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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

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SCOPE FOR FURTHER RESEARCH

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

- Garg, Sambhav (2011): "Business Ethics" Paper presented at the Annual International Conference for the All India Management Association, New Delhi, India, 19–22 June.

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- Kumar S. (2011): "Customer Value: A Comparative Study of Rural and Urban Customers," Thesis, Kurukshetra University, Kurukshetra.

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- Garg, Bhavet (2011): Towards a New Natural Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

ANALYSIS OF TOMATO MARKETING IN UASIN- GISHU COUNTY, KENYA

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ABSTRACT

This research was to examine tomato marketing in the Uasin-Gishu County with specific objectives of identifying factors affecting volume of tomato supply in the County. The study was conducted in Uasin- Gishu County, were both primary and secondary data on tomato production and marketing was collected. A total of 328 farmers and traders were interviewed, with a sample frame of all the tomato farmers and traders in the County. Both systematic random and purposive sampling techniques were used.Tobit and Heckman two stage Econometric Models was used to investigate factors affecting tomato market participation decision and quantity supply of tomato in the County. Sample markets were inefficient, characterized by oligopolistic market structure in Eldoret municipal market. Research findings suggest that an improvement in producers bargaining power through cooperatives is necessary to reduce the oligopolistic market structure. Structure of the markets indicates that licensing and years of tomato trade experience did not hinder entry into tomato market, but education and capital were barriers. Market information is the main problem. Based on the Heckman two-stage model, the study identified the main determinants of tomato market participation decision and its effect on the quantity supply. One of the most important variables influencing the decision to participate in tomato market is tomato production. Consequently, extension work should focus on encouraging farmers to participate in tomato production especially, there is a need to increase new varieties that are disease resistant variety and disseminate these technologies to potential areas. The other factors that adversely affects market participation is crop yield of the households. Keeping their specialization and social role in tomato production potential areas is necessary. Moreover, tomato production and extension contacts are the determinant factors of the quantity of tomato supplied. Therefore, policies that would improve tomato production capacity by identifying new technologies and create stable demand for surplus production would enhance farmers' decisions on marketable surplus. Non farming income and number of livestock affected the quantity of tomato supplied negatively. Thus, stakeholders have to make further investigations on cost and benefit of non-farm income and livestock production of farmers and let them know the result to make their decision. This implies that there is poor market information system, limited bargaining power of farmers, oligopolistic market structure in the tomato market. The findings suggests that, effective market information service has to be established to provide accurate and timely information to farmers and traders on current supply of tomato output, demand and prices at national and County levels.

KEYWORDS
Heckman, Marketing, Tobit, Tomato, Uasin-Gishu.

1.0 INTRODUCTION

The giant berry traded abroad has a colorful history, and the story above is typical of a fruit that originated in one hemisphere, became popular in another, and returned back close to home for intense breeding that produced the tomato now familiar to most people today. *Lycopersicon esculentum* now enjoys worldwide distribution and is integral to the culinary disposition of multiple cultures. Tomatoes belong to the genus Lycopersicon, which is in the same family, Solanaceae, as potatoes. The resemblance betwixt leaves and flowers of potato and tomato plants seems to validate this taxonomic grouping. Two members of the genus Solanum (the genus which potato is classified in) have been successfully hybridized with members of the Lycopersicon genus. These are *S. lycopersicoides* and *S. pennellii.* Wild tomato species have tiny fruits, and only the red ones are edible. Tomato plants do not tolerate frost, and grow as annuals in colder regions. In warmer regions, they are perennial, and flower regardless of day length.

Tomato production in Kenya has increased considerably in the recent past with greenhouse production being adopted in many areas. The tomato *(Lycopersicon esculentum)* is popular with both small and large scale farmers for its edible fruits both for export and local consumption. Monsanto hybrids rank highly amongst the reputable brands associated with tomato production in the country. Tomato Anna F1 (Hybrid Tomato Anna) is an indeterminate hybrid bred and developed by the Monsanto Vegetable Seeds division for greenhouse production.

For a successful crop of Anna F1 tomatoes the grower needs to diligently observe certain practices at each stage notably; field selection, soil environment, land preparation, seed requirement, Nursery management, transplanting and agronomic practices. The two common growing systems in Kenya include Greenhouse and outdoor methods. Anna F1 is ready for harvesting in 70 to 75 days depending on weather. Usually the very first cluster bears the first ready fruits and marketing is done when the fruit is deep red in colour and firm.

2.0 LITERATURE REVIEW

2.1 MARKET AND MARKETING CONCEPTS

Market is an area in which one or more sellers of given products/services and their close substitutes exchange with and compete for the patronage of a group of buyers. A market is a point, or a place or sphere within which price-making force operates and in which exchanges of title tend to be accompanied by the actual movement of the goods affected (Backman and Davidson, 1962). Conceptually, however, a market can be visualized as a process in which ownership of goods is transferred from sellers to buyers who may be final consumers or intermediaries. Therefore, markets involve sales, locations, sellers, buyers, and transactions.

According to Kotler and Armstrong (2003), marketing is managing markets to bring about profitable exchange relationships by creating value and satisfying needs and wants. Lele and Jain (1997) defined the marketing concept, as philosophy of business, which states that customer's want satisfactions, is the economic and social justification for a firm's existence.

2.2. MARKETING SYSTEM

The concept of marketing system includes both the physical distribution of economic input and products and the mechanism of process or coordinating production and distribution (cited in Andargachew 1990). Branson and Norvel (1983) define the marketing system in terms of what is otherwise known as marketing channel. In broad terms, marketing system may be defined as the totality of product channels, market participants and business activities involved in the physical and economic transfer of goods and services from producers to consumers. Marketing system operates through a set of intermediaries performing useful commercial functions in chain formations all the way from the producer to the final consumers (Islam et al., 2001).

2.3. MARKETING CHANNEL

The term channel is derived from the Latin word *canalis*, which means canal. A marketing channel can be viewed as a large canal or pipeline through which products, their ownership, communication, financing and payment, and accompanying risk flow to the consumer (Backman and Davidson, 1962). Formally, a marketing channel is a business structure of interdependent organizations that reach from the point of product origin to the consumer with the purpose of moving products to their final consumption destination (Kotler and Armstong, 2003). Abbot (1958) also define marketing channel as the sequence of intermediaries through which goods pass from producer to consumer.

2.4. FACTORS AFFECTING MARKET SUPPLY

The market supply refers to the amount actually taken to the markets irrespective of the needs for home consumption and other requirements. Whereas, the marketed surplus is the residual with the producer after meeting the requirement of seed, payment in kind, and consumption by farmer (Wolday, 1994).

Bellemare and Barrett (2006) estimated factors affecting sell of animals in Kenya and Ethiopia. They observed that the net purchase and net sales volume choices depend on expected market participation. The household head sex (female headed), age, family size, herd size, female TLUs, encumbered males, and small stock (sheep and goat) had significant and negative influence on number of animals sold. Unlikely, assets, land holding, other income, encumbered females, and average price of larger stock (camels and cattle) had correlated positively with number of animals sold.

Singh and Rai (1998) identify factors affecting marketed surplus of buffalo milk in Haryana. They observed milk production and price significantly affected marketed surplus positively while land holding and family size negatively affected.

2.5. APPROACHES TO THE STUDY OF AGRICULTURAL MARKETING PROBLEM

The most common approaches in marketing are the functional, institutional, and commodity approaches.

2.6. FRAMEWORK FOR EVALUATION OF MARKETING SYSTEM

The development of reliable and stable market system has been an important element in commercialization and specialization in the agricultural sector. In order to study the functioning of markets many researchers have applied the Structure-Conduct-Performance (SCP) paradigm. The SCP approach was developed in the United States as a tool to analyze the market organization of the industrial sector and it was later applied to assess the agricultural system and this framework was to evaluate the performance of industries in the USA (Wolday, 1994). Subsequently, it was applied in the functioning of markets in agricultural sector, and served as a tool to evaluate the performance of the commercial system. The framework distinguishes between three related levels; the structure of the market, the conduct of the market, and the performance of the market. The same approach has been used in the current study.

3.0 IMPORTANCE OF THE STUDY

This study covers the tomato production in the supply potential areas, and analyses the performance of the market through the evaluation of the marketing activities along the different marketing channels of the crop, which could be a major input to formulate appropriate marketing policies and procedures. This information would help the farmers, consumers, traders, investors, and Governments agents to make appropriate decisions in boosting the production of the crop instead of relying on imports from Elgeyo- Marakwet and Central Province, yet the County has enormous potential.

4.0 STATEMENT OF THE PROBLEM

The high potential areas of Kenya can produce enough tomato to meet the needs of the people in the deficit areas. However, the poor agricultural marketing system, disease, high input prices and unstable price of tomato discourage farmers to produce more. The increasing proportion of the population living in urban centers in the County and rising level of income require more organized channels for processing and distributing tomato. Tomato is a major vegetable crop produced by the few farmers in the North Rift. Despite its significance in the Kenyan economy and current income generating capacity of tomato as compared to its magnificent potential in the country it has not been given due attention by farmers and the Uasin-Gishu County government. In the County, the production of tomato is constrained by variable seasonal conditions. As a result, the variation in its supply on rural and urban market is considerable, hence massive importation from central Kenya and Elgeyo- Marakwet County. These calls for a study to investigate the factors affecting tomato supply to the market in the County of Uasin-Gishu and reducing the information gap on the subject and by contributing to work better understanding on improved strategies for reorienting production and marketing system for the benefit of all.

5.0 OBJECTIVE OF THE STUDY

1) To identify factors affecting marketable supply of tomato in Uasin- Gishu County;

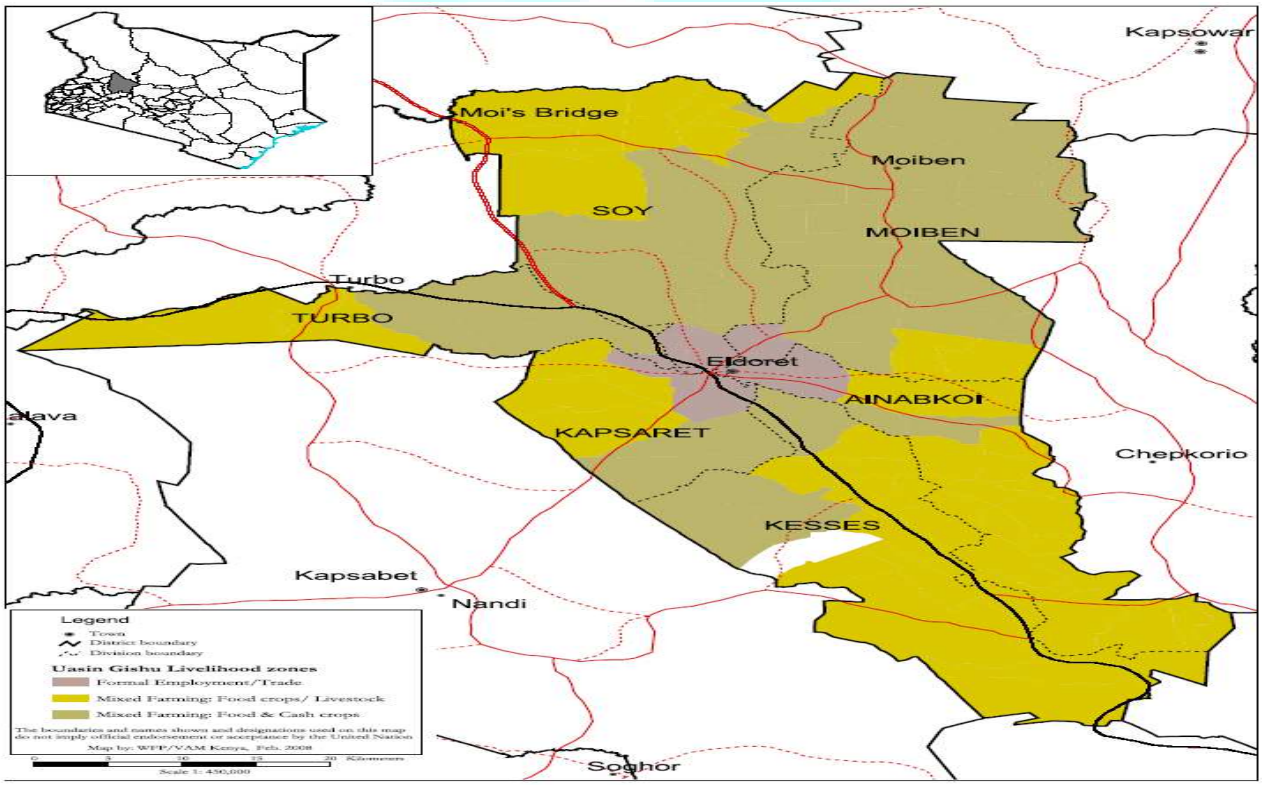
6.0. HYPOTHESES

H_{01}: There are no problems affecting marketable supply of tomato in Uasin- Gishu County;

7.0 RESEARCH METHODOLOGY

7.1. STUDY AREA

FIGURE 1.1 MAP OF UASIN-GISHU COUNTY, KENYA



Source: DAO, 2012

7.2. SOURCES AND DATA REQUIREMENTS

The study utilised both primary and secondary data. The secondary data on different markets, prices, number of licensed tomato traders at branch offices of Municipal market. Primary data collected from farmers and traders focused on factors affecting market supply, size of output, access to market, market information, and annual income from non farming activities, livestock ownership, land holding, extension service contact, credit access, family size, production of food grain from farmers using pre-tested questionnaire.

7.3. SAMPLE SIZE

The sample frame of the study was the list of tomato producer households and traders in the County of Uasin-Gishu which have been documented at the Ministry of Agriculture and Eldoret Municipal market. From the six constituencies (Kesses, Kapseret, Ainabkoi, Moiben, Soy and Turbo) farmers were selected purposively based on the level of production. The household sample size of the study areas indicated below.

TABLE 7.1: NUMBER OF SAMPLE TOMATO FARMERS IN THE COUNTY

CONSTITUENCIES/DIVISIONS	NUMBER OF PRODUCERS	SAMPLE SIZE OF TOMATO FARMERS
Ainabkoi	73	37
Moiben	62	27
Kesses	58	25
Kapseret	66	27
Soy	56	23
Turbo	46	25
Total	361	164

Source: Own compilation, 2012

TABLE 7.2: NUMBER OF SAMPLED TOMATO TRADERS IN THE COUNTY

Markets in the County	Number of Traders	Sample size of Tomato Traders
Eldoret Municipal	134	28
Turbo	64	12
Moi's bridge	49	10
Ziwa	48	10
Langas	80	12
Kapseret	50	10
Huruma	68	12
Kapsoya	56	10
Moi University	48	10
Cheptiret	36	10
Burnt-Forest	38	10
Ainabkoi	34	10
Moiben	26	10
University of Eldoret	48	10
TOTAL	**773**	**164**

Source: Own compilation, 2012

The sites for the trader surveys were market towns in which a good sample of tomato traders exists. On the basis of flow of tomato, fourteen markets were selected, as the main tomato marketing sites in the County.

7.4. DATA ANALYSIS

Two types of data analysis, namely descriptive statistics and econometric analysis were used in analyzing the data collected from farmers and market surveys.

7.4.1 Descriptive analysis

Employed here were ratios, percentages, means, variances and standard deviations in the process of examining and describing marketing functions, farm household characteristics, market and traders' characteristics. The indicators used in this part of the analysis were structure conduct and performance (S-C-P) model.

7.4.2. Econometric analysis

In this part the supply function (Tobit and Heckman two stage models) were utilized.

7.4.2.1. Factors affecting market supply

To investigate factors affecting tomato supply (a continuous-valued choice about how much quantity to sell) Tobit model was used. Because of the restrictions put on the values taken by the regressand, this model can be called limited dependent variable regression model. The data have a censored sample as dependent variable, 17.6% of household didn't supply tomato even if they produce tomato from the total of 361 samples, the data are censored, and Tobit estimation is relevant. If zero values of dependent variables were the result of rational choice of farmers, a Tobit model would be more appropriate (Abrar, 2004). Thus, maximum likelihood Tobit estimation (Tobin, 1958) was used in the analysis of factors affecting sales volume. One concern with the model; recall that in a Tobit with left-censoring at zero:

$Y^*_i = \beta_0 + \sum_{i=1}^{m} \beta_i \times_i + \mu_i,\ i = 1,2, \ldots, m$ ……(7.1)

Where Y= Y*, if Y* > 0, Y = 0 if Y* ≤ 0 and Y= max (Y*, 0).

Where Y^*_i = market supply of tomato (dependent variable)

β_0 = an intercept

β_i = coefficients of i^{th} independent variable

X_i =independent variable and 'i' is 1, 2, …., m

U_i = unobserved disturbance term

The model parameters are estimated by maximizing the Tobit likelihood function of the following form;

$L = \prod_{Y>0} \frac{1}{\delta} f \frac{Y-\beta_i x_i}{\delta} \prod_{Y\leq 0} F(\frac{-\beta \times_i}{\delta})$ ……(7.2)

Where f and F are respectively, the density function and cumulative distribution function of Y_{i*} Π_{yi*}>0 means the product over those i for which y_{i*}>0, and $\Pi y_{i*} \leq 0$ means the product over those i for which $y_{i*} \leq 0$.

As cited in Maddala (1997), Johnston and Dinardo (1997), proposed the following techniques to decompose the effects of explanatory variables into quantity supply and intensity effects. Thus, a change in X (explanatory variables) has two effects. It affects the conditional mean of Y_{i*} in the positive part of the distribution, and it affects the probability that the observation will fall in that part of the distribution. Similar approach will be used in this study.

1. The marginal effect of an explanatory variable on the expected value of the dependent variable is:

$\frac{\delta E(Y_i)}{\delta(X_i)} = F(Z)\beta_i$ ……(7.3)

Where, $\frac{\beta_i x_i}{\delta}$ is denoted by z, following Maddala, (1997)

2. The change in the probability of market participation as independent variable X_i changes:

$$\frac{\delta F(z)}{\delta X_i} = f(z)\frac{\beta_i}{\delta} \quad \text{..... (7.4)}$$

3. The change in intensity of quantity supplied with respect to a change in an explanatory variable among sellers:

$$\frac{\delta E(Y_{i/Y_i^*}>0}{\delta X_i} = \beta_i\{1 - \frac{f(z)}{F(z)} - \left[\frac{f(z)}{F(z)}\right]^2\} \quad \text{.....(7.5)}$$

Where, F(z) is the Cumulative Normal Distribution of z, f(z) is the value of the derivative of the normal curve at a given point (i.e., unit normal density), z is the Z score for the area under normal curve, β_i is a vector of Tobit Maximum Likelihood estimates and σ is the standard error. The problem can be overcome using the Heckman's sample selection model where a Probit model for the participation or 'selection' equation is estimated and a regression model, which is corrected for selectivity bias, is specified to account for the level of the amount marketed. In this study, the Heckman's sample selection was also employed. First, the probability of participation was modeled by Maximum Likelihood Probit, from which inverse Mill's ratios were estimated. In the second-stage, the estimated Inverse Mill's Ratio (IMR) was included as right-hand variable in the corresponding tomato supply function. The Probit model is specified as:

$Y_i = x_i'\beta_i + \varepsilon_i, \quad i = 1, \ldots, n$ ..... (7.6)

Where: Y_i is a dummy variable indicating the market participation that is related to it as $Y_i = 1$ if $Y_i > 0$, otherwise

$Y_i = 0$

β_i are the variables determining participation in the Probit model,

x_i' is unknown parameter to be estimated in the Probit regression model,

ε_i is random error term.

Then the parameters can consistently be estimated by OLS over n observations reporting values for Y_i by including an estimate of the inverse Mill's Ratio, denoting λ_i, as an additional regressor. More precisely selection model is specified:

$Y_i = x_i'\beta_i + \mu\lambda_i + \eta_i$ ..... (7.7)

Where Y_i is the volume of supply in the second-step,

β_i are the explanatory variables determining the quantity supply,

x_i' is unknown parameter to be estimated in the quantity supply,

μ is a parameter that shows the impact of participation on the quantity supply,

η_i is the error term.

An econometric Software known as "LIMDEP" was employed to run the models (Tobit and Heckman two-stage selection).

8.0 RESULTS AND DISCUSSIONS

This chapter deals with the descriptive statistics and econometric models, on identifying factors affecting tomato supply in Uasin-Gishu County.

8.1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF SAMPLE FARMERS AND TRADERS

In this part of the research, socio demographic characteristics of farmers (demographic characteristics, market, extension, credit and information access, farming and non farming experience, income, resource ownership, production and productivity, input used) and traders' demographic characteristics.

8.1.1. Demographic characteristics of sample farmers

The demographic characteristics of farmers defined in terms of sex, religion, marital status, education level, age, and family size of household head are presented on Table 8.1. Sex of the sample households was comparable for the two research areas (Rural and Urban) and 94% of sample household were male. Regarding religion, 98% of the sample households are Christians. However, there is a statistically significant difference in religion in the two areas at less than 10%. With regard to marital status, 90% total sample respondents are married; however, 93% of the sample respondents in rural, which is greater than 84% of Urban are married household head. Table 8.1 shows that the chi-square test for marital status of the two areas was found to be significant at less than 5% significance level.

TABLE 8.1: DEMOGRAPHIC CHARACTERISTIC OF SAMPLE FARMERS (% AND AVERAGE) VARIABLES

Variables	N=64 Urban	N= 100 Rural	N=164 Total	χ^2/t-value
Sex -Male	95.3	92	94	1.182
-Female	4.7	8		
Religion- Christian	99.3	96	98	6.735*
-Muslims	0.7	2	0.8	
-Others	2	-	0.4	
Marital status - Single	2	10	5.2	9.135**
-Married	93.3	84	89.6	
-Divorced	0.7	0.1	0.4	
-Widow	4	-	4.8	
Education- Illiterate (%)	46	40	43.6	18.389***
-Primary (%)	29	43	34.8	
-Secondary (%)	17	2	10.8	
-Post secondary	8	15	10.8	
Age of household head	46 (13.02)	40 (15.4)	42.18 (14.16)	3.218***
Family size	7.71 (2.91)	6.33 (2.62)	6.56 (2.58)	1.041

N=sample size, ***, ** and * significantly at less than 1%, 5% and 10% significance level, respectively.
Figures in parenthesis indicate standard deviation

Source: Survey result, 2012

The educational background of the sample household heads is believed to be an important feature that determines the readiness of household heads to accept new ideas and innovations. About 35% and 44% of the sample household heads were primary level holders and illiterate respectively. However, in Urban, only 46% and in rural areas about 40% of the sample households were illiterate. About 17% and only 2% had secondary level of education whereas 8% and 15% had joined post secondary school in Urban and Rural areas, respectively. The chi-square test indicates that there is a significant difference between the two areas at 1% significance level in their education.

The average age of the sample households was 42. The mean age of farmers in Urban (46) was less than Rural (40). The independent sample t-test revealed that there is difference at 1% level of significance on mean age of farmers in the two areas. This indicates that urban farmers were older than rurals. The available data indicates that average family size in each household is 7 members.

Table 8.2 depicts that the average years of farming experience for total sampled household were 24 years. The survey result indicates that Rural farmers (27 years) had more farming experience than Urban (23 years) and the independent sample t-test revealed that there was difference at less than 5% level of significance on the mean years of farming experience. The table suggests that farming is the main source of household income in both study areas. The average annual farming income of the sample household for the year 2012 was Kshs 25,000 per household.

TABLE 8.2: EXPERIENCE AND INCOME OF FARMERS

Variables	N = 64 Urban	N = 100 Rural	N = 164 Total	t / χ^2 - value
Years of experience in farming (year)	22.63 (12.58)	26.68 (13.58)	24.25 (13.11)	2.413**
Annual farming income (Kshs)	30,000 (1791)	20,000 (1389)	25,000 (1639)	0.31
Non -farming experience (yes, %)	9	16	12	2.52
Non -farming experience (year)	4.64 (3.34)	5.47 (3.66)	5.35 (3.48)	-0.642
Annual non farming income (Kshs)	16,610 (1493)	7,380 (514)	11,690	2.32**

N=sample size, ** significantly at less than 5% significance level, Figures in parenthesis indicate standard deviation

Source: survey result, 2012.

From Table 8.2 one can also see that non-farming is the next major source for 12% of the total sample households. These households had a mean of 5 years on non-farming experience. However, the sample households have annual average of non-farming income of Kshs 11,690 per household. The data in the table shows that the average annual non-farming income (Kshs 16,610/household) in Urban was higher than in rural (Kshs 7,380/household).

This income was obtained from business and salary from working. Analysis of independent sample t- test revealed that there is significant difference on the mean of non-farm income between urban and rural areas at less than 5% level of significance.

The nature and development of markets and development centers for factors of production (land, labour), outputs, and extension service can play a major role in determining patterns of production and sale. Where markets are well-developed and competitive, farmers can be expected to respond largely to the profitability of alternative tomato production and supply options.

With respect to the distance of the markets, about the proximity or distance of, where they sold their tomato, the respondents were asked whether the market place is far or not from their home. Accordingly, the average walking time of total sample household was 1.15 hour.

8.1.2. Access to services

Access to service like credit, agricultural extension, and market information, which are the most important factors that promote production and productivity thereby increasing marketable surplus and ultimately farm income are shown in Table 8.3.

TABLE 8.3: EXTENSION AND CREDIT SUPPORT IN 2012

Variable	N = 64 Urban	N = 100 Rural	N = 164 Total	χ^2/t
Credit need (yes, %)	55.30	70.70	61.2	5.95**
Credit taken (yes, %)	11.30	11.10	11.2	0.003
Amount credit (Kshs)	15,930 (410)	18,180 (682)	16,810 (533)	1.095
Extension contact (yes, %)	63.30	6	40	81.141***

*** and ** Significant at less than1%, and 5%significance level, respectively, N=sample size, Figures in parenthesis indicate standard deviation

Source: Survey result, 2012

However, from the total of 164 sampled respondents who were asked whether they need credit or not, about 61% of the respondents pointed out that they need credit and only 11% of them had received credit. More of the rural farmers (71%) needed credit than urban (55%) farmers. The chi-square result shows that there is statistically significant difference at less than 5% level on credit need. The average credit taken by 11% of the total sampled household in 2012 was Kshs 16,810 per household. The table shows that only 40% of the total sampled household had extension contact in relation to tomato production. The table makes clear also that more of urban farmers (63%) had extension contact than rural farmers (6%). According to the chi-square test there is a statistically different on extension services between the two areas at 1% level of significance.

TABLE 8.4: FARMERS' ACCESS TO PRICE INFORMATION

Variables		N = 64 Urban	N = 100 Rural	N = 164 Total	χ^2
Information on nearby market price (Yes, %)		62	22	44	3.128*
Information on Eldoret market (Yes, %)		21	2	13	20.57***
Source of Information	Tomato traders (%)	36	7	24.4	75.03***
	Electronic media (%)	1	-	0.4	
	On Market (%)	4	43	19.6	
	Broker (%)	3	-	1.8	
	Other different Sources (%)	15	29	20.4	

*** and * Significant at less than 1% and 10% significance level, respectively, N=sample size

Source: Survey result, 2012

It is assumed that producers and traders who have market information can decide how much to produce and market. However, Table 8.4 revealed that 44% of the total sampled households had tomato price information about the nearby market price before they sold their tomato. From the table one can see that more of urban farmers (62%) had nearby market information than rural farmers (22%). Only, 13% of the total sampled household was aware of the price in Eldoret municipal market. More urban farmers (21%) had information about market price in Eldoret municipal market than rural farmers (2%). The chi-square tests concerning nearby and in Eldoret municipal market price information indicate that there are statistical significant difference at less than 10% and 1% significance level, respectively. Asked about where they obtain the market price information, 24% and 20% of the total sampled households pointed out that they obtain price information from tomato traders and personal observation on market, respectively. More of the farmers in urban (36%) got information from tomato traders than rural (7%). About 43% of urban farmers pointed out that they checked price information by directly participating in the market themselves while only 4% of the rural farmers participated on the market. The rest of the sample traders indicated that they got information from different sources like neighbors, Radio/ television, brokers, and through the combination of tomato traders, personal observation. The chi-square test indicates that the statistical significant difference on source of market price information at less than 1% level.

8.1.3. Demographic characteristics of traders

Table 8.5 summarizes the demographic characteristics of traders in terms of age, family size, Gender, marital status, and religion.

TABLE 8.5: DEMOGRAPHIC CHARACTERISTICS OF TRADERS

Variable	Langas	Ziwa	Moiben	Huruma	Burnt Forest	Turbo	UoE	Moi University	Eldoret	Total	t/χ^2
Age	31 (8.35)	32 (8.74)	38 (11.61)	23 (3.46)	37 (8.55)	35 (7.78)	32 (7.66)	41 (8.50)	31 (1.41)	35 (8.97)	0.735
Family size	9 (2.64)	9 (5.86)	7 (1.41)	5 (1.15)	12 (14.65)	4 (2.68)	8 (4.73)	7 (4.11)	5 (2.62)	7 (5.83)	4.519
Trade experience	10 (5.42)	5 (1.53)	9 (9.19)	4 (3.21)	8 (3.36)	7 (4.85)	6 (3.63)	10 (4.65)	7 (5.86)	8 (4.83)	0.707
Gender- Male (%)	2	-	2	2	7	-	-	-	7	20	
- **Female (%)**	20	7	2	4	4	11	13	9	11	80	15.77**
Religion- Muslims (%)	2	-	-	2	2	2	-	2	-	11	
- **Christians (%)**	2	7	2	-	9	9	13	7	17	74	48.22***
- **Others (%)**	9	-	-	4	-	-	-	-	-	15	
Marital status- Single (%)	17	7	4	4	9	7	2	9	2	78	
- **Married (%)**	4	-	-	2	-	4	2	-	4	17	18.68
-Divorced/widows (%)	-	-	-	-	-	2	-	-	2	5	
Education- Illiterate (%)	-	-	2	2	-	4	-	2	-	14	43.4
-Primary (%)	9	2	2	4	4	7	7	7	2	47	
-Secondary (%)	2	2	-	2	7	-	4	-	2	33	
-Post Secondary (%)	-	2	-	-	-	-	2	2	-	6	

Source: Own Compilation

The survey result indicates that the sampled traders were on average 35 years old. Urban assemblers were the youngest of all other traders who were 31 years old on the average. Family size differs across the markets and the average family members are 7.

Traders had 8 years of experience on the average. Wholesalers (urban) are more experienced, and had much exposure to trade. The survey indicates that 80% of the sample traders were Females while 20% of them are males. However, the chi-square test indicates a significantly difference at 5% significance level on gender distribution among markets. About 74% of traders were Christians while the remaining were 11% and 15% are Muslims and others respectively. The chi-square result indicates that there is a 1% significance difference on religion distribution among markets. From sample traders 78% were single, and 47% and 43% of the sample traders are within the level of primary and secondary school education, respectively and only 6% of the traders had post secondary level of education.

8.2. MAJOR PRODUCTION AND MARKETING CONSTRAINS

There are a number of highlighted constraints that hamper further development of the tomato sub- sector in Uasin- Gishu County. The following production and marketing problems were the main issues indicated by various respondents.

8.2.1. Production and marketing problem of farmers

Given the current production levels and the production of tomato for market as a deriving motive, there appears that the farmers have market problem at certain seasons. However, the less possibility of improved production and expansion of tomato might decrease the amount of tomato sold and create problems in marketing.

Table 8.6 summarizes production issues that impact on tomato trade potential. It shows that primarily, tomato diseases were indicated as the major hindrance of production by 96% of the farmers. Diseases to tomato are also critical problems that affect quality. The other constraints identified were poor access to credit, lack of demand during glut periods and expensive chemicals. About 83%, 73.1% and 72% of sample farmers reported that lack of these respective inputs are causes for low productivity.

TABLE 8.6: PRODUCTION AND MARKETING PROBLEMS OF HOUSEHOLDS (% of farmers)

Variables	N = 64 Urban	N = 100 Rural	N=164 Total
Disease	96.7	96	96.4
Credit	72.0	99	82.8
Chemicals	56.7	95	72
Demand	60	61	73.1
Transportation	12	64	46.3
Price Setting	43.3	79	73.2
Fee	17	45	39
Supply	11.3	51	39.1

N= Sample size

Source: Survey results, 2012

Price setting is the major problem of marketing. Farmers could not set price for their product. The reasons stated by farmers are: usually price set by traders, more unstable tomato price than other crops, and lack of real price information from terminal market and no direct relation with traders. About 73% of the farmers' tomato was set by traders. Farmers had to pay a fee before tomato sold. This forces them to sell at farm gate at low price. About 39% of them responded that tax is the other major problem related to market. About, 73% of the sample farmers responded that face is a demand problem, due to low quality of tomato caused by disease, increase in supply in other parts of the country and absence of regular buyers. Transport was also a major problem especially in rural areas during the rainy seasons. 64% of the rural farmers faced transport problems during the months of April to September of every year.

8.2.2. Marketing constraints of traders

Table 8.7 indicates the major problems faced by tomato traders: natural quality, capital shortage, fluctuation in demand, government support, supply shortage, access to credit, farmers' reluctance to sell, administrative problems, competition with licensed traders, roads, theft, competition with unlicensed traders, information flow, health, unstable prices, brokers, and perish ability are reported as the problems. Only some of the most important problems are briefly discussed below:

TABLE 8.7: MARKETING PROBLEMS OF TOMATO TRADERS (% of traders)

Problems	N = 100 Rural	N = 64 Urban	N = 164 Total
Natural Quality	94.4	90	89.1
Capital Shortage	94.4	90	87.0
Lack of Demand	83.3	70	78.3
Absence of Government Support	83.3	75	76.1
Supply Shortage	66.7	80	71.7
Access to Credit	72.2	80	69.6
Transport	44.4	75	57.17
Competition with unlicensed	27.8	55	34.8

N= sample size

Source: Survey results, 2012

About 89% of them confirmed that they faced quality problems due to disease and perish ability. From these results about 87% of the traders indicated that they face capital shortage to conduct and expand their business. This is due to lack of friendly lending institutions and most of the traders sold their tomato on credit to their buyers (other traders). About 78% of them reported that they face demand problem due to limited number of buyers, high supply of tomato from other parts of the country, and low quality of tomato due to disease, road and transportation problem, especially in rural markets. Their other problem is unstable price of tomato causes demand problem. The table revealed that 76% of traders complain that the government didn't support, and didn't focus on tomato trade (which is similar to other grain traders) by building refrigerated storage facility and credit facility. About 72% of them face supply shortage during certain months of a year due to many farmers relying on rain fed agriculture.

According to the traders, disease of tomato plant, drought and large number of buyers in the specific market are also the cause of supply shortage.

Access to credit was reported by the sample traders as limiting factor in operation and business expansion. The problems in acquiring loan occur from lack of collateral for micro finance and banks. Even if there is an access to credit, the complexity of process to get credit from micro finance, and high interest rate discourage loan. Tomato trade is seasonal and its profitability is doubtful for informal lenders. Therefore nobody wants to lend for tomato traders. Despite the fact that 70% of those interviewed reported did not obtain any credit.

The other infrastructural problem is that village markets are connected with the urban markets by poorly paved roads. Human portages and pack animals are the most frequently used to transport larger loads. Many of the roads to the village markets are difficult for vehicles during rainy season. In town, varieties of forms of transport are hired to get bags of tomato from farmers to wholesale points, including donkeys and trucks.

However, 52% of the traders reported that there was transport problem. Roads in Kesses, Kapseret, Soy, Moiben, Ainabkoi and Turbo constituencies are inaccessible for vehicles for 4 to 6 months. It was observed that tractors and donkeys are the only and best means of transport for traders and to move goods from place to place. From April to September tractors go to the market with winged, which help them to take out the trucks from mud. If the road is muddy, trucks will stay up to 3 days with their load in the road. Under such cases traders are forced to pay high transportation cost to cover the time cost.

All sample traders from rural markets reported that they could get transport only on market days and contract. Because of transportation problems, mobile traders couldn't reach to the market on time. Under such circumstance, farmers will be unable to sell their product and return it back home from the market.

The study indicates that lack of a uniform mechanism to enforce licensing requirements with regard to all traders is the most important problem in the tomato markets. About 35% of the traders reported that the absence of government control on un-licensed merchants. Although the law requires merchants to acquire a license from the municipal authorities in order to engage in tomato trading, licensed traders allege that this is not well enforced and provides an un-even playing field in tomato trading.

8.3. BARRIER TO ENTRY

Capital: Traders were constrained from receiving credit from micro finance for lack of guarantor and complicated process to get credit. In the survey about 87% (Table 8.7) of the sample traders respond that major problem to run their business was lack of capital. In interviews, they stated that their greatest constraint is access to finance, which they view as a constraining factor in expanding their scale of operations and achieving greater efficiency needed. In these cases, capital requirement discourage entry into tomato trading.

Level of Education: As indicated in Table 8.3, 47%, 33% and 6% of sample traders had received primary, secondary and post secondary schooling, respectively. About 14% were illiterate. This indicates that the level of formal education seem to be a barrier to entry because majority of tomato traders had primary level of education.

Lack of experience: From survey result more than 50% had been in tomato trading business for more than 5 years. Survey result reveals that, 43%, 35%, 13% and 9% of traders had 1-5, 6-10, and 11-15 and 16-20 years of experience, respectively (Table 8.9). The majority of traders found in over all markets that had 1-5 and 6-10 years of experience. There appears relatively high variation within a sample that it is from 2 to 20 years of experience. This may explain that there is no barrier to entry in tomato trade with respect to years of experience.

TABLE 8.9: EXPERIENCE IN TOMATO MARKETING

Years range	N=164 Total	Percentage (%)
1-5	70	43.5
6-10	57	34.8
11-16	22	13.0
16-20	15	8.7

Source: survey result, 2012

8.4. FACTORS AFFECTING TOMATO MARKET SUPPLY

The hypothesized determinants of tomato market participation and marketable surplus are summarized in Table 8.10, where 9 variables are continuous and the remaining 7 are dummy variables. The Tobit, Probit and Selection models results are depicted in table 8.11, 8.12 and 8.13, respectively.

TABLE 8.10: DESCRIPTION OF VARIABLES USED IN THE TOBIT AND HECKMAN SELECTION MODELS

Variable	Description	Types	Values
SOLDQUAN	Quantity supplied	Continuous	Amount of Tomato sold in kg
SOLMKTDI	Access to the market	Continuous	Walking minutes
AGE	Age of household head	Continuous	Number of years
T_TOMATO	Size of output (Tomato)	Continuous	Tomato production (kg)
T_LAND	Size of land holding	Continuous	Total land obtained in hectares
PRICE	Price of Tomato in 2012	Continuous	Average annual lagged price (Kshs)
FAM_SIZE	Family size	Continuous	Man equivalent
TLU	Number of livestock	Continuous	TLU exclude number of oxen
CROP_YIE	Productivity of food crops	Continuous	Bags per hectare
MKT_PART	Market participation	Dummy	1= sale, 0=otherwise
GENDER	Gender of household head	Dummy	1=male, 2=female
EDU_CAT	Education of household head	Dummy	1=yes, 0=otherwise
NONF_INC	Income from non-farming	Dummy	1=yes, 0=otherwise
CREDITOT	Credit access	Dummy	1=yes, 0=otherwise
EXT	Extension service	Dummy	1=yes, 0=otherwise
INF_NEA	Market information	Dummy	1=yes, 0=otherwise

Source: own computation, 2012

8.4.1. Tobit result

The Tobit model estimated results of the variables that are expected to determine quantity tomato supply are presented in Table 8.11. Out of 15 variables, 4 were found to significantly influence the quantity of tomato supplied to the market. Accordingly, market distance, production of tomato, extension contact and market information significantly affected the quantity of tomato supply.

Access to market (SOLMKTDI): Distance to market was expected to adversely affect total sales (both volume and participation). However, the opposite has been observed in the result. Access to the market was significantly and positively affected marketable surplus. An increase in one minute walking time indicated on increase in the quantity supplied by 0.0234 kg among the whole sample and 0.0233 kg among the seller group. As distance increased by a minute a probability of quantity supplied increased among non-sellers group by 0.0002%. The assumption that farmer who has nearest market that the positive impact on market supply, because markets tend to be important to make other business would entail expectation that quantity sale would decrease, with distance. However, it is likely that better non-farm employment opportunities in addition to farming activity for households close to the markets may account for their smaller reliance on tomato sale.

Production of tomato (T_TOMATO): As hypothesized the regression coefficient of tomato production variable was positively related with quantity supplied and significant at 1% probability level. The marginal effect of output on quantity supplied was 0.9782 kgs among the whole groups and 0.9742 kgs among the seller group. Each additional kg of tomato production led to increase in the probability of quantity supplied among non-sellers group by 0.006%. The implication is that since tomato is the major horticultural crop for the majority (88%) of farmers, markets seemed the most important factor motivating farmers to produce and supply.

TABLE 8.11: MAXIMUM LIKELIHOOD ESTIMATES OF TOBIT MODEL AND THE EFFECTS OF CHANGE ON THE SELECTED EXPLANATORY VARIABLES ON INTENSITY OF QUANTITY SUPPLIED

Explanatory Variable	Estimated coefficient	Std. Error	t-radio	Change among the whole	Change among tomato sellers	Change in Probability
CONSTANT	-1.9061	10.1576	-0.188	-1.9055	-1.8977	-0.00013
SOLMKTI	0.0234	0.0111	2.111**	0.0234	0.0233	1.54E-06
GENDER	-3.5102	4.2684	-0.822	-3.5091	-3.4947	-0.0002
AGE	0.0651	0.0776	0.840	0.0651	0.0649	4.28E-06
EDU. CAT	2.2348	2.2543	0.991	2.2341	2.2250	0.0001
NON. INC	-4.2804	2.882	-1.48	-.4.2796	-4.2620	-0.0003
CREDITOT	0.0334	0.1385	0.241	0.0334	0.0332	2.19E-06
T_TOMATO	0.9785	0.0075	129.914***	0.9782	0.9742	6.43E-05
T_LAND	-1.7967	1.3743	-1.307	-1.7962	-1.7888	-0.0001
EXT	5.8791	2.0154	2.917***	5.8774	5.8532	0.0004
INF_NEA	5.8041	2.1655	2.680***	5.8023	5.7785	0.0004
ACTIV_LA	0.1635	0.8893	0.184	0.1634	0.1627	1.07E-05
TLU	-0.2663	0.3559	-0.748	-0.2662	-0.2651	-1.7E-05
OX	-1.9939	1.3075	-1.525	-1.9933	-1.9851	-0.0001
CROP_YIE	-0.2903	0.2226	-1.304	-0.2902	-0.2890	-1.9E-05
PRICE	-0.5653	0.9780	-0.578	-0.5652	-0.5628	-3.7E-05

Log likelihood function = -853.0278
Z= 0.0009
F(z)=0. 9997
f(z)= 3.39
Sigma = 13.6957
Number of observations 164
*** and ** represents level of significance at 1% and 5%, respectively.

Source: own computation, 2012

Extension contact (EXT). As hypothesized, contact with extension agents positively influenced the quantity supplied and was significant at 1% significance level. On average, change in the extension contact of the household on the quantity of tomato supplied was 5.8774 kgs among the whole group and 5.8532 kgs among the sellers group. Extension contact of household heads increased the probability of quantity supplied among the non sellers by 0.04%. This suggests that access to extension service improved production and farmers could be aware of the various aspects of the production and productivity of tomato.

Access to market information (INF_NEA): Information access is also another factor, which positively affects quantity supply at 1% significance level. On the average, the change in having market information of farmers on quantity supplied was 5.8023 kgs among the whole group and 5.7785 kgs among the sellers. Having market information increase the probability of quantity supplied among non-sellers by 0.04%. The implication is that obtaining and verifying information helps to supply more.

8.4.2. Heckman two-stage result

Tobit model implies that all producers are potential suppliers of tomato i.e. sellers may not be drawn randomly from the population and introducing a selectivity bias into the supply equations and that supply levels and market participation are influenced by the same variables and in the same way. However, if two decisions are involved, such as participation and volume of supply, a Heckman is desirable. This model allows the supplier to choose whether or not to participate in a particular market, and if so, to choose the volume of supply. Thus, a Heckman (1979) two-stage procedure is used in which the inverse Mill's Ratio is calculated from a Probit estimation of the decision to sell and introduced into the supply equations.

8.4.2.1. Determinants of tomato market participation decision

Results of the Probit model are summarized in Table 8.12. In the first stage, households decide whether they will be sellers, or not. The decision to participate in the tomato market was estimated by Probit maximum likelihood method. Of the potential variables i.e. a total of 12 potential predicted variables (5 dummy and 7 continuous) were selected and entered in to the Probit model. The Probit model was highly significant with a χ2-value of 213.1239 and correctly predicted 95% of the observed outcomes. The significant variables described as follows:

Production of tomato (T_TOMATO): As hypothesized, tomato production influenced the farmers' decision to participate in tomato market positively. This is explained by the fact that tomato is the major horticultural crop for small farmers and shows that the higher the output, the higher is the farmer willing to participate in the market.

Productivity of food crops (CROP_YIE): The productivity of food crops influenced tomato market participation negatively. The implication is that the low productivity of food crops increases tomato market participation, which is in line with the expectation that a family who faces low productivity in grain production will face food grain shortage that needs to be compensated through purchase of food grains. The cash source in turn can be from the sale of cash crops like tomato.

TABLE 8.12: MAXIMUM LIKELIHOOD ESTIMATES OF PROBIT MODEL

Variables	coefficients	t-ratio	Marginal effect
Constant	0.8772	0.524	4.498E-05
GENDER	-0.6341	-0.867	-1.015E-05
AGE	0.0008	0.078	4.307E-08
EDU_CAT	0.0388	0.097	2.067E-06
NONF_INC	-0.4552	-0.896	-8.546E-05
CREDITOT	0.0026	0.246	1.330E-01
T_PTOMATO	0.0649	6.233***	3.329E-06
T_LAND	-0.1959	-0.754	-1.004E-05
EXT	0.4788	1.218	2.556E-05
FAM_SIZE	-0.1022	-0.720	-5.242E-06
TLU	-0.0319	-0.658	-1.637E-06
CROP_YIE	-0.1174	-2.466**	-6.018E-06
PRICE	0.0113	0.073	5.801E-07

Log-likelihood function -9.756451 Chi-squared 213.1239
Restricted log likelihood -116.3184 Predicted Success 95%
Significance level 0.0000000 Number of observation 164
*** and ** indicate statistically significant at 1%, and 5% respectively

Source: own computation, 2012

8.4.2.2. Factors affecting quantity of tomato sold

The second stage estimation is summarized in Table 8.13 and it indicates that the decision of how much households sell. Each decision has been studied by using a selection model which included the inverse Mill's Ratio calculated from a Probit estimation of the decision to sellers into the supply equations. There are 14 potential explanatory variables (8 continuous and 6 dummy) including inverse Mill's Ratio (LAMBDA). Out of these 5 variables, production of tomato (T_TOMATO), non farming income (NONF_INC), extension contact (EXT), livestock (TLU) and inverse Mill's Ratio (LMBDA), had significant effect on quantity of tomato supplied. The F-test value 5.11 for the selection model was highly significant and the adjusted R2 was 99.07%.

Non-farming income (NONF_INC): As hypothesized, non-farm income of the household heads negatively affected quantity supplied. On average, if a tomato producer gets non-farming income causes a 4.55 kgs reduction in the quantity of tomato supply. This may be explained by the fact that farmers who have better non-farm income will not tend to generate cash from sell of agricultural commodities (tomato) rather from their non-farm income.

Production of tomato (T_TOMATO): As hypothesized the regression coefficient of tomato production variable was positively related with quantity supplied and significantly at 1% probability level which is the similar significance level. The result shows that a one kg increase in the tomato production causes a 0.9710 kgs increase in the amount of marketed supply. Total tomato production influenced the amount of marketed supply of tomato positively showing that farmers who produce more sell also more, which is consistent with the general expectation.

TABLE 8.13: ESTIMATES OF SELECTION MODEL

Variables	Coefficient	Standard deviation	t-ratio	Marginal effect
Constant	-5.5281	8.2933	-0.667	-5.5281
SOLMKTDI	0.0040	0.0096	0.419	0.0040
GENDER	-1.4928	3.7463	-0.398	-1.4928
AGE	0.0621	0.0667	0.932	0.0621
EDU_CAT	2.1165	1.9876	1.065	2.1165
NONF_INC	-4.5428	2.5851	-1.757*	-4.5428
CREDITOT	-2.5770	2.6278	-0.981	-2.5770
T_TOMATO	0.9710	0.0072	135.078***	0.9710
EXT	4.8113	1.7743	2.712***	4.8113
INF_NEA	-0.8691	1.9392	-0.448	-0.8691
FAM_SIZE	0.1661	0.7568	0.219	0.1661
TLU	-0.4932	0.2070	-2.383**	-0.4932
CROP_YIE	-0.2137	0.1898	-1.126	-0.2137
PRICE	0.0892	0.8135	0.110	0.0892
LAMBDA	7.7730	3.7503**	2.073**	7.7730

Inverse Mill's Ratio (LMBDA): The inverse Mill's Ratio affects the quantity supplied positively with 5% significance level and it indicates that in Heckman two-stage model, the correction for selectivity bias is significant.

The results of the Tobit differ substantially from those of the Heckman two-stage model. Many of the more sensitive results only emerge from the more general estimation method used. For example, market access and market information and these overloaded appear only in Tobit specification. Non- farming income,

crop yield and livestock ownership significant in the more general, in Heckman two-stage model. All of these qualitative differences suggest that the estimator the study introduced indeed adds real value.

9.0 FINDINGS

The finding reveals that there is poor market information system, limited bargaining power of farmers, oligopolistic market structure in the tomato market. Barrier to entry were education and capital. Market information system was not transparent among farmers and traders. However, all traders have information from different informal sources. Regarding the conduct of tomato market, pricing strategy of the traders indicated that 50% of traders set their purchase price. This indicates clearly that the tomato market is oligopolistic in nature. The result of this study has shown that the increase in size of livestock and farmers non-farming income affected the quantity supply of tomato negatively.

Tomato production is the most important and significant variable influencing the decision to participate in tomato market positively. However, food crop yield adversely affected tomato market participation. Moreover, tomato production and extension contacts are the significant determinant factors of the quantity of tomato supplied positively. However, non farming income and number of livestock are the significant determinants of the quantity of tomato supplied negatively. The coefficient associated with the inverse Mill's ratio was significant, indicating that the influence of unobservable factors in the farmers' decisions to participate was significant.

10.0 RECOMMENDATIONS

The following policy measures could be; enhancement of tomato producers' bargaining power through cooperatives, hence reducing the oligopolistic market structure in the municipal markets. Such measure also facilitates the regular supply of tomato at reasonable price to consumers.

To promote tomato market participation in a sustainable way, some policy implication is suggested to be addressed by those stakeholders (extension agents and juice extraction factories). A policy that would improve tomato production capacity by identifying new technologies and the causes of diseases problems. Creating stable demand for surplus production would enhance farmers' decisions on tomato production. There is need to improve extension system and technical supervision and follow up must be strong. Strengthening of market extension (linking farmers with markets, building marketing capacity of farmers, etc.) is necessary. Here, the stakeholders should further evaluate critically farmers cost incurred and benefit obtained from the livestock, none farming income and tomato production and then, let report them the result. Then, the farmers can decide where to invest by comparing and contrasting the results of the evaluation. Competitive market and market information services have to be established or strengthened to provide farmers and traders accurate and timely information on current supply, demand and prices at national and county levels.

11.0 CONCLUSION

Both farmers and traders should form strong cooperative societies to enable them to access credit and have a bigger bargaining power in marketing the produce for the benefit of all players. In times of glut production, the same co-operative societies should establish processing plants for value additions to reduce wastage and other losses in the sub-sector. Barriers to entry need to address to make the market more competitively.

The county government needs to upgrade major rural roads in all the six constituencies to ease transport problems in accessing the market. The main determinants of the quantity supply of tomato were analyzed using Tobit model. However the problem with the Tobit model is that it assumes that all producers are potential suppliers of a good and that volume of supply and market participation are influenced by the same variables in the same way. This may introduce a selectivity bias.

12.0 SCOPE FOR FURTHER RESEARCH

A research study needs to be done in the neighbouring Counties to establish the potential of Horticultural food market so as to utilize the Eldoret International Airport for exports.

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