Analysis of Haricot Bean Market Chain: The Case of Meta District, Eastern Hararge Zone of Oromia National Regional State, Ethiopia

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Abstract
Production and marketing of haricot bean is constrained by different factors. Furthermore, the marketing chain, market competition, market structure, conduct and performance of haricot bean and their characteristics were not well identified in the study area. Hence, the overall objective of the study was to analyze the market system and factors affecting the supply of haricot bean in the study area. A total of 150 sample households and 36 traders were selected using simple random sampling method for interview. To identify factors affecting market supply Heckman’s two-stage model was used. The result revealed that only 14% of producers have the power to set haricot bean price and 22.67% of price was set by market, while above the average 63.33% of price was set by traders. There were six identified haricot bean market channels. Wholesalers and rural assemblers take the largest share, purchasing 52.23% and 29.41% of producer’s production, respectively. Wholesalers obtained the highest profit, which accounts for 1.70 Birr per kilogram. From a total of sampled producers, about 43% of haricot bean producers were found to be non-sellers of haricot bean due to different reasons. The four-firm Concentration Ratio implies that haricot bean market was characterized by an oligopolistic market. Variables like size of output, extension contact, improved seed and number of oxen have a positive effect on households’ decision to sale haricot bean; while family size and non-farm income determined volume of sale negatively. The coefficient of lambda was significant, indicating that the influence of unobservable factors in the producers’ decisions to participate was significant. As identified, producers were not beneficial from the production of haricot bean. Therefore, government attention is needed in improving the efficiency in production and marketing chain through strengthening institutions like cooperatives. The finding suggested that, improved seed and effective market information service have to be established to provide accurate and timely market information to producers.

Keywords: Haricot bean, market chain, structure-conduct-performance, marketing margin

1. Introduction
Agriculture is the mainstay of Ethiopia’s economy and the largest source of foreign exchange earnings. Ethiopian economy is largely dependent on agriculture, employing 85% of the labor force and accounting for nearly 43% of the gross domestic product (GDP). The same sector contributes about 90% of the country’s foreign exchange earnings and supplies about 70% of the country’s raw material required for agro-based large and medium sized local industries.

As per the National Accounts data, agricultural crop production accounts on average for 60%, livestock 27%, and forestry and other sub-sectors 13% of the total agricultural value added (EHAO, 2011).

Marketing activities also have an intrinsic productive value, in that it adds time, place and possession utilities to products and commodities. Through the technical functions of storage, processing, and transportation and through exchange, marketing increases consumer satisfaction from any given quantity of output.

An efficient agricultural marketing is crucial for effective agricultural and rural development, particularly with regard to sustained increase in agricultural production, producer’s income and improvement of the food security capabilities (Arora, 1997). In Ethiopia, common bean is one of the most important cash crop and source of protein for producers in many lowlands and mid-altitude zones.

The country’s export earnings are estimated to be over 85% of export earnings from pulses, exceeding that of other pulses such as lentils, horse (faba) bean and chickpea (Negash, 2007). Overall, common bean ranks third as an export commodity in Ethiopia, contributing about 9.5 % of total export value from agriculture (FAOSTAT, 2010). Total national production was estimated at 421,418 ton in 2008, with a market value of US 132,900,609 million (FAOSTAT, 2010).

Even though haricot bean is largely grown in Ethiopia, the national average yield in general and Meta district in particular is low ranging from 0.5 to 0.8 tons per hectare, which is far below the corresponding yield recorded at research sites (3.5 to 3 tons per hectare) using improved varieties (EBPA, 2004). The low national mean yield observed for haricot
bean could be attributed to various constraints related to low marketing facility, lack of access to improved varieties of seed and poor cultural practices (Alemitu, 2011).

Astewel (2010) also explained that in Ethiopia the performance of agricultural marketing system is constrained by many factors such as: poor quality of agricultural produce, lack of market facilities, weak extension services which ignored marketing development and absence of marketing information.

The flow of agricultural produce from the producer to the consumer involves a long chain of intermediaries, who, without creating value-added, merely keep on stretching the chain. Hence, this particular study was initiated to fill this gap.

2. Research Questions

This study has attempted to answer the following research questions:

- What are the major haricot bean marketing channels in the study area?
- Through which actor large percent of the product enters to the market?
- Who gets the major share of the marketing surplus in haricot bean marketing channels in the study area?
- What are the constraints and opportunities of haricot bean marketing in the study area?
- What factors affect the supply of haricot bean to the market?

3. Research Methodology

The study was conducted in Meta district in Eastern Hararge Zone of Oromia National Regional State in the eastern Ethiopian highland. Simple random sampling method was employed. It has two parts that are traders and the producers’ survey. The traders’ survey was employed in three sample markets. The sample markets include Dire-Dawa and two local markets, Kulubi and Chelenko from Meta district. Sample producers were selected from those who produce haricot bean. From 51 kebeles of Meta district 12 kebeles grow haricot bean. From these five kebeles were selected randomly and from these five kebeles 15% of the population, a total of 150 producers were randomly selected and interviewed. Semi structured formal interview guidelines were prepared and piloted before data collection in order to include all the necessary information. Formal survey and interviews were made with randomly selected producers and traders using questionnaires. On the other hand, an informal survey in the form of Rapid Market Appraisal (RMA) technique was employed using checklists for both producers and traders to obtain additional supporting information for the study.

i. The participation Equation: The Probit model is specified as:

\[ Y_i = x_i' \beta_i + \epsilon_i, i = 1, \ldots, n \]

Where: \( Y_i \) is a dummy variable indicating the market participation that is related to it as

\[ Y_i = 1 \text{ if } Y_i > 0, \text{ otherwise } Y_i = 0 \]

\( \beta_i \) are the variables determining participation in the Probit model,

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

\( \epsilon_i \) is random error term

ii. Regression (OLS): Selection model is specified as:

\[ Q = Z_i \alpha_i + \mu \lambda + \eta \]

Where: \( Q_i \) is the volume of haricot bean supplied to market

\( \alpha_i \) is a vector of unknown parameters to be estimated in the quantity supply equation

\( Z_i \) is a vector of explanatory variables determining the quantity supplied

\( \mu \) is the parameter that helps to test whether there is a self selection bias in market participation

\( \eta \) is the error term.

Lambda, which is related to the conditional probability that an individual household will decide to participate (given a set of independent variables), is determined by the formula.

To identifying factors influencing haricot bean supply, the main task is to analyze which factor influences and how? Therefore, potential variables, which are supposed to influence haricot bean market participation and quantity of haricot bean supply, need to be explained. In view of that, the major hypothetical variables expected to have influence on both the producers’ participation decision and quantity supply are explained as follows.

4. Dependent Variables

Market participation decision (MKTPD): This is a dummy variable, which takes value 1 if the producer decides to participate in marketing of haricot bean and 0 otherwise.

Quantity supplied (QSU): It is a continuous variable that represents the actual supply of haricot bean in Qt by farm household to the market.

5. Independent Variables

Sex of the respondent (SEX): - It is a dummy variable taking zero if female and 1 if male. It is hypothesized to affect both participation and supply of haricot bean to be considered.

Age of household head (AGE): - It is a continuous variable and measured in years. Aged households’ heads are believed to be wise in resource use, and it is expected to have a positive effect on market participation and marketable surplus.

Education of household head (EDUCHH): It is a categorical variable and refers to the formal schooling of a respondent during the survey period. Accordingly, household heads are sort out in to six categories (illiterate who cannot
read and write, read and write, 1-4, 5-8, 9-12 and >12). Households who had education determine the readiness to accept new ideas and innovations, and easy to get supply, demand and price information and this enhances producers’ willingness to produce more and increase volume of sales. Therefore, education will be hypothesized to positively influence market participation and marketable surplus.

Total size of land owned (TSLO): Total size of land that the respondent owned measured in hectares. The expected sign will be positive. The more land owned the more will be the probability to allocate for haricot bean crop and more to supply.

Family size (FAMSIZE): Family size is the number of family members in the household. It is a continuous variable. The higher number of family members an individual has the more size of land allocated to the haricot bean and more to supply.

Number of oxen owned (Ox): This is a continuous variable that refers to the number of oxen the respondents owned. Households with high number of oxen may be engaged in more of haricot bean production that increases the producers’ volume of haricot bean supply.

Extension service (EXTENSION): A dummy variable representing extension service as a source of information on technology. Those producers who have contact with extension workers are more likely to know the advantage of haricot production for market.

Total livestock unit (TLU): - This is a continuous variable in which, when the household has less production; he must either borrow money or sale his livestock to meet household needs

Distance from development center (DISFDEVC): - This variable was considered to see the intensity of extension service. The nearer a farmer is to a development agent the more frequent would be his chance to get an advice. As a farmer dwelled far the lesser would be the probability of participation decision.

Income from non-farming activities (IFNFA): It is a dummy variable, which is obtained from non-farming activities by the household head. This income may strength farming activity or reluctant to produce haricot bean to generate money from haricot bean rather than getting income from non-farming activities. Therefore, getting income from non-farming activity is assumed to have inverse relation with market participation and marketable surplus.

Credit access (CREDA): This is a dummy variable, in which access to credit will enhance the financial capacity of the producer to purchase the necessary inputs. Therefore, it is hypothesized that access to credit will have positive influence on market participation and volume of sale.

Distance from market (DISTFMKT): This is a variable used to measure access to markets measured in travel hours for a feet single trip. It is a continuous variable and expected to influence participation and supply negatively.

Access to improved varieties of seed (SEEDU): It is dummy variable, which is 1if they have access to improved seed and 0 otherwise. Producers who have access to improved varieties of haricot bean inputs can increase the productivity of this commodity.

Fertilizer application (FERTIAPPLI): is a dummy variable, which takes a value one if the producers use fertilizer for haricot bean production and zero otherwise. Hence, fertilizer application is assumed to have a positive effect on haricot bean quantity supplied.

Market information (MKTINF): It is a dummy variable, which takes a value one if the producers have access to market information and zero otherwise. Therefore, it is hypothesized that market information is positively related to market participation and marketable surplus.

6. Result and Discussion

Descriptive Analysis

6.1. Sex, Marital Status, Religion and Educational Level

The survey result in Table 1 depicted that 70% of sample households were male and the rest 30% were female. Regarding religion, the majority of sample household heads (81%) were Muslim; where as 14% and 5% of the sample household heads were Orthodox and Protestant respectively. With regard to marital status, 81% of total sample respondents are married. While 15% and 4% were divorced and single, respectively. Education enables the person to do basic communications and interact with different valuable situation. Hence, educational background of the sample household heads is believed to be an important factor that determine the readiness of household heads to accept new ideas and improve their market participation decision.

The survey result showed that about 46.67% of the sample household heads were illiterate. Among the sample households, about 14.67% of them could read and write whereas 18.67%, 13.3% and 4.67% had joined primary, junior school and secondary education school respectively. These groups were able to interpret market and other information better than those who had less or no education. The chi-square test indicated that there was a significant difference between participants and non-participants at 1% significance level in their education.
Table 1: Demographic Characteristics of Sample Producers

| Variables          | Description     | Non-Participant | Participant | Total | %     | $\chi^2$ -value |
|--------------------|-----------------|-----------------|-------------|-------|-------|----------------|
| Sex                | Male            | 42              | 63          | 105   | 70    | 0.216         |
|                    | Female          | 22              | 23          | 45    | 30    |               |
| Religion           | Orthodox        | 10              | 11          | 21    | 14    | 2.966         |
|                    | Muslim          | 53              | 68          | 121   | 81    |               |
|                    | Protestant      | 6               | 2           | 8     | 5     |               |
| Marital status     | Single          | 2               | 4           | 6     | 4     | 0.416         |
|                    | Married         | 52              | 70          | 122   | 81    |               |
|                    | Divorced        | 10              | 12          | 22    | 15    |               |
| Education level of | Illiterate      | 43              | 30          | 73    | 48.67 | 20.92 ***     |
| household head     | Read/write      | 10              | 12          | 22    | 14.67 |               |
|                    | 1-4             | 7               | 21          | 28    | 18.67 |               |
|                    | 5-8             | 4               | 16          | 20    | 13.33 |               |
|                    | 9-13            | 0               | 7           | 7     | 4.67  |               |

Table 1: Demographic Characteristics of Sample Producers

*** Means Significance, at 1% Significance Level
Source: Own Survey

6.2. Age and Family Size of the Sample Households

Age of the household head is one of the major factors, since it determines whether the household benefits from experience, or has to base its decisions on the risk-taking attitude of younger producers. The result of the study depicted that the age of respondents ranged from 20 to 74 Years With Average age of 37.31 years. The independent sample t-test revealed that there is a significant difference at 1% level of significance on mean age of producers in the sample kebeles. The average family size of sample farm households was 8.14. The minimum and maximum family sizes were found to be 1 and 16, respectively. A significant and negative relationship is observed between age and size of output and market participation decision at 5% significance level (Table 2).

Table 2: Age and Family Size of the Sample Households

| Variables          | N   | Mean | S.D  | Min | Max | t-value |
|--------------------|-----|------|------|-----|-----|---------|
| Age                |     |      |      |     |     |         |
| None participant   | 64  | 39.28| 10.90| 20  | 74  | 2.13**  |
| Participant        | 86  | 35.85| 8.80 |     |     |         |
| Family size        |     |      |      |     |     |         |
| None participant   | 64  | 8.14 | 3.78 | 1   | 15  | 4.39*** |
| Participant        | 86  | 5.71 | 3.00 |     |     |         |

Table 2: Age and Family Size of the Sample Households

*** And ** Means Significance, at 1% and 5% at Significance Level Respectively
Source: Own Survey

6.3. Sex, Religion and Marital Status of Sample Traders

Table 3. depicted that 22 (61.1%) of the sample traders are male and the remaining 38.9% of the sample traders are female. Accordingly, wholesalers are 100 % male, rural Assembler 60 % male, Urban Assembler 42.9 % male and the retailers are 33.6% male.

With regard to religion of traders, 30.5% of them are Orthodox, 66.7% are Muslim and the remaining 2.8% were protestant. The sampled data showed that the majority of respondents about 80.6% were married, the remaining share of single and divorced were 13.9% and 5.5% respectively.

Table 3: Sex, Religion and Marital Status of Sample Traders

| Variables          | Wholesalers N = 8 | Urban assemblers N =15 | Urban assemblers N=7 | Retailer N=6 | % | Total N=36 |
|--------------------|-------------------|------------------------|----------------------|---------------|---|-----------|
| Sex                | Male              | 8                      | 100                  | 9             | 3 | 42.9      | 2 | 33.6       | 61.1 | 22          |
|                    | Female            | 0                      | 0                    | 6             | 4 | 57.1      | 4 | 66.4       | 38.9 | 14          |
| Religion           | Orthodox          | 2                      | 25                   | 4             | 3 | 42.9      | 2 | 33.6       | 30.5 | 11          |
|                    | Muslim            | 5                      | 62.5                 | 11            | 4 | 57.1      | 4 | 66.4       | 66.7 | 24          |
|                    | Protestant        | 1                      | 12.5                 | -             | - | -         | - | 2.8        | -   | 1           |
| Marital status     | Single            | -                      | -                    | 3             | 1 | 14.3      | 1 | 16.7       | 13.9 | 5           |
|                    | Married           | 8                      | 100                  | 11            | 5 | 71.4      | 5 | 83.3       | 80.6 | 29          |
|                    | Divorced          | 0                      | 6.7                  | 1             | 1 | 14.3      | - | 5.5        | -    | 2           |

Table 3: Sex, Religion and Marital Status of Sample Traders

Source: Own Computation from Survey Data
with better market information are in a better position to supply their surplus production to the market. The major variable identified that 7 variables were found to be the significant factors affecting the producers market participation decision. Those identified factors affect participation decision in both directions (negatively or positively). That means except family size and income from nonfarm activity all the significant variables increase the chance of selling haricot bean. In line with this (Astewel, 2010) stated that size of output, total livestock unit and market information significantly affects the chance of household selling of rice to the market positively. Moreover, Goetz (1992), in his study of household food marketing behavior found that better information significantly raised the probability of market. Those producers with better market information are in a better position to supply their surplus production to the market.

6.4. Marketing Channels
Marketing channel is the sequence of intermediaries through which whole product passes from producers to consumers (Rehima, 2006). The analysis of marketing channels was intended to provide a systematic knowledge of the flow of goods and services from its origin of production to final destination (ultimate consumers or export). The estimated volume of production of haricot bean in the district was about 2,86600kgs. In this study, six haricot bean market channels were identified.

As can be understood from Figure 1 the major haricot bean buyers from producers were wholesalers 52.3% followed by rural assemblers with a percentage share of 29.41%. Likewise, the channel comparison based on the volume that passed through each channel were analyzed. Correspondingly, the channel of producer-wholesaler-exporter carry on the largest followed by producer- rural assembler- wholesaler- exporter carry on a volume of 149700kg and 84300kg respectively.

6.5. First Stage Estimation (Probit Model)
For the first stage, households decide whether they were a seller, or not. Table 5, revealed that the Probit model identified that 7 variables were found to be the significant factors affecting the producers market participation decision. The major variables affecting market participation decisions family size (FAMSIZE) income from non-farm income activity (IFNFA), size of output (SISEOPT), total size of land owned (TSLO) and market information (MKTINFO), number of oxen (OX) and extension visit (EXTENSION) respectively.

According to the report, among the trader’s haricot bean wholesalers get the highest marketing margin, even if they incur the highest marketing cost.

![Figure 1: Marketing Channel of Haricot Bean](source: own computation)

| No | Marketing Margin | Channels (%) |
|----|------------------|--------------|
| I | II | III | IV | V | VI |
| 1 | TGMM | 0.00 | 19.32 | 43.30 | 43.30 | 43.30 | 19.32 |
| 2 | GMM producer | 100 | 80.68 | 54.70 | 54.70 | 54.70 | 80.68 |
| 3 | GMM rural ass | - | - | - | 15.65 | - | 15.65 |
| 4 | GMM urban ass | - | - | - | - | 16.07 | - |
| 5 | GMM whole seller | - | - | 43.30 | 27.65 | 27.23 | - |
| 6 | GMM retailer | - | 19.32 | - | - | - | 4.35 |

Table 4: Gross Marketing Margin
Source: Own Computation from Survey Data

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### Table 5: Maximum Likelihood Estimates of Probit Model

| Variables   | Coefficients | Standard Error | t-ratio | Marginal effect |
|-------------|--------------|----------------|---------|-----------------|
| Constant    | 5.810        | 2.541          | 2.290   | 10.797          |
| SEX         | 0.354        | 0.355          | 1.000   | 0.002           |
| AGE         | 0.007        | 0.020          | 0.380   | 0.041           |
| FAMSIZE     | -0.029*      | 0.052          | -0.560  | -0.073          |
| SISEOPT     | 0.400**      | 0.118          | 3.410   | 0.070           |
| IFNFA       | -0.900***    | -0.568         | -5.140  | -0.021          |
| TSLO        | 0.960**      | 0.347          | 2.760   | 0.600           |
| TLU         | -1.054       | -0.372         | -2.830  | -0.005          |
| OX          | 2.722**      | 0.212          | 3.410   | 0.007           |
| EXTENSION   | 1.028*       | 0.407          | 2.530   | 0.011           |
| DISTFDEV   | -0.001       | -0.007         | -0.140  | -0.014          |
| CREDCA      | -1.242       | 0.584          | -2.130  | -0.097          |
| DISTAFMKT  | 0.002        | -0.007         | -0.030  | -0.016          |
| MKTINFO     | 0.209**      | 0.083          | 2.530   | 0.002           |
| FRTAPPPLI   | 0.183        | 0.228          | 0.800   | 0.001           |
| SEEDU       | -0.080       | 0.304          | -0.260  | -0.007          |
| EDUHH       |              |                |         |                 |
| edu1        | -0.944       | -0.0459        | -0.820  | -0.002          |
| edu2        | 1.346        | 0.0047         | 1.150   | 0.006           |
| edu3        | 0.583        | 0.0021         | 0.510   | 0.001           |
| edu4        | -0.954       | -0.0061        | -0.780  | -0.009          |

Number of Observations = 150

Log likelihood function = -223.414

Prob > chi2 = 0.000

Chi2 = 246.230

Prediction Success = 90%

Restricted log likelihood = -89.905

6.6. Second Stage (OLS Estimation) of the Selection Model

According to Heckman (1979), a sample selection bias refers to the problems where the dependent variable is only observed for a restricted and non-random sample. Ordinary least square estimation hence leads to both biased and inconsistent estimates of the parameters. To overcome the problem Heckman suggested adding inverse Mills ratio (sometimes referred as hazard rate) as a regressor in to the model enables the parameter estimates become unbiased and inconsistent. The effect of participation decision also on the level of supply is indicated on the parameter estimates of the IMR, which is obtained from the probit mode in the first step of the Heckman two-step procedures. Table 5 summarizes the result of the ordinary least square estimation corrected for the selection bias (second step in Heckman’s selection model). Under this there are 16 potential explanatory variables including LAMBDA. Out of these 6 variables, Family size (FAMSIZE), size of output (SISEOPT) extension visit (EXTENSION), availability of improved seed (SEEDU), income from non-farm activity (IFNFA), and inverse Mill’s Ratio (LMBDA), had significant effect on quantity of haricot bean supplied. The F-test value 4.95 for the selection model was significant and the adjusted R2 was 97.6%.

6.6.1. Size of Output (SISEOPT)

The size of output is 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 haricot bean production causes a 0.729 kgs increase the amount of marketed supply. Total haricot bean production influenced the amount of marketed supply of haricot bean positively showing that producers who produce more sell also more, which is consistent with the general expectation.

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6.6.3. Income from Nonfarm Activity (IFNFA)

The model identified that non-farm income of the household heads negatively affected quantity supplied. On average, if a haricot bean producer gets non-farming income causes a 3.805 kgs reduction in the quantity of haricot bean supply.
This may be explained by the fact that producers who have better non-farm income will not tend to generate cash from sell of haricot bean rather from their non-farm income.

6.6.4. Family Size (FAMSIZE)

Family size affects haricot bean quantity supplied to the market negatively. As the number of family member increased by one unit causes a 0.113 kgs reduction in the quantity of haricot bean supply.

6.6.5. Access to Improved Seed Variety (SEEDU)

Access to improved varieties of seed significantly affects quantity supplied. It causes 3.074kgs increase in haricot bean supply to market. In line with this, Alemitu, (2011) stated that although haricot bean is largely grown in Ethiopia, the national average yield of haricot beans is low ranging from 0.5 to 0.8 tons per hectare, which is far below the corresponding yield recorded at research sites (2.5 – 3 tons per hectare) using improved varieties.

The low national mean yield observed for haricot bean could be attributed to various constraints related to low adoption of improved agricultural technologies.

6.6.6. Extension Visit (EXTENSION)

The other significant variable was extension contact, which affected positively the marketed supply of haricot bean. If all producers get extension contact the amount of haricot bean supplied to the market significantly increases. This suggests that access to get extension service avails information regarding technology, which improves production that affects the marketable surplus.

6.6.7. Inverse Mill’s Ratio (Lamda)

The inverse Mill’s Ratio affects the quantity of haricot bean supplied positively with 10% significance level and it indicates that in Heckman two-stage model, the correction for selectivity bias is significant.

| Variables   | coefficients | Standard Error | t-ratio | Marginal effect |
|-------------|--------------|----------------|---------|-----------------|
| SEX         | -0.272       | 0.265          | -1.030  | 0.248           |
| AGE         | 0.010        | 0.014          | 0.740   | 0.037           |
| FAMSIZE     | -0.113***    | 0.039          | -2.880  | -0.036          |
| SISEOPT     | 0.729***     | 0.088          | 8.280   | 0.002           |
| IFNFA       | -0.805*      | 0.097          | -2.051  | 0.050           |
| TSLO        | 0.454        | 0.323          | 1.400   | 0.088           |
| TLU         | -0.319       | 0.381          | -0.840  | -0.008          |
| OX          | 0.181        | 0.176          | 1.030   | 0.021           |
| EXTENSION   | 0.757**      | 0.293          | 2.500   | 0.082           |
| DISTFDEV    | -0.007       | -0.006         | -1.210  | -0.018          |
| CREA        | 0.208        | 0.315          | 0.660   | 0.004           |
| DISTAFMKT   | -0.006       | 0.005          | -1.210  | 0.004           |
| FRTIAPPLI   | 0.280        | 0.187          | 1.500   | 0.046           |
| SEEDU       | 3.074***     | 0.234          | 8.310   | 0.085           |
| EDUCHH      |              |                |         |                 |
| edu1        | -0.120       | -0.499         | -0.240  | -0.097          |
| edu2        | 0.343        | 0.595          | 0.580   | 0.005           |
| edu3        | 0.098        | 0.529          | -0.190  | 0.0092          |
| edu4        | 0.373        | 0.603          | 0.620   | 0.009           |
| Lambda      | 0.388*       | 0.565          | 1.690   | 0.095           |

Rho 0.362
Sigma 1.074
R-squared = 0.9810 Adjusted R-squared = 0.976

Number of Observations = 86
Log likelihood function = -223.415
Prob > ch12 = 0.000 F = 4.95***
Chi2 = 246.230
Prediction Success = 90%
Restricted log likelihood = -89.905

Table 6: Factors Influencing Quantity Supplied to the Market
***,**, * Significant at 1%, 5% and 10% Respectively
Source: Own Computation From Survey Data

7. Conclusion and Recommendations

Based on the results of this study, the following conclusion and recommendations are given to be considered in the future intervention strategies, which are aimed at the promotion of haricot bean production and marketing in the study area. A number of factors affected market participation decision and volume of sales of haricot bean in the study area.
area. Those identified factors are family size, size of output, extension contact, income from nonfarm activity and access to improved seed as main determinants of market participation decision for a household. For the volume of supply, household head’s family size and income from non-farm activity, size of output, number of oxen, extension visit and access to improved seed varieties were the important variables that determine the volume of haricot bean sale in the market. The study also revealed that haricot bean producers are working on limited plots of land as a sole crop and mostly produce by intercropping as well as socio-economic factors without using improved agricultural inputs. Therefore, increasing production and productivity of haricot bean per unit area of land is a better alternative to increase marketable supply of haricot bean. Introduction of improved varieties, application of chemical fertilizers and using modern technologies should be promoted to increase production.

The results of the study indicated provision of extension service improves market participation of haricot bean. Producers have to link production with marketing. Moreover, it is good to enlighten producers to produce based on market signals, consumer preferences. On the top of that producers should get advice on the proper methods of handling, storing, transporting, and above all improving quality of haricot bean. Hence, it is recommended to assign efficient extension system, updating the extension agents’ knowledge and skills with improved production and marketing system. Traders should have license to carry out at any level of trade. Some of the traders have continued carrying out trading without license. Both urban and rural assemblers and retailers are engaged in this business without license. This has made the legal traders in a disadvantage position when competing in the market. Therefore, public authorities in collaboration with representatives of traders should devise means of controlling those engaged in illegal trade. The finding of the study identified that family size significantly affects the volume of supply. With limited production, supporting a larger and extended family size would have been difficult for the producers.

This problem can be avoided through the intervention of integrating family planning with health extension service and with respective concerned bodies. The evidence obtained from this study illustrated that producer cooperative are weak in organizational structure, because of low capital and lack of infrastructure. As a result, this leads to poor contribution in market stabilizing of the producers’ output.

Moreover, member of the cooperatives is not benefited from the cooperative. Therefore, government and non-governmental bodies should take corrective measure in general and by members of the cooperative in particular. Cooperatives are assumed to play an important role in improving the bargaining position of the producers creating lower transaction costs and reducing the level of oligopolistic market type by creating competitive market. The result of the survey indicated that the overall haricot bean marketing system was found to be traditional, disjointed and inefficient. Thus, the district administrations and government should certify and inspect competing haricot bean product traders to ensure quality standards and to facilitate the haricot bean production and marketing process.

In line with, this the district agricultural office, district trade and industry office, producers cooperatives and traders should work together to increase the efficiency of the market and to gain normal profit in the market chain by giving great attention to the mode of production and marketing to bring about stable income from it for all market actors.

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