Input Voucher Program: A promise or premise to agro-dealers in Tanzania?

Factors influencing agro-dealer's decision to engage in input voucher program in Mufindi District

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DEDICATION

I would like to dedicate my thesis work to my late father, Mr. Merchon Chotamagumla Ndanzi (Mungu ailaze roho yako mahali pema peponi, Amina) and to my mother Costansia Ngailo for their positive attitude towards educating their children, despite the fact that you had no opportunity to attend to school. It is because of your positive attitude you have made me the way am today. I am real proud of you all.

ABSTRACT

This study identifies the factors influencing agro-dealer's decision to engage in IVP and explores the impact of IVP on the identified factors in Mufindi district of Iringa region, Tanzania. Structured questionnaires were used to collect quantitative data from 50 IVP participants and 50 IVP non-participants. The data were analyzed using SPSS and STATA program. Descriptive statistical techniques and logit model were used to quantify the significance of explanatory variables while difference-in-difference method was used to estimate the impact of IVP. It was found that education level, access to credit, ownership of improved storage facility and distance to input market has a positive and statistically significant correlation to agro-dealer's decision making. On the contrary; experience, total wealth and distance between agro-dealers is statistically insignificant at influencing decision making of agro-dealers. The impact of IVP is positive and statistically significant on improving; access to credit, total wealth and distance to input market. On the other hand IVP had a negative impact on distance between agro-dealers who participate in IVP. The study recommends that; (1)agro-dealers should be encouraged to use improved storage facilities in areas where they operate their business (2) the government should invest on improving agricultural infrastructures which can trigger the willingness of agro-dealers to operate in rural areas (3)agro-dealers should be given opportunities to attend adult education and training so as to reduce the illiteracy level and increase agro-business knowledge among them (4) further follow up studies are required to fill up the knowledge gap on the impact of IVP to agro-business.

Keywords:

Agro-dealers, Input voucher, Access to credit, Program impact, Factors influencing.

ABBREVIATIONS

ADT	Agro-dealers Training Program
AGRA	Alliance for Green Revolution in Africa
AITF	Agricultural Input Trust Fund
CNFA	Citizens Network for Foreign Affairs
DD	Difference-in-difference method or Double difference method
IMF	International Monetary Fund
IVP	Input Voucher Program
Km	Kilometers
MAFC	Ministry of Agriculture, Food Security and Cooperatives
NMB	National Microfinance Bank Plc.
SAP	Structural Adjustment Program
SEMOC	Sementes de Moçambique (Seed Mozambique)
SSA	Sub Saharan Africa
TASP	Tanzania Agro-dealer Strengthening Program
TFC	Tanzania Fertilizer Company
TZS	Tanzanian shillings

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1.0.   INTRODUCTION

Currently, Tanzania is putting significant effort to stimulate private sector to participate in agricultural input market[1] through various food security programs which can promote access to farm inputs and use of farm inputs to enhance food productivity among poor farmers in rural areas (MAFC 2009). Among others, input voucher program is an approach adopted by the government to strengthen the agro-dealer's network by improving their businesses and technical skills through provision of training, link them with input supply wholesalers, and enable access to credit and provision of improved customer services to smallholder's farmers. This initiative has positioned agro-dealers at the centre that connects input wholesalers and smallholder farmers in the rural areas (Odame& Muange 2010). The adoption of agro-dealers model is based on findings from several researches that signal the problem of low agricultural productivity due to low farm input use by smallholder farmers who lack access to modern inputs in rural areas (Chianu et al. 2008). Therefore building agro-dealers network via input voucher programs is taken as a cornerstone which can increase accessibility to agricultural inputs by poor farmers in the rural areas (Odame & Muange 2010).

In 2008, Tanzania in collaboration with Alliance for Green Revolution in Africa (AGRA) and Citizens Network for Foreign Affairs (CNFA) instigated a Tanzania Agro-dealer Strengthening Program (TASP) to increase the use of modern agricultural inputs which is vital for raising food dependence of poor farmers in the rural areas (Zorya 2009; World Bank 2009; Saweda et al. 2010).The program is implemented in eleven food potential regions of Tanzania namely Iringa, Ruvuma, Rukwa, Mbeya, Kilimanjaro, Morogoro, Tabora, Kigoma, Lindi, Mara and Mtwara. 53 districts are covered by the program and more than 1,000 agro-dealers are trained and certified by CNFA to serve 700,000 small scale farmers. The idea is to bring agro-dealer's services close to poor farmers and increase access to farm inputs at affordable[2] prices in rural remote areas (MAFC 2009; AGRA 2009).

Programs are believed to be important instruments that can be used to build the capacity of agro-dealers on provision of affordable services to poor farmers in rural areas through assisting agro-

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[1] For the sake of this study, Input market is defined as the retail market where agro-dealers sell farm inputs to smallholder farmers in rural areas.
[2] Agricultural inputs if supplied in appropriate small packages to poor farmers can increase affordability, safety and quality whereby widening the input use in rural areas (AGRA 2009).

dealers to acquire training in business skills, record keeping, sales and marketing, stock management, managing business working capital, input market search, customer service and knowledge on the proper use of modern technology (AGRA 2007; Chianu et al. 2008; Chinsinga 2011). Furthermore, programs connect agro-dealers with formal financial institutions and farm input wholesalers for credit purposes to increase their working capital base. Normally trained agro-dealers receives a certificate which allows them to participate in selling agricultural input under input voucher program after signing a contract with the government to recover some of the costs involved in the transaction (MAFC 2009).Also certified agro-dealers are linked to major agricultural input supply firm by credit guarantees to be supplied with inputs on credit bases and pay after 30 to 60 days. Therefore certified agro-dealers have a guaranteed input demand and profit margin for supplying farm inputs in rural areas which reduces risks and uncertainties in their business and increases business working capital (Tiba 2010). To date 79.5% of fertilizer and 68.7% of improved seeds in Tanzania agricultural potential regions are supplied via agro-dealership network (MAFC 2009).

1.1. Problem statement

Smart[3] input voucher program has turned out to be more promising development program that can effectively supply farm inputs in rural areas via strengthen agro-dealer's businesses in private sector (Gregory 2006; 2007). For example, agro-dealers have the opportunities to obtain finance and acquire business training through program participation (MAFC 2009). Also poor infrastructures increases transaction costs and raised input prices leading into significant low use of farm input in rural areas (Morris et al. 2007; Chinsinga 2004; Tostão 2007). Without program supply of farm inputs in rural areas is often difficult and expensive due to high agricultural financing perceived risk by lending institutions (Odame & Muange 2010) and higher transaction costs which reduces the profit of agro-dealer's business. It is therefore sought that, program increases farm input market assurance for certified agro-dealers and attracts more agro-dealers to engage in farm input distribution network in rural community.

However, despite the importance of the input Voucher program to strengthen and empower agro-dealers in the commercial market (MAFC 2009) to accelerate agricultural productivity for food

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[3] Smart input voucher program which is also termed as smart subsidy in some of the references refers to the mechanism that provide goods and services which can promote development of input market and enhancement of poor farmer's ability to use input effectively and efficiently. Whereby Voucher is used to transfer income from government or donor agencies to the poor farmers and the transfer is realized through agro-input dealers in the private input markets. On the other hand to agro-dealers, vouchers is a way that reduces some of the business risks associated with input supply by providing a guarantee demand in the market (Minot & Benson 2009).

reliance in Tanzania, relatively little attention has been given to understand and promote agro-dealer's businesses, for instance until now there is no specific fertilizer distribution policy in Tanzania and the link between fertilizer policy and fertilizer use in Africa (including Tanzania) is not well established (Shetto et al. 2007; Minot & Benson 2009). Poor farmers do not use farm inputs as a result they get low production yield because they cannot afford to buy farm input at the given high prices which translate into input market failures. To date the main issues revolves around the limited capacity of the majority agro-dealers to effectively and efficiently supply input to remote rural areas at affordable prices by poor farmers. Many agro-dealers lack financial capability to meet the costs involved in establishing the business, running the businesses, building input storage facilities (e.g. for storing fertilizer), and the critical cost involved in transporting farm input to the rural areas where road infrastructures are poor and require traveling long distances. Also agro-dealers lack knowledge and technical skills to improve their business management, safe product handling, crop husbandry practices and knowledge to form agro-dealer's business association which can be acquired via attending training (Odame and Muange, 2010).

Based on the above situation, one may wonder why we still have program participants and non-participants if the program really intends to assist agro-dealer's businesses, considering the fact that there are no restrictions in joining the program in all areas where input voucher program is established. Therefore, given these different challenges to agro-dealers, it raises the following research question "what are the factors influencing agro-dealer's decision to participate or not participate in input voucher program?" We intend to explore factors such as access to credit, distance to input source[4], distance between agro-dealers, Distance to input market, wealth of the agro-dealers, educational level of agro-dealers, sex of the agro-dealers and age of the agro-dealer and investigate whether they influence agro-dealer's decision to engage in the program. We will further explore if IVP improves access to credit, wealth of the agro-dealers and coverage areas of input supplied by agro-dealers.

1.3. Justification of the study

In Tanzania, persistence of low agricultural productivity among rural poor households is attributed much by missing farm input market to smallholder farmers. Poor farmers have low capacity to access input market due to various reasons such as poor physical infrastructures which disconnect smallholder farmers in rural remote areas to input market, and low income among rural small scale

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[4] For the sake of this study, Input source is defined as the wholesale market where agro-dealers purchase farm inputs. Most of wholesale markets are located at well-connected areas (town centres).

farmers. Poor physical infrastructure increases input transportation costs which translate into higher input prices. Higher input prices lead into low input use which translates into low agricultural productivity.

The government has commercialized input market to allow private sector to supply farm input in rural areas without any intervention through food security program such as input voucher program whereby voucher is used to increase the poor farmer input purchasing power. But input suppliers like any other traders; they are business entities that seek to maximize profit or minimize costs. Definitely, they will not supply inputs in rural areas unless they earn profit. The easy way for them to earn profit is to increase input price to cover for higher transportation costs which on the other hand reduces the earnings of the poor farmers resulting into input market failure. With more increase in input prices, poor farmers cannot afford to purchase and ignore using them on their agricultural fields. The evidence is found on the study by Skarstein (2005), that due to poor roads in rural areas of Tanzania it was costly for agro-dealers to transport input fertilizer so traders increased input prices but the farmers could not afford to purchase inputs at higher prices.

As a response to low input use by poor farmers, many studies found the reasons behind. Poor access to input market by stallholder farmers is among the major constraint. For example, in their study about fertilizer subside in Africa Minot and Benson (2009),argued that input market is unpredictable due to sharp increase in their prices which smallholder farmers cannot afford which in turn poses high risk to agro-dealer's business due to market failures. They also supported the idea of developing input program that can allow for expansion of private agro-dealers network through training and credit. The World Bank (2008), report about accelerated food security program under the global food crisis in Tanzania commenting that input programs should give financing opportunities to input suppliers. However, many of these studies has been investigating the input demand side (poor household farmers) leaving behind the input supply side which can be investigated through the commercial market sector. Therefore, we need to study the behaviour of input suppliers and find out if they actually benefit from the program which will assist in understanding the roles of farm input suppliers in raising agricultural productivity by smallholder farmers through IVP.

1.4. Main objective

The main objective is to identify and investigate factors influencing agro-dealer's decision to engage in IVP and explore whether IVP improves access to credit, total wealth and distance coverage.

1.4.1. Specific objectives

i.   To find out if access to credit influence agro-dealer's decision to participate in IVP.

ii. To find out if distance to inputs source influence agro-dealer's decision to participate in IVP.

iii. To find out if total wealth of agro-dealers influence agro-dealer's decision to engage in IVP.

iv. To explore if IVP improves access to credit, total wealth, distance travelled by agro-dealers to sell input (input market) and distance between agro-dealers.

1.5. Relevance of the study

The findings from this study provides fundamental information which can offer guidance to agricultural policy makers in developing appropriate policies to allow mutual benefit amongst agro-dealers, input wholesalers, importers, smallholder farmers and government in Tanzania and other developing countries. Also the study offers guidance for future researchers since input voucher program is still new and much is not known yet especially in Tanzania, where many studies have been conducted to analyse factors responsible for low input use in agricultural production by poor farmers in rural areas. But agro-dealers play an important role in input supply chain and they should not be neglected in order to achieving sustainable food security via smart input voucher program.

2.0. BACKGROUND INFORMATION

2.1. An overview of farm input supply in Tanzania

According to the studies by the World Bank (2007), Minde et al. (2008) and Tiba (2010), agricultural policies in Sub Saharan Africa (SSA) in the 1960's supported the use of fertilize through universal subsidy. Under this policy the import, procurement, pricing and distribution of fertilizer were legally monopolized by public sector. This was also the case with Tanzania where Tanzania Fertilizer Company (TFC) was the sole monopoly in importation, procurement, supply and pricing of fertilizer in all regions. TFC was 100% owned by government and fertilizer was subsidized up to 80% via donor's funds (World Bank 1994). There was no private company involved in input distribution market because there was no policy to promote commercial private input supply market.

In mid-1980's changes in agricultural policies across SSA was introduced (Jayne et al. 2008; Tiba 2010). The World Bank and International Monetary Fund (IMF) stopped to support subsidy programs because; Subsidies weaken private sector and results into missing markets of farm input, subsides are expensive and increases government budget, subsides distorts farmers incentive and benefit rich farmers instead of poor farmers (World Bank 2008; Minot & Benson 2009; Tiba 2010; Chinsinga 2011). Other study by World Bank (1994a), argued that input market liberation can assist to reduce price of farm inputs in rural areas. Also, the World Bank (1994b), report cited by Meertens (2000), indicates that removal of Fertilizer subsidy in Tanzania will eliminate government intervention on the market hence a net increase in fertilizer use by poor farmers. According to Crawford et al. (2003), cited in Chinsinga (2011), input market liberalization would translate into economically sustainable and viable private sector driven agricultural marketing systems. Following these different reasons, subsidies were abolished by African governments through implementing structural adjustment program (SAP). The importation, procurement, pricing and distribution of agricultural inputs are now controlled and managed by private sector in SSA including Tanzania, expecting that input market liberalization will stimulate private sector (agro-dealers) to supply inputs in rural areas at affordable prices to smallholder farmers (Kelly et al. 2003). However SAP could not work out as expected. The finding by Meertens (2000) disparaged the World Bank reports and argued that liberalization of input market lead into increase inputs prices especially in rural remote areas where agro-dealers could not reach due to long distances associated with poor infrastructures. As a response to this problem, the government of Tanzania introduced an agricultural input trust fund (AITF). The aim of AITF was to provide soft loans with interest rate below commercial lending market to input suppliers in order to make sure that inputs

reach farmers on time. Unfortunately this could not work out as anticipated because the government had inadequate funds to accommodate requests from all input suppliers in the private markets (Meertens 2000).

Therefore, in mid-1990's, the World Bank and IMF declared to have failed to support agriculture development through SAP which was implemented in 1980's (Morris et al. 2007; Chinsinga 2004) because, market liberation resulted into substantial low use of farm inputs (e.g. fertilizer) and increased food shortage in most of rural poor households; other reasons included depletion of soil fertility, political demand for fertilizer subsidy and underperformance of agriculture (Morris et al, 2007). Agricultural subsidies are now again considered a potentially useful way of promoting agricultural growth and food security in developing countries. For example, since 2003 Tanzania implemented a program which was known as fertilizer transport subsidy. The program aimed at encouraging access and use of farm inputs by poor farmers to enhance food productivity. The program targeted a few selected food crops such as maize and paddy, and a few cash crops such as tea, coffee and cashew nuts without government involvement in importation, pricing, procurement and distribution of inputs due to privatization policy (MAFC 2009). But factors such as low input purchasing power by poor rural farmers, lack of capital by agro-dealers, poor transportation infrastructures in remote areas, lack of information by agro-dealers about input market and poor knowledge on input led to input market failure (MAFC 2009).

The study by Minot & Benson 2009 argue that, in Africa government can adopt smart subsidies to avoid mistakes done in the past subsidy programs which were monopolized by states and undermined the input distribution networks by private sector. In 2008 smart input voucher program was inaugurated to achieve multiple objectives in Tanzania; (1) Increase agricultural productivity through improving access to farm input, (2) Improve poor farmer's income (Pan & Christiansen 2011), (3) Strengthen farm input supply chain by expanding network of certified agro-dealers and (4) Strengthening national seed system(MAFC 2009; World Bank 2009). In regard to agro-dealers, the program aimed at strengthening their business via provision of training in business skills, product knowledge, safe handling of agro-chemicals and use of modern technology. The ideal is that, trained agro-dealers can offers good services to poor farmers by provision of credit information on agricultural input use. Also certified agro-dealers are connected to major input supply company and input wholesalers using the guarantee scheme for the purpose of acquiring stocks on credit (MAFC2009; AGRA 2009; Chinsinga 2011). It is believed that the IVP will assist to develop private input distribution market in rural areas (Minot & Benson 2009).

2.2. Farm input supply network in Tanzania since 2007

The input voucher program depends on private commercial supply network which comprise of importers, wholesalers, transporters and agro-dealers. Wholesalers and importers are responsible for importation and distribution of inputs to agro-dealers without government intervention in the entire process of procurement, price setting and supply, and they sign a memorandum of understanding (MoU) with government to ensure inputs are timely available in line with quantity demanded by poor farmers. Certified agro-dealers by CNFA act as retailers on the distribution process of farm inputs. This process allows agro-dealer to link input suppliers and poor farmers in rural areas. Also the system enable farmers holding input vouchers purchase specific quantities of farm inputs from the contracted and trained agro-dealers. Certified agro-dealers agree to accept vouchers from poor farmers as means of payment for the transaction involved (MAFC 2009).

On the other hand, the program link certified agro-dealers to input suppliers and National Microfinance Bank limited (NMB) for credit purposes. NMB is the only financial institution involved in this program due to its wide range of network coverage (World Bank 2009; Pan &Christiansen 2011) i.e. unlike other banks; NMB is located in every district of the country and therefore can reach more agro-dealers especially those based in rural areas. The bank accepts redemption of voucher from agro-dealers as payment method. All certified agro-dealers are required to open and operate bank account with NMB at a branch of their choice for easy redemption of vouchers. Furthermore, certified agro-dealers can apply for overdraft facility to boost up their business working capital subject to availing collateral which covers 62.5% (NMB 2011).

2.3. Agro-dealership model in Tanzania.

Agro-dealer model is believe to be a powerful, effective and efficient instrument that can be used to improve farm productivity, income of smallholder farmers, promote agro-business and enhance food security in SSA countries and other developing countries worldwide through smart IVP. For example the agro-dealer model is supported and being adopted by Tanzania, Kenya, Malawi, Ghana, Mali and Zimbabwe (CNFA 2010).

Agro-dealer model was initially adopted by the government of Tanzania in 2007 through TASP. The program (TASP) was funded by AGRA to run for three years and it was facilitated by CNFA. The agro-dealer model had four objectives namely; (1) to provide business management training to agro-dealers and commercial trainers. The training aimed at building agro-dealer's capacity to bring their services close to farmers in rural remote areas (2) facilitates access to financial services whereby certified agro-dealers can be linked with NMB bank by a guarantee which cover 37.5% of

the total loan amount to boost up business working capital or business start-up capital. The program is sought to reduce the high lending risks to agro-dealers perceived by lending institution. The agro-dealership model in figure 1 below indicates three possible sources of credit guarantee facilities that can be linked with agro-dealer which are 50% guarantee banking credit from banks, large input supply companies which can provide stocks to agro-dealers on credit bases and Micro financial institutions which can extend credit facility to agro-dealers at agreed percentage of credit guarantee (3) provision of value added services and marketing strategies. Agro-dealer can act as the agricultural marketing hub in agricultural value chain by participating in farm input supply, provision of market information, offering storage facilities of crops to smallholder farmers, transportation of crops to the market, milling, packaging, etc. and accept vouchers as means of payment for farm inputs (4) policy advocacy. Agro-dealer model seek to developing national agricultural policy that calls for sustainable mutual benefit between agro-dealers and smallholder farmers. CNFA is also striving to developing sustainable local institutions that will allow the model to operate after program phase out. Figure 1.0 below shows the agro-dealers model as summarized by CNFA (CNFA 2010).

Figure 1: Summary of agro-dealer model

Source: http://www.cnfa.org
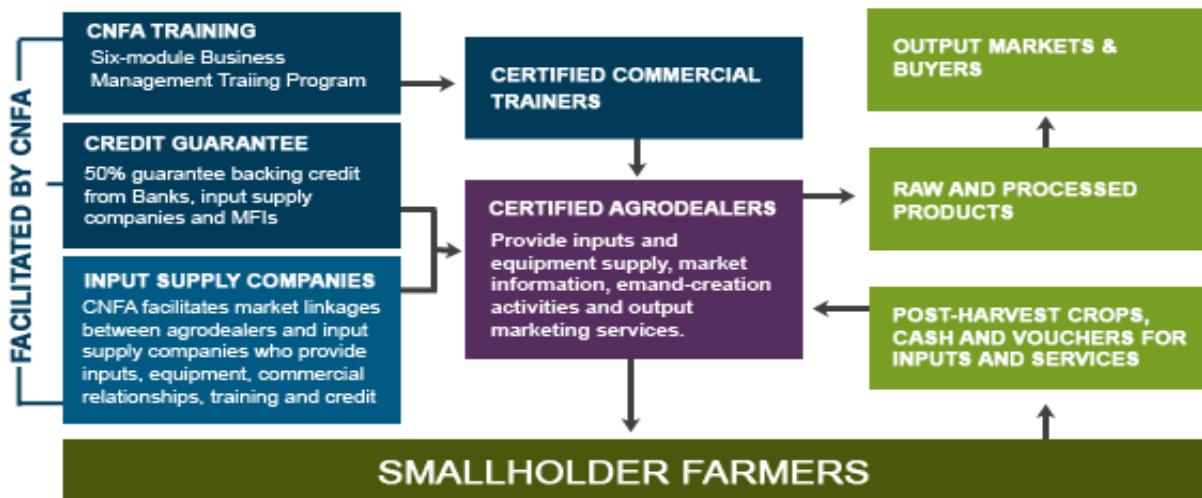
By the end of 2009, CNFA had trained and certified 1,600 agro-dealers in Tanzania. The training focused on building agro-dealers capability on business management, access to financial services, marketing, provision of good services and policy issues. In 2010, a new source to finance the TASP was required. The Tanzanian government through assistance from World Bank, inaugurated and

funded an agro-dealers training program (ADT) to take over all activities which was being implemented through TASP. Under ADT program, CNFA was given another chance to train and certify 50 commercial trainers and 1,025 agro-dealers in 39 districts of the country. CNFA is also responsible for assisting and giving guidance to agro-dealers to develop agro-dealer's associations. The idea is that, agro-dealer's association can be used as an instrument to unit agro-dealers after the program phase out. To date CNFA has trained and certified more than 2,600 agro-dealers to save more than 1.5 million poor farmers in rural areas of Tanzania. Initial indicators have revealed a positive sign of agro-dealer's model success in expanding agro-dealers input supply network in rural areas of Tanzania through private commercial market (CNFA 2010).

3.0. LITERATURE REVIEW

3.1. Empirical studies on private input supply market

Recent studies in developing countries argue in support of developing and strengthening agro-dealers model in the private commercial input market in order to increase agricultural productivity of poor farmers in rural areas. The purpose of this chapter is to look at what is already known about the factors that influence decision making of an individual and what is already known about the impact of IVP on agro-business characteristics.

Credit related characteristics: Several studies have identified access to credit as a major factor that influence decision making of an individual or small firm. Many individuals and small firms (agro-dealers and agro-businesses) have limitations that hinder their access to finance due to lack of collateral which can be used to reduce risks perceive by lending institutions. Credit is an important ingredient which can boost up the business working capital via increased business stocks to enhance availability of all farm inputs in the amount demanded. Existence of various food security programs and agricultural development programs assists individuals and small firms to get access to credit by reducing the risks perceived by lenders through provision of guarantee facilities. Access to credit is therefore sought to influence the decision making of an individual and small firm to engage in such programs. Evidence is found on several studies, for example, the study by Swaminathan et al. (2009), about the impact of access to credit on labour allocation pattern in Malawi, the authors investigated access to credit as a major factor that influenced women decision to participate in off-farm activities. The authors randomly selected 50% of clients who are credit program participants and 50% of non-participating clients. To reduce endogeneity problem, the authors used the credit limit concept to measure access to credit and found that access to credit increases the likelihood to engage in credit programs especially for women. Access to credit has been identified by several other researches as an important determinant on decision making of an individual or household or small firm (Digne 1999; Digne & Zeller 2001; Swaminathan et al.2009).

Access to credit can be improved via instigating various program in rural areas for example program that improves access to credit empowers poor rural household to engage more in productive farm and off-farm income generating activities and provide guidance on allocation of scarce resource (funds) to various programs competing for the same resource (Digne & Zeller 2001). However, participation in the program does not give an automatic access to credit by agro-dealer because access to credit can incredibly be improved to agro-dealers who possess more assets than those owning fewer assets. The IVP program for example in Tanzania links agro-dealers

and NMB and provide a guarantee that covers only 37.5% of the loan amount. This means an agro-dealer has to provide a proof of asset ownership as collateral to cover 62.5% of the loan amount (NMB 2011). This matches the findings in the study by Odame and Muange (2010), concerning the question whether agro-dealership model can deliver the green revolution in Kenya. The authors found that agro-dealers in Uasin Gishu had relatively higher ownership of assets than agro-dealers based in Machakosi. In general majority of agro-dealers had low ownership of assets which had negative implication on access to credit because lending institutions asked for proof of ownership of business premise or motor vehicle as collateral for loans. Therefore, it makes sense to reason that, programs that can increase the probability of agro-dealers to access credit may influence their decision making towards engaging on such a program.

The study by AGRA (2009), in developing rural agricultural input supply system in Africa suggested that, African government should strive on strengthening rural stockist by giving them access to training and finance to boost their capital so as to increase access to farm input in Africa. They argue that poor farmers can be assisted by allowing agro-dealers to distribute farm inputs in smaller parks which they can easily afford to purchase as most of them have small fields and low incomes. Furthermore, using Kenya, Uganda and Malawi as the case study, the authors found that there is a positive correlation between access to credit and the volume of farm inputs supplied in rural areas. However, empirical evidence from other studies shows that there are other factors which need to be considered as well in order to have a successful agro-dealer input supply network in rural areas. For example investment on public goods such as credit constraints, bureaucratic obstructions and road infrastructures which can trigger private sector to supply inputs in rural areas without government interference is vital. Absence of improved agricultural infrastructures may result into failure of private sector to supply farm input in remote areas (Chinsinga 2011).

Distance and other factors: Improving and strengthening agro-dealers network to supply input in rural areas in developing countries is seen various government as a cornerstone for enhancing agricultural productivity by poor farmers. Consequently, the agro-dealership model has attracted the attention of policy makers and it has been at the centre of discussion on how the green revolution can be attained in SSA (CNFA 2010; Odame & Muange 2010). The issue revolves around how to build sustainable input supply networks that can allow agro-dealers to supply farm input in rural areas at affordable prices without government intervention. The idea of using agro-dealers model to make sure that farm inputs are brought close to smallholder farmers in rural areas is brilliant; however several researchers have identified several factors that undermine the success of

the model. These factors include; poor road infrastructures and long distances to reach rural areas. The study by Denning et al. (2009), concerning input subsidies to improve smallholder maize productivity in commercial input supply market in Malawi, identified long distance accompanied by poor public infrastructures to be the reason behind input missing markets in rural areas. Travelling long distances with poor roads increases transaction costs to agro-dealers hence discouraging them to operate in these areas. Lack of input market in these areas, results into low level use of farm inputs by poor farmers because even the available farm inputs are sold at higher prices due to high transaction costs. Most areas with poor public infrastructures included rural remote areas located far away (up to 300 km in Kenya) from town centers where most of active agro-dealers are based (Chianu et al. 2008).

Another study by Farrow et al. (2011), investigated on how agro-dealers network can be improved in rural areas in Malawi. The authors in their study they employed spatial analysis in concurrence with location-allocation model to assess the existing input outlet distance coverage and delivering optimum location for village-input level. The study found that, there is poor distance coverage by agro-dealers and location inefficiency of agro-dealers in rural areas and that these obstacles hinder access to agro-dealers by poor farmers. The location allocation model aimed at looking if agro-dealers are based in areas where poor farmers can easily reach them. This suggest that in order to successful enhance and strengthen agro-dealers network, agro-dealers need to be located strategically points. Their discoveries match the findings by Odame and Muange (2011), who researched on whether agro-dealers can deliver the green revolution in Kenya. The authors revealed that agro-dealers are concentrated in agricultural potential areas. Potential areas are well served with good infrastructures and are located close to town centers where large input supply companies are based. They further found that agro-dealers located in these areas benefit more from the program as compared to those in low potential areas. This was identified as a weakness of agro-dealership model to deliver new seeds and other modern technologies to smallholder farmers in rural areas.

Another study by Chianu et al. (2008), on challenges and opportunities facing farm input marketing in western Kenya, identified factors such as credit constraint, long distance to input markets, lack of storage facility, lack of market information, low input demand and limited business knowledge as the most important constraints faced by agro-dealers in supply of farm input in rural areas of Kenya. These factors were classified as five major business constraints or challenges faced by agro-dealers. Online distance calculator was used to estimate distance from input selling points and

purchasing point and descriptive statistics was used to present results. The results shows that high transport costs (54%) was the biggest constraint to input dealer mainly due to poor physical infrastructures associated with long average distances travelled by agro-dealers to purchase input or sell inputs. The distance travelled by agro-dealers to input market ranged from 20km to over 300km while the average distance travelled ranged from 80 km to 113 km signifying higher input prices to compensate profit margin charged by input dealers and there is a positive correlation between the distance to input source and input price at which agro-dealers is willing to sell them. Increasing agro-dealers network or expansion of sustainable coverage area by agro-dealers is therefore an important way of reducing distance coverage which in turn reduces price per unit input. Low demand (30%) was ranked as second constraint followed by lack of market information (23%), Lack of storage facilities (14%) and limited business skills and knowledge (14%). The study further suggests areas which call for improvement in order to develop sustainable input supply network in commercial market by using agro-dealers model. The most important factors include; improvement in training provided to agro-dealers, the main question being who should be targeted by the training? The owner of the business or the employee? Given the current situation where CNFA provide training to agro-dealers (Business owner) only while not all business owners run their business on full-time basis so they have less contact with farmers as compared to their employees who always have great contact with farmers. Therefore it is sought that, training employees increase their ability to respond to technical queries from customers when selling farm inputs (Chinsinga 2011).

The study by Kelly et al. (2003) on what can be done to expand input use in SSA , identified factors such as low education level, poor road infrastructures and limited information on market systems as major limitations to increase agricultural productivity. They studied the input supply and input demand sides and they broadly categorized constraints of both demand and supply side into the following categories; knowledge constraints, financial constraints and risk issues. The study suggests that African governments should strive to find ways of improving the livelihood of poor farmers that goes hand in hand with growth of private sector input market. For example provision of public goods such as improving road infrastructures in rural areas can increase incentive to private sector to expand farm input distribution network. The authors noted down that by the time of survey most input program were less than five years resulting into difficult in measuring agro-dealers impact on expanding input supply market.

Generally, there is a notable knowledge gap in literatures in regard to the roles of agro-dealers in enhancing sustainable farm input market in rural areas through smart IVP in Tanzania and other developing countries. Rather, most studies have given considerably attention on effectiveness of farm input subsidy by considering farm input demand side as it relates to agricultural productivity in rural community (Chinsinga 2011). However, understanding the roles played by agro-dealers in input commercial market is important for developing viable input supply network through IVP in rural areas. Because many studies have analyzed the problem of low agricultural productivity in SSA by looking at the perspective of farmers (input demand side), this study intend at reducing the gap by studying the other side of the coin (input supply side) using agro-dealers as a unit of study who provide a link between poor farmers and input market in rural communities.

Therefore the study focuses on the following two aspects; (1) to identify and investigate factors that influence agro-dealers decision to engage in input voucher program and (2) to exploring whether the IVP improves access to credit, distance to input market, distance between agro-dealers and wealth of agro-dealers. The impact of IVP is explored by using difference-in-difference method as elaborated in chapter 4 sections 4.6.1. This study provides the first empirical evidence on IVP impact assessment to agro-dealers in Tanzania. As for other SSA countries where IVP is implemented, the benefits of the program to agro-dealers are not yet quantified. This fact can be supported by the study of Odame and Muange, (2010), who declared that, the benefit of IVP to agro-dealers have not yet been evaluated due to the fact that IVP is fairly new in all countries where it have being implemented. However, the authors pointed out some initial indication which shows positive impact of IVP to agro-dealers such as increase in access to finance from equity bank in Kenya which translates into boosting their business via increased sales.

4.0. THEORETICAL FRAMEWORK

The government of Tanzania has adopted agro-dealers model to enhance sustainable input supply system in rural areas via smart IVP which does not involve any sort of intervention from the government and its agencies. This framework identifies the factors that influence the agro-dealers to engage in IVP and reviews what is already available in the literatures about the measurement unit suitable to be used to measure each factor.

4.1. Access to Credit

Most agro-dealers in developing countries lack access to credit needed to finance their start-up business capital or working business capital. Limited access to credit leads into slow business expansions due to little capital base necessary for increasing business working capital and adoption of new technologies for new business ventures. Also limited access to credit by agro-dealers results into failure to purchase agricultural inputs during the time when these inputs are needed by farmers (planting season). Therefore it makes sense to assume that all programs that allow agro-dealers to access credit will significantly increase agro-dealer's ability to acquire capital which can increase the ability to supply more agricultural inputs. In their study about impact of access to credit on labour allocation in Malawi, Swaminathan et al. (2009) measured access to credit using credit limit concept[5]. The author categorized individuals who could borrow any positive amount from informal or formal credit market as able to access credit. The author used the credit limit concept because it is said to be a good instrument which can be used to measure access to credit as it reflects the supply-side factors and is relatively more exogenous than loan borrowed through credit program (Digne 1999; Digne & Zeller 2001; Swaminathan et al. 2009). In their study Digne (1999) and Digne et al. (2000), explain explicitly the concept of credit limit which entails the credit constrained individuals. It includes those clients who have a need to borrow but borrows fewer amounts than what they wanted, those who did not apply for the fear of credit defiance and those who applied and got zero amounts. The study by Digne et al. (2000) classified two methods of measuring access to credit. The first way is the indirect method which concludes the presence of credit constraints[6] by violating the assumption of the permanent income hypothesis and the second method is by directly asking people whether they consider themselves as credit constrained.

This study, access to credit is measured using the second method. We have considered access to credit into two categories; credit constrained and credit unconstrained agro-dealers (Simtowe &

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[5] Credit limit concept refers to the maximum amount that an individual or firm can borrow from informal or formal sector (Swaminathan et al. 2009).
[6] Any borrower is credit constrained to some extend in his demand for credit (Digne et al. 2000).

Zeller 2006). To capture relevant information during data collection, agro-dealers were asked whether they needed to borrow in the past twelve months. We further asked those who needed to borrow if they borrowed/got the amount they wanted/applied for their business investments. We expect to find a positive relationship between credit and agro-dealers decision to participate in the program. Credit access is treated as dummy variable, credit constrained = 1 and credit unconstrained = 0. Our interest is to use credit constrained agro-dealers to find out if access to credit influence agro-dealers decision making and explore whether the input voucher program improves access to credit by agro-dealers. Difference-in-difference method was used to measure the impact of IVP on access to credit.

4.2. Wealth of the agro-dealer

Wealth refers to the ownership of assets[7] and is considered a potential determinant of agro-dealers to participate in the program. The finding by Kelly (2003) indicates thirty seven agro-dealers who own improved input storage facility qualified for SEMOC[8] credit in Mozambique. Another study by Gregory (2006), and Minot & Benson (2009) show significant correlation between ownership of improved input storage facility and participation in the input voucher program. Wealth is measured in terms of total value of assets owned by the agro-dealers. In this study it is assumed that agro-dealers who own valuable assets have a higher chance and opportunity to adapt the new program. Thus, we expect participation to increase with increase in total wealth of agro-dealers (positive influence).

4.3. Educational level

Education is believed to increase the ability of the agro-dealer to understand the benefits and weaknesses of the program and therefore will affect decision making. In this case, educated agro-dealers may have higher ability to learn and acquire new knowledge and skills, process and use the information available and make decision. The study by (MAFC 2009) in input voucher program in Tanzania indicates most of village voucher committee with inadequate education, had little awareness about the program, and ceased their participation in the program without any clear reasons. Education level of the agro-dealers is measured as total number of years attended to school. We expect positive relationship between education level and agro-dealers decision making.

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[7] Assets includes; ownership of input storage facility, total business capital, value of house owned by agro-dealers, other personal and business assets like ownership of cars . These are used as a proxy for wealth although ownership of improved storage facility is treated separate and not included in the total wealth figures.
[8] SEMOC this was a state owned company created in 1980's to supply all commercial seeds in Mozambique (Tostão 2007).

4.4. Distance

Price of agricultural input increases with distance to market and availability of improved infrastructures such as good roads and communication network. In rural areas price of inputs are high due to higher transaction costs caused by poor infrastructures, therefore agro-dealers find difficult to converse smallholder farmers to purchase inputs (Odame and Muange 2010). This situation has a negative impact on agro-dealers business through decrease sales turnover. Another study by Chianu et al. (2008) indicates that farm services do not reach farmers in rural remote areas due to high risks associated with agricultural input supply in rural areas and it further points out that agro-dealers still travel long distances to outsource agricultural inputs. Long distances have a negative impact on agro-dealers as it disconnects rural areas from input market. It is hypothesized that agro-dealer located close to input source market have higher chance of joining the program. This hypothesis is consistent with the findings by Diagne et al. (1996) cited in Swaminathan et al. (2009) who argued in favor of individuals living close to their families or parents found easier to gain membership into a formal credit program in Malawi. Distance to input source is measured in kilometers from the agro-dealers shop to the nearest input market. We expect a negative relationship between distance to input source and agro-dealers decision making.

Furthermore, agro-dealers who participate in the program are expected to be more closer (shorter distances between them) than non-participants as evidenced in the study by Odame and Muange (2011), they found agro-dealers to be more concentrated in high potential agricultural areas and they tend to benefit more from the program. For example in Kenya more agro-dealers in potential agriculture areas received training. Agro-dealers who are clustered within the same area are more likely to exchange and share information easily and influence each other's decision. Distance between agro-dealers is measured in kilometers, and is categorized into two groups i.e. agro-dealers located below 5 kilometers from each other and above 5 kilometers from each other. A negative correlation on distance between agro-dealers and agro-dealers decision making is anticipated. We further measured the impact of IVP on distance coverage using difference-in-difference method.

4.5. Analytical models

According to Pindy & Rubinfield (1998) and Verbeek (2008:200) if the dependent variable in a model is not a continuous variable it violates the key assumption[9]of linear regression analysis. In this case ordinary least square is inappropriate to be used because it will result into estimation of

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[9] With dichotomous dependent variables the probability of doing something does not change linearly with the explanatory variables (Verbeek 2008).

inconsistent parameters. So they propose non-linear probability models (Probit or Logit model) to be used because both give very similar results. For example, in their study of loan repayment performance in Ethiopia Assefa (2002), used Logit model while Abafit (2003), used probit model for a similar study. Nevertheless, probit models follow normal distribution function while logit model follows the logistic distribution function with a slightly heavier tails than normal distribution function. The two different methods are estimated by maximum likelihood and usually do not provide different answers (Verbeek 2008).Therefore, this study used Logistic model to analyze the dichotomous outcomes.

4.5.1. Logit model

The dependent variable is a dichotomous i.e. the decision whether to engage or not engage in the program. Equation (1.2) below is expressed in terms of probability of Y occurring given values between 0 and 1. A value close to 0 means that agro-dealer is likely to decide not to participate in the input voucher program and a value close to 1 means that agro-dealer is likely to participate in input voucher program (Field 2009).The focus is on agro-dealers decision to participate and sought to quantify the significant factors influencing these decisions.

Dependent variable = agro-dealer's decision.

Independent variables = factors influencing agro-dealers decision which includes access to Credit, Education, Gender, wealth of agro-dealers, Distance to input market, Distance between agro-dealers, Distance to input source and Marital status.

The value of the dependent variable is 0 and 1.

0 = Agro-dealers decided not to participate in the program (Non participants).

1 = Agro-dealers decided to participate in the program (Participants).

$$Z_i = \alpha + \beta X_i + \varepsilon_i \quad \text{.. (1.1)}$$

$$P_i = \text{Prob}(Y_i = 1) = \frac{1}{1+e^{-Z_i}} \quad \text{.. (1.2)}$$

Where:

Z_i refers to threshold value or propensity to participate, subscript i denotes the i-th observation in the sample which form a linear combination in equation (1.1), P_i is a probability that agro-dealers will make a certain decision given X_i, Y_i is an agro-dealer's decision whether to participate or not

participate in the program, X_i is the vector of the explanatory variables, *e* is the base of the natural logarithms, α and β are parameters of the model to be estimated whereby $β_i$ are the coefficients associated with each explanatory variables X_i.

4.6. Program impact assessment.

We applied difference-in-difference approach to answer the questions;(1) Whether IVP improves access to credit (2) Whether IVP improves the distance travelled by agro-dealers to input market (3) whether IVP improves distance between agro-dealers and (3) whether IVP improved total wealth of agro-dealers. This approach is selected because it allows us to compare the changes in outcome between participants and non-participants over a certain period of time (before and after the program). Non-participants as a comparison group were chosen in way to be as similar as possible to participants group, which is essential for the internal validity of our estimates. When calculating DD estimates we assume that with time changes in outcome within the treated group would have been similar to changes within control group if the input voucher program had not been initiated.

4.6.1. Difference-in-difference Method

The Difference-in-difference method is widely used method in impact evaluation analysis. It is also known as double difference method; its estimator relies on the comparison between participants and non-participants average outcomes before and after the program. Participants are referred to as a treated group where non-participants form a control group. The data were only collected after the program, but the questions were designed to collect both before and after the program and we estimated the impact of the program by treating the before data as our baseline data. We further assumed that unobserved heterogeneity is time invariant and does not correlate with the treatment over time, basically this assumption solve the missing data problem(Khandker et al. 2010) in that case the outcome changes in non-participants reveals the counterfactual outcome changes (Ravillion 2005; Marianne et al. 2004). Also double difference method is considered as a powerful tool to measure the impact using panel data or repeated cross section data collected before and after the program (Khandker et al. 2010).

''In fact what is needed… is a set of four means calculated from the same sample over time regardless of using panel data or cross sectional data… which can be used to calculate the difference between 'after' and 'before' values of mean outcomes for each treated and untreated group, the difference between these two is the impact (Ravillion 2005)''.

The point of using DD is to compare sample mean of participants and non-participants before and after the intervention (Ravillion 2005). The comparison between treated and control group is basically done in terms of outcome changes over time relative to the outcome observed for the pre-treated baseline. By calculating the mean outcome of before and after the program the method allows us to estimate the impact of the program which is equal to the difference between mean outcomes. According to Ravillion (2005) and Khandker et al. (2010) the impact of the program can be expressed as follows; given data for the two periods, t=0 before the program, t=1 after the program and let Y_t^T and Y_t^C denote outcomes of the program for the treated and control group in time t. double-difference method will estimate the average program impact as

$$DD = E(Y_1^T - Y_0^T \mid T_1 = 1) - E(Y_1^C - Y_0^C \mid T_1 = 0) \quad \text{...1.3}$$

Where:

$T_1 = 1$ Treated group at t=1

$T_1 = 0$ Control group at t=0

DD =   Difference-in-difference

In equation 1.3 the changes in average outcome of the control group (non-participants) tells the counterfactual changes in average outcome which explain the assumption that unobserved factors are time invariant and cancels out through differencing (Khandker et al. 2010). Therefore equation 1.3 is used to calculate the input voucher program impact on wealth, access to credit and distance coverage.

5.0. METHODOLOGY

5.1. Description of the study area.

The study was conducted in Mufindi district of Iringa region located in the southern highlands of Tanzania. The district has an estimated population of about 320,000 people with a population density of 45 inhabitants per square kilometre but according to 2002 census the district had 283,032 inhabitants. The annual average temperature is 20°C. The major economic activities of the area include subsistence agriculture which is primordially based on rain fed with the use of simple technology and minimal inputs (Campenhout et al. 2011). Most households grow maize, potatoes, tomatoes, tea, trees for timber, charcoal, different varieties of temperate fruits, keeping small herds of livestock for savings, milk or trade. In urban areas many households are engaged in small scale business
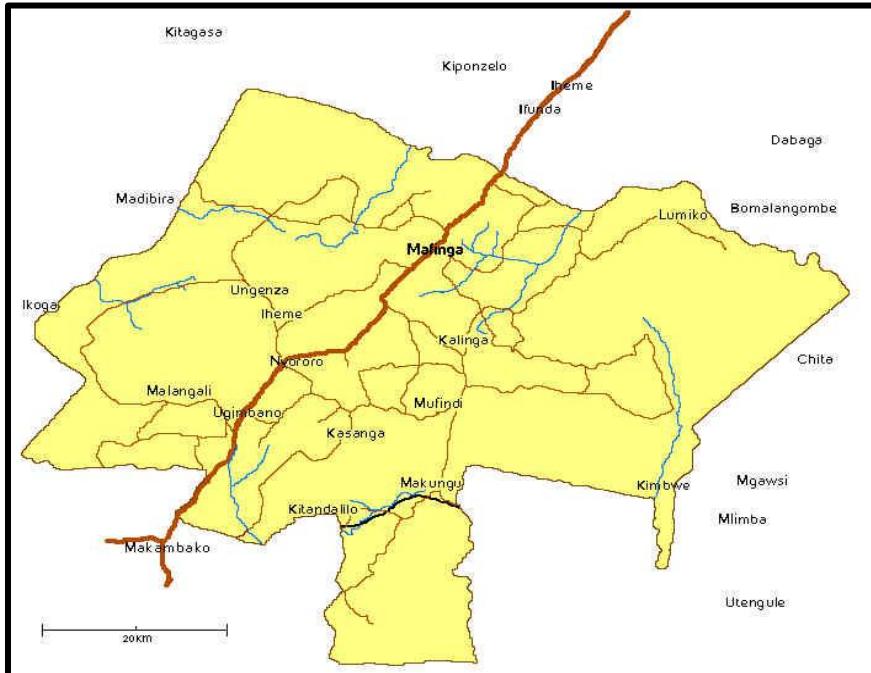
Figure 2: Map of Mufindi District, Source: www.google.co.uk/image

activities such as petty trade, crop trade, timber and agricultural inputs just to mention few. The district has 5 divisions, 28 wards and 148registered villages. Mafinga is an administrative and market center and is connected by the tarmac road which runs from Dar es Salaam to Malawi and Zambia. This road plays an important role in transporting agricultural inputs from Dar es Salaam port to the southern highlands of the country (Iringa 2002).

5.2. Unity of analysis

The evaluation is carried out using agro-dealers[10] as the unit of analysis. The study by Odame & Muange(2010), defines agro-dealers as 'traders in agricultural inputs' (which may include improved seeds, fertilizers, pesticides, animal feeds, veterinary drugs and simple farm tools) but

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[10]Other common names given to agro-dealers includes; stockist, agro-input dealers and agro-vets (Odame & Muange 2010).

Chinsinga (2011), define agro-dealer as a locally-based entrepreneur who sells seeds, fertilizer and agro-chemicals to poor farmers in remote areas. According to Kelly et al. 2003 and AGRA 2007 defines agro-dealers as a rural shop owners trained by NGOs on general business management and technical knowledge of agricultural inputs to reach farmers in rural areas. This definition is not appropriate to our study as it assumes that all agro-dealers receive training which is not the case in Tanzania business environment, where only agro-dealers who participate in IVP receives training from CNFA. In this study therefore, agro-dealer is defined as a single person or a group of people who supply agricultural input[11]in rural areas at a retail prices. i.e. an entrepreneur who purchase inputs from wholesalers or importers and sell them to smallholder farmers at retail prices and therefore agro-dealers connect poor farmers to input supply market.

5.3. Data collection on the field

The data was collected between early December2011 and mid March2012. The survey interviewed a total of 100 agro-dealers and the interviews were done with assistance of District agricultural and livestock development officer. Primary data was obtained through structured questionnaire from interviewing agro-dealers who are participant and non-participants of input voucher program. The questionnaire (Appendix A) comprised of open ended questions and closed ended questions and was translated into Swahili language for better understanding by the respondents. The questionnaire was pretested during the third week of November by involving 5 respondents in Mufindi district before the field survey to identify and remove any questions that will not receive response from agro-dealers. The pretesting was done after translating the questionnaire into Swahili language. Also pretesting assisted us to check if the questionnaires were comprehensive enough to gather appropriate information required for the study analysis. In addition, the study used data collected through personal observation made during the field survey and desk research conducted for two weeks from mid-November 2011 in Agriculture and Livestock section office of Mufindi district. This triangulation of data sources was vital in obtaining missing information for reliable research (Gobezie &Garber, 2007).

4.4. Sampling technique

Purposive sampling technique was used to select Iringa region out of 11 other food potential regions of Tanzania. The Random sampling technique was used to select one district out of eight districts of Iringa region. After that random sampling technique was used to select 50 agro-dealers from a list of names of 55 participants of the program. The list of agro-dealers was obtained from

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[11]For the sake of this study agricultural inputs or farm input are defined to include; fertilizer, improved seeds and pesticides used by small scale farmers in growing maize and paddy.

Mufindi district council agriculture and livestock department. Unfortunately, we could not gate a list of names of agro-dealers who do not participate in input voucher program from this office.

Therefore we decided to use a snowball[12]sampling techniques to get conduct with non-participants of the program (Kumar 2005:179). A snowball technique was selected because we aimed at interviewing only 50 agro-dealers who are not participants of the program. We started by asking agro-dealers who participate in the program to refer us to agro-dealers who do not participate in the program. At Mafinga centre we got six agro-dealers who referred us to other agro-dealers in other wards. We kept on asking interviewed non-participants to refer us to other agro-dealers until we got 50 non-participants. At the end we had a total of 100 agro-dealers out of which 50 were obtained through a random sampling technique (participants group) and the other 50 via snowball sampling technique who were categorized as non-participants. Random sampling technique among the participants was used to account for selection bias problem. According to Mafinga agricultural and livestock office there are no more than 109 agro-dealers in the entire district and so we believe that our sample is a good representative of the population because approximately 95% of agro-dealers were covered through interviews i.e. 50 out of 55 participants and 50 non-participants.

4.5. Scope of the study

- There are so many factors that may influence agro-dealers to engage in the program such as institutional factors, social economic factors, business related factors, credit related factors, program related factors, policy related factors and geographical related factors. Indeed to study all this factors calls for more resource than we can afford, therefore our study covered the social-economic related factors, business and credit related factors focusing on educational level, experience, wealth, distance travelled by agro-dealers and access to credit.

- Also the study is restricted on exploring whether the input voucher program improves access to credit, improves wealth of the agro-dealers, improves distance between agro-dealers and distance travelled by agro-dealer to input markets.

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[12] Snowball sampling refers to the process of selecting a sample by using the available network (Kumar 2005: 179).

4.6. Limitation of the study

- Agro-dealers value their time and they are very busy. This affected the time we spent on interviewing them and their concentration on giving response to questions. This in one way or another might have influenced the accuracy of the information they provided.

- Most agro-dealers had low level of education and were poor record keepers. Others had not kept any record about their business therefore this situation might have affected the availability of precise information for the research.

- Limited access to resources: The survey involved travelling long distances using unreliable transport which was time consuming and costly. Availability of more resources to allow the survey to be conducted in all eleven food potential regions, may be could translate into different and more interesting results.

- Reference from Tanzania: The IVP is still new in most of the countries where it's implemented and so there is a notable gap of reference in regard to input supply side. Also, we could not find reference which analyses the impact of IVP on agro-business in these countries including Tanzania.

6.0. RESULT AND DISCUSSION.

6.1.0. Descriptive statistics

In this sub section, descriptive statistics analysis by using SPSS program was employed to verify the difference characteristics of participants and non-participants. For continues variables, we calculated mean and standard deviation and we used simple t-test to check if there is a significant difference in decision making among participants and non-participants. For discrete variables we calculated percentages and we used Pearson chi square to check whether there is a significant different in decision making among participants and non-participants. We used mean and percentages to explain the situation before and after the program. These were done to create a better understanding of agro-dealer's profile (Henry et al. 2000). See table 1 and 2 below.

Table 1: Descriptive statistics for continuous variables

Variables	Agro-dealers	N	Mean	Std dev	T-value
Age of the respondents (years)	Non-participants	50	37.94	9.23	
	Participants	50	40.3	9.63	-2.251
Education level (Years)	Non-participants	50	3.28	4.5	
	Participants	50	6.9	5.9	-3.478*
Experience (Years)	Non-participants	50	7.3	3.4	
	Participants	50	9	4.4	-2.167**
Total wealth before the program (1,000,000 TZS)	Non-participants	44	37	20	
	Participants	47	47	24	-2.098**
Total wealth After the program (1,000,000 TZS)	Non-participants	50	45	28	
	Participants	50	64	41	-2.82*
Distance to input source before the program (Km)	Non-participants	50	75.62	40.71	
	Participants	50	27.76	16.95	7.675*
Distance to input market before The program (Km)	Non-participants	50	75.24	37.77	
	Participants	50	50.82	18.2	4.119*
Distance to input market after	Non-participants	50	82.24	35.34	

The program (Km)

	Participants	50	88.58	25.00	-0.974

Note: *p<0.01, **p<0.05, ***p<0.10. Standard deviation = Std. dev. All figures in wealth are in Tanzania shilling by the time of survey 1Euro was equivalent to 2000Tzs. **Source:** Survey result

Table 2: Descriptive statistics for categorical/discrete variables

Variables		Non-partici (N)	Partici (N)	Total (N)	χ2
Marital status	Single	12 (24%)	6 (12%)	18	
	Married	35 (70%)	38 (76%)	73	2.027
Sex of respondents	Female	11 (22%)	13 (26%)	24	
	Male	39 (78%)	37 (72%)	76	0.219
Access to credit (1 = credit constrained)	Before	47 (94%)	49 (98%)	96	1.042
	After	42 (84%)	26 (52%)	68	11.765*
Distance between agro-dealers (Below 5 Km)	Before	12 (24%)	21 (42%)	33	3.66***
	After	17 (32%)	36 (72%)	53	14.492*
Distance between agro-dealers (Above 5 Km)	Before	38 (76%)	29 (58%)	67	3.66***
	After	33 (68%)	14 (28%)	47	14.492*
Improved storage facility		15 (30%)	38 (76%)	53	21.236*

Note: *p<0.01, **p<0.05, ***p<0.10,   Non-partici means Non-participants and partici = Participants

Source: survey data

6.1.1 Agro-dealer's characteristics

Age and experience: The average age of the respondents was 39 years with a range between 24 and 60 years old. The average age for participants and non-participants was 40 and 38 respectively (Table 1). Participation of agro-dealers increases with increase in number of years and then declined with age above 51 years old. This trend is persistent in both groups i.e. among participants and non-participants. 74% of participants were in the middle age category ranging between 31 to 50 years old as compared to 58% of non-participants (Figure 2). Higher proportion of middle age group among participants and non-participants indicates more business experience and asset

ownership than younger age group below 30 years old. The average years of experience were higher in participant group (9) as compared to non-participants group (7), implying that participants have more business experience than non-participants (Table 1).

Figure 3: Age of respondents
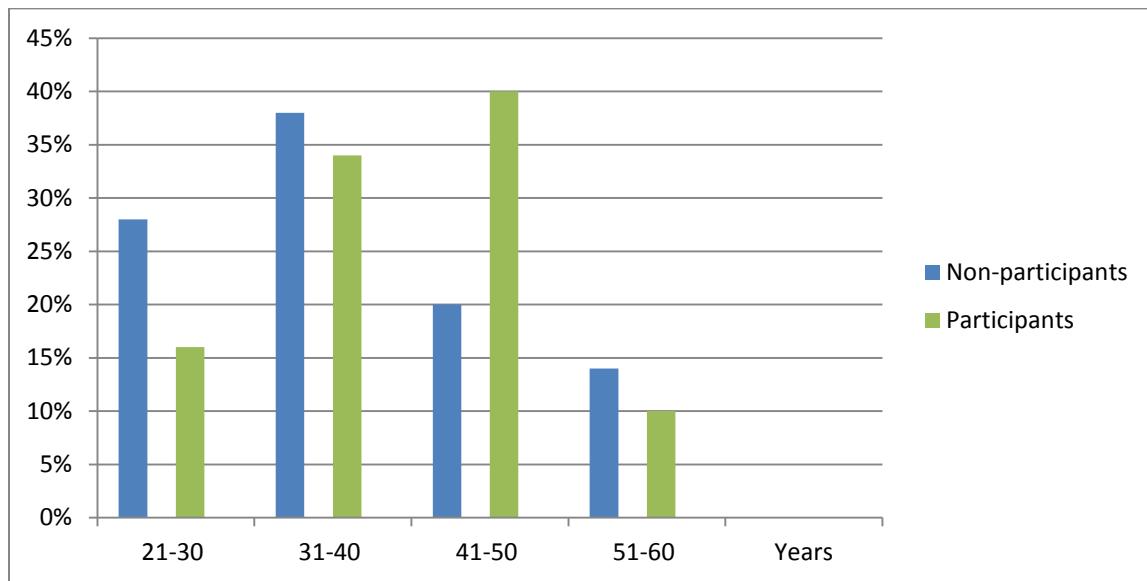
Source: Field study, March 2012

Education level: The result indicates a substantial difference in literacy level among participants and non-participants. Of the participants 66% are literate butonly34% did not attend even primary school education. Of the non-participants 60% are illiteracy while only 40% are literacy. Large percentages (60%) of illiteracy people are in the non-participant group whereas only 34% are in participatory group. Furthermore, 32% of the participants completed secondary and higher education but only 6% of the non-participants attained this level (table 5). The mean in participating group (7) is relatively higher than in non-participants (3) see Table 1, indicating high literacy level among participant's group than non-participants. Higher literacy level shows that participants have higher ability to grasp, evaluate and use information about the program to their advantages. This is in line with the study by Munyua et al.(2010) which signify high mean (number of years attended to school) as an indicator for higher literacy level among farmers capability to grasp information on improved maize technology in Kenya. Also the study by Saweda et al. (2010) indicates that large fraction of voucher program participants are with higher education level than non-participants. Thus education is an important determinant towards decision making on whether to participate in the program or not.

Figure 4: Education level of respondents
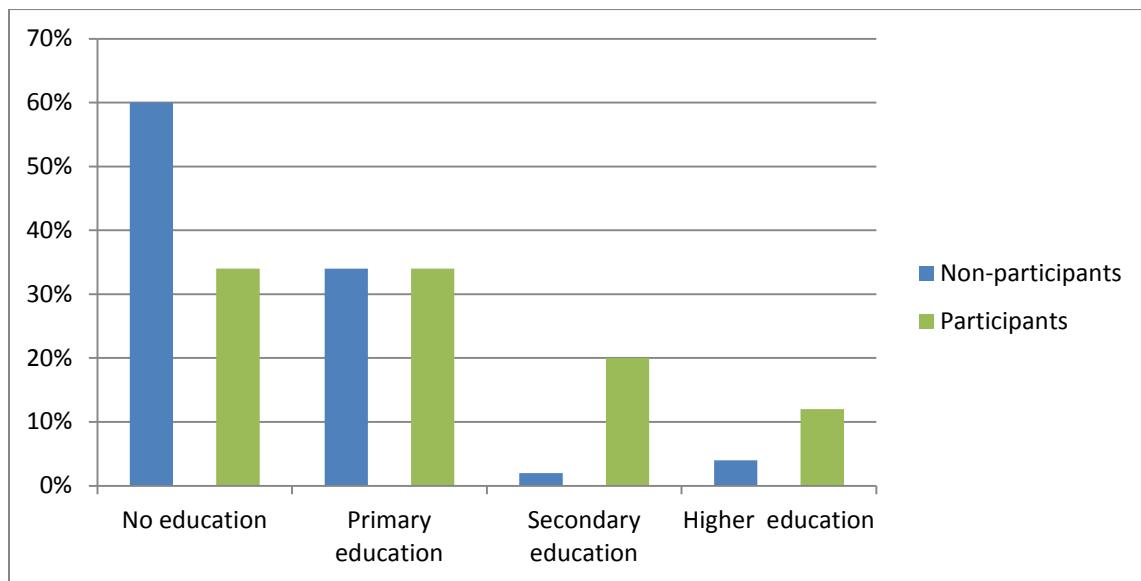
Source: Survey results

Sex: 78% of non-participants of the program were male as compare to 74% of participants while female participants accounted for 26% as compared to only 22% of the non-participants. In both groups there is more male engaging in supply of farm inputs than female. The percentage of male is far away bigger than that of female indicating that females face more challenges in engaging in input supply system than male in Mufindi district. However more female are participants implying that they adopt the program easily as compared to male although the difference is not significant (Table 2 & Figure 4).

Marital status: 24% of non-participants are single as compared to only 12% of participants. 4% of non-participants are divorced as compared to 6% of participants. 2% of non-participants are widow as compared to 6% of participants while 70% of non-participants are married as compared to 76% of participants. This means that single agro-dealers have less chance to engage in the program as compared to married agro-dealers (Table 2 & Figure 4).

Figure 5: Sex and Marital status of respondents
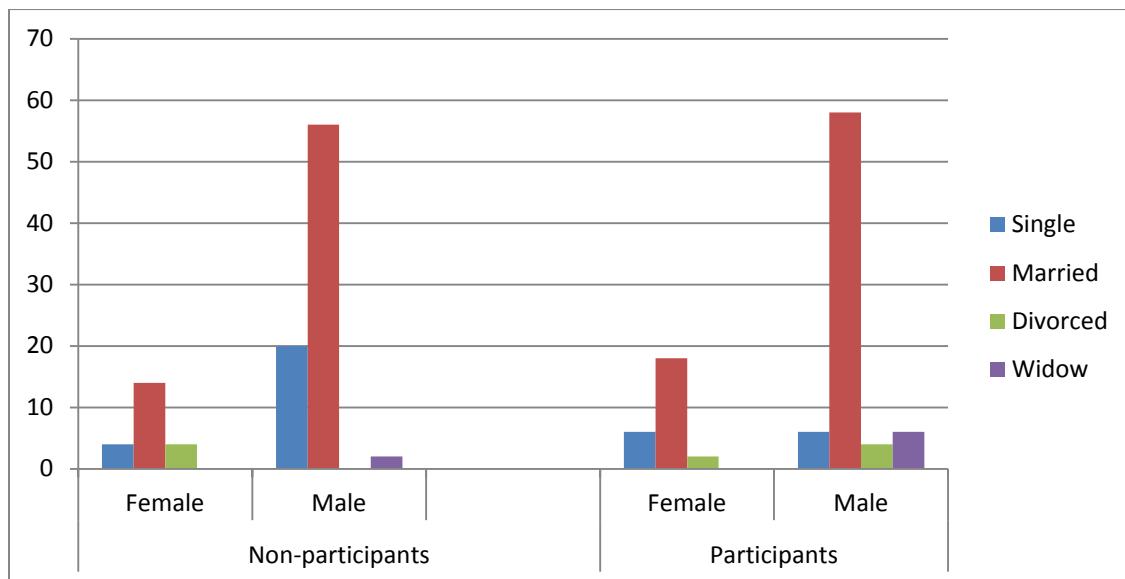
Source: Survey results

6.1.2. Credit related characteristics

Credit constrained agro-dealers: Access to credit is believed to be effective for the credit constrained clients (Diagne & Zeller 2001) than those who are credit unconstrained, because unconstrained agro-dealers will tend to use the loan funds on unintended activities reducing the effectiveness of the program impact. Therefore our discussion is based on credit constrained agro-dealers who are considered to be potential for the success of the program. We categorized agro-dealers who needed to borrow but borrowed fewer amounts than amount applied/wanted as credit constrained. We further identified agro-dealers who needed to borrow but did not apply for credit due to fear on credit denial for various reasons such as lack of collateral etc and categorized them as credit constrained. Agro-dealers who obtained the amount they applied were categorized as credit unconstrained and those who don't need credit facility were also classified as credit unconstrained. Using this as a rule of thumb, in twelve months of year 2008 before the program inauguration, 94% of non-participants were credit constrained as compared to 98% participants (Table 2 & Table 4). Three years later i.e. twelve months of the year 2011 after the program commencement, 84% of non-participants were credit constrained as compared to 52% participants (Table 2 & Table 5). This result indicates that with time access to credit improves in both groups but the improvement is remarkable for participants than for non-participants.

Access to credit facility: 82% of the participants are enjoying loans facilities from bank while only 28% of the non-participants enjoy these facilities leaving behind larger percentage (72%) without ability to qualify for credit facility from banks. Most of the non-participants claimed to get loans from friends, wholesalers of farm inputs and from SACCOS. 18% of participants didn't have loan facility(Table 3) due to various reasons such as; they applied for loan facility and waiting for approval, still on application process because have recently joined the program, applied but did not get the facility due to various reasons, got less amount than was applied for so decided to turn down the loan facility, business has been in operation for less than one year and others were not interested with the loan facility especially from bank due to perceived complicated application procedures.

Nevertheless, ownership of assets by agro-dealers was found to be one important determinant to access to credit. Participants had relatively higher level of business asset than non-participants implying more ability to acquire credit from formal banks since they have assets which can be pledged as collateral. This matches the findings by Munyua et al. (2010) who found high level of wealth with significant effect on securing business loans. This means that non-participants are inaccessible to financial market limiting the ability for business expansion. Also the study by Diagne (1999) in Malawi found the composition of the household assets to be much more important determinant of household access to formal credit. Therefore agro-dealers would prefer to join the program to increase their chance of obtaining credit to increase their business capital base.

Table 3: Do you have any loan facility from bank?

	Yes	No
Non-participants	14	36
	(28%)	(72%)
Participants	41	9
	(82%)	(18%)

Source: Survey results

Need of Loan: 98% of participants needed to borrow within 12 month before the program as compared to 94% of non-participants. Out of agro-dealers who applied for credit from the bank none got the amount applied for and we classified them as credit constrained. This shows that regardless of the program agro-dealers need credit to finance their business. Most of agro-dealers

(78%) decide to participate into program because they believe they can easily access to finance(table 6).Participants are more credit constrained than non-participants although the difference is not significant. 2% of participants had no need of borrowing money from financial institutions as compared to 4% of non-participants. The percentage of agro-dealers who needed to borrow before the program is by far higher than the percentage of those who did not need loan facility. Agro-dealers who did not need credit finance declared that during that time they were not aware of credit programs and were struggling using their own means to finance their businesses. This indicates that approximately all agro-dealers need loans to finance their business working capital. Therefore programs that enables agro-dealers access to credit stands a higher chance of attracting more participants.

Table 4: Needed to borrow before the program (2007) and did not get the amount applied for

	Needed to borrow		Got amount applied/wanted	
	yes	No	yes	No
Non-participants	94%	6%	0%	100%
Participants	98%	2%	0%	100%

Source: Research survey result

Looking at the situation after the program (the year 2011) it was discovered that all the respondents needed to borrow funds from the bank because awareness about the program and demand for credit increased amongst agro-dealers. Despite this increase in need of credit by agro-dealers, 48% of participants got the amount they wanted as compared to only 14% of non-participants. 84% of non-participants were credit constrained as compared to 52 % of participants (Table 2 &Table 5).This shows that financial institutions are willing to extend credit facilities to a certain maximum amount which is below the actual loan requirement of the agro-dealers. However, most agro-dealers accept fewer amounts than they need because there is no other best alternative credit source for them.

Table 5: Needed to borrow in year 2011 and did not get the amount applied

	Needed to borrow	Got amount applied/wanted
	yes	yes
Non-participants	100%	14%
Participants	100%	48%

Source: Research survey result

Why agro-dealer's engage in program? According to the survey, 78% participants joined input voucher program in order to obtain credit for expansion of their business capital base. 8% joined because they needed training in business management, 4% joined the program due to influence from their friends who are doing the same business and are participants of the program, 2% joined the program because they had a good relationship with input wholesalers who are participants of the program and 4% thought would increase their sales turnover and get more profit by being members of the program (Figure 5).

Figure 6: Reasons for joining input voucher program
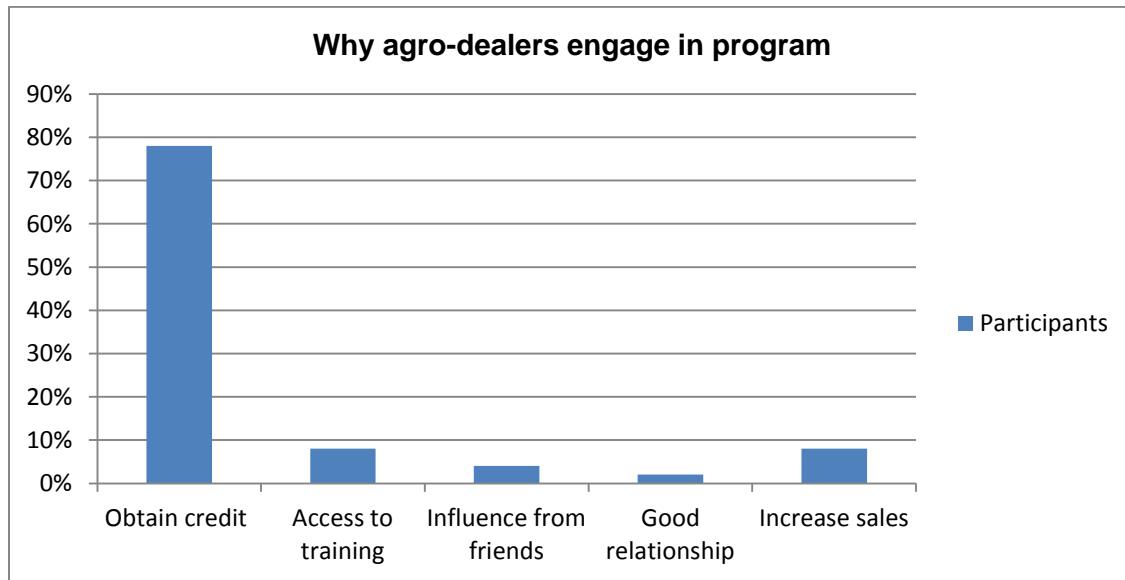
Source: Survey results

6.1.3. Business related Characteristics

Wealth of agro-dealers: This variable is measured by calculating the total value of assets ownership such as motor vehicles and houses. Then we calculated the total wealth of individual agro-dealer for the twelve months in year 2008 before the program start and for the last twelve months in the year 2011 after the program. The average wealth in Tanzanian shillings was calculated (Table 1). The result shows that before joining the program, participants had higher average total wealth (47 million Tzs) than non-participants (37 million Tzs). This result implies that wealthier agro-dealers have more capacity to transport more farm inputs using their motor vehicles, and probably they own large input shops and can store more farm inputs relatively to poor agro-dealers. Also wealthier agro-dealers sells farm inputs at larger quantities, because it is not possible to sell the entire quantity at once, they need large improved storage facility to keep farm inputs for long time. Also the percentage ownership of improved input facility was higher among participants (76%) than among non-participants (30). All of which implies that ownership of assets influences decision making of agro-dealers. Our result matches the findings by Munyua et al. (2010), in Kenya which indicated more land ownership (2.8 acres) for adopters of the new technology as compared to 1.9 acres of land ownership by non-adopters.

During our survey, it was also noted that majority of agro-dealers operated on the rented business premises, but ownership of business premises was more in participating group (45 percent) than in non-participating agro-dealers (29 percent). Therefore non-participants were noted to be relatively poor than participants being one among the factors limiting them to access to finance.

It was further noted that participants operated input mobile shops and they travel to assigned villages in rural areas on specified voucher distribution days to sell farm inputs. We asked some of them and they said it was too costly to acquire input storage facilities in every ward where they operated. The input mobile shops normally ceased to operate immediately after unused input voucher were collected from the farmers at off peak farming season. This finding is in line with the study by Chinsinga (2011), who found agro-dears using mobile markets to supply seeds in Malawi rural areas during specific voucher distribution dates to poor farmers. During farming seasons, participants without mobile shops temporarily rent houses and use them for storing inputs. Only 11% of participants own house in rural areas. In most case inputs were not timely delivered as a consequence to this situation, farmers traded their vouchers for cash to agro-dealers distorting the intention of the input voucher program.

The mean wealth of participants is higher than that of non-participants in both periods and has increased with time. However, the slope of participant's graph (Figure 6) is steeper than the slope for non-participants signifying higher growth rate of total wealth among participants than non-participants.

Figure 7: Total wealth of participants and non-participants
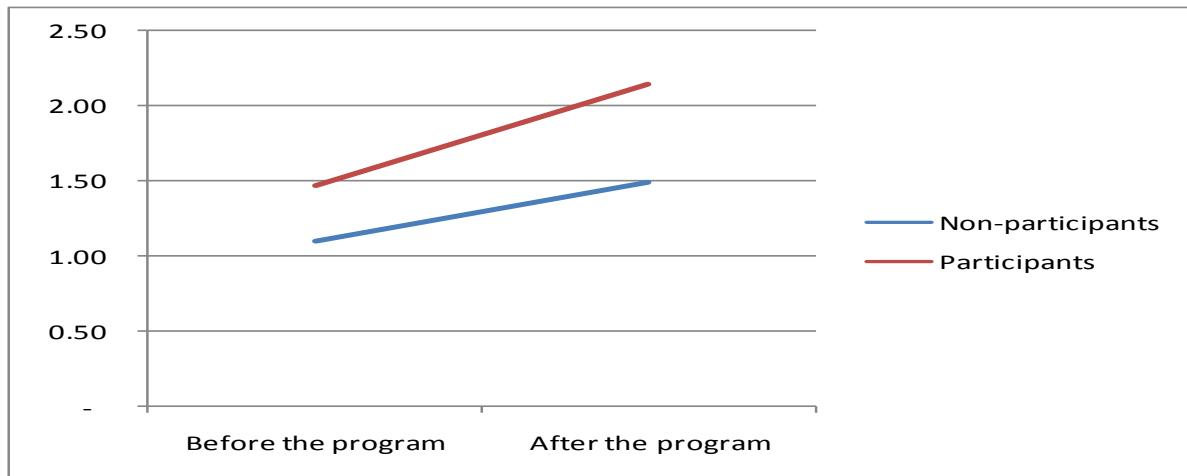
Source: Survey results, 2012.

Distance between agro-dealers: Our result indicates that before the program most agro-dealers where situated in a distance above 5 km i.e. 76% for non-participants and 58% for participants as compared to 24% non-participants and 42% participants. However the distance between non-participants is bigger than that between Participants (Table 2). This indicates that one have to walk for more than five kilometers from one input shop to the next input shop in rural areas. After the program, there is higher percentage (72) of participants located below 5 kilometers from each other. Only 28% are located above 5 kilometers from each other as compared to non-participants 68% (Table 2). The number of agro-dealers located below 5 kilometers is increasing for both groups however the increase is bigger amongst participants than non-participants implicating higher influence among participants than non-participants. The number of agro-dealers located above 5 kilometers from each other is declining; the decrease is also higher among participants than non-participants. This is due to most new entrants being situated in potential areas and centres for input markets. Also some agro-dealers migrate from rural areas to agricultural potential centers where there are good road infrastructures, availability of information and other social services like hospitals, schools, education. For example by the time this survey was conducted 15 agro-dealers were based at Mafinga township center and 5 at Igowole center. Our finding is

consistent with the study by Kormawa et al. (2003) who found most farm input supply companies concentrated in urban areas or rural agricultural potential areas in Benin. High interaction between them influences decision making from one to another, increases flow of information and awareness about the program. Therefore after the program, participants are close to each other and there are more input shops due to increase in the number of agro-dealers.

Furthermore, this result indicates that, increase in distance from one to another agro-dealers result into less likelihood to participate in the program. This implies that there is a negative relationship between distance and agro-dealer's decision making. After the program more participants (72%) are located below 5 kilometers as compared to 32% of non-participants, see table 5.The survey result also reveals that many agro-dealer's shops are located nearby input wholesaler's shops (Large scale input suppliers).

Distance to input source: The distance that agro-dealers travel to buy farm inputs, ranges from 2kilometers to over 180kilometers from Mafinga town which is the input distribution center. The average distance travelled by the program participants to source inputs is 28 kilometers while for non-participants is77 kilometers(Table1).The results indicates that program participants are located close to the farm input source as compared to non-participants because most participants are literate and migrate from rural areas to town more easily than non-participants as most of them are illiterate. Most of illiterate agro-dealers are based in rural remote areas and find difficult to adopt the program. The analysis shows a negative correlation between decision marking and distance to input source i.e. as distance to input source decreases the probability of participation decreases. This result is consistency with our expectation.

The shorter the distance the higher the price margin for the agro-dealer the higher the participation level. It is therefore possible that participants get more profit than non-participants because of reasons such as availability of input market due to increase in input purchasing power by poor farmers who receive input vouchers. Participants based nearby agricultural potential areas enjoy relatively low transport and transaction costs. Also National microfinance bank is located at Mafinga centre. In that case it can be easier for agro-dealers based around this area to get information and acquire loan facility than the one located far away who cannot easily develop relationship with the bank.

Distance to input market: This is the distance travelled by agro-dealer to sale farm input to poor farmers in villages where most of poor farmers are based. Before the program non-participants were travelling longer distances as compared to participants the reason being most businesses of non-participants are based in rural areas. Due to poor infrastructures associated with travelling long distances, it is costly to supply farm inputs for agro-dealers in rural areas due to higher transportation costs. The average distance travelled by participants was 50.8 kilometers as compared to 75.24 kilometers travelled by non-participants (Table 1). This is an indication that most non-participants are based in the rural areas than participants.

However, after introduction of the program the mean distance travelled by participants increased by 38 kilometers while the mean distance travelled by participants only increase by 7.01 kilometers (Table 1). This means that increase in number of program participants increases the coverage of farm input supply in rural remote areas. Because of the program, participants are willing to travel more distances to supply farm input as long as they have input market assurance from poor rural farmers whose purchasing power has increased due to input voucher program. Our findings is consistent with Munyua et al. (2010) which pointed out higher mean- distance for farmers travelling long distances and low mean-distance for those travelling shorter distances to obtain seeds from seed stockist in Kenya.

5.2.0. Logistic regression analysis

This sub section presents the estimation of results from logistic regression analysis run by using Stata program. We start by calculating R^2 to check whether our model gives us better predictions and estimations. We used marginal effect after logit to check whether independent variables have significant effects on agro-dealer's decision making. As we indicated earlier, the dependent variable is treated as dummy variable with 1 for participants and 0 for non-participants.

5.2.1. Goodness of the model.

The model result revealed that the logistic regression model (Table 6) correctly classified 93% of agro-dealers decision to participate in the program. The logit model predicts that 40 agro-dealers would not participate in the program and 43 agro-dealers would participate. But in reality 50 Agro-dealers did not participate while 50 participated. Furthermore, the predictions tell us that 38 out of 40 predictions of non-participants are correct and 2 are wrong. Of the 43 predictions to participate 39 are correct and 4 are wrong. So in total there are 77 correct predictions and 6 wrong predictions. Due to this reason we consider our logit model as a good prediction tool we could have

used to find a counterfactual data. Likewise, the measure of goodness of fit used in the binary decision model was pseudo[13] R square which was 0.7456 indicating that the variation in explanatory variables explains 75% of the agro-dealers decision to participate or not participate in input voucher program (Table 7).

Table 6: Logistic model for Agro-dealer

```
                -------- True --------
Classified |        D          ~D |      Total
-----------+------------------------+-----------
      +    |        39          4 |         43
      -    |         2         38 |         40
-----------+------------------------+-----------
   Total   |        41         42 |         83

Classified + if predicted Pr (D) >= .5
True D defined as Agro-dealer = 0
----------------------------------------------------
Sensitivity                   Pr (+| D)    95.12%
Specificity                   Pr (-|~D)    90.48%
Positive predictive value     Pr (D| +)    90.70%
Negative predictive value     Pr (~D|-)    95.00%
----------------------------------------------------
False + rate for true ~D      Pr (+|~D)     9.52%
False - rate for true D       Pr (-| D)     4.88%
False + rate for classified + Pr (~D|+)     9.30%
False - rate for classified - Pr (D| -)     5.00%
----------------------------------------------------
Correctly classified                       92.77%
----------------------------------------------------
```

Source: survey result, 2012.

6.2.2. Marginal effect after logit

Apart from signs, coefficients in logistic regression analysis is not ease to interpret directly, the easy way is to calculate the marginal effect of changes in explanatory variables (Verbeek 2008). Therefore table 9 present results of marginal effect extracted from logistic regression model. We included eleven variables which are tentatively linked to influence agro-dealer's decision to participate in program and then we controlled for some variables to check how they affected our results.

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[13]Pseudo R[2] measure can be interpreted in the same way as OLS-R[2] in the linear model which lies in interval of [0, 1]. The relevant behaviour of several pseudo-R[2] measures is analyzed in a series of misspecified binary choice models; the misspecification is the omitted variables or an included irrelevant variable (Cameron & Windmeijer 1997).As shown in table 7, the pseudo R[2] is 0.745 in this logit model.

Table 7: Marginal effects after logit

Variables	LogReg 1	LogReg 2	LogReg 3	LogReg 4	LogReg 5
Age (years)	-.040***				
	(0.022)				
Sex (1=Male, 0 = Female)	0.304***	0.352**			
	(0.17)	(0.18)			
Education (years)	0.054**	0.054**	0.052**	0.047***	0.047***
	(0.029)	(0.026)	(0.026)	(0.027)	(0.0267)
Marital status (1 = Marries, 0 = Single)	0.415**	0.292	0.243		
	(0.186)	(0.213)	(0.284)		
Experience (years)	0.0134	-0.019	-0.009	-0.008	
	(0.032)	(0.027)	(0.028)	(0.026)	
Improved Storage facility (1=yes,0=No)	0.523*	0.498*	0.429*	0.486*	0.474*
	(0.177)	(0.175)	(0.177)	(0.168)	(0.166)
Total wealth of agro-dealer before program (Tzs)	5.051	8.739	7.287	7.526	7.666
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
Distance to input source before program (Km)	-0.027**	-0.27*	-0.025*	-0.028*	-0.028*
	(0.013)	(0.008)	(0.008)	(0.008)	(0.008)
Distance to input market before program (Km)	0.009	0.013	0.013***	0.015***	0.016***
	(0.010)	(0.009)	(0.008)	(0.009)	0.009
Distance between agro-dealers before program (Km)	0.197	0.372	0.23	0.256	0.247
	(0.224)	(0.29)	(0.279)	(0.274)	(0.273)
Access to credit before program (1 = credit constrained)	0.541*	0.583*	0.571*	0.634*	0.633*
	(0.194)	(0.153)	(0.162)	(0.148)	(0.147)
Constant	-2.7758				

Log likelihood = -14.6341

Pseudo R^2 = 0.7456,

Prob > Chi^2 = 0.0000

*p<0.01, **p<0.05, ***p<0.10

Note: Marginal effects after logit are expresses without parentheses and standard error in parentheses. **Source:** Survey results, 2012.

The age coefficient is negative as expected and has a significant effect at 10 percent level on the probability of participation. It means agro-dealers decision to participate in program decreases as they become old. A unit increase in the age of agro—dealer results in a 4 percent less likelihood in participating in the program. This suggests that older agro-dealers faces more challenges in making decision to join in new programs. These challenges may include unwillingness to accept changes, risk averse, ownership of sufficient business working capital, retiring from business and being weak due to low life expectancy in Tanzania where life expectancy was projected at 54 years for male and 58 for female by 2010 to be confirmed after the national census on 2012 (MHSW 2010). Younger agro-dealers below 40 years are more knowledgeable and willing to bare risks associated with participating into new program, while aged agro-dealers becomes weak and retire from business. This is in line with, the early empirical finding hypothesis by Adesina & Zinnah (1993).In most adoption studies old age happen to be one of the problem frequently associated with non-adoption of new programs (Simtowe & Zeller 2006).

Sex of agro-dealers is positive with significant effect at 10 percent level on the probability of participation. Being male agro-dealers increases the probability of participation by 30 percent. Probably this is because; if a female is not a house head she cannot make decision on her own because male will tend to make decision on behalf of most African families. Therefore it is important for the policy makers to look into challenges facing female agro-dealers. By the time of survey there were only 26% of female agro-dealers participating in the input voucher program.

As expected there was a positive relationship between the numbers of years attended to school and the choice to participate in the program. This means, a unit increase in years attended to school results into 5.4 percent likelihood in adoption of new program. This relationship implies that a more educated agro-dealer has the ability to get, process and use the available information as compared to a less educated agro-dealer. In line with this argument, a more educated agro-dealer is more likely to develop the entrepreneurial skills and knowledge that enable decision making to join input voucher program. Education variable is significant at 5% level in influencing agro-dealers decision to participate in the program.

There is a positive relationship between participation and marital status of agro-dealers which was significant at 5% level in influencing agro-dealers decision to participate in the program. Being married increase the likelihood of participating in the program by 41 percent.

Ownership of storage facility is positively related to adoption of the program and is statistically significant at 1% level in influencing agro-dealers decision to participate in the program. Input storage facility increases the probability of agro-dealer to participate in the input voucher program by 52 percent.

Agro-dealers decision to participate in the program is negatively influenced by the distance to input source as expected and the relationship is statistically significant at 5% level. This means, a unit increase in distance (Kilometers) to input source results into 2.7 percent less likelihood in participation in input voucher program signifying that the chance for agro-dealer's decision to participate in the program increases with decrease in distance to input sources. The reasoning behind this finding might be that long distances are associated with poor paved roads which increase transportation costs of farm inputs; more time is involved in the transaction process resulting into reduction of profit margin to agro-dealers. In turn this transforms into higher input prices which of course small scale farmers cannot afford. As a result of this, most agro-dealers tend to operate their business close to input source and in agricultural potential centers.

Access to credit had positive sign as was anticipated. This shows a positive relationship between agro-dealers decision to participate in the program and access to credit which means a unit increase in a chance for access to credit results into 54 percent likelihood of agro-dealer's decision to participate in input voucher program. Access to credit was significant correlated at 1% level with the agro-dealers decision to participate in the program. This indicates that credit influence agro-dealer's decision for participation in input voucher program.

Other predictors that positively influenced agro-dealer's decision to participate in the program but were not statistically significant included experience, wealth, distance between agro-dealers and distance to input market. Nevertheless, these findings are different from what we expected and the explanation behind the insignificant results can be as follows;

Positive and insignificant correlation for distance between agro-dealers implying that flow of information about the program does not depend on the physical closeness among agro-dealers due to availability of mobile phones in rural and urban areas. Phones facilitate quick flow of information and increases awareness of the program. Also increased use of mobile shops in remote areas which allows agro-dealers to operate farm input businesses on several locations without being stationed

in that particular location can be another reason. This input shops are seasonal which means during the farming season the number of input farm shops increases while during the off season the number of these shops decline reducing the number total shops and therefore the distance between agro-dealers (shops) remaining approximately the same as that before introduction of input voucher program. Since most agro-dealers joined the program in order access to credit,

Agro-dealers decision is positively influenced by wealth of agro-dealer as anticipated (Table 7). But the influence is not significant, this is because; most of the agro-dealers claimed to join the program (78% in table 4) so that they can get access to credit, but participation is not a guarantee to get access to finance since there are some other requirements for them to qualify for loan facility. This included a maximum amount of thirty million Tanzanian shilling prior to pledging collateral which covers not less than 62 percent of the amount borrowed. For a wealthier agro-dealer, this amount seems to be too small and can get it from banks even without joining the program. Also, agro-dealers may not want to acquire more assets since this action reduces business working capital. This may be the reason why most agro-dealers were found to rent vehicles to transport farm input and operate on rented business premises.

After controlling for age, sex, marital status and experience, distance to input source, education level, access to credit are still strongly associated with program participation. When we controlled for storage facility, wealth became significant at 10% level but still it maintained a positive sign. Due to this reason we were conversed that our independent variables namely years of schooling, access to credit, distance to input source and distance between agro-dealers are robust enough on influencing agro-dealer's decision making with exceptional of wealth which changed from insignificant to significant after controlling for storage facility. We think storage facility and total wealth are spuriously related.

6.3.0. Impact assessment of input voucher program

This sub section discusses the impact of input voucher program on access to credit, total wealth and distance travelled by agro-dealers to sell inputs. We used difference-in-difference method to estimate change in outcomes (equation 1.3) of variables and a simple comparison by using "t-test" in STATA program was used to compare respondents and non-participant's samples as proposed by Khandker et al. (2010).

Table 8: Difference-in-difference results

Variables	Group	N	Mean	t-value
Change in total wealth (Mean*1,000,000Tzs)	Non-participants	44	12.1	
			(1.52)	
	Participants	47	20.5	
			(3.00)	
	Combined	91	16.3	
			(1.73)	
	Impact		-8.36	-2.485*
			(3.36)	
Change in access to credit (1= credit constrained)	Non-participants	47	0.17	
			(0.055)	
	Participants	49	0.469	
			(0.077)	
	Combined	96	0.3229	
			(0.049)	
	Impact		-0.2992	-3.273*
			(0.095)	
Change in distance to input market (Km)	Non-participants	50	6.8	
			(1.19)	
	Participants	50	37.18	
			(2.19)	
	Combined	100	21.99	
			(1.97)	
	Impact		-30.38	-12.187*
			(2.49)	
Change in distance between agro-dealers (Km)	Non-participants	50	0.42	
			(0.076)	
	Participants	50	-0.14	
			(0.095)	
	Combined	100	0.14	
			(0.067)	
	Impact		0.56	4.607*
			(0.121)	

Note: Standard errors are shown in parentheses. The negative sign of impact means that outcome of participants (1) is greater than that of non-participants (0), thus implying that the participation impact is in fact positive thence the impact is interpreted as positive. Khandker, et al. (2010).

Note: *p<0.01, **p<0.05, ***p<0.10.

Source: Own calculation from survey data, 2012

6.3.1. Wealth of the agro-dealers

To find out whether program has an impact on wealth of agro-dealers we established a null hypothesis that the difference between mean of non-participants and participants is equal to zero. The result (Table 8) shows that Input voucher program increases total wealth by 8,360,000 Tanzanian shillings and this impact is significant at 1 percent level. The increase among participants (20,000,000 Tanzanian shillings) is larger than among non-participants (12,000,000 Tanzanian shillings). This implies that by participating in the program, agro-dealers have a chance to increase their sales turnover (Increase in profit) due to expansion in farm input market, which in turn demands for more input storage facilities, houses with big space to be used as input shops and more vehicles for transporting farm input to the market. For those agro-dealers who do not own houses and input storage facilities increase in profit due to participation in program raise their financial abilities and enables them to hire vehicles for input transportation and rent offices at good business location centers. This result is in line with my early reasoning in previous section (Table 1) which implicated higher average total wealth for agro—dealers after the program than before and higher average total wealth for participants than non-participants after the program.

6.3.2. Access to credit

Most agro-dealers in developing countries are believed to lack access to credit needed to finance their start up business capital or working business capital, which in turn has a negative significant effect on expansion of business capital base necessary for increasing business working capital and adoption of new technologies for new business ventures. Also, agro-dealers who lacks access to credit fails to purchase agricultural inputs and delivery at the right time during the pick production season. Therefore program that allows agro-dealers to access to credit will significantly increase their ability to acquire capital for sufficient supply of agricultural inputs in rural remote areas. However, a lack of credit does not always imply a need to credit because credit access will only be effective for the credit constrained agro-dealers due to credit fungibility Digne & Zeller (2001).Hence, this section explores whether input voucher program improves agro-dealers access to credit, the essence is to assess the impact of the program on access to finance. This is done by calculating the mean difference between the numbers of participants and non-participants who were credit constrained before and after the program by engaging difference-in- difference method see equation 1.3.After testing our null hypothesis which states that there is no difference in mean of credit constrained agro-dealers (i.e. between participants and non-participants) we came up with the following findings.

Results (Table 8) suggest that Input voucher program improves access to credit by 30 percent and this impact is significant at 1 percent level. This indicates that with time access to credit improves to both non-participants and participants but the improvement is better amongst participants (5%) than non-participants (2%), signifying less credit constrained participants than credit constrained non-participants. The improvement in access to credit is thought to be accelerated by the existing input voucher program. In other words, the number of agro-dealers who were not able to borrow 3 years before the program now they can access credit due to their participation in the program. Non-participants are believed to benefit from the existence of the program in indirect way, for example via dissemination of knowledge and influence from trained agro-dealers. However, access to formal credit is not automatic due to participation, because there are some requirements for participants to qualify for loan e.g. collateral to cover the loan amount up to 62.5% and cash flow statement (NMB 2011), this requirement pose barriers to most agro-dealers who do not own land title deed and new agro-dealers.

6.3.3. Distance to input market
To find out whether program has an impact on distance travelled by agro-dealers to sell farm input (to market) we established a null hypothesis that the difference between mean distance of non-participants and participants is equal to zero. This hypothesis was tested after running the difference-in-difference using Stata.

The result (Table 8) shows that Input voucher program participation by agro-dealers increases distance coverage by 30 kilometers and that this impact is significant at 1 percent level. The result indicates that with time distance coverage by both non-participants and participants increases, but the increase among participants is approximately five times more (38km) than among non-participants (7km). This is due to the fact that all participants of input voucher program are assigned up to 5 wards to distribute farm inputs depending on their ability and capital (widening their market). So participants make sure that they work hard to supply inputs in the assigned villages because input supply for this year will be used next year to determine how many villages should be assigned to agro-dealer in question. But on the other side most of the non-participants are located in rural areas and would just wait for the farmers to walk into their shops and buy farm inputs. Therefore the program has enabled agro-dealers to travel more distances to supply farm

inputs in rural areas, we consider this as an important way of getting farm inputs closer to the poor farmers especially in remote areas where roads are poor and not passable throughout the year.

6.3.4. Distance between agro-dealers

To find out whether program has an impact on distance between agro-dealers (location of agro-dealers) we established a null hypothesis that the difference between mean-distance from one agro-dealer to another agro-dealer among non-participants and participants is equal to zero. This hypothesis was also tested after running the difference-in-difference using Stata.

The result (Table 8) shows that Input voucher program participation by agro-dealers reduces distance between agro-dealers by 56 percent. This impact is significant at 1 percent level. However the distance among non-participants increased by 42 percent while decreased by 14 percent among participants. The result signify the fact that most participants based at trading centres (Agricultural potential area) does not open new shops in remote areas when they expand their businesses, instead they open new shops in agricultural potential areas and centers where infrastructures are good and use mobile shops to supply farm inputs in rural areas during the production season only. Our findings is in line with Chinsinga (2011)study in Malawi indicates most agro-dealers based at trading centres throughout the years were venturing out into the remote areas once the farm input subsidy program season kicks in. Participants would sometimes hire house and use to store farm input during the production season only. Also permanent[14]agro-dealers use seasonal[15] agro-dealers to supply farm input in remote areas during the production season only. While on the other end, most non-participants who are based their activities in rural areas are migrating to agricultural potential areas, this might be due to more information are available at their disposal now than before the program.

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[14] Permanent agro-dealers refers to agro-dealers supplying farm input throughout the years. (This study is based on permanent agro-dealers).

[15] Seasonal agro-dealers refer to stockist who supply farm input during the peak production period only and they cease operation when the production season is over. They normally engage themselves with other retail businesses selling variety of goods in their small shops at retail prices. They are seen when the production season starts and disappear when the season ends (Chinsinga 2011). The actual number of these retail shops is not known in rural areas.

7.0. CONCLUSION

In this chapter, we draw conclusion on factors that affect agro-dealer's decision to engage in IVP (section 7.1) and we conclude on whether IVP improves access to credit, total wealth, distance to input source and distance between agro-dealers (section 7.2). These conclusions are drawn based on results and discussion in chapter 5 above.

7.1 Factors affecting agro-dealer's decision making

This study provides the first empirical evidence on factors that influencing agro-dealer's decision to engage in IVP in Mufindi district. The study has demonstrated that education, access to credit, distance to input markets and ownership of improved storage facility are important factors which positively influence agro-dealer's decision to engage in IVP. Education level is positive correlated to agro-dealers decision making and is statistically significant at 1% level. This means participation increases with increase in number of years attended to school. It is found that illiterate level is low among participants relatively to non-participants. It seems that most non-participant forego school for business.

Improved storage facility is positive and statistically significant at influencing agro-dealers decision making. This means that agro-dealers who own input storage facility stood a higher chance to adopt IVP, but it was noted that most agro-dealers were based in input trade centers and they seasonally supply inputs in rural areas via mobile shops because they don't have input storage facility in every ward where they operate. This results into delay in input delivery during the pick production season. It was also noted that, some agro-dealers pretended to supply farm input using mobile shops while in real sense they were involved in purchase of physical vouchers from poor farmers. Worse enough, for the sake of getting large profit margin, some agro-dealers were noted to inflate the price of farm inputs. This action by agro-dealers reduces the purchasing power of poor farmers. Agro-dealers activities are not monitored by government as a result they are free to do whatever they want.

After controlling for experience, age, and marital status, distance to input market is positively correlated to decision making of an agro-dealer and is statistically significant at 10% level. This implies that interior input markets are reached by more program participants than non-participants because agro-dealers who engage in the program travel longer distances to sell inputs. On contrary, distance to input source is negatively correlated to decision making of the agro-dealer and is statistically significant at 1% level. This means that, distance to input source decrease with increase in participation signifying that more participants are based close to input source than non-participants. The reason behind might be, larger firms that supply inputs as well as CNFA training offices are located in trade centres e.g. Mafinga town, which enables agro-dealers based close to

trade centres to easily access more information at lower costs. Access to credit is positively correlated with agro-dealer's decision making and is statistically significant at 1%level. This indicates that, participants of IVP stood a better chance to acquire formal credit as compared to non-participants. This is because program provides guarantee facility to agro-dealers which reduces the risk perceived by lending institutions. Non-participants lack collateral to pledge against loans so they are regarded as riskier customers by lending institutions.

7.2. Impact of input voucher program

Also, this study provides the first empirical evidence on the impact of IVP on factors that influence agro-dealer's decision making. From this study, it is found that IVP has a significant positive impact on access to credit. Results from DD model shows that with time IVP has improved access to credit by agro-dealers by 30%. The impact is statistically significant at 1% level. However among participants access to credit improved by 5% while among non-participants access to credit improved by only 2%. This means that IVP has higher impact on access to credit among agro-dealers who engage in IVP than those who do not participate. Also the result indicates that IVP improved the distance to input market by 30km, this impact is statistically significant at 1% level. However the improvement is far higher for participants (38km) than for non-participants (7km).

It is interesting to note that the IVP has a negative impact on distance between agro-dealers. The result shows that distance between agro-dealers decrease by 56% since the program inauguration and that this impact is statistically significant at 1% level, yet the distance from one agro-dealer to another agro-dealer among participants decreased by 14 km whereas it increased by 42 km among non-participants. This means with expansion in agro-business, participants open more shops in trade centres while non-participants migrates from rural areas to trade centres. Furthermore, our finding indicates that IVP has a significant impact on total wealth of the agro-dealer. Result from difference-in-difference model shows that with time IVP have improved total wealth by 8,360,000 Tanzania shilling at 1% significant level. Total wealth improved by 20,000,000 Tanzanian shilling among participants while the improvement among non-participants was only 12,000,000 Tanzanian shillings.

8.0. RECOMMENDATIONS

In this chapter, recommendations to improve agro-dealer's services to smallholder farmers (section 8.1) and recommendations for further research (section 8.2) are formulated based on the findings, discussion and conclusion presented in chapters 6 and 7 above.

8.1. Policy recommendations

Based on the results and conclusion in chapters 6 and 7 respectively, several feasible recommendations to improve the supply of farm input in rural areas of Mufindi district through private sector were formulated. These recommendations are presented below

The government should re-design the smart IVP to run for a long time. This will enable agro-dealers to adopted and enhance a sustainable farm input supply network which can function even when the program is phased out. This should be implemented hand in hand with investing in agricultural infrastructures such as improving agricultural research institutes, programs to provide common market of farm products, programs to provide market information to farmers and programs dedicated to improving roads in rural areas. Improved agricultural infrastructures reduce transaction costs associated with supply of input in remote areas. In turn these investments will trigger the willingness of participants and non-participants to penetrate deeper and supply farm inputs in interior rural areas and reduce the number of agro-dealers migrating from rural areas to input trading centers as well as attracting new entrants. However, further research is needed to determine how long the smart IVP should run in order to eradicate the missing farm input market and capture the full benefits of market development in rural areas.

In order to increase the effectiveness and efficient of input supply in rural areas and time delivery especially during production seasons, agro-dealers should be encouraged to build improved input storage facilities nearby input markets (i.e. in wards where they supply farm inputs). Improved input storage facility will enable inputs to be transported and stored during dry seasons when roads are passable. Stored farm inputs can easily be available nearby production fields during the production season when most of the roads are not passable. On the other hand, this storage facilities will discourage mobile input shops which are not reliable given poor road infrastructures in rural areas which are not passable throughout the year.

The government in collaboration with CNFA should encourage all agro-dealers regardless of whether they are participants or non-participants of the IVP to attend the training which can assist every single agro-dealer to access right information, improve their competence on farm input

business and enable them understand fully how the program works. The training should be conducted regularly as they are always new entrants (agro-input) in the commercial market. These will enable more agro-dealers to participate in the program and increase their probability to access credit from financial institutions and other sources of finance via credit guarantee schemes. The training should also aim at developing the entrepreneurship capacity of both new and existing agro-dealers which in turn will promote the creation of self-sustained input market in underserved rural areas.

Due to lack of control by government some agro-dealers operate shops without enough stocks of farm inputs; instead they collect physical vouchers from poor farmers and trade them for less amount of money than the amount indicated on face of the voucher. This action distorts the objectives of smart IVP. Furthermore, in order to get higher profit margin, agro-dealers inflated the prices of farm inputs. This action hinders the development of input market by reducing the purchasing power of smallholder farmers. Therefore, the government should introduce a control mechanism to monitor agro-dealer's activities to ensure that they keep farm inputs required by farmers and operate their shops accordance to the laws of the countries. Nevertheless, the control mechanisms should not intervene the whole process of farm input supply by private sector.

Amongst the object of smart IVP is to enhance and strengthen agro-dealer's network in rural areas through provision of training and credit guarantee schemes. Likewise, the government should establish educational policy that gives further opportunities to agro-dealers to attend adult education at their convenient time. This will reduce the illiteracy level among the non-participants. Also linking agro-dealers to financial institutions by provision of 37.5% credit guarantee facility is important but not sufficient condition to improve their access to credit. Since most agro-dealers are poor and lacks collaterals to pledge against loans facilities, it makes sense to increase the credit guarantee facility up to 50% so that the number of agro-dealers who can afford the facility is increased.

8.2. Recommendations for further research

To have a clear and complete picture of the topic under investigation we recommend for further follow up studies, because this study has indicated a notable knowledge gaps which calls for further researches. Refer the research limitations described in chapter 4 section 4.6 the study was restricted to only one district due to limited access to resources therefore quantitative research to cover all agricultural potential area under IVP is crucial to fully understand the impact of IVP program to agro-business in private input supply market.

REFERENCES

Abafita, J. (2003) 'Microfinance and loan repayment performance: A Case Study of the Oromia Credit and Savings Share Company (OCSSCO) in Kuyu', MSc thesis, Addis Ababa University, Addis Ababa.

AGRA. (2007) *Agro-dealer Networks to Serve 1.6 Million Rural Farmers.* Available at: www.eurekalert.org/pub_releases/2007--12/bcant120607.pha.   [Accessed25th June 2012].

AGRA. (2009) Developing Rural Agricultural Input Supply Systems for Farmers in Africa. Available at www.agraalliance.org. [Accessed on 25th June 2012]

CNFA (2010) http://www.cnfa.org cited on 07/07/2012 at 06:22 hours

Aliou Diagne, Manfred Zeller (2001). Access to Credit and Its Impact on Welfare in Malawi; International Food Policy Research Institute, Research Report 116. Washington, D.C.

Aliou Diagne, Manfred Zeller, and Manohar Sharma (2000). Empirical Measurements of Households' Access to Credit and Credit Constraints in Developing Countries: Methodological Issues and Evidence. IFPRI FCND DP No. 90

Andrew Farrow, Kumbirai Risinamhodzi, Shamie Zingore , Robert J. Delve., 2011 Spatially targeting the distribution of agricultural input stockists in Malawi: Agricultural Systems 104 (2011) 694–702

Andy Field, (2009). "Discovering Statistics using SPSS".SAGE Publications, Third Edition

Assefa B.A. (2002) 'Factors influencing loan repayment of rural women in Eastern Ethiopia: the case of Dire Dawa Area', A Thesis presented to the school of graduate studies, Alemaya University, Ethiopia.

Akinwumi A. Adesina and Moses M. Zinnah, (1993). Technology characteristics, farmers' perceptions and adoption decisions: A Tobit model application in Sierra Leone**.**

Agricultural Economics, 9 (1993) 297-311, Elsevier Science Publishers B.V., Amsterdam

Bernard, Munyua; Hellin, Jon; Nyikal, Rose and Mburu, John (2010). Determinants for Use of Certified Maize Seed and the Relative Importance of Transaction Costs. Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. (2004). "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics* 119 (1): 249–75.

Bjorn Van Campenhout, Els Lecoutere, Ben D'Exelle (2011). Trading in Turbulent Times; Smallholder Maize Marketing in the Southern Highlands, Tanzania. IFPRI discussion paper 01099

World Bank (2008). New Approaches to Input Subsidies. Agriculture For Development Policy Brief. World development report policy brief no. 41390.

Bert Meertens (2000). Agricultural performance in Tanzania under structural adjustment programs: Is it really so positive? *Kluwer Academic Publishers in the Netherlands. Agriculture and Human Values* 17: 333–346, 2000.

Blessings Chinsinga (2011). Agro- dealers, Subsidies and Rural Market Development in Malawi: A Political Economy Enquiry; Future Agricultures, working paper 031.

Cameron A. C. and Windmeijer F. A.G. (1997), 'An R-squared measure of goodness of fit or some common nonlinear regression models', Journal of Econometrics 77 11997) 329-342.

Chianu, J.N, Mairura, F, Ekise, I and Chianu, J,N, (2008). Farm Input Marketing in Western Kenya: Challenges and Opportunities. African Journal of Agriculture Research Vol. 3 (3), pp. 167-173

Chinsinga, B. (2004) 'Poverty and Food Security in Malawi: Some Policy Reflections on the Context of Crumbling Traditional Support Systems', *Canadian Journal of Development Studies* XXV(2), 320-341.

Denning, G., Kabambe, P., Sanchez, P., Malik, A., Flor, R., Harawa, R., Nkhoma, P., Zamba, C., Banda, C., Magombo, C., Keating, M., Wangila, J., Sachs, J., 2009. Input subsidies to improve smallholder maize productivity in Malawi: Toward an African green revolution. PLoS Biol. 7, e1000023.

Diagne, A. (1999). Determinants of household access to and participation in formal and informal credit markets in Malawi. Food Consumption and Nutrition Division Discussion Paper 67. International Food Policy Research Institute, Washington, D.C.

Diagne, A., M. Zeller, and C. Mataya. (1996). Rural financial markets and household food security: Impacts of access to credit on the socioeconomic situation of rural households in Malawi. Final report submitted to the Ministry for Women, Children Affairs, Community Development and Social Welfare, and to the German Agency for Technical Cooperation in Malawi, Bunda College of Agriculture, University of Malawi, Lilongwe. International Food Policy Research Institute, Washington, D.C.

Emílio Tostão, (2007). Why is the Development of Agricultural Input Markets Sluggish in Mozambique?; Food agriculture and natural resource policy analysis network. FANRPAN Report 2007/003

Eric Crawford, Valerie Kelly, T.S. Jayne, Julie Howard (2003). Input use and market development in Sub-Saharan Africa: an overview; Food Policy 28 (2003) 277–292

Gobezie, G. & C. Garber (2007). 'Impact Assessment of Microfinance in Amhara Region of Northern Ethiopia'. Submitted to: International Conference on Rural Finance Research: Moving Results into Policies. FAO, Rome, Italy.

Gregory, I. (2006). The Role of Input Vouchers in Pro-Poor Growth. Selected Sections from a Background Paper Prepared for the African Fertilizer Summit June 9-13, 2006 Abuja, Nigeria.

Hannington Odame and Elijah Muange. (2010). Can Agro-Dealers Deliver The Green Revolution in Kenya?, Future Agriculture, working paper number 014.

Henry, C., Sharma, M., Lapenu, C. & M. Zeller (2000). 'Assessing the Relative Poverty of Microfinance Clients. A CGAP Operational Tool'. International Food Policy Research Institute, Washington D.C.

Iringa, (2002): http://www.tanzania.go.tz/regions/IRINGA.pdf cited on 22/09/2011 at 18:00 hours.

Kelly, V., Adesina, A.A., Gordon, A., 2003. Expanding access to agricultural inputs in Africa: a review of recent market development experience. Food Policy 28, 379–404.

Kormawa, P., Munyemana, A., Soule, B., (2003). Fertilizer market reforms and factors influencing fertilizer use by small-scale farmers in Bénin. Agric. Ecosyst. Environ. 100, 129–136.

Lei Pan and Luc Christiaensen., (2011). Who Is Vouching for the Input Voucher? Decentralized Targeting and Elite Capture in Tanzania: World Bank

MapofMufindidistricthttp://www.google.co.uk/search?tbm=isch&hl=en&source=hp&biw=1366&bih=667&q=mufindi+map&gbv=2&oq=mufindi+map&aq=f&aqi=&aql=&gs_sm=e&gs_upl=15091l19795l0l21164l11l11l0l3l1l0l176l849l2.5l7l0 cited on 02/10/2011 at 18:00 hours

Martin Ravillion, (2005). Evaluating ant-poverty program. Forthcoming in handbook of development economics volume 4

MHSW. (2010). Ministry of Health and Social Welfare, Health sector performance profile report for mainland Tanzania, 2010 update.

Minde, I., T. S. Jayne, et al. (2008). Promoting Fertilizer Use in Africa: Current Issues and Empirical Evidence from Malawi, Zambia, and Kenya. USAID

MAFC - Ministry of Agriculture Food Security and Cooperatives,. (2009). Report on the monitoring of subsidized agricultural inputs supply programme in six high food potential regions, Monitoring and Evaluation Unit. *Department of Policy and Planning*, Tanzania

Minot, N. and T. Benson., (2009). Fertilizer Subsidies in Africa – Are Vouchers the Answers? International Food Policy Research Institute. Washngton, IFPRI Issue Brief 60

Morris, M.K.V., Kopicki, R.J., Byerlee, D., (2007). Fertilizer use in African agriculture: Lessons learned and good practice guidelines. The World Bank

NMB,(2011),http://www.nmbtz.com/index.php?option=com_content&view=article&id=151&Itemid=160 cited on 24/09/2011 at 17:05 hours

Pindyck, R. S. and Rubinfield A.L, (1998), Econometric models and Economic forecasts, Irwin/McGraw-Hill, USA

Ranjit Kumar, (2005). Research methodology, a step-by-step guide for beginners. SAGE Publications, second edition

Rune Skarstein., (2005). Economic Liberalization and SmallholderProductivity in Tanzania. From Promised Success to Real Failure, 1985–1998 Journal of Agrarian Change, Vol.5 No 3, July 2005, pp 334-362

Saweda L.O. Liverpool-Tasie, Afua B. Banful, and Babatunde Olaniyan, (2010).Assessment of the 2009 fertilizer voucher programme in Kano and Taraba, Nigeria, International food policy research institute.

Shahidur R. Khandker, Gayatri B. Koolwal, Hussain A. Samad (2010). Handbook on impact evaluation: Quantitative methods and practices, The International Bank for Reconstruction and Development; the World Bank, Washington D.C.

Shetto, M.C, Kawalama, P. M. and Kisamfu, V, (2007). Rationalisation and harmonization of policies, regulations, Procedures, grades and standards in the fertilizer sub-sector in East and Central Africa - a case of Tanzania. Proceedings of a workshop

Simtowe, Franklin and Zeller, Manfred (2006). The Impact of Access to Credit on the Adoption of hybrid maize in Malawi: An Empirical test of an Agricultural Household Model under credit market failure; Munich Personal RePEc Archive. MPRA paper no. 45.

Swaminathan, H., R. Salcedo Du Bois, and J. L. Findeis.(2009). Impact of Access to Credit on Labor Allocation Patterns in Malawi. ELSEVIER. World Development vol. **38 no.4 pp** 555-566

Verbeek, M. (2008) A *Guide to modern Econometrics*, 3rd edition, John Wiley and Sons, Limited, RSM Erasmus University, Rotterdam.

World Bank (1994a). Tanzania Agriculture: A Joint Study by the Government of Tanzania and the World Bank. Washington, DC: A World Bank Country Study.

World Bank (1994b). Adjustment in Africa: Reforms, Results and the Road Ahead. New York: A World Bank Policy Research Report, Oxford University Press

World Bank, (1994). Tanzania – Agriculture. A World Bank Country Study. Washington DC: World Bank.

World Bank, (2007). New Approaches to Input Subsidies. World Development Report 2008: Agriculture for Development, Policy Brief 41390. Accessed from permanent URL = http://go.worldbank.org/43D8YAOXA0

World Bank, (2009). Accelerated Food Security Program of the United Republic of Tanzania under the Global Food Crisis Response Program, Emergency Program Paper. Report No: 48549-Tz

ZoltanTiba, (2010). The role of input subsidies: Operational guidelines on implementation of Policies for Good Economic Management of Food Price Swings in African Countries. FAO and DFID Policy making capacity building document

Zorya, S. (2009). National agricultural input voucher scheme in Tanzania. Presentation prepared for the Common Market for Eastern and Southern Africa workshop "Input Market Development," June 15–16, Livingstone, Zambia

APPENDIX "A"

Questionnaire

Factors influencing agro-dealer's decision to engage in input voucher program in Iringa, Tanzania.

1. Name of the respondent _____
2. Date _____
3. Sex
   ☐ Male
   ☐ Female
4. Age _____years
5. What is your educational level? (Indicate number of years attended to school)
   ☐ Non
   ☐ Primary school_____years
   ☐ Secondary school _____years
   ☐ Certificate ____ years
   ☐ Diploma _____ years
   ☐ Degree& above ____years
6. Marital status
   ☐ Single
   ☐ Married
   ☐ Divorced
   ☐ Widowed
7. For how long have you been engaged in input supply business? _____years. (You may indicate the year when started the business).
8. Which agricultural inputs are you selling in your shop? (Rank them in order of being easily sold).

Input	Rank

9. Which assets do you own?
   ☐ Car

☐House
☐ Oxen
☐Input storage facilities
☐ Others, please specify _____
10. If you have input storage facility, what kind of agricultural inputs do you store?
    a) ………………………………………
    b) ………………………………………..
    c) ………………………………………
    d) ………………………………………
11. What is the approximate value of these assets in Tshs?
Car _____
House_____
Oxen _____
Input storage facilities _____
Others, please specify _____
12. Did you acquire these assets before joining input voucher program?
☐Yes
☐No
13. What is the total business capital in Tshs?   _____
14. When did you join the input voucher program? (Please indicate the year) _____
15. Where did you get the information about the input voucher program?
☐Other agro-dealers
☐ Radio or television
☐ Extension worker
☐ Input supplier/transporter
☐ Input wholesaler
☐ Others _____
16. What are reasons behind your decision to engage in input voucher program?
☐ To obtain credit
☐ To access training
☐ Influence from friends who are also selling inputs
☐ Your relationship with input wholesaler
☐ Others, please specify_____
17. How much voucher do you receive per each year since you joined the program?
1st year _____ vouchers
2nd year_____ vouchers
3rd year _____ vouchers
18. Where do you buy inputs? From,
☐ Input wholesalers
☐ Others, please specify _____
19. How far do you travel to buy inputs?
☐Less than 30 Kilometers
☐More than 30 kilometers
20. How do you consider the condition of roads?
☐ Good. (If it is passable throughout the year)
☐ Bad (If it is not passable throughout the year)
21. What is the distance from your shop to the next nearest shop selling agricultural inputs?
☐Less than 5 Kilometers
☐More than 5 kilometers
22. How many shops are located within 5 kilometers from your shop? _____

23. Was this the case since before input voucher program was introduced?
    ☐ Less shops now than before
    ☐ More shops now than before.
24. Do you have a mobile cell phone?
    ☐ Yes
    ☐ No
25. Do you get any information about input market through your mobile cell phone?
    ☐ Yes
    ☐ No
26. What kind of information do you get via cell phone communication _____
27. Do you have any loan facility? ☐ Yes ☐ No
28. If yes, from which source?
    ☐ Bank
    ☐ Friend
    ☐ SACCOS
    ☐ Wholesaler
    ☐ Others (Please specify) _____
29. Did you get the amount you requested?
    ☐ Yes
    ☐ No, I got less than amount applied.
30. When did you get your first loan from the bank?
    ☐ Before you joined input voucher program. _____ (mention the year)
    ☐ After joining input voucher program. _____ (mention the year)
31. If you have not applied for loan facility, what is the reason behind?
    ☐ Afraid of credit denial
    ☐ You don't need credit
    ☐ Failed to pay the other loan
    ☐ Others (Please specify) _____
32. What advantages do you get by participating in the program?
    a) _____
    b) _____
    c) _____
    d) _____
33. Did you encounter any problem when you were joining the input voucher program?
    a) _____
    b) _____
    c) _____
    d) _____
34. Did you take any training related to input voucher program? ☐ Yes ☐ No
35. If yes, what kind of training did you participate?
    ☐ Business training
    ☐ How the input voucher system works
    ☐ Training on proper use of inputs
    ☐ Other (Please specify) _____
36. By whome this traning was given?
    ☐ By the government
    ☐ By NGO's
    ☐ Others (Please specify)_____
37. Was the traning usefull?
    ☐ Yes

☐ No

38. Can you recommend such training to your friends who are also dealing in input business?
    ☐ Yes
    ☐ No

39. What are the problems do you consider to be the major challenge in your business?
    _____
    _____
    _____

40. What is your overall openion about the input voucher program?

_____

    _____

    _____

41. Do you have any comment to improve agro-dealers business in your districts?
    _____
    _____
    _____

THANKS FOR YOUR CO-OPPERATION.