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The influence of Value Chain on the Adoption of Improved Bean Varieties Among Smallholder Farmers in Misenyi District

[1]Scholastica Nyabweke Justus, [2]Crispin Lucas Mkonya[3], Sarah Benedict Killagane

[1] (Corresponding Author)

Department of Local Government Accounting and Finance, Local Government Training Institute, P.O Box 1125, Dodoma, Tanzania

Schocty20@gmail.com

[2]Department of Local Government Accounting and Finance Local Government Training Institute, P.O Box 1125, Dodoma, Tanzania

cmkonya@yahoo.co.uk

[3]Department of Local Government Administration, Local Government Training Institute, P.O Box 1125, Dodoma, Tanzania

Sarahbenedicttunu@gmail.com

Abstract: *The study examined the influence of value chain on the adoption of improved beans varieties. The study adopted a cross-section research design. Data were obtained through questionnaire, which were distributed to 192 respondents. Descriptive statistics, chi-square, independent sample t-test, multiple response and binary logistic regression were employed to analyse and present data. The study found that the value chain factors have positive significant influence on the adoption of improved bean varieties when performed and managed in good manner. The study concluded that there were multiple factors that influenced the adoption of improved varieties that lead to greater gross margin of adopters. It is recommended that to ensure effective monitoring and evaluation system performance, uses of new varieties, training of farmers, credit access and extension services to be addressed in future projects in the district and the country as whole.*

Keywords: Value Chain, Adoption, Beans Variety, Smallholder Farmers, Misenyi district.

1. Introduction

Most of developing countries including Tanzania focus on agriculture production as a poverty reduction strategy. In that regard, smallholder farmers (Nang'ole et al., 2011) are spending massive efforts and resources on improving agricultural production, productivity and promoting market access. Agriculture is the backbone of both smallholder livelihoods and the national economy where 85 % of the national population is directly dependant on agriculture for food security and economic livelihood support. (Mizambwa, 2016). One of the crop produced in Tanzania is beans, which is an important food and cash crop produced mostly in Arusha, Kilimanjaro, Tanga, Mbeya, Ruvuma, Rukwa, Iringa, Morogoro, Kigoma and Kagera regions (Mushongi, 2009). Though it is a matter of perception, literature has demonstrated that the common bean is termed as "poor man's meat (Chianu, 2010; CIAT, 2008).

Improving beans production among smallholder farmers solely depends on adoption of bean varieties and the value chain interventions (Nang'ole et al., 2011). In Tanzania, value chain development approach has been adopted by many development organizations, Non-Governmental Organizations (NGOs), research institutions and government programmes in addressing the problems of agricultural production and marketing (Match Maker Associates (MMA), 2012). It is anticipated that value chain development initiatives benefit farmers in gaining better prices for their produces (Jeckoniah et al., 2013; Mizambwa, 2016).
Several efforts have been done by the government of Tanzania to improve to improve productivity of small farmers in different crops. In order to improve agricultural productivity to smallholder farmers, the Government of Tanzania has adopted a multipronged approach like the Agricultural Sector Development Programme (ASDP) and Agricultural Development Initiative 'Kilimo Kwanza' (Agriculture first) which focuses on modernization and commercialization of private sector based small, medium and large scale agriculture for increased productivity, employment creation, profitability and increased incomes. ASDP has identified value chain approach that anticipates helping smallholder farmers gain access to local, regional and global market niches (URT, 2010). Common bean is the most important grain legume grown and consumed in Tanzania, and one of the strategic crops in the efforts to eradicate poverty and food insecurity in Sub-Saharan Africa (FAO, 2009).

Despite the government's contribution on agricultural growth and bean being important crop as food and cash crop in many areas, bean yields are still below the average (about 0.5 – 0.6 t/ha) This is because farmers have been relying on their own saved seed for sowing (informal seed system), (Mukandala and Wartmann, 1999). However, smallholder farmers encounter multiple constraints such as inadequate capital, pests and diseases, poor access to improved germplasm, poor marketing infrastructure, low labour productivity and unreliable climatic conditions. This has led to low agricultural productivity and low supply of beans in the market by the smallholder farmers. (Birachie. et al., 2011).

Monela (2014), Jeckoniah (2013), Nang'ole et al., (2011), Mushongi (2009) and Mgenzi et al., (2002) have documented about adoption of improved varieties to smallholder farmers and value chain in different areas in Tanzania but a little is known on the adoption of improved varieties in bean value chain particularly in Misenyi Districts. Therefore, the aim of this study is to fill the knowledge gap by analysing factors influencing adoption of improved bean varieties among smallholder farmers in Misenyi district since they are the largest cultivators of bean in Kagera and Tanzania in general. The district produces about 95000 Metric tons per year while other districts produce below 90000 tons per year (Misenyi District Profile, 2015/2016).

2. Materials and Methods

2.1 Study Area

The study was conducted in Misenyi District, which is one of the eight districts of the Kagera Region established on 1st July 2007. The district covers an area of 2,709square kilometres where 58% of its land is used for cultivation. The area was chosen because it is the leading area of bean production and better yield beans about 95000 Metric tons per year.

2.2 Population and Sample

The population of this study was smallholder farmers at household level located in Misenyi District Council selected through multistage sampling technique. The sample size of 192 smallholder farmers in household was selected, including male headed and female-headed household who were included in the same proportions. In addition, eight (8) key informants (not part of the sample) were interviewed including 1 District Agricultural Extension Officer, 3 Ward Agricultural Extension Officer (WAEO), 3 Village Agricultural Extension Officers (VAEO) and 1 input suppliers to provide basic information needed and clarify farmer's information in order to get a meaningful detail for interpretation of findings.

2.3 Data collection proceeding

192 questionnaires were distributed to smallholder bean farmers in Misenyi District as indicated in table 2.

Table 1 : Distribution of questionnaires and responses (n=192)

Ward	Village	No.	Response	Response rate (%)
Nsunga	Byamtemba	20	20	100
	Ngando	20	18	90
Kilimilile	Kilimilile	19	17	89
	Kenyana	19	15	79
Kasambya	Nyabihanga	19	17	89
	Gabulanga	19	14	74
Mushasha	Mushasha	19	17	89
	Bulembo	19	16	84
Mabale	Mabale	19	15	79
	Nyankere	19	17	89
Total		192	166	86.5

Table 2 shows that 166 (86.5 %) respondents returned the questionnaire. Nulty, (2008) cited Richardson (2005) when stating that 50% is regarded as an acceptable response rate in social research postal surveys. However, Richardson (2005), indicated that the Australian Vice Chancellors' Committee & Graduate Careers Council of Australia (2001) regarded 'an overall institutional response rate for the Course Experience Questionnaire (CEQ) of at least 70% to be both desirable and achievable' But he concluded that I his comments, 'Response rates of 60% or more are both desirable and achievable. Therefore, the overall response rate of 86.5% in this study is a good response rate that can produce accurate, useful results.

2.4 Data Collection

Both primary and secondary data were collected to obtain the real knowledge and information for analysis based on the objectives of the study. In this case, data were collected through questionnaires that was distributed to 192 respondents. Key informants interviewed include 1 district agricultural extension officer, 3 Ward Agricultural Extension Officer (WAEO), 3 Village Agricultural Extension Officers (VAEO) and 1 input suppliers formed part of interviewed respondents, was employed. Moreover, secondary data were obtained from various sources.

2.5 Data Analysis

Data were analyzed using descriptive and inferential statistics. Data were collected and checked for correctness, coded and improved, including recording variables in units before being entered into SPSS.

3. Results and Discussion

3.1 Demographic characteristics of Respondents

The important demographic characteristics influencing adoption of improved varieties in bean value chain covered in this study include age, gender, marital status and education level as indicated in table 2. These characteristics are important in marking necessary attributes which influence the decision making process of an individual. Rogers (2003) states that "individuals' perceptions of these characteristics predict the rate of adoption of innovations

Table 2: Demographic Characteristics of Respondents

1.	**Sex of Respondents (N=166)**	**Frequency**	**Percentage**
	Female	61	37
	Male	105	63
	Total	**166**	**100**
2.	**Age of Respondents (N=147)**		
	18-25	20	14
	26-33	51	35
	34-41	52	35
	41-49	16	11
	Above 49	8	5
	Total	**147**	**100**
3.	**Marital Status (N=I66)**		
	Married	151	91
	Single	7	4
	Widow	8	5
	Total	**166**	**100**
4.	**Education Level (N=166)**		
	Non	12	7
	Primary Education	94	57
	Secondary Education	60	36
	Total	**166**	**100**

The results on table 2 indicates that, sex of the household head has influence on adoption of the use of improved common bean varieties, These data show that most of smallholders' farmers who participate in bean production specifically on improved variety were male 105(63%), this can be due to result of enlightenment campaigns by agricultural extension officers. The results on table 2 also indicates that majority (74.1%) of respondents of improved bean, variety was in the age range of 18-41 years. This implies that the adopters of improved bean variety involved in bean value chain activities are relatively younger who are more likely to try new technology and the ones up taking the use of improved bean varieties in the study area because of increasing market demand of the crop.

Mdoe and Macha (2002) attests that in most rural areas, families gain a living by producing both cash and food crops although there is a tendency of male members of the family to engage themselves in cash crops and female members in food crops. Due to domestic involvement in works, risks are inevitable. Also due to the poverty, most of the male household heads are involved in agriculture in order to improve the economic conditions of their households. However, Venance S. et al., 2016 stated that the

common bean business has preponderantly attracted male farmers and generates significant income because men are attracted to agricultural activities that generate sizeable income.

Moreover, the results from Table 6 indicate that majority of the respondents 151 (91%) married, whereas. This implies that smallholder farmers specifically married people are more involved in bean production and that lead to influence on adoption of the improved common bean varieties. The majority of married smallholder farmers were engaged in agriculture so that they could rise up their income and overcome poverty.

In addition, the results shows that 94(57%) of respondents had a primary education, while 60(36%) (7.2 %) secondary education. The implication of these findings is that majority (about 93%) of adopter had attain formal education therefore basing on those data, education could be one of the influence adoption of improved bean varieties and ensure proper implementation of bean value chain activities.

Roger and Shoemaker (2001) observed that education is not only an important determinant of adoption of innovations but also an instrument for successful implementation of innovation for profitability. They also stressed that farmers who have attained some level of formal education are likely to raise their productivity through wise use of credit. Similarly, Ingye (2005) reported that educational attainment has positive effect on the adoption of farming techniques because it allows farmers to perceive and implement skills acquired from the extension agents. The same results were found by Venance et al., (2016) who found that farmers have basic education and can be considered literate since education can be considered to be important as it makes a farmer innovative and also easily understand concepts that are taught in the trainings and consequently adopt new technologies with ease.

However, education level had highly significant level of p = 0.000) between adopters and non-adopters that implies that, education level had greater influence on adoption of new technologies specifically with improved varieties in bean value chain introduced in an area. Letaa et al., (2015) depict that the expected sign of education on the adoption of new improved bean varieties is indeterminate.

3.2 Awareness of Respondents on Improved beans Varieties

We intended to provoke respondents' awareness on the improved beans varieties. The results were as shown on table 3.

Table 3 : Awareness of improved variety (=166)

Awareness of IMV	Adopters		Non-adopters	
	n	%	n	%
Yes	146	99.3	7	36.8
No	1	0.7	12	63.2
Total	**147**	**100**	**19**	**100**

Results from Table 3 indicates that most (about 99%) respondents had prior information or awareness on improved bean variety. The results imply that majority of participants had adequate knowledge and well informed on the varieties and its adoption. The awareness is associated by the existence of extension services provided by extension officers ad input suppliers who. Provide information like existence of improved seed, how to new agricultural technology is being practices.

3.3 Socio-economic Characteristics of Smallholder Farmers Influencing the Adoption of Improved Varieties

The study intended to determine the influence of socio-economic characteristics of adoption of improved bean varieties among smallholders' farmers of Misenyi District. Specifically, it sought to analyse how gender, education, experience, farm size, training, extension, farmers' organization and government support influence smallholder farmers to adopt improved varieties. Descriptive and binary logistic were used to analyse these socio-economic characteristics to see if there is significant influence on adoption. The results are as shown on table 4. The binary logistic regression model used to estimate the socio-economic characteristics of adoption of improved bean varieties among smallholder farmers in bean value chain. The overall significance of the model was assessed using an Omnibus tests of model coefficients which produced the Chi-square of 66.065 and p-value of 0.000 as well as the Hosmer and Lemeshow test with Chi-square equals to 16.492 and p-value equals to 0.36. The two measures

together indicate that the model of adoption of improved varieties was more suitable to the data. The 2log likelihood of 152.039[a], Cox & Snell R^2 of 0.328 and Nagelkerke's R^2 was 0.645 indicating a strong relationship between prediction and grouping.

Table 3 : Results of the binary logistic regression for Socio-economic characteristics

Variables	B	S.E	Wald	df	Sig	Exp(B)
Gender	1.399	.818	2.925	1	.042*	4.848
Education	4.301	1.034	17.305	1	.000*	73.756
Experience	-.227	.268	.722	1	.407	.797
Farm size	-.367	.439	.699	1	.066	.693
Training	.014	1.443	.900	1	.000*	1.014
Extension services	2.984	2.647	1.271	1	.000*	.051
Farmers Membership	1.172	1.262	.862	1	.005*	.310
Gov. Support	.390	1.369	.081	1	.067	1.476
Household size	-.207	.962	.046	1	.830	.813
Constant	-2.233	3.475	.413	1	.000	.107

Omnibus Tests of Model Coefficients (Chi-square = 66.065; sig. = 0.000); Log likelihood= 52.039[a]; Cox & Snell R Square = 0.328, Hosmer & Lemeshow Test (Chi-square= 16.492; sig. = 0.36); Nagelkerke R Square = 0.645

Results indicate that there were five variables which were found significant to influence adoption of improved varieties among smallholder farmers in bean value chain where by significant value $p<0.05$. These significant variables were gender, education training, extension and farmer's organizations. The findings are discussed in details in the subsequent sections 4.4.1 to 4.4.5. Also the results shows that gender of household heads significantly and positively influenced smallholder's farmers to adopt improved bean varieties at $p = 0.042$ and Exp (B) = 3.848. Likewise, the model produced a Wald statistic of 2.709 that predict that smallholders' gender contributes significantly to influencing adoption of improved variety. Being male headed household increases probability of adoption of improved bean varieties by 3.848 it causes the log odds to be 1.347 which implies that male headed household are 1.347 more likely to have influenced adoption of improved varieties.

The same results were found in literature. CIAT (2008) echoes that most of the households (85-94%) in all zones of bean production in Tanzania were male-headed with one wife who was mostly adopting at least on improved variety. In addition, Katungi et al., (2014) reported men to be the major decision makers in bean production as they make most of decisions for land preparation, input use, crop management and use of harvest. Correspondingly, Akinbode and Bamire, (2015) found that male headed were higher than female-headed households that were attributed to economic, and socio position of female headed households such as labour shortage and limited access to required information and inputs. Similar Obasoro (2015) reported that gender of the farmer was significant at 1% and positively related to the probability of adoption of improved soybean variety implying that being a male farmer increases the likelihood of adoption of the improved soybean variety.

In addition, Ayalew (2011) reported that due to many socio-cultural values and norms, males have freedom of mobility and participation in different extension programs and consequently have greater access to information. Therefore, it is hypothesized that male farmers are more likely to adopt new technology. The positive significance influence implies that the higher level of formal education the higher probability to adoption of improved bean varieties because he/ she can process information more rapidly than others can. This is in line with the findings by Tahirou et al., (2015) who found that the more educated the households are, the greater the tendency to adopt improved varieties. In Benue State, Nigeria. Likewise, Akinbode and Bamire (2015) found that the coefficient level of formal education of household head was positively and statistically significant at 1% where education increased the adoption probability in the study area.

Bruce et al., (2014) that, formal education helps farmers to understand the information which in turn facilitates the adoption of a technology. Moreover, education gives farmers the ability to perceive, interpret and respond to new information much faster. (Bekele and Meckonnen 2010, Uaiene et al., 2009, Nzomoi et al., 2007, Salasya et al., 1996). Tesfaye et al., (2001) and Teshale et al., (2006) who studied determinants of adoption of improved technology in Yelma Dansa woreda in Ethiopia state that training is an important input that improves farmers' performance and equips farmers with better new knowledge and skills on production practices and technologies than non-trainer, which helps to increase production and productivity of improved bean.

Roger, (2003) that, the innovation-decision process starts with the knowledge stage, an individual learns about the existence of innovation and seeks information about the innovation on "What?" "how?" and "why?" which are the critical questions in the knowledge phase. (Ayalew, 2011; Belay, 2003) argues that, training is one of the means by which farmers acquire new knowledge

and skills and it is measured by the number of times the farmer has participated in training hence, participation in training is expected to positively influence farmers' adoption behavior

Onu (2006) who reports that farmers who had access to extension adopted improved farming technologies and had a higher productivity growth rate than those who had no access to extension services. Akinbode and Bamire (2015) reported that households that had regular contact with extension agents are more enlightened through advisory services and therefore, they appreciate more the benefit of new technology where an increase in frequency of contact with extension agents increased the intensity of use of improved varieties. However, these findings contradict that of Ademiluyi (2014) in the study named adoption of improved maize varieties among farmers in Bassa Local Government area of Plateau State, Nigeria that reported negative coefficient of contact with extension agent at significant of 1% probability level. It implies an inverse relationship between contact with extension agent and adoption rate. This means that, the decrease in extension contact might be responsible for farmer's non-adoption.

Another important influence predictor is farmers' organizations that being formed by smallholders. The findings (Table 15) showed that farmers organization significantly predicts households' adoption of improved varieties with p = 0.05, Exp (B) = 0.310 and Wald = 0.862. The findings further showed that when farmers organization increases by 0.310 membership the odds ratio is 1.172, implying that membership of households in farmers' organization are 1.172 more likely to have higher influence on adoption of improved varieties than those non-member households. Akinbode and Bamire (2015) in their study found that more than half of the respondents (52.8%) were members in farmers' association and assumed that membership of respondent to farmers' organization had influenced adoption decision on farm households.

Amaza et al., (2007) in the study of farmer's perception, profitability and factors influencing the adoption of improved maize varieties in the Guinea Savannah of Nigeria. Obasoro, (2015) found that about 58% of farmers belong to a cooperative as this avail the farmers the opportunity of not only obtaining credit and agricultural inputs but also information on how to improve his farming activities. Belonging to a cooperative society was positively related with the soybean yield. This implies that farmers who belong to cooperative societies have more access to information and resources that could help improve yield. Also these findings are Consistent with the studies of Babatunde et al., (2007).

3.4 Seed Sourcing

Respondents were asked to indicate the areas and means through which they obtain improved bean seeds. The results are as indicated in table 5. The results indicate that majority of farmers 60(36%) obtain seed from shops and 54(33%) obtain from individual farmers or farm groups. The results imply that, farmers can buy certified seed from stock lists at district and village levels; and quality declared seed (QDS) from registered individual/farmer groups and own saved seed.

Table 5: Seed sourcing of Improved bean varieties by adopters and non-adopters

Source of IMV	Frequency	Percentage
Seed shops at the district level	60	36
Stock lists at the village level	9	5
Local markets	10	6
Individual farmers/Farm groups	54	33
Own saved seeds	17	10
Friends	16	10
Total	**166**	**100**

This is proved by the study by Rubyogo (2015) that commercial seed is of higher quality because are certified than farmer saved seed. Farmer saved seed is undervalued because it is produced in the same field as grain and is not certified. This implies that improved seed has high quality and resistance to diseases since are certified and that can cause to have high yield return. It is supported by Abebe et al., (2013), stated that, improved varieties have better yields and are more resistant to late blight, virus and bacterial wilt. Thus, this value chain activity of sourcing for seeds had an influence on adoption of improved variety to smallholder farmers

3.5 Value chain factors influencing adoption of improved bean varieties

Respondents were asked to state the value chain factors influencing adoption of improved bean varieties. The results were as indicated in table 6.

Table 6 : Value chain factors influencing adoption of improved bean varieties (n=166)

Variable	B	S.E	Wald	Df	Sig	Exp(B)
Pesticide usage	9.978	3.143	10.076	1	.002	21539.377
Awareness	10.429	13.695	.580	1	.446	33821.100
Farmers Membership	1.052	1.755	.359	1	.549	2.863
Storage	-1.269	4019.297	000	1	1.000	.281
Harvest	.017	.006	9.197	1	.002	..983
Experience	-2.95	1.547	.036	1	.849	.744
Farm size	2.371	.782	9.204	1	.002	10.710
Constant	-26.815	4019.330	.000	1	.995	.000

Omnibus Tests of Model Coefficients (Chi-square = 93.069; sig. = 0.000); Cox & Snell R Square = 0.437, 2 Log like hood=24.050; Nagelkerke R Square = 0.849

The binary logistic regression model was estimated to examine the influence of value chain factors in adoption of improved bean varieties among smallholder's farmers. The overall significance of the model was assessed using Omnibus Test of the model coefficient, which produced the Chi-square of 93.069 and p value of 0.000. This indicated that the model was more suitable to the data. The 2log like hood of 24.050, Cox & Snell Square of 0.437 and Nagelkerke R^2 of 0.849 together indicated a strong relationship between prediction and grouping as showed in Table 14, where by the variation in X such as use of pesticides, land size and amount of harvest affect the variation in Y (Adoption or Non-adoption). The NagelkerkeR^2 value was 0.849%, which means that the independent variables entered in the model explained 84.9% of variance in the dependent variable. Garson (2008) notes that Nagelkerke R^2 is normally higher than Cox-Snell R2 and is the most-reported of the pseudo R^2 estimates.

The results of binary logistic regression show that according to the model regression coefficients, the significant value chain factors that influence adoption of improved variety were the use of pesticides, the expected harvest amount and land size owned for cultivation. Predictors, which produced negative coefficients, included awareness, membership of farmers' organization, storage, and experience and farm size. Moreover, the results indicated that use of pesticides was a strong predictor of adoption of improved varieties. The results were statistically significant at $p < 0.005$ that was $p= 0.002$, a Wald of 10.076 and Exp (B) = 21539.377. The Exp (B) indicated that when pesticides use increased by 21539.377 Tshs coursed the odds ratio to be 9.978 times as much and therefore smallholders were 9.978 times more likely to have much adoption of improved varieties.

This implies that bean is a food crop that requires the producers to provide special cultural management and attention thus the use of pesticide increase so as to enable plant growth through pest, disease and weeds control that hinder plant growth hence increase in adoption of improved varieties.

Similar findings were obtained by the Department of Agriculture and Fisheries (2013) who reported that all major green bean production regions in Queensland and Australia needs to apply insecticides, fungicides and herbicides to manage insects, diseases and weeds in fresh market or processing bean production. Insects, diseases, weeds and plant viruses can damage all stages of green bean growth, though the flowering and pod development stages are critical, as damaged pods cannot be marketed.
In addition, the results revealed that harvest was found to be significant at 5% probability level with positive coefficient. However, it indicated that expected amount of harvest was another strong predictor of smallholders' adoption to improved varieties at $p = 0.002$, a Wald statistic of 9.197 and an Exp (B) of 0.983. A Wald statistic of 9.197 imply that the amount of harvest influenced significantly to smallholder farmer's adoption of improved variety. The Exp (B) value indicates that when the amount of harvest increases by 0.983 kilograms the odds ratio is 0.017 times as large, and therefore household headed are 0.017 times more likely to have higher adoption rate of improved varieties.

Crop varieties that have capacity to high yield stand a better chance of being adopted. The result implies that output has a direct relationship with adoption of improved bean varieties where by an increase in yield increases the likelihood of adoption. This finding agrees with the results of Idrisa et al., (2012) in Borno State. The findings were also similar to those by Chirwa et al., (2007, 2005) that, farmers using improved seeds often realize higher bean outputs than those using indigenous seeds and thus are

more likely to increase outputs. Improved varieties have a higher potential to recover from adverse effects of drought, pest and diseases and have a longer life cycle.

Porter (1985) in his theory of value chain stated that value chain system includes arrangements of activities that consume resources such money, labour, materials and management, these activities when carried out determines costs and affects profits. The chain of activities gives the products more benefit than the sum of benefits of all activities. Moreover, the results showed that farm size in bean value chain had positively and significantly predicted smallholder farmer's adoption to improved varieties with $p = 0.02$ and Exp (B) = 10.710. However, the model had a Wald statistic of 9.204, which implies that the size of the farm influenced highly in predicting the adoption of improved bean varieties. The findings further indicated that if the size of the farm increased by 10.710 acres, the odds ratio is 2.371. The implication of this was that, the farm size in bean value chain cultivation is 2.371 more likely to have higher adoption rate of improved varieties. This implies that an increase in farm size of respondent increased the area planted with improved varieties.

Similar results were found in the literature. Akinbode and Bamire (2015) reported that the total farm size of respondent was positive and has a statistic significance influence at 1% level on the adoption of improved varieties. Per contra, the large farm owners have more flexibility in their decision-making, greater access to discretionary resources. They also have more opportunities to use new practices on trial basis with more ability to deal with risks because large farm size presupposes large farm assets thus farmers who had more assets had more depositions to adopt new technologies than those who had less. Kabubo-Mariaura et al., (2010), Mariano et al., (2012) and Hailu (2008) reported that farm size exerts a positive influence on adoption of improved technologies. Chirwa et al., (2007, 2005) states that, farmers using improved seeds often realize higher bean outputs than those using indigenous seeds and thus are more likely to increase outputs. Improved varieties have a higher potential to recover from adverse effects of drought, pest and diseases and have a longer life cycle.

4. Conclusion

The adoption of improved varieties in bean value chain among smallholder farmers in Misenyi District has been influenced by many factors including value chain factors and socio-economic characteristics. Pesticides, harvest ad farm size positively influence the probability of adoption of improved varieties in bean value chain, this means that farmers are decision to adopt or not is highly influenced by the size of farm, pesticide used and its cost associated and the output of harvest achieved which will make farmers earn more income due to its high yield and better quality. This can be achieved through proper control and management of value chain factors that will determine its costs and affects profits. To effectively enhance adoption of been variety, extension services and farmers' organization where smallholders got information on new improved varieties and how there are performed. This shows that the decision making of an individual is being influenced by not only one factor but also multiple of factors when interacted together and give out a positive result. Moreover, Gross margin of adopters was three times much higher than that of non-adopters.

As the adoption of seems to improve bean positively impact to smallholder farmers, adoption of improved bean seed varieties among smallholder farmers in bean value has to be seriously coordinated. The factors including the those activities, performed in bean cultivation that needs to be properly controlled and managed so that bit can result to better harvest since proper control and management of value chain factors determines cost and effects profit. Moreover, socio-economic characteristics including age, gender, education, training, and extension of services and farmer's organization ae crucial to be synchronised. Again, the return they had influenced the adoption of improved varieties that was the gross margin resulted as proper management hence lead to low cost.

Further, special programme intervention such as training should be provided to smallholder farmers specifically aimed at targeting all household categories including the poor and/or older households' heads should be considered. This could be done through the existing NGOs and community based organizations (CBOs) in each respective community hence awareness of improved varieties will be created to all people of all ages specifically the poor and older household heads. Not all farmers have proper skills and knowledge on common bean husbandry. The dissemination of improved bean varieties should go hand-in-hand with strengthening of farmers' training sessions on common bean management practices by improving extension services and availability of village Agricultural Extension Officers (VAEO) in each village.
There would be a tremendous influence on the adoption of the improved technologies aimed at alleviating household food insecurity and improving income.

References

Abebe G., Jos Bijmana J., Pascuccia S., and Omtaa O., (2013). Adoption of improved potato varieties in Ethiopia: The role of agricultural knowledge and innovation system and smallholder farmers' quality assessment. Agricultural Systems 122 (2013) 22–32.

Ademiluyi I.O. (2014), Adoption of improved maize varieties among farmers in Bassa local government area of Plateau State Nigeria, International journal of innovative Agriculture and Biology Research. Seahi publication. 2 (4):26-33.

Akinbode W and Bamire A. (2015), Determinants of adoption of improved maize varieties in Osun State, Nigeria. Jornal of Agricultural extension and rural development Vol 7(3) pp 65-72.

Amaza P, Kwacha, Kamara, A. (2007): Farmers' Perceptions, Profitability, and Factors Influencing the Adoption of Improved Maize Varieties in the Guinea Savannas of Nigeria, IITA: Research to Nourish Africa.

Australian Vice Chancellors' Committee & Graduate Careers Council of Australia (2001). Code of Practice: Canberra.

Ayalew A.M. (2011), factor affecting adoption of improved bean varieties and associated agroomic practice in Dale Wareda. Thesis for award of degree of master of science in plat science at Hawassa University.

Babatunde R.O., Omotosho O.A., and Sholatan O.S., 2007, Socio-economic characteristics and food security of farming households in Kwara State, North-Central Nigeria. Pakistan Journal of Nutrition, 6: 49-58.

Bartlett, J. E. II., Kortrijk, J. W. and Higgins, C. C. (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. Information Technology, Learning, and Performance Journal 19 (1): 43-50.

Bekele G. And Mekonnen A., (2010). Ivestment in land conservation in Ethiopia highlands: A household plot level analyis of the roles of poverty teur security and market incentives,EfD DP 10-09.

Belay Kassa, 2003. Agricultural extension in Ethiopia: The Case of participatory demonstration and training extension system. Journal of Social Development in Africa, Harare, 18(1).

Birachie, E., Ochieng1, J., Wozemba, D., Ruraduma, C., Niyuhire, M. and Ochieng, D., (2011). Factors influencing smallholder farmers' bean production and supply to market. African Crop Science Journal, Vol. 19, No. 4, pp. 335 – 342.

Bruce A., Donkoh S., and Ayamga (2014), Improved rive variety adoption and its effects on farmers output I ghaa. Journal of Development and Agricultural Economics Vol.6(6) pp242-248.

Chianu J., Nkonya E., Mairura1 F., Chianu J., and Akinnifesi F., (2010). Biological nitrogen fixation and socioeconomic factors for legume production in sub-Saharan Africa: a review. Agronomy for Sustainable Development, Springer Verlag/EDP Sciences/INRA, 2011, 31 (1), pp.139-154.

Chirwa, E.W. 2005. Adoption of fertilizer and hybrid seeds by smallholder maize farmers in Southern Malawi, Development Southern Africa. 22 (1).

Chirwa, R.M., Aggarwal, Vas, D., Phiri, M.A. and Mwenda, R.A. 2007. Experiences in implementing the Bean Seed Strategy in Malawi. Journal of Sustainable Agriculture 29(27):43-69.

CIAT (2005). CIAT bean improvement. [http://www.ciat.cgiar.org/africs] site visited on 10/10/2016.

CIAT, (2008). The impact of improved bean production technologies in northern Tanzania', Highlights. CIAT in Africa, no. 42, Kampala: CIAT.

Department of Agriculture and Fisheries (2013). Queensland Government: Pesticide Application to green beans [https://www.daf.qld.gov.au/plants/fruit-and-vegetables/vegetables/green-beans/ipm-for-green-beans/pesticide-application]. Site visited 17th July 2017.

FAO (2009). Promoting the Growth and Development of Smallholder Seed Enterprises for Food Security Crops: Best Practices and Options for Decision Making. FAO Plant Production and Protection Paper Case studies from Brazil, Côte d"Ivoire and India.24pp.

FAO (2015). Statistics dry beans. In http:// faostat3.fao.org/download/Q/QC/E, accessed October 2016.

Hailu beyene, 2008. Adoption of improved teff and wheat production in crop livestock mixed system in northern and western shewa zones of Ethiopia Ph. D. Thesis University of Pretoria.

Idrisa Y.L, Ogunbameru, B. O and Madukwe, M.C. (2012): Logit and Tobit Analysis of the Determinants of Likelihood of Adoption and Extent of Adoption of Improved Soya Bean seed in Borno State, Nigeria. Greener Journal of Agricultural Sciences, 2, 37-45. https://doi.org/10.15580/GJAS.2013.3.1231

Jeckoniah J., Mdoe N., and Nombo C., (2013) Mapping of gender roles and relations along onion value chain in northern Tanzania. International Journal of Asian Social Science. 2013, 3(2):523-541.

Kabubo-Mariaura J., Linderhof V., Kruseman G., Atieno R., Mwabu G., (2010). Household welfare, investment I soil and water conservation and teure security: Evidence from Kenya, Enviroment development and economic.15 (2):1-83.

Katungi,E., Ojara, M., Hamzakaza, P., Muimui, K., Reyes, B., Maredia, M., and Muimui, K2 (2014), Assessing access and adoption of common bean improved varieties in Zambia. Pan-Africa Bean Research Alliance.

Letaa E., Kabungo1 C., e. Katungi E., Ojara M. and Ndunguru1 A. (2015). Farm level adoption and spatial diffusion of improved common bean varieties in southern highlands of Tanzania, African Crop Science Journal, Vol. 23, No. 3, pp. 261 - 277

Mariano, M., Villano, R. and Fleming, E. (2012). Factors influencing farmers' adoption of modern rice technologies and good management practices in the Philippines. Agricultural Systems 110: 41-53.

Match Maker Associates (MMA) (2012), Scoping study on value chain initiatives and studies in Tanzania, 36pp.

Mdoe, N. and Macha, J. (2002). Gender and Rural Poverty in Tanzania: Case of Selected Villages in Morogoro Rural and Kilosa Districts. LADDER Working Paper No. 8. University of East Anglia, Norwich, U.K. 10pp.

Mizambwa, J., (2016). Onion value chain and its effects on price among small scale farmers. Dissertation for Award of M. A Degree at Moshi Cooperative University:.Moshi: Tanzania.

Monela, A., (2014). Access to and adoption of improved seeds by smallholder farmers in Tanzania, cases of maize and rice seeds.Dissertation for award of M.A `degree at Sokoine University Of Agriculture. Morogoro: Tanzania.

Mugenzi, S. R. B., William, M. N. M. and Ishika, M.(Ed.) (2002). Bean research in Kagera Region. Proceedings of the Bean workshop for Lake Zone. Maruku, Bukoba, Tanzania, 14 November, 2002. 33pp.

Mukandala, L. G. and Wortmann, C. S. (1999): Beans: A crop for food and income for Kagera farmers. In: Planning the Future: Past, Present and Future Perspectives of Land Use in the Kagera Region. (Edited by Folmer, E. C. R. et al.), 14 May 1999, Bukoba, Tanzania. 98-107pp.

Mukandala, L., (2010). Diversity and genotype x environment interaction of bean Landraces in bukoba and missenyi districts of Tanzania. Dissertation for award of M.A degree at Sokoine University of Agriculture. Morogoro: Tanzania. (Reviewed in Maruku, Bukoba 10th September 2014).

Mushongi, C., (2009). factors influencing the performance of marketing intermediaries in bean marketing. Dissertation for award of M.A degree at Sokoine University of Agriculture. Morogoro: Tanzania.

Nang'ole E.M, Mithöfer D and Franzel S. (2011), Review of guidelines and manuals for value chain analysis for agricultural and forest products.World Agroforestry Centre. 47pp.

NBS (2012). Tanzania National Census [https://en.wikipedia.org/iki/ Misenyi_ District# Refences] visited on 12/1/2017.

Nulty, D., (2008). The adequacy of response rates to online and paper surveys. Assessment & Evaluation in Higher Education Vol. 33, No. 3, Routledge Taylor & Francis Group, 301–314.

Nzomoi J.N., Byaruhanga J.K., Martin H.K., Omboto P.I., (2007). Determinants of technology adoption in the production of horticultural export procedure in Keya. Afr. J. Bus Std. Vol. 1 (5) pp. 129-135,

Obasoro O.A., Iwinlade A., Popoola O., and Adeoti A.I., 2015, Effect of Adoption of Improved Soybean Variety on Productivity of Farm Households in Benue State, Nigeria, Legume Genomics and Genetics, Vol.6, No.6, 1-9 (doi: 1 0.5376/lgg.2015.06.0006).

Onu, D.O. (2006): Socio – Economic Factors Influencing Farmers' Adoption of Alley Farming Technology Under Intensified Agriculture in Imo State, Nigeria. the Philippine Agricultural Scientist, 89(2): 45-52.

Porter, M. E. (1985), Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press: New York.

Richardson, J.T.E. (2005). Instruments for obtaining student feedback: a review of the literature. Assessment & Evaluation in Higher Education 30, no. 4: 387–415.

Rubyogo, J.W., Sperling, L., Nasirumbi L., and Kasambala, S., (2015). Developing seed s ystems with and for the marginalized: case of common beans (Phaseolus vulgaris

L.) in East, Central and Southern Africa

Roger, E.M. and Shoemaker, F.F. (2001). Diffusion of Innovations. Fourth Edition Free Press, New York, U. S. A, 345 pp.

Rogers, E. M. (1983). Diffusion of Innovations, 3rd Edition, Free press Macmillan: London.

Rogers, E. M., (1995). Diffusion of Innovations. Free Press: New York.

Rogers, E.M. 2003. Diffusion of innovations. New York, U.S.A: Free Press.

Salasya, et al (1996), Assessment of the adoption of seed and fertilizer packages and the role of credit in smallholder maize production in kakamega and vihiga districts. CIMMYT Nairobi.

Tahirou A., Bamire A., Oparinde A., Akinola A., (2015), Determinants of adoption of improved cassava variables among farming households in Oyo, Benue and Akwa Ibom state of Nigeria, HarvestPlus Working paper, No.20.

Tesfaye Zegeye and Shiferew Tesfaye, 2001. Determinants of adoption of maize technologies and inorganic fertilizer in Southern Ethiopia. Research Report No. 39. Ethiopia Agricultural Research Organization (EARO). 54p.

Teshale Adugna, Mulat Demeke and bezabhe Emana, 2006.Determinants of fertilizer adoption in Ethiopia. Agricultural economics society of Ethiopia, Addis Ababa. Ethiopia.

Uaiene R N, Arndt C, Masters W A. 2009. Determinants of Agricultural Technology Adoption in Mozambique. Discussion papers (67E). National Directorate of Studies and Policy Analysis, Ministry of Planning and Development, Republic of Mozambique: 1–31.

Venance S., Mshenga, P., Birachi, E.A., (2016) Factors Influencing on-Farm Common Bean Profitability: The Case of Smallholder Bean Farmers in Babati District, TanzaniaJournal of Economics and Sustainable Development Vol.7, No.22, 2016