



FACTORS INFLUENCING CHOICE DECISION FOR MARKETING CHANNELS BY COFFEE FARMERS IN KARAGWE DISTRICT, TANZANIA

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Abstract

Marketing channel choice is among the most complex and challenging decisions facing farmers. This study therefore assessed the factors influencing choice decision of marketing channels by coffee farmers in Karagwe District of Tanzania. A cross-sectional research design was employed to collect data from 120 smallholder coffee farmers using semi-structured questionnaire, participatory group discussions and key informants interviews. The data were analysed using qualitative analytical techniques such as descriptive statistics as well as quantitative methods such as regression analysis. The Multinomial Logit Model was employed to determine the factors influencing farmers' choice for marketing channel. The study found that farmers sell coffee through three main marketing channels namely; Rural Primary Societies (35%), Private Coffee Buyers (46.7%) and Village buyers (18.3%). The Model results show that three factors significantly influenced the farmer's marketing channel choice namely; Age of household head, price of dry coffee cherry and distance to selling center from homestead. Further results showed that there were wide variations of farm gate prices between farmers selling in different market channels. The study recommends the restructuring of cooperative societies, introduction of formal credit facilities to provide favourable credit to farmers and the establishment of more rural primary cooperative societies' and private coffee buyers' buying centers in the remote villages to reduce transportation costs.

Key words: Marketing Channel; Contractual Choice Factors; Multinomial Logit Model.

1. Introduction

Coffee is one of Tanzania's primary agricultural export crops accounting for about 24% of total traditional cash crops export value and generating export earnings averaging USD 145 million per annum. The industry provides direct income to more than 450 000 farmer households thus supporting the livelihoods of an estimated 2.4 million individual Tanzanians (TaCRI, 2011). Tanzania is Africa's fourth largest coffee producer after Ethiopia, Uganda and Ivory Coast. The country is endowed with favorable climatic and natural resource conditions for production of Arabica (70%) and Robusta (30%) coffee varieties (NKG, 2010). The major Arabica growing regions are Kilimanjaro, Arusha, Mbeya, Ruvuma and Mbinga. Other Arabica growing regions include Tanga, Iringa, Morogoro, Kigoma, Manyara, Mwanza, Rukwa and Mara Robusta coffee is mainly produced in the Kagera region (TCB, 2012).

In Tanzania, the coffee marketing system like many other commodity markets has undergone a series of transformation over time. In August 1993, the coffee sector was liberalized whereby coffee marketing and production were opened to private agents (producers, traders, processors and exporters) along with the cooperatives to create a competitive marketing environment that could bring about competitive prices at all levels of the coffee marketing chain (URT, 2008). During that era, private coffee buyers were invited to purchase coffee directly from farmers and therefore coffee producers had a choice to sell their produce through four marketing channels: Private Coffee Buyers (PCBs), Cooperative System, Farmer Groups, and Independent Primary Societies that had split from the Cooperative union system (BACAS, 2005).

1.1 Coffee Production and Marketing in Karagwe District

Karagwe district is one of the eight districts of Kagera region in the North-Western Tanzania. The district is largely occupied by smallholder farmers who mainly grow Robusta coffee (95%) alongside small quantities of Arabica coffee (5%) together with food crops while others keep few livestock (KDCU, 2011).

Despite coffee liberalization in 1993, coffee growers in Tanzania particularly smallholder farmers still receive lower price of green coffee compared to most of other coffee producing countries (Mahdi, 2010). A study conducted by World Bank (2010) to analyse coffee and maize parallel value chains in Kagera region (Tanzania) and Rakai district (Uganda) found that farmers in Rakai district received higher farm gate price per kg of dry cherry Robusta coffee from 14% to 29% compared to farmers in Kagera region. Another study on Kagera coffee marketing

system carried out in 2006 by the Ministry of Industry, Trade and Marketing, cited by (Gabagambi, 2011) revealed that about 60% of coffee produced in Kagera region was smuggled to Uganda.

There is limited literature on Robusta coffee marketing in Karagwe district. Previous studies on coffee marketing (Parrish *et al.*, 2005; Mbise, 2007; Ng'webesa, 2008; Temu, 2009; Mhando and Mbeyale, 2010; Mwashikumbulu, 2011) were concentrated on northern and southern Tanzania (Kilimanjaro, Mbeya and Mbinga) and specifically on Arabica coffee. Therefore, this empirical study was undertaken to fill the existing information gap by identifying, describing and analyzing coffee marketing channels and associated institutional challenges. In addition, the study examines the factors influencing choice decision of marketing channels by coffee farmers in Karagwe district.

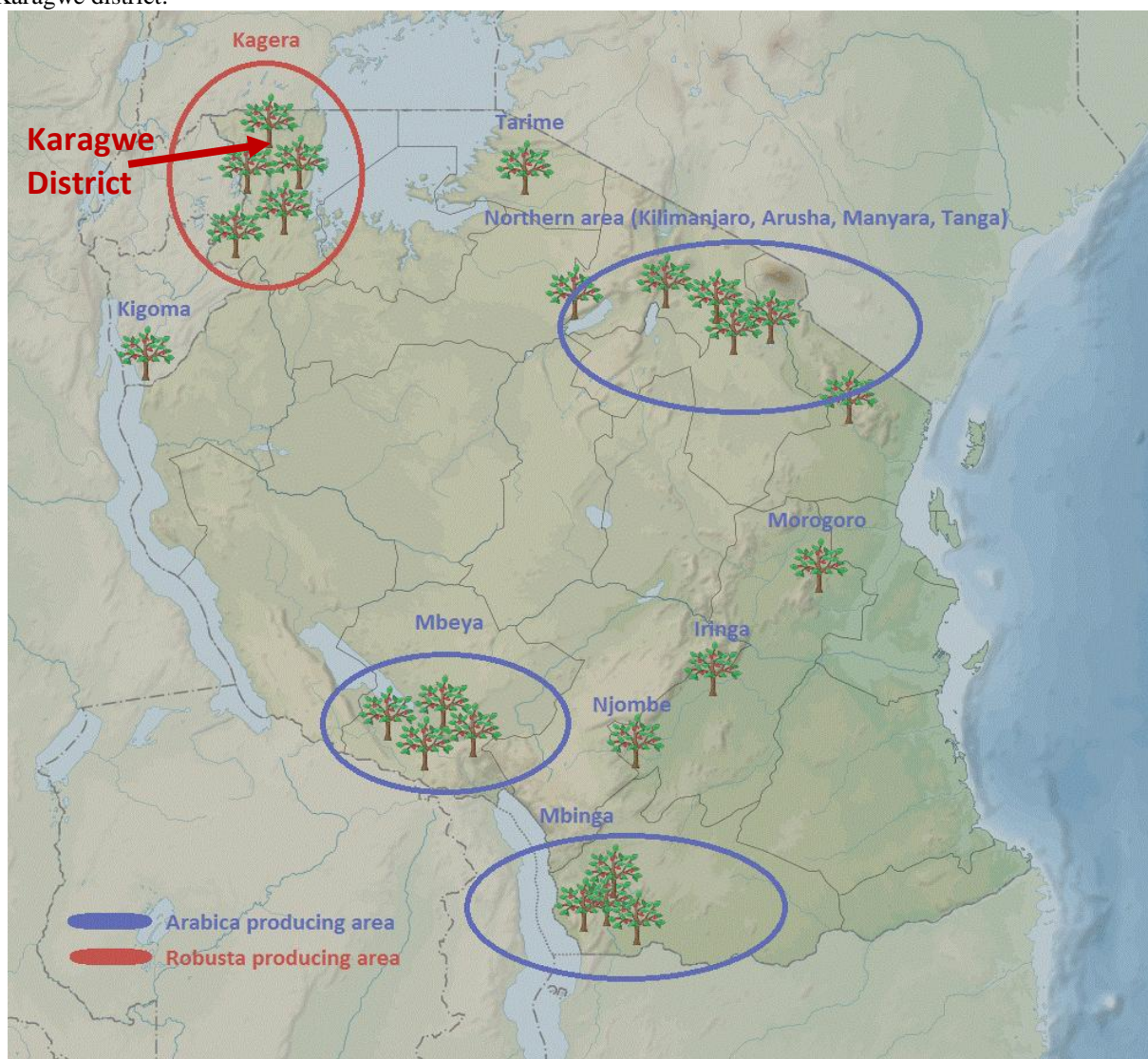


Figure 1: A map of Tanzania showing main coffee producing areas

Source: TCB (2012).

It is envisaged that the findings from this study would be useful for coffee industry regulatory bodies and institutions in effecting favourable policy and regulatory changes needed in the upgrading of the coffee value chain. Consequently, this study would complement availability of necessary information required for implementation of the Tanzania Coffee Industry Development Strategy (2011-2021) which strives to ensure that coffee farmers receive at least 75% of the auction price by suppressing unnecessary intermediaries and thereby reducing marketing costs.

1.2 Conceptual framework

Figure 2 shows the conceptual framework that stems on the theory of utility maximization and rational choice within a probabilistic framework which states that; *ceteris paribus*, farmers are rational producers hence they are likely to choose the marketing channel that will enable them to minimize costs and maximize net returns/ profit (McFadden, 1981).

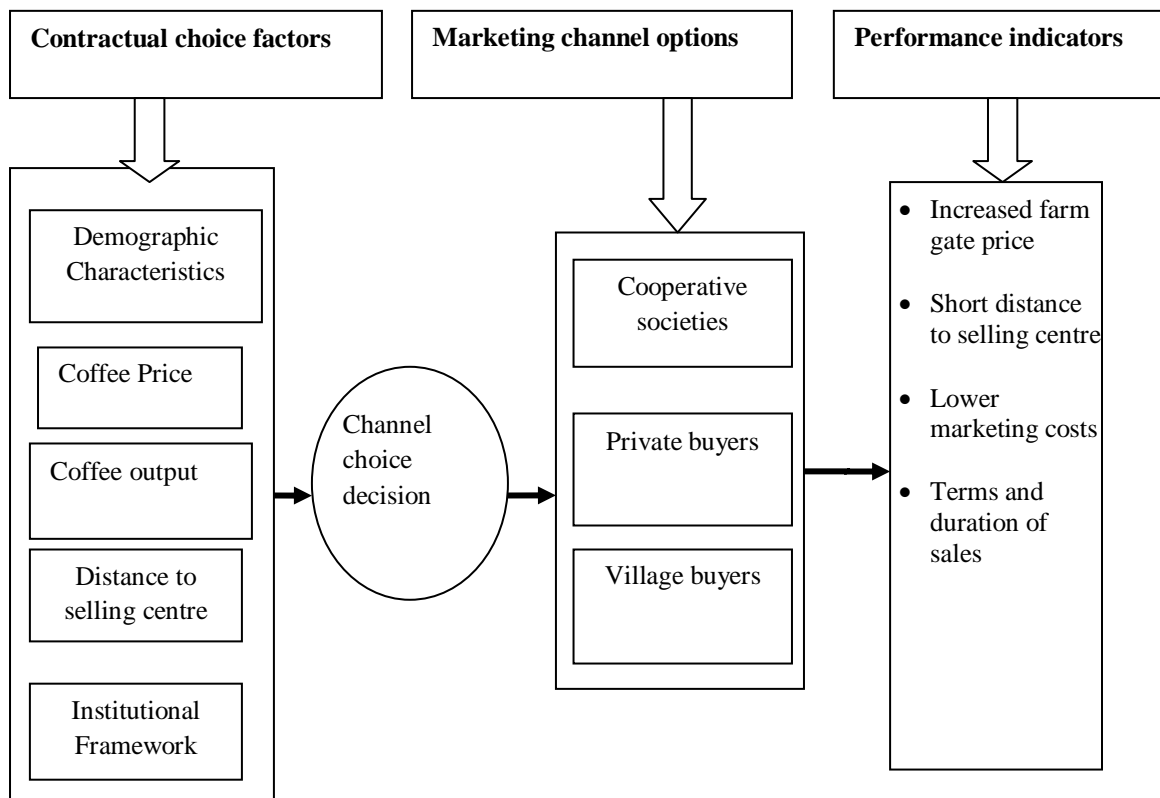


Figure 2: Conceptual framework of the study

1.3. Methodology

This study was carried out through a cross-sectional research design that employed both both judgmental/purposively and simple random sampling techniques. In the first stage, purposeful sampling technique was used to select 6 villages from 5 wards which were among the leading producers of coffee in the study area as directed by the District Agricultural and Livestock Development Officer (DALDO). The villages include; Runyaga, Chanika, Katembe, Nyabwegira, Chonyonyo and Kamagambo. In the second stage, simple random sampling technique was used to select a sample size of 120 households; 20 from each village from a sampling frame from DALDO’s office) of 22 838 coffee growing households. Field data were collected through a semi-structured questionnaire and checklists for farmers and key informants respectively. Data were analyzed using descriptive statistics and econometric analytical tools; the latter involving estimation of a multinomial logit model (MNL) to determine the factors influencing coffee farmers’ choice for marketing channels using the SPSS software version 16.

1.4 Specification of the Multinomial Logit Model

Multinomial Logit Model (MNL) is used when the dependent variable has more than two choice outcomes (polychotomous) (Hyun, 2006). In this study, the dependent variable (marketing channel) has three distinguished choice options ordinally coded as: 0 = Cooperative, 1 = Private buyer, 2 = Village buyer. The MNL model focused on marketing channel as a unit and used respondent’s characteristic such as age, sex, education, marital status, coffee output as well as marketing channel’s characteristics such as price of dry cherry coffee and distance to the selling center as explanatory variables or predictors. The selected variables in Table 1 were regressed simultaneously holding Village buyers as a reference or baseline for the other dependent variable categories.

Each marketing channel choice alternative offers some utility that comprises two components (Manski, 1977) as follows:

$$U_{in} = V_{in} + \varepsilon_{in} \dots\dots\dots (1)$$

Whereby: U_{in} is the utility derived by the n^{th} individual from choice alternative i , V_{in} is the systematic (deterministic) component of utility and ε_{in} is the random/stochastic part of utility. The deterministic component of utility can be expressed as:

$$V_{in} = X_{in}\beta \dots\dots\dots (2)$$

Whereby: X is a vector of observable attributes and β are unobservable parameters estimated. Then probability that individual n chooses alternatives j or i from the choice set is presented with a normalised scale factor. The MNL (conditional on alternative i being chosen by respondent n) becomes a conditional logit model given by (McFadden, 1973).

$$Pr[in] = \frac{\exp(X_{in}\beta) \Lambda[x(\beta_j - \beta_i)]}{\sum \exp(X_{jn}\beta)} \dots\dots\dots (3)$$

Whereby: $\Lambda(\cdot)$ is the logistic function. In other words, conditional on the choice being either j or i , the probability that the outcome is j follows a standard logit model with parameter vector $\beta_j - \beta_i$ (Wooldridge, 2002).

Table 1: Variables used in the empirical model estimation for choice decision of coffee marketing channel

Variable	Unit of measurement	Description	Expected sign
		Coffee Marketing Channel Choice	
Age	Years	As age increases farmers tend to sell coffee to Cooperative and Private buyers against Village buyers due to long term trust developed in past.	(+)
Sex	0=Female 1=Male	In most African countries men are the main decision makers (Bishanga, 2008). Hence there are likely to decide to sell coffee to Village buyers at homestead against Cooperative and Private buyers in order to obtain immediate cash for personal leisure.	(-)
Marital Status	0=Single 1=Married	Married households are likely to sell coffee to Cooperative and Private buyers against Village buyers to fetch higher price for family needs.	(+)
Education	0=Illiterate 1=Literate	As education level increases farmers tend to sell coffee to Cooperatives and Private trader against village buyers to fetch higher price.	(+)
Price of coffee	TShs/kg	As Cooperative and Private buyers pay higher coffee price than Village buyers, Farmers tend to sell coffee to Cooperatives and Private buyers against Village buyers.	(+)
Output of Coffee	Kilograms	The buying capacity of the Village buyers may be constrained by working capital. This might lead farmers with higher coffee output to sell to Cooperatives and Private buyers.	(+)
Distance to selling point	0=Short 1=Long	Farmers located long distance from Cooperative and Private buyers are enticed to sell coffee to Village buyers at homestead.	(-)

2. Results and Discussions

2.1 Organization of Coffee Marketing System in the Study Area

Table 2 presents the main coffee marketing channels identified in Karagwe district. The findings show that some of respondents (46.7%) sell their dried coffee cherries to the registered private coffee buyers' posts (PCBs) or through their commission agents who collect coffee from farmers' households (homestead) while other respondents (35%) sell their coffee to the rural primary cooperative societies (RPSs) which are the agents of the Cooperative Union (KDCU). The rest of the respondents (18.3%) sell their coffee to un-registered Village buyers (*abayeki*) who buy coffee at farmers' homestead then re-sale it either to the registered private coffee buyers (PCBs) or to rural primary cooperative societies at higher price. In some instances, Village buyers pay farmers a few months before coffee harvest (forward sale) with condition that farmer is obliged to sell to them certain portion of coffee produce (*Obutura*) at a prior-agreed price. Chi-square test was not statistically significant ($p \leq 0.30$) implying that coffee marketing channels were evenly distributed in all villages surveyed.

Table 2: Distribution of marketing channels in the surveyed villages

Village surveyed	Cooperative	Private buyer	Village buyer
	(n =20)	(n =20)	(n =20)
	% of respondents		
Runyaga	30	35	35
Chanika	35	40	25
Katembe	55	35	10
Nyabwegila	35	55	10
Chonyonyo	30	10	60
Kamagambo	25	55	20
Overall (n=120)	35	46.7	18.3

$X^2 =$ Significant at 0.30

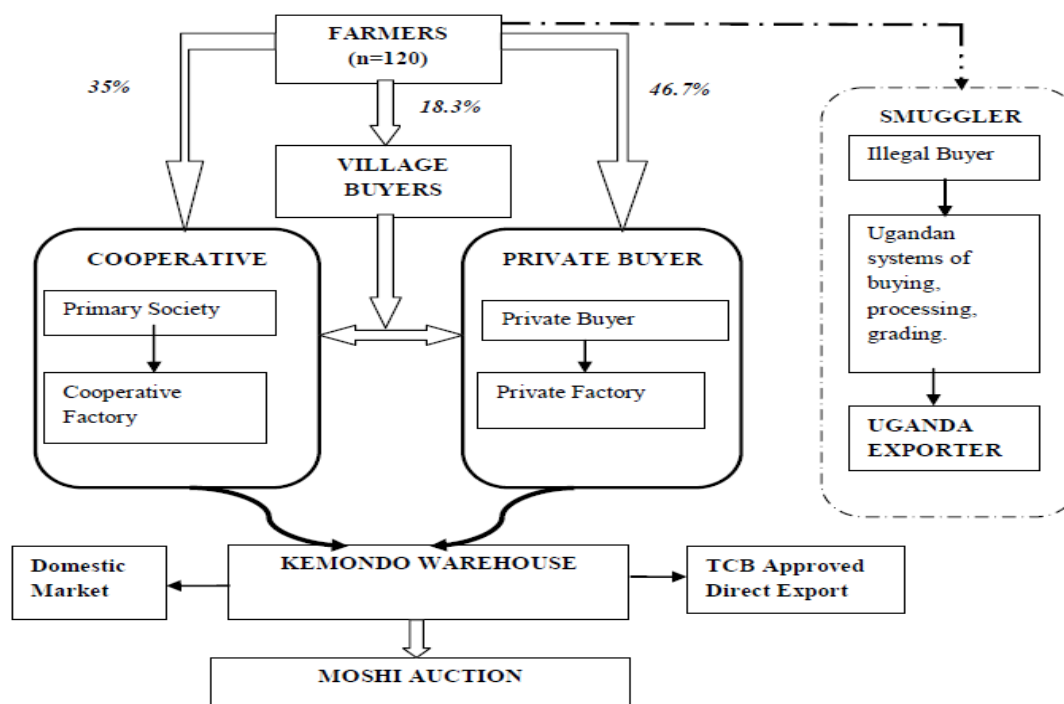


Figure 3: The patterns of coffee marketing channels in the study area

Fig. 3 depicts the patterns of coffee marketing channels in the study area commencing from the household level to various destinations particularly at the coffee auction operated by TCB. According to the existing literature (Gabagambi, 2011) a portion of Robusta coffee produced in Karagwe district is often smuggled to Uganda where it is assumed to be sold at relatively higher price.

2.2 Transportation of Coffee in the Study Area

The findings in Table 3 show that the respondents transport coffee to the rural primary societies (RPSs) or private coffee buyers' centers (PCBs) using porters (10.1%), bicycle (30.8%), motorcycle (15.8%) and pick-up, lorry or truck (8.3%). The respondents transporting coffee from homesteads to RPSs or PCBs pay between TShs 500-1500 per 70kg bag depending on the distance. The accumulated coffee at RPSs or PCBs is then transported by lorries or trucks to their main warehouses where it is stored before delivered for curing (processing) at KDCU or privately owned factories. Later on, the coffee beans are cleaned, graded and packed as "green coffee" which is transferred to Kemondo Bay (Bukoba) warehouse, ready to be sold to global buyers at the TCB-managed auction in Moshi or direct export approved by the TCB via Dar es Salaam or Tanga port.

Table 3: Modes of transporting coffee and distance to selling centers in surveyed villages

	Runyaga (n = 20)	Chanika (n = 20)	Katembe (n = 20)	Nyabwe- gila (n = 20)	Chonyo- nyo (n = 20)	Kamaga- mbo (n= 20)	Overall (n=120)
Mode of transport	% of respondents						
Farm gate (homestead)	20	30	30	35	70	25	35
Porters	25	5	10	5	0	15	10
Bicycle	35	35	35	35	10	35	30.8
Motorcycle	20	25	25	5	5	15	15.8
Pick-up lorry/truck	0	5	0	20	15	10	8.3
$X^2 = \text{Significant at } 0.027$							
Distance (km)							
0=(homestead)	20	30	30	35	70	25	35
<1	25	20	60	30	0	40	32.5
1-2	40	35	10	25	10	25	24.2
>2	15	15	0	10	20	10	8.3

$X^2 = \text{Significant at } 0.189$

The assessment of transportation modes between villages was statistically significant ($p \leq 0.027$) signifying that coffee farmers used different modes of transport in surveyed villages. In particular, majority of respondents in Chonyonyo village (70%) sell their coffee to village buyers at homestead because there is neither rural primary cooperative societies (RPSs) nor private coffee buyers' posts (PCBs) instead they have to transport their coffee to neighbouring villages of Rukore and Ihanda (more than 2km) using bicycles, motorcycles, pick-ups or lorries.

2.3 The Coffee Farm Gate Prices during the 2012/2013 Marketing Season

Fig. 4 indicates that respondents sold their coffee at varying prices during the 2012/13 marketing season. The findings show that (23.3%) of respondents sold the dried Robusta coffee cherry at TShs 1 200 per kilogram. This was the indicative price which was directed by the District Coffee Inspector. Other respondents sold their coffee at varying prices depending on the form of coffee sold (wet or dry), place and duration of sale as well as the type of contract arrangements with buyers (Table 4).

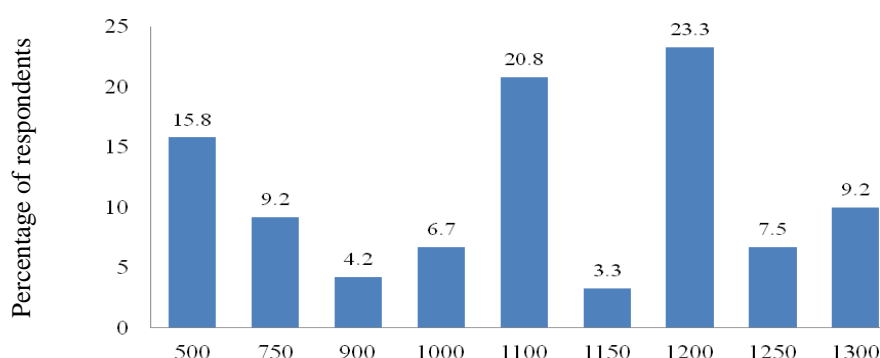


Figure 4: Coffee farm gate prices during the 2012/2013 marketing season

It was remarkable to observe a wide range of coffee farm gate price among respondents (TShs 500-TShs 1 300 per kg). This is due to the fact that village buyers (Table 4) often purchase 10 buckets of Wet coffee beans each of 20 kilogram at a price between 40 000 and 65 000 TShs. After drying 10 buckets of Wet coffee beans they remain with 7 buckets of dried cherry coffee each weighing about 12 kilograms. Thus, 7 buckets of dried cherry (7 x 12) is equivalent to 84 kilograms. By dividing the average price paid for 7 buckets of dried cherry (40 000 – 65 000 TShs) to the average weight of 7 buckets (84 kilograms) it results to 500-750 average TShs per kilogram.

Table 4: Coffee Farm Gate Prices with respect to different marketing channels

Price of Coffee (TShs/kg)	Coffee Marketing Channel				
	Cooperative	Private buyers	Village buyers	Total	%
	0	0	19	19	15.8
	0	9	2	11	9.2
	3	2	0	5	4.2
500	0	7	1	8	6.7
750	19	6	0	25	20.8
900	4	0	0	4	3.3
1100	15	13	0	28	23.3
1200	1	8	0	9	7.5
1250	0	11	0	11	9.2
1300					
Total	42	56	22	120	100

2.4 Multinomial Logit Model Results

Table 5 presents the results for the multinomial logit model which was used to analyse the socio-economic factors that influence the coffee producer's choice decision of marketing channel in the study area. The model results show that three factors significantly influenced the farmer's marketing channel choice namely; *Age of household head* (positively) at $p \leq 0.10$, *distance to selling center from homestead* (negatively) at $p \leq 0.05$ and *price of dry coffee cherry* (positively) at $p \leq 0.05$ levels of significance respectively.

Firstly, the estimated coefficient for *Age* was positive and significantly influenced coffee producer's choice decision towards cooperative against Village buyers at 10% level of significance. The results are consistent with the expectation implying that as age of a coffee farmer increases, likewise it influences him/her to sell coffee to cooperative union against the village buyer. These results are supported by the fact that in the 1950s and 1960s, cooperatives in Tanzania provided economic and social protection to members by paying fair prices and provision of services like education and trusteeship for loans (Bibby, 2006). That is why the more aged coffee farmers are loyal to sell their coffee through cooperatives channel because of their long term trust that they have developed for many years unlike the young aged coffee producers.

Secondly, the estimated coefficient for *Distance* was negative and significantly influenced coffee producer's choice decision at 1% level of significance. This is contrary to what was expected that coffee farmers located short distances from cooperatives would be influenced to sell their coffee to cooperatives instead of Village buyers. In opposite, farmers located near the cooperatives centres were reluctant to sell their coffee through cooperative compared to those located far distances. This could perhaps be explained that farmers located near the cooperatives centres are well informed about cooperatives' misconducts hence are reluctant to sell their coffee through cooperative compared to those located in remote areas and far from roads such as those in mountainous or semi-arid areas without sufficient marketing information (Nicholas and Ruth, 2007). Likewise, Bibby (2006) established that since their re-introduction in 1982, cooperatives in Tanzania are tarnished by poor administration and leadership, poor business practice, untrustworthiness and persistent corruption.

Thirdly, the estimated coefficient for *Price* was positive and significantly influenced coffee producer's choice decision towards private buyers against Village buyers at 1% level of significance. These results reflect the real situation from the study area which show that private buyers pay relatively higher average farm gate price of TShs 1180/kg compared to Village buyers who pay an average price of TShs 500/kg for dry coffee cherry. Also these

results are evidenced by the fact that farmers are rational producers hence they are likely to choose the marketing channel with relatively higher price so as to maximize net returns or profit (Debertin, 2012).

Table 5: Parameter estimates of factors influencing choice decision of marketing channel in the study area

Coffee Marketing Channel		Coef.	Std. Error	Wald	df	Sig.
Cooperative	Intercept	2.501	8.744	.082	1	.775
	AGE	.114	.066	2.967	1	.085*
	OUTPUT	.910	.902	1.019	1	.313
	PRICE	.010	.006	2.569	1	.109
	EDUC	.348	.867	.161	1	.688
	[SEX=0]	4.322	3.521	1.507	1	.220
	[SEX=1]	0 ^b	.	.	0	.
	[MARITAL=0]	-2.019	3.569	.320	1	.572
	[MARITAL=1]	0 ^b	.	.	0	.
	[DISTANCE=0]	-21.768	1.987	119.965	1	.000**
[DISTANCE=1]	0 ^b	.	.	0	.	
Private buyer	Intercept	-3.706	7.158	.268	1	.605
	AGE	.073	.057	1.664	1	.197
	OUTPUT	.472	.823	.330	1	.566
	PRICE	.017	.005	10.625	1	.001**
	EDUC	.513	.785	.427	1	.514
	[SEX=0]	1.666	3.303	.254	1	.614
	[SEX=1]	0 ^b	.	.	0	.
	[MARITAL=0]	.696	3.388	.042	1	.837
	[MARITAL=1]	0 ^b	.	.	0	.
	[DISTANCE=0]	-14.679	.000	.	1	.
[DISTANCE=1]	0 ^b	.	.	0	.	

Note: The reference category = Village buyer

Statistically Significant at ** (1%) and * (10%)

Number of observations = 120

(-) = negative relationship

Pseudo-R² = Cox and Snell = 0.752; Nagelkerke = 0.860 and McFadden = 0.673

LR chi-square = 167.152; Probability sig. = 0.000; Log likelihood = 79.650

3. Conclusion and Recommendations

The main objective of this study was to identify, describe and analyze coffee marketing channels and associated institutional challenges in the study area. The study identified that coffee farmers in the study area sold dried cherry coffee through main three channels namely; rural cooperative societies (35%), private coffee buyers (46.7%) and village buyers (18.3%). It was also observed that coffee farmers in different channels received varying farm gate prices. In some instances, some coffee farmers enter into informal contracts with village buyers a few months before the coffee harvest (forward sale) with condition that farmer will be obliged to sell their coffee produce to them at lower price (*Obutura*).

The second objective was to examine the factors influencing choice decision of marketing channels by coffee farmers in the study area. The study results show that three factors significantly influenced the farmer's marketing channel choice namely; Age of household head (positively) at $p \leq 0.10$, distance to selling center from homestead (negatively) at $p \leq 0.05$ and price of dry coffee cherry (positively) at $p \leq 0.05$ levels of significance respectively.

The study recommends introduction of formal credit facilities such as Savings and Credit Cooperative Societies (SACCOs) and Village Community Banks (VICOBA) to provide favourable credits to farmers and thereby stop them from selling coffee unprofitably. The MNL model results revealed that farmers located near cooperative buying centres were reluctant to sell their coffee through cooperative because they were well informed about cooperatives' misconducts in terms of corruption, delay of payments, malpractices in measurements and unfair deductions. The study stresses a need to review the cooperative policies (*modus operandi*) so as to allow the government authorities to conduct regular checks on their books of accounts, prices, authenticity of weighing scales

and deductions (levies). In addition, the study recommends for the establishment of more buying centres, cooperatively or privately owned, in the most remote villages particularly *Chonyonyo* in order to reduce costs of transporting coffee to neighbouring villages' buying posts. A deeper understanding of the modus operandi of coffee marketing systems of neighbouring countries like Uganda would go a long way towards drawing important synergies for mutual improvement and clamping down on cross-border coffee smuggling.

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