LOCAL POTENTIALS AND LIMITS FOR COMMERCIALIZATION OF SMALL-SCALE RURAL AGRO-ENTERPRISES: THE CASE OF SUNFLOWER IN IDIFU VILLAGE, CENTRAL TANZANIA

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ABSTRACT

Commercialization of the rural agribusiness sector is critical for addressing rural poverty and creating jobs. Tanzania sunflower subsector provides edible oils, industrial raw materials, animal feeds, employment and livelihoods to rural households. The production and productivity of sunflower have remained low despite its importance, especially in semi-arid areas. Commercialization of smallholder sunflower sector is seen as a requisite for farm-level investments needed to upgrade productivity. This study assessed the potentials and constraints for commercialization of smallholder sunflower production in Idifu village in Chamwino District, Dodoma region of Central Tanzania. A household survey involving 70 randomly selected smallholder farmers from Idifu village was conducted between 20th August and 30th November, 2016. Factors including financial services, physical infrastructure, land availability, social demography were evaluated to characterize the potential and limitations regarding sunflower production and commercialization in the study area. Study findings reveal that majority (100%), of the respondents own land financial services are available and accessible to 65% of the respondents in the study area Also, labour availability, and family support were positively evaluated by 61% and 98% of the respondents respectively. However, unsatisfactory participation in farmers' groups (66%), frequent droughts (94%), land degradation (84%), and limited agricultural education (65%) were found to be serious limitations to sunflower production in the study area. Also, productivity and Gross margins suggest that, sunflower production can be undertaken profitably and efficiently when the size of farm holding is below median (0.8) ha. Despite these shortfalls, the study area exhibits medium potential for commercialization of sunflower production since the mentioned limitations can be ameliorated through education, improving infrastructure and sensitization over such issues such as good agricultural practices and marketing.

DECLARATION

I, Betty Amos Begashe, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

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DEDICATION

This work is dedicated to my Beloved mother Sekunda Silvan Massawe. Thank you for your trust on me. Be blessed.

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LIST OF ABBREVIATIONS

AfDB	- African Development Bank
AIS	- Agribusiness Insight Survey
ASDP	- Agricultural sector Development Programme
CRDB	- Cooperative Rural Development Bank
EAC	- East Africa Community
GDP	- Gross Domestic Product
MAFSC	- Ministry of agriculture food security and cooperatives
MKUKUTA	- National Strategy for Growth and Reduction of Poverty
MKUZA	- The Zanzibar strategy for growth and reduction of poverty
NMB	- National Microfinance Bank
SADEC	- Southern African Development and Economic Community
SNAL	- Sokoine National Agricultural Library
SSA	- Sub Saharan Africa
TASAF	- Tanzania Social Action Fund
TDV	- Tanzania Development Vision
TRANS-SEC	- Innovating Strategies to safeguard Food Security using Technology
URT	- United Republic of Tanzania
VICOBA	- Village Community Bank

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Agribusiness is the most important sector in the development of global economy. Today, Agribusiness operates in a globalized world and with the development of globalization; companies and individuals can reach the world faster and at lower costs than ever before. This trend has increased productivity, has led to technological advancement and transfer and the expansion of markets. Also, changes in demographics, economic, political, and natural environment have an impact on agribusiness as is the case in any other business (AIS, 2015; Konig *et al*., 2013).

In Africa, the richness of natural resources, coupled with clear strategic and operational plans, relevant partnerships and sufficient capital offers great opportunities for value creation in the African agribusiness sector – which is predominantly rural and driven by smallholder family farming (Tschirley, 2010). Agribusiness is also considered as an important sector for the development of Tanzania economy because the sector's performance has a significant effect on output and corresponding income and poverty levels (Kazungu *et al.,* 2014).

In Tanzania, there are still many opportunities for agribusiness development which are yet to be exploited. These include availability of plenty arable fertile land, high demand of modern techniques for irrigation, expansion of fruits and vegetables market, open room for oil, seed, and sugar cane production (Phillip, 2014).

Despite its economic importance, agribusiness sector in Tanzania encounter many challenges and most of which are a result of its nature and poor strategies in management. According to Ngaiza (2012), among the challenges facing agriculture sector in Tanzania include poor access and low use of improved agricultural technologies for planting and harvesting, under-investment in productivity-enhancing technologies including agricultural mechanization, limited access to financing for uptake of technologies, limited access and or lack of market information.

Agribusiness and its related industries have of late been getting higher attention in policies and strategies that aim to promote investments in agro-enterprises and agro based value chain development. This is after the realization that the sector is the apparatus for growth and commercialization. Such policies and strategies include the Tanzania development vision (2025) which aims to move Tanzania from least developed country to the middle level developed country by the year 2025 with high level of human development (TDV 2025), national strategies for economic growth and poverty reduction (MKUKUTA and MKUZA), KILIMO KWANZA and the establishment of agriculture development bank (Ngaiza, 2012).

One of the important agricultural subsectors in Tanzania is the sunflower sub-sector. The sector produces one of the essential and valuable vegetable oils in the country; and the crop is ranked fourth after soybean, palm, and rapeseed oils in the international market, (Xingfei, 2016). The development of the sub-sector in Tanzania is influenced by its utility value as food and that the crop is grown solely for its oil product which is mostly produced for human consumption.

Enock and Eno (2013) estimated the number of smallholder farmers involved in sunflower production in Tanzania to be around 8 million. They also indicated that about50% of edible oils supplied in Tanzania is produced in the country and the remaining 50% is imported mainly as crude or refined palm oil from other edible oil producing countries. More than USD 230 million is spent annually on edible oil imports, which shows the level of demand of the product in the country. Investing in sunflower edible oil production could therefore reduce the edible oil import share hence save some foreign exchange.

According to Schmid (2014) sunflower sub-sector has the potentials of creating employment opportunities, facilitating foreign exchange saving, and steering up technology development. High demand for edible oil would encourage new investments in the sunflower value chain resulting into job creation and income generation. The author observes further that sunflower sub-sector is constrained with low productivity and production, weak institution policies and frameworks, unreliable markets, deficient market information and poor linkage among the value chain stakeholders.

1.2 Statement of the Problem and Justification

Agribusiness sector, which encompasses business activities which are carried out from farm to fork, is a major source of employment and income worldwide. The sector has grown and has increased in importance and has now shifted from pure production oriented approach to broader system that focuses on agri-food and value chain coordination (Röttger and Da Silva, 2007). Majority of Tanzanians engage in agriculture activities to sustain their lives. Through agriculture, they grow crops for food and for sale of surplus products inside and outside the country, which increase national income and improve livelihood of agricultural community as a result (ASDP, 2016).

Agribusiness potentials and or opportunities available in Tanzania include availability of arable land for construction of agribusiness factories, high demand of modernized agricultural facilities and the increasing market for agro-processed food (URT, 2013). Many of these opportunities and potentials available in agribusiness industry remain underutilized and some of them remain even unidentified in some products chains.

The demand for sunflower edible oil has been growing; the growth has partly been associated with the quality and health benefits obtained from sunflower oil. Sunflower oil is light in taste and good in appearance; it is the richest in vitamin E than any other vegetable oil. Thus, the oil is valued for its light taste, frying performance, and health benefits (Tuntufye, 2013). However, domestic production of sunflower and other oil crops has not been able to bridge the domestic edible oil supply gap (Ginny, 2013). Tanzania has continued to import over a half of the domestic requirement of edible oil at the expense of limited foreign exchange (URT, 2016). The current study is therefore critical in order to explore the local potentials and limitations of profitable commercialization of the domestic sunflower sector within the edible oil industry.

In Tanzania, smallholder farmers have been central in the development of the sunflower sector as they have been key players in the production node of the sub-value chain. Studies (e.g. Enock and Eno, 2013; Ginny, 2013; Ekblom, 2016) conducted in Tanzania on the sunflower sub-sector development have not adequately addressed agribusiness growth potentials and limitations of the rural sunflower enterprise. Therefore, a study on the existing local potentials and limitations facing smallholder sunflower farmers is crucial determining how the sector would run sustainably and make it commercially profitable. Commercialization pathways could be through the use of better productive technologies such as improved seeds and having access to profitable market including end-market

linkages. This study seeks to generate the information that will help untie the limits and unlock opportunities for profitable commercialization of the rural sunflower sub-sector.

1.3 Objectives of the Study

1.3.1 Overall objectives

The study intends to assess the local potentials and limits of commercialization of small-scale rural agro-enterprises using sunflower sub-sector

1.3.2 Specific objectives

i. To evaluate determinants of productivity and profitability which may contribute to commercialization of smallholder sunflower enterprise
ii. To characterize processes/factors which impede commercialization of smallholders sunflower enterprises

1.4 Research Questions

i. What are the influences of biophysical factors to commercialization of sunflower in the study area?
ii. What are the effects of socio-economic factors to commercialization of smallholder sunflower enterprise in the study area?
iii. Is there any relationship between gross margins and factors (i) and (ii) above?
iv. What is the relationship between gross margins and factors (i) and (ii) above?

1.5 Conceptual Framework

Commercialization of sunflower smallholder farmers is influenced by biophysical and socio-economic factors. Biophysical factors include such aspects as climatic conditions,

soil types, quality, and fertility; whereas socio-economic factors include land ownership, availability, and utilization. These two factors can determine the potentials or limits of sunflower commercialization. Furthermore, socio-economic factors such as physical and institutional infrastructure, social capital (e.g. social economic groups, social demographic factors and family support), and financial services (e.g. availability, loan access, and repayment) might influence or constrain commercialization of sunflower in the study area.

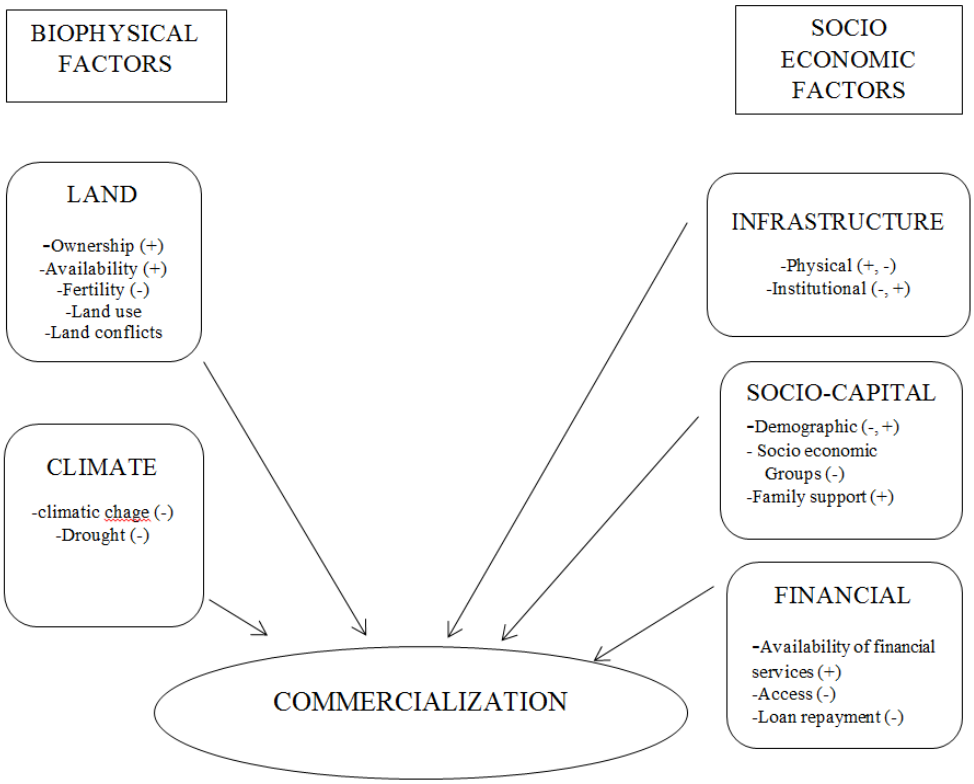

Figure 1: Conceptual framework

Keyword

- (+) signs represent potentials
- (-) signs represent limits

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Commercialization of Smallholder Farmers

According to Perkmann *et al*. (2013), commercialization is a subset of the broader process of innovation. It is driven by market and profit motives, with firms and other stakeholders seeking to gain a positive return on investment in research, licensing, product development, and marketing, through the creation of competitive niche markets. Commercialization contains an element of exchange by external and voluntary market actors (Sløk-Madsen *et al*., 2015). Commercialization involves a sale whereby the buyer pays the seller for some or all of the seller's rights in the technology and the money changes hands (Speser, 2008).

Understanding the heterogeneity of Idifu rural sunflower producers and their different potential and limits based on agricultural sunflower producers is critical to designing strategies for commercially viable smallholders.

Principle driving forces of commercialization include a conducive macroeconomic environment, non-distortive trade policies, infrastructure development, and legal and contractual environment in which farmers and processors may operate efficiently. Policies related to these driving forces will very much influence the nature and speed of the agricultural commercialization process. Policies will in turn largely determine the impacts of the process on farm household income and nutritional status (von Braun, 1995).

According to Siegel (2008), numerous rural households do not seem to be anticipated to directly benefit from agricultural commercialization without protection networks. Some of

these smallholders might be able to achieve food security and more expanded incomes over time. However, to say the least even smallholders with the potential to be more market-oriented will require significant assistance to make the transformation into commercial farmers (Pingali and Rosegrant, 1995). Government policies aiming at investment in rural infrastructure and crop improvement research and extension, establishment of secure rights to land and water, and development and liberalization of capital markets, can help to influence agricultural commercialization. In many areas, transformation of smallholders into commercial agricultural producers fails because local conditions such as land relations, labour regimes, livelihoods and local economies play a critical role inhibiting the transformation process (Hall *et al.*, 2017).

According to Hakizimana *et al*. (2017), the rising class of commercial farmers act as potential for agricultural commercialization. It increases collective land consolidation, but also land destruction as a result of population pressure and prevalence of inheritance as a pathway to land acquisition in the case of horticultural out growers. The existing potential market size and market characteristics of the product, competition by other related products, product quality requirements and assurance as well as legal and regulatory environment can influence or limit commercialization of agricultural products (Borowitzka, 2013).

According to Zhou *et al*. (2013), rural poor primarily depend on agriculture for livelihoods; therefore commercialization of agricultural production from the current subsistence toward market oriented can significantly increase the income and welfare as well as contribute to economic growth and poverty alleviation among smallholder farmers. Presenting opportunities available to smallholders farmers for participation in the commercialization of their produce, Zhou *et al*. (2013) cite changing environment driven

by growing population, urbanization, income, global interconnectedness, policy reforms, technology, food industry restructuring and climate change. The study conducted by Carletto *et al*. (2017) reveals high level of commercialization by even the poorest and smallest landholders, with rates of market participation as high as 90%. This indicates that it is possible to commercialize smallholder farmers according to their rates of market participation. Higher level of crop production, land size, access to credit and all-weather roads enhanced market participation while age of household head and family size reduced participation (Abafita *et al.*, 2016).

A study by Kabiti *et al*. (2016) recommend for an increase of public and private sector contribution towards commercialization through training and financial support. They observe further that it is essential to increase allowances by family members outside farming. According to the authors, smallholder farmers have a great potential for commercialization if necessary conditions are made available to them. Key strategies for commercialization of smallholder farmers include monitoring of market prices, diversifying sales networks and applying large quantities of pesticides and crop diversification (Riwthong *et al.*, 2016).

African agriculture is characterized by slow growth, low factor productivity, trade declining and environmental problems (Gwartney and Norton, 2008). Since 1970s to mid-1980s, many African countries have practiced macroeconomic, sectorial, and institutional reforms in order to ensure sustainable economic growth, food availability, and good living standard. Regardless of the existence of some recent agricultural growth influencers, the sector's growth has never been able to adequately address poverty, attain food security, and to achieve sustained GDP growth on the continent (Gwartney and Norton, 2008).

Low productivity is influenced by lack of access to markets, the rise of abiotic and biotic stresses and technology, which in recent years, have been compounded by unpredictable food and energy prices as well as global financial crisis (Shiferaw *et al.*, 2011). Most African countries have had a number of sound agricultural policies whose implementation has been very poor. Furthermore, growing dissatisfaction of some donors within the agricultural sector increased the gap between policy formulation and application. Although, investment in agriculture has suffered from a declining trend in several decades, before the crisis few donors including the African Development Bank (AfDB) continued with their involvement in agricultural investment. This facilitated the improvement of agriculture in terms of financial and market expansion (Salami *et al.*, 2010).

2.2 Sunflower Productivity

Sustainable sunflower production requires efficient use of inputs, maintenance of optimum yields and production of high quality product (Sheoran et al., 2013). Yield potential for sunflowers depends on soils and climate. Under the right conditions, sunflowers can yield between 2200 and 2800 kg/ha or higher, but many factors can considerably limit yields (Tuntufye, 2013).

Fertilizer is an important factor in enhancing productivity of sunflower. Sunflower utilizes soil nutrients exceptionally well. The main reason for this is the finely branched and extensive root system. The roots come in contact with nutrients which cannot be utilized by other crops. Sunflower normally reacts well to nitrogen and phosphorus fertilization where there is a shortage of these elements in the soil (Sultana *et al.*, 2015). It is therefore essential that any fertilization programme for sunflower should be preceded by soil analyses. Soil analyses cannot only lead to more appropriate fertilization levels, but it can also significantly limit unnecessary fertilization costs.

2.3 Rural Agriculture Development Potentials and Limits

Economic development in any country, to a greater extent, depends on rural development and it assists the economy to grow and sustain. In the rural areas, agriculture is the main source of livelihood to the people (Christiaensen and Todo, 2014). There is a direct relationship between agriculture production, income and the demand for industrial goods (Matsuyama, 1999).

Despite its position and importance in the economy, agricultural development in Tanzania is still poor due to production challenges. These include inadequate access to inputs, poor transfer of agricultural education, a decline in the use of improved seeds, poor infrastructure, lack of market information, inadequate credit for agricultural production and rain-dependent agricultural production (Kaarhus *et al.*, 2010).

Advancement of technology, increasing productivity, improvement of social and physical infrastructure and, more importantly, highly skilled manpower, with innovativeness and creativity, are the driving forces of Tanzanian society (Harnesk and Brogaard, 2016; Hamdy *et al.*, 2017). The performance of most food crops has remained poor mainly due to extreme rainfall patterns and the use of poor technologies. As a result, food security situation has remained one of the major problems in the rural areas. There is need to increase agricultural productivity by improving markets, private sector investment, physical infrastructure, human capital, and demand–driven research and extension services (URT, 2011). Opportunities which foster rural development include better prices for outputs from rural productive systems, improvement in investment climate which increases employment opportunities, advancement in infrastructure and institutions as well as rural financing instruments (Binswanger-Mkhize, 2009).

In order to minimize the limits and utilize better the potentials available for rural development, it is important to have the development programme which focus on conservation of natural resources, training of the field practitioners and farmers on the effective transfer of technologies from laboratories to the field, development of physical and social infrastructure which contribute to market access and employment. Also indigenization of social research which will solve problems in the agricultural sector, and bringing about faster rural transformation and corporatization of the rural economy to meet farmers requirements of quality produces and diversification of crop production (Gabor, 2013; Nair, 2014).

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of the Study Area

The study was conducted in Chamwino District in Dodoma region. The area is characterized by semi-arid condition with annual rainfall between 350 and 500mm. The physiography consists of flat plains and small hills. The local food system is primarily based on sorghum and millet with strong livestock integration (Mnenwa and Maliti, 2010). Much of Dodoma Region is predominantly associated with food insecurity (Graef *et al*., 2014).

Idifu village, which is the study area, covers about 6 000 ha out of which 2 000 ha are suitable for agriculture. The village is estimated to have a population of 5 086 people living in 1 169 households – making an average household size of 4 people.

Economic activities

The main economic activities in the village include agriculture and livestock keeping. Farmers grow pearl millet, sorghum, groundnuts and sunflower. About half of the households (50%) grow sunflower. Most women in the village participate in salt making as an alternative economic activity.

Soil

Over three quarters (75%) of the soil in Idifu village is sandy, 15% clay and 10% is red soil. The soil has very low fertility; most of the land contains sandy soil, where crops like pearl millet, groundnuts and cassava are planted. On the other hand rice, maize, sorghum,

sunflower and vegetables are planted on clay soil, while groundnuts, maize, and sesame are grown on red soil.

Water availability

The water is scarce due to the fact that the village is in the semi-arid area. The mainly sources of water include few deep wells installed with pumps, shallow wells, and rainwater. People in the village use this water mainly for domestic use and animal drinking. The water from shallow wells is used to irrigate vegetables because it contains less salt. The water available in Idifu village also supports the nearby village.

Pasture resources

Idifu village I is dry and vastly de-vegetated so there are no enough pastures to feed livestock for the whole year. Farmers use crop residues as animal feeds for their livestock. Households with livestock tend to stock dried crop residues which are used to feed livestock during critical dry seasons. This to some extent reduces the animals' vulnerability to death due to drought and shortage of fodder.

Production

Given the nature of the soil, a number of crops is grown in the area namely pearl millet, sorghum, groundnuts, Bambara nuts, sunflower, and sesame. Some farmers also cultivate tomatoes, cowpeas, cucumbers, watermelon, and pumpkins. Pearl millet is the main source of food in the village. Almost every family in the village grows pearl millet in a plot size of 3 acres on average. The land planted pearl millet crop in any given production season accounts for about 70% of all village arable land. Sunflower is grown by around 200 families, each managing an average of 3 acres – making area under sunflower production accounts for 20% of all arable land in the village.

Social services and infrastructure

Important social services which are available in the village include two primary schools, one secondary school, and one village dispensary. Mobile phone networks available include Vodacom, Airtel and Halotel. *Bodaboda* (commercial motorbike services providers) and provide local transportation services in the village, while one passengers' vehicle provides daily transport between Idifu and Dodoma town.

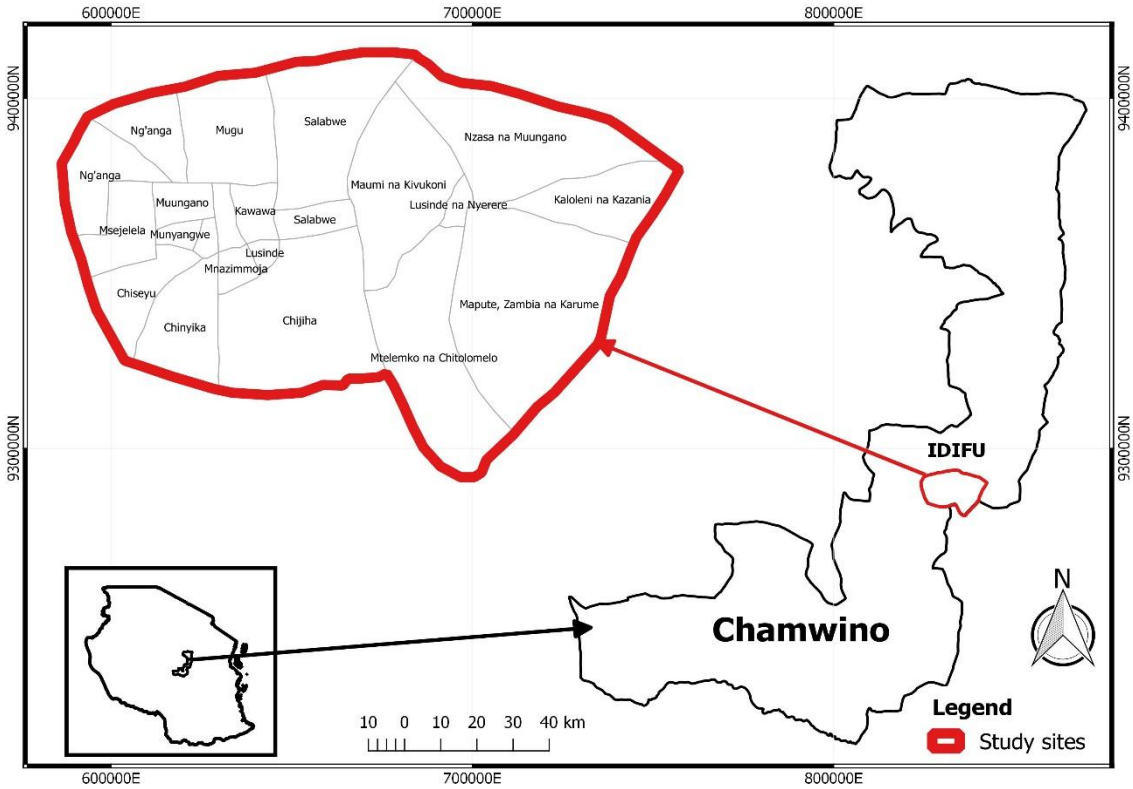

Figure 2: Study area

3.2 Research Design

Cross sectional research design was used to collect data from smallholder farmers at a particular point in time. The method enabled the researcher to get a 'snapshot' of the outcome and the characteristics associated with it, at a specific point in time with high degree of accuracy. Data obtained are very useful in ranking among the alternatives and

suggesting the effective strategies to be used in facilitating commercialization of sunflower enterprise among rural smallholder farmers.

3.3 Sampling

3.3.1 Study area selection

Dodoma region is one of the leading regions in sunflower production in the country. Between 2005 and 2010 Dodoma contributed to an average of 38% of the total sunflower production in the country.

3.3.2 Farmers selection

A list of 200 sunflower producers was established from the village government office. This sampling frame was used to draw study sample of farming households. Statistical procedure and available research resources were used to determine the sample size by considering time and financial budget. The anticipated confidence level which required a degree of precision and the level of heterogeneity in the research population were considered as key aspects in the determination of sample size (Cochran 1963; Yumbya *et al*., 2014). The current study adopted 90% confidence level, 10% precision level or error margin of 0.5 which assumed a maximum measure of heterogeneity in the population.

$$n_o = \frac{z^2 pq}{e^2} \qquad \text{……………………………………….. (1)}$$

Where: n_o = the sample size; z^2 = the z-score (the abscissa of the normal curve that cuts off an area at the tails, which is 1.65 for 90% confidence level); e = the desired level of precision of 10%, that is, the margin of error that is acceptable; p = the proportion of the population having the characteristic, $q = 1$-p

The formula gave a total sample of 68 farming households. As a result, 70 sunflower producing households were randomly selected from the list of sunflower producers in the village.

3.4 Types of Data and Data Collection

The study involved both qualitative and quantitative data from primary and secondary sources. The qualitative data were summarized in tables of quantitative data in order to simplify the analysis. Secondary data such as total village population, the size of arable land, were obtained from literature and published reports (e.g. National Census, Agricultural reports) and from the village ward records (e.g. village rosters). A structured questionnaire was used to collect the information from sunflower farmers through personal interviews.

3.5 Data Analysis

The collected data from the study were analysed using statistical package for social science (SPSS) (v.16) (SPSS Inc., Delaware) where frequencies and percentages for core variables were calculated. Box and whisker plots were also constructed using the same software. Gross margin analysis was used to assess sunflower farmers' profitability between those who cultivate below and above median (0.8) ha. Then T- test was done to compare gross margins between farmers with below and above median acreage.

3.5.1 Assessment of local potentials for smallholder sunflower commercialization.

The variables which promote commercialization of small holder sunflower farmers in the village included land ownership and its costs, technical knowledge, labour force, financial services, possession of mobile phone, education, availability of workforce, social networks

and family support. These variables were analysed using descriptive statistics to characterize their effects on productivity and profitability of sunflower subsector.

3.5.2 Analysis of limitations for smallholder sunflower commercialization

The variables which impede commercialization of sunflower subsector were lack of government support, frequency of occurrence of drought and associated crop failures, unavailability and unreliability of electric power. Descriptive statistics was performed to evaluate the extent to which these variables limit or impede commercialization of sunflower subsector in the study area.

3.6 Gross margin analysis

Gross margins for sunflower produce was calculated from the total revenue obtained minus the total variable cost associated with sunflower production, transport, storage and preservation of sunflower. Gross margin was used to analyse profitability accrued by sunflower producers in Idifu village. As performance from agriculture varies from season to season and crop to crop, gross margin analysis is useful for production cycles of less than a year as this enables costs and returns to be directly linked to a particular activity. It also allows establishing profitability of an enterprise in facilitating commercialization (Makombe *et al.*, 2007). The Model for gross margin analysis is presented.

$GMI = \sum TR - \sum \text{TVC}$..... (2)

$TR = P_y . Y_1$..... (3)

$TVC = P_{X_.} X$ ..... (4)

Where, GMI = Gross Margin Income

TR = Total Revenue

TVC = Total Variable Cost

Py = Unit Price of Output Produced

Y = Quantity of Output (Kg)

Pxi = Unit Price of Variable input used

X = Quantity of Input.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Farmers Sunflower Productivity

In this study, small scale farmers were those who cultivated below median acreage (0.8ha) whereas large scale farmers cultivated above median (>0.8ha). There was no significant difference ($P \leq 0.05$) between small scale and large scale farmers in terms of sunflower productivity. Besides, small scale farmers obtained high yields compared to large scale farmers (Table 1). According to Chand's *et al*. (2011) empirical observation, small scale farms present higher land productivity than large farms. To facilitate commercialization farmer education concerning effective utilization of resources (land) is required to increase productivity. Farmers who own large farms should potentially utilize their farms to obtain high productivity than those who own small farms. This might motivate small farmers to own large farms and facilitate commercialization of sunflower in the study area.

Table 1 : Sunflower productivity/ha **median=0.8ha**

Median	**Average Productivity/ha**
Below median	**0.48**
Above median	**0.44**
t-statistics	**0.6**

4.2 Farmers Sunflower Profitability

An increase in agricultural profitability is a fundamental precondition for sustainable economic development. When agricultural profitability increases, there will be efficient utilization of resources notably; labour and capital can be released from food production to

expand the non-agricultural sectors of the economy. Also, resources such as land and water can be used for environmental purposes. In coming decades, if populations continue to grow, growth in agricultural profitability will become increasingly important in maintaining the environment and improving standards of living (O'Donnell, 2010). For sunflower to be commercialized, profitability under a certain level of production must be achieved (Dalipagic *et al.*, 2014).

Gross Margin Analysis

Gross margins for sunflower produce was calculated from the total revenue obtained minus the total variable cost associated with sunflower production, transport, storage and preservation of sunflower. Gross margin was categorized according to farm size. Farmers were categorized as small scale farmers and large scale farmers (those cultivate below and above median acreages respectively). In both groups, there were respondents who reported both losses and gains, although farmers owning below median acreage reported higher gross margin than those owning above median acreage (Table 2).

Table 2: Gross margin analysis between farmers who own below and above median acreage (0.8ha)

Scale of production	**Av. Variable costs TZS ha**	**Av. Revenue TZS ha**	**Mean Gross Margins (TZS/ha)**
Small scale	198 827.60	253 428.82	**54 601.22**
Large scale	238 331.98	203 895.45	**34 436.53**
t-statistics			**0.6**

Furthermore, in the median acreage group, there were large numbers of losers compared to the below median acreage group (Fig 3). This is in agreement with a study by Bennet *et al.* (2006) which shows that despite the production scale, small scale cotton farmers who adopted new technology obtained gross benefit margins/ha which were as much as if not more than those obtained by larger producers.

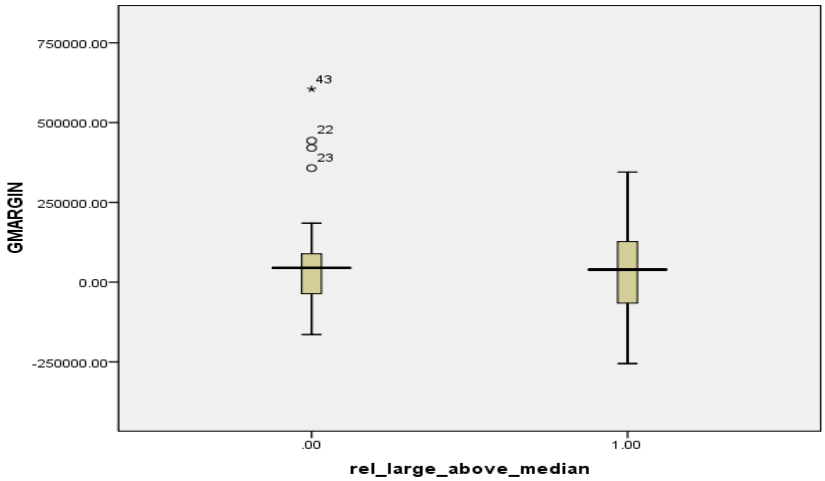

Figure 3: Farmers who own below and above median profitability

Although there was no significant difference (P<0.05) between farmers who received and those who did not receive agricultural training, farmers in the former category obtained, on average, higher gross margins than those in the latter category(Table 3), (Fig 4).

Table 3: Impact of agricultural education on farmers gross margins

Receive Agri-training?	Gross margins/ha	Standard deviation
Yes	78 735.17	166 908.20
No	10 302.61	138 797.26

Absence of significant difference between the two farmer categories in terms of Gross margin suggests that farm acreage in the study may not be a good indicator in determining

profitability of sunflower production enterprises. Farmers owning large acreages may not necessarily obtain higher yields and revenues because of high production costs which may be associated with poor management especially in the utilization of inputs to maximize outputs. On the other hand, farmers owning small acreage but with good farming practices can obtain higher outputs and thus higher gross margins.

Gross margin may not be a distinctive indicator on whether or not large or small acreage is profitable. This study reveals that profitability of sunflower farming depends on how efficiently the variable inputs can be changed into outputs by the farmer. This may have a bearing on agricultural education, experience, and exposure of the farmer. For example, respondents who had received agricultural training obtained higher gross margins compared to those who had not received any agricultural training, even though gross margin between the two groups was not statistically significant. This suggests that training would be a very important aspect, as it enables farmers to adopt good agricultural practices, which include the use of improved varieties and soil fertility adjustments which are necessary for sunflower production. As Filipovic *et al*. (2015) reported, farmers who received education on western corn rootworm risk assessment obtained higher gross margins on corn than non-participating farmers.

Figure 4: Gross margin analysis between farmers who did and didn't receive agri-training

4.3 Local Potentials for Commercialization of Sunflower Production

4.3.1: Financial access and easiness of access to credit

Financial capital is important to support agricultural activities (Allahyari, 2009). In the study area, a number of financial micro-finance institutions were reported by 75% of the respondents. These institutions include village/community banks (VICOBA), private credit providers and government programs (e.g. TASAF). Although financial services are available only 10% of the respondents use it. Furthermore, majority reported to be having difficulty in accessing loans due to conditions attached by these lending institutions (Table 4). Lack of adequate collateral, high incidence of defaults and high administrative costs associated with small loans (Kashuliza *et al*., 1998) might be the reasons for the majority not having access to formal credits in the study area. On the other hand, majority of the respondents avoid loans because they are afraid of the inability to repaying in an event of crop failure resulting from bad weather, which is common in the study area. Over 91% of the respondents reported that crop failure is a common risk resulting from frequent droughts. Availability of financial institutions in the study area and generally, with the fact

that access to financial services is possible suggests that more farmers can be attracted into sunflower farming. This indicates the potential of commercialization sunflower subsector in the study area.

The analysis of profitability indicates that farmers who had access to loans reported higher gross margins unlike those who did not have this access (Table 4). High profitability may be linked to farmers' enhanced ability through loans of buying agro-inputs, increase sunflower planted area and improve farming technology. This underscores the need of financial capital to support agricultural activities (Conway *et al*., 2016). Available financial facilities in the study area may provide financial services in terms of soft loans to facilitate their farming activities of the existing/prospective sunflower growers.

Table 4: Availability and utilization of financial services

Availability	Frequency	Percent	Gross margins/ha	Productivity	use service	frequency	%
Yes	53	75	56580.99	0.48	yes	7	10
No	17	25	-26591.50	0.35	No	63	90

4.3.2: Possession of mobile phones

Mobile phone ownership as a tool of facilitating farmer-market interaction and access to agricultural information was evaluated and results are presented in Table 5. About 83% of the respondents own mobile phones, 16% of these own more than one device (Table 5). The value of mobile phones for majority of the respondents ranged from TZS. 25 000 to 50 000, which means most of the phones were non-smart phones. When mobile phone ownership was related to profitability of sunflower production, there is an indication that the respondents owning phones reported high gross margins than those without ones. Mittal and Tripathi (2009) point out that mobile phones can result into easy access to customized content, save time and reduce inconveniences as owners can carry their phones

with them even when going to the field. Moreover, with mobile phones, farmers can communicate with multiple sources of information to shape and enrich their knowledge base and make production or marketing decisions. Therefore, from communication point of view, possession of mobile phones and availability of stable mobile network may contribute to the commercialization of sunflower production in the study area

Table 5: Mobile phone possession

No of phones Owned	Frequency	Percentage	Gross margins/ha
1	46	65.7	50 095.24
2	10	14.29	28 775.93
3	2	2.9	201.77
0	12	17.14	9 287.62
Total	**70**	**100**	

4.3.3: Education

Respondents' education was assessed in terms of whether of attending school and years spent in school. The results are presented in Table 6. Less than half (47%) of the respondents attended primary education 9% attended secondary and college and 44% did not attend school at all (Table 6). Education was also related to the profitability of sunflower production; in terms of testing if the level of education attended has any effect on gross margin. The results show that farmers with primary education obtained higher gross margins than those with no education at all, even though the difference in gross margin between the two farmer categories was not statistically significant. This finding is agreement with a meta-analysis study by Phillips (1994) who confirms that education attainment has a positive effect on agricultural productivity. In order to commercialize sunflower in the study area, education is essential, particularly in imparting social change,

improving individual social position, increasing abilities of rural people to diagnose their needs and take greater control of decisions affecting their lives.

Table 6: Education level

Education level	Frequency	percent	Productivity	Gross Margins/ha
None	31	44	0.47	33 701.11
Primary	33	47	0.48	33 980.59

4.3.4: Availability of workforce and frequency occurrence of diseases

Aspects which affect labour force availability such as household size, age, the number of disabled persons and frequency of occurrence of diseases such as malaria, cholera, and diarrhoea were investigated and are presented in Table 7. This study also sought to determine the relationship between workforce availability and productivity. The results show that 57% of households have people ranging between one and three persons with the ability to work, whereas 47% of households have above three persons with the ability to work (Table 7). As for disability and health, 13% of all respondents in the study area had disability of one kind or the other. In terms of productivity, the results also indicate that, as the size of manpower increase in the family so is the average productivity (Table 7). There was also moderate occurrence of diseases and deaths reported by respondents. However, there is a possibility of having stable manpower in the household due to the availability of government dispensary and diseases control strategies applied by the respondents in the study area. Such strategies as the use of mosquito nets, keeping the surroundings clean and attending clinic provides for the maintenance of good health. Healthy households imply reliable supply of manpower in rural settings, thus by extension, the study area has enough workforce to support higher productivity, which is one of the essential ingredients in the

commercialization of sunflower subsector. The results are also in line with those by Chang *et al* (2017) who point out the need for healthy human power in agricultural operations.

Table 7: Number of workforce in household

Number of workforce per hh	Percentage	Productivity/ha
8	1.4	0.21
7	5.7	0.26
6	7.1	0.31
5	5.7	0.49
4	14.3	0.43
3	20	0.59
2	41.4	0.53
1	4.3	0.39
Total	**100**	

4.3.5: Government and family support

The Government might adopt supportive policies on income formation by input factor (Kobayashi *et al*., 2016). The support from the government might also influence the availability and operations of different groups in the study area. Government support in the study area has been reported to be good and satisfactory reported by 10% and 90% of the respondents respectively. Satisfactory government support increases the chances of getting financial support. It also leads to more understanding of agricultural policy and strategies which might influence capital availability and operation of different groups in achieving sunflower commercialization. Apart from Government support, majority (99%) of the respondents reported to have received full support from their family in farming activities (Table 8). By getting full support from the family and the Government including manpower, financial, social, institutional and moral support in farming activities might influence sunflower commercialization. Their support might help to increase manpower,

capital and importing innovative ideas in increasing agricultural production, will also lead to an increase in productivity and gross margins (Table 8).

Table 8: Status of family and Government support in agriculture

	Family support		Gross Margins/ha	Government Support	
	Frequency	**Percent**		**Frequency**	**Percent**
Good	29	39.7	**22 261**	7	9.5
Satisfactory	41	56.2	**66 777**	63	90.4
Total	**70**	**100.0**		**70**	**100.0**

4.3.6: Mobile phone network quality

Mobile network quality in terms of clarity of voice call was assessed and the results are presented in Table 9. Half of the respondents ranked mobile network quality as good and another half ranked it as satisfactory. The former obtained higher average gross margins than the latter (Table 9). To commercialize sunflower production in the study area an increase in market participation is important. Unreliable telecommunication facilities may limit agricultural development through increased production and marketing costs. Also, the link between farmers and buyers may be severed (Krishna *et al*., 2014). Moreover, telephone ownership may help farmers to get updated information on such aspects as market price, weather updates, and climatic change alerts.

Table 9: Assessment of the quality of the mobile phone network

Mobile phone network	**Frequency**	**Percent**	**Gross Margins/ha**
Good	35	50	56 420
Satisfactory	35	50	32 649
Total	**70**		**100.0**

4.4 Local Limits for Commercialization of Sunflower Production

4.4.1: Distribution of sunflower farmers by landholding size

Total landholding size as a factor on the amount of land committed to sunflower production was investigated.. The results indicate that despite land availability, only a small fraction of the land was committed to sunflower production (Table 10). This is probably due low soil fertility and vulnerability to soil erosion both of which are characteristics of sandy soils, which are typical in most semi-arid areas. Although sunflower is drought tolerant crop , good soils with substantial water-holding capacity are required for the crop to flourish in arid areas (Hussain *et al*., 2008). In addition, half (50%) of the farmers owned 2 to 5 hectares, 37% owned less than two hectares, and only 13% owned above 5 hectares. Majority of sunflower farmers were in the category of landholding size of between 2 and 5 hectares. Potentially, the study area can be under extensive sunflower commercialization by effective utilization of land available to increase surplus of sunflower production (Deininger *et al*., 2016).

Table 10: Distribution (%) of sunflower farmers by landholding size

Landholding size	Landholding size		Distribution of sunflower farmers	
	Frequency	Percentage	Frequency	Percentage
Up to 2 ha	26	37.14	66	94.28
2 to 5 ha	35	50	3	4.29
Above 5 ha	9	12.86	1	1.43
Total	**70**	**100**	**70**	**100**

4.4.2: Sunflower Processing in the Village

The Trans-Sec project introduced a sunflower pressing machine in order to stimulate value addition and ignite commercialization of the sunflower enterprise. Around 18% of sunflower producers utilized this village based processing facility. Majority were still

taking their sunflower seeds for pressing at Mvumi centre about 10 kilometres from the village (Table 11). Problems related to raw material, equipment and electricity for processing, market accessibility, and competition are the constraints which prevent the processing machine from performing well for the attainment of commercialization status (Ekblom, 2016). In addition, as for the myths on the use of diesel to operate machines, the respondents believe that diesel oil might mix with processed sunflower oil. This myth limits many farmers from processing their sunflower using village processing machine. Farmers' education is required in order to change this mind-set.

Table 11: Places where sunflower farmers processed their seeds

Places	Frequency	Percent
Village based processors	13	18.3
Mvumi mission town Centre	42	59.2
Total	**55**	**77.5**

4.4.3: Business communication

About half (42%) of the respondents were not adopting any strategies to manage price risks; instead, they were selling their crops to buyers in the village even where the prices were not suitable for them. The remaining 54% waited for prices to rise and others looked-for suitable market for their crops (Table 12). According to McNeil, *et al*. (2015) price risks can be managed by implementing various sourcing, contracting, and financing strategies. When farmers sell their crops at low prices, they incur losses and reduce their gross margins unlike the farmers who waited for the prices to rise and or those who looked for suitable market (Table 12). This trend act as an obstacle for the commercialization of sunflower, farmers will continue to cultivate in a small area because they get low or no profit at all.

Table 12: Strategies used to manage price risk

Strategies	Frequency	Percent	Gross Margins per ha
Sell anyway	30	42.9	15 122
Wait for price to rise	20	28.6	47 565
Find suitable market	17	24.3	27 697
Total	**67**	**95.7**	

4.4.4: Status of road and electricity

Quality road in the study area might act as a stimulus for commercialization because it facilitates trading activities, and farmers would be able to travel to town market and sell their products at fair prices as opposed to selling through village collectors at low prices. Depending on the use and exposure, the respondents rated the road status differently. More than a half (62%) of the respondents cited bad condition of the roads as a reason for them to sell their products through village collectors. The remaining 38% said that the roads were moderately fine (Table 13). Lack of electricity reduces efficiency in the performance of sunflower processing machine in the village due to an increase of the costs of operation. Farmers use diesel to operate machines; this is more expensive than electricity. This is in agreement with the study by Patel, (2010) who pointed out that both physical and institutional infrastructures significantly influence the spread of proven yields in enhancing agricultural technologies. Generally, lack of effective physical infrastructure may, in the long run, affect commercialization of sunflower production in the study area. This is because; transportation of agro-inputs and sunflower products might be difficult due to poor road network which may raise transportation costs and lower gross margins.

Table 13: Status of rural road network

Quality of the road	Frequency	Percent	Gross Margins
Moderate	26	37.1	53 094
Bad	44	62.9	36 428
Total	**70**	**100.0**	

4.4.5: Group participation status

According to Flora (2016), there is a strong relationship between social group network and agriculture. Village groups in the study area offer agricultural training, financial support and social assistance. Regardless of merits from different groups 60% of the respondents were not members of any group, only 40% of the respondents reported to be members of different groups found in the village. Respondents who reported to be members of groups said to be belonging to such groups as Agricultural training group, *Amani* group, *Bustani kiroba* group, Hisa group, Agriculture Irrigation group, *Jipemoyo* group, *Majik*o *banifu* group, Agri-terrace group, *kuku* project group, sunflower processing machine group, *Upendo* group, *Ushindi* group and *Vicoba* group (Figure 5). All the cited groups were operating in the study area. Availability of social groups in the study area indicates the availability of social protection in the village which can be used as a driver to commercialization. Groups might provide financial support for agricultural production; facilitate market access and training for participation in profitable agriculture (Tirivayi *et al.*, 2016).

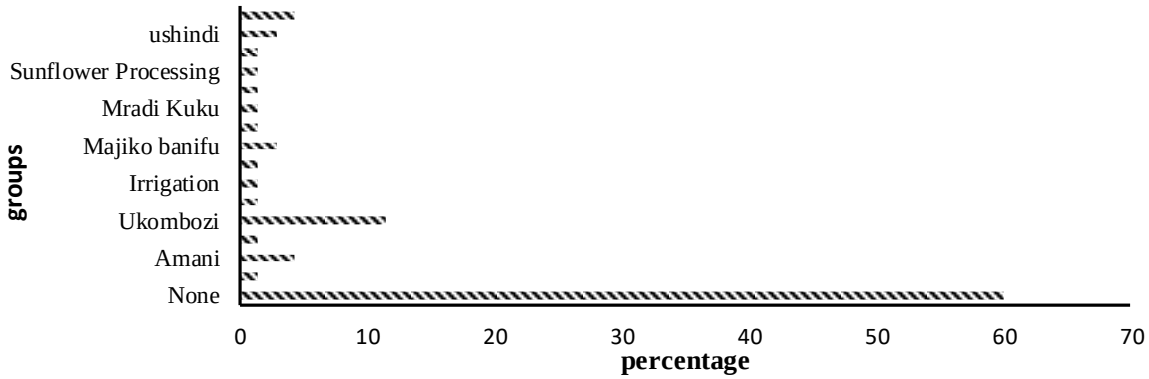

Figure 5: Availability of village groups and participation status

Village group members were asked to indicate whether or not there was any benefit from being a member of village groups. About 89% reported to have received benefits from the

groups to which they belonged. These benefits include financial support, social support, and agricultural training. The benefits also depend on the groups to which they belonged, and admitted group membership helped to increase their gross margins. About 11% reported to have not received any benefits from the village groups to which they were members (Table 14).

Table 14: Benefits from group membership

Benefits	Frequency	Percent	Gross Margins
Yes	25	89.3	22 303
No	3	10.7	1 025
Total	**28**	**100.0**	

According to study findings, land availability and costs, availability of and access to financial services, possession of mobile phone, satisfactory mobile network, availability of education services, and family and government support were the potential factors for commercialization of sunflower enterprise in the study area. On the other hand, a small proportion of land committed for sunflower production in relation to the total land owned by the farmer, a small number of farmers using sunflower processing machine, lack of price risk management strategies, poor status of road and electricity, and farmers participation in socio-economic groups in the study area are the inhibiting factors against commercialization of sunflower in the study area. Under the presence of limits, farmers who cultivate below median acreage (0.8) ha seem to be effective in exploiting the available potentials, this lead to an increase of productivity and profit maximization unlike hose those who cultivated above median. Productivity and profitability of these farmers exceed that of those who cultivated in large farms although this difference is not statistically significant. It is possible to commercialize sunflower in the study area because most of the limits and their impacts can be mitigated. Although the study area experience

high climatic variability associated with high risks, commercial sunflower production can still be possible through adherence to good agricultural practices by the farmers.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In this study, potentials and limits for sunflower commercialization were assessed, here different parameters which seem to act as potentials and limits were evaluated; these included infrastructure, financial, socio demographic, land, assets ownership, social capital and average productivity. Average gross margin was used to calculate profitability, lastly o results shows the existence of potentials for commercialization of sunflower production in Idifu village due to availability of arable land, labour, increasing demand of sunflower oil and support from different agencies and projects in boosting sunflower production in the study area.

Sunflower has a great potential of being commercialized as a cash crop in Idifu village due to an increase in the demand of sunflower oil because of the increase of consumers awareness on health benefits of the product, market niche and viability of profit depends on acreage cultivated. Sunflower production is profitable to farmers who cultivate below median acreage (0.8) ha, as exhibited by higher gross margins.

Poor weather condition is an overall major risk which may lead to soil erosion, poor soil fertility, low productivity and hunger. Weather conditions also adversely affect farmers' confidence on borrowing money for investing in sunflower production. Also, poor communication network, lack of awareness on the potentials of financial facilities and famers groups available in the study area, and limited market access to farmer's products are the factors constraining commercialization of sunflower in the study area.

5.2 Recommendations

i. High profitable market is available but most farmers sell their crops through local village collectors and receive low profits; markets should be strengthened, farmers should be given the means of obtaining market information for them to sell their crops at the right time, fair price, and in the right place.

ii. In order to improve the overall quality of harvest and value addition, farmers require knowledge on value addition on their crops. This will increase profit in other words, farmers who process sunflower and sell oil and cake receive more profits compared to farmers who sell seeds only.

iii. Training on good agricultural practices is required. Planting crops which add nutrients to the soil and cultivation of drought resistant crops such as sunflower in the region like Dodoma reduce the impact of climate-related risks which might lead to crop failure in the study area.

iv. Awareness is important among farmers on the potentials they have in their village, and these include financial support, land availability, family support, health service and workforce, which if are well utilized might influence commercialization of sunflower production and reduce or eliminate the cited limits in the study area.

v. Gross margins are expected to be higher for farmers with below median acreage. However, low gross margins for large farms might be the result of farmers not employing good agricultural practices resulting into high production costs. Farmers' education is necessary for efficient and effective production which would and take advantage of large scale production.

vi. In order to utilize the available potentials well and in a productive way, financial assistance and education should be provided to farmers. Social awareness to participate in different village groups must be enhanced. In addition, production

and marketing knowledge is required by farmers in order to implement good agricultural practices.

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APPENDICES

Appendix 1: Questionnaire for sunflower producers (Farmers).

List of questionnaire to assess the factors affecting growth and competitiveness of sunflower value chain in Idifu village

PART 1

Socio demographic characteristics

1. Basic household information			
Interviewer name:		Respondent name	
Village name:	Household no.		Date:

2. Household members:					
Position	Name	Marital Status (Note 1)	Sex	Age	Education (note 2)
House hold head					
spouse 1					
spouse 2					
Number of other adult members (15 -69 years or older):					
Number of children under 14yrs:					
Number of disabled in a family					
Number of elders over 70yrs					
Number of manpower in the family					

Note 1: 1- Married, 2- Unmarried, 3- Divorced, 4- Widow, 5-Separated

Note 2: 1-none, 2-primary, 3-ordinary level, 4- certificate level, 5-advanced level, 6-diploma, 7- university

PART 11 (HOUSEHOLD ASSETS)

Land ownership

3. Do you own land? 1, yes 2, No ……. If yes 3.1

3.1

Acre owned	Land use (note 3)	Acquisition (note 4)	Fertility (note 5)	Cost of land

NOTE3: 1, agriculture, 2, grazing, 3, business, 4, no use, 5 other, specify

NOTE4: 1, inheritance, 2, bought, 3, rent, 4 other, specify

NOTE 5: 1, better. 2, good, 3, moderate. 4, bad

4.

Do you own any of the following: (Items are to be in working condition last 12 months)	**Asset**	**Number**	**Total value**
	Chair		
	bed		
	Table Clock / watch		
	Bicycle		
	Radio		
	Sewing machine		
	Telephone/mobile		
	television		
	Shops or kiosks		
	Car		
	Water pump		
	Tractor		
	Milling machines.		
	Motorbikes		
	Trucks		
	Sawing machine		

Water

5. Do you have access to water? 1, yes…..2, No if yes respond to 5.1

5.2 What is the status of water? (Note 6)

5.3 What are the most use of water? (Note 7)

6. What is the current status of the following in your village (tick where appropriate)

Item name	better	good	moderate	bad
road				
electricity				
Telephone network				
Health services				
Transportation (cars, motorcycles)				
Education services				

NOTE 6: 1, better, 2, good, 3, moderate, 4, bad

NOTE 7: 1, irrigation, 2, domestic use, 3, for animals drinking, 4, other specify

7. Are you a member of any village group? 1…. Yes…..2, No

7.1 If yes

Group name	Activities (NOTE 8)	Participation status (NOTE 9)	Is it beneficial? 1, yes, 2, no

7.2 If not why? (NOTE 10)

8. Do you engage in any economic activity apart from agriculture? 1…yes 2…. No if yes 8.1

8.1

Type of activity (NOTE 11)	Time spent	Source of capital (NOTE 12)	Income generated

9. Do you receive any agricultural trainings in this village? 1 yes 2 no

9.1 If yes

Type of training (NOTE 13)	Trainers (NOTE 14)	Frequency of training (NOTE 15)	Commission from training 1, yes, 2, no	Status of training (NOTE 16)	Benefit of (training Note 17)

NOTE 8: 1, agriculture, 2 business, 3 social groups, 5, other, specify

NOTE 9: 1, good, 2, moderate, 3, bad

NOTE 10: not allowed, 2, busy, 3, I don't see any importance, 4, other specify

NOTE 11: 1, processing 2, business, 3, fishing, 4, other specify

NOTE 12: 1, own source, 2, loan, 3, from family, 4 other specify:

NOTE 13: 1 farming training, 2, business training, 3, environmental training, 4, gender training 5, other, specify

NOTE 14: 1,Village leaders, 2,sponsors, 3, projects personnel, 4, government members, 5, other, specify

NOTE15: 1, more frequency. 2, moderate, 3, less frequency

NOTE 16:1, better, 2, good, 3, moderate, 4, bad

NOTE 17: 1, more benefit, 2, somehow I benefit, 3, no benefit at all

ACCESS TO FINANCE

10. Do you have any access to finance? If yes 10...1, if no 10.2

10.1

Creditor	Status of access (NOTE 18)	Nature of conditions (NOTE 19)	Finance use (NOTE 20)

10.2 If no why (NOTE 21)

11. If you are involved in sunflower cultivation

Type of seeds cultivated (NOTE 22)	Acre cultivated	Total harvest par year	Is sunflower cultivated enough to cater the family needs? 1, yes, 2. No	Surplus for sale 1, yes, , no	Sale duration (NOTE 23)	Is market for sunflower available? 1. Yes, 2. No

12. Do you have enough food to support your family thought the year? 1… yes… 2... No

PART 111

POLICIES AND PROCESSES

13. How do you view agricultural support from the following? Tick where appropriate

government	better	good	moderate	bad
Village leaders				
Non-government org				
sponsors				
projects				
family				

NOTE 18: 1, good, 2, moderate, 3, bad

NOTE 19: 1, light, 2, moderate, 3, difficult to comply

NOTE 20: 1, agriculture, 2, business, 3, family use, 4, other, specify

NOTE 21: 1, difficult to comply, 2, I don't need money, 3, I am afraid, 5, other specify

NOTE 22: 1, modern, 2, local, 3, other, specify

NOTE: 23, 1, soon after harvest, 2, wait the price to rise then sell

13. Is there any difficulties in implementing agricultural policies and strategies? 1 … yes… 2… no. If yes why (NOTE 24)

PART 1V

VULNERABILITY AND STRATEGIES

Serious event	How severe? (NOTE 25)	How did you cope with the income loss or costs? Please indicate the most important strategy
Serious crop failure		
Death/serious illness in family (productive age-group/adult)		
Loss of fertile land because of drought		
Loss of grazing area because of drought		
Loss of waged employment because of drought		
Climate/drought/floods		
Price changes on products and consumer goods because of drought and seasonality		
Land conflicts		

14. Please indicate the degree of successful from the above strategies

Serious event	strategy	Status of success			
Serious crop failure		**better**	**good**	**moderate**	**bad**
Death/serious illness in family (productive age-group/adult)					
Loss of agriculture land because of drought					
Loss of grazing area because of drought					
Loss of waged employment because of drought					
Climate/drought/floods					
Price changes on products and consumer goods because of drought					
Land conflict					

NOTE 24: 1, they are not clear, 2, no benefit, 3, poor support from government, 4 other, specify

NOTE 25: 1, more frequently, 2, moderate, 3, less frequently

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Appendix 2: Questionnaire for processors (Sunflower Processing Machine Group)

1. Name of respondent
2. Village
3. Gender of respondent ……1=male 2=female
4. Age of respondent…….
5. Marital status 1=married 2=single 3=widowed 4=divorced
6. Education level of respondents 1=no formal education 2=primary 3=secondary 4=post-secondary
7. How do you rank the quality of the oil processed from this machine in relation to the oil from other processor? 1, low quality 2, equal 3, high quality
8. Do most villagers process their sunflower here? 1… yes,,,,, 2, no
9. If yes how much percent? .....
10. If no why? 1, price. 2. Cost. 3 they don't know, 4 other specify