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DETERMINANT OF TURMERIC MARKET SUPPLY IN YEKI DISTRICT OF SHEKA ZONE OF SOUTH WEST PART OF ETHIOPIA

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ABSTRACT

This study was aimed at analyzing the market supply of turmeric in Yeki District Sheka Zones of South West Ethiopia with specific objectives of analyzing the determinants of turmeric supply to the market in the study area. The data were collected from both primary and secondary sources. The primary data for this study were collected from 333 farmers and from key informants through application of appropriate statistical procedures. The result of the multiple regression model indicated that marketable supply is significantly affected by access to market inform, distance to the nearest market, quantity of turmeric produced, land size owned by farmers, household education, access to extension service, price of turmeric and turmeric farming experience. Moreover, the study result showed that turmeric producers are faced with lack of modern input supply on the production side. Unfair marketing system and lack of policy framework to control the illegal trading system of the area are also the major problems on the market side. Therefore, policy aiming at increasing farmers' access to modern inputs, developing and improving infrastructure, developing bargaining power of producers, gender consideration, and improving extension system are recommended to accelerate turmeric supply.

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INTRODUCTION

Turmeric is the dried rhizome (*Curcuma Longa*) which is used as a ground spice and in curry powder, mainly as a food-coloring agent as well as a coloring material in the textile industry. Ethiopia is one of turmeric importing countries until 1972 but two varieties of turmeric were introduced from abroad for adaptability study from India and China and planted at *Jima, Metu, Bebeke, Tepi, Wenago, Awasa, Magi* and *Bako* in 1972. Since then in those areas turmeric is produced by small land owners. Turmeric can be grown up to an altitude of 2000m in areas with high rainfall. At present, because of the suitability of Southern humid regions, turmeric is widely grown. Although the country produces a number of economically important spices and turmeric is the significant one; it had not established itself as a significant international supplier until recently (Abdalla, 2013). Compared to India the production and export of turmeric is very low.

The annual export of India for the period between 2008 -2012 was 62410 tons which has annual value of \$108.62 million USD. Ethiopia's per annum export for the same period was only 1276 tons with annual earnings of \$ 1.37 million USD. During the last five years the Ethiopian annual average turmeric export has been growing at a rate of 35% by volume and 26 % in value which is better than the growth rate recorded by Indian. The number of importing countries from Ethiopia for turmeric has been increased which is a good panorama for turmeric producers and exporters in the country (Addisu, 2014). The production of spices particularly ginger and turmeric are a major source of cash sale of the farming system in the south western part of Ethiopia such as in *Godere, Yeki* and *Sheko* and some parts of *Bench Maji Zone*. In the areas where rain is available for spices production and the presence of the *MizanTeferi – Bonga – Jimma* highway for onward marketing, spices production is a major source of cash income for the households and one of the major sources of livelihood for a large number of transporters, middlemen and traders in the area (USAID, 2005). In *Gomma Woreda*, (Ayelech, 2011) pointed out factors influencing fruit

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marketable supply. Accordingly quantity produced, experience, education and price in the previous year were the main factors that significantly affect quantity supplied to the market. The nature of the product on one hand and lack of organized marketing system on the other often resulted in low supply. Therefore, this study would help to analyze the market supply of turmeric in *Yekiworeda* of *Shekazon* of south west part of Ethiopia.

MATERIALS AND METHODS

The study was carried out in *Yeki* districts of south west part of Ethiopia with specific objectives of market supply chain analysis of turmeric. In order to select a representative sample of turmeric producer, a multi-stage sampling technique was employed. First, by employing purposive sampling method *Yekidistrict* was selected since the most producers of turmeric in zone. In the second stage, with the consultation of *Woredas* agricultural experts and development agents, out of 22 *kebeles* of *YekiWoreda*, 16 turmeric producer *kebeles* were purposively selected based on their level of production. In the third stage, from the identified or selected rural *kebeles*, seven namely *Hibret-Fre*, *Adisbirhan*, *Bechi*, *Shosha*, *Beko*, *Kome*, *Tsanu* were selected randomly. In the fourth stage, using the household list of the sampled *kebeles*, 333 sample farmers were selected randomly based on proportional to the population size of the selected *kebeles*. Apart from farmers, interview was conducted for key informants to get thorough understanding of the issue from the support service providers.

Data Analysis: Descriptive statistics, inferential statistics for household characteristics and econometric analysis by employing Linear multiple Regression model were used to analyze the data collected from turmeric producers.

Hypothesis: To identifying factors influencing turmeric supply to the market it was explored which factors potentially influence and how (the direction of the relationship) these factors are related with the dependent variables.

Linear Regression (CLR) model should hold true. Hence, multicollinearity and heteroscedasticity detection test were performed using appropriate test statistics for each. Eight variables (namely quantity produced, land, and household education, access to extension service, market information, experience and price) were found to be significant at 1%, 5% and 10% significant level. The multiple linear regression result shows that quantity of turmeric produced (QPron) was positively and significantly affected turmeric quantity supplied at 1% level. The positive coefficient indicates that a unit increase in quantity of turmeric produced will increase the marketable supply of farmers.

The result also implied that, a unit increase in the quantity of turmeric produced has caused an increase of 0.409 qt of marketable turmeric. These shows that the more the households produce, the more they supply to the market. This is due to the fact that almost all producers have an objective to generate income from what he/she produced as there is consistency in the general expectation and because of insignificant consumption of turmeric at home. This is in line with (Abraham, 2013) who found that, a quintal increase in the quantity of potato, cabbage and tomato production has caused an increase of 0.47, 0.97 and 0.77qt of marketable potato, cabbage and tomato respectively. (Abay, 2007) also illustrated an increase of tomato and papaya production by farming households has augmented marketable supply of the commodities significantly. The quantity of turmeric produced at the farm level affected marketable supply of turmeric positively and significantly. However, farmers are working under limited plots of land by natural as well as socio-economic factors without using improved technologies and agricultural inputs. They use limited inputs. Hence, increasing production and productivity of turmeric per unit area of land is better alternative to increase marketable supply of turmeric. Introduction of improved varieties, application of chemical fertilizers, and using of modern technologies should be promoted to increase production.

	Independent variables	Direction of relationship with depend variable(sign of direction)
1	Sex of the Household Head(being male)	+ (positively affect turmeric market supply)
2	Age of Household Head(increase)	+ (positively affect turmeric market supply)
3	Price of turmeric (increase)	+ (positively affect turmeric market supply)
4	Turmeric farming experience	+ (positively affect turmeric market supply)
5	Land size (increase)	+ (positively affect turmeric market supply)
6	Family Size (increase)	+ (positively affect turmeric market supply)
7	Accessibility of extension service	+ (positively affect turmeric market supply)
8	Access to credit	+ (positively affect turmeric market supply)
9	Number of livestock owned	_ (negatively affect turmeric market supply)
10	Access to Market Information	+ (positively affect turmeric market supply)
11	Education of the Household Head	+ (positively affect turmeric market supply)
12	Distance to Nearest Market (increase)	_ (negatively affect turmeric market supply)
13	Quantity of turmeric Produced	+ (positively affect turmeric market supply)
14	Income from None/Off Farming Activities	(negatively affect turmeric market supply)

FINDINGS AND DISCUSSION

In the study area, turmeric is produced mainly for market and it is important cash crops in for farmers. According to the research report, all sample households are good suppliers of turmeric to the market. Analysis of factors affecting farm level marketable supply of turmeric was found to be important to identify factors constraining turmeric supply to market. In this respect, 14 variables were hypothesized to affect farm level marketable supply of turmeric. Multiple linear regression models were employed to identify the factors. For the parameter estimates to be efficient, assumptions of Classical

Distance to nearest market (DMkt) was expected to adversely affect the volume of total sales. As hypothesized, this variable is negatively related to marketable surplus of turmeric. The result shows that access to the market was significantly and negatively affected marketable surplus at 10% level. An increase in one kilometer indicated a decrease in the quantity supplied by 1.118 quintals. This is in line with (Ayelech, 2011) who illustrate that an increase in one kilometer indicated a decrease in the quantity supplied by 3.912 quintals. (Holloway et al., 1999) and (Wolday, 1994) also indicated that distance to market caused market surplus of milk and food grain to

decline. The coefficient of price of turmeric which shows a positive relation to the quantity of turmeric sold or supplied to market. Producers checked the price of turmeric for their best benefit and this directs to the determinant to be significance at 5% level. The positive and significant relationship between the variables indicates that as the price of turmeric at market rises, the quantity of turmeric sold at the market also rises, which in turn increases quantity of turmeric sold per household per year. The coefficient of the variable also confirms that a unit price increase in the turmeric market directs to the household to increase yearly turmeric sales by 0.411 quintals.

This is in line with (Mebrat, 2014) who found that a one unit increase in tomato price per quintal increases marketed surplus of tomato by 0.816 quintal. Access to market information (Minfo) affected marketed supply of turmeric positively and significantly at 1% significance level. On average if turmeric producer gets market information, the amount of turmeric supplied to the market increase by 3.907 quintals. This suggests that access to market information reduces farmers risk aversion behavior of getting a market and decreases marketing costs of farmers that affects the marketable surplus. It also shows that access to market information like where to sell, how to sell and price information plays a pivotal role in deciding the amount of turmeric to be supplied to the market. The implication is that obtaining and verifying information helps to supply more quantity of turmeric. This is in line with (Mohammed, 2011) who illustrated access to market information by farming households increase marketable supply of *teff* significantly in Halaba especial Woreda. Similarly, the study by (Abraham, 2013), indicated that access to market information by household heads increases marketed supply of potato significantly in Habro and Kombolcha Woreda. If a potato and tomato producer gets market information, the amount of potato and tomato supplied to the market increase by 3.1 and 2.4 quintals, respectively. It is found that access to extension service (AcExtS) was negatively and significantly associated with turmeric sale volume at less than 5% significant level. The result shows that on average, if turmeric producer gets extension service the amount of turmeric supplied to the market decreased by 1.958qts. The possible reason for the negative sign may be due to the unintentionally deliberation of extension service which is largely in favor of crop production. This is in line with (Carlson *et al.*, 2005) and (Sonko *et al.*, 2005) who explained the current extension approach was in favor of cereals. It is also found that education of the household head (HEduc) was a determinant variable factor for market supply of turmeric quantity.

Education has showed positive effect on turmeric quantity sold with significance level at 5%. On average, if turmeric producer gets educated, the amount of turmeric supplied to the market increases by 3.276 quintal. The result further indicated that, education has improved the producing household ability to acquire new idea in relation to market information and improved production, which in turn enhanced productivity and thereby increased marketable supply of turmeric. This is in line with (Ayelech, 2011) found that if avocado producer gets educated, the amount of avocado supplied to the market increases by 2.642 quintal. In the same way (Astewel, 2010) also illustrated that if paddy producer gets educated, the amount of paddy supplied to the market increases, which suggests that education improves level of sales that affects the marketable surplus. The other factor which affects turmeric market supply is land size. The outcome has showed

significant effect at less than 1% significant level for turmeric with expected positive sign. When land owned by the farmers' increases they increase land allocation for turmeric production which increases marketable supply of turmeric. An increase in the size of one hectare of land owned of producers resulted in an increase in farm level supply of 1.255 quintals keeping other factors constant. Turmeric production is not suitable for crop rotation. It is a yearly product unlike maize and millet which are produced with the same land in a year. Since it is also a cash crop it is not quick to hand mouse consumption; it needs waiting of markets. Because of these factors farmers who have less land are favor to produce other crops. However when the land size of farmers increases they have a probability to allocate their land for immediate consumption and additional income through turmeric sales. In support of the finding here, (Mebrat, 2014) found that as the household possess of land increases by one hectare marketed surplus tomato would increase by 1.35 quintal. (Larsen, 2006) found size of land holdings positively affected the volume of cotton sales at the household level in Tanzania. Similarly, (Kindie, 2007) indicated that the area of land allocated for sesame production in *Metema* District significantly and positively affected farm level marketable supply of sesame. The size of land owned affected the smallholder commercialization of turmeric positively and significantly. However, increasing the size of land holding cannot be an option to increase turmeric supply since land is a finite resource.

Table. 1 Determinants of turmeric quantity supplied to the market

Variables	Coef.	Robuststd.Err	T	P-value
Sex	-2.247	1.214	-1.85	0.107
Age	0.021	0.060	0.35	0.725
Price	0.411**	0.210	2.00	0.048
TFExp	0.175**	0.077	2.28	0.025
Land	1.255***	0.323	3.89	0.000
Family	0.248	0.181	1.37	0.175
AcExtS	-1.958**	0.914	-2.14	0.034
Credit	1.001	1.277	0.79	0.434
TLU	0.018	0.028	0.66	0.509
Minfo	3.907***	1.409	2.77	0.006
HEduc	3.276**	1.486	2.20	0.029
Dmkt	-1.118*	0.665	-1.68	0.095
Qpron	0.409***	0.058	7.04	0.000
NOFI	-1.181	1.528	-0.77	0.441
Const	1.279	3.200	0.40	0.690

Note: Dependent variable- is volume of turmeric supplied to the market; and ***, ** and * indicates Significance at 1 percent, at 5 percent and at 10 percent respectively. $N=838$ $R^2 = 0.916$, $Adjusted R^2 = 0.906$
Source: Own computation from survey result, 2018

Table 2. Major production constraints of turmeric producers

Major constraints	N	%
High price of fertilizer	536	63.9
Lack of pesticides	271	32.3
Lack of improved seed	233	27.8
Labor	706	84.2
Wood and water	788	93.9

Source: Own computation from survey result, 2018

Therefore, intervention aims to increase productivity of turmeric per unit area of land through proper utilization of land resource in the area. Increasing the productivity of turmeric per unit area of land through promoting and delivering technology packages to smallholders that would increase productivity of smallholders and enables them to link up with turmeric output market would be a better alternative for smallholder commercialization. Moreover turmeric farming experience

(TFExp) has showed significant effect at 5% significant level for turmeric market supply with expected positive sign. Thus, the result implied that, as farmer's experience increase by one year, the turmeric supplied to market increased by 0.175 quintals. This is mainly due to the fact that more experienced households have better accumulated wealth that can be used for purchasing production inputs (fertilizer, seeds, farm implements etc), access to information related to the use of new recommended packages and pricing of the product. It is also believed that more experienced household heads are wise in resource use, has better skill of turmeric production and likely to have positive effect on market participation and marketed supply of turmeric than less experienced ones. This result is also supported by (Abay, 2007), who indicated that as farmers' experience increases the volume of tomato supplied to the market also increases. In addition, one year increment in production of vegetables maximize marketable surplus of vegetables of households by 0.362 quintal (Tadesse, 2011).

Production constraints

There are factors that hinder the production of turmeric products in the study area. The majority of the sample producers indicated high price of fertilizer, seed shortage, pesticide shortage, labor and boiling raw materials like wood and water were major constraints of turmeric production. Inputs were not supplied at the right time, place and at fair prices especially fertilizer price is increasing year to year. Seed shortage is one of the main problems of producers especially farmers who have not produced in the previous years. Farmers produce more when its price become high but at the same time the availability of the seed is difficult. Sometimes development agents and research centers supplied improved seed but the supplied was only few farmers and its price was expensive. More over the result of some improved seed is below the old seed because when it becomes dry its kilogram decreases more than the old seed type. Producers use local seed above the recommended rate and fertilizers below the recommended rate that ultimately affects production and income of producers. The other problem observed was labor and raw material of production. Turmeric is labor intensive starting from planting to loading. Collecting of woods and fetching of water is also another expense. 84.2% of the respondents reply labor as the main constraint for production of turmeric. Shortage of labor forced producers to give their turmeric for another farmer for equal sharing which was also the other constraint attributed to low production by decreasing per house hold productivity and market supply. Absence of appropriate post-harvest handling practice is a major problem in the area, some farmer's dry turmeric in area which is not clean and liable for foreign matters. It was also observed that farmers dry turmeric on the floor of around their house that leads to over drying and decrease its pungency then by the quality of the product.

Conclusion

The plant turmeric has been grown in different agro ecological zones of Ethiopia by smallholder farmers, mainly as a source of income as well as for food. The production of turmeric is a major source of cash sale of the farming system in the study area. They serve as a major source of household income. The government of Ethiopia (GoE) also considered as the prime candidates for the diversification of our sole export commodities coffee and sesame to augment the foreign currency earnings of the country and for improving the

livelihood of poor, land-constrained small holder farmers and women (Addisu, 2014). However, higher average productivity of turmeric recorded in the study area in compared to the average productivity national production of turmeric; its production and market supply is found in low level as compared to its potential and compared to other cash crops. The result of the multiple regression model indicates that marketable supply of turmeric is significantly affected by access to market information, quantity of turmeric produced; land size owned by farmers, household education, access to extension service, price of turmeric sold and turmeric farming experience at less than 5% and distance to the nearest market at less than 10%. Therefore, these variables require special attention if marketable supply is to be increased.

Recommendations

The recommendations or policy implications to be drawn from this study are based on the significant variables from the analysis of present study. To start with, dissemination of modern input technologies is essential in increasing the productivity of turmeric. Given that farmers are small-scale and unorganized in the study area, this state of affairs clearly needs strong government intervention. Not only does it require providing input facilities, but also their dissemination to ensure optimal access. Effort should also be made to strengthen farmers' cooperative and encourage collective action of farmers to lower transaction costs to access inputs. Secondly, the results of econometric analysis indicate that turmeric supply to the market is positively and significantly affected by access to market information, quantity of turmeric produced; land size owned by farmers, household education, price of turmeric sold, and turmeric farming experience. Therefore, these factors must be promoted in order to increase the amount of turmeric marketable supply. Increasing the production and productivity of turmeric per unit area of land is better alternative to increase marketable supply of turmeric. Introduction of improved varieties, application of chemical fertilizers and using of modern technologies should be promoted to increase production. Strengthening the supportive activities such as information centers and input supply systems would also boost turmeric supply. In addition to that, building the asset base of the farmers and developing the skills what farmers have through experience increases turmeric supply to the market. Thirdly, marketable supply is significantly and negatively affected by distance to nearest market and access to extension service. Therefore, strengthening efficient and area specific extension systems, improving road infrastructure, supporting DAs by giving continuous capacity building trainings and separating DAs extension work from other administrative activities increases turmeric supply to the market.

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