Tanzanian Journal of Population Studies and Development, Vol. 26 No. 1, 2019: 97-111

Determinants of Participation of Smallholder Coffee Farmers in Warehouse Receipt System in Mbinga District, Tanzania

Matei E. Mapunda†, David G. Mhando‡ & Betty M. Waized§

Abstract

The Warehouse Receipt System (WRS) holds considerable opportunities necessary for improving incomes and livelihoods of smallholder farmers. However, there has been little progress regarding participation of smallholder farmers in the system. This paper examines factors that influence smallholder coffee farmers' participation in the WRS. The specific objective was to identify factors influencing participation. A random household survey of 390 farmers was conducted in Mbinga District, Tanzania. Data were analysed using binary logistic regression. The results show that a respondent's age, market information, sex, and distance from coffee farms to Agricultural Marketing and Cooperative Societies (AMCOS) or farmers' group (FG) centres influenced coffee farmers' decisions to participate in the WRS. Young, male farmers with access to coffee market information are more likely to use the WRS. Dissemination of the market information and the location of AMCOS or FG centres closer to coffee farmers could be a key to increasing farmers' participation in the WRS.

Keywords: *coffee, warehouse receipt system, institutionalisation, market information*.

1. Introduction

Agriculture is the main industry in Sub-Saharan Africa countries (SSA). However, SSA's agriculture is dominated by smallholder farmers who play a key role in African agriculture. Salami et al. (2010) and Biteye (2016) have reported that smallholder farmers are described as those with 2ha or less, and they represent 90% of all. In the study area (Mbinga district), the average coffee land holding is 1.6ha per household (TaCRI, 2015), signifying that farmers in Mbinga are mainly smallholders.

In Tanzania, agriculture provides about 66.9% of employment, accounts for about 23% of the GDP, and contributes to 30% of exports and 65% of inputs to the industrial sector (URT, 2016). The main exported cash crops are coffee, tea, cotton, cashews, raw tobacco, sisal, and spices. Coffee is one of the important cash crops, with average production ranging between 30 000 and 40 000 metric tons each year, generating average export earnings of US$100m per annum. Approximately 70% of the coffee is Arabica, and 30% is Robusta (IFAD, 2014).

†Tanzania Institute of Accountancy, Tanzania: maundamatei@yahoo.com

‡College of Social Sciences and Humanities, SUA, Tanzania: david_mhando@yahoo.com

§School of Agricultural Economics and Business Studies (SAEBS), SUA, Tanzania: yzbetty@sua.ac.tz

In Mbinga District, Tanzania, where the study was carried, farmers grow coffee as their cash crop; and it is the major source of household's income. However, some studies have shown that returns in the coffee sector are decreasing due to low agricultural productivity, which results from the lack of access to farm inputs, extension services, credit, modern technology application, trade and marketing support, and participation (Millinga, 2009; Madulu, 2011; Sitko, 2012; Mhando et al., 2013).

Participation of smallholder coffee famers in WRS is the central issue in this paper. The word participation can be defined as the act of being involved in something (Shah et al., 2008). According to Oboh and Kushwaha (2009), participation means some form of involvement of people, with similar needs and goals, in decisions affecting their lives. Since people are actively involved in the process, Lapar et al. (2003) argue that participation helps promote a sense of ownership and control among the people. In the light of these definitions of participation, this paper seeks to identify factors influencing farmers' participation in WRS to create a sense of ownership and sustainability of coffee marketing channels.

Tanzania piloted the WRS in 2002 purposely for coffee and cotton, and the Warehouse Receipt Act was enacted in 2005 aiming at enabling groups of farmers, primary societies, and cooperative unions to access financial services and loans, and increase participation in farm production and marketing (URT, 2005). The WRS is an arrangement aimed at providing services related to storage, access to credit and marketing of farmers produce (URT, 2005). However, in spite of the introduction of the WRS by the government, smallholder farmers still face various problems including the lack of enhanced participation in marketing channels, very limited access to short-term financing and reliable commodity market information (Millinga, 2009; Madulu, 2011; Sitko, 2012; Mhando et al., 2013; Liquate & Venkatakrishnan, 2014).

Recent market analysis confirmed that the potential benefits of higher produce prices and lower input prices are effectively transmitted to smallholder farmers when market access is guaranteed (IFAD, 2010; Komba, 2011; Madulu, 2011; Mhando et al., 2013). The WRS aims at facilitating farmers to participate directly at the coffee auction, which reduces the role of middlepersons and increases their income (Millinga, 2009; URT, 2010; IFAD, 2011).

Despite the WRS operating in Mbinga District since 2002, the number of farmers participating in WRS, as well as their awareness on the WRS operation, is still very low (Millinga, 2009; URT, 2010; Komba, 2011; Mhando et al., 2013). For instance, although about 80.6% of the farmers interviewed in 2012/13 acknowledged to have observed improved changes in coffee prices and coffee quality after the introduction of the WRS, their level of participation and use of WRS services was low at about 25.8% (Mhando et al., 2013).

Recent data show that farmers who participate in the WRS benefit more than those who do not as prices of their farm produce are higher at auctions than when sold to private buyers TaCRI (2015). Table 1 presents the price trends per kilogram of coffee in the auction for the past five years.

Table 1: Coffee Price Trends per Kilogram in the Auction for the Past Five Years

Harvesting Season (year)	Price (TZS)
2010/2011	8800
2011/2012	9540
2012/2013	5545
2013/2014	4970
2014/2015	7100

Source: TaCRI (2015).

Through the WRS, farmers sold coffee at an average of price of TZS7191 per kilogramme, while private coffee buyers bought at an average price of TZS1350 per kilogramme in the 2010/2011 and 204/2015 season (TaCRI, 2015). Therefore, WRS users had an advantage of higher price of coffee over non-users.

There is a limited knowledge about factors that cause farmer's low participation, the overall implementation of the WRS, and farmers' organisations in the WRS. This study attempts to fill this knowledge gap. The paper contributes to the knowledge on policy interventions to make smallholder coffee farmers cope with changing market structures, specifically of WRS in the coffee industry in less developed country like Tanzania. The main objective is to identify determinants of smallholder coffee farmers' participation in WRS in Mbinga District, Tanzania.

2. Theoretical and Analytical Frameworks

2.1 Theoretical Framework

The theoretical framework of the study pivots on participation. The theory explains a choice for participation in a program from a set of mutual exclusive alternatives, $j = 1, 2\ldots k$, for rural people in most developing countries (Ajzen & Fishben, 1980; Ajzen, 2001). The theory, sometimes known as the margin theory, states that a decision whether or not to participate in a program is a "… function of the relationship of load to the power" (Green, 2000). Load is defined as the "… self and social demands by a person to maintain a minimum level of autonomy," while power is described as "… resources such as abilities, possessions, position, allies, etc., which a person can command in coping with the load" (Byrka, 2009). In other words, the higher the margin between load and power, the lesser the participation in a program (Ajzen, 2001).

The theory expounds factors and behavioral attributes that affect smallholder farmers' participation in a given program. The attributes include expected profit maximization objectives and costs of participation, attitudes, values, and skills of the people; design and other characteristics of a program; and the legal, political, and institutional environment prevailing at the time (Green, 2000; Glasman & Dolores, 2006).

2.2 Analytical Framework

This study relies on the attributes of the smallholder farmers' participation in the WRS. The attributes include age, coffee market information, education level, sex, farm size, and distance from coffee farms to the nearest market centers. The determinants of participation are qualitative decisions that are based on probabilities of either choosing to participate or not (in this case, the participation of smallholder coffee farmers in the WRS marketing channel). One qualitative choice model of interest in this type of decision is the logistic regression model (Green, 2000; Gujarati & Sangeetha, 2007; Adong et al., 2012).

Logistic regression is a very useful tool in predicting a categorical (usually dichotomous) variable from a set of predictor variables. It is often chosen if the predictor variables are a mix of continuous and categorical variables, and/or if they are not normally distributed (Wuensch, 2006). Factors that influence participation are well documented in literature (Allen & Gale, 1994; Tanga et al., 2000; Lapar et al., 2003; Bahta & Bauer, 2007; Boughton et al., 2007; Barret, 2008; Agwu et al., 2012). This literature identifies a wide range of socio-economic and demographic variables that affect market participation. This study used the variables in Table 2 for the estimations of participation, which gave the equation:

$$logit(PPT_i) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Whereby:

PPT_i = Levels of participation in WRS

X_1 = Age of respondent in years

X_2 = Access to coffee market information

X_3 = Education of respondent

X_4 = Sex

X_5= Cultivated land size

X_6 = Distance from coffee farms to the nearest AMCOS/ Farmers' group centres

ε_i= Error term

Table 2: Definition of Variables Used in Regression Model and Measurements

Variable	Variable Description	Variable Measurement	Expected Sign and Explanation
Dependent variable			
PPT_i	Levels of participation in WRS	Dummy: 1 = Coffee farmer participate in WRS, 0 = Otherwise	+ the use of WRS services (storage, marketing, and agro-inputs) increase participation in WRS
Independent variables			
AG_i	Age of respondent in years	Dummy: 1 = age of coffee farmers ≤ 50 years (productive aged farmers), and 0 = otherwise (less productive aged farmers) (URT, 2013)	+/- The coefficient of old age group is also expected to have a positive or negative sign. Older farmers are wealthier hence more likely not to use agro-inputs credit. On the other hand, though wealthier, older farmers may not be keen to use WRS services (storage, marketing, and agro-inputs) due to various reasons such as lack of knowledge
$MKINF_i$	Access to coffee market Information	Dummy: 1 = yes, 0 = Otherwise	+ A farmers who have market information are expected to be good participators in WRS
$EDUC_i$	Number of years in levels of classes	Dummy: 1 = coffee farmers ≤ 7 years of schooling (primary education educated farmers or less), 0 = otherwise (secondary and post sec. educated farmers)	+ More educated persons (more years spent in schooling) in Tanzania are more likely use WRS services (storage, marketing, and agro-inputs) than less educated ones
SEX_i	Male or female	A dummy variable indicating a male or female, 1= male and 0 = Otherwise	- The coefficient of sex of the head of the household is expected to have a negative sign for female headed households. The reason is that women have little or no access to resources such as land, and credit.
FSZ_i	Cultivated land size	Hectares	+ Coefficient is expected to have a positive sign because the bigger the hectare the increased the agriculture production that motivates to participate in WRS
$DWMK_i$	Distance from coffee farms to the nearest to AMCOS/ Farmers' group centres	A dummy variable 1 = residing ≤ 1 km (near), 0 = Otherwise	+/- the nearer to the AMCOS/ Farmers' group centres the higher the level of participation in WRS and otherwise

3. Methodology

3.1 Study Area

The study was carried out in Mbinga District, Tanzania, from May to October, 2014. The district was chosen because coffee cultivation is an important source of income for smallholder farmers. In Mbinga District, 95% of the coffee is produced by smallholder farmers (Pike, 1938; Basehert, 1972; Itani, 1998). The other reason is that coffee was one of the piloted crops when WRS was introduced in Tanzania in 2002 (URT, 2014).

A cross-sectional research design was used and considered appropriate because data were collected at one point in time from two different groups of respondents (FGs and AMCOS). Moreover, it was also easier and adequate to organize and relate the data collected at a single point for processing, analysis, and presentation (Kothari, 2004). Quantitative data were collected using a structured questionnaire; qualitative data were collected through key informant interviews; while secondary information was obtained from published and unpublished reports.

The study population of the study was coffee farmers. The sampling frame was farmers who were eligible to access WRS services. The eligibility was grounded on membership in either in AMCOS or farmers groups. The District Agricultural, Irrigation and Cooperative Officer (DAICO) provided register books containing names of coffee farmers who were members of 21 AMCOS and 21 farmers' groups, with a total of 3900 farmers. A stratified random sampling procedure was used to select the respondents based on their membership. Using the Yamane (1967) formula, 4 AMCOS and 4 farmers' groups were obtained of coffee farmers from both lowland and highland zones. The formula gave a total of 390 respondents from both AMCOS and farmers' groups. Since AMCOS had more coffee farmers (2304) than farmers' groups (1596) (Appendix 1). A proportionate sampling was employed to select 390 respondents, comprising of 230 households from AMCOS and 160 from famers' groups. A selection of respondents who were heads of households was by simple random sampling of random numbers generated in MS Excel. The sample of 390 respondents was deemed large enough than the minimum of 30 respondents recommended by Bailey (1994).

4. Results and Discussions

4.1 Descriptive Statistics and Variables for Participation in WRS

Table 3 summarizes the respondents' characteristics. About 89% of the eligible farmers participated in the WRS, indicating that most coffee farmers in the study area were having an opportunity of participating in the WRS. As Table 3 indicates, more than half of the respondents in the study area were 50 years of age or less. In the Tanzanian context, this is a youth age group (URT, 2014). This indicates that coffee production in the study area is dominated by young coffee farmers. Likewise, 97% of the respondents were having access to coffee marketing information, with the average land holding of 1.3ha, which implies

Table 3: Descriptive Statistics of the Respondents (n = 390)

Variable	Variable descriptions	%	Mean	Std
Levels of participation in WRS	Dummy: 1 = Coffee farmers' level of participation in SCM (either in storage, credit and marketing or storage and marketing), 0 = Otherwise	89		
Age of respondent in years	Dummy: 1 = age of coffee farmers ≤ 50 years, 0 = otherwise	57		
Access to coffee marketing Information	Dummy: 1 = yes, 0 = Otherwise	97		
Number of years in schooling	Dummy: 1 = coffee farmers ≤ 7 years of schooling, 0 = otherwise	66		
Sex of respondent (male or female)	A dummy variable indicating a male or female, 1= male and 0 = Otherwise	61		
Farm size	Hectares		1.3	1.87
Distance from coffee farms to the nearest to AMCOS/ Farmers' group centers	A dummy variable 1 = less than one km, 0 = Otherwise	96		

that the study was dominated by smallholder farmers. On average, 96% of farmers seem to reside close to the AMCOS/FGs marketing centres and most of them were within the perimeter of 1km.

More than half of the respondents in the study area were 50 years of age or less (Table 3), in the Tanzanian context, this is a youth age group (URT, 2014). This indicates that the coffee production in the study area is dominated by young coffee farmers. Likewise, 97% of the respondents were having access to coffee marketing information, with the average land holding of 1.3 hectares (Table 3), which implies that the study was dominated by smallholder farmers. On average, 96% of farmers seem to reside close to the AMCOS/FGs marketing centres and most of them were within the perimeter of 1km.

Likewise, Table 3 shows that, about 66% of the respondents had at most seven years of schooling (primary education or less). This indicates a general low level of education among the smallholder coffee farmers in the study area. The study findings also show that most coffee farmers who participated in the WRS were males than females. This indicates that female respondents had little or no access to resources such as land, credit and extension services due to taboos and African culture-related interactions between men and women (World Bank, 2005).

4.2 Determinants for Participation in the WRS

The model fitness for analysis of the determinants of participation of smallholder farmers in the WRS, as well as results of the logistic regression are presented in Table 4. The goodness of fit of the model was tested (Table 4), and indicated a Pseudo R^2 of 0.1111, significant at 99% level of confidence. The log likelihood is negative (-118.3477), which is an indication of excellent model fit.

Table 4: Results of Logistic Regression Model (n = 390)

Variable	β Coefficients	Std Error	P>|t|	Exp (β)
Sex-biological nature of respondent (male or female)	0.983**	0.4187	0.019	2.672
Age of respondent (≤ 50 years or otherwise)	1.026***	0.370	0.006	2.790
Education (≤ 7 years of schooling or otherwise)	0.263	0.362	0.467	1.300
Farm size	0.124	0.086	0.147	1.132
Access to coffee market Information	2.060***	0.736	0.005	7.844
Distance from coffee farms to the nearest to	0.147***	0.436	0.009	1.583
AMCOS/Farmers' group centers Constant	1.916	1.055	0.070	6.792
LR (Likelihood ratio)	chi^2 (6)	=		29.5700
Prob > chi^2	chi^2 (6)	=		0.0000
Log likelihood = -118.3477	Pseudo R^2	=		0.1111
Number of observations		=		390

Note: Dependent variable: Levels of participation in WRS; ** = P < 0.05, *** = P < 0.01

The results for logistic regression analysis of the factors that influence coffee farmers' participation in the WRS are as shown in Table 4. Participation in the WRS was influenced to a great extent by four covariates of access to market information, sex, age, and distance from coffee farms to the AMCOS/FG centres. The other two covariates—i.e., education and coffee cultivated land size—were insignificant in influencing farmers participation in the WRS. The reasons for the insignificant variables could be viewed in the context that about 66% of the respondents had primary education or less, leaving too few in the higher education categories to enable capturing the influence of education on participation.

According to Reimers and Klasen (2012), returns to secondary and post-secondary education is higher than primary education or less because secondary or post-secondary education gives farmers a better ability to think critically and take decisions that have positive effect on productivity in the face of other agricultural challenges such as changing seasons, market and inadequate funds for inputs, and hired labour. The finding supports the participation theory that a resource, such as education, plays an important role in participation in the WRS and its effectiveness. The higher the education, the higher the percent of participation. The other variable of cultivated land size was insignificant because Mbinga District is densely populated with no room for expansion of coffee cultivating land (Millinga, 2009).

It should be noted that the interpretation of logistic coefficients differs from typical linear regression (Field, 2005), and hence requires more manipulation to analyse the impact of the independent variables on the probability of WRS participation in marketing channel. The interpretation of significant logit coefficients is as in the sub-sections 4.2.1 to 4.2.4.

4.2.1 Coffee Marketing Information and WRS Participation

With regards to coffee marketing information (such as input price, auction price, collateral, and credit availability), the coefficient of coffee market information (β) was found to be 2.060; this coefficient was highly significant at 99% level of confidence (p value = 0.005). The interpretation of β can be manipulated in terms of log odds [Exp (β)]. Holding all other covariates constant; the probability of smallholder coffee farmer participating in the WRS increases by 7.844 times for those who had coffee market information, as compared to those who had not.

Consequently, this implies that coffee market information is a significant factor for the participation of smallholder farmers in the WRS in the study area. In a study on maize in Babati District, Tanzania, assessing the factors of participation of farmers in the WRS, Kimaro and Towo (2013) found that 90.6% of the surveyed farmers that had market information participated in the WRS, while only 9.4% did not. Likewise, in this study, 97% of the respondents who had access to coffee marketing information participated in the WRS (Table 2). KENFAP (2011) reported that the availability of market information to farmers boosts confidence of households willing to market their produce. Thus, farmers who are more informed are more likely to participate in the WRS.

4.2.2 Sex of the Respondents and Participation in the WRS

The estimated coefficient for male farmer (β) was 0.983, significant at 95% level of confidence (p value = 0.019). The interpretation of β can be manipulated in terms of log odds [Exp (β)]. Holding all other covariates constant, the probability of smallholder coffee farmers to participate in the WRS increases by 2.672 times for males than females. This is consistent with the fact that most communities in African societies, including Tanzania, are characterised by male-dominant systems that marginalise women in various social aspects, such as education, land, and wealth ownership; hence making them less participative in economic activities (Doss, 2011). This finding indicates that males dominated coffee production compared to females in the district due to the nature of coffee being a cash crop(male crop), and needs a lot of investment in terms of agro-inputs. Therefore, males have more chance of making decision of participation in the WRS. The finding is in line with Ghasia (2003) whose study in cashewnut crop in Mtwara region found that 80% of the respondents were males, and 20% were females who engaged in the WRS due to the nature of resource (land and cash crops) ownership in the study area.

4.2.3 Farmers' Age and Participation in the WRS

The estimated coefficient for age of household head (β) was 1.026, significant at 99% level of confidence (p value = 0.006). Holding all other covariates constant, the probability of smallholder coffee farmer participating in the WRS increases 2.790 times for young coffee farmers as compared to older ones. This means that young coffee farmers are motivated more by the WRS compared to older farmers, and that youth age helped improve coffee marketing over time.

The results contradict that of Cunningham et al. (2008), which showed that the age of farm household head has a positive significant effect on the level of market participation. This could be the case because the age of a farmer determines the experience one has in a certain type of farming and marketing activities. It is argued that old farmers (aged above 50 years) have more experience in farming and develop skills to participate in markets (Madulu, 2011; Temu et al., 2001). Contrary to Cunningham et al. (2008), Mahelet (2007) shows that the age of a household head negatively and significantly affects the degree of household commercial participation because a household participation with decreased in age index ranges from 0% to 95% through the study area. This could arise from the fact that older heads (aged above 50 years) have limited access to market information, and are more risk averse in trying new things whereas younger heads (aged 50 years or less) could sell a relatively large portion of their product through WRS due to better access to price information their willingness to accept risk in trying new situations.

4.2.4 Distance to AMCOS/ Farmers' Group Centres and WRS Participation

The estimated coefficient for coffee farmers residing nearby AMCOS/FGs centres (β) was 0.147, significant at 99% level of confidence (p value = 0.009). Holding all other covariates constant, the probability of smallholder coffee farmers participating in the WRS increase by 1.583 times for coffee farmers residing close to AMCOS/FGs centres (within 1km perimeter) as compared to coffee farmers residing far from these selling points.

The finding shows that the farther a farmer lives from AMCOS/FGs marketing centres, the less the probability of participation in the WRS. This shows the importance of government intervening and facilitating the operations of AMCOS/FGs services closer to farmers. According to the WHO, social services are considered as a human right, and their reach should be within one kilometre from home (WHO, 2003). This finding supports the participation theory: the higher the margin between costs and benefits accrued, the lesser the participation in a program (Ajzen, 2001). Farmers located closer to market centres incur lower transport costs and can get market information more easily (Anthony et al., 2012). As Madulu (2011) argued, farmers located closer to market centres are more likely to participate in the WRS and market their produce compared to those who are located far away.

Conclusions

Generally, the study findings support the participation theory: that the decision of a farmer whether to participate in the WRS is influenced by self and social demands of a farmer after weighing costs and benefits accrued in the process of participation. This paper determined factors influencing farmers' participation in the WRS. The results show that the age of respondents, access to market information, sex and

distance from coffee farms to the AMCOS/FGs centers are significant factors that influence the probabilities of coffee farmers' decisions to participate in the WRS.

The findings also show that young farmers are more likely to sell coffee through the WRS marketing channel than farmers who are old because they have relatively higher educational level to explore coffee market opportunities than old ones. Farmers with access to coffee market information are more likely to choose the WRS than farmers who have no access. Also, long distances from coffee farms to AMCOS/FGs centres can encourage farmers to choose alternative market outlets within the vicinity of their households or farms.

In conclusion, stakeholders in the coffee sector can support coffee farmers by focusing on facilitating the participation of female and young household heads in the WRS through special programs/packages and education. AMCOS or FGs should be facilitated to operate close to the coffee farms to reduce the distance in accessing WRS services. Among others, facilitation of institutionalisation of coffee market information services is recommended to enhance coffee marketing environment, and increase the number of participants in the WRS.

References

Adong, A., F. Mwaura & G. Okoboi. 2012. What Factors Affect Membership to Farmer Groups in Uganda. [http://ageconsearch.umn.edu/bitstream/ 126774/2/ Adong WCover.pdf] site visited on 20/11/2015.

Agwu, N.M., C. I. Anyanuzi & E. I. Mendie. 2013. Socio-economic Determinants of Commercialisation Among Smallholder Farmers in Abia, Nzaria. *Greener Journal of Agricultural Sciences,* 2(8): 392–397.

Ajzen, I. 2001. Perceived Behaviour Control, Self-Efficacy, Locus of Control and the Theory of Planned Behaviour. *Journal of Applied Social Psychology,* 32: 1–20.

Ajzen, I. & K. Fishben. 1980. *Understanding Attitudes and Predicting Social Behaviour Engle wood Cliffs*. United States of America.

Allen, F. & D. Gale. 1994. Limited Market Participation and Volatility of Asset Prices. *American Economic Review,* 84: 933–955.

Anthony, O., O. O. Usoroh, D. T. Adieme & N. J. Deedam. 2012. Determinants of Market Participation in Nigerian Small-Scale Fishery Sector: Evidence from Niger Delta Region. *The Journal of Sustainable Development,* 9(1): 69–84.

Antony, C., T. Gelson & L. Mary. 2012. Smallholder Farmers Participation in Livestock Markets. The Case of Zambian Farmers. Working Paper No. 48 66. Indaba Agricultural Policy Research Institute (IAPRI) Lusaka, Zambia.

Bahta, S. T. & S. Bauer. 2007. Analysis of the Determinants of Market Participation Within the South African Small-Scale Livestock Sector. Tropentag Paper, Tropentag, October

9–11. 2007, Witzenhausen: Utilisation of Diversity in Land Use Systems: Sustainable and Organic Approaches to Meet Human Needs. 8pp.

Bailey, K. D. 1994. *Methods of Social Research* (4th edition). New York: The Free Press.

Barrett, C. 2008. Smallholder Market Participation: Concepts and Evidence from Eastern and Southern Africa. *Food Policy,* 33: 299–317.

Basehert, H. 1972. Traditional History and Political Change among the Matengo of Tanzania. *Journal of the International African Institute,* XLII(2): 87–97.

Biteye, M. 2016. 70% of Africans Make a Living Through Agricultur, and Technology Could Transform Their World. World Economic Forum on Africa 2016. The World Economic Forum on Africa Kigali, Rwanda from 11 to 13 May 2016. [https://www. weforum.org /agenda/2016/05/70-of-africans-make-a-living-through-agriculture-and-technology-could-transform-their-world] site visited on 24/12/2016.

Boughton, D., D. Mather, C. B. Barrett, R. Benfica, B. Abdula, D. Tschirley & B. Cunguara. 2007. Market Participation by Rural Households in a Low-Income Country: An Asset-Based Approach Applied to Mozambique [http://papers. ssrn.com/sol3/papers. cfm?abstract_id=1846745] site visited on 09/11/2015.

Byrka, K. 2009. Attitude-behaviour Consistency Campbell's Paradigm in Environmental and Health Domains. University of Technology Library.

Cunningham, L. T., B. W. Brown, K. B. Anderson & E. Tostao. 2008. Gender Differences in Marketing Styles. *CSA of Ethiopia, Annual Agricultural Sample Survey Reports from 2003/4–2010/11.*

Doss, C. 2011. The Role of Women in Agriculture. *Agricultural Development Economics,* 2(11): 1–48.

Field, A. 2005. *Discovering Statistics Using SPSS.* London: SAGE Publishers.

Ghasia, H. A. 2003. An Assessment of Institution Factors Affecting Cashew Nuts Marketing in Mtwara Region. MA thesis, Sokoine University of Agriculture, Morogoro, Tanzania.

Glasman, L. R. & A. Dolores. 2006. Forming Attitudes That Predict Future Behaviour. University of Florida. A *Meta-Analysis of the Attitude Behaviour Relation,* 132(5): 778–822.

Green, W. H. 2000. *Econometric Analysis*. New Jersey: Prentice- Hall.

Gujarati, D. & N. Sangeetha. 2007. *Basic Econometrics.* 4th Edition, New Delhi: Tata McGraw-Hill.

International Fund for Agricultural Development (IFAD), 2010. *Mozambique Country Program Evaluation: Improving the Market Participation of Smallholders and Artisanal Fishers*. Mozambique.

—. 2011. A Framework for Linking Small Farmers to Markets1ifad and the United Republic of Tanzania Prime Minister's Office (2010). Agricultural Marketing Systems Development Scheme. *Completion Report*.

—. 2014. A Framework for Linking Small Farmers to Markets IFAD and the United Republic of Tanzania Prime Minister's Office (2014). Agricultural Marketing Systems Development Scheme. *Completion Report*.

Itani, J. 1998. Evaluation of an Indigenous Farming System in the Matengo Highlands, Tanzania, and its Sustainability. *African Study Monographs. 19*: 55–68.

Kenya National Federation of Agricultural Producers (KENFAP). 2011. *The Role of Warehouse Receipt System and Financial Services in Improving Produce Marketing by Smallholder Farmers in Kenya*. KENFAP-Kenya October 2011.

Kimaro, P. K. & N. N. Towo. 2013. Warehouse Receipt System: A Solution Towards Smallholder Farmers Financial Constraints. Working Papers, Department of Documentations and Publications. MUCCoBS, Moshi, Tanzania.

Komba, L. 2011. *Market Position of Coffee Farmers in the Coffee Supply Chain*: A *Case Study of Mbinga, Tanzania*. Lambert Academic Publishing.

Kothari, C. R. 2004. *Research Methodology, Methods and Techniques*. New Delhi: New Age International Publisher.

Lapar, M. L., G. Holloway & S. Ehui. 2003. Policy Options Promoting Market Participation Among Smallholder Livestock Producers: A Case Study from The Philippines. *Food Policy,* 28: 187–211.

Likwata, M. Y. & V. Venkatakrishnan. 2014. Performance of Agricultural Marketing Cooperative Societies in Cashew Nut Production and Marketing in Masasi District, Mtwara Region, Tanzania. *IRACST0 International Journal of Research in Management and Technology,* 4(5): 282–293.

Madulu, R. B. 2011. Improving Access to Credit for Paddy Farmers Through Warehouse Receipt-Based Agricultural Marketing System in Tanzania. *African Crop Science Journal,* 10: 37–39.

Mahelet, G. F. 2007. Factors Affecting Commercialization of Small holder Farmers in Ethiopia. *International Food Research Journal,* 23(4): 1797–1807.

Mhando, D. G., B. D. Mntambo, S. K. Ganja & A. G. Gongwe. 2013. Opportunities and Constraints: The Warehouse Receipt System for Production and Marketing in Mbinga District, Tanzania. *Journal of the Korean Association of African Studies,* 3(9): 179–217.

Millinga, M. 2009. Empowering Farmers in Tanzania Through the Warehouse Receipt System. *IFAD Report*. Tanzania.

Oboh, V. U. & S. Kushwaha. 2009. Socio-economic Determinants of Farmers' Loan Size in Benue State, Nigeria. *Journal of Applied Sciences Research,* 5(4): 354–358.

Pike, A. H. 1938. Soil Conservation Amongst Matengo Tribe. *Tanganyika Notes and Records,* 6: 79–81.

Reimers, M. & S. Klasen. 2012. Revisiting the Role of Education for Agricultural Productivity. *American Journal of Agricultural Economics,* 95(1): 131–152.

Salami, A., A. B. Kamara & Z. Brixiova. 2010. Smallholder Agriculture in East Africa: Trends, Constraints and Opportunities. Working Papers Series No. 105 African Development Bank (AfDB), Tunis, Tunisia.

Shah, S. B., A. Hashmi & A. Bukhari. 2008. Determination of Credit Program Participation and Socioeconomic Characteristics of Beneficiaries: Evidence from Sargodha. *The Pakistan Institute of Development Economics,* 47(4): 947.

Sitko, N. J. & T. S. Jayne. 2012. Why are African Commodity Exchanges Languishing? a Case Study of the Zambian Agricultural Commodity Exchange. *Food Policy, Elsevier,* 37(3): 275–282.

Tanga, F. K., M. A. Jabbar & B. I. Shapario. 2000. *Gender Roles and Child Nutrition in Livestock Production System in Developing Countries: a Critical Review*. Socio Economics and Policy Research Paper 27. ILRI, Nairobi Kenya. pp 64.

Tanzania Coffee Research Institute (TaCRI). 2015. Research for Development. *Annual Report for 2015.*

Tanzania Coffee Research Institute (TaCRI) 2015. Research for Development. *Annual Report for 2015.*

Temu, A. A., A. Winter-Nelson & P. Garcia. 2001. Market Liberalisation, Vertical Integration and Price Behaviour in Tanzania's Coffee Auction. *Development Policy Review. 19*(2): 205–222.

United Republic of Tanzania (URT). 2005. *The Warehouse Receipt Act of 2005*. Dar es Salaam: Government Printers.

—. 2010. *National Strategy for Growth and Reduction of Poverty II NSGRP II,* Dar es Salaam: Ministry of Finance and Economic Affairs.

—. 2014. *National Strategy for Growth and Reduction of Poverty II (NSGRP II) Annual Implementation Report. 2013/14: Accounting for Results.* Dar es Salaam: Ministry of Finance and Economic Affairs.

—. 2016. National Five-Year Development Plan 2016/2017-2020/2021: *Nurturing Industrialization for Economic Transformation and Human Development*. Ministry of Finance and Planning. Dar es Salaam: Government Printers.

World Health Organisation (WHO). 2003. *The Right to Social Services.* WHO Library Cataloguing-in-Publication Data. Geneva.

World Bank. 2005. Gender and 'Shared Growth' in sub-Saharan Africa. Briefing Notes on Critical Gender Issues in sub-Saharan Africa 2005-1. Washington DC: World Bank. Available at [http://siteresources.worldbank.org/EXTABOUTUS/ Resources/ Gender Growth. pdf] site visited on 15/07/2017.

Wuensch, K. L. 2006. Curvilinear Regression. In: N. J. Salkind, (ed.). *Encyclopaedia of Measurement and Statistics.* Thousand Oaks, CA: Sage. pp 211–215.

Yamane, T. 1967. *Statistics: An Introductory Analysis*, 2nd Edition., New York: Harper and Row. 38pp.

Appendix 1: Sampling Methods

Sample members	Population	No. of respondents	Sampling Method
Highland area AMCOS	12	1 AMCOS	The sample was randomly picked from the villages in low and high land zones using a table of random numbers generated in excel. The sample size used formulae as below. 1. Sample size formula $n = N(1 + Ne^2)^{-1}$ Where: n = sample size, N = population, e = an error (e = 0.05) 2. Sample ratio formula $n^* = p_i.n$, Where: n^* = sample size in AMCOS or farmers' groups, p_i = proportion of the number of respondents in the target population (i.e. population in AMCOS or farmers' group/ total population)
Lowland area AMCOS	9	1 AMCOS	
Highland area Farmers' Group	8	1 F. GROUP	
Lowland area Farmers' Group	13	1 F. GROUP	
Highland area farmers from AMCOS	1,245	125 farmers	
Lowland area farmers from AMCOS	1,059	106 farmers	
Highland area farmers from Farmers' Group	833	83 farmers	
Lowland area farmers from Farmers' Group	763	76 farmers	
Farmers who are members of AMCOS who accessed agro-inputs using income from other sources	1,097	110	
Farmers who are members of farmers' groups who accessed agro-inputs using income from other sources	762	76	
Farmers who are members of AMCOS who accessed agro-inputs through WRS credit system	1,496	150	
Farmers who are members of farmers' groups who accessed agro-inputs through WRS credit system	1,033	103	
Farmers who were in both groups i.e. accessed agro-inputs through WRS credit system and using income from other sources	491	49	
Total number of respondents (farmers)	3,900	390 farmers	

Source: Yamane (1967)