

Determinants of Agricultural Commodity Market Supply

Amare Tesfaw
College of Agriculture and Natural Resources, Debre Markos University
P.O.Box 269, Debre Markos, Ethiopia
Email: yordanoseyuel@gmail.com

Abstract
This study was initiated to achieve the specific objectives as identification of factors that affect market participation decision of households and determination of factors that determine the volume of market supply of pepper. In order to acquire the relevant data, formal and informal methods of data collection were accomplished. To differentiate factors affecting the market participation and the amount of pepper sold, the Heckman Two-Stage econometric model was employed. The outcome equation result revealed that market participation decision of households and amount of pepper sold were significantly affected by many of the variables hypothesized to have impact on the explained variable. In order to settle price fluctuations and to strengthen the bargaining power of producers, there should be a well stated commodity standard that is set at the national level. Furthermore, market competitiveness, structure and efficiency can be improved through facilitating training regarding pepper trading as it help producers and other interested bodies better involve in the commodity market.
Keywords: Heckman two stage model, Inverse Mill's Ratio, Outcome equation

1. INTRODUCTION

Pepper is the world's most important vegetable next to tomatoes and among the vegetables; it is the rich source of vitamins A, C and E. It can be consumed either fresh as vegetable or in powder forms (Bosland and Votava, 2000; Swiader *et al* 1992). Because of its diverse utilization in the modern world, it is sometimes called the king of spices. It rules the spice trade both in terms volume as well as value and contributes about 34% of the total of spice trade by volume (CEDA 2004).

In Ethiopia, pepper is cultivated in many parts of the country and it is an important source of cash earning for smallholder producers. Since the larger proportion of the pepper produced is for market, it takes a significant share of the national income from commodity export.

Pepper is a common ingredient of the daily dish of almost all Ethiopians. People consume pepper for intake enhancement as well as to supplement the dietary household needs.

According to EEPA (2003), red pepper is a major spice and vegetable crop produced by the majority of producers in south, Oromia, and Amhara regions. Despite the significance of pepper in Ethiopian economy and current income generating capacity of pepper as compared to its magnificent potential in the country, it has not been given due attention.

1.2. Statement of the Problem

In Ethiopia, pepper is consumed in different forms. It is unlikely to see Ethiopian traditional meals consumed devoid of pepper. Although farmers allocate relatively big areas for the production of pepper, they are constrained by a lot of problems. Unstable prices and poor marketing practices are reported to prevail in the area. In order to improve the supply of red pepper from the study area, and ultimately to improve the livelihood of households, it is important that the factors that affect the market supply need to be identified.

1.2. Objectives of the Study

The study was designed in achieving the following specific objectives:

1) Identification of the factors that affect market participation decision of households
2) Determining the factors affecting the volume of marketed supply of pepper

2. METHODOLOGY

Jabi Tehinan is one of the 15 districts of West Gojjam administrative zone in Northwestern Ethioia. The district is bordered by Bibugn district to the East, Kuarit to the North, Burie district to the West, Sekela district to the Northwest and Dembecha wereda to the Southeast. Jabi Tehinan is found 374 kms Northwest of Addis Ababa and 171.7 kms south west of Bahir Dar, the Regional State capital. The climate of the district is in general 88% Weina Dega and 12% Kola. The average annual rainfall of the district is 1250mm. Maize, *teff* and wheat are the major crops in the district (BoARD 2009). Topographically, the district is classified as plain land (65%), terrain (15%), valley (15%) and unclassified land (5%). Altitude of the district ranges from 1300 to 2300 masl. The annual mean temperature ranges from 14^{o}C to 32^{o}C.

2.1. Data Requirements and Data Source

Primary data were collected from individual households and concerned organizations. The data were collected from individual interviews. Primary data were gathered from pepper producers, intermediaries of the market

chain, concerned government officials and non-government bodies.

In addition, secondary data such as production area, output, number of farmers producing pepper, number of pepper traders and price of pepper were taken from secondary sources. Secondary data sources include the Bureau of Agriculture and Rural Development (BoARD) and Central Statistical Authority (CSA, 2007; CSA, 2008) of Ethiopia.

2.2. Sample Size and Sampling Design

In general, the decisions involved on sampling procedures and the sample size to be taken are partly the functions of the currently available information, time and other resources available, accessibility and openness of the respondents themselves as well as the estimated size of the target population (Mendoza *et al* 1995).

In order to generate primary data, a total of 120 pepper producing farmers were selected using a two stages random sampling method. In the first stage, 6 Kebele Administrations (KAs) were selected purposively based on their production levels out of the 12 pepper producing Kebeles in the district. In the second stage, based on proportion of population (by taking the list of households from Development Agents' office), 120 sample respondent farmers were selected randomly from each KA in order to have 120 total sample size.

2.3. Methods of Data Collection

Before the beginning of data gathering through interviewing, a three days training was given to four enumerators all of which are diploma holders. These enumerators were frequently supervised and the required data from the producers were gathered using a pre-tested interview schedule.

2.4. Methods of Data Analysis

Econometric analysis has been used for processing the data obtained from the survey. The appropriate econometric models that can help identify the factors affecting the amount of pepper sold to the market and the market participation decision are Tobit or Heckman Two-stage (Gujarati 2004; Heckman 1979). Heckman Two-Stage model was employed because of its advantages over the Tobit model in its ability to eliminate selectivity bias and it separates the effect of variables on the probability of market participation from the effect on the volume of pepper that can be sold (Bellemare and Barrett; Heckman 1979). Using the Heckman sample selection model, the first stage is market participation equation, which helps to identify factors affecting red pepper market participation decision using Probit. Then in the second stage, OLS regression was fitted along with the Probit estimate of the Invers Mill's ratio to identify factors that determine the volume of marketed supply of pepper.

1. The probability of a household's head to participate in supplying will be given by the selection equation as:

$$Y_i = \beta i X_i + \varepsilon i \quad , \qquad (1)$$

Where $\varepsilon_i \sim N(0, 1)$

i= 1, 2, . . ., n.

Y_i = A dummy variable that takes a value of 1 if a household's head has participated and 0 otherwise

β_i = Vector parameter

X_i = Parameters to be estimated in the model

ε_i = Error term and it is normalized to 1 since a farmer who participated is observed and it is assumed to bivariate, and normally distributed (with correlation coefficient, ρ)

2. The amount (intensity) of supply will be given by the following equation by including an estimate of the inverse Mill's Ratio (λ_j) as:

$$Y_j = \beta_j X_j + \lambda_j \mu + \varepsilon_j \qquad (2)$$

where $\varepsilon_j \sim N(0, \delta^2)$

Y_j = the amount of pepper supply and observed if only participation is yes, that is Y_j =1

β_j = Unknown parameter to be estimated in the outcome equation

χ_j = Explanatory variable that can affect the amount of pepper supply

λ = A correction factor for selection bias (Invers Mill's Ratio)

ε_j = Error term, this is assumed to be bivariant, and normally distributed with correlation coefficient , δ^2)

Gujarat (2004) indicated that Variance Inflation Factor (VIF) is used to check multicolinearity among continuous variables. Before fitting important variables in the model it is necessary to test multicolinearity problem among continuous variables and check associations among discrete variables, because it highly affects the parameter estimates. If the value of VIF is greater than 10, the variables are said to be highly collinear.

$$VIF(\chi_j) = (1-R_j^2)^{-1} \quad (3)$$

Where, R_j^2 is the multiple correlation coefficients between explanatory variables, the larger the value of R_j^2, the higher the value of VIF (χ_j) causing collinearity in the variable (χ_j).

The mullticolinearity between discrete variables can be calculated using contingency coefficient. The value ranges between 0 and 1, with 0 indicating no association between the variables and value close to 1 indicating a high degree of association between variables.

$$CC = \sqrt{\frac{\chi^2}{N+\chi^2}} \quad (4)$$

Where, CC - Contingency coefficient,

χ^2 - Chi-square test and

N - Total sample size.

If the value of CC is greater than 0.75, the variables are said to be collinear.

2.5. Hypothesis, Variables formulations and their Definition

Social, economic and demographic data among red pepper producers and traders were used for the study. The dependent and independent variables that were considered are explained below.

2.5.1. Dependent variables

Red pepper market participation decision (MAR_PART)

It is dependent dummy variable which is regressed in the first stage of Heckman two stage model. This variable has a value 1 if the respondent had sold and 0 otherwise.

Amount of pepper supplied to the market (QUAN)

It is continuous dependent variable in the second stage of Heckman two-stage estimation equation that represents the amount of marketed supply of red pepper. It is selected for regression analysis and takes positive value.

2.5.2. Independent variables

The explanatory variables which are hypothesized to affect the above dependent variables are as shown in the following table.

Table 1. Summary of the independent variables considered

Category	Independent variables	Definition	Hypothesized impact of variables	Rationale
Socio-demographic	Sex	0=Male, 1=Female	+ _	Males practice ploughing more than females
	Age	Years	+	Better experience
	Education	Illiterate, read and write, grade 1-4, etc.	+	Better attitude leads to high production and market supply
	Family size	No of males and females with age categories	+	An increase in family size increases labor
Resource ownership	No of livestock	Quantified in terms of tropical livestock units	_	Producers may specialize in this business
	Oxen	Number	+	Ease of cultivation
	Land holding	Hectares	+	Contribute to high production
Service and information access	Access to the market	Kilometers	_	Wastage of time (transport cost)
	Access to extension	1=Yes 0=No	+	Better access, better productions and supply
	Market information	1=Yes 0=No	+	Creates awareness
Yield and non-farm income	Pepper yield	Quintals	+	Increases supply
	Productivity of other crops	Quintal per hectare	_	Producers may focus only on crop production
	Non- farm income	Annual income from non-farm activities	_	Retards pepper production and supply due to specialization

Source: Own survey, 2010

3. RESULTS AND DISCUSSION

3.1. Results of the Heckman Two-Stage Model

Table 2 summarizes the variables determining the market participation decision and volume of marketed supply of red pepper. In order to check the existence of multicolliniarity among the continuous variables, Variance Inflation Factor was used and the degree of association among the dummy (discrete) explanatory variables was investigated by using Contingency Coefficient. The test result indicated that there was no significant multicolinearity or association of variables observed for the test (Appendix Table 1 and 2).

Table 2. Nature of variables analyzed by the Heckman Two-Stage model

Variables	Label	Variable type	Unit of measurement
LAND	Land holding size	Continuous	ha
A_PROD	Amount of pepper produced	Continuous	qt
QUAN	Quantity sold	Continuous	qt
AGE	Age of households	Continuous	Years
DIS_MKT	Distance from the market	Continuous	Km
CRO_YLD	Other crops' productivity	Continuous	qt/ha
FAM_SIZE	Family size	Continuous	Man equivalent
NO_LIV	Number of livestock	Continuous	TLU without oxen
OXEN	Number of oxen owned	Continuous	Number
SEX	Sex of household head	Dummy	Female=0, Male=1
ACC_CRDT	Access to credit	Dummy	Yes=1, No=0
MAR_PART	Market participation	Dummy	Sold=1, No=0
EDU_LEVEL	Education level	Categorical	Leveled as 0, 1, 2, etc.
NONF_INCO	Non-farming income	Dummy	Yes=1, No=0
ACC_EXT	Access to extension service	Dummy	Yes=1, No=0
MKT_INF	Market information	Dummy	Yes=1, No=0

Source: Own survey, 2010

3.1.1. Factors determining the market participation decision of households

In the first stage of Heckman sample selection model, the Probit maximum likelihood estimation method was used to identify factors affecting the market participation decision of households. A number of variables were hypothesized to affect the market participation decision of households. Results of the Probit model showed that out of the 12 explanatory variables that were entered to the model, seven of them, namely amount of pepper produced (A_PROD), age (AGE), access to the market (DIS_MKT), number of livestock owned (NO_LIV), number of oxen (OXEN), education level of households (EDU_LEVEL) and non-farm income (NONF_INCO) were found to significantly affect producers' decision to sell pepper. The results of the Probit model are depicted in Table 3.

3.1.2. Amount of pepper produced (A_PROD)

If households produce large amount of pepper, they will have higher tendency to participate in the market. The result indicated that the market participation decision of households was significantly (at less than 1% significant level) and positively affected by the size of their produce implying that anything which improves the production of pepper would also increase the market participation decision of households. This result is in line with IPC (2009).

AGE

It was hypothesized that the age of producers could determine their willingness to participate positively. This was from the point of view the experience that they could acquire through time. However, the opposite was revealed in the result. The age of households negatively influenced the market participation decision of households at less than 10% level of significance. This is because when households get older and older, they shift to the production of the lesser labor intensive farming alternatives like production of grain crops or they tend to rent out their land. This had in turn reduced their market participation.

3.1.3. Distance from market centre (DIS_MKT)

It was hypothesized that the distance from the nearest market centre could determine their willingness to participate negatively. This was from the idea that farmers whose residences are closer to the market would have more access and higher level of market participation than those who live away from the nearest market centre. The model result revealed that distance of the residence of households' from the nearest market centre negatively affected their market participation decision at less than 5% level of significance. This was because the closer the households' residence to the market, the frequency of visit to that particular market increase as there is no extra transport cost or wastage of time. A one kilometer increase in distance of households' residence from the nearest market centre decreases the probability of market participation decision of producers by 0.7% keeping all other factors constant.

Table 3. Maximum likelihood estimates of the Probit model

Variables	Coefficients	t-ratio	Marginal Effect
LAND	0.9667	1.63	0.5383
A_PROD	0.5176	3.13***	0.8881
AGE	-0.0808	-1.85*	-0.0088
DIS_MKT	-0.2194	2.09**	-0.0070
CRO_YIELD	-0.0301	-0.51	-0.2231
FAM_SIZE	-0.2876	-1.1	-0.1873
NO_LIV	0.2951	2.03**	0.0677
OXEN	-1.2897	-2.21**	-0.1171
SEX	-0.5244	-0.57	-0.5485
EDU_LEVEL	0.8400	2.62***	0.4508
NONF_INCO	1.4170	1.82*	0.3168
MKT_INF	-0.1656	-0.25	-0.1730
CONSTANT	0.7404	0.31	

Note: ***, ** and * indicate significance at 1%, 5% and 10% probability levels respectively
Log likelihood = -17.1365 Number of observations=120 $\chi^2 = 73.86$
Source: Own computation Pseudo R^2=0.6831

3.1.4. Number of livestock (NO_LIV)

This variable affected the decision to sell significantly and positively at less than 5% significant level. This contradicts the original hypothesis which relates the number of livestock possessed in terms of tropical livestock unit. The original hypothesis was that if households own higher number of livestock, the larger portion of their earnings would be from the sale of livestock and their tendency to produce and sell pepper would be low.

In Jabi Tehinan district, farmers who produce cash commodities like pepper and vegetables at a better scale than others are those individuals who have better economical backgrounds. Such people also undertake production of sheep, cattle, and poultry as a means of cash earning better than that of those farmers who are more specialized in cereal and legume crops production. Thus, farmers who produce pepper in large quantities also possess larger number of livestock than households of medium or lower economic status. Generally, when the number of livestock owned by a household increases, income increases which in turn encourages high cost demanding production of pepper, high produce and better market participation. On the other hand, if households possess larger number of animals, they can have sufficient surplus of manure for their pepper field. Thus, the contribution of livestock size to the producers' market participation decision is positive.

3.1.5. Number of oxen owned (OXEN)

The effect of this variable is contrary to what had been hypothesized. The number of oxen possessed by households was found to significantly and negatively affect the market participation decision of households at less than 5% probability level. This is because on one hand, pepper lands are relatively small as compared to that of other crop lands and thus producers can cultivate their field by hoeing using family or wage laborers. On the other hand farmers who own larger number of oxen were those who are relatively at a better economic status. These farmers produce grain crops on larger plots using their oxen and they have low tendency of pepper production as their major income (cash) source is from the sale of livestock and grain crops. This characteristic in turn had reduced their tendency of market participation.

3.1.6. Education level of households (EDU_LEVEL)

It was assumed that producers with better education levels would have better understanding and information about the current market situations relative to others (unlearned). The Probit model result revealed that the education level of households affected the market participation decision of households by a similar manner as the hypothesis. At less than 1% significance level, the education level of households influenced the market participation decision of producers positively and significantly. As the education level of households is improved, their attitude to adopt new technologies and to acquire market information becomes better. This would help them produce more and increases their willingness to sell.

3.1.7. Non-farm income (NONF_INCO)

This variable affected households' decision to sell pepper positively and significantly at less than 10% level of significant. This is just a contrary to the hypothesis set earlier. This is because producers who have income source alternatives from non farming activities are those who relatively have smaller plots of land. They do not produce grain crops at a better scale due to their limited land which is utilized mainly for the production of vegetables including pepper. Their major cash source is from the sale of pepper and income from non farming activities. Thus, this variable was found to have a positive impact on the farmers' market participation decision.

3.2. Factors affecting the volume of the marked pepper

From the Probit estimates, the Inverse Mill's Ratio (Lambda) was calculated and included in the second stage of the selection model in order to determine the factors determining the amount of the marketed pepper. Out of the

variables entered to the model, five of them, namely, amount for pepper produced (A_PROD), productivity of other crops (CRO_YLD), education level (EDU_LEVEL), access to credit (ACC_CRDT) and access to extension services (ACC_EXT) were found to significantly affect the marketed surplus of pepper (Table 4).

3.2.1. Amount of pepper produced (A_PROD)

This variable affected the amount of pepper sold significantly and positively at less than 1% level of significance. This is in line with the idea of Tomek and Robinson (1990) which assumed a positive relationship between the yield and the marketed surplus. Singh and Rai (1998) in their buffalo milk study found that the amount of milk supplied to the market was determined by the quantity produced. When production of pepper in a given year is better, the higher the market supply and the amount of pepper that can be sold to the market. As shown in the model result, a one quintal increment of the amount of pepper produced increases the amount the pepper sold by 0.90qt (other variables held constant). Hence, the amount of pepper produced is one of the major factors determining the volume of the marketed pepper.

3.2.2. Productivity of other crops (CRO_YIELD)

The effect of this variable on the amount of pepper sold was found to be as predicted in the original hypothesis. It affected the dependent variable negatively and significantly at less than 1% level of significance. A similar negative relationship of productivity of other crops with the amount of pepper sols was found by Rhima (2008). If farmers are specialized in the production of other food crops like cereals and legumes, their emphasis to produce and sell pepper will be limited. The result shows that a 1qt/ha increase in the productivity of other crops decreases the amount of pepper sold by 0.22qt. Therefore, in order to improve the amount of pepper produced and the amount of pepper that can be sold to the market, extension activities should focus educating farmers to practice specialized farming.

Table 4. OLS estimates of factors affecting the volume of marketed pepper

Variables	Coefficients	Standard Error	t-ratio	Marginal Effect
LAND	0.5672	0.6673	0.85	0.5672
A_PROD	0.9037	0.045	19.68***	0.9037
AGE	-0.0135	0.0432	-0.31	-0.0135
CRO_YLD	-0.2250	0.0674	-3.34***	-0.2250
FAM_SIZE	0.0591	0.2628	0.22	0.0591
OXEN	0.0392	0.3823	0.10	0.0392
SEX	-0.0944	1.1376	-0.08	-0.0944
EDU_LEVEL	0.5009	0.2670	1.88*	0.5009
NONF_INCO	-0.1780	0.7941	-0.22	-0.1780
ACC_CRDT	-1.9077	0.8676	-2.2**	-1.9077
ACC_EXT	4.2811	1.3631	3.14***	4.2811
MKT_INF	-0.4832	0.9970	-0.48	-0.4832
CONSTANT	6.7533	2.8074	2.41	6.7533
LAMBDA	-1.5032	1.9906	-0.76	-1.5032

$\chi^2 = 758.35$ Number of observations =120

Rho = -0.4374 Sigma = 3.4370

Note: ***, ** and * indicate significance at 1%, 5% and 10% probability levels respectively

Source: Own computation

3.2.3. Education level (EDU_LEVEL)

As Abay (2008), producers who have higher education level have better attitudes towards the new production technologies, input utilization, to actively being beneficiaries of services provided to them. The education level of farmers exhibited a significant and positive effect on the marketed surplus of pepper at less than 10% significant level. As the education level of farmers was increased by one level (illiterate to read and write, read and write to grade 1-4, etc.), the amount of pepper sold increased by 0.50qts. Hence, the education level of farmers is one of the factors which determine the marketed surplus of pepper in the district.

3.2.4. Access to extension services (ACC_EXT)

As hypothesized, better extension access allows farmers to acquire new technologies. At less than 1% level of significance, the volume of pepper sold was affected by access to extension service positively and significantly. As shown in Table 4, when a producer has gets extension service, there is a 4.28qt increase of pepper sold to the market. Thus, to intensify the production level and eventually the amount of pepper marketed, extension service is one of the major determinant factors to be promoted.

3.2.5. Access to credit (ACC_CRDT)

The impact of this variable on quantity sold was found to be a contradiction to the previous hypothesis and the work of Bekele (2001). It was hypothesized that if households have access to credit services, they can have sufficient finance to purchase agricultural inputs or wage for the hired labor in the process of production. The

reason for the expected sign change of the effect of the variable was that in the study area, households who have better access to credit services were those who involve in trading activities than the potential pepper producers. The result showed that access to credit affected the marketed surplus of pepper negatively at less than 5% significance level. When a producer gets credit access, there was reduction in the amount of pepper sold by 1.91qt keeping other variables held constant.

3.2.6. Inverse Mills ratio (LMBDA)

The Inverse Mills ratio (**λ**), which is a correction factor for selectivity bias, was insignificant depicting that there were no unobserved factors that might affect the selection (participation) equation as well as the outcome (marketed surplus) equation.

4. SUMMARY AND CONCLUSION

This study was initiated to understand the emerging red pepper marketing system in the study area for proper identification of the existing constraints and opportunities for improved contribution of the crop in household and district level livelihood options. The specific objectives were identification of factors that affect market participation decision of households, determination of factors affecting the volume of market supply of pepper, investigation of the role of different marketing actors along the marketing chains and determining the marketing margin.

Of the total of 12 pepper producing KA's (Kebele Administrations) in Jabi Tehinan district, 6 of them were selected. In order to obtain the necessary primary data, a total of 120 farmer respondents were interviewed using a pre-tested interview schedule. The collected data were then analyzed by descriptive statistics and with the aid of an econometric model using STATA.

The econometric model employed to analyze the collected data was the Heckman Two-Stage model. In the first stage of the model, the Probit model result indicated that the amount of pepper produced (positively at less than 1%), age of households (negatively at less than 10%), distance from market centre (negatively at less than 5%), number of livestock owned (positively at less than 5%), number of oxen (negatively at less than 5%), education level of household heads (positively at less than 1%) and income from non farming activities (positively at less than 10% probability levels) were found to significantly affect the market participation decision of households.

The OLS result revealed that the size of the marketed pepper was significantly affected by the amount of pepper produced (positively at less than 1%), productivity of other crops (negatively at less than 1%), household heads' education level (positively at less than 10%), access to credit (negatively at less than 5%) and access to extension services (positively at less than 1% significance level).

In order to intensify the emerging commercialization and to have better understanding about the production and marketing situations (problems and opportunities) of red pepper in the district, the results of this study can lay a basic ground to concerned bodies. This newly growing commercialization to be diversified, market imperfections should be absent. In Jabi Tehinan district, the existence of the prevailing marketing problems such as lack of competitiveness, price fluctuations, inadequate price information and weak bargaining power of producers have to be considered in order to widen the scope of production and to create better market situations.

A time to time fluctuation of price of pepper imposed a negative impact to producers. Fearing that prices may decline in the future, producers prefer to sell their pepper occasionally (without schedule).

In order to improve the problem of pepper price fluctuation and the bargaining power of producers, implementation of a well-defined standard of the commodity is relevant. Concerned bodies should practice product grading and price differentiation based on the quality of the pepper such as color, pungency and pod size. Hence for a defined standard of the commodity, a common price can be set.

Result of the Heckman sample selection model showed that education level of household heads positively and significantly affected the market participation decision and the amount of pepper sold as less than 5% significant level. Training producers about pepper trading could encourage their willingness to sell and thereby help improve the amount they supply to the market. The result also indicated that at farmers' access to extension services determined the volume of the marketed pepper positively and significantly at probability level of 1%. Hence anything which strengthens the existing extension services can expand the volume of the marked surplus of pepper.

The OLS regression result also showed that the amount of pepper sold was significantly and negatively affected by the productivity of other crops. Thus in order to scale up the volume of pepper that can be sold to the market, extension activities should focus on educating farmers to practice specialized farming which focuses on production of pepper.

5. ACKNOWLEDGEMENTS

Primarily, I thank the almighty God, the ultimate source of all kinds of ability. Special thanks are owed to my parents; my father Tesfaw Hunegnaw and my late mother Yalganesh Alemu, who reared me up and paved the bright path towards my success.

My heartfelt gratitude is owed to my beloved wife Rahel Zegeye and my kids Eyuel Amare and Yordanos Amare whom I departed during the research work.

6. REFERENCES

Abay, A. (2008) Vegetable Market Chaian Analysis in Amhara National Regional State: The case of Fogera district, south Gondar. An MSc thesis presented to the school of graduate studies of Haramaya University, Ethiopia. 99p.

Bekele, H. (2001) Factors Influencing Input Loan Repayment Performance of Smallholders in Ethiopia: The case of Oromia and Amhara National States: M.Sc Thesis presented to the School of Graduate Studies of Haramaya University, Ethiopia.

Bellemare, M. F., and C. F. Barrett. (2006) An ordered tobit model of market participation:Evidence from Kenya and Ethiopia. American Journal of Agricultural Economics. 88(2): 324-337.

BoARD (Bureau of Agriculture and Rural Development). (2009) Farming systems and Production pattern of Jabi Tehinan wereda.

Bosland, P., and E. Votava. (2000) Peppers: Vegetable and Spice Capsicums. CABI Publishing. New York, USA.

CEDA (Caribbean Export Development Agency). (2004) Caribbean Regional Program for Economic Competitiveness. *Discussion Paper*, Barbados.

CSA (Central Statistical Authority). (2008) Area and Production of Crops (Private

CSA(Central Statistical Authority). (2007) Area and Production of Crops (Private Peasant Holding, Meher Season). Addis Ababa.

EEPA (Ethiopian Export Promotion Agency). (2003) Spice Potential and Market Study, Addis Ababa. 103p.

Gujarati, D.N. 2004. Basic Econometrics. 4th Edition. McGraw Hill, New York.

Heckman, J.J. (1979) Sample Selection Bias as a Specification Error. Econometrica. Macmillan,New York. Pp.153-161.

IPC (International Pepper Community). (2009) Seasonal Price of Pepper. 37th IPC Meeting and Global Pepper Conference held in Belen, Brazil.

Mendoza, M., and M. Rosegant. (1995) Pricing conduct of spatially differentiated markets. Prices, Products, and People. International Potato Center, Lima, Peru. Pp.343-356.

Rehima, M. (2006) Analysis of Red pepper marketing: the case of Alaba and Silte in SNNPRS. MSc thesis presented to the school of graduate studies of Haramaya University, Ethiopia.

Singh, V., and K.N. Rai. (1998) Economics of production and marketing of buffalo milk in Harayana. Indian Journal of Agricultural Economics, 53(1): 43-52.

Swiader, M. G., M. Were and M.C. Collum. (1992) Peppers. Fourth edition. International Book Distributing Company. India.

Tomek, W.G., and K.L. Robinson. (1990) Agricultural Product Prices. Third ed., Cornell University Press, New York. Pp.107-8(360)

The IISTE is a pioneer in the Open-Access hosting service and academic event management. The aim of the firm is Accelerating Global Knowledge Sharing.

More information about the firm can be found on the homepage:
http://www.iiste.org

CALL FOR JOURNAL PAPERS

There are more than 30 peer-reviewed academic journals hosted under the hosting platform.

Prospective authors of journals can find the submission instruction on the following page: http://www.iiste.org/journals/ All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Paper version of the journals is also available upon request of readers and authors.

MORE RESOURCES

Book publication information: http://www.iiste.org/book/

Recent conferences: http://www.iiste.org/conference/

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar