



# Export promotion and farmers' welfare impact: Evidence from common beans (*Phaseolus vulgaris* L) farming in Arusha, Tanzania

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## LIST OF ABBREVIATIONS

|         |  |
|---------|--|
| ARDL    | Autoregressive-distributed lag                     |
| ATT     | Average Treatment Effect                           |
| CIAT    | International Centre for Tropical Agriculture      |
| FAO     | Food and Agriculture Organization                  |
| FAOSTAT | Food and Agriculture Organization Statistics       |
| FDI     | foreign direct investment                          |
| FYDP    | Five Year Development Plans                        |
| GDP     | Gross Domestic Product                             |
| ISS     | Institute of Social Studies                        |
| JKIA    | Jomo Kenyatta International Airport                |
| PPML    | Poisson Pseudo-Maximum Likelihood                  |
| PSM     | Propensity Score Matching                          |
| REPOA   | Research on Poverty Alleviation                    |
| SDGs    | Sustainable Development Goals                      |
| TAHA    | Tanzania Horticultural Association                 |
| UNCTAD  | United Nations Conference on Trade and Development |
| URT     | United Republic of Tanzania                        |

## ABSTRACT

Agriculture, including horticulture is a mainstay of development in Tanzania - however the country has not exploited much of its enormous export potential of horticultural produce. Recent studies on the horticulture production and export promotion have focused on various issues. These studies have provided significant contribution to the overview of the production, marketing and business-related aspects. However, the empirical relationship between horticulture export and its contribution on small scale farmer's welfare has been somewhat neglected in the literature despite its role in the development process being long recognised. Therefore, using quantitative analytical methods this study assesses the impact of horticulture export promotion on farmers' welfare in Arusha Tanzania.

The results of this study suggest that common beans' farmers in Tanzania are aware of significant role of exporting their crop than trading locally. Results further suggest that different factors such as age of a farmer, household size, other business, access to extension and contract farming are likely to influence the decision of farmers to export common beans. In addition, gender, marital status, experience, land size allocated for common beans, contract farming and marketing training can significantly influence the extent of common beans export. Specifically, it was observed that there's positive impact of common beans export on farmers' consumption expenditure. However, the export does not have any significant impact on farmers' income and assets ownership.

The study recommends that policy attention needs to shift from supporting and regulating particular trade policies only but should rather focus on how farmers will be trained and utilize the available opportunity of common beans export market. In addition, horticultural contract farming should be strengthened by the Government and monitored by the extension officers at the grassroots.

## INTRODUCTION

### 1.1 Background of the study

Economic growth is the leading goal for policy makers worldwide and is a primary aim of developing countries and a recurrent theme in the trade and development literature is the role of exports in this process (Sanjuán-López and Dawson, 2010; Hernandez, 2011). It is a conventional wisdom among policy makers and academics that export is a key factor in promoting economic growth in developing countries (Myovela *et al.*, 2015). However, one concern is that many developing countries are heavily dependent on primary commodity exports to developed countries (Alam and Myovella, 2016). Agricultural exports therefore can play an important role in economic growth, and export-led growth from agriculture may represent optimal resource allocation for those countries that have a comparative advantage in agricultural production particularly in Sub-saharan African countries such as Tanzania (Sanjuán-López and Dawson, 2010; Lwesya, 2018; Kanyangemu and Kundu, 2019).

Agriculture, including horticulture is a mainstay of development in Tanzania (Mallya 2019; Gupta, 2020). Horticulture industry in Tanzania is the fastest growing subsector within the agricultural sector with an annual average growth of about 9 - 12 per cent per annum (Match-Maker, 2017; TAHA, 2018; Juma *et al.*, 2019). This record of growth is more than double the overall annual growth rate of the agricultural sector. In 2015, horticulture contributed 38% of the foreign income earned from the agriculture sector. The exports value in 2015 reached US \$ 545 million, compared to US \$ 64 million in 2005. Horticulture sub sector employs about 2.5 million people, which makes the industry a major employer within the agricultural sector (Match-Maker, 2017).

The horticulture industry is dominated by small-scale farmers with less than 2 hectares, especially in vegetables production whereby they account for about 70% of vegetable producers. Majority of these small-scale farmers are not connected to the regional and international markets and therefore have limited chance to conduct export business themselves (Match-Maker, 2017). Tanzania is among world top 20 producers of fresh vegetables according to FAOSTAT data, although it has an insignificant position in the export of vegetables, mainly due to the current business arrangements whereby Tanzanian exporting companies are subsidiaries of large aggregation companies often based in Kenya, and these kinds of exports are not fully captured in Tanzania data (Match-Maker, 2017). The horticulture sector is dominated by varieties of vegetables include Asian vegetables, baby corn, baby marrow, beetroots, beans, cabbage, carrots and baby carrots, cauliflower, eggplant, kale, leeks, onions and shallots, okra, peas, potatoes, spinach, tomatoes and common beans.

The common bean (*Phaseolus vulgaris L.*) is one of the principle food and cash crop legumes grown in the tropical world and most of the production takes place in developing countries (Hillocks *et al.*, 2006). Common or French beans are by far the most important pulse crop both as a source of dietary protein and calories and as a



source of farm income (Mishili *et al.*, 2015; Mutungi *et al.*, 2020). The crop is by far the most important legume in Tanzania. At least 34% of smallholder rural households cultivate the beans for its green leaves, green pods, and dry beans, and 16–41% sell part of the harvest to raise revenue (Stahley *et al.*, 2019; Mutungi *et al.*, 2019).

Various literatures show that Tanzania has not exploited much of its enormous export potential of horticultural produce and yet it is among the 20 biggest producers of horticultural crops in the world but does not feature among the 20 biggest exporters (Mayala and Bamanyisa, 2018; Gramzow *et al.*, 2018). Also, various challenges facing horticultural sector have been documented including limit or inhibit export of horticulture products both on the demand and supply side (Mashindano *et al.*, 2013). Thus, development of the horticultural sector in Tanzania particularly promotion of its export is inevitable and will offer many opportunities for investors, technology suppliers and knowledge institutes but at the same time challenges related to the investment climate in Tanzania will have to be addressed.

## **1.2 Problem statement and initial research questions**

Tanzania's level of production of horticulture is increasing and there is still significant production potential although it does not contribute much to the vegetable export market despite the fact that she is among the top 20 producers of the crop (Mashindano *et al.*, 2013). This implies a clear and undesirable mismatch between vegetable production in Tanzania and official exports from the country (Mashindano *et al.*, 2013; Match-Maker, 2017). As a consequence, the country is losing significant benefits in terms of lost employment opportunities, lost incomes and more so the fact that the international statistics on production and exports are distorted. In addition, Tanzania does not seem to utilize her comparative advantage in the production of agro-based products in making potential impact in the world export market (Mashindano *et al.*, 2013).

Analysing the horticulture sub-export sector's performance, with a specific focus on the determinants of horticultural exports, had attracted the interest of policymakers and scholars in various areas of the world, particularly in developing countries (Dube *et al.*, 2018). This is because the export of horticultural items allows many developing nations to diversify their export base, which is currently dominated by tea, coffee, and cocoa exports. As a result, developing countries will be less reliant on a small number of core products. However, recent studies on the horticulture production and export promotion have focused on various issues such as factors development of horticulture extension support system for the small holder farmers influencing youth involvement in Horticulture Agribusiness in Tanzania; the role of seed companies on the horticultural production; perception of chemical usage in horticulture production; horticulture value chain; and reduction of postharvest losses (Maginga, 2019; Guijtand Reuver, 2019; Ng'atigwa *et al.*, 2020; De Blasis, 2020; Samwele *et al.*, 2020; Warraet *et al.*, 2020).

On the other hand, Tanzania's government and other stakeholders are currently promoting export in various agricultural commodities including horticultural produce. These studies have provided significant contribution to the overview of the production, marketing and business-related aspects. However, the empirical relationship between horticulture export and its contribution on small scale farmer's welfare has been somewhat neglected in the literature despite its role in the development process being long recognised. Therefore, this study seeks to understand the link and critically assess the impact of horticulture export promotion on farmers' welfare.

### **1.3 Overall objective**

The overall objective of this study is to assess the link and critically assess the impact of horticulture export promotion on farmers' welfare.

#### **1.3.1 Specific objective**

- i. To examine socio-economic, institutional and production factors influencing horticulture export and its extent by small scale farmers
- ii. To analyse the impact of horticulture export on farmers welfare

### **1.4 Research questions**

- i. What are the socio-economic, institutional and production factors influencing horticulture export and its extent by small scale farmers?
- ii. What is the impact of horticulture export on farmers' welfare?

### **1.5 Rationale for the study**

Export promotion on the horticultural crops in Tanzania and its contribution on farmers welfare has been under emphasized for different reasons resulted from socio-economic, institutional and production factors. The impact of export promotion activities intending to address these problems can be therefore expected to differ across goods with different degree of differentiation. Empirical evidence on this respect is virtually inexistent. This study aims at filling this gap in the literature by providing estimates of the effect of these factors over farmers farming practices. In addition, selected horticultural farmers in the study area will illustrate the unique patterns and specific areas for policy interventions in order to promote and develop export of horticultural crops. For instance, examining various institutions and how they link in the process of supporting small scale farmers will draw a clear map on how to design policies that harmonize and minimize challenges in export sector. Also, understanding socio-economic factors that determine farmers' decision to export horticultural crops will help to design different policies that consider the roles of socio-economic, institutional and production factors. Furthermore, the cross-cutting issues will provide an avenue for further research that are important for horticultural production in Tanzania. The present research is therefore intended to make contributions to the literatures on determinants, extent, and roles of institutions in promoting horticultural crops exportation in Tanzania.

## LITERATURE REVIEW

This chapter presents the theoretical and empirical perspectives related to common beans export in the past studies. The Chapter covers the Overview of Common Bean production and export in Tanzania, Horticultural Crops export, institutional support for common beans production in Tanzania, government support in horticultural sub-sector, policies and strategies supporting horticultural export in Tanzania, empirical review of horticultural export and theoretical review of the study.

### 2.1 Overview of common bean production and export in Tanzania

Horticulture is an important sub-sector that can exploit the potential of the country particularly the underutilized arable land of 44.0 million ha. The Tanzanian horticultural industry faces several universal challenges, namely, weak production base, low productivity and quality, invisibility and marginalization, and limited access to finance especially lack of long-term financing and investment. It also faces bottlenecks in land, policy and infrastructure, inadequate market development support, weak industry linkages, limited entrepreneurship capability and inadequate skilled and competent human resources (URT, 2010). Common beans (French beans) is regarded as high valued crop amongst other horticultural produce with enormous potentials in world market (TAHA, 2011).

The common bean belongs to the legume plant foods with a long history in sub-Saharan Africa due to their multiple benefits. Pulses, and legumes in general, can play an important role in agriculture because their ability to biologically fix atmospheric nitrogen and to enhance the biological turnover of phosphorous; thus, they could become the cornerstone of sustainable agriculture in. Due to their rich nutritional value, pulses are an important part of a balanced, healthy diet. Legumes are a good source of protein and of micronutrients such as iron and zinc. Africa (Snapp *et al.*, 2018).

Many legume plant foods including common beans provide an important source of income as they can be sold for high prices at local or international markets. The price often reflects the nutrition packed nature of legume grains, with a high protein content. At the same time, a household survey in Malawi indicated that farmers were not always realizing a profit from legume sales, as labour inputs were high, access to good seed was poor, and legume prices varied tremendously (Snapp *et al.*, 2002). The crop (common beans) does not get the attention it deserves from the public sector nor the opportunity to attract private sector investment due to myriad of policy, institutional, technical, and socio-economic constraints. Legumes particularly common beans can therefore play a critical role in achieving the Sustainable Development Goals (SDGs) (Ojiewo *et al.*, 2018).

Green bean is grown as a cash crop by large scale and smallholder farmers, and more than 90 percent of the crop produced in eastern Africa is exported to regional and international markets. Green bean/snap bean is an important export vegetable crop in

Kenya, Tanzania, and Uganda. Market preferences for green bean pods differ with regions. Most of the snap bean produced in Eastern Africa are round and thin mainly to suit European markets. Green bean is also grown by large commercial companies for export to overseas supermarkets and for canning industries. Due to the high pod quality, packaging, and post-harvest care required for export produce, smallholder farmers are organized into groups (CIAT, 2006).

FAO (2021) shows that green beans production trend from 2015-20219 by region, Africa's Production share accounts for (3.1%) which ranks the third, while Europe (3.7%) ranks the second and Asia (91.9%) leads the production of common beans in the world. In East Africa, Kenya is the leading producer of common bean (French bean), while Tanzania lags behind in the production of implying huge opportunity in the regional market.

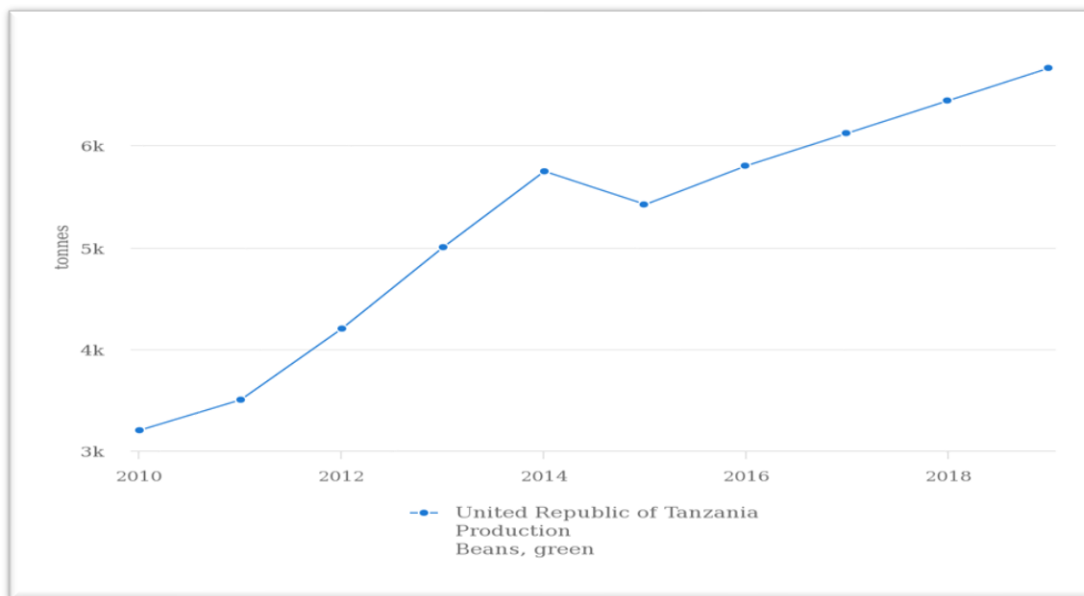
In Tanzania, common beans are grown mostly in the northern Tanzania of Moshi, Arusha, Manyara province and little production in Morogoro province. Family growers in this mountainous area use a combination of rain-fed and irrigated agriculture. Most farmers own half a hectare of land which they efficiently manage with farmyard manure. Due to the strict inspection of the crop abroad, they keep off pesticides, all together. Fresh French Beans and different types of peas are currently the main exports in the (traditional) vegetables product group, accounting for about 50% in quantity and value (Match Maker Associates, 2017). Despite Tanzania being among world top 20 producers of fresh vegetables, it has an insignificant position in the export of vegetables, mainly due to the current business arrangements whereby Tanzanian exporting companies are subsidiaries of large aggregation companies often based in Kenya, and these kinds of exports are not fully captured in Tanzania data. (Match Maker Associates, 2017).

**Table 1: Production trend of green beans in Tanzania from 2010-2019**

| <b>Year</b> | <b>Production (000 Tonnes)</b> |
|-------------|--------------------------------|
| <b>2010</b> | 3200                           |
| <b>2011</b> | 3500                           |
| <b>2012</b> | <b>4200</b>                    |
| <b>2013</b> | 5000                           |
| <b>2014</b> | 5745                           |
| <b>2015</b> | 5419                           |
| <b>2016</b> | 5800                           |
| <b>2017</b> | 6120                           |
| <b>2018</b> | 6440                           |
| <b>2019</b> | 6760                           |

**Source:** FAO STAT (2021)

**Figure 1: Showing production trend of green beans in tones from 2010-2019**

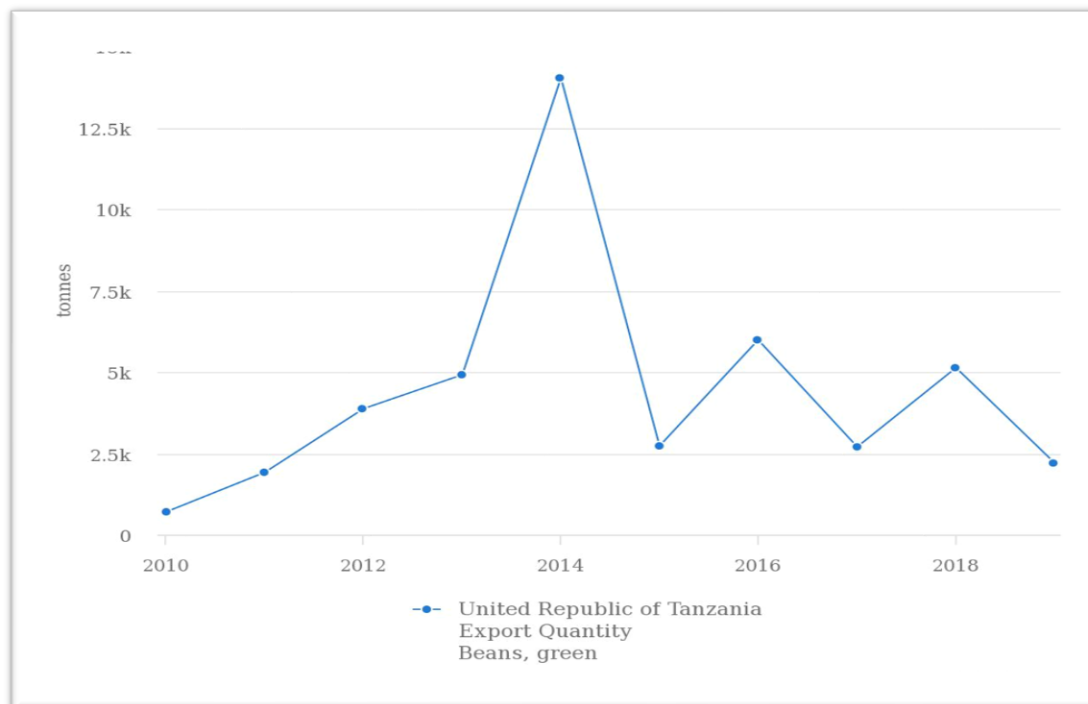


**Source:** FAO STAT (2021)

## 2.2. Horticultural crops export

Increased horticultural produce trade between developing and high-income countries has been linked to: 1) increased foreign direct investment in developing country horticultural sectors; 2) increased horticultural export chain consolidation and vertical coordination; and 3) increased public food safety regulations and the spread of private food standards (Van den Broeck *et al.*, 2018). Tanzania ranks 5<sup>th</sup> worldwide in bean production and is the leading producer of beans in Africa which is produced almost entirely under intercropped systems with maize and other crops (FAOSTAT, 2014; Binagwa *et al.*, 2014). However, the main importing countries for Tanzania green beans are United Kingdom and European Union. Exports of green beans from the United Republic of Tanzania are fluctuating since Tanzania had its highest peak in 2014 for the decade, currently in 2019 recorded exports of 2198(000) tonnes. Despite of the sluggishness in export quantity, export value has intended to increase significantly through 2010 - 2019 period ending at 2,351 (000) US\$ in 2019. The export value has increased by 896.19 % from 2018 to 2019 (FAO, 2020).

**Figure 2: Showing Tanzania exportation of green beans from 2010-2019**



**Source:** FAO STAT (2021)

### **2.3 Institutional support for common beans production in Tanzania**

National Development Vision 2025, which highlights the need to streamline and prioritize the country's development planning, implementation and follow-up mechanisms has led to a series development plans. One of it being the first Five Year Development Plans (FYDSPs) (FYDP 2011/12-2015/16) which aims to put in place the basic conditions for high, broad-based and pro-poor growth (FADPA, 2014). The Second Five Year Development Plan, 2016/17- 2020/21 with the theme "Nurturing Industrialization for Economic Transformation and Human Development" aimed at enhancing the pace of progress towards the Tanzania Development Vision 2025(URT, 2016).

The FYDP I showed failure to transform the land through a shift from traditional to commercial use. This was to be done through facilitation and promotion of contracts between large scale farmers and out-growers in partnership with nuclear farmers. Large tracts of land were to be availed to commercial farmers and industrialists. However, this did not happen, and most of the planned projects, which required relatively large tracts of lands, have not been fully developed. Furthermore, Delays in decision making in a fast changing and dynamic global market, time is of the essence as projects feasible today may easily lose viability if there are delays in taking off (URT, 2016). The FYDP II focuses on many aspects including improvement of the existing Business and Investment Environment to be more conducive. The private sector remains the engine of growth, poverty reduction and the driver of economic transformation. The three roles cannot be effectively played if the business and investment environment is unsupportive and/or unfriendly. Large, small and micro

businesses need to strive and become effective partners in the development process. Making smallholder farmers, micro and small businesses part of the growth process, is an effective means to achieving inclusive growth (URT, 2016).

Tanzania Horticultural Development Strategy 2012- 2021 is a result of a strong and growing partnership between Government and the Private Sector in charting the future of the Horticulture Industry. The Strategy integrates with and supports the National Export Strategy and other relevant agriculture, trade and poverty alleviation strategies. The strategy envisages facilitating the development of horticultural industry so as to improve nutritional status, increase incomes and reduce poverty while increasing productivity and quality of the produce (URT, 2010).

### **2.3.1 Government support in horticultural sub-sector**

The relationship between efficiency and per capita spending in agriculture is positive, but with a decreasing rate. This means that there could be a saturation point, beyond which the impact of additional public expenditure on agricultural efficiency could be very limited. Nevertheless, most African countries are still well below this threshold, suggesting that there is substantial room to increase efficiency through additional public expenditure in the sector (Pernechele *et al.*, 2021).

Research and development in agricultural has focused mainly on cereal crops while relatively little attention has been given to legumes despite their nutritional, health, ecological and economic importance. Cereal crops are referred to as staple or food security crops, while most legumes are non-staple crops or considered as cash crops for export. Thus policymakers and stakeholders recognize two categories of crops: cash crops and non-cash crops. Legumes are often wrongly grouped in the latter category, while they are targeted for cash sales, even fetching better prices in the local markets (Ojiewo *et al.*, 2018). Furthermore, Studies in India have showed that legume prices are often not regulated or supported by government policies, and vary tremendously from one market to another over time compared to stable prices associated with cereal prices (Rao, 2000). Spending a higher proportion of the budget for agriculture on public goods, such as research, extension services and technical assistance, is positively correlated with agricultural efficiency. This is particularly the case in countries with a more advanced level of agricultural transformation (FAO 2021).

#### **2.3.1.1 Policies and Strategies supporting horticultural export in Tanzania**

The horticulture industry has been operating within the framework of the national policy priorities, national framework of institutions as well as the legal framework. In Tanzania, horticulture is regarded as a subsector of agriculture. It falls under sectoral (agricultural) policies which include "*The draft of the national agricultural policy of 2010*" which seeks to revolutionize agriculture through modernization and productivity enhancement and The National Horticultural Strategy 2010-2020 which seeks to double agricultural exports by 2020.

*"The national irrigation policy of 2009"* seeks to expand land under agriculture and improve agricultural productivity and profitability for food security and poverty alleviation through irrigation. In addition, horticulture industry also falls under the "agricultural marketing policy of 2007" which seeks to develop an efficient, effective, flexible, accessible, and equitable agricultural marketing system such as institutional and tax reforms in value chain, infrastructure and private sector development.

Also, horticulture industry falls under "Rural Development Policy of 2001" focusing on increasing rural incomes through improving productivity of the agricultural sector, and growth of rural non-farm businesses to reduce poverty.

TAHA has successfully advocated for various policy reforms through lobbying and advocacy for policy reforms that have had a favorable impact on the horticultural industry as a whole. For example, TAHA was instrumental in getting Tanzania's government to abolish the 18 percent VAT on airfreight for horticulture products, which was impeding Tanzanian enterprises' ability to compete in international markets. Kenya's import prohibition on Tanzania's cut flowers in transit (placed by Kenya in 2011 to safeguard Kenya's horticulture industry from pests) was also abolished in 2013 by TAHA through JKIA for export to Europe and other countries.

## **2.4 Empirical review of horticultural export**

Several empirical studies on agricultural exports, particularly in the horticulture industry, have been done. In order to determine the elements that influence the export of horticulture commodities, many methods of study have been used. Some of the findings were comparable, while others were dissimilar.

Meme, (2015) used secondary time series data for horticultural export, real exchange rates, agricultural GDP, real interest rate, and foreign income for a period of 30 years from 1984 to 2014 to examine the factors impacting the export of horticulture commodities in Kenya. The Cointegration, error correction model was used to analyze this type of data. The findings demonstrated that the real exchange rate, agriculture GDP, and real interest rate all had a substantial impact on horticulture exports. Foreign earnings were found to be minimal in comparison to horticulture exports. The report advised the government to assess and implement policies aimed at raising agricultural GDP, achieving competitive exchange rates, and lowering lending rates in order to boost Kenyan horticultural exports.

Mold and Prizzon (2008) discovered that pricing had a minor impact on agricultural exports. The results of pooled regression estimates of unit price elasticity of African exports for the period 1980-2001 revealed that agricultural exports had a negative and substantial co-efficient, meaning that African countries boosted agricultural exports as international prices fell.

A comparable empirical study was undertaken by Braha et al., (2017) to analyse the primary factors of its agricultural export. For the period of 17 years, from 1996 to 2013,



the baseline gravity model was used to analyse Albanian export flows using conventional gravity variables. To examine the effects of the Albanian Diaspora, exchange rate and price stability, trade liberalization, and institutional distance, the model was estimated in a stepwise manner using the Poisson Pseudo-Maximum Likelihood (PPML). The main findings of this study revealed that the size of the economy has a substantial impact on agricultural export, implying that importers' absorption capacity has a greater impact on Albanian productive potential

Furthermore, Dube et al., (2018) examined the horticulture subsector's export performance in Ethiopia. The study looked at the elements that influenced Ethiopia's export performance from 1985 to 2016. The study also used secondary time series data from the National Bank of Ethiopia, Ethiopia Horticulture Producer Exporter Association, Ministry of Agriculture of Ethiopia, FAOSTAT, UNCTAD, and the World Bank to examine the relationship between the series of data using the Autoregressive-distributed lag (ARDL) bound test Cointegration approach. There was Cointegration among the data series, as demonstrated by the Error Correction Model. The real effective exchange rate, Ethiopia's real GDP, foreign direct investment (FDI), pricing, and the structural break all had a substantial impact on horticulture export performance in the short and long run, according to the model. Only in the long run did foreign GDP and real interest rates prove to be relevant. As a result, the study recommends supportive macroeconomic measures to boost Ethiopia's horticultural export performance. Nonetheless, the analysis was country-specific, with a focus on macroeconomic and supply-side aspects.

Salasya (1989), in a study on analysis of factors that influence export of French beans from Kenya used linear regression of total French beans exports on price and air freight charges. The regression findings showed that the co-efficient for price was positive but insignificant at 5 percent level. The air-freight co-efficient was negative and statistically significant at the 5% level. She claimed that price had a minor impact on the number of French beans shipped.

## **2.5 Theoretical review of the study**

### **2.5.1 Factor endowment theory**

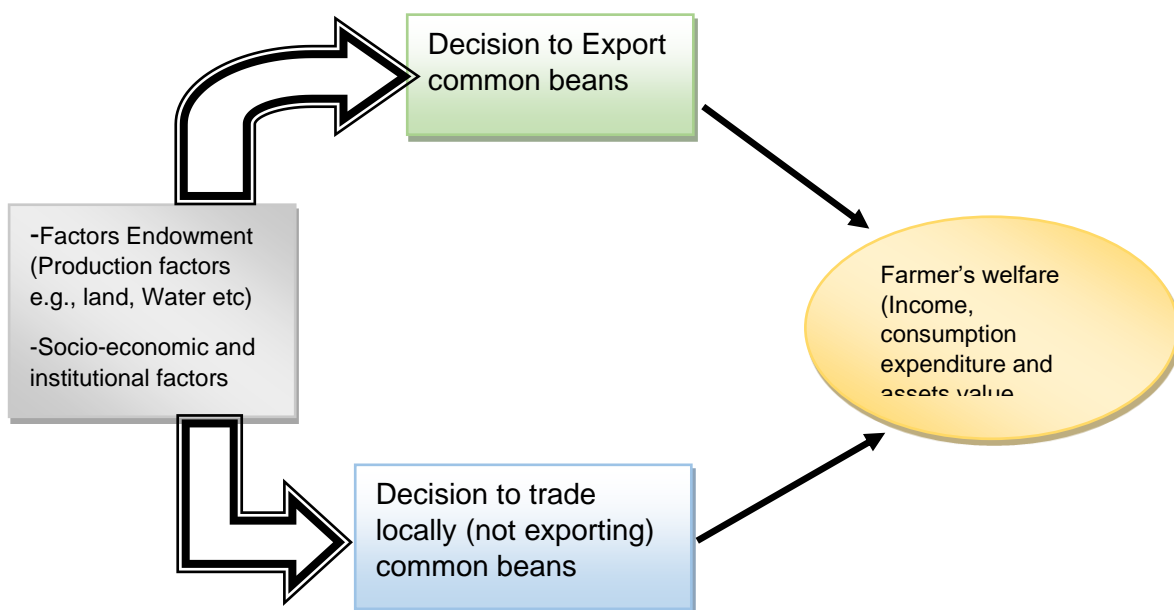
Heckscher and Ohlin's (1935) factor endowment theory enhanced the classical theory of commerce by emphasizing the role of disparities in the endowments of factors of production in affecting commodity export and import, and thus trade patterns. The theory explains commodity trade patterns in terms of different countries' factor endowment proportions, based on the assumption that no factor of production is internationally mobile, despite the fact that some factors of production are stated to travel across borders in real life (Caves *et al.*, 2007). Furthermore, according to the Heckscher-Ohlin hypothesis, countries would gain from specializing in the manufacturing of commodities utilizing their most abundant factor of production. This means that the theory assumes substantial trade flows between nations with differing technology and factor endowments, but minor trade flows between nations with

similar circumstances. The fact that even countries with identical technology and factor endowments may still trade in huge volumes proves this thesis false, given the majority of trade flows occur within industries (Caves *et al.*, 2007).

### 2.5.2 Conceptual framework

From the factor endowment theory above and to expand the argument of the theory, the current study seeks to know what other factors are than factor endowments that can influence the country's export, and more specifically, the horticultural produced crops. It is conceptualized that, common beans farmers in Arumeru District in Arusha are endowed with favorable resources (production factors) for common beans farming such as arable land, water and ready market as compared to other regions in the country. Therefore, given these resources together with other socio-economic and institutional factors influence farmers to engage in common beans export as indicated in Figure 3. Thus, the study aims to understand the link between these factors and their contribution in farmer's decision to export or not to export and if exporting what is the impact on their welfare.

**Figure 3: Conceptual framework**



**Source:** (Author's conceptualisation)

## **METHODOLOGY**

This chapter presents research methodologies employed in this study. It describes research approach, research design, study area, study population, sample size, sampling technique, data collection, and analysis methods used.

### **3.1. Description of the study area**

The study was conducted in Arumeru district in the Arusha region, north of Tanzania, where is a perfect location for export because of its good connections to the major eastern African seaport of Mombasa. Moreover, the region's equatorial climate allows the cultivation of vegetables and fruit all year round. Two wards with highest number of common beans exporters were also purposively selected which are Kikwe and Mbuguni Wards.

### **3.2 Research design**

This study employed a cross-sectional design to collect data on relevant variables from a variety of common beans farmers in the study area. The information brought deeper insights and better understanding of the problems. The study reflects a mix of both qualitative and quantitative data and methodological treatments.

### **3.3 Data collection**

Data was obtained from both primary and secondary sources. Primary data was obtained using semi-structured and structured questionnaires while secondary data was obtained from journals, articles, and research studies. Both quantitative and qualitative data were collected for the study. For the quantitative data, semi-structured questionnaires were used. The data generated through the questionnaires were analysed using STATA software.

### **3.4 Sample size and sampling technique**

One hundred and thirty-one (131) respondents were interviewed. Out of this, 91 were engaged in common beans export while 40 were trading common beans locally. Purposive sampling (non-probability sampling) technique was used based on the intention or the purpose of study. The selected elements entail the population which only suits the best for the purpose of our study. Key informants i.e., trade, community development officers and agricultural extension officers were also interviewed to share general information on the institutional support for common export.

### **3.5 Analytical methods**

#### **3.5.1. Socio-economic, institutional and production factors influencing common beans export and its extent by small scale farmers**

##### ***Probit regression model***

This study will employ binary probit model with the assumption that, the decision by small holder farmer to export and the intensity/extent of exportation are decisions

which are made simultaneously. Thus, in this study the first stage is decision to export equation that will be estimated by using a probit model as described in equation 1.

$$d_i^* = X'_{1i}\beta_i + U_i \quad U_i \sim N(0,1) \quad (1)$$

1 if  $d_i^* > 0$  and 0 if  $d_i^* \leq 0$

Where  $d_i^*$  the latent discrete participation choice variable that denotes binary censoring (i.e., 1 means a farmer decides to export, and 0 means otherwise).  $X'_{1i}$  are vector of explanatory variables hypothesized to influence participation choice (i.e socio-economic, institutional and production factors) and  $\beta_i$ s are vector of parameters and  $U_i$  is the standard error term.

### **Tobit regression model**

The Tobit regression model is employed to quantify the magnitude and direction of the effects of the factors influencing common beans export. The Tobit or censored normal regression model assumes that the observed dependent variables  $Y_j$  for observations  $j = 1, \dots, n$  satisfy:

$$Y_j = \max(Y_j^*, 0) \quad (2)$$

Where the  $Y_j^*$ 's are latent variables generated by the classical linear regression model:

$$Y_j^* = \beta' X_j + U_j, Y_j = \begin{cases} Y_j^* & \text{if } Y_j^* > 0 \\ 0 & \text{if } Y_j^* \leq 0 \end{cases} \quad (3)$$

Where  $X_j$  denotes vector of regressors, possibly including 1 for the intercept, and  $\beta'$  denotes the corresponding vector of parameters. The model errors  $U_j$  are assumed to be independently normally distributed:  $U_j \approx N(0, \sigma^2)$ . An observation of 0's on the dependent variable could mean either a "true" 0 or censored data  $Y_j$  or would always equal  $Y_j^*$  and the true model would be linear regression and not Tobit.

Tobit model parameters do not directly correspond to changes in the dependent variable brought about by changes in independent variables. According to Greene (2003), the marginal effect on the intensity of market participation due to changes in the explanatory variable is given as follows:

$$\frac{\partial E\left[\frac{Y_j}{X_j}\right]}{\partial X_j} = \beta\phi\left[\frac{\beta' X_j}{\sigma}\right] \quad (4)$$

### **3.5.2 Modelling the impact of horticulture export on farmers welfare**

In this research, Propensity Score Matching (PSM) approach will be used to examine the impact of horticulture export on farmers' welfare which will be measured by Income as an indicator for welfare. The method compares the welfare of farmers who are exporting and those who are not. The parameter of interest in the estimation of the propensity score is the Average Treatment Effect on the Treated (ATT). The propensity score  $p(Z_i)$  is defined as the conditional probability of farmers to export horticultural crops given pre-participation characteristics:

$$p(Z_i) \equiv Pr[L_i = 1|Z_i] = E[L_i|Z_i]; p(Z_i) = F\{h(Z_i)\} \quad (5)$$

where  $L_i = (0,1)$  is the indicator of mobile money based enterprise participation and  $Z_i$  denotes a vector of pre-participation characteristics, and  $F\{ . \}$  can be a normal or logistic cumulative distribution. The propensity score can be predicted with either the logit or probit model. The predicted propensity scores can then be used to estimate treatment effects given the propensity score, the three effect are evaluated as:

$$ATE = E[E\{Y_i^*|L_i = 1, p(Z_i)\} - E\{Y_i|L_i = 0, p(Z_i)\}] \quad (6)$$

$$ATT = E[E\{Y_i^*|L_i = 1, p(Z_i)\} - E\{Y_i|L_i = 0, p(Z_i)\}|L_i = 1] \quad (7)$$

$$ATUT = E[E\{Y_i^*|L_i = 1, p(Z_i)\} - E\{Y_i|L_i = 0, p(Z_i)\}|L_i = 0] \quad (8)$$

Where  $Y_i^*$  and  $Y_i$  are two counterfactual outcomes of those who are exporting and those who are not exporting

**Table 2: Definition of variables and measurement**

| <b>Variables</b>                         | <b>Definition and measurement</b>   |
|--|---|
| <b>Dependent variables</b>               |   |
| Participation in Export                  | 1 If a farmer is participating is exporting common beans, 0 otherwise   |
| Annual Gross farm Income                 | Total amount of income from the sale of the common beans (in TZS)   |
| Assets                                   | Current monetary value of assets owned by a farmer he/she started since common beans farming (in TZS)   |
| Household Expenditure                    | Household expenditure in TZS. (For precision, farmers were asked to remember their expenditure on quarterly basis). These expenditures included food, non-food items, different community contributions, entertainment and emergencies. |
| <b>Independent variables</b>             |   |
| <b>Socio-economic factors</b>            |   |
| Age                                      | Age of household (measured in years)  |
| Household size                           | Number of members of household (count)  |
| Experience                               | Farmers experience in common beans production   |
| Gender                                   | Gender of the respondent (farmers)  |
| Marital status                           | Marital status of a farmer (1 if married, 0 =otherwise)   |
| Education                                | Education level of farmers (measured in number of years in school and then categorized).  |
| Farm season                              | Farmers were asked if they farm on season basis (1=Yes, 2=No)   |
| Other business                           | Farmers were asked if they were engaged in other economic activities in the last season   |
| <b>Production as the last per season</b> |   |
| Total Land size                          | Total land size owned by a farmer (acres)   |
| Land size Beans                          | Size of the land dedicated for common beans production (acres)  |

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|                              |  |
|------------------------------|--|
| Fertilizer costs             | Total costs of fertilizer (all types of fertilizers used were asked and total monetary value in TZS. were computed)                                      |
| Pesticide costs              | Total costs of pesticides (all types of pesticides used were asked and total monetary value were computed)   |
| Labour costs                 | Total costs used for labour (farmers were asked to remember number of labour used in each farming activities and their total costs were computed in TZS) |
| Yield                        | Production amount (Kg)   |
| Distance to the market       |  |
| <b>Institutional factors</b> |  |
| Access to extension          | Farmers were asked if they had an access to extension services in the last season (1 yes, 2=No)  |
| Extension days               | Number of days visited by extension officers   |
| Group membership             | Farmers were asked if they engaged in any farmers group/association in the last season (1 yes, 2=No)   |
| Access Credit                | Farmers were asked if they had an access to credit in the last season (1 yes, 2=No)  |
| Contract farming             | Farmers were asked if they engaged in contract farming in the last season (1 yes, 2=No)  |
| Grade/Standard compliance    | Farmers were asked if they were focusing on grade/standard compliance in the last season (1 yes, 2=No)   |
| Marketing training           | Farmers were asked if they had an access to marketing training/capacity building in the last season (1 yes, 2=No)  |

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## RESULTS AND DISCUSSIONS

### 4.1 Socio-economic, production and institutional characteristics of common beans farmers

Table presents the descriptive statistics of continuous variables between farmers who are exporting common beans and those who are not exporting. These variables are categorized into demographic factors, market factors, welfare factors and other factors grouped into production as the last year season. Age, household size and experience are the important demographic factors of the farmers interviewed. Total land size, land size for beans production, fertilizer costs, pesticide costs, labour, number of extension days and number of times farmed are the socio-economic factors of common beans farmers gathered into production as the last year per season, distance to the market is grouped into market variables while assets, expenditure and annual gross farm income is categorized into the welfare factors of the common beans farmers (as illustrated in table 1). These are the important socio-economic characteristics of the common beans' farmers interviewed. The socio-economic characteristics of common beans farmers are further explained as follows:

**Table 3: Characteristics of farmers interviewed (continuous variables) using independent t-test**

| Characteristics                          | Mean       |              |            | t-test    |
|--|------------|--------------|------------|-----------|
|  | Exporters  | Local market | Combined   |           |
| <b>Demographic factors</b>               |            |              |            |           |
| Age                                      | 47.5       | 48.7         | 47.9       | 0.5912    |
| Household size                           | 3.9        | 4.2          | 4          | 0.2389    |
| Experience                               | 19.4       | 20.8         | 19.8       | 0.4882    |
| <b>Production as the last per season</b> |            |              |            |           |
| Total Land size                          | 2.02       | 1.8          | 1.9        | 0.1670    |
| Land size Beans                          | 1.6        | 1.5          | 1.59       | 0.5967    |
| Fertilizer costs                         | 148,274.7  | 111,925      | 137,175.6  | 0.0001*** |
| Pesticide costs                          | 39,285.71  | 34,650       | 37,870.23  | 0.0766*   |
| Labour                                   | 52165.62   | 57487.5      | 53790.62   | 0.7133    |
| Extension days                           | 1.72       | 1.55         | 1.67       | 0.0496**  |
| Number of times farmed                   | 1.28       | 1            | 1.2        | 0.0003*** |
| <b>Market</b>                            |            |              |            |           |
| Distance to the market                   | 39.67      | 24.77        | 35.12      | 0.0000*** |
| <b>Welfare factors</b>                   |            |              |            |           |
| Assets (TZS)                             | 12,700,000 | 653,5250     | 10,800,000 | 0.0140**  |
| Expenditure (TZS)                        | 356,450.5  | 369725       | 360503.8   | 0.8518    |
| Annual Gross farm Income (TZS)           | 3,413,718  | 2,574,879    | 2826531    | 0.0127**  |

*\*, \*\*, \*\*\* Significant at 10%, 5% and 1%*

1 USD = 2,319TZS (June 2021)

**Table 4: Characteristics of farmers interviewed using Pearson chi-square method**

| <b>Characteristics</b>        | <b>Category</b> | <b>Exporters</b> | <b>Local</b> | <b>Overall</b> | <b>Chi-Square (<math>\chi^2</math>)</b> |
|-------------------------------|-----------------|------------------|--------------|----------------|---|
| <b>Socio economic factors</b> |                 |                  |              |                |   |
| Gender                        | Male            | 71               | 34           | 105            | 0.356                                   |
|                               | Female          | 20               | 6            | 26             |   |
| Marital status                | Married         | 86               | 39           | 125            | 0.450                                   |
|                               | Not married     | 5                | 1            | 6              |   |
| Head of Household             | Head            | 70               | 36           | 106            | 0.079*                                  |
|                               | Not head        | 21               | 4            | 25             |   |
| Education level               | Primary         | 81               | 37           | 118            | 0.659                                   |
|                               | Secondary       | 5                | 3            | 8              |   |
|                               | High school     | 1                | 0            | 1              |   |
|                               | Certificate     | 2                | 0            | 2              |   |
|                               | Diploma         | 2                | 0            | 2              |   |
| Other business                | Yes             | 43               | 7            | 50             | 0.001***                                |
|                               | No              | 48               | 33           | 81             |   |
| <b>Production factors</b>     |                 |                  |              |                |   |
| Farm season                   | Yes             | 81               | 40           | 121            | 0.029**                                 |
|                               | No              | 10               | 0            |                |   |
| <b>Institutional factors</b>  |                 |                  |              |                |   |
| Extension services            | Yes             | 25               | 18           | 43             | 0.049**                                 |
|                               | No              | 66               | 22           | 88             |   |
| Group membership              | Yes             | 80               | 13           | 93             | 0.000***                                |
|                               | No              | 11               | 27           | 38             |   |
| Access Credit                 | Yes             | 49               | 11           | 60             | 0.005**                                 |
|                               | No              | 42               | 29           | 71             |   |
| Contract farming              | Yes             | 89               | 7            | 96             | 0.000***                                |
|                               | No              | 2                | 33           | 35             |   |
| Grade/Standard compliance     | Yes             | 85               | 12           | 97             | 0.000***                                |
|                               | No              | 6                | 28           | 34             |   |
| Market training               | Yes             | 78               | 3            | 81             | 0.000***                                |
|                               | No              | 13               | 37           | 50             |   |

\*, \*\*, \*\*\* Significant at 10%, 5% and 1%



#### **4.1.1 Socio-economic factors of common beans farmers**

##### ***Age***

The age of the common beans' farmer could affect market participation either positively or negatively. This is because young farmers could be more innovative and easily informed about the possible advantages of exporting common beans, hence this increases their chances of participating in export markets. Furthermore, age of the respondent has an implication on the acceptance to the new information thus influencing decision of common beans farmers' participation in export markets. Age variable has showed the higher means for farmers who traded locally than those who are exporting common beans. This implies that, older people take some time to accept and adopt the new information such as market information on common beans exportation - in turn many of them deny to export common beans whilst the youth can easily accept and adopt to the new forms of market systems which enables them to participate more in common beans exportation. Results show that, the mean for common beans farmers who are selling locally is 48.7 higher than the mean for farmers who participate in export markets (47.5). These results might be caused by the nature of the export trade itself as it requires much movements, negotiations and close follow-up with the customers to ensure that common beans is delivered timely and payments are made as required. Therefore, sometimes, older farmers become in active and may get some difficulties to deal with some unfaithful youth or young traders in international markets while export common beans.

##### ***Household size***

Household size can be viewed both in terms of family labour and the number of mouths to feed. This is because large household size results to higher consumption as compared to the smaller households. Similarly, large size of the household also indicates availability of labour hence affecting the total output to be produced because cultivation of common beans is labour intensive. Therefore, household size of the farmers affects participation in export markets both positively and negatively. Large families normally use large percent of the family income to meet the basic needs of the household members hence this restricts their possibility to invest more in cultivating common means so as to have surplus for exporting. Also, large household size minimizes the household income in a way that, only little amount is used in operating and managing the farming activities which in turn results to small output obtained, hence they fail to participate in export markets. Results show that, the means for large household size is 4.2 higher than the mean for small household size (3.9). Further, this implies that, the household head with large family will always be busy to meet the needs of the household members, hence spent large percent of the family income to meet the family needs such as food, shelter, clothes and education whereby only little remaining money is spent in common beans farming activities. Therefore, only small output of poor quality is obtained which do not suit the export markets standards.

### ***Experience***

Years of experience in common beans farming has an implication to the extent of farmers participating in export market. Older people who sometimes deny exporting common beans since they take time to adopt to the new market information are the ones who are more experienced in common beans farming - thus decreases the possibility for them to participate in export markets. Results show that, the mean for farmers who are selling locally is 20.8 higher than the mean for common beans farmers who are exporting (19.4). These results indicates that, older farmers who are more experience in common beans farming are less participating in export markets than youth/ young farmers. The higher the experience of common beans farmers in farming activities, the lower the possibility for them to adopt and accept new forms of markets hence high experience in common beans farming reduces the probability of farmers participating in export markets.

### ***Gender***

Gender represents sex of the common beans' farmer. Gender of the respondent also has an influence on the decision to participate in the export market. Male headed household have a higher tendency to participate compared to females. Males are considered more vigilant and willing to take up risks compared to female who fear for the food security of the members. Gender of the farmer have a negative relationship with farmers participation in exporting common beans because female farmers are faced with more challenges compared to the male farmers in terms of access to information and resources. Results show that, male exporters are male exporters are many than the female exporters indicating that, males are the one who mostly export common beans while the female farmers are selling to the local market.

### ***Marital status***

This is an independent variable that represents the marital status of the head of the household. The variable takes the value 1 if the household head is married and 0 otherwise. If the household is married, this increases the likelihood of them participating in exporting the common beans while if the household head is not married, meaning that it becomes difficult to export common beans given that, the household will be alone and very busy to ensure the basic needs of the family such as food, shelter, clothes, and education for the children are provided. Results show that, exporters of the common beans are those ones who are married while those who are not married are selling to the local market.

### ***Household head***

Household head also affects farmer's participation in exporting the common beans. This is because the household head is in position to make decision for the family also the household head has the authority and power for all decisions concerning the family. If the farmer is the household head, this increases the likelihood of participation in export markets while if the farmer is not the household head; the probability of participating in export market is minimized. Mean for the household head for exporters is higher than the mean for the farmers who are selling in the local market. Also,

household head is statistically significant influencing farmers participation in export markets at 0.1 level of significance ( $P < 0.1$ ).

### ***Education***

Education level have mixed results since on the one hand, educated farmers who are committed in farming may be able to take up improved technologies faster as they understand the benefits associated with the technology, hence increasing their efficiency in production as well as the output obtained. On the other hand, educated farmers may be more engaged in other income generating activities and avail less attention to their farms, hence lowering their efficiency. Education level also has ambiguous effects on the decision to participate in export markets. First it is expected to enhance the household decision making process with regards to market dynamics like when to sell. Also, an educated household is likely to know more about input usage and the consequent of output sales. In addition to that, they are likely to be endowed with better business and managerial skills that will equip them for the commercialization process. Similarly, education tends to increase the chances of an individual securing a decent job hence lowering the chances of engaging in commercial agriculture. Results show that, farmers who are not educated, those ones with primary school level of education are the ones who exports more than the educated farmers.

### ***Other business***

Similarly, farmers whose main occupation is farming are expected to have lower efficiency than those engaging in employment and other businesses as well. This is because the latter are more able to finance their farming activities. Off-farm income is having a positive effect on production efficiency hence increase the likelihood of farmers to participate in export markets. This is because, farmers with other business have a regular source of income that they can use to acquire farm inputs as well as to supervise and manage all other farm and production activities. Results show that, other business is statistically significant influencing farmers participation in common beans exportation at 0.01 level of significance ( $P < 0.01$ )

### ***Extension services***

This represents a set of variables that is a proxy measure of the formal source of agriculture production and market access information. This is a binary variable taking a value 1 if the household received any extension service for both production and marketing and 0 otherwise. This is because the extension agents are responsible for the transfer of technology that has been carefully developed by research. This serves as expected to impact positively on total output produced and the decision to participate in the market. Results show that, extension services is statistically significant influencing farmers participation in export markets at 0.05 level of significance ( $P < 0.05$ ). However, only a small number of the respondents received extension services which provided a challenge for the government to encourage and support the extension officers in implementing their roles so as to increase farmer's participation in export markets.

#### 4.1.2 Production characteristics of common beans farmers

##### **Total Land size**

The higher the total land size owned by the household, the higher the output and surplus obtained (other things remain constant). The higher the total land size, results to the higher output realized and consequently the amount sold out to the market. This variable is important as it shows the total area that the household can allocate to various uses. Therefore, total land size of the household increases the possibility of farmers to participate in export markets. Results show that, the means for farmers who are exporting is 2.02 higher than the means for farmers who are selling the common beans locally (1.8). This implies that, total land size of the household has a positive implication towards farmer's participation in common beans exportation though not statistically significant.

##### **Land size Beans**

Participation in common beans export market is predominantly determined by the size of the land allocated for beans production. Land size allocated for beans production is a proxy measure of scale of production hence determining surplus production for the export market. Martey *et al.*, (2012) confirm that larger farms have potential for a household to increase its marketable surplus hence increasing market participation. Larger farms are also likely to benefit from scale economies which translate into lower transaction cost and increased potential of participating in the market. Results shows that, the mean for farmers who are exporting common beans is 1.6 higher than the mean for common beans farmers who are selling locally (1.5). This implies that, large size of the land allocated for beans production has an important implication on influencing export market participation by the common beans' farmers.

##### **Fertilizer costs**

The cost of fertilizer that the farmers spent in common beans production has an implication towards farmer's participation in export markets. The more fertilizer used, the higher the harvest and possibly the more output sold in the market by the farmer. When higher cost is used in production of common beans, this results to large amount of output harvested, hence increases the possibility of farmers engaging in export markets. Results show that, much fertilizer costs are used by exporters (TZS148,274.7/=) compared to the cost used by farmers who are selling locally (TZS 111,925/=). Moreover, results reveal that, fertilizer costs are statistically significant at 0.01 level of significance ( $P < 0.01$ ) which implies, there is significant relationship between fertilizer costs and probability of farmers participation in exporting common beans.

##### **Pesticide costs**

The costs of pesticides invested in common beans production also influence the probability of farmer's participation in export markets. Higher cost of pesticides in managing common beans crops during farming practices, results to large amount of output obtained hence increases the chances/ probability of farmers to export the common beans given that there is higher output of high quality. Results depicts that,

much "pesticides costs" is used by farmers who are exporting the common beans (TZS 39,285.71/=) compared to the pesticides costs used by the farmers who are selling locally (TZS 34,650/=). Also, "pesticide costs" is statistically significant at 0.05 level of significance ( $P < 0.05$ ) indicating that pesticide is an important and significant aspect for farmers who are exporting common beans.

### ***Labour costs***

Common beans production is labour intensive production, therefore availability of labour in production activities increases the possibility of farmers to export more given that, more surplus will be available for trade purposes. However, results show that, the mean labour for farmers who are selling locally is higher than the mean labour for farmers who are exporting the common beans. This could be caused by the fact that, more labour who are available to work in farming activities are unskilled labour hence they apply low technology in production activities results to small amount of output of poor quality that will be obtained. This reduces the possibility of farmers to export the common beans.

### ***Number of times farmed***

This refers to the number of times that the farmers cultivate common beans in a year. Higher number of time increases the likelihood of common beans farmers to participate in export markets. The mean for number of times farmed by farmers who are exporting common beans is higher (1.28) than the mean for farmers who are selling locally (1). This implies that, exporters cultivate common beans many times a year than farmers who are selling locally. Number of times farmed is statistically significant influencing common beans exportation at 0.01 level of significance ( $P < 0.01$ ).

### ***Farm season***

If the common beans farmers they farm on season basis, more output will be obtained since the production season support common beans production activities hence likelihood of farmers to export will increase. Results show that, farm season is statistically influencing market participation by common beans farmers at 0.05 level of significance ( $P < 0.05$ )

## **4.1.3 Institutional characteristics of common beans farmers**

### ***Extension days***

This refers to the number of days that the extension officer pays a visit to the farmers so as to advise those concerning modern means of production and market information. The larger the number of extension days the higher the possibility of farmers to access the information on the better methods of farming and improved technologies that improve productivity results to higher output obtained sufficient to be exported. This is because the extension agents are responsible for the transfer of technology that has been carefully developed by research. This serves as expected to impact positively on total output produced and the decision to participate in the market. Results show that, mean for the mean number of extension days for farmers who are exporting the common beans is higher (1.72) compared to the mean of

farmers who are selling locally (1.55). Also, number of extension days is statistically significant at 0.05 level of significance ( $P < 0.05$ ) which implies that the number of days that a farmer is visited by extension agent plays a great role in production for those who are exporting common beans.

### ***Group membership***

Group membership help farmers to mitigate problems associated with market imperfections. This also increases the bargaining power of the farmers since they will be in position to sell their produce in bulk. Results shows that, group membership is statistically influencing farmer's participation in common beans exportation at 0.01 level of significance ( $P < 0.01$ ). Group membership also increases the likelihood for farmers to access market information and credit hence possibility of them to export the common beans is also increased.

### ***Access to credit***

Access to credit provides funds necessary for farmers to overcome liquidity problems that hinder them from purchasing inputs on time. Also, the farmers can be in position to use the improved common beans varieties as well as managing the production activities which in turn increases surplus obtained sufficient to be exported. Results shows that, access to credit is statistically influencing export market participation by common beans farmers at 0.01 level of significance ( $P < 0.01$ ).

Contract farming increases the likelihood for farmers to participate in export market. This is because the Farmer who is unable to purchase the improved seed varieties as well as applying the modern technology, will now is in position to use the improved seeds of the farm owner. These results for more output to be obtained hence increases the possibility of farmers to export the common beans. Contract farming is statistically significant influencing export market participation by the common beans' farmers t 0.01 level of significance ( $P < 0.01$ )

### ***Access to market training***

Access to market training increases the likelihood of farmers participating in export markets. With market training, the farmers will now be able to understand various procedures and requirements necessary in exporting rice hence increases the likelihood of them to participate in exporting the common beans. Results show that, market training is statistically influencing market participation by common beans farmers at 0.01 level of significance ( $P < 0.01$ )

### ***Grade/standard compliance***

If the farmers were focusing on grade/standard compliance when producing the common beans, this leads to the produce with high quality and standards which can competes in the international markets hence increases the likelihood of farmers to participate in export markets. Results show that, grade/ standard compliance is statistically influencing market participation by common beans farmers at 0.01 level of significance ( $P < 0.01$ )

### ***Distance to the market***

This is a continuous variable that reflects the total distance from the household resident to the marketplace. Distance from the farm to the market is noted as a major constraint to the intensity of export market participation by the smallholder farmers. This is because nearness to the market increases access market information, inputs, and credit. Whereby, farmers can be in position to access and learn about export requirements and procedures. Moreover, nearness to the market simplifies the transportation activities hence influences farmer's participation in export markets. Access to transport facilities both rural and urban roads and improved delivery systems of the produce influence market participation by the farmers. Results show that, the mean for farmers who are exporting common beans is (39.67) higher than the mean for farmers who are selling locally (24.77) implying that, distance to the market is an important factor influencing participation in export markets by common beans farmers. Also distance to the market is statistically significant influencing market participation by common beans farmers at 0.01 level of significance ( $P < 0.01$ )

#### **4.1.4 Welfare factors of the common beans' farmers**

##### ***Assets***

These refers to all the possessions of the household such as include land, livestock and poultry, hand hoes, radio, television, mobile phone and bicycle. Household assets increase the ability of the household to obtain information about possible market areas and the consequent response to the market information by the household in question. Also has a positive effect on farming activities as it increases efficiency in production. Specifically, bicycles and motor vehicles help farmers to move easily to the market, radios and televisions help farmers to access information through the media, while mobile phones assist the farmers to communicate and exchange information quickly. As such, the assets combined to make the farm more efficient hence increase the likelihood of common beans farmers to participate in export markets. Results show that, mean assets for farmers who are exporting common beans is (TZS 12,700,000/=) higher than the mean assets for farmers who are selling locally (TZS 653, 5250/=). Also, assets owned by the household is statistically significant influencing farmers participation in export markets at 0.05 level of significance ( $P < 0.05$ ) indicating that, assets owned by the household is an important factor influencing farmers participation in export markets.

##### ***Expenditure***

Household expenditure per year on common beans farm activities also influences the possibility of farmer's participation in export markets. The higher the expenditure in common beans production the higher the output to be obtained hence increases the likelihood of farmers to participate in export markets. This is because if the farmer spent large amount of the household income in managing the farm, buying inputs and improved seeds, paying the labours, and supervising all activities, this results to large quantity harvested hence more surplus is obtained to be exported. Results show that, mean expenditure of farmers who are exporting common beans is TZS 356,450.5/=

higher than the mean expenditure for the farmers who are selling locally (TZS 369725/=). This implies that, household expenditure is an important factor to be considered so as to increase the likelihood of farmers to participate in export markets.

### ***Annual gross farm income***

Annual gross farm income is also an important factor that increases the likelihood of farmer's participation in common beans exportation. The higher the annual gross income of the household, the higher the output harvested hence results to more surpluses which in turn increase the likelihood of farmers to participate in export markets. Amount of money invested in common beans production enables the farmer to highly invest in common beans production, cover the necessary costs and undertaking bigger risks in running business activities thus increases the likelihood of common beans farmers participation in export markets. Results show that, mean annual gross farm income for exporters is higher (TZS 3,413,718/=) than the mean annual gross farm income for farmers for farmers who are selling locally (TZS 2,574,879/=). Similarly, annual gross farm income is statistically significant influencing farmers participation in export markets at 0.05 level significance ( $P < 0.05$ ).



## 4.2 Factors influencing common beans export

**Table 5; Propensity score for farmers participation in common beans export (probit model results)**

| Variables                                | Coefficient | Marginal effects | Standard Error | z         | P>z     |
|--|-------------|------------------|----------------|-----------|---------|
| <b>Socio-economic factors</b>            |             |                  |                |           |         |
| Gender                                   | 0.206408    | 0.004            | 2.410575       | 0.09      | 0.932   |
| Age                                      | -0.12371    | -0.002           | 0.071083       | -1.74     | 0.082*  |
| Marital status                           | -3.42952    | -0.066           | 2.16E+00       | -1.59     | 0.113   |
| Household size                           | -1.83563    | -0.036           | 8.73E-01       | -2.1      | 0.035** |
| Education level                          | -1.3205     | -0.026           | 1.434762       | -9.20E-01 | 0.357   |
| Experience                               | 0.232216    | 0.004            | 0.121902       | 1.9       | 0.057*  |
| Other business                           | -2.54162    | -0.049           | 1.414479       | -1.8      | 0.072*  |
| <b>Production as the last per season</b> |             |                  |                |           |         |
| Land size Beans                          | 1.822536    | 0.035            | 2.525153       | 0.72      | 0.47    |
| Fertilizer costs                         | -2.62325    | -0.051           | 1.668951       | -1.57     | 0.116   |
| Labour costs                             | -0.49573    | -0.010           | 0.444521       | -1.12     | 0.265   |
| Pesticide costs                          | 1.667701    | 0.032            | 1.750571       | 0.95      | 0.341   |
| <b>Institutional factors</b>             |             |                  |                |           |         |
| Access to extension                      | 4.663797    | 0.090            | 2.31773        | 2.01      | 0.044** |
| Group membership                         | 4.051503    | 0.078            | 3.444391       | 1.18      | 0.239   |
| Access Credit                            | -5.33292    | -0.103           | 3.534744       | -1.51     | 0.131   |
| Contract farming                         | -7.90972    | -0.153           | 3.232005       | -2.45     | 0.014** |
| Distance to the market                   | -0.03388    | -0.001           | 0.081923       | -0.41     | 0.679   |
| Marketing training                       | -4.88869    | -0.095           | 3.79042        | -1.29     | 0.197   |
| _cons                                    | 49.34772    |                  | 33.99057       | 1.45      | 0.147   |
| Log likelihood                           | -12.558681  |                  |                |           |         |
| Number of obs                            | 131         |                  |                |           |         |
| LR chi2(17)                              | 136.10      |                  |                |           |         |
| Prob> chi2                               | 0.0000      |                  |                |           |         |
| Pseudo R2                                | 0.8442      |                  |                |           |         |
| Outcome correctly specified              | 96.18%      |                  |                |           |         |

\*, \*\*, \*\*\* Significant at 10%, 5% and 1%

### **Age of a farmer**

Age has negative influence on farmers participation in common beans export and statistically significant at 10% level and has a marginal effect of -0.002, other things being equal. An increase in age of household would reduce the probability of farmer's participation in common beans export by 0.2 %. This implies that when household age increases, they become less motive to involve agriculture as mental capacity and physical ability to do manual work decreases and youth become more likely to engage fully in the common bean production. This aligns with Nwaru and Iwuji (2005) reported that entrepreneurship gradually becomes less as the age of the entrepreneur increases.

### **Household size**

Household size has negative influence on farmers participation in common beans export and statistically significant at 5% level and has a marginal effect of -0.036, other things being equal. An increase of household size would reduce the probability of farmer's participation in common beans export by 3.6 %. This implies that household size which indicates the number of family labourers used in production is not a crucial factor to make the farmers produce and export common beans since the country has never had shortage of it. This finding stresses to answer the question on the needs and essential facilities required by these household to engage fully on the production and maximize export quantity. This confirms with the study done by SNV (2012), focuses on the matter of poor technology and innovation among common beans farmers leading to post harvest losses which account for significant losses in yield at farm level.

### **Other Business**

Other Business has negative influence on farmers participation in common beans export and statistically significant at 10% level and has a marginal effect of -0.049, other things being equal. An increase engagement in other business would reduce the probability of farmer's participation in common beans export by 4.9 %. This implies that engagement of farmers in other economic activities apart from common beans production and export eases the burden of dependence on agriculture sector which is mostly unproductive in Tanzania. This aligns with the study done by Mishra *et al.*, (2015), found farmer's engagement in off farm activities enhances food security as they manage food consumption fluctuations better than a household without such an activity.

### **Access to extension**

Access to extension has positive influence on farmers participation in common beans export and statistically significant at 5% level and has a marginal effect of 0.090, other things being equal. An increase in Access to extension would result in 9% probability of farmer's participation in common beans export. This implies that extension service including training to farmers is still imperative especially in common beans production which is affected much by pests and diseases and intensive use of pesticides may result to non-compliance of international standard. The risks associated with the lack of compliance to the specified standards are borne by the farmer (Prowse, 2012). This is consistent with the results by Okello *et al.*, (2007), Some companies would not accept beans produced by smallholders for fear that they might violate its client's pesticide residue and hygiene standards. This concludes that extension service should be increased especially to smallholder farmers to expose them with proper method of farming using minimum pesticides to adhere with good Agriculture Practices (GAP).

### **Contract farming**

Contract farming has negative influence on farmers participation in common beans export and statistically significant at 5% level and has a marginal effect of -0.153, other things being equal. An increase in Contract farming would reduce the probability of farmer's participation in common beans export by 15.3 %. The reasons for this could

be associated with the setbacks experienced in contract farming such as excessive power among buyers leading to exploitation of small holder farmers. This confirms with the study done by Singh (2008), Buyers are violating terms of the agreement by delaying payment and deliveries to factory or by manipulating provisions of the contract. Other studies are contrary to the current findings and concluded that smallholder farmers have remained to be passive actors in the contract farming programmes. Nevertheless, the general impact on the economic gains at farm level is positive (Match Maker Associates, 2006).

### 4.3 Factors influencing farmer's extent of common beans export

Table 6 below presents the factors that are influencing extent of common beans export

**Table 6: Factors influencing extent of common beans export by farmers**

| Variables                                | Coefficient | Marginal effects | Std. Err. | t-statistics | P>t      |
|--|-------------|------------------|-----------|--------------|----------|
| <b>Socio-economic factors</b>            |             |                  |           |              |          |
| Gender                                   | -0.046      | -0.046           | 0.015     | -3.11        | 0.002**  |
| Age                                      | 0.000       | 0.000            | 0.001     | -6.00E-02    | 0.949    |
| Marital status                           | 0.086       | 0.086            | 0.025     | 3.49E+00     | 0.001*** |
| Household size                           | 0.004       | 0.004            | 0.004     | 1.17         | 0.246    |
| Education level                          | 0.005       | 0.005            | 0.007     | 0.76         | 0.448    |
| Experience                               | -0.002      | -0.002           | 0.001     | -2.91        | 0.004**  |
| Other business                           | 0.000       | 0.000            | 0.011     | 0.03         | 0.98     |
| <b>Production as the last per season</b> |             |                  |           |              |          |
| Land size Beans                          | -0.028      | -0.028           | 0.012     | -2.39        | 0.018**  |
| Fertilizer costs                         | 0.002       | 0.002            | 0.015     | 0.15         | 0.878    |
| Pesticide costs                          | 0.004       | 0.004            | 0.015     | 0.27         | 0.784    |
| Labour costs                             | 0.009       | 0.009            | 0.007     | 1.29         | 0.201    |
| <b>Institutional factors</b>             |             |                  |           |              |          |
| Access to extension                      | -0.011      | -0.011           | 0.012     | -0.89        | 0.377    |
| Group membership                         | 0.029       | 0.029            | 0.023     | 1.22         | 0.225    |
| Access Credit                            | -0.024      | -0.024           | 0.015     | -1.63        | 0.107    |
| Contract farming                         | 0.117       | 0.117            | 0.024     | 4.88         | 0.000*** |
| Distance to the market                   | 0.000       | 0.000            | 0.001     | -0.34        | 0.736    |
| Marketing training                       | 0.045       | 0.045            | 0.025     | 1.77         | 0.08*    |
| _cons                                    | .22712      |                  | 0.243     | 0.93         | 0.353    |
| Log likelihood                           | 198.03966   |                  |           |              |          |
| Number of observation                    | 131         |                  |           |              |          |
| LR chi2(17)                              | 157.45      |                  |           |              |          |
| Prob> chi2                               | 0.0000      |                  |           |              |          |

\*, \*\*, \*\*\* Significant at 10%, 5% and 1%

#### **Gender**

The coefficient for gender of common beans farmers' variable was negative and statistically significant at the 5% level. This indicates that with an increase in the

number of male farmers the extent of common beans export will also decrease. The implication of this findings may be drawn from the literature on the role of African women in agriculture. A wide variety of literature is available on the importance of agriculture to economic development in Africa and on the critical role that rural women play within this sector. Women can greatly improve food security by working as labourers on farms or as farmers, but compared to men they have fewer opportunities and resources, making it difficult to enter the sector (Davidson, 2019; Human, 2020; Vemireddy and Pingali, 2021).

### ***Marital status***

The coefficient marital status variable was positive and statistically significant at the 1% level. This implies that, an increase in the number of farmers who are married will lead to an increase in the extent of common beans export. This is because marriage symbolize household responsibilities and hence influence farmers to work hard and eventually increase the exportation of common beans.

### ***Experience***

The coefficient for experience of common beans farmers' variable was negative and statistically significant at the 5% level. This indicates that an increase in the farmers' years of experience lead to a decline in the extent of export. The possible reasons for this could be the fact that within increase in the years of farming experience at some point a farmer might be bored and would like to try another crop or venture of interest.

### ***Land size allocated for common beans***

The coefficient for land size allocated for common beans production variable was negative and statistically significant at the 5% level. This implies that, an increase in the amount of land allocated for common beans export will lead to a decline in the extent of common beans export. The reasons could probably be that increasing more land space for common beans farming become difficult and inconvenient for small holder farmers to manage the production given his/her capital and skills.

### ***Contract farming***

The coefficient for contract farming for common beans production variable was positive and statistically significant at the 1% level. This implies an increase in the level of contract farming engagement by common beans farmers will lead to an increase in the extent of export. Contract farming a preharvest agreement between farmers and buyers is commonly understood as a useful tool to mitigate prevalent market failures and to reduce the risks facing smallholder farmers (Balwig *et al.*, 2009). Contract farming is believed to improve productivity and income because it facilitates coordination between farmers and other actors in terms of production, processing and marketing of agricultural products (Nguyen *et al.*, 2015).

### ***Marketing training***

The coefficient for marketing training for common beans production variable was positive and statistically significant at the 10% level. This implies that, access to market training motivate farmers to engage in exporting common beans as they become more

aware of the export structure and also, they learn to manage their farms for profit. The role of training in building farmers' capacity for successful agricultural development cannot be overemphasized (FAO, 2013). Building farmers' competences for agricultural development translates into increased demand for improved knowledge, information and technologies (Opolot *et al.*, 2018).

### 4.3 Farmers' perceptions of common beans exports

#### 4.3.1 Socio-economic factors

To determine the reasons for exporting common beans the study estimated the equations by considering socio economic factors. In table.... the results show that, 3.30 percent of the farmers strongly agree that the exportation of common beans is due to the existence of reliable traders. Moreover, 54.95 percent of the farmers agree that the exportation of common beans is due to the existence of reliable traders. However, 41.76 percent of the farmers have a neutral perception if the exportation of common beans is due to the availability of reliable trades. Regarding market condition of the crop, the study found that 1 percent of the farmers strongly agree that crop marketability influence the exportation of common beans. Whereby 35.16 percent of the farmers also agree that crop marketability influence the exportation of common beans. However, 63.74 percent of the farmers have a neutral perception if the exportation of common beans is due to marketability of the crop.

The study findings also report that exportation of common beans is due to the good price commanded by the crop in the market where by 1 percent of the farmers strongly agree, 58.24 percent only agree, and 40.66 percent of the farmers are having a neutral opinion. Moreover, considering the sales, revenue and profitability that has always been increasing over years the study findings report that, 50 percent of the farmers strongly agree this socio-economic factor influence the exportation of common beans. While the other 50 percent of the farmers have a neutral perception. Considering effective relationship with foreign partners, the study findings report that 34.07 percent of the farmers strongly agree that effective relationship with foreign partners influence the exportation of common beans. While 65.93 percent of the farmers are having a neutral opinion on the influence of effective relationship with foreign partners to the exportation of common beans.

**Table 7: Reasons for exporting common beans: Socio-economic factors**

| Socio-economic factors  | 5                        | 4         | 3         | 2 | 1 |
|---|--------------------------|-----------|-----------|---|---|
|   | Frequency and Percentage |           |           |   |   |
| There are reliable traders  | 38(3.30)                 | 50(54.95) | 3 (41.76) | - | - |
| The crop is marketable  | 1(1)                     | 32(35.16) | 58(63.74) | - | - |
| The crop commanded a good price   | 1(1)                     | 53(58.24) | 37(40.66) | - | - |
| Sales, revenue, and profitability has always been increasing over years | -                        | 43(50)    | 43(50)    | - | - |
| Effective relationship with foreign partners                            | -                        | 31(34.07) | 60(65.93) | - | - |

Scale: 5= Strongly Agree, 4= Agree 3=Neutral 2= Disagree 1= strongly Disagree.

### 4.3.2 Institutional factors

In determining the reasons for exporting common beans the study also examined institutional factors. The study findings report that, 1.1 percent of the farmers strongly agree that having access to market information influence the exportation of common beans. Also, 23.33 percent of farmers agree on that having access to market information influence the exportation of common beans. However, 75.56 percent of farmers have a neutral attitude towards having access to market information effect the exportation of common beans.

Considering the reduction of international barriers to global trade as a reason for exporting common beans. The study findings report that, 4.40 percent of farmers agree, 94.52 percent of farmers are having a neutral opinion and 1.1 percent of the farmers are strongly disagree with the reduction of international barriers to global trade influence exportation of common beans.

The study also reports that; 14.29 percent of the farmers agree that legal policies influence exportation of horticultural products hence influence the exportation of common beans. However, 84.62 percent of the farmers have a neutral perception and 1.1 percent of the farmers strongly disagree that exportation of common beans is influenced with legal policies which influence exportation of horticultural products.

Additionally, the study reports that 1 percent of the farmers strongly agree, and 18 percent of farmers agree that accessibility of distribution channels for export influence the exportation of common beans. On the other hand, the study findings report that 80 percent of the farmers have a neutral opinion and 1.1 percent strongly disagree that accessibility of distribution channels for export influence the exportation of common beans. The study also considered tariff relief on exportation; the findings show that 7.78 percent of the farmers agree that tariff relief on exportation have a positive effect on exporting common beans. While 92.22 percent of farmers have a neutral perception.

**Table 8: Reasons for exporting common beans: Institutional factors**

| Institutional factors  | 5                        | 4         | 3         | 2 | 1      |
|--|--------------------------|-----------|-----------|---|--------|
|  | Frequency and Percentage |           |           |   |        |
| Access to market information                                   | 1(1.1)                   | 21(23.33) | 68(75.56) |   |        |
| Reduction of international barriers to global trade            |                          | 4(4.40)   | 86(94.51) |   | 1(1.1) |
| Legal policies influence exportation of horticultural products |                          | 13(14.29) | 77(84.62) |   | 1(1.1) |
| Accessibility of distribution channels for export              | 1(1)                     | 17(18)    | 73 (80)   |   | 1(1.1) |
| Tariff Relief on exportation                                   |                          | 7(7.78)   | 83(92.22) |   |        |

Scale: 5= Strongly Agree, 4= Agree 3=Neutral 2= Disagree 1= Strongly Disagree.

### 4.3.3 Production factors

The study also took in consideration the effects of production factors on the exportation of common beans. The findings show that, 4 percent of the farmers agree that having prior experience with the product influence exporting common beans. However, 41 percent of the farmers are having a neutral opinion if exportation of common beans is due to having prior experience with the product. With regard to the growth process of the product, the study findings report that 22 percent of the farmers agree that exportation of common beans is due to the products are easy to grow. Whereby 23 percent of the farmers are having a neutral perception.

The findings also show that, 1 percent of the farmers strongly agree that the yield from the product is generally good influence exportation of common beans. But also, 16 percent of the farmers agree that if the yield from the product is generally good it influences exportation of common beans. Though, 82 percent of the farmers are having a neutral opinion. Considering the production cost, the study findings show that 1 percent of the farmers strongly agree exportation of common beans is highly influenced by low production cost. Furthermore, 9 percent of the farmers also agree. However, 90 percent of the farmers are having a neutral opinion on the influence of low production cost on exportation of common beans.

**Table 9: Reasons for exporting common beans: Production factors**

| Production factors                           | 5                        | 4      | 3      | 2 | 1 |
|--|--------------------------|--------|--------|---|---|
|  | Frequency and Percentage |        |        |   |   |
| Prior experience with the product            |                          | 2(4)   | 32(41) |   |   |
| The products are easy to grow                |                          | 4(22)  | 30(23) |   |   |
| The yield from the product is generally good | 1(1)                     | 15(16) | 75(82) |   |   |
| Production cost is low                       | 1(1)                     | 8(9)   | 82(90) |   |   |

Scale: 5= Strongly Agree, 4= Agree 3=Neutral 2= Disagree 1= Strongly Disagree

### 4.4 Impact of common beans export on farmer's welfare

Table 10 presents the results of the impact of common beans export on farmers' welfare with Gross Income from common beans, household consumption expenditure and assets value as outcome variables.

**Table 10: Impact of common beans export on farmers welfare: PSM results**

| Matching estimator (algorithms) | ATT for our outcome variables (TZS) |                                   |                   |
|---------------------------------|-------------------------------------|-----------------------------------|-------------------|
|                                 | Gross income from common beans      | Household consumption expenditure | Assets value      |
| Nearest Neighbour Matching      | 928,000(0.644)                      | 1,530,000 (2.273)*                | 3,990,000(1.112)  |
| Radius Matching                 | 1,290,000(1.436)                    | 360000 (0.805)                    | 4,570,000 (1.348) |

Notes: \*\*\*, \*\* and \* means significant at 1%, 5% and 10% levels, respectively

#### **4.4.1 Impact of common beans export on farmer's assets endowment**

Assets were measured in terms of the value of all the durable commodities a farmer had ranging from livestock, furniture, electronics, land, tools and equipment. Their value was estimated using current market prices. Currently, poverty debates reflect a growing interest in the importance of assets for understanding poor people's ability to respond to shortages and shocks and generate future income and consumption (e.g., Anderson, 2012; Donovan and Poole, 2014). It is further argued that assets provide a better option for understanding the underlying causes and the dynamics of poverty than a focus on income or consumption variables alone (Carter and Barrett, 2006; Donovan and Poole, 2014). The results depict that there is no significant difference between the assets of farmers who are exporting and those who are trading. Although there is no significant difference on assets endowment, common beans farmers are likely to use part of their income from common beans production to purchase assets and this explains why they probably have more assets than their control counterparts. The insignificant difference indicates that the amount of assets owned by farmers are not directly influenced by common beans export. Thus, common beans export does not have any significant impact on the amount of assets owned by farmers in the study area.

#### **4.4.2 Impact of common beans export on farmer's income**

The results in Table 9, show that there is no statistically significant difference in income between farmers who are exporting common beans and those who do not export. This means that they have a stream of income especially when the markets are good. As opposed to their counterparts who only depend on other types of income source, snow peas farmers have an additional source of income. This explains why they probably have more monthly net income as compared to non-snow pea's growers. The results are contrary to the findings of Tolemariam (2010) who found that households' participation in market development intervention by coffee producers did not have statistically significant impact on their income.

#### **4.4.3 Impact of common beans export on farmer's consumption expenditure**

The results show a statistically significant difference between the consumption expenditure of farmers who are exporting and non-exporters of common beans. Those farmers who are involved in common beans exportation depicted to spend more amount of money on various consumption expenditures. This could be explained by the fact that common beans exportation could be giving them more income compared to their counterparts. They are therefore able to afford all the basic commodities in satisfying amounts. They are able to afford good education for their children by taking them to good schools. Also, farmers who are exporting can afford both fresh and non-fresh staples more frequently than farmers who are trading locally.



## **5.0 CONCLUSION AND RECOMMENDATION**

### **5.1 Summary and conclusion**

Improving horticultural export is one of Tanzania's policy priorities. In this respect, farmers are expected to play an important role in achieving better growth in the sector. This study was conducted to assess the relationship between horticultural crop export and farmers' welfare using common beans (*Phaseolus vulgaris*) as a case study in Arusha, Tanzania. Though, the potential for increasing rural incomes through the agricultural export is substantial. Different socio-economic, production and institutional factors play significant roles. The results of this study suggest that common beans farmers in Tanzania are aware of significant role of exporting their crop than trading locally. Results further suggest that different factors such age of a farmer, household size, other business, access to extension and contract farming are likely to influence the decision of farmers to export common beans. In addition, gender, marital status, experience, land size allocated for common beans, contract farming and marketing training can significantly influence the extent of common beans export.

On the other hand, common beans export has a positive impact on farmers' welfare. Allowing for interactions between common beans export and other determinants of common beans' export (socio-economic, production and institutional factors), specifically, it was observed that there is the positive impact of common beans export on farmers' consumption expenditure and does not have any significant impact on farmers' income and assets ownership. This can be interpreted as evidence that horticultural export may have an important causal impact in terms of household welfare to some aspects.

### **5.2 Policy implications and recommendations**

The following policy interventions are suggested. With regards to institutional factors, capacity building on common beans export should be more emphasized to most of the farmers as it has shown to positively influence extent of common beans exportation. Policy attention needs to shift from supporting and regulating particular trade policies but rather should focus on how farmers will be trained and utilize the available opportunity of common beans export market. Also, horticultural contract farming should be strengthened by the government and monitored by the extension officers who are wit farmers to support farmers in acquiring best deals with exporting companies. Results have shown that contract farming has a potential role in increasing the extent of common beans exportation. In addition, with regards to the socio-economic factors, income diversification should also be emphasized to farmers as it was found that those who were engaged in other business were also influenced to export more of the common beans.

### **5.3 Areas for further research**

This study did not analyse the technical efficiency between the two group of farmers, this is an area where further research may focus on comparing their technical efficiency

in relation to the export with given socio-economic, production and institutional factors.

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