Volume 18 Issue 27
Originally issued as B5

Global Journal of Management and Business Research: B
Economics and Commerce
Volume 18 Issue 5 Version 1.0 Year 2018
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4588 & Print ISSN: 0975-5853

Camel Milk Marketing Channel Choices for Enhancing Competitiveness in Eastern Ethiopia: Multinomial Logit Approach

By Bedilu Demissie, Hussien H. Komicha, Adem Kedir & Sisay Asefa

University of Winnipeg

Abstract- Literature on camel milk market channel choices has been thin, especially in pro-poor pastoral/agro-pastoral area of sub-Saharan Africa, as a result its prudent to note that none of past studies identified factors affecting camel milk market channel choices in Eastern Ethiopia even though camel milk market access is pivotal to transform livelihood of people who live in arid and semi-arid areas of Ethiopia. Therefore, the study seeks to determine factors influencing camel milk marketing channel choice in Gursume and Babile districts of Eastern Ethiopia, with the aim of enhancing camel milk competitiveness. Data were collected from 92 camel milk producers' pastoral/agro-pastoralist by using two-stage stratified sampling. Multinomial Logit model was employed for analyzing data. Multinomial Logit model result indicated that, compared to assembler market channel outlet (base channel), the likelihood of accessing consumer market outlet was higher among pastoral/agro-pastoral who have higher educational level, better livestock extension services, better milk market information and higher income from none dairy source. The likelihood of accessing commission man milk marketing channel choice was higher for households who wanted better milk price offered by commission agent as compared to the base channel. Compared to accessing assembler market outlet, the likelihood of accessing retailer milk market outlet was higher for those who have better dairy extension services and for those who were far away from milk market.

Keywords: *camel milk, marketing channels, multinomial logit, pastoralist.*

GJMBR-B Classification: *JEL Code: M29*

CAMELMILKMARKETINGCHANNELCHOICESFORENHANCINGCOMPETITIVENESSINEASTERNETHIOPIAMULTINOMIALLOGITAPPROACH

Strictly as per the compliance and regulations of:

Research | Diversity | Ethics

© 2018. Bedilu Demissie, Hussien H. Komicha, Adem Kedir & Sisay Asefa. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Camel Milk Marketing Channel Choices for Enhancing Competitiveness in Eastern Ethiopia: Multinomial Logit Approach

Bedilu Demissie [α], Hussien H. Komicha [σ], Adem Kedir [ρ] & Sisay Asefa [ω]

Abstract- Literature on camel milk market channel choices has been thin, especially in pro-poor pastoral/agro-pastoral area of sub-Saharan Africa, as a result its prudent to note that none of past studies identified factors affecting camel milk market channel choices in Eastern Ethiopia even though camel milk market access is pivotal to transform livelihood of people who live in arid and semi-arid areas of Ethiopia. Therefore, the study seeks to determine factors influencing camel milk marketing channel choice in Gursume and Babile districts of Eastern Ethiopia, with the aim of enhancing camel milk competitiveness. Data were collected from 92 camel milk producers' pastoral/agro-pastoralist by using two-stage stratified sampling. Multinomial Logit model was employed for analyzing data. Multinomial Logit model result indicated that, compared to assembler market channel outlet (base channel), the likelihood of accessing consumer market outlet was higher among pastoral/agro-pastoral who have higher educational level, better livestock extension services, better milk market information and higher income from none dairy source. The likelihood of accessing commission man milk marketing channel choice was higher for households who wanted better milk price offered by commission agent as compared to the base channel. Compared to accessing assembler market outlet, the likelihood of accessing retailer milk market outlet was higher for those who have better dairy extension services and for those who were far away from milk market. The study reveals to exploit the indigenous social capital of pastoral/ agro-pastoral to enhance milk marketing supply chain, in addition to strengthening the formal institution (such as education, livestock extension and develop milk collecting cooperatives) to increase the competitiveness of camel milk market in semi-arid areas of Ethiopia and sub-Saharan Africa in general.

Keywords: camel milk, marketing channels, multinomial logit, pastoralist.

I. Introduction

Ethiopia is one of the richest countries in livestock inventory both regarding number and diversity. However, the benefit obtained from it is low as compared to other African countries. The livestock subsector comprised 24% of agricultural GDP between the year 1995/96 and 2005/06, and is a source of livelihood for 60 to 70% of the population (NBE, 2005/ 06), and accounts for about 12 to 15% of national export earnings (EEA, 2005). However, CPALD (2013) revealed that agricultural GDP calculations in Ethiopia underestimated the contribution of livestock to the Economy because the value of economic benefits that are derived from livestock power for farming and transport are not routinely included.

In arid and semi-arid parts of sub-Saharan Africa, pastoralism is a well-suited way of life. In Ethiopia pastoral area cover more than 62% of the national land area (EARO, 2003), which support about 9.8 million people of which 56% are pastoral, 32% are agro-pastoral and remaining 22% are urban dwellers (EEA, 2005). It contribute about 30% of the GDP and 90% of the hard currency from live animal export and employs about 27% of the national population (Amaha, 2003). However, this communities are marginalized and generally not given due consideration in wider socio-political analysis (Simenew et al., 2013) of the country relative to Highland area.

Camels live in the vast pastoral areas in Africa and Asia, Ethiopia stands third in camel population in Africa by possesses over 2.4 million dromedary camels (FAO, 2010), which is all owned by pastoral. In this harsh area, camels produce milk even during the dry season when milk from cattle is scarce (Bekeleet al., 2002), because of this outstanding performance pastoralists of eastern Ethiopia mainly rely on camels for their livelihood, without camel their life can be jeopardized. However, despite its significant contribution camel is one of the neglected domestic livestock by the scientific community in Ethiopia (Yesihak and Bekele, 2003), until recently. Even regarding camel milk, very little is known and understood about its marketing, despite its critical and increasingly relevant role for the pastoral/agro-pastoral food security (Nori, 2010).

Ethiopia produces about 75,000 tons of camel milk (Felleke, 2003). However, pastoralists have not economically benefitted to the extent they ought to from the milk produced (Bedilu et al., 2015) because their participation in market-led dairy development has not been widespread. Hence, increasing pastoral market participation as well as developing chain competitiveness and efficiency are valuable strategies for poverty alleviation and food security in arid and semi-

Author α ρ: Department of Agricultural Economics, College of Agriculture and Environmental Science, Arsi University.
e-mails: bediluzeleke@yahoo.com, billybedilu@gmail.com
Author σ: Department of Economics, University of Winnipeg, Winnipeg, Canada.
Author ω: Department of Economics, College of Arts and Sciences, Western Michigan University (WMU).

© 2018 Global Journals

arid part of Ethiopia. According to CSA (2015), for the year 2014, out of the total milk production only 6% was sold. This low volume of sale is attributed to market-related issues such as, low collaboration among dairy value chain actors, bargaining on price setting, weak market integration, forging forward and backward linkages, lack of relevant market information, lack of meeting the market quality and safety requirement (Andualem, 2015; Ketema et al., 2016), and lack of market-oriented production.

One of the necessary condition for producers to reap economic benefits is the provision of assured milk market outlets (Bardhan et al., 2012). However, scant attention has been given on analyzing the factors that determine dairy producers' channel choice (Berhanu et al., 2013), especially there have been relatively few studies to quantitatively asses milk market outlet issue (Falkowski et al., 2008), even though market access is one of the major limitations in harnessing opportunities in camel milk production, as camels live most of the time in remote area their milk accessibility could be difficult. The major camel milk marketing channels[1] through which pastoral and agro-pastoral of eastern Ethiopia can deliver their camel milk are consumer channel, assembler channel, retailer channel and commission agent channel.

To maximize the benefits that pastoral and agro-pastoral earn, they have to make an appropriate decision as to where and to whom they should sell their camel milk produce. Identifying these factors is very important regarding determining areas of interventions for effective policy formulations and to integrate pastoral and agro-pastoral into the modern marketing channels. Consequently, the research is aimed at providing an empirical basis for identifying camel milk market channel choices of pastoral/agro-pastoral. In doing so, the study attempts to contribute to filling the knowledge gap by assessing factors affecting camel milk market outlet choices in eastern Ethiopia.

II. Material and Methods

a) Topography and climate of the study region

The study was conducted in the arid and semi-arid area extending from Gursum to Babile districts of Hararghe zone, Oromia Regional State of Ethiopia, along the main road to Jijjiga having an area of 967.3 km^2 and 3022.2 km^2, respectively. The camel milk-shade extends from Dire Dawa to Harar to Jijjiga milk-shade, it is not only limited to Gursum and Babile districts.

Gursume and Babile districts are characterized by warm lowlands between 1200 m to 2950 m and 950 to 2000 m above sea level, respectively. The area has a good potential for camel and camel milk production, which is mainly commenced by pastoral and agro-pastoralists households of both Oromia and Ethio-Somali tribe. The districts livestock population comprises of 125, 996 cattle, 23160 sheep and 10936 camel (East Hararghe profile, 2009).

b) Source of data and sampling techniques

The field was conducted during 2012/13 year. Data collection focused on household heads, key informants, rapid market appraisal and focus group discussions. In addition to the primary data, different sources were used to collect secondary data. The selected districts and Peasant Associations (PAs) were selected as they were considered the milk-shade due to their potential for camel milk production and commercialization. Two-stage stratified sampling was employed to select the sample households (HHs). The base for stratification of sample household was milk production types as only camel, and both camel and cow milk producers as pastoralists and agro pastorals own only camel or else both camel and cow as their livestock herd. Based on the stratification, 53 and 40 households were selected from only camel, and camel and cow milk producers, respectively. Then using probability to proportional sample size sampling technique making the sample HH level 93 households.

c) Theoretical Framework

The study is based on the theory of rational choice, which is used in modeling economic behavior. The theory assumes that pastoralists and agro-pastoralists are rational, means they will rank alternative marketing channel outlets in order of utility subject to pastoralists socio-economic, demographic and institutional factors influencing the choice entrenched in each outlet. Hence, pastoralists'/agro-pastoralists' milk marketing channel outlets choice was conceptualized using the random utility model.

The pastoral and agro-pastoral of eastern Ethiopia were mapped into four marketing channel outlets: direct consumers, assembler, retailer and commission agents. The camel milk producer pastoral/ agro-pastoral i was able to choose from a set of alternative channels (j=1,2,3,4) (which provided a certain utility level U_{ij} from each alternative, by comparison on marginal benefit and costs based on the utility that will be gained by selling to particular camel milk marketing channel.

However, according to Green (2002), it is not possible to directly observe the utilities, but the choice made by pastoral/agro-pastoral revealed which marketing outlet provides the great utility. Hence, the utility was decomposed into deterministic V_{ij} and random ε_{ij} part:

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

[1] Camel milk marketing channel is a sequence of milk marketing institutions from milk producers to final consumers, including pastoral/agro-pastoral milk producers, milk traders (such as assemblers, retailers, wholesalers etc.), brokers, commission agents and the final users of camel milk, who exist for their joint opportunity in the camel milk market.

© 2018 Global Journals

Since it was not possible to observe the random (ε_{ij}) and predict exactly the choice of camel milk marketing channel, the probability of any particular channel choice was used in which a pastoral/agro-pastoral selected a marketing outlet $j=1$ if:

$$U_{ij} > U_{ij} \ \forall_i \neq k \qquad (2)$$

Where U_{ik} represents a random utility associated with the market channel outlet $j=k$, V_{ij} represents an index function denoted the decision maker's average utility associated with this alternative and ε_{ij} represents the random error.

d) Methods of data analysis

Both descriptive and econometric tools were used to analyze the collected data. Descriptive statistical tools were used to explain the socio-economic, demographic and institutional characteristics of camel milk market participants. While Multinomial Logistic Model (MNL) was used to identify the determinants of camel milk market channel choice decisions (Berhanu et al., 2013; Xaba and Masuku, 2013; Mukiama et al., 2014; Bezabih et al., 2015; Riziki et al., 2015) of the sampled pastoralists and agro-pastoralists, because it is the standard method for estimating unordered, multi-category dependent variables. It also assumes independence across the channel choices, that is, it does not allow correlation between alternatives (Wooldridge, 2006).

The result revealed that households accessed milk market channel outlets such as individual consumers, assembler, retailer, commission agents and the combination of thereof. However, due to mutually inclusiveness of choices, fewer representation and similar collection and operation practices, only household who had access to individual consumer, assembler, retailer and commission agents camel milk market channels were considered in multinomial logit regression. Out of these channel choices, selling camel milk to assembler was taken as a base category against which other milk market channels are going to be compared. Following Green (2003), the Multinomial Logit model for multiple choice problems takes the form:

$$\Pr(y=j) = \frac{\ell^{\beta_j x_i}}{\ell^{\beta_o x_i} + \ell^{\beta_j x_i} + \ldots + \ell^{\beta_j x_i}} \qquad or$$

$$\Pr ob(y=j) = \frac{\ell^{\sum_{k=1}^{k} \beta_{jk} x_k}}{1 + \sum_{j=1}^{J-1} \ell^{\sum_{k=1}^{k} \beta_{jk} x_k}} \qquad (3)$$

Given Prob (y =1), where $j = 1,2,3, J-1$.

The parameter β has two subscripts in the model, k for distinguishing x variables, and j for distinguishing response categories. The subscript j indicates that there are J-1 for sets of β estimates. In other words, the total number of parameter estimates is $(J-1)k$. This implies that the sample size should be larger than $(J-1)k$.

To test the potential multicollinearity problem among discrete and continuous variable (Green (2002), variance inflation factor (VIF) and contingency coefficient (CC) among explanatory variables were tested, respectively. And it was found not to have any potential influence on estimates from the model. The econometric software STATA 13 is used to estimate the parameter coefficient and predicted marginal value.

e) Variable Hypothesis

i. *Dependent Variable*

Camel milk market channels or outlets are those pathways where camel milk produce passes through to reach the final consumer. According to the consumer theory, camel milk producers are expected to choose the best channel through which they sell their camel milk depending up on various criteria. The prevailing alternative camel milk marketing channels for the sampled households include Direct to Consumer, Assembler, Retailer and Commission agent. Of which the base category is Assembler Channels only because this channel was chosen by most of the pastoral/agro-pastoral households to trade their camel milk.

Consequently, the dependent variable for the model is discrete variable taking a value of 1, 2, 3, and 4 representing the channel choices, where 1 represents selling camel milk through consumer channel; 2 represents selling camel milk through assembler channel; 3 representing selling camel milk though retailer channel; and 4 represents selling camel milk through commission agent channel.

ii. *Independent Variables*

Based on earlier works (Alemu et al., 2012; Berhanu et al., 2013;Xaba and Masuku, 2013 ; Mukiama et al., 2014; Bezabih et al., 2015; Geoffrey *et al.,* 2015; Moturi et al.,2015; Mutura et al., 2015; Riziki et al., 2015; Frank et al., 2017) and observations during field survey in arid and semi-arid area of eastern Ethiopia, the pastoral/agro-pastoral households' decision to choose a particular camel milk market channel depends on socio-economic, institutional and demography variables. The expected effects of each of these variables are summarized as follows in Table 1. The following variables were used as an independent variable: Age of the household head (AG_HH), Educational level of household head (EDL_HH), Household members under 5 years (HH_MM5_YR), Experience in livestock Production (EXP_LIV_PRO), Livestock extension service (LV_ESV), Distance to near dairy milk market (DS_MLK_MRK), Number of milk camel own (N_MIK_CAM), Milk market information (MRK_IFF), Quantity of milk sold (Q_MIK_SOLD), Income from non-dairy source (IN_NOND) and Family size (FS_HH).

© 2018 Global Journals

Table 1: Description of the independent variables used in the logistic regression model

Independent Variable	Type	Value	Hypothesis
AG_HH	Continuous	Number of years	+
EDL_HH	Continuous	Years of schooling	+
EXP_LIV_PRO	Continuous	Years	+
HH_MM5_YR	Continuous	Number	-
LV_ESV	Dummy	1=Yes, 0=No	+
DS_MLK_MRK	Continuous	Kilometer	-
MRK_IFF	Dummy	1=Yes, 0=No	+
N_MIK_CAM	Continuous	Number	+
Q_MIK_SOLD	Continuous	Liter	+
IN_NOND	Continuous	Birr	+
FS_HH	Continuous	Adult Equivalent	-

III. Results and Discussion

Camel milk is the vital part of a diet for pastoralist of eastern Ethiopia, especially during the drought period when pasture is scant, and it produces milk when milk from cattle is scarce (Bekele et al., 2002). In the study area camel milk is consumed mostly as a raw state, milk tea, and in the form of fermented milk without adding any value to the camel milk, because of the limited ability of camel milk to be coagulated by enzymes, due to the composition of the casein micelles (Zubeir and Jabreel, 2008). However, a small amount of milk produced in the study area is subject to butter and cheese processing by mixing it with goat and cow milk based on their endogenous knowledge, the result is in agreement with the finding of Yagil (1982). Nevertheless, it is possible to processes camel milk into cheese using Camifloc and calcium chloride (Khan et al., 2004; Zubeir and Jabreel, 2008) to preserve camel milk and create potential trade to camel keepers in semi-arid and arid areas of Eastern Ethiopia, as it can help to improve pastoral/agro-pastoral economic condition by finding a proper market for camel milk cheese, especially by exporting to Europe (Saima et al., 2003).

a) Composition and physical characteristics of camel milk

Dromedary camel milk composition is excellent in from nutritional view point (Sisay and Awoke, 2015) as it has valuable nutritional properties as it contains a high nutritional value, with vitamin C, which is three times greater than the cow's milk, iron content ten times and B vitamins present in reasonable amount (Arrowal et al.,2005). In addition to that, cow milk tends to make people fat, causing obesity but camel milk gives strength, endurance, and stamina, and attribute that pastoralists need in order to pursue a nomadic life style (Sisay et al., 2015). However, the camel milk has not been given as much attentions in research and development as the cow milk, especially in Eastern Africa.

b) Camel milk market participation by sample pastoralist and agro-pastoralists

The average milk yield per day per camel was estimated to be 4.8 liters under the desert condition for the study area. The study spotlighted that, the total camel milk produced per day in the study area was estimated to be 1720.25 liters or 12041.75 liters of milk per month, and the average milk yield per lactation per head was found to be 1391.23 liters. The study reveals that all of the camel dairy owned by sampled respondents were found to be local breeds, which are low in milk productivity as compared to Israel's' dairy camels which yield 20 liters a day or more (Yagil et al., 1994).

Out of the total sampled household, 98.9% of sampled camel milk producers were found to participate in milk marketing. The share of camel milk sold by sample producer was 77.76%, and the mean milk production per day per dairy household during the survey period was found to be 18.48 liter, by revealing that the study area has high potential of commercialization if due attention is given regarding market-oriented milk production and liking farmers with modern market which is based on consumer needs to increase the competitiveness of camel milk in the study area specifically and in sub-Saharan African generally.

c) Market characteristics in relation to market outlets

The study reveals that most of the sampled households (35.87%) sell camel milk though the assembler channel outlet. Next, to the assembler, 29.35% of the sampled households sell their camel milk produce through direct consumer channel. The remaining pastoralists and agro-pastoralists sell their camel milk though retailer (18.49%) and commission agent (16.3%) marketing channel. In Easter Ethiopia, camel milk producers supply milk as a household and by forming informal groups of women locally called '*affosha*[2]' and the other social institution in the camel milk marketing is personalized method of economic exchange called '*maamilla*' which is based on a supplier and buyer trust-based relationship that

[2] '*Affosha*' is informal group of women who group themselves up to ten persons together to market camel milk by round up to same amount as they were agreed, especially pastoral/agro-pastoral who produce small amount of came milk use such informal grouping mechanism to reduce the transaction cost associated with selling small amount of milk at distance milk market.

© 2018 Global Journals

is developed from a regular exchange of camel milk with each other.

Nearly all of the camel milk trader's (especially, rural assembler and retailer) in the study area were females, this result is consistence to Nori (2012) who revealed that camel milk is predominantly marketed by women in Puntland, Somali, implying that increasing the competitiveness of the camel milk though value addition in Eastern Africa would have high importance at enhancing female milk traders empowerment, food security and poverty alleviation in arid and semi-arid parts of sub-Saharan Africa.

The mean household characteristics by camel milk market outlets are provided in Table 2. The mean age of market participant pastoralist and agro-pastoralist who used the consumer, assembler, commission agent and retailer market as marketing outlet had 41 years, 43 years, 46 years and 46 years, respectively. This implied that those respondents who sold their camel milk to the consumer were slightly younger than those who sold at the other channels. This reveal that younger people tend to market their produce at distance urban markets to reap the full benefit of price margin which goes to milk marketing middleman, even by taking the risk and transaction cost associated with trading milk in the urban market as selling camel milk via profitable channels can lead to investment in productive assets and new agricultural technology (Jensen, 2010).

Households with few numbers of children below five years old marketed their camel milk though consumer milk marketing outlet, other than assembler, commission agent and retailer because as the number of children below five years old reduce the time allotted to market milk at distance urban markets would be better off. The mean dairy farming experience was highest for pastoralist and agro-pastoralist who had access to assembler, retailer and commission agent milk market channel outlet, with 43 years, 46 years and 46 years, respectively. The main reason for this is that, most of the experienced camel milk producers had informal business tie with the milk purchaser locally called '*maamilla'* which mean customer. Most of the time experienced dairy producers do not sell camel milk unless the buyer is their customer, as this experienced dairy producers also market their camel milk in return to sugar and salt with their '*maamilla'*, and even at credit base.

The average distance traveled to the nearest urban milk market was lowest to households who had access to direct consumer channel outlet (13 km), compared to pastorals/agro-pastorals supplying to retailers outlet (20 km) and commission agent outlet (26 km). This reveals that most of the time commission agent collect camel milk from pastorals and agro-pastoralist who residence is far from town as wholesalers own track to collect and transport the camel milk to Somali land. Moreover, the research pinpointed that, the average price offered by commission agent market outlet was 5.59 Ethiopia Birr per liter, which is higher than the price offered by other market outlets as commission agent purchase camel milk in large quantity and good quality, which would be exported to Somali land.

Table 2: Mean household characteristics by camel milk market outlets

Variables	Consumer	Assembler	Commission Agent	Retailer
	Mean	Mean	Mean	Mean
Age	41(9.7)	43 (11)	46 (13.7)	46 (16.6)
Children's (<5 years)	1(1.2)	2 (1.8)	2 (1.3)	2 (1)
Experience	18(13.4)	21 (15)	24 (15)	25 (17)
Distance	13(6.8)	13 (11)	26 (18)	20 (10)
Number of milk camel	6 (1.14)	15 (2.4)	13 (2.7)	8 (1.8)
Quantity of milk sold	10(9.6)	21 (15)	24 (21)	12 (12.7)
Income from non-dairy	6038(6369.3)	6494 (12057)	1384 (2448.8)	2822 (3380)
Family size	7(3.3)	8 (5)	8 (4.5)	7 (3)
Selling price/liter	5.38 (0.15)	4.88 (0.15)	5.59(0.19)	4.93(0.2)

Source: Field data analysis, 2012/2013

The mean dairy camel ownership of households who had access to consumer, assembler, commission agent and retailer milk market outlets was 6, 15, 13 and 8 numbers, respectively. This reveals that households that owned a large number of dairy camels accessed assembler and commission agent milk market outlet because of the two-channel purchases a large amount of camel milk, especially the commission one because the camel milk purchased by commission agent is supplied to wholesalers who export camel milk to Somali land. The same holds for the quantity of camel milk sold, as we can observe that the largest amount of camel milk quantity was sold at commission agent milk market and assembler milk market channel with the mean value of 24 liters and 21 liters, respectively. The lowest quantity of camel milk was supplied to consumer milk market channel outlet with the mean value of 6 liters.

© 2018 Global Journals

Households with high income tend to sell their camel milk to assembler and the consumer channel outlet, with the mean value of 6494 and 6038 Ethiopia Birr, respectively. Households with lower income from nondairy source choice to sell their milk at the commission agent and retailer marketing channel outlet with the mean value of 1384 and 2822 Ethiopian Birr, respectively. The mean family size by camel milk market outlets was 7, 8, 8, and 7 with individual consumer, assembler, commission agent and retailer, respectively. The mean household size for households who accessed consumer and retailer milk market outlet was higher than the mean household size reported by Berhabu et al., (2013) for Woliata zone cow milk-shed.

The proportion of household characteristics by camel milk market outlets is given in Table 3. In term of education level, the result indicates that out of the educated respondents the market participants who used the consumer, assembler, commission agent and retailer channel outlet were 51.85%, 22.22%, 7.41% and 18.52%, respectively. It is evident that camel milk participants who sold their milk at consumer outlet had a higher percentage than others channel outlet, this was because of the fact that education enhanced milk market participant ability to perceive the high level of returns from urban milk market. Hence, there is a need to improve the dairy farming pastoralists educational level to enable them to make an informed decision on camel milk marketing channel outlet they choice.

Table 3: The proportion of household characteristics by camel milk market outlet

Variables		Consumer	Assembler	Commission Agent	Retailer
		Percentage	Percentage	Percentage	Percentage
Education status of HH	Uneducated	20	41.54	20	18.46
	Educated	51.85	22.22	7.41	18.52
Access to livestock Extension	Yes	37.5	21.88	9.38	31.25
	No	25	43.33	20	11.67
Access to milk market information	Yes	36.62	30.99	15.49	16.9
	No	4.76	52.38	19.05	23.81

Source: Field data analysis, 2012/2013

Out of the households who had access to livestock service 37.5%, 21.88%, 9.38% and 31.25% of households had accessed individual consumer, assembler, commission agent and retailer camel milk market outlets, respectively. In terms of milk market information, the result reveals that out of the sampled respondents who have milk market information 36.62%, 30.99%, 15.49% and 16.9% sold their milk at consumer, assembler, commission agent and retailer market outlet, while out of sampled respondents who had no market information only 4.76% sold their milk at consumer channel outlet. This reveals that the majority of market participants who sold at urban market directly to consumers had access to price information.

d) Determinants of Camel milk market channel choice

Out of eleven variables hypothesized to influence camel milk market channel choice, six variables were found to be significant. Table 4 presents the Multinomial logit estimates for the hypothesized variables.

Education status of the household head was positively related to a household choice of consumer channel outlet over assembler dairy marketing channel, at 5% significance level. This reveals that education increased the household likelihood of selling its camel milk through the consumer outlet over the assembler by 29.5 percent. This result is in agreement with the finding of Mamo and Degnet (2012), who revealed that educated farmers preferred selling to an actor that offered better prices.

Having access to livestock extension services is significantly associated with high probability of selling camel milk to the retailer channel as opposed to assembler channel. The possible explanation could be retailer supply camel milk to hotels, restaurants, and urban consumers with good quality. Only pastoralist and agro-pastoralist who had training on camel milk handling through extension services were able to sell their camel milk through retail channel over assembler channel. The marginal effect shows that the likelihood of accessing retailer milk market outlet increases by 35.5% as compared with assembler milk market outlet for one more member access to livestock extension services.

© 2018 Global Journals

Table 4: Multinomial logit estimates and marginal effects for factors influencing the choice of marketing channels

Explanatory Variable	Direct to Consumer		Commission Agent		Retailer	
	Coef.	dy/dx	Coef.	dy/dx	Coef.	dy/dx
AG_HH	0.015	0.002	0.022	.0009	0.038	0.005
EDL_HH	1.774**	0.295**	0.014	-0.053	0.575	-0.002
HH_MM5_YR	-0.542	-0.072	-0.117	0.006	-0.248	-0.017
EXP_LIV_PRO	-0.009	-0.0005	0.011	-0.0006	0.014	-0.002
LV_ESV	1.893**	0.138	0.523	-0.057	2.562***	0.355***
DS_MLK_MRK	0.006	-0.005	0.096***	0.007*	0.1**	0.015**
N_MLK_CAM	-0.138*	-0.015	-0.975	-0.004	-0.105	-0.01
MRK_IFF	3.092***	0.296***	0.413	-0.006	0.244	-0.049
Q_MIK_SOLD	-0.028	-0.004	0.049	0.006	0.024	-0.004
N_NOND	0.0013*	0.00003***	-0.003*	0.00003***	-0.0005	-7.74e-06
FS_HH	-0.708	-0.016	0.12	0.012	0.06	0.104
_cons	-2.343		-3.463		-3.305	
Number of obs.=92						
LR chi2(33)=81.80						
Prob> chi2=0.0000						
Pseudo R2=0.333						
Log likelihood= -81.945						

Source: field data analysis, 2012/13

Contrary to the expectation, *distance to market* positively influenced the likelihood that sampled pastoral and agro-pastoral will choose commission agent and retailer over the base channel outlet (assembler) at 0.7% and 1.5%, respectively. A plausible explanation for this is that household who were far from market places preferred to sell their camel milk to commission agents because commission agents collect milk from distance place. The results are consistent with findings by Moturi et al., (2015).

There was a positive relationship between choice of direct consumer market channel and access to market information. The result of the study reveals that access to market information increased the household likelihood of selling its camel milk through the direct consumer outlet over assembler by 29.6 percent, it is significance at p-value of 1 percent. The finding is in line with that of Geoffrey (2015), who revealed that increase in price information had a positive influence on the choice of selling pineapple the local market channel.

Income from nondairy source is significantly associated with a high probability of choosing direct consumer and commission agent market as compared to selling to assembler channel. The probability of choosing direct consumer and commission agent milk market channel as opposed to selling to assembler channel increases for every unit increase in the household nondairy income by 0.003% for both consumer and commission agent channel over the assembler channel outlet, it was highly significant at 1% level for both channels.

IV. Policy Implication

Using household data from Ethiopia, we have examined pastoral and agro-pastoral milk market channel choice to sell their camel milk, and based on the study result the following policy implications were forwarded for future intervention to improve the camel milk market in Eastern Ethiopia.

In the study area camel milk marketing lack inadequate horizontal and vertical integration among pastoralists and agro-pastoralists milk producers, milk assemblers, retailers, and commission agent. Sampled pastoral and agro-pastoral households supplied their milk through traditional marketing channels such as assembler channel (35.87%), direct consumer channel (29.35%), retailer channel (18.49%) and commission agent channel (16.3%), even though pastoral and agro-pastoral have social capital which is based on informal collective action institutions. However, though exploiting the indigenous knowledge of eastern Ethiopia pastoralists and agro-pastoralists such as "*affosha*", (informal types of group which supply camel milk to one another by grouping themselves up to 10 persons) and "*maamilla*" (customer based camel milk selling) it would be easy to cording and form horizontal and vertical integration among the pastoralists to enhance institutional arrangement which is based on endogenous knowledge of the pastoralist society. As organizing such informal institution into formal one such as cooperative and modern marketing channel have a great advantage to attaining competitive edge by forming a strategic alliance in the camel milk marketing channel.

As most of the milk trader who operates in all milk market outlets are females, improving milk trading practice through vertical and horizontal linkage based on endogenous knowledge would empower the female milk trader and enhance their capacity, especially the value addition one. Therefore there is a need to develop gender smart intervention approach to consider gender as a core process in the camel milk value chain, as such

© 2018 Global Journals

intervention brigs gender gap in the arid and semi-arid area of eastern Ethiopia.

Despite the lack of coordinated marking channel in the study area, the assemblers channel has remained the most prevalent marketing channel for the sampled pastoral and agro-pastoral households. Hence, it would be important to enhance the existing tradition marketing channel into better existing profitable market channel, i.e. in our case to the direct consumer channel and commission agent channel to empower the pastoralist and agro-pastoralist camel milk producers and to reduce poverty.

The Multinomial logit model result reveals that compared to accessing assembler milk market channel outlet, the likelihood of accessing direct consumer market outlet was higher among educated households, as educated farmers preferred to sell to an actor that offer a better price. The likelihood of accessing retailer market channel outlet was higher for households who had access to livestock extension serves over the assembler channel outlet. The possible explanation could be as retailer supply camel milk to hotels, restaurants and urban consumers at good quality, respondents who gone training on camel milk handling though training services were able to sell their camel milk. Compared to accessing the assemblers milk market channel outlet the likelihood the respondents choose commission agent and retailer outlet increases by 0.7% and 1.5%, respectively. A plausible explanation is that, household who were far from market place had not alternatives rather than selling to commission agent. The other factors which affected, milk market channel choice by sampled respondents were income from nondairy source and market information. The result of the study reveal that, access to market information increased the household likelihood of selling its camel milk through the direct consumer outlet over assembler by 29.6 percent. Therefore, as one of the key factor to boost camel milk market outlet choice, dairy extension services, camel milk collection center at distance place, information dissemination through formal source should be strengthened.

Acknowledgements

This work was financially supported by Italian contribution to the Education Sector Development Program (ESDP) - Postgraduate program (PGP) Haramaya University.

References Références Referencias

1. Alemu, E., Erik, M., Miet, M., Jozef, D., Kidanemariam, G., Hans, B., Kindeya, G., 2012. Vertical Coordination in the Local Food Chains: Evidence from Farmers in Ethiopia. International Journal of Economics and Finance Studies 4 (1): 11-20.
2. Amaha, K., 2003. Pastoralism and the need for future intervention in pastoral areas of Ethiopia. Annual Review on National Dry Land Agricultural Research Systems, Addis Ababa, Ethiopia.
3. Andualem, T., 2015. A review on cattle husbandry practices in Ethiopia. International Journal of Livestock Production, Vol. 7(2): pp. 5-11.
4. Arrowal, RP, Beniwal, R., Kochar, Dt., Tutaja, FC, Ghorui, SK., Sahui, MS., and Sharma, S., 2005. Camel milk as an adjunct to insulin therapy improves long-term glycaemia control and reduction in doses of insulin in patients with tye-1 diabetes A I year randomized controlled trail. Diabetes Res. Clin. Pract. 68: 17.
5. Bardhan, D., Sharma, M.L., and Saxen, R., 2012. Market participation behavior of smallholder dairy farmers in Uttarakhand: A Disaggregated Analysis. Agricultural Economics Research Review, Vol. 25 (No. 2), pp. 243-254.
6. Bedilu, D., Hussien, H.K., and Adem, K., 2015. Structure, conduct and performance of marketing chains: The case of milk marketing among pastoralists and agro-pastoralists of Eastern Ethiopia. Glob. J. Agric. Econ. Ext. Rural Deve, Vol. 3(3), pp. 206-213.
7. Berhanu. K., Derek, B., Kindie, G., and Belay, K., 2013. Factors affecting milk market outlet choices in Wolaita zone, Ethiopia. African Journal of Agricultural Research, Vol. 8(21). Pp. 2493-2501.
8. Bekele, T., Zeleke, M., and Baars, R.M.T., 2002. Milk production performance of the one humped camel (Camelus dromedaries) under pastoral management in semi-arid eastern Ethiopia. Livestock Production Science, Vol 76, 1-2, pp 37-44.
9. Bezabih, E., Mengistu, K., Mutimba, J. K., and Jemal, J., Factors affecting market outlet choice of Potato production in Eastern Hararghe zone, Ethiopia. Journal of Economics and Sustainable Development, Vol. 6, No. 15.
10. Central Statistical Agency (CSA), 2015. Agricultural sample survey 2014/15 Volume VII. Report on Crop and Livestock Product utilization for private peasant holdings, meher Season, Statistical Bulletin 578, CSA, Addis Ababa, Ethiopia.
11. Ethiopian Agricultural Research Organization (EARO), 2003. National pastoral an agro-pastoral strategic research planning document, Addis Ababa, Ethiopia.
12. Ethiopian Economic Association (EEA), 2004/05. Transformation of the Ethiopian Agriculture: Potentials, Constraints and Suggested Intervention Measures. Report on the Ethiopian Economy. Vol. IV 2004/05. Addis Ababa.
13. Falkowski, J., Malak-Rawlikpwska, A., and Milczarek-Andrzejewska, D., 2008. Dairy supply chain restructuring and its impact on farmers'

© 2018 Global Journals

revenue in Poland. 12th Congress of the European Association of Agricultural Economists-EAAE 2008.
14. FAO, 2010. Food and Agricultural Organization of the United Nations (FAO). Production yearbook, Vol. 56. Rome 432 p.
15. Felleke, G., 2003. A Review of the Small Scale Dairy Sector-Ethiopia. FAO Prevention of Food Losses Program: Milk and Dairy Products, Pos-harvest Losses and Food Safety in sub-Saharan Africa and the Near East. Retrieved on April 10, 2010 from http://www.fao.org/ag/againfo/projects/en/pfl/documnets.html
16. Frank, E. M., Edilegnaw Z. W., and Lloyd J. S. B, 2017. The welfare impacts of market channel choice by smallholder farmers in Tanzania, development in practice, 27: 7, 981-993, DOI: 10.1080/09614524.1353066.
17. Geoffrey, S. K., Hillary, B. K., Jonah, E. U., and Timothy, O. O., 2015. Factors Influencing the choice of marketing outlets among small-scale Pineapple farmers in Kericho. International Journal of Regional development, Vol. 2, No.2, doi:10.5296/ijrd.v2i2.6237.
18. Green, W.H., 2002. Econometric analysis 5th ed. Upper Saddle River: Prentice hall, pp. 285, 291, 283, 306.
19. International Authority on Development (IGAD) Center for Pastoral Area and Livestock Development (ICPALD), 2013. The Contribution of Livestock to the Ethiopian Economy. Policy brief No: ICPALD 5/CLE/8/2013.
20. Jensen, R.T., 2010. Information, Efficiency, and welfare in Agricultural markets. Agricultural Economics 41 (1): 203-216.
21. Ketema, M., Aman, A., Seifu, E., Getachew, T., Hawaz, E., and Hailu, Y., 2016. The dairy value chain and factors affecting choice of milk channels in Harar and Dire Dawa area, Eastern Ethiopia. Review of Agricultural and Applied Economics, Vol. 19 (2), pp. 10-18, Dio: 10.1514.
22. Khan, H., Hussan, A.I. and Aslam, M., 2004. Evaluation of cheese prepared by processing milk. Pakistan Journal of Zoology, 36, 323-326.
23. Mamo, G., and Degnet, A., 2012. Patterns and Determinants of livestock farmers' choice of marketing channels: Micro-level evidence. Working paper No. 1/2112. Ethiopian Economic Association/Ethiopian Economic Policy Research Institute.
24. Mukiama, B. K., Suphanchaimat and, N., and Sriwaranum, Y., 2014. Factors influencing vegetable farmer's choice of marketing channel in Khon Kaen, Thailand. KHON KAEN AGR. J., Vol. 42 (4), pp. 595-604.
25. Mutura, J., Nyairo, N., Mwangi, M., and Wambugu, S. K., 2015. Vertical and Horizontal Integration as determinants of market channel choice among smallholder dairy farmers in lower central Kenya. Asian Journal of Economics and Empirical Research, Vol. 2. No. 2, pp. 83-90.
26. Moturi, W. O., Obare, G. A., and Kahi, A. K., 2015. Milk marketing channel choices for enhancing competitiveness in the Kenya dairy supply chain: A multinomial Logit Approach. International Conference of Agricultural Economics (ICAE), 29th Milan Italy 2015, Universita Degli Studi Di Milano, August 8-14, Agriculture in an interconnected world.
27. Nori, M, 2010. Along the Milky Way: Marketing Camel Milk in Puntland, Somalia. European Journal of Development Research, Vol. 22, 5, 696-714.
28. NBE (National Bank of Ethiopia). 2005/06. Annual Report.
29. Riziki, M. J., Mlongo, M. P., Mwanarusi, S., Agnes, N., and Ipomai, O. S., 2015. Determinants of choice of marketing outlets for African indigenous vegetable among the Agro-pastoral Maasai of Narok and Kajaiado countries of Kenya. Journal of Economics and Sustainable Development, Vol. 6, No.8, 2015.
30. Saima, I., Arian, M. A., Khaskheli, M., and Malik, A.H. 2003. Study on the effect of processing on the chemical quality of soft unripened cheese made from camel milk. Pakistan Journal of Nutrition 2, 102-105.
31. Simenew, K., Dejen, T., Tesfaye, S., Fekadu, R., Tesfu, K., and Fufa, D., 2013. Characterization of camel production system in Afar pastoralists, North Eastern Ethiopia. Asia Journal of Agricultural Science, Vol. 5(2), pp. 16-24.
32. Sisay, F., and Awoke, K., 2015. Review on production, quality and use of camel milk in Ethiopia. Journal of Fisheries and Livestock production 2015, 3:3 http://dx.doi.org/10.4172/2332-2608.1000145
33. Wooldridge, J., 2006. Introductory Econometrics. A Modern Approach. 3rd Edition. South Western College publishing.
34. Xaba, G. B., and Masuku, M. B., 2013. Factors affecting the choice of marketing channel by vegetable farmers in Swaziland. Sustainable Agriculture Research, Vol. 2, No. 1; 2013.
35. Yagil, R., 1982. Camels and Camel Milk. Animal Production and Health Paper No. 26. FAO, Rome, Italy.
36. Yagil, R., Zagorski, O., Van, C., Crevel, C., and Sarah, A., 1994. Science and Camel's milk production (some keys for nutrition and marketing), Ed. Saint Marin, G. Expansion Scientifique Francais, Paris, 75-89.
37. Yesihak, Y., and Bekele, T., 2002. Socio-economic importance of camel in Ethiopia: An overview.

© 2018 Global Journals