion as their common crop (Figure 1). Respondents interviewed argued that, although maize production increased at household level, very little was sold, as farmers tended to reserve it for their food needs and for emergencies as some kind of financial security.

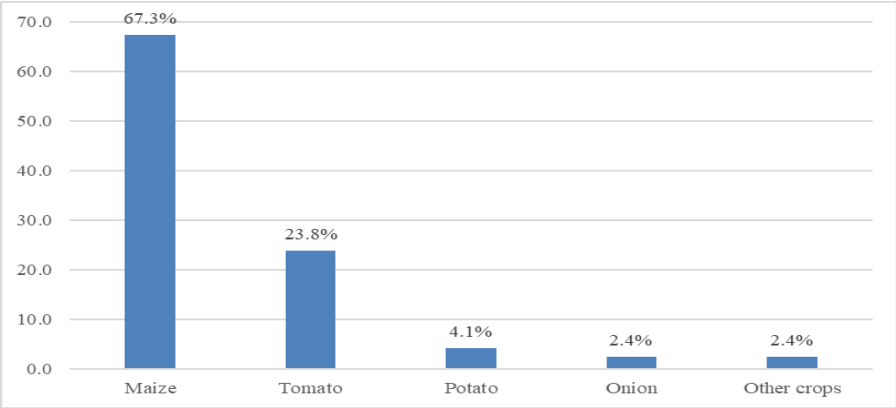

Figure 1: Most commonly produced crops (n = 206)

4.3.2 Crops produced for commercial purposes

Based on findings in Figure 2, it seemed that most crops grown in the study areas were partly for commercial and partly for subsistence. However, of all crops, maize (42.1%) was the most dominant for commercial as well as for subsistence. Tomato was another dominant crop (34.1%) for commercial purposes after maize. As aforementioned, this is an indication that smallholder farmers have one foot in subsistence and another foot in the market. In either case, this does not amount to the conclusion that smallholders are semi-commercial farmers. Occasional surplus selling to meet some household requirements does not in itself imply commercial orientation. Commercial production should be taken as a deliberate decision to produce for and based on the market demand.

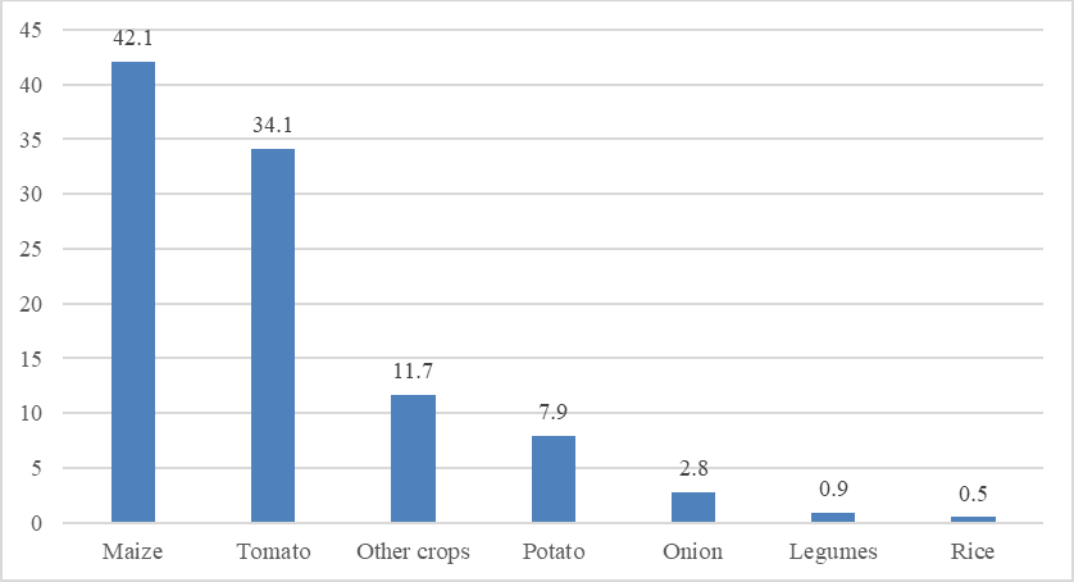

Figure 2: Main crop produced for commercial purposes (n= 206)

Although a majority of farmers produced crops mainly for subsistence and occasionally selling surpluses as established above there are farmers who produced specific crops for the market. Some of the crops that are grown purely for commercial purposes include sunflowers (41.4%) and horticultural crops (36.5%). Few respondents (1.6%)

mentioned fruits. This is where measurement of commercial orientation of smallholders is not unambiguous. Looking at some crops, smallholders may appear to be subsistent and at the same time commercial with respect to other crops. This implies that smallholders are concerned with both food security as well as income, making them neither fully subsistent nor fully commercial.

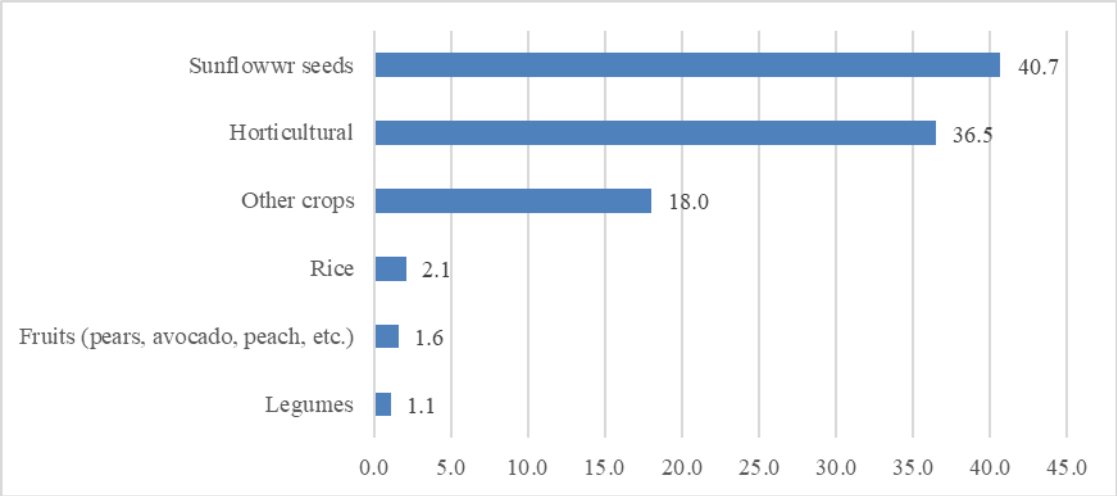

Figure 3: Pure commercial crops grown (n = 206)

4.3.3 Purposes for keeping livestock/poultry

About 72.6% of respondents interviewed stated that they kept livestock just because of traditional practices, including oxen for farming. Very few (23.5%) showed that they kept livestock for commercial purposes (Figure 4). During the interview it was learned that, most of farmers tend to sell livestock and poultry during times of emergencies. Out of that, most of livestock and poultry kept were used for food. This result is similar to smallholder farmer who occasionally sell surplus to meet their immediate requirements.

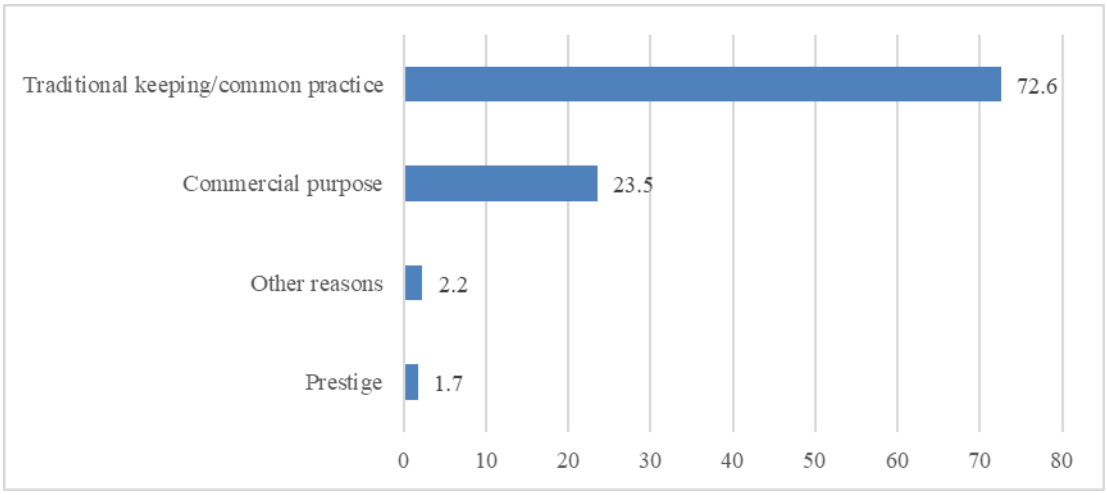

Figure 4: Purpose for keeping livestock or poultry (n = 170)

4.3.4 Selection of crops and animals

Selection of crops and animals to keep was determined by a couple of issues including social-economic, environmental, cultural factors and availability of inputs. Findings in Figure 5 show that most of small scale commercial farmers (41.4%) considered market factors in the course of crop/livestock selection. The more the crop is marketable, the high the chance to be selected. Food security (38.8%) was also mentioned as another important thing for selecting crops to produce. This is because majority of small scale commercial farmers do not practice purely commercial farming. Partly they produce for selling and partly for consumption. Moreover, respondents pointed availability of seeds (9.7%) as an important factor that was considered in selecting crops for production.

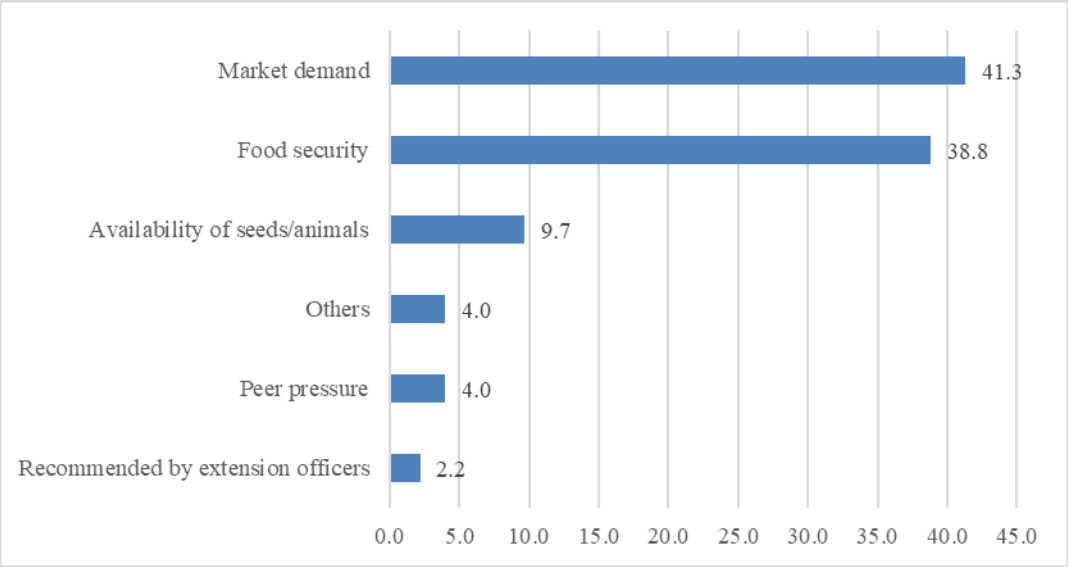

Figure 5: Factors considered in selection of crops and animals to keep (n = 201)

4.3.5 Decision about commercial agriculture

Findings showed that decision to engage in commercial agriculture in most of the households was more of the household (84.0%) than individual. Individual decision (16.0%) seems was rare (Figure 6). This finding shows that for the most part inclusiveness of views from members of household in decision making was considered and valued. Although production was a household decision, FGDs indicated that men dominated in marketing of produce. It was regarded as a common practice for men to transport the produce to urban or market centers, leaving their wives behind to take care of the family. Some of those men sold the produce but came back home with nothing claiming that they have been robbed. Due to awareness, women were increasingly participating in marketing of their produce.

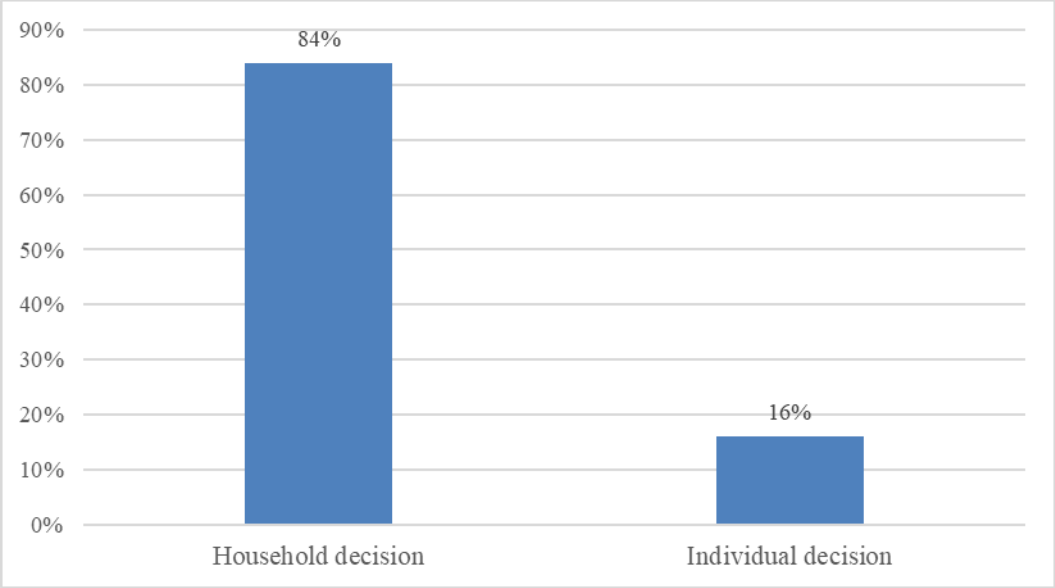

Figure 6: Decision about commercial agriculture (n = 171)

4.4 Determinants and Models of Commercialization of Smallholder Agriculture

This section presents the extent of commercialization, characteristics of smallholders engaged in commercial agriculture and models of commercialization practiced in the study areas. The aim of this section is to understand the kind of the population group which transformed from subsistence production to commercial production, as one poverty-breaking pathway and document the common models of commercialization practiced by farmers in the area. First, we asked farmers whether or not they considered themselves as commercial oriented using a 5 point Likert items. Second, we asked if there were farmers in their localities who could be considered as commercial oriented, the characteristics that distinguish commercial oriented farmers and others, and the common models of commercialization.

4.4.1 Smallholder farmers considered by others as commercial oriented

About two third of respondents involved in the study indicated that in their communities there were smallholder farmers that could be considered as commercial oriented. In this, the larger proportion (93.8%) was noted in Lulanzi village and the lowest proportion in Ihemi village (23.8%) (Figure 7). The findings entail that transition of farmers from subsistence farming to commercial farming as a means of improving household income was increasing rapidly. These changes in one hand are due to various agricultural related interventions by the government and other development partners and on the other hand due to environmental and market forces. However, as established above, findings from the literature review indicates that farming in Tanzania is neither purely subsistence nor purely commercial (Mpogole *et al*., 2012; Tanzania Agricultural Sector Development Strategy 2015/15-2025/26).

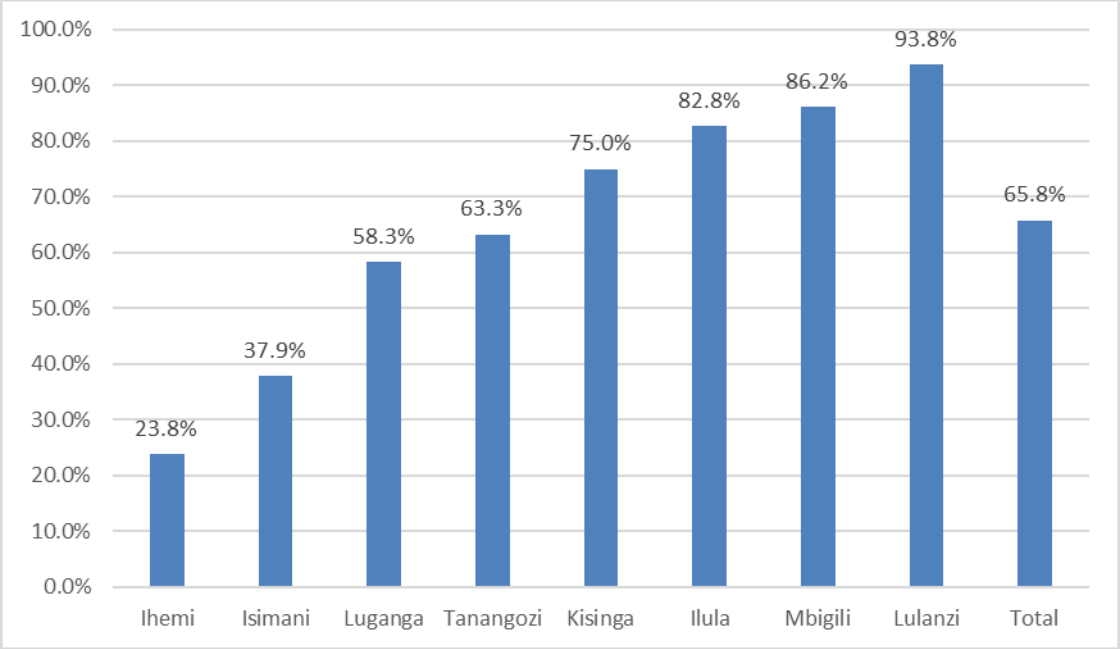

Figure 7: Small farmers considered as commercial oriented (n=206)

Findings in Table 6 revealed that 42.3% of respondents pointed that farmers or households that could be regarded as commercial oriented were less than a quarter. Meanwhile, 35.8% claimed that there were about one quarter and the rest 12.3% claimed that there were more than a half and 6.9% argued there were about a half. These findings entails that the spirit of commercialization was prevailing in the study areas as some farmers were already commercializing and that what they produce was deliberately for the market and was not merely a sale of surplus production.

Although some farmers in the area were practicing commercial farming, still a large proportion of farmers were still engaging on subsistence production partly due to shortage of capital and land. Financiers required collateral in form of immovable assets and key business documents which most of the farmers did not have. On the other hand, where finance was available (especially from micro-finance institutions), the interest rates were exorbitantly high and unaffordable.

Table 6: Proportion of commercial oriented farmers (n=206)

Village	Less than a quarter	About one quarter	About a half	More than a half
Ihemi	75.0	25.0	0.0	0.0
Ilula	21.7	60.9	13.0	4.3
Isimani	50.0	50.0	0.0	0.0
Kisinga	50.0	40.9	4.5	4.5
Luganga	57.1	28.6	0.0	14.3
Lulanzi	42.9	35.7	7.1	14.3
Mbigili	12.0	40.0	8.0	40.0
Tanangozi	77.8	11.1	11.1	0.0
Total	**42.3**	**35.8**	**6.9**	**12.3**

Findings revealed that nearly two third of those engaged in commercial agriculture in the study areas were youth and adults. Contrary to findings recorded in other areas, youth participation in commercial agriculture in this area was high (18.0%) compared to adult (16.5%) (Table 7). A survey carried out by the Ministry of Agriculture Livestock and Fisheries between January and March 2014, showed that the number of

youth engaged in commercial agriculture was increasing. The survey found out that youth had formed out different groups for purpose of pulling their efforts together to improve production. Increasing youth engagement on commercial agriculture is very linked to efforts taken by the government of Tanzania and other stakeholders, including formulation of youth policy (2013) and National Strategy for Youth Involvement in Agriculture (2016-2021). These two instruments involve offering incentives to the young population, providing information on agricultural marketing, providing capacity building for those engaged in agriculture and creating awareness of the profitable ventures that are provided by agriculture (Ommani, 2011). With the current trends of declining employment in the formal sector, youth are left with limited options, agriculture being certainly one of those. The engagement of energetic youth in commercial agriculture is likely to be a viable approach to enhance productivity, value addition and competitiveness of the sector.

Table 7: Characteristics of smallholders considered as commercial by age (n=206)

Village	Youth	Elders	Both youth and elders
Ihemi	25.0	0.0	50.0
Ilula	8.3	12.5	79.2
Isimani	23.5	35.3	41.2
Kisinga	9.5	4.8	85.7
Luganga	14.3	14.3	71.4
Lulanzi	7.1	14.3	78.6
Mbigili	38.5	11.5	50.0
Tanangozi	15.8	31.6	52.6
Total	**18.0**	**16.5**	**64.7**

Although findings showed that both male and female (67.9%) were engaged in commercial agriculture, there were more male (26%) than female (5.7%) (Table 8). Only a few households in Isimani (29.4%) and Luganga (21.4%) had female engaged in commercial agriculture. Poor engagement of female on commercial agriculture in this area, as in other areas of Tanzania, can partly be attributed to gender inequalities in ownership of land and other productive resources. Female are denied the right to own

land. They have a very limited chance to engage in productive activities and access loans in some parts of the country due to cultural and traditional practices. Although it was stated above that commercial agriculture is a household decision, gender inequality disproportionately affects women.

Table 8: Smallholder farmers considered as commercial oriented by sex (n=206)

Village	Male	Female	Both male and female
Ihemi	50.0	0.0	50.0
Ilula	12.5	0.0	87.5
Isimani	23.5	29.4	47.1
Kisinga	4.5	0.0	95.5
Luganga	21.4	21.4	57.1
Lulanzi	57.1	0.0	42.9
Mbigili	38.5	0.0	61.5
Tanangozi	31.6	0.0	68.4
Total	**26.4**	**5.7**	**67.9**

Findings indicated that most of those engage in commercial agriculture had attained primary education (69.3%) and some had no formal education (20.7%) (Table 9). Only 8.6% had attained secondary education and 1.4% attained post-secondary education. These findings portray the existing situation across the country. The educated group seems to have less preference in agriculture because of many uncertainties accompanied by farming, including unreliable weather and markets. Due to this, majority of them once they accomplish their secondary or post-secondary education migrate to urban areas to seek for white color jobs. Thus, the current government effort of increasing youth engagement in agriculture is certainly a welcome phenomenon.

Table 9: Smallholders considered as commercial oriented by education (n=206)

Village	No formal education	Primary education	Secondary education	Post-secondary training
Ihemi	0.0	100.0	0.0	0.0
Ilula	16.7	75.0	8.3	0.0
Isimani	11.8	64.7	23.5	0.0
Kisinga	9.1	77.3	4.5	9.1
Luganga	50.0	50.0	0.0	0.0
Lulanzi	21.4	78.6	0.0	0.0
Mbigili	15.4	69.2	15.4	0.0
Tanangozi	36.8	57.9	5.3	0.0
Total	**20.7**	**69.3**	**8.6**	**1.4**

4.4.2 Factors influencing commercial orientation of smallholder farmers

We asked farmers about characteristics that distinguished commercial oriented farmers from others. As shown in Table 10, majority of respondents pointed access to capital (78%) as a major factor differentiating commercial oriented farmers from others. However, it was not clear how some farmers had more access to capital than others in the same localities. Another distinguishing factor was level of education of farmers. Most of those engaged in commercial agriculture in the study areas had primary education and some had no formal education. Given that about 75% of respondents had primary level of education (Table 2), it appears that there was a small proportion of farmers with secondary or higher education that were considered as commercial by others. Contrary to our expectation, smallholders did not recognize membership to farmer associations or cooperatives as one of the important factors for commercial orientation.

Table 10: Factors differentiating commercial oriented smallholders and others (Multiple response; n=206)

Village	Level of education	Access to capital	Heritage	Ethnicity/tribe	Membership to association
Ihemi	25.0	75.0	0.0	0.0	0.0
Ilula	42.9	76.2	0.0	9.5	0.0
Isimani	66.7	66.7	0.0	0.0	0.0
Kisinga	5.3	73.7	21.1	0.0	0.0
Luganga	0.0	92.9	7.1	0.0	0.0
Lulanzi	36.4	90.9	18.2	0.0	0.0
Mbigili	75.0	56.2	18.8	12.5	0.0
Tanangozi	5.6	88.9	16.7	0.0	5.6
Total	**29.4**	**78.0**	**11.9**	**3.7**	**0.9**

To ascertain the factors influencing commercial orientation of farmers, we performed a regression analysis as shown in Equation 1. The regression results are shown in Table 11. As seen, the model was significant in explaining about commercial orientation of farmers. The adjusted R-squared was 18.5%. This value is considered adequate given that the dependent variable was a nominal 5 point Likert scale item. The Variance Inflation Factor (VIF) did not indicate any presence of serious collinearity among the independent variables. Factors such as sex, age, ownership of land, access to extension services and household size significantly influenced commercial orientation of smallholder farmers. Female farmers were less likely to be commercial as compared to their male counterparts. Similarly, and as established above, elder farmers were less likely to be commercial as compared to the youth.

Table 11: Determinants of commercial orientation of farmers

Source	SS	df	MS	F	=	7.134
Model	39.612	6	6.602	Prob>F	=	0.000
Residual	144.364	156	0.925	R-squared	=	0.215
Total	183.975	162		Adj R-squared	=	0.185

Variable	**Coef.**	**Std. Error**	**t**	**Prob>t**	**Tolerance**	**VIF**
(Constant)	3.94	0.499	1.116	0.000		
Sex of the respondent	-0.431	0.171	1.134	0.013	0.896	1.116
Age of respondent	-0.021	0.007	1.093	0.002	0.882	1.134
Ownership of land (acres)	0.024	0.008	1.043	0.002	0.915	1.093
Access to extension services	-0.186	0.082	1.097	0.025	0.959	1.043
Household size	0.101	0.04	1.091	0.012	0.911	1.097
Level of education	0.07	0.112	0.623	0.534	0.916	1.091

Farmers with limited or no access to extension services were less likely to be commercial as compared to farmers with access to the services. The larger the land owned by farmers as well as household size the more the likelihood of becoming commercial. Contrary to our expectation, education level did not significantly influence commercial orientation of farmers. This could be due to the fact only about 19% of respondents had secondary or higher education. Surveys carried out in different areas of the country pointed to limited access to capital and lack of land titles as the critical constraints that hinder most of households to engage in commercial agriculture in Tanzania. For instance, the National Panel Survey 2008-2009 established that only 6.5 percent of rural households had access to credit (NBS, 2008).

4.4.3 Models of commercialization of smallholder agriculture

The study sought to determine whether certain villages can be regarded as commercial oriented. If so, what things characterize such villages and the specific models of commercialization? Results showed that about 70% of respondents (n= 117) observed that there were villages in their Districts that could be considered as more commercial oriented than others in terms of either crop production, poultry or livestock.

Respondents perceived that access to extension services, financial services, transport infrastructure, and collective storage/marketing characterized certain villages as being commercial oriented (Figure 8). Also, cooperatives or farmer groups, irrigation schemes, and contract farming characterized the commercial oriented of villages. The results are consistent with studies such as Gabagambi (2003), Mpogole *et al*. (2012), and Mpogole (2013) that transport infrastructure in terms of paved roads, extension services, credit facilities and farmer groups enhanced productivity and commercial orientation of smallholder farmers.

Regarding groups, smallholder farmers are said to be better off in association or cooperative than individuals. On the individual basis, smallholder farmers cannot produce enough quantities to fill a truck and transport to market centers. As such, they lose bargaining power against middlemen and traders. Middlemen and traders take advantage of individual farmers due to their immediate cash needs and the small and scattered quantities that they produce (Mpogole, 2013).

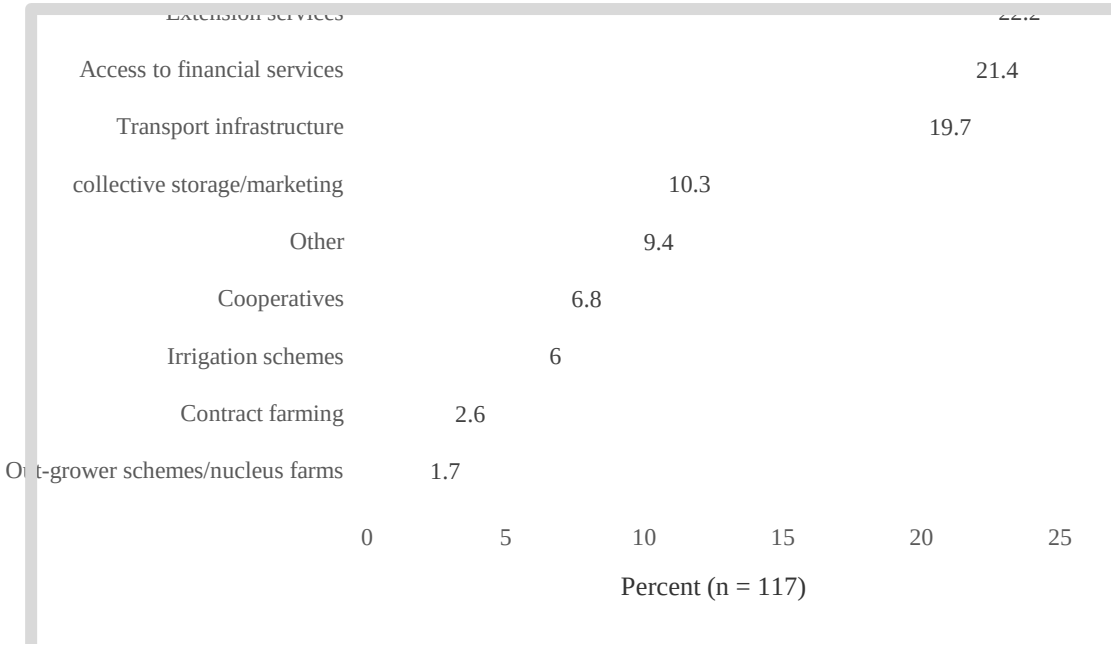

Figure 8: Characterization of commercial orientation of villages

In terms of models of commercialization, the study found that traditional surplus selling as well as individual farmers' commercial production were the most common ways (Figure 9). This means that some farmers were not necessarily producing for the market but sold any accrued surplus to meet their basic requirements. A few farmers, however, were purposely producing for the market. These results are consistent with Mpogole *et al*. (2012) that although some farmers do not consider issues of market when they make decisions to produce, they may end up selling the surplus or part of their produce to meet other important requirements.

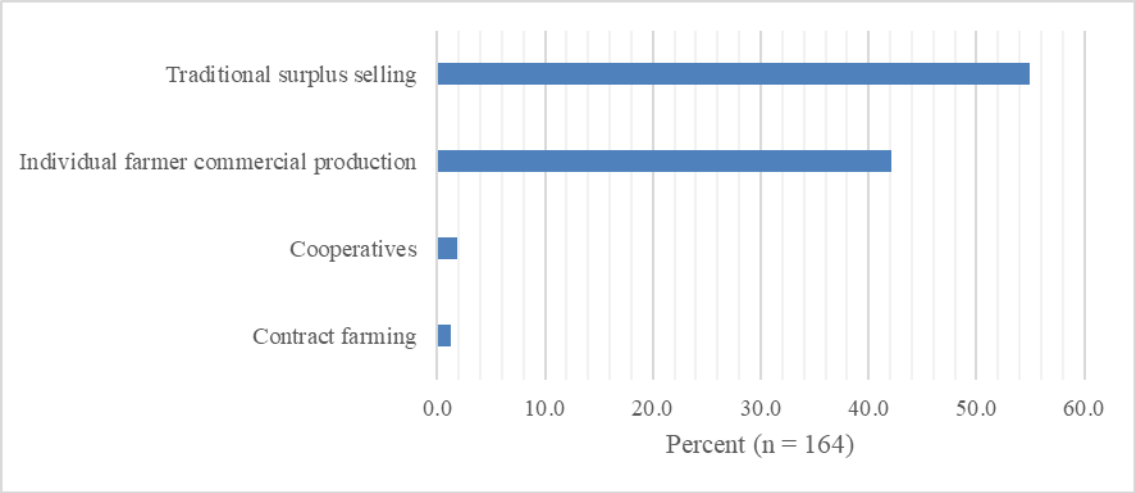

Figure 9: Models of commercialization of smallholder farmers

Like in Table 10, results in Figure 8 and Figure 9 are somewhat contradictory. In other incidences farmers perceived villages with strong cooperatives as being commercial oriented while in other cases cooperatives did not strongly feature as one of the common models for commercialization.

In Ethiopia, Bernard *et al*. (2008) established similar findings that cooperatives enhanced farmers to obtain higher prices but were not associated with a significant increase in the overall share of crop production sold commercially by their members.

Nevertheless, this does not undermine the importance of associations or cooperatives in enhancing commercialization of smallholder production (Bernard et al., 2008; Deng *et al*., 2021; Mpogole, 2013). When smallholder farmers obtain higher prices by virtual of being a member of a cooperative they are likely to increase production for the market in the coming farming seasons. Cooperatives shield individual farmers against middlemen and traders. Under cooperatives or associations, farmers have a collective bargaining power and sell at market prices. This motivates smallholders to produce more hence, increasing their commercial orientation. Figure 10 depicts the kind of intervention that may be required to provide a protective environment for smallholder farmers to enhance their commercial orientation.

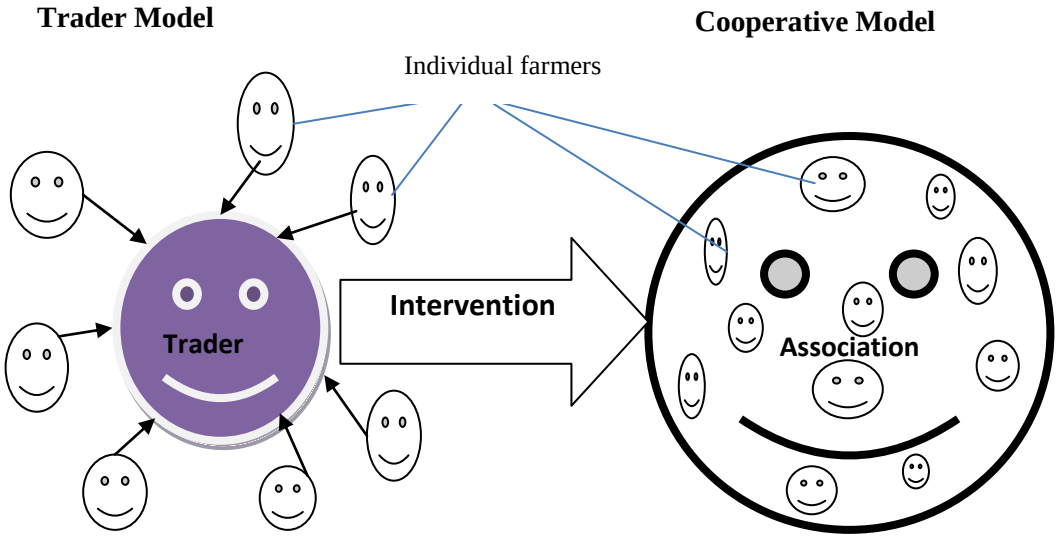

Figure 10: Enhancing commercialization through farmer groups

***Source*: Mpogole (2013; 143)**

4.5 Linkages between Smallholders and Medium and Large-Scale Farmers and Agro-Industries

This section unpacks the existing relationship between smallholders and medium and large scale farmers and agro-processors. It aims at showing how do commercializing

small farms interact with larger-scale farmers and agro-industries in production and supply chain. Supply and production chains are as diverse in their integration and sophistication of logistics as the farms they serve. Nevertheless, two broad types can be distinguished. Some supply and production chains are decentralized, fragmented and competitive while others are centralized, integrated and sometimes monopolistic. Further the section uncovers issues that are perceived to affect the strength of the link.

4.5.1 Existing linkages between smallholders and medium and large -scale farmers of agro-industries

Findings showed that more than two third of all respondents stated that there was no linkage between smallholders and medium and large-scale farmers or agro-industries (Table 12). Only about 30% depicted that there were some kinds of linkages. During the interview with farmers, it was learned that at the production level the interaction between individual small scale farmers and larger scale farmers and small scale agro-processing industries was minimal in such a way that it is insignificant contrary to the supplying level.

Upon harvesting, commercial small scale farmers sell their produce to small-scale traders, often in spot deals. Small-scale traders deliver to retailers, small scale-agro-processing industries and/or directly to consumers with little or no storage or processing. Farmers who produced to high standards and in larger quantities benefit more as were able to deliver regularly to traders in quantities needed. In this chain, small scale traders got a large share of the price paid by consumers than farmers. Thus, on one hand, the chain was beneficial to farmers, as market assurance was higher and on the other hand, had limited benefits to farmer as it paid less than market prices.

Table 12: Linkages between smallholders and medium and large -scale farmers of agro-industries (n=206)

Village	Presence of linkages	
	Yes	No
Ihemi	11.8	88.2
Ilula	46.4	53.6
Isimani	59.1	40.9
Kisinga	20.7	79.3
Luganga	24.0	76.0
Lulanzi	37.5	62.5
Mbigili	35.7	64.3
Tanangozi	10.0	90.0
Total	**30.3**	**69.7**

FGDs indicated that medium and large-scale farmers and investors had better linkages with smallholder farmers at their initial stages of investment. For instance, smallholders cited an example of a livestock investor who at initial stages purchased maize and animal feeds from farmers. Afterwards, the investor started to produce their own maize and other animal feeds. Finally, the investor stopped purchasing the maize from smallholder farmers. Apparently there was no linkage with such investor and smallholder farmers struggled to access markets elsewhere.

4.5.2 Preferred linkage model among smallholder farmers

About a half of respondents indicated that they mostly preferred a direct linkage with individual large-scale farmers or processors. Others (18.0%) mentioned contract farming, middle men (11.5%), out-grower scheme (8.2%), collective storage (6.6%) and cooperatives storage/marketing (4.9%) (Table 13). Direct linkage with individual large-scale farmer's model was more preferred by small scale farmers because it was less exploitative in nature and was less expensive to operate, compared to the other models such as contract farming. Some interviewed farmers acknowledged engaging in contract farming in which they had signed agreements with different larger scale farmers and a few small scale agro-processing industries to supply produce. Although

this model linked smallholder to larger scale farmers, traders or processors with the latter providing the farmers with inputs, technical assistance and marketing in return for an assurance of getting regular supplies from the farmers, most of the interviewed farmers did not prefer much this model. This is because of multiple reasons, first being failure of the traders and or small scale processor to execute the agreement accordingly and, second being timeliness of the service delivery.

Table 13: Mostly preferred linkage model among smallholder farmers (n=206)

Village	Contract farming	Out-grower schemes	Associations/ Cooperatives	Collective storage/ marketing	Direct linkage with individual large-scale farmers	Middlemen
Ihemi	0.0	0.0	0.0	100.0	0.0	0.0
Ilula	30.8	0.0	0.0	0.0	46.1	23.1
Isimani	9.1	0.0	0.0	0.0	90.9	0.0
Kisinga	14.3	14.3	42.9	0.0	28.6	0.0
Luganga	0.0	40.0	0.0	0.0	50.0	10.0
Lulanzi	33.3	0.0	0.0	16.7	16.7	33.3
Mbigili	22.2	0.0	0.0	11.1	55.6	11.1
Tanangozi	33.3	0.0	0.0	0.0	66.7	0.0
Total	**18.0**	**8.2**	**4.9**	**6.6**	**50.8**	**11.5**

4.5.3 Challenges in linking smallholders with large-scale farmers/agro-industries

The study analyzed challenges in linking smallholder farmers with medium and large-scale farmers and agro-processors as shown in Figure 11. The identified challenges included: low capital base of smallholder farmers; insecurity and lack of trust on fulfilling required agreements or contracts; exploitation against smallholder farmers; and, information asymmetry. These results are consistent with previous studies such as Kusongwa *et al*. (2020) and Mpogole (2019). For instance, Mpogole (2019) established that links between smallholder farmers and agro-processors were considered weak because of limited contractual arrangements. Issuance of informal credit facilities by processors/traders to smallholder farmers was the most common thing that helped to bind the two parties together.

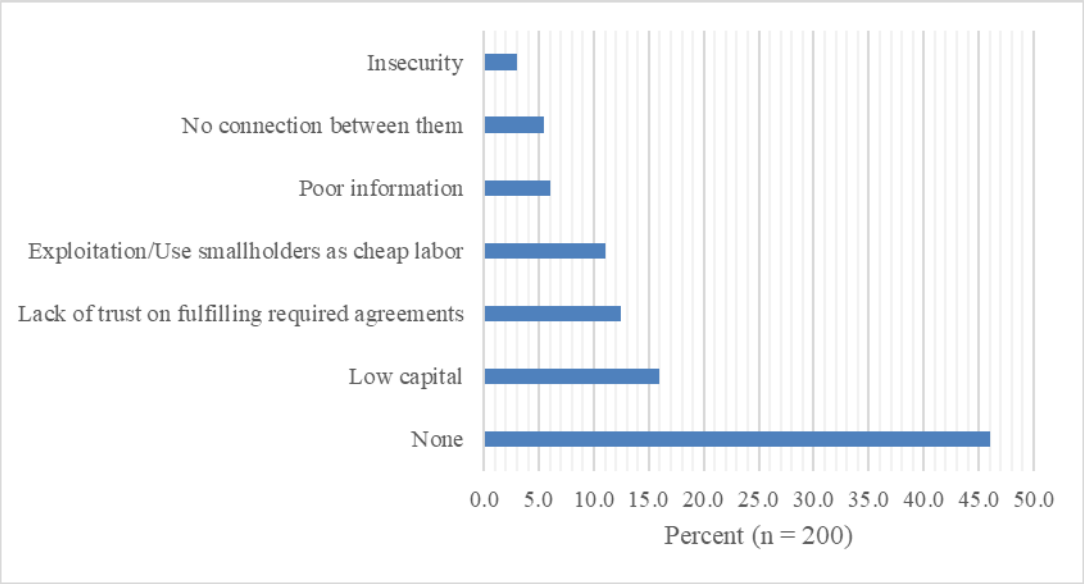

Figure 11: Challenges in linking smallholders with large-scale farmers/processors

4.5.4 Willingness of Small Scale Farmers to Offer Labor to Investors

Despite of many challenges facing smallholder farmers, majority of them (73.2%) indicated that they were not willing to quit their own farming to provide labor to investors. However, in Tanangozi Village in Iringa District, nearly half of respondents (48.3%) were willing to quit their own farming to provide labor to investors (Figure 12). This could be due to the urban characteristics of the village in which people may prefer employment over own farming employment. Although the majority indicated that they were not willing to quit their own farming over employment, 56% of respondents stated that they had seen or had known smallholder farmers who quitted farming for employment by investors. This indicates that quitting farming among smallholders was not an uncommon phenomenon.

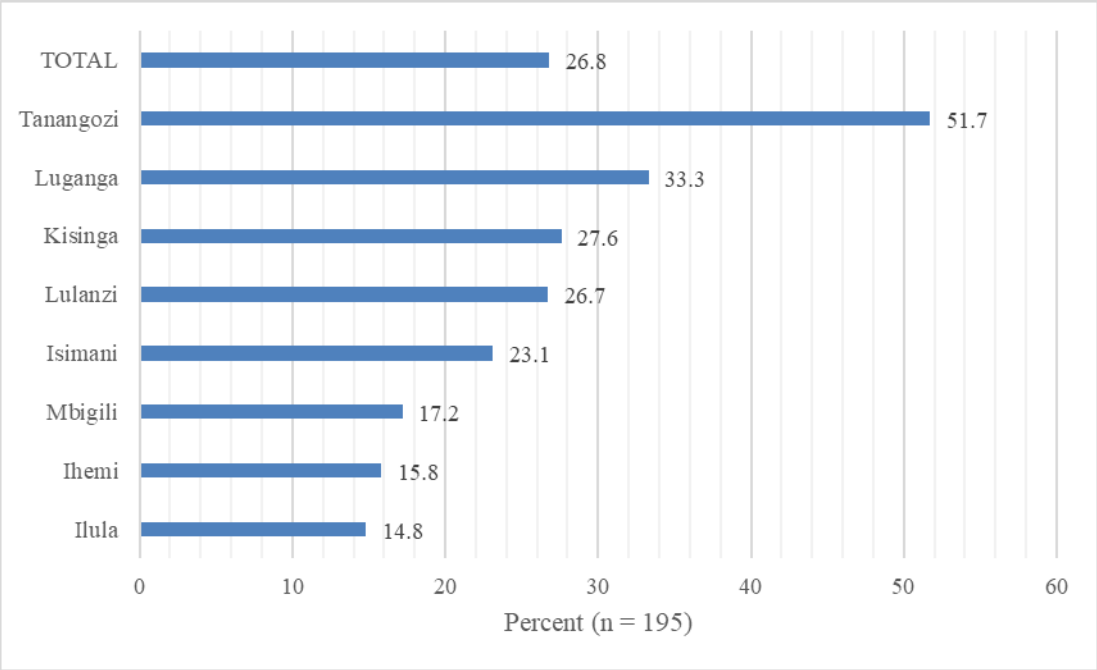

Figure 12: Willingness to quit own farming to provide labor to investors

The study further investigated the attitudes of rural communities towards smallholders who quit their own farming for employment elsewhere. As shown in Figure 13, nearly a half of respondents were positive towards smallholders who quit farming for employment. This has serious implications for efforts that aim to enhance commercialization of smallholder production. If smallholders are negative about farming activity they are unlikely to respond to interventions that aim to encourage them remain in farming to produce for the market.

Thus, efforts of the government to enhance commercialization of smallholders should identify farmers with market orientation who are ready to go commercial. Targeting every individual farmer may not yield positive results as not all of them were willing to produce primarily for the market. Smallholders who were willing to quit farming if alternative employment opportunities were available, are not the kind of farmers to target the interventions, if true commercialization is to take place.

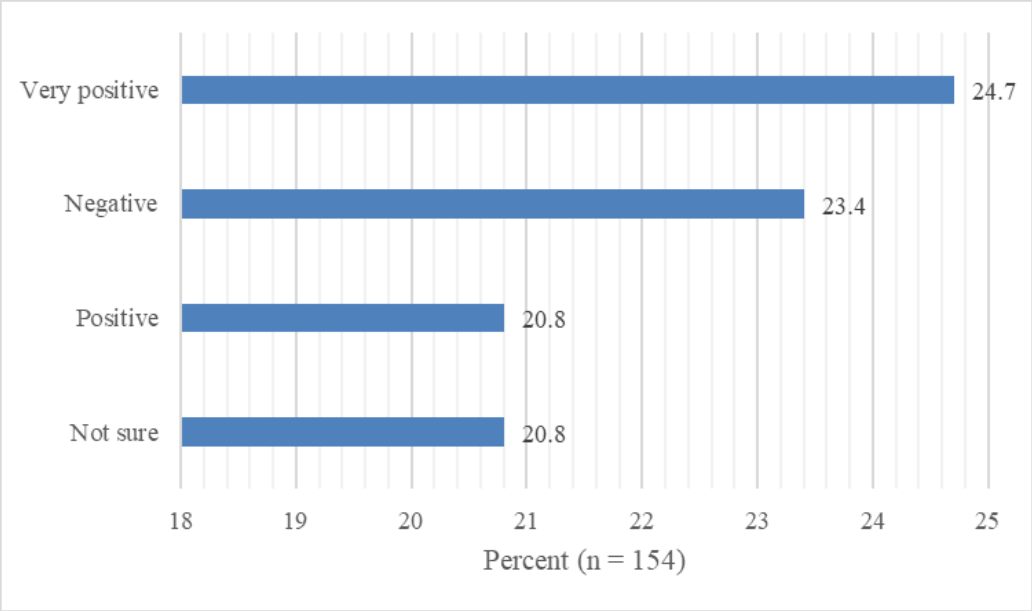

Figure 13: Attitudes of villagers when someone quits farming for employment elsewhere

In terms of smallholders who were not willing to quit their own farming to offer employment to others the study found that their motivations included the freedom to do what they wanted, food security, and protection of land (Figure 14). Over 70% of 144 respondents stated that the main reasons for not preferring to quit farming over employment were either freedom to do what they wanted or to ensure household food security. This finding is also of interest since no farmer mentioned that they won't quit own farming employment because it was a profitable venture. In essence, this implies that surveyed smallholder farmers did not consider farming as a business, which is a deterrent to commercialization efforts.

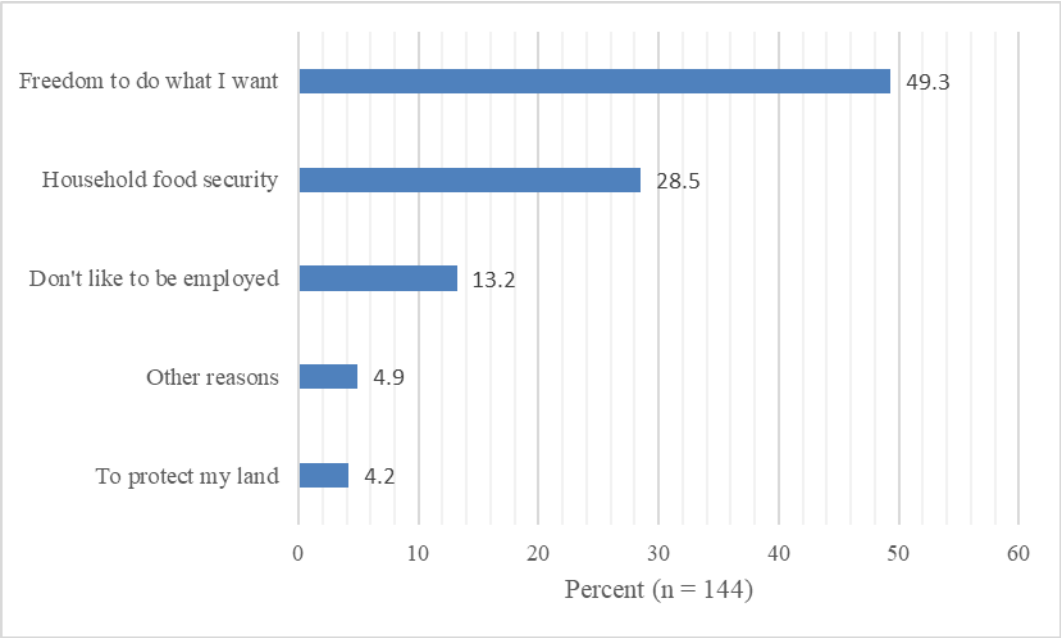

Figure 14: Reasons for not quitting farming over employment

4.6 Perceptions of Smallholders Towards Commercial Agriculture

Table 14 provides the responses to statements that aimed at determining farmers' perceptions about commercial agriculture. About 84.8% of farmers indicated that they liked commercial agriculture and most of them strongly agreed on some positive worded statement, suggesting that farmers had a fairly strong positive perception towards commercial agriculture and viewed it as something worth. To a great extent most respondents showed that commercial farming increased food production (52.5%), increased income of smallholder farmers (51.0%), and created more jobs for youth (55. 3%). To a moderate extent, respondent showed that investors in agriculture should be encouraged to come to invest in their villages (40.7%) and were aware of government efforts to promote commercial agriculture (40.2%). Moreover, majority of respondents supported the government effort for commercialization of agriculture (45.5%).

Furthermore, respondents indicated that neither will commercial agriculture make smallholder farmers poorer (53.5) nor lead to food insecurity/hunger problems (52.2%).

Table 14: Smallholders perception towards commercial agriculture (%)

SN	Statement	Not sure	Not at all	To a small extent	To a moderate extent	To a great extent
1	Commercial farming increases food production.	1.5	5.9	9.3	30.9	52.5
2	Commercial farming increases income of smallholder farmers.	0.0	2.5	5.4	41.2	51.0
3	Commercial farming is difficult for smallholders.	0.0	17.0	19.5	21.5	42.0
4	Commercial agriculture will make smallholder farmers poorer.	5	53.5	20.5	14.0	11.5
5	Commercial agriculture leads to lower cost of production.	6.5	55.5	17.0	15.0	6.0
6	Commercial agriculture creates more jobs for youth.	.5	4.0	3.0	37.2	55.3
7	Commercial agriculture is detrimental to food security.	22.0	23.5	19.0	25.5	10.0
8	I am afraid of commercial agriculture	.5	73.4	6.4	11.8	7.9
9	Our village has a good plan for agricultural investors.	23.4	38.3	13.9	18.4	6.0
10	Investors in agriculture should be encouraged to come to invest in our village.	4.4	18.6	16.7	40.7	19.6
11	Investors in agriculture are good people	7.4	11.3	19.2	46.3	15.8
12	There are example of good relationship between smallholders farmers and investors in agriculture.	49.5	17.6	14.2	13.7	4.9
13	There are example of bad relationship between smallholder farmer and investors in agriculture.	47.8	21.7	14.3	10.3	5.9
14	Smallholder farmers and investors in agriculture can co-exist together without any conflicts.	6.9	30.0	23.2	29.6	10.3
15	I have been producing some crops for selling.	1.0	18.9	18.4	46.3	15.4
16	I sell some crops when i have a problem	1.0	35.5	21.5	33.0	9.0
17	The crops I produce are not enough for selling.	5	61.7	10.4	15.9	11.4
18	If I sell part of my crops my family will face food insecurity/hunger problems.	0;0	52.2	16.9	20.9	10.0
19	I consider myself as commercial oriented farmer.	1.0	43.3	21.2	22.2	12.3
20	My main motive for agriculture is to get food for my family.	.5	7.6	10.2	27.9	53.8
21	Extension officers have sensitized us to	1.5	20.9	25.4	21.9	30.3

SN	Statement	Not sure	Not at all	To a small extent	To a moderate extent	To a great extent
	do commercial agriculture.					
22	I am aware of government efforts to promote commercial agriculture.	3.5	16.1	21.6	40.2	18.6
23	I support the government effort for commercialization of agriculture.	7.9	4.0	10.9	45.5	31.7
24	In this village many people like commercial agriculture.	1.5	2.0	9.5	45.8	41.3
25	commercial agriculture is seen as a threat to smallholder farmers.	3.0	49.3	19.7	18.7	9.4
26	Small holder farmers have a place in industrialized economy.	7.4	7.8	33.8	36.8	14.2
27	I like commercial farming.	0.0	1.5	2.9	10.8	84.8

Based on the attitudes of smallholders as indicated above, we performed Exploratory Factor Analysis (EFA) in order to explore the underlying theoretical structure of an unknown scale. Specifically, the study attempted to determine whether the 27 items in Table 14 had similar patterns of responses to create some constructs. The 27 items of the positive and negative perceptions towards commercialization of smallholder production were subjected to Principal Component Analysis (PCA) using IBM SPSS Statistics 20.

Prior to PCA, the suitability of the data for factor analysis was examined. Items that did not load well in particular components were removed from the analysis until a satisfactory solution was reached (Tabachnick and Fidell, 2007). The satisfactory solution was reached with 17 items as shown in Table 15. All communalities were greater than 0.4, which is well above the minimum threshold of 0.3. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.652, which is also greater than the minimum threshold of 0.5 and the Bartlett's Test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix (Pallant, 2013).

Table 15: Results of exploratory factor and scale analyses

Statement	Component					Communalities	Cronbach's Alpha
	1	2	3	4	5		
Examples of good/bad practices							
Commercial agriculture will make smallholder farmers poorer.	.668					.463	.751
Commercial agriculture leads to lower cost of production.	.618					.429	
Commercial agriculture is detrimental to food security.	.793					.666	
There are examples of good relationship between smallholder farmers and investors in agriculture.	.599					.616	
There are examples of bad relationship between smallholder farmers and investors in agriculture.	.685					.665	
In this village many people like commercial agriculture.	.618					.408	
Perceived food security							
I sell some crops when I have a problem.		.698				.573	.741
The crops I produce are not enough for selling.		.858				.768	
If I sell part of my crops my family will face food insecurity problems.		.767				.628	
Perceived extension/government support							
Extension officers/village leaders have sensitized us to do commercial farming.			.742			.567	.652
I am aware of the government efforts to promote commercial agriculture.			.791			.642	
I support the government effort for commercialization of agriculture.			.786			.651	
Perceived benefits of commercial production							
Commercial agriculture creates more jobs for youth.				.587		.483	.605
Investors in agriculture should be encouraged to come to invest.				.760		.615	
Investors in agriculture are good people.				.789		.732	
Perceived commercial orientation							
I have been producing some crops for selling.					.790	.642	.627
I consider myself as a commercial oriented farmer.					.829	.694	

PCA revealed the presence of five components with eigenvalues greater than 1, explaining a cumulative variance of 60.24% as shown in Table A1. To aid interpretation of these five components, varimax rotation with Kaiser normalization was performed. The rotated solution revealed the presence of simple structure, with all components showing a number of strong loadings and all items loading substantially on one component. Also, reliability analysis was conducted to assess the scale's internal consistency *i.e*. to determine whether a given set of items were measuring the same underlying construct or factor. For this purpose, we used Cronbach's alpha coefficient.

A set of items for each component was entered for scale analysis. Items that would increase alpha coefficient when deleted were removed. According to Pallant (2013), removing such items is essential in situations such as this when developing a scale rather than when using an already validated scale. Final results are as shown in Table 15. As seen, all alpha coefficients were greater than 0.6. Although a Cronbach's alpha of 0.7 is desirable, a coefficient of 0.6 is considered acceptable in exploratory research (Hair Jr. *et al*., 2010). Based on EFA, the theoretical relationship of the five components can be summarized as in Figure 15.

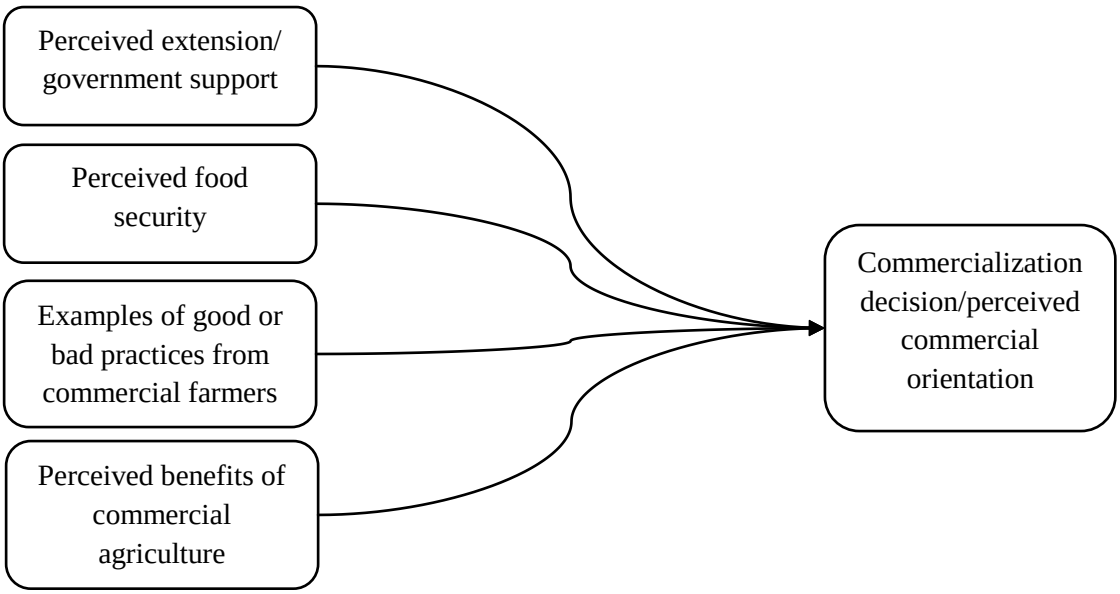

Figure 15: Conceptualization of the factors for commercialization decisions

As shown, the five components have been named as perceived extension/government support, perceived food security, examples of good/bad practices from commercial farmers, perceived benefits of commercial agriculture, and perceived commercial orientation/ commercialization decisions of smallholder farmers. That is, if extension services could be available, farmers could be assured of food security either from own production or buying by using income earned from commercial production. Evidence of good/bad practices from existing commercial farmers, and assessment of benefit that commercial production would offer, may determine commercial orientation or commercialization decision of smallholders. Further studies may validate the conceptual framework presented in Figure 15.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The findings of this study reveal a number of issues that are important for knowledge in the body of literature, practitioners and professionals in agriculture as well as for policy:

First, in terms of characteristics and farming practices of smallholder farmers it has been established that men dominate in crops that are produced for commercial purposes. More youth than adults are engaged in commercial agriculture. Given the current decline in employment in formal sector youth engagement in agriculture is not a surprising phenomenon. The engagement of energetic youth in commercial agriculture is likely to be a viable approach to enhance productivity, value addition and competitiveness of the sector. However, the continued reliance on rudimentary farm equipment such as hand hoe is one of the major deterrents to meaningful production.

Second, in terms of determinants of and models of commercialization of smallholder agriculture, the study establishes that traditional surplus selling, farmer groups, middlemen, and contract farming as well as individual farmers' commercial production are the most common models. This implies that some smallholder farmers are not necessarily producing for the market, but they sell any accrued surplus to meet their basic requirements. This is not uncommon as smallholders are said to have one foot in subsistence and another foot in the market. However, there are smallholders who could be considered as being more commercial oriented than others. Female farmers are less likely to be commercial as compared to their male counterparts. Similarly, elder farmers were less likely to be commercial as compared to the youth. Farmers with limited or no access to extension services are less likely to be commercial as compared to farmers with access to the services. Contrary to expectations, the study has established that education level does not significantly influence commercial orientation of farmers. Villages with access to extension and financial services, transport

infrastructure, collective storage/marketing, cooperatives, irrigation schemes, and contract farming are characterized as being more commercial oriented than other villages. Despite the potential for commercialization, access to capital and extension services are the main challenges facing smallholder farmers.

Third, the study has established that linkage between smallholders and medium and large-scale farmers and agro-industries is limited. Seldom contract farming between smallholder farmers and agro-processors was observed. Those contracts involved provision of inputs to farmers who were expected to repay in-kind after harvest. However, adherence to contract agreements was limited in both sides, which made smallholders feel insecure and exploited. In some villages, smallholders were willing to quit their own farming over employment to investors when available. Examples of smallholders who quitted own farming to provide labor to investors were available and other farmers perceived this as a positive thing. For farmers who did not plan to quit farming none of them mentioned that they will not quit farming because it is a profitable venture. In essence, this implies that surveyed smallholder farmers do not consider farming as a business, which is a deterrent to commercialization efforts. If smallholders are negative about farming activity, they are unlikely to respond to interventions that aim to encourage them remain in farming to produce for the market.

Fourth, despite the fact that some smallholders would quit their own farming if other employment opportunities were available, they indicated that they like commercial agriculture and most of them strongly agreed on some positive worded statements, suggesting that farmers had a fairly strong positive perception towards commercial agriculture. EFA with PCA revealed the presence of five components namely, perceived extension/government support, perceived food security, examples of good/bad practices from commercial farmers, perceived benefits of commercial agriculture, and perceived commercial orientation, which may affect commercialization decisions of smallholder farmers. However, further studies may validate this conceptualization.

5.2 Recommendations

Based on the study findings the following key recommendations are made:

First, despite the government efforts, there is a need for continued emphasis to enhance smallholder farmers' access to farm technology, affordable capital as well as extension services. Instead of transferring appropriate agricultural technologies and good farming practices, the service providers should go beyond and support smallholders in adopting a more market-oriented approach, prioritizing marketing, and the linkages with agro-industries.

Second, there is a need to sensitize formation and strengthening of farmer groups and cooperatives as well as forward and backward linkages with agricultural input suppliers and processors to enhance commercialization of smallholders.

Third, since some farmers were willing to quit their own farming activities and provide labor to medium and large-scale producers and processors there is a need to be selective in efforts to promote smallholders to commercialize. Thus, efforts of the government to enhance commercialization of smallholders should identify farmers with a market orientation who are ready to go commercial. Targeting every individual farmer may not yield positive results as not all of them are willing to go commercial.

Fourth, there is a need to sensitize farmers on the benefits of producing for the market in relation to their food security, especially their ability to meet food and other basic requirements from sales of crops, poultry or livestock.

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Table A 1: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.275	19.262	19.262	3.275	19.262	19.262	2.703	15.901	15.901
2	2.079	12.229	31.492	2.079	12.229	31.492	2.324	13.673	29.574
3	1.822	10.719	42.210	1.822	10.719	42.210	1.941	11.418	40.992
4	1.606	9.445	51.655	1.606	9.445	51.655	1.726	10.154	51.147
5	1.460	8.589	60.244	1.460	8.589	60.244	1.547	9.097	60.244
6	.989	5.815	66.059						
7	.878	5.166	71.224						
8	.795	4.677	75.901						
9	.704	4.143	80.045						
10	.668	3.928	83.972						
11	.565	3.322	87.294						
12	.498	2.927	90.221						
13	.417	2.454	92.676						
14	.366	2.155	94.830						
15	.343	2.017	96.848						
16	.290	1.707	98.555						
17	.246	1.445	100.000						

Extraction Method: Principal Component Analysis.

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ABOUT THE AUTHORS

Hosea Mpogole is a Lecturer in Agricultural Economics, Monitoring and Evaluation (M&E), Mathematics, and Statistics at the Institute of Rural Development Planning. His areas of research interests include development planning, agriculture, impact assessment, ICT for development (I4D), microfinancing, and policy analysis.

Boniface Kauki is an Assistant Lecturer in Climate Change and Environmental Planning at the Institute of Rural Development Planning. His areas of research interests include smart agriculture, climate change, natural resources, disaster management, and sanitation.

Emma Ngilangwa is an Assistant Lecturer in Community Development at the Institute of Rural Development Planning. Her areas of research interests include rural development planning, development studies, population and development, and gender studies.

Christina G. Mandara is a Senior Lecturer in Development Planning, Environment, and Sociology at the Institute of Rural Development Planning. Her areas of research interests include GIS and remote sensing, gender studies, rural water services, policy analysis, food security, sanitation, and climate change.

Baltazar Namwata is an Associate Professor at Moshi Cooperative University (MoCU). His areas of research interest include agricultural and commodity value chains, urban farming, extension approaches, environmental sociology, climate change adaptation, capacity needs assessment, Water, Sanitation and Hygiene (WASH) and Integrated Water Resources Management, gender and development, vulnerability analysis, adoption and impact studies, monitoring and evaluation.

Emmanuel Hauli is a Senior Lecturer in Social Sciences in Linguistics and Education at the Institute of Rural Development Planning. His areas of research interest include development studies, planning, language and education.

Institute of Rural Development Planning (IRDP)
P. O. Box 138, Dodoma, Tanzania
Tel: +255 26 2963037
Fax: +255 26 2963036
E-mail: rector@irdp.ac.tz
Website: www.irdp.ac.tz

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