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Marketing Analysis of Onion in the Case of Fentalle Woreda, East Shewa Zone, Oromia National Regional State, Ethiopia

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ABSTRACT

This study is attempted to analyze marketing of Onion in Fentalle Woreda with the following specific objectives, identifying factors affecting farmers' onion market participation and intensity of participation. Tobit model were used to examine factors affecting supply of onion. The econometric model result indicated that all the significant variables had a positive effect on households' decision to sell onion except for total number of family size of the head of the household which negatively influenced the marketable supply of the onion. Among the explanatory variables which included in the model, only five variables significantly influenced onion marketable supply. They were family size, non-farm income, total land size, total quantity of onion produced and credit services access significantly influenced the quantity of onion supplied to the market. Producers were not benefited from onion production because of the low producers' share of the markets and high marketing cost. Therefore, the attentions of government are needed in improving the inefficiency in marketing through strengthening institutions. The study suggests that, effective market information service has to be established for accurate and timely market information to producers. Moreover, attentions should be given to improve the storage and transportation systems, access to credit and other services such as training to improve the efficiency of marketing of onion.

Key words: *Marketing chain; Marketing margin; Onion supply; Tobit model*

Introduction

Variety of vegetable crops is grown in Ethiopia in different agro-ecological zones which produced through commercial and small farmers both as a source of income and food. However, the type of vegetable crops is limited and production is concentrated to some pocket areas. In spite of this, the production of vegetables differs from cultivating few plants in the backyards for home consumption up to a large-scale of production for domestic and foreign markets [1].

Onion contributes substantially to the national economy apart from overcoming local demand. According to marketing report the average annual sale of onion was estimated about 2.0 million birr [2]. This indicates that Ethiopia has high potential to benefit from onion crop. In view of this onion is one of the most important cash generating crops for farmers especially around East Showa Zone [3]. Fentalle Woreda is endowed with beautiful different natural resources with the capacity of growing different vegetables. Hawash River is one of Major River which provides great advantages to the Woreda. It is used for irrigation during the dry season for the production of horticultural crops mainly vegetables. Major types of vegetable crops currently growing in the area include onion, tomato, green peppers and some leafy vegetables.

The entire vegetable production in the Woreda is mainly for market. The nature of vegetable production is very fragmented and uncoordinated where all growers produce similar type of crop resulting in glut (mainly onion and tomato).

Objectives of the Study

The overall objectives of the study were to analyze onion marketing chain in Fentalle Woreda, East Shewa zone of Oromia region with the following specific objectives:

1. To analyze the structure, conduct, and performance of onion marketing in Fentalle Woreda.
2. To examine factors affecting farmers' market participation and intensity of participation in Fentalle Woreda (Table 1).

Table 1: The summary, description and measurements of the independent variables.

Variable	Variable code	Operational definition
Age of HH	AGEHH	Continuous (+)
Sex of HH	SEXHH	Dummy (no)
Family size	FAMLYSIZ	Continuous (-)
Educn. Level of HH	EDUCHH	dummy (+)
Extension contact	EXTENTN	Dummy (+)
Distance from market	MARKDIS	Continuous (-)
Current market price	RICEPER	Continuous (+)
Total Qtt. produced	TOTQtPRO	Continuous (+)
Farming experience	EXPERANC	Continuous (+)
Labour force	LFORCE	Continuous (+)
Access to market inf.	MRKTINFO	Dummy (+)
Credit access	CREDIT	Dummy (+)
Non-farm income	NONFINC	Continuous (+)
Total livestock unit	TLU	Continuous (+/-)
Total land size	TOTLAND	Continuous (similar)

Data Analysis Method

The study used simple random sampling method. It has two parts that are trades and the producers' survey. The traders' survey was employed in three sample markets. The sample markets were Welenchiti, Adama and one local market, normally Metehara from Fentalle Woreda.

The sampling method that was adopted for these study is as follows; to select producers a three stage sampling technique were used, that is in the first stage from the 18 kebeles in Fentalle woreda, major onion producing kebeles be first identified purposively from the woreda. In the second stage among onion producing kebeles, five kebeles was selected randomly. In the third stage from the selected kebeles, 140 onion producer farmers after sorting onion producing farmers were selected randomly using proportionate random sampling technique and interviewed [4,5]. The sample size determination is resolved by Slovi's sampling formula with 90 percent of confidence level.

Contrary to farmers, traders' sample was 42. Traders are also selected by systematic random sampling technique. Following the roots of the chain, terminal market traders such as Adama and Welenchiti were also selected.

The overall condition of the marketing situations of the farmers and onion traders was assessed by using rapid market appraisal (RMA) technique and questioner administered survey.

To analyse determinant factors of onion supply, the study used a Tobit model. The data have a censored sample as dependent variable, 16.4% of households does not supply onion even if they produced onion.

Results and Discussion

Household Characteristics

The age of sample household head ranged from 24 to 69 years with a mean of 38.82. The analysis for family size of onion producing households also showed that the family size ranged from a minimum of 1 to a maximum 11 with average family size of 5.79 in adult equivalent. The survey result depicted that about 90% of sample household heads were male and the rest 10% were female. Regarding religion, majority of the sample household heads (91.5%) were Muslims and about 7.1% and 1.4% were wake feta and Orthodox Christians respectively. With regards to the marital status, 0.7% and 89.3% of sample respondents were single and married respectively. While 2.1% and 7.9% were divorced and widowed, respectively.

Land Holding

The survey result indicated that the average land holding of the sample households was 1.5143 hectare. The maximum and the minimum holding sizes were 0.5 and 3.0 hectares, respectively. The result showed that from the total average land size of 1.5143 hectare owned by a producer average 1.4489 hectare of land were cultivated and an average of 0.0071 hectare was allotted for homestead.

Experience of Household in Farm Activities and Income

Onion production experiences of the respondent were 7.36. The result shows households had lesser production experiences. This is because of the livelihood diversifications that they recently made from pastoralist to agro pastoralist. But now a day's farm is the main source of income for the household (Table 2).

During off season, farmers in the Woreda gained additional income by participating in different off-farm activities. As indicated in the above Table 2, off-farm activities are the second source of income and on average it accounts around 1,700 birr/year with a mean non-farming experience of 2.07 years [5-7]. Casual labor activities, involving in productive safety net program, horse drawn carts income, and other cultural material makers such as shoemaker were found to be the major off-farm activities.

Credit Access

Credit is important to facilitate the introduction of innovative technologies, for input and output marketing arrangements. It is the most important factor that promotes production and productivity thereby increasing marketable surplus and ultimately farm income. However, from the total of 140 sampled producers, about 19 from non-participants and 97 forms participant a total of 116 of the respondents need credit and about 33% of them had received credit at an annual interest rate of 10.5% from Microfinance and 8.5% from Peasant association. The chi-square result indicated that there is a significant difference between participant and non-participant at less than 1% on the purpose of credit and source of credit.

Market Participation and Quantity of Onion Sold

A random selection of 140 onion producing farmers for this study encompasses 117 participants and 23 non participants in the market. From these sampled respondent 14 female (4 from non-participant and 10 from market participants) and 126 male (19 from non-participant and 107 from market participants) farmers were taken. The average total quantity of onion sold from both own land and share out for market participants was 144.61 with a minimum of 46 quintals and a maximum of 320 quintals. On the other hand, the average total quantity of onion produced for market non-participants was 16.78 with a minimum of 8 quintals and a maximum of 30 quintals [8,9]. They are manly from Turo Bedenota and Gidara kebeles which are around 20 to 25 Kms away from the market, Metehara. The result of the RMA showed that the reason for the non-market participants do not participate in the onion market was associated with the less land they hold (0.25 to 0.5 hectare), the high family size with a maximum of eleven and minimum of six in their family members and distance to the market, Metehara.

Labor Force

The analysis for source of labor force of onion producing households had depicted 85.7% of the household relay on hired labor. From the result, only 10.7% of the labor force was covered by family labor. This was because of their less experience in farming activities which are diversified from pastoral ways of life (Figure 1).

Degree of Market Concentration

District level analysis was undertaken to calculate concentration ratio as the number of traders was few at the local market level. Due to the limited number of traders in their respective locality, Woreda level market concentration ratio is used to analyze the type of markets prevailed in the district. Concentration ratio was calculated by taking annual volume of onion purchased in 2011/12 [3,10].

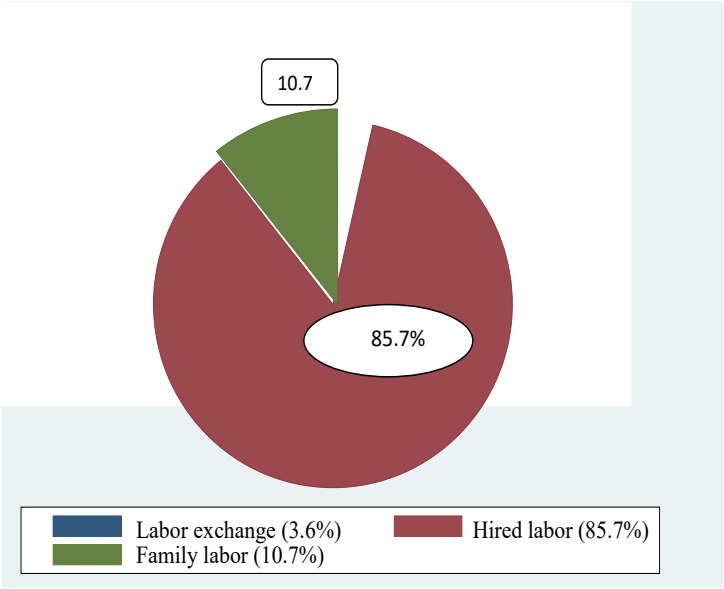
The result of the district level concentration ratio for onion was found to be 34.7 percent. This indicated that the top four traders handled between 30 and 50 percent of the onion market (Table 3).

Onion Marketing Channels

In this study, seven onion marketing channels were identified. As can be understood from Figure 2 the main receivers from producers were wholesalers, rural assemblers and urban assemblers with an estimated percentage share of 45.6%, 25.6% and 19.8%, respectively.

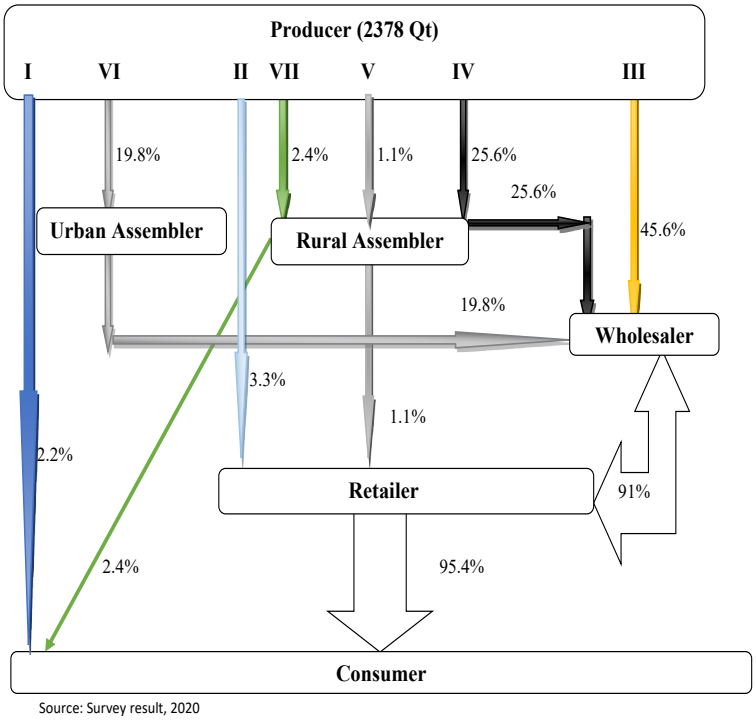
Table 2: Experience of household in farm activity and income.

Variable	N	Min	Max	Mean	Std. D
Experience in farm activities (yr)	140	1	14	7.36	2.98
Annual farm income (birr)	140	5,000	71,000	19,169.14	7,902.64
Experience in nonfarm activities (yr)	140	0	10	2.07	3.2
Annual non-farm income (birr)	140	0	9,100	1,700	2,593.21
Source: Survey result, 2020					



Source: Survey result, 2020

Figure 1: Sources of labor for onion producer households.



Source: Survey result, 2020

Figure 2: Onion market channels for different market participants.

Channel I Producer →Consumer = 52 Qt (2.2%)

Channel II Producer →Retailer→ Consumer = 78 Qt (3.3%)

Channel III Producer →Wholesaler→Retailer→Consumer = 1084 Qt (45.6%)

Channel IV Producer→Rural assembler→Wholesaler→Retailer→Consumer= 610Qt (25.6%)

Channel V Producer →Rural assembler→ Retailer→Consumer = 27 Qt (1.1%)

Channel VI Producer→Urban Assembler→Wholesaler→Retailer→Consumer=471Qt (19.8%)

Channel VII Producer →Rural assembler→Consumer = 56 Qt (2.4%).

Table 3: Onion traders' concentration ratio in Fentalle Woreda.

Number of traders	Cumulative frequency of traders	% of traders	Cumulative % of traders	Quantity purchased in Qt	Total quantity purchased in Qt	% share of purchase	% cumulative purchase
1	3	2.4	2.4	300	300	4.5	4.5
1	4	2.4	4.8	120	120	1.8	6.3
1	8	2.4	7.2	250	250	3.7	10
2	9	4.7	11.9	150	300	4.5	14.5
1	10	2.4	14.3	100	100	1.5	16
1	11	2.4	16.7	180	180	2.6	18.6
1	12	2.4	19.1	350	350	5.2	23.8
1	13	2.4	21.5	380	380	5.6	29.4
2	14	4.7	26.2	250	500	7.4*	36.8
1	15	2.4	28.6	200	200	3	39.8
4	16	9.6	38.2	150	600	9*	48.8
3	17	7.2	45.4	250	750	11.2*	60
2	18	4.7	50.1	200	400	6	66
1	19	2.4	52.5	150	150	2.2	68.2
2	20	4.7	57.2	175	350	5.2	73.4
4	22	9.6	66.8	120	480	7.1*	80.5
2	23	4.7	71.5	80	160	2.4	82.9
3	24	7.2	78.7	50	150	2.2	85.1
1	25	2.4	81.1	100	100	1.5	86.6
2	26	4.7	85.8	120	240	3.5	90.1
2	27	4.7	90.5	150	300	4.5	94.6
1	28	2.4	92.9	120	120	1.8	96.4
2	29	4.7	97.6	60	120	1.8	98.2
1	30	2.4	100	80	80	1.8	100
42		100			6680	100	

Source: Own computation, 2020

Results of the Tobit Model

The Tobit model results shows that out of 15 variables, 5 found to significantly affect the quantity of onion supplied to the market. Accordingly, family size of the household, non-farm income of the household, total land size of the household, total quantity of onion produced and access to credit services significantly affected the quantity of onion supplied to the market.

Total production of onion (TOTQtPRO): The regression coefficient of onion production variable is positively correlated with quantity supplied and significant at 1%. The marginal effect of output was 0.929 kg

Family size (FAMLYSIZ): As hypothesized, the size of the family influenced negatively and significantly the quantity supplied at 5% probability level. Each additional family member decreases the probability of quantity supplied by 0.036% [11]. A unit increase in family member decreases the quantity of onion supplied to the market by 1.161 factors among the whole sample respondents and by 0.953 factors among onion sellers. The result indicates the larger family size tend to supply the less onion produce to the market.

Income from non-farming activities (NONFINC): Is the other variable which positively and significantly affects quantity supply at 1% significance level. On the average, the change in participating on non-farming activities of farmers on quantity supplied was 0.0011 kg among the whole group and 0.001 kg among the sellers. Participating on non-farming activities increase the probability of quantity supplied among non-sellers by 3.33E-05% (Table 4).

Credit access (CREDIT): From the above tables, access to credit variable had positive and significant influence on the likelihood of quantity supplied at less than 5% significance level. Change in credit access of the household was 3.575 kilograms. Access to credit increases the probability of quantity of Onion supplied among the non-suppliers by 0.111%. This indicated that credit access improves production level of Onion [12-15]. Therefore, strengthening and expansion of credit institution into rural area is of paramount importance to address credit needs of farming community.

Total land holding (TOTLAND): Total size of land owned by the sample households was expected to adversely affect total sales (both volume and participation). Total land holding was positively and significantly affected marketable

Table 4: Tobit model result.

Explanatory Variables	Estimated Coefficients	Standard Error	t-ratio	Change among the whole $\frac{\partial E(Y_i)}{\partial X_i}$	Change among onion sellers $\frac{\partial E(Y_i/Y_i^* > 0)}{\partial X_i}$	Change in probability $\frac{\partial F(Z)}{\partial X_i} = f(Z)\frac{\beta_i}{\sigma}$
SEXHH	2.10939	2.978084	0.71	2.10939	1.7327134	0.06535779
AGEHH	-0.0179434	0.1192092	-0.15	-0.0179434	-0.01473919	5.56E-04
EDUCnHH	-1.118411	1.007517	-1.11	-1.118411	-0.91869503	-0.03465309
FAMLYSIZ	-1.159984	0.5872487	-1.98**	-1.159984	-0.95284363	-0.03594117
NONFINC	0.0010759	0.000328	3.28***	0.0010759	0.00088377	3.33E-05
TLU	-0.0055244	0.0480544	-0.11	-0.0055244	-0.00453788	1.71E-04
TOTLAND	5.479856	2.286135	2.40**	5.479856	4.5013104	0.169789
TOTQtPRO	0.9295516	0.0262516	35.41***	0.9295516	0 .76356026	0.02880142
LFORCE	-0.3351515	1.142503	-0.29	-0.3351515	-0.27530299	-0.0103844
EXTENTIN	-0.3198348	1.89007	-0.17	-0.3198348	-0.26272144	-0.00990983
CREDIT	3.575313	1.72885	2.07**	3.575313	2.9368646	0.11077826
MARKDIS	0.0857301	0.1069838	0.80	0.0857301	0.07042113	0.00265628
MRKTINFO	1.761627	1.724563	1.02	1.761627	1.4470504	0 .0545826
PRICE	0.0073448	0.0076446	0.96	0.0073448	0 .0060332	2.27E-04
EXPERANC	-0.4718617	0.4883524	-0.97	-0.4718617	-0.38760066	-0.01462026
Constant	3.084024	7.68982	0.40			

Number of observations = 140 Prob> chi2 = 0.0000
Log likelihood function = -410.39333 LR chi2 (15) = 565.12
Pseudo R2 = 0.4078
*** and * is for significance level at 1%, and 5% respectively
Source: Own computation, 2020

surplus of onion. Increase in a hectare of land designated on increase in the quantity of onion by 5.479 kilograms. A kilogram increase in the size of land holding increases the quantity supplied by non-sellers' group by 0.169%. The assumption that farmer who has more land that the positive impact on market supply, because if a farmer owns more land, the probability of allocating land for onion crops would increase.

Major Constraints and Opportunities in Onion Production and Marketing

Constraints of onion production and marketing: Onion marketing in Fentalle Woreda was constrained by so many factors. According to sample respondents, problems connected to production of onion was lack of knowledge, market related problem and high risk because of poor shelf life. Additionally, there was different types of pest and disease which affects productivity and then marketability of the product.

Production problems: difficulties such as absence of good post-harvesting practice like onion on field watering a day- or two-days prior to gathering the product in order to increase the weight at the time of selling were the usual activities which resulted in poor quality of the product, simply damageable and ultimately low market price. Another problem was problems related with disease and pest such as root rots and water scarcity. In addition, there was a problem of poor production as well as access to extension and uncoordinated input distribution. Farmers obtained seeds from open market [16]. There are no certification, test of quality, and assurances. There was also a problem related to poor agronomic practices such as tillage, application of chemical fertilizer, watering and weeding in the production of onion in the study area.

Marketing problems: Fentalle Woreda onion crop was categorized by imperfect market information. The imperfection in market information makes problems in the negotiating efficiency in which well-versed actors increase their personal advantage while those who don't have info were sidelined. Since most of the producers produce the products at the same time, the production is in excess in the season compared with the demand leading to less price related with bulkiness of the product, perishability and seasonality of the product. Furthermore, weight cheating was a common exercise and marketing influence were occupied by the traders. Failure of unions/cooperative to organize farmers in onion marketing leads to farmers to be price takers than price makers [17,18]. Lack of satisfactory market related research in the study area were also another challenge which hampers concerned authority to make decisions in provision of marketing channel and the whole system.

Opportunities of onion marketing: The major opportunities for Fentalle Woreda were the emergence of Fentalle Boset Irrigation Project for vegetable crop production because of the existence of high irrigation capacities in the Woreda by the Hawash River. The Fentalle producers have a relative benefit of producing onion due to the low-priced work force. Experience (learning effect) and neighborhood effect were more vital in technology acceptance, production and marketing of the produce [18]. The commencement of on farm onion seed making were also another opportunity of production and marketing. Access to infrastructures like road and communication facilities are played huge part in onion market by attracting wholesalers of diverse parts of Ethiopia. The presence of farmers training centers in all *village* are played a great role in the production and improving farmer's managing performance of onion product and thereby increase their volume of market supply. The other opportunities were the existences of governmental and non-governmental organization like Gudina Tumsa Foundation/GTF/, and Lebete Fentalle, that created market linkage with different market actors, enables experience and knowledge sharing within and outside the Woreda.

Conclusion

The channel analysis and gross margin results of the supply chain performance revealed different channels that producers used. Onion farmers should be assisted in identifying the best outlet. Hence, farmers should be encouraged to join co-operatives because they can collect farmers' produce and enable them to have bargaining power for input and product prices. This could assist farmers to find markets and access information about the demand, supply and price of onion. In turn this would motivate them to increase their production as a result of economies of scale.

The major factors identified as a problem in onion market chain analysis were related to both onion production and marketing. Thus, appropriate interventions are required to alleviate these problems. To solve the marketing problems and increase marketable supply of onion, the following recommendations are forwarded:

The results of the study indicated that increase in land holding has a significant effect to the amount supplied. Hence, it is important to provide modern inputs at the right time and the required amount at reasonable price to increase production. Solving the group collateral procedure and collateral problems of farmers and traders to get a credit from different financial institutions is very important. The increase in onion production technique has a significant effect to increase production then by marketed surplus. Hence, continuous education and training that would change the production skill of producers is very important to change the attitude of farmers since they recently diversify their livelihoods from pastoralists. Hence, concerned stakeholders need to provide continuous education and training in production and marketing of onion.

Onion storage facilities were poor in both rural and urban areas. Onion being bulky and perishable, farmers face storage loss and quality deterioration. To solve these problems constructing storage and processing facilities by traders and the government would be very important.

The result of this study has shown that producers in the study area does not get marketing info on time up on which they rely on for their marketing decision. They rely on other stakeholders and relatives for pricing information. Accordingly, there must be an organization that can give them accurate and appropriate marketing related information essential by the producers instantaneously. These would let the market to operate competently and effectively. Access to on time and exact marketing data led farmers' negotiating power to exchange with purchasers of the product. To get these benefits there must be improvements in extension service which focuses on market extension and connection of producers with marketing system is needed to guarantee a consistent market channel for farmers of the study area.

The outcomes of the study also show access of extension package advances marketing involvement of onion producers. Producers have to connecting production with marketing. Additionally, it is important to enlightening producers to produce in line with market demands, consumer favorites and to direct or assist on the appropriate ways of handling, storing, moving, and beyond all up-grading quality of the product. Hereafter, it is suggested to allocate well-organized extension scheme, apprising the extension agent's knowledge and skills with enhanced production and market arrangement even if the settlements of the households are in the scatter manner.

The outcomes of the study also shown that credit services accesses have a substantial result to the amount of onion supplied to the market. Hence, it is important to provide sufficient credit services at the right time and the required amount to increase production and there by quantity supplied. Therefore, government and any concerned bodies have to improve the credit system of the Woreda through strengthening institutions like cooperatives.

Finally, further studies on onion marketing system should be conducted in all onion growing areas other than Fentalle Woreda so that well organized regional and national onion marketing can be implemented.

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