DETERMINANTS OF MARKET PRICE OF GOATS IN CASE OF ASSAYITA MARKET, AFAR REGION, ETHIOPIA

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Abstract: *The main objective of the study is to analyze the determinants of market price of goats in case of Assayita market, Afar region, Ethiopia. Specifically the study attempted: to examine the impact of animal characteristics (like weight, age, sex, and body condition)on market price of goats; and to analyze the effect of market characteristics(like time of the transaction, the purpose of the buyer and seller type) on market price of goats in the study area. For the purpose of this study the primary data were collected through structured observation of animal and market characteristics by researcher. Also the secondary data that used for this study, collected through inspection of reports of some identified federal and regional government institutions and websites. For the observation purpose 320 goats were selected purposely on the bases of their characteristics. For data analysis econometric methods of data analysis were employed to meet the objective of the study through the help of STATA 10 software package. Finding of the study shows that, animal characteristics (weight, age and body conditions), and market characteristic (seller type) had a significant effect for the variation of goat's market price in the study area.*

Keywords: Goats, Marketing, Traders, Afar, and Price

INTRODUCTION

The livestock population of Ethiopia is believed to be one of the leading in Africa and the largest in the world having 49.3 million cattle, 25.02 million sheep, 21.88 million goats and 38.13 million other animals (NABC, 2010). However, as a result of inefficient pricing performance the income generating capacity of livestock and livestock products as compared to its huge potentials in the country has not yet been exploited (NABC 2010; PIF, 2010).

Afar region had a large number of livestock population; from which goats cover more than half of livestock population. Farmers in Afar region had total 1,853,798 cattle, 2,804,222 sheep, 4,467,901 goats and 570,581 camels (CSA, 2013; Roy B, 2010; BOFED, 2009; LDMPS,

2006). However, the region is one of the poorest and least developed regions of Ethiopia. However, as a result of poor marketing performance the existing income generating capacity of this animal as compared to its enormous potential in the region is not encouraging (Tesfaye, 2009). Since many of the pastoralists in Afar Region hold most of their wealth from goats, markets for this animal exert a great influence on their livelihoods, both in establishing their assets and by affecting herd management decisions.

Marketing efficiency is an important commonly used measure of marketing performance. Having an improved (efficient) marketing system is a common wish of farmers, marketing organizations, government, consumer and society in general. The aspects of market efficiency concern how accurately, effectively, rapidly and freely the market system make price, how much goods and services are provided at a minimum average cost to the market. Higher efficiency means, better performance, while lower efficiency expresses poor performance (Thegay, 2015). The question of whether a market is efficient, or not, where the inefficiencies lay, is crucial to price evaluation. If markets are, in fact, efficient, the market price is the best evaluator of value, and the process of assessment becomes one of justifying the market price (Dillon, *et al, 2013*).

However, goats are generally traded by 'eyeball' pricing, and weighting is uncommon in the study area. In goat marketing system, price agreement reached by a long one-to-one bargaining between a seller and a buyer. Under such circumstances, price paid frequently reflected by buyers preference for various animal characteristics (weigh, age and body condition), the purpose of animals purchased (for resale, slaughter, or consumption), type of seller (farmer or trader) and time of sale (early morning, morning or afternoon) (Suiter, 1994; Desta, 2009).

Regarding to this the traders and producers faced many challenges which hinder them to run their business in full confidence like other business, which in turn highly damage the while market effectiveness of especially in goats marketing system(Ali, 2013). For instance, the price of grain remains stable for some periods even in different market places, while the price of goats can show variation in the same market place and in the same market day. Even, when the underlying price of goats' product (like meat and hides) remains stable, the price of this animal can vary sharply (Chris, 2001). This subjective and unstable practice typical exposes goat's producers and traders to greater risk than crop producer and traders

face. Therefore, pastoralists cannot exploit the high potential from market participation for their welfare(Thegay, 2015). As a result of which, poverty, especially low cash-income, small-scale production and poor living standards still dominate in pastoral areas of the Afar Regional state, while the economic gap between the rural and urban, becomes larger and larger.

However, the current information in the region on factors determining goats price is poor and inadequate for designing pricing procedures, policies and institutions expected to improve the livestock marketing system in the Afar region(Ali, 2013). This study is, thus, tried to identify the factors that have a significant contribution for inefficient pricing condition and price instability in goats marketing system in afar regional state. Therefore the study were attempted to fill the existing information gap on the subject.

OBJECTIVE OF THE STUDY

The General Objective

The general objective of the study is to analyze determinants of market price of goats in case of a far national regional state, Ethiopia

Specific Objective

1. To examine the impact of animal characteristics that determine market price of goats

2. To analyze the effect of time of the transaction, the purpose of the buyer and seller type on market price of goats.

MATERIALS AND METHODOLOGY

Description of the Study Area

Afar is one of the nine ethnic divisions of Ethiopia and contains the homeland of the afar people located in north east Ethiopia stretched from the north Danakil depression to south lowland Awash valley sharing international boundaries with Eritrea and Djibouti. The regional temperature is usually high and range from 12^0c to 48^0c.May, June and July are the hottest months and January and February the coldest months (BoFED, 2009).

The study took place in assayita market, in Assayita woreda, one of 32 woredas in Ethiopia's Afar region (Figure 1), with field data collection within one month, November, 2016. Assayita is in southeastern Afar, 70km from the regional town of Samara and 640km from the national capital, Addis Ababa. Asaita has 11 rural kebeles and two town kebeles. Seven

of the rural kebeles are agropastoralist and have both animal production and crop production areas; the other four are pastoralist kebeles, dedicated to animal production only. The woreda's total land area is 1678.28km2 (WoPARD, 2004) as sited Gebremariam, (2015).
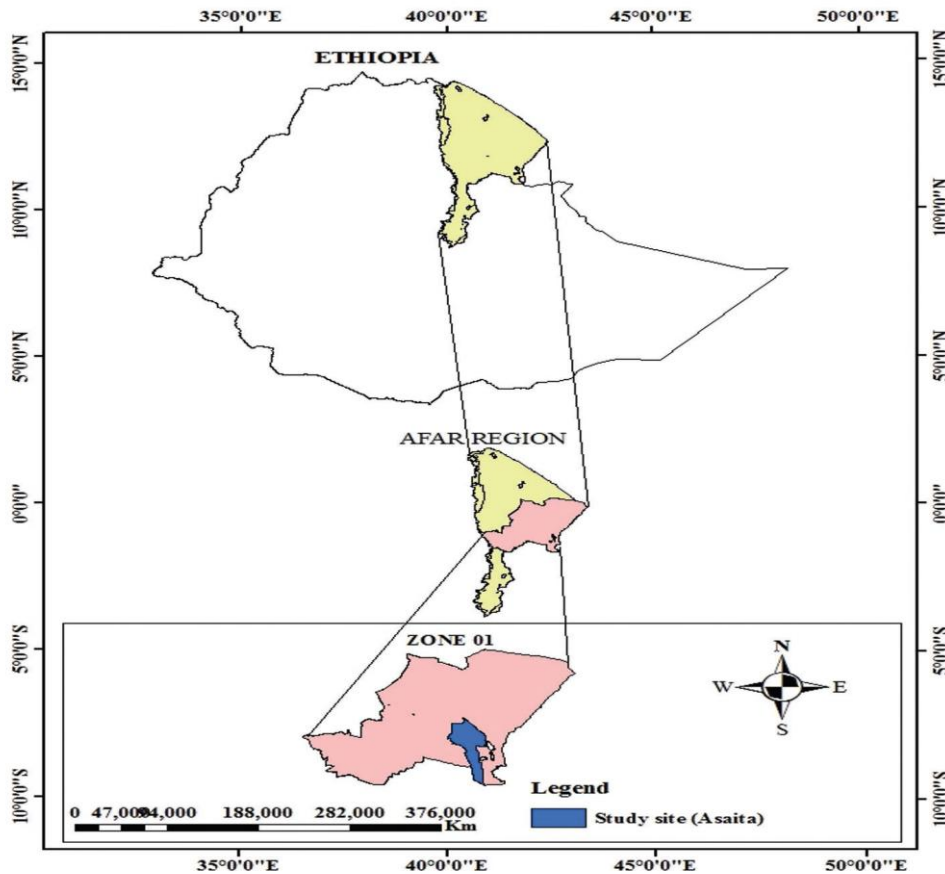

Figure 1. Map of study area

Data Type and Sources

This study adopted mainly quantitative research approach. The quantitative approach has several advantages. As it is highly structured, it can allow for cost efficient and less boring data. It also allows for the computation of statistics from which the interpretation easily drowned (Greener, 2008).For this study both primary and secondary data were used. The primary data were collected through structured observation and interaction with market participants on different variables like age of the animal, general body condition of animal, animal sex, weight of animal, time of transaction, seller type, purpose of buying and time of transaction. Secondary data were collected through the inspection of different federal and regional government offices reports an website.

Data Collection and Instrument

For the study data were collected mainly from primary sources. Primary data were gathered through and structured observation of marketing characteristics (seller type, time of transaction and purpose of buying) and animal characteristics (like weight, age, sex, and body condition) within one month November, 2016. Therefore 312 animal observations were conducted to generate data for econometric analysis. The accomplished survey forms were collated, and statistically analyzed and interpreted.

Data Processing and Analysis

For data analysis econometric methods of data analysis were employed to meet the objective of the study. Therefore, for the analysis of data the pre-coded data of the research were entered to gather into a computer and analyzed using STATA 10 software package.

Specification of the Model

There are a number of statistical models have been developed that help to study the effect independent variable on the dependent, when the independent variables are any mix of qualitative or quantitative predictors. The specification of the model depends on the character of the dependent variable. In the most popular cases, for binary (discreet) dependent variable we use "logistic regression" or the probit models and for continuous dependent variable we can use ordinary least squares (OLS) method.

For this study, as the dependent variable price per kilogram of live weight of the goat in Birr (P) is continuous, ordinary least squares (OLS) method was used in order to identify animal and market characteristics that influence variations in goat's prices and evaluate their relative importance. In statistics, ordinary least square (OLS) is a method for estimating the unknown parameters in a linear regression model. According to Gujarati (2003) OLS is the most widely used technique.

The model specified in this study has the following form:

$$P = \alpha_0 + b_1 W + \sum_{i=2}^{4} b_i A_i + \sum_{i=5}^{8} b_i B_i + \sum_{i=9}^{12} b_i Pb_l + \sum_{i=13}^{15} b_i T_i + \sum_{i=16}^{17} b_i S_i + \sum_{i=18}^{19} b_i Ts_i + e_i - - - - - - 2$$

The dependent variable (P) is price per kilogram of live weight of goats in birr.

α_0 is an intercept term (the average price of livestock for respective variable)

b_1 is coefficients of continuous variable weight.

b_2 to b_{19} refer to the coefficient of dummy variable measures the difference in intercept, which will be the premium or discounts associated with the given base variables W, A, B, Pb, T, S and T's are independent variables such as Weight, Age, Body condition, Purpose of buying, Time of transaction in the market day, Sex of animal and Type of seller respectively

e_i is a disturbance term (with mean zero and constant variance and zero covariance.)

The overall goodness of fit of the regression model is measured by the coefficient of determination (R^2). It informs us what proportion of the variation in the dependent variable, or regress and, is explained by the explanatory variable. R^2 lies between 0 and 1, the closer it is to 1, and the better is the fit. After overall significance of the model checked, the t-test was used to see the individual coefficient of the dummy variable i.e. premium or discount relative to the base. The insignificance of the coefficient of each dummy variable of the group means that there is no difference between the dummy with which the premium or discount associated and the dummy in the base.

Operational Definitions of the Variables with their Respective Hypothesis

Market Price of Goats: the variable selected for the econometric analysis of price is a continuous variable representing the observed price per kilogram live weight. Price per kilogram live weight will be used as a dependent variable for price analysis following the previous studies undertaken on the subject by (Thegay, 2015;Asfaw*et al,* 2011; Teressa, 2006). The price per kilogram model is preferred in terms of useful market information than price per head in order to alleviate variation in price due to weight.

Market Prices of goats frequently affected by their characteristics/attributes (such as weight, age, sex body condition), market characteristics and buyer purpose and type of seller. It is a central measure of market efficiency of livestock; so as it is a good indicator of goat market performance. The assumption here is that goats' market pricing practice in the region is unfair and instable.

The variables that cause price variation in goat marketing system, which selected for econometric analysis, include a set of continuous variable and discrete variables in the form of dummies. Accordingly, the empirical model was built using the data collected for the variables listed below. The associated hypothesis for respective variable is also presented.

Weight: Is the live weight of the goat which is an important factor to explain the price variation among animals in each marked due to the lack of weighting facilities in the market.

This variable used as a continuous variable represented by positive integer value. It was hypothesized that as the animal gets heavier its price increases. The weight of the goats determined using heart girth weighting scale instrument called mater girth Predicting the body weight of goats from a measurement of their heart girth is easy and accurate (Slippers *et al*, 2000).

Age: is the number of years since the time of birth that the animal has arrived at the time of the survey. For this study it was used as discrete dummy variable having three classes namely immature (less than 2 years), young (2-4) years, and matured (greater than 4 years). It represented in the model by 1 and 0, 1 when the case appears and 0 otherwise. Age is an important variable in explaining variation in goat's price. It was hypothesized that if the age of goat increases the price of goat will increases positively in all markets using immature as a base variable. Age of goats can be determined by the type and number of teeth erupted

Animals Body Conditions: represent the fatness of animal body condition. The variable is important in explaining the variation in price depending on the body condition of the animal. This is because animals with different body condition are used for different purpose in different markets and the price may vary depending on the degree of fatness of animals. This variable used as a discrete dummy variable by having four classes very thin, fat, and very fat based on some characteristics it was represented in the model by 1 and 0,1 when the case appears and 0 otherwise. It was hypothesized that price of goats increases with the improvement of body condition using very thin as a base variable. Body condition of goats' determined by observing the condition of certain physical features of goats like back bone, hipbone, ribs, and tail.

Buyer's Purpose: Refers to the different purposes that animals are purchased and it is expected to have a significant effect in price in primary, secondary and terminal markets. This variable used as dummy variable having four categories consumption, resell, hotel and restaurant and butchering and each category are represented in the model by 1 and 0, 1 when the case appears and 0 otherwise. It was hypothesized that buyers for home consumption purpose, the expected result is positive and for other purposes it is a negative relation to price. It was determined by identifying most frequently used buyers purpose. These alternatives are home consumption, resell, hotel and restaurant and butchering.

Time of Sale: is about the time of the marketing day on which the animal is sold. It was represented in the model as a dummy variable with three classes, early morning, morning and afternoon. The value assigned to variables is 0 and 1, 1 when the case appears and 0 otherwise. It was hypothesized that in the morning the price of the animal goes down and have negatively coefficient. The possible alternative selling time of sale during the day for this study are early morning, morning and afternoon.

The sex of the animal: there is a significant variation of price due to animal sex. These variables incorporated in the model of this study as a dummy variable having two sexes male and female and assigned a value of 1 and 0, 1 for female and 0 for male. It was hypothesized that the price of male goats is higher in all market than price for female goats. Thus, male are used as the base for comparison of prices for the sex of goats in the assumption of price discount is lower if the animal is male.

Type of Seller: there is a significant variation on price due to the seller is farmer or trader. These variables incorporated in the model of this study as a dummy variable having two types of sellers and assigned a value of 1 and 0, 1 for farmer and 0 for trader. It was hypothesized that the price discount for farmer is higher in all market than traders. So, traders are used as the base for comparison of prices for the type of sellers in the assumption of price discount is lower if the seller is traders.

RESULT AND DISCUSSION

Analysis of Factors Determining Goat Price

As it is clearly stated in the methodology, for this study, as the dependent variable price per kg of live weight of goats in Birr (P) is continuous, ordinary least squares (OLS) method has been used in order to identify animal and market characteristics that influence variations in goats' prices and evaluate their relative consequence. In statistics, ordinary least squares (OLS) is a technique for estimating the unknown parameters in a linear regression model.

Before operating the OLS regression model, all the hypothesized explanatory variables were checked for the existence of multicollinearrity. The study used contingency coefficient (CC) to inspect the degree of multicollinearrity among discrete (dummy) variables. The software known as SPSS 16.0 was employed to compute CC values. The values of CC were ranging between 0.032 and 0.543. In addition to this, pairwise Correlation Coefficients was used to test degree of association among discrete variables with the help of econometric software

known as STATA 10. The values of Correlation Coefficients were ranging between 0.0008 and 0.6672. Hence, multicollinearrity was not a staid problem among discrete variables. The overall goodness of fit of the regression model is measured by the coefficient of determination (R^2). The value of adjusted R-square shows that 77% of the variation in price per head of goats is explained by the explanatory variables included in the model. Hence, the overall model goodness of fit represented by model count R-square is very good. F-value of the model is significant at one percent confidence level.

The second step is an OLS regression of the goat price per kg of live weight. Table 1 blow reports estimation results. The coefficients can be interpreted as percent changes in the price per kilogram bring to a unit change in the respective independent variable.

Table 1: Estimated Parameters of Factors Affecting Goat Price

Price		Coefficient	t-value	P-value
Weight		19.41478	24.93	0.000***
Age	Young	-39.77507	-2.10	0.037*
	Mature	-30.09075	-1.42	0.157
Body condition	Tin	23.93572	1.40	0.162
	Fat	73.05118	4.46	0.000***
	Very fat	84.81061	4.93	0.000***
Purpose of buying	Reseal	17.89481	1.12	0.263
	Butchery	29.921079	0.52	0.602
	Restaurant and hotel	20.01636	1.05	0.295
Time of sale	Morning	7.505304	0.55	0.584
	After noon	13.6867	0.93	0.351
sex	Female	-9.597731	-0.82	0.413
Type of seller	Farmer	-17.3175	-1.49	0.136
Constant		-106.1631	-3.95	0.000***
Adjusted R-squared		0.7720		
F-value at (13, 297)		81.75		
Prob> F-value		0.000***		
Number of observation		312		

***, * and ** indicate statistical significance at the 1%, 5% and 10% level.

Source, Survey Result, 2016

Live Weight of Goats

The results of the regression analysis of price per kg of live weight model indicated that live weight of animals had a significant at one percent confidence level in all sample markets. The coefficient of live weight was positively related to price per kg of live weight showing that, other things remain constant, when the weight of goats increases by 1kg, the price of a

goats increase by 19.41 birr on average. So price increase, as the animals got heavier in weight constant with prior expectation. Teressa, (2006) and Suiter, (1994) also obtain comparative result on their study of 'Seasonal and inter-market differences in the prices of small ruminants in Ethiopia' and 'Determinants of market prices of cattle in the eastern Ethiopia ' respectively. But in the place like Afar region, where there are poor marketing facilities like weighting scales, accurate pricing is difficult. Also from market place observation it is founded that many of the participants use 'eyeball' estimation to determine price in sample market. This implies that, the delivery of services like weighting scales can avoid such kinds of subjective pricing practice.

Age of Goats

Price formation in the goats market transactions studied here takes into account the age factor. Other things being equal, the dummy variables young took negative but significant coefficients suggesting that such animals tend to assume lower prices in relation to immature animals. But old ones received insignificant and negative coefficients in relation to base variable immature. The young goats received lower discount than the old ones. This result proves the prior expectation of the study and the result of Hailemaria*et al,* (2009) on the determinants of livestock prices per kilogram. Having such kinds of information helps the traders and producers to search another market for young once. But in the place like Afar region where market information is very poor, this factor can affect both market performance and producers incentive negatively.

Body Condition of Goats

Body condition of goats has a significant effect on variation in the goat price in the entire sample markets. Other things being equal, the price of goats increases with the improvement of body condition constant with the prior expectation of the researcher. In all sample markets, higher prices were obtained from goats with better body condition than the skinny ones. The dummy variables fat and very fat took positive and significant coefficients suggesting that such animals tend to assume highest prices in relation to very thin. The variable very thin that was the base variable received lower premium than the goats with the thin body condition. In general, goats having a good body condition received relatively higher premium than goats in poor body condition. This result agrees with the hypothesis specified and confirms the findings of Suiter, (1994), Andargachew and Broken

(1993) and Hailemariam*et al,* (2009). However, it is interesting to note that the discount for very fat is higher than that for a fat body condition. This might happen as buyers are more likely to obtain higher price discounts on animals of better body conditions than the poor body conditioned ones for the transactions are not on weight basis. The implication is, delivery of services like weighting scales and practicing standardized grading system can avoid this kind of subjective pricing practices.

Buyer Purpose

The dummy variables recording the purpose of purchase are insignificant, which contradict with prior expectation of the researcher and the findings of Jabbar (1998) and Teressa, (2006). Other things remain constant, the dummy variables magnifying goats bought for resale, butchering and hotel and restaurant buying purposes had insignificant positive coefficients, implying that they exhibited not significant price premiums in relation to the home consumption purpose.

Time of Transaction in Market Day

Other things being equal, the time of day when the transaction occurred has a positive and but insignificant coefficient implying that the variable has no appreciable effect on price of goats. Morning is used as the base for comparison of prices for the time of sale in market day in the assumption of price discount is higher if the time of sale is morning. The model result suggests that there are insignificant price differences at different times of transaction within a given market day, and the magnitude of the coefficient suggests the impact is not all that large. But the positive coefficient of the dummy variable (constant with the finding of descriptive analysis in this study) early morning and afternoon in relation to base variable morning indicate that prices tend to increase at early morning and later hours of the market day. This confirms one or both of the following opinion: first, the most desperate sellers vend and go early or traders who face fixed transport costs and want to have a truck-herd or trek-quota for the day were likely to pay higher prices near the end of the market day. The discussions with some of the sellers during the survey period suggested that most of them were likely to take their animals back home if they do not get the prices they have expected, which would favor the latter interpretation. This unstable pricing practice implies poor performance of the goat's marketing system due to lack of market services like weighting

scales and consistent marketing information. Delivery of services like weighting scales and consistent marketing information helps to avoid such kind of unstable pricing practices.

Sex of the Animal

Females are used as the base for comparison of prices for the sex of goats in the assumption of price discount is higher if the animal is female. Other things being equal, the coefficient of dummy variable representing females was negative but statistically insignificant. Negative coefficient implies that selling female goats results in an insignificant price discount compared to selling male goats. It would appear that there is no significant difference between the price per kilogram received for male goats and that of females. This finding contradicts prior assumption of the researcher and suggests that there is no significant difference in their end product and ends product price like their meat and hide.

Type of Seller

Traders are used as the base for comparison of prices for the type of sellers in the assumption of price discount is higher if the seller is a farmer. Other things remain consistent, the variable recording whether the seller is a farmer exhibits insignificant but negative coefficient constant with prior assumption of the researcher. This implies that farmer sellers are more likely to sell their animals at price discounts compared to trader sellers confirming the hypothesis. This resulting from a relatively weaker farmers' bargaining ability associated with their desire to meet instant cash needs and lack of up to date market information.

In general, these pieces of information are useful in designing appropriate goat pricing as well as goat marketing procedures like provision of facilities like weighting scale, and services like reliable marketing information to avoid unfair goats-pricing practices. These measures could enhance the efficiency of the goat pricing system and consequently improve the livelihoods of producers and incentive of traders.

CONCLUSION

Price per kilogram live weight of goats is influenced by animal characteristics, like age, sex, live weight and body condition that goat price formation takes into account these characteristics. Furthermore, market characteristics like the type of sellers, buyer's purpose and time of transaction in a market day can also affect goat prices. The results of the econometric analysis indicate that animal characteristics (weight, age and body conditions),

and seller type had a significant effect on the variation of the goat's price in the study area. This is mainly because, most goats transactions in the study area done based on 'eyeball' estimation and feeling the body of the animal by hand, which tend to be highly subjective. Providing facilities like weighting scales, services like consistent marketing information and practicing standardized grading system helps to avoid such kind of subjective pricing practices.

REFERENCES

1. Ali Hussein Safeno,2013.analysis of goat marketing in a far/a case study of chifraworeda/ Unpublished M.Sc Thesis, Mekelle University Mekelle Ethiopia.

2. Andargachew, K., Brokken, R.F, 1993. Intra-annual sheep price patterns and factors underlying price variations in the central highlands of Ethiopia. *Agric. Econ.* 8. 125-138

3. AsfawNegassa, Shahidur Rashid, and BerhanuGebremedhin, 2011.Livestock Production and Marketing. Development Strategy and Governance Division, International Food Policy Research Institute – Ethiopia Strategy Support Program II, Ethiopia.

4. AsresuYitayew. 2014. Determinants of the decision to participate in the marketing of goats by rural households in Ethiopia. M.Sc. Thesis, Bahir-Dar University, Bahir-Dar, Ethiopia.

5. BoFED, 2009. Regional Atlas 2: Afar National Regional State. *Finance and Economic Development Bureau*, Semera Ethiopia.

6. Chris B., 2001. Livestock Pricing and Markets Performance. Pastoral Risk Management Project, *The Global Livestock CRSP*, Utah State University

7. CSA (Central Statistical Agency). 2013. Ethiopia Agricultural Sample Survey.

8. DestaHamito, 2009. Estimation of weight and age of sheep and goats, Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP), *Technical BulletinNo.23*

9. GebremariamGebrezgabherGebremedhin and YemiruTesfaye, April 2015, Market chain analysis of live goats, Asaita District, Afar Regional State, Ethiopia.

10. Gujarati, D.N., 2003. *Basic Econometrics*.4th Edition. McGraw-Hill, New York. 563-636p.

11. HailemariamTeklewold, GetachewLegese, DawitAlemu and AsfawNegasa, 2009. Determinants of Livestock Prices in Ethiopian Pastoral Livestock Markets:. *International Association of Agricultural Economists*, Beijing, China.

12. NABC, 2010. Fact Sheet: Livestock Ethiopia. Livestock in Ethiopia and opportunity analyses. *Dutch investment. Netherland as-African Business Council*.

13. PIF, 2010.Ethiopia's Agricultural Sector Policy and Investment Framework. *FDRE, Ministry of Agriculture and Rural Development* 2010-2020.Final Report.

14. S.C. Slippers, B.A. Letty and J.F. de Villiers, 2000. Prediction of the body weight of Nguni goats, South African Journal of Animal Science, 30(Supplement 1)

15. Suiter, J. (1994).*Body condition scoring of sheep and goats. Department of Agriculture, Western Australia.* Farmnote 69/1994

16. TeressaAdugna, 2006. Determinants of Market Prices of Cattle in Eastern Ethiopia, Alemaya University, Contributed paper prepared for presentation at the *International Association of Agricultural Economists Conference*, Gold Coast, Australia, August 12-18.

17. TesfayeBerihun, 2008. Performance Efficiance Analysis of Livestock Marketing in Afar Region Ethiopia. Unpublished MSc Thesis, *University of Mekelle*, Mekelle, Ethiopia.

18. TsegayGebreselassie, 2015.Hedonic price analysis of indigenous sheep and goats traits in eastern and central Tigray, northern Ethiopia Unpublished m.sc thesis, *Haramaya University* Haramaya Ethiopia.