

Full length Research Paper

## Contribution of Pepper (*Capsicum* spp) Production to Household Food Security in Shashogo Woreda, Hadiya Zone, Ethiopia

Tesfasilassie Girma<sup>a</sup>, Serawit Handiso<sup>b\*</sup>, Messay Mulugeta<sup>a</sup> and Admasu Shibiru<sup>c</sup>

<sup>a</sup>Addis Ababa University, Center for Food Security Studies, College of Development Studies, Po Box: 1176, Addis Ababa, Ethiopia

<sup>b,d</sup> Education Strategy Center, Po Box 32742, Addis Ababa, Ethiopia

<sup>b</sup> Wolaita Sodo University, College of Agriculture, Department of Plant Sciences, Po Box 138, Wolaita Sodo, Ethiopia

**Article history**

Received: 15-10-2017

Revised: 25-10-2017

Accepted: 01-11-2017

**Corresponding Author:**

**Serawit Handiso**

Wolaita Sodo University,  
Department of Plant  
Sciences, College of  
Agriculture, Po Box 138,  
Wolaita Sodo, Ethiopia.

**Abstract**

Pepper producing farmers of Ethiopia cling on it to solve their food security problems. However, information on the contribution of pepper to household food security is not adequate in Ethiopia. The purpose of this study was to investigate the status of pepper production and household food security in Shashogo Woreda, Hadiya Zone, SNNPR, and Ethiopia. The study employed cross-sectional survey design which incorporates both quantitative and qualitative survey methods. The data were collected from primary and secondary sources. Primary data were gathered by using structured household survey questionnaires, key informant interview and focus group discussions. For this study, data from 322 sample households were collected from three rural kebeles namely: Kemacho Borara, Shaymbe Wanchikota and Alage. The data were analyzed by using SPSS software version 20. Population number increases from time to time whereas land holding size and soil infertility are declining. Therefore, to alleviate this problem providing training regarding to family planning is essential. To reduce the problem of more severe land scarcity in the Shashogo Woreda to where there is available land within the region. Hence, Shashogo Woreda's government bodies should take this action into consideration. Enhancing farmers' indigenous knowledge on preservation, storage, post-harvest management, saving, and diversifying income sources. To maximize agricultural production government should facilitate access of agricultural inputs on credit basis. In addition to that, to alleviate input cost problem, using compost instead of chemical fertilizers support poor households. Government should give high emphasis to increase food production and productivity of the farmers through improving better access and availability to improved agricultural technologies: promoting strategies such as crop diversification, providing of subsidized farm inputs to enhance households' food production and productivity. Livestock holding is one of the factors affecting the food security status of households in the study area. Therefore, based on the results of this study to improve production and productivity of the livestock, this will eventually increase food security situation of the rural households.

**Keywords:** food security, household, production, pepper

**Introduction**

Pepper (*Capsicum annuum*) is the world's most important vegetable after tomato and used as fresh, dried or processed products, as vegetables and as spices or condiments (Acquaah, 2004). They have become a component condiment as well as food by the indigenous Americas and form an essential part of human diet in Africa and other parts of the world (Tweneboah, 2000). According to Bosland and Votava (2000), pepper production has increased in recent years worldwide and this could be ascribed partly to its high nutritional value. Peppers are an important cash crop for smallholder farmers in developing countries such as Ethiopia, Nigeria, Ghana, China, India, Pakistan, Bhutan, Indonesia, Cambodia, and Thailand (Sanjeet *et al.*, 2013). Pepper is the world's most important vegetable next to tomatoes and among the vegetables; it is the rich source of vitamins A, C and E it can be consumed either fresh as vegetable or in powder forms (Bosland and Votava, 2000). It belongs to the family Solanaceae, which is an important group of vegetables cultivated extensively in Pakistan and also widely cultivated in almost every country of the world (Channabasavanna *et al.*, 2000). Pepper originated from America with their cultivation now grown all around the world because they are widely used as

food and medicine (Mazourek *et al.*, 2009). Pepper was one of the first plants to be domesticated and cultivated in the western hemisphere. The total area devoted to pepper worldwide is estimated at 4 million hectare with an average annual increase of 5% (Weiss, 2002). World pepper production in 2004 reached 1.65 million hectare with more than 24 million metric tons harvested (FAO, 2005). China is the world's largest producer, with more than 33% of the total production area and nearly 50% of total world production (FAO, 2005). According to FAO (2009) report, the estimated production of peppers were 220,791 t on 97, 712 ha in green form and 118,514 t of dry pepper from an area of 300,000 ha. Capsicum production especially the green one grew worldwide from 11 million in 1990 to 23.2 million metric tons in 2003 and 28 million metric tons in 2009 (FAO, 2009). World production of chili and pepper is 28.4 million tons both dry and green fruit from 3.3 million ha, with an annual growth rate of 0.5% (FAO, 2007).

Food security has about 200 definitions (Hoddinott, 2001). This study, however, makes use of the definition given in the State of Food Insecurity 2010 report by the Food and Agricultural Organization (FAO) that defined food security as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2010). Establishing food security, particularly household food security, is widely accepted as an important goal in advancing the living standards of the rural poor. One opportunity toward realizing this is through small-scale agriculture, which can be fostered through appropriate agricultural extension. However, food security programs and extension approaches and agendas often are not well-matched.

Red pepper and chili are the leading vegetable and spices grown in the country. The central (eastern and southern Shoa), western, north western (Wollega, Gojjam) and the southern part of the country are the potential pepper producing areas. The plant requires a hot and dry climate free of frost and suitable agro ecological area. According to MOA (2009), suitable altitude range for optimum production of pepper is between 1000 and 1800 meter above sea level (m.a.s.l). The total production of pepper in the country for the year 2015/2016 Ethiopian main cropping season was estimated to be 2,627,908.26 quintals. In addition to, SNNPR region the total production was 15,168 quintal for the same year. Therefore, the contribution of the SNNPR region for the country production was 35%. The production of pepper in the region is dominantly by smallholder farmers using rain by traditional farming practice.

The research paper aspires to examine the pepper production income on food security and nutrition among rural households in Shashogo *Woreda* of Hadiya Zone. As one of food insecure areas in Hadiya Zone, Shashogo *Woreda* can be taken as a sound and logical research site to investigate the nexus between pepper and food security notion. Not only is food insecurity widespread in the *Woreda*, it also produces a large number of pepper production. These pepper production are sources of income for majority of households in the *Woreda* and the income from pepper production has become a livelihood strategy for households in the *Woreda* to improve their living condition.

However, information on the contribution of pepper to household food security is not adequate in Ethiopia. The purpose of this study was to investigate the status of pepper production and household food security in Shashogo *Woreda*, Hadiya Zone, SNNPR, and Ethiopia.

## Materials and Methods

### Methodology

The purpose of this study was to investigate the pepper production and household food security in Shashogo *Woreda*, Hadiya Zone, SNNPR, and Ethiopia. The research design employed in this study was cross sectional survey design which incorporates both quantitative and qualitative survey method. The data were collected from primary and secondary sources. Primary data were gathered by using structured household survey questioners, key informant interview and focus group discussions. For this study, data from 322 sample households were collected from three rural *kebeles* namely: Kemacho Borara, Shaymbe Wanchikota and Alage. The data were analyzed by using SPSS software version 20 employing descriptive statistics, logistic regression model and food security measuring models household food balance model, household food insecurity access scale, and household dietary diversity model were used to analyze food security status of households.

## Results

### Income Sources of Sample Households

The distribution of sample household size given below in Table 4.7 shows that the majority of household heads 311 (96.6%) were from farming, 5 (1.6%) household heads petty trade, 3 (.9%) household heads monthly salary, 2(.6%) household heads safety net and the remaining 1 (.3%) household heads daily laborer. It is expected that the occupation of respondent should have a positive relationship with their farming activities. The assumption is that the respondents in farming related occupation should be more involved in the pepper production. The distribution of respondents according to their major occupations is presented in Table 1. The Table indicates that about 96.6% of the respondents have farming as their major occupation.

### Contribution of Pepper Production to Household Food Security

Contribution of pepper production to the household income generation from pepper play important role for households in the study area. According to the (SWARDO, 2016), report from the sample population, pepper producer have generated income from their

pepper. The study gathered information pertaining to household pepper production revealed different observations. Based on key informants who were agricultural extension officers the study revealed that the main pepper cultivated in the study area. Exchanging food item in household level normally based on availability of pepper in which not only obtained from home produce but from any other sources like purchasing food.

**Table 1:** Distribution of income sources to households

Income sources	Frequency	Percent
From Farming	311	96.6
Petty Trade	5	1.6
Daily Laborer	1	.3
Monthly Salary	3	.9
Safety Net	2	.6
<b>Total</b>	<b>322</b>	<b>100</b>

(Source: Field survey data, 2017)

Farmers contact with development agents is one of the individual extension methods with strong power to bring behavioral change among farmers (Van Den Ban and Hawkins, 1996; as cited by Dereje, 2008). The potential explanation is that development agents are the major sources of information, provides technical support, advice on use of the availability of technology, facilitate the use of input to farmers, encourage for extension package participation and other development issues for rural farmer which have aggregated impact for enhancing production and productivities. Pepper production is one of the main activities of their livelihood that household engaged in the study area.

The contribution of pepper for your households in the study area is increased household income, increased agricultural production, and diversification of crops grown. Based on this, the study indicated that most respondents were derived their income mostly from pepper product relationship between household food security and pepper of production. According to the home consumption survey undertaken, the study identified an average household home consumption. The researcher observed the situation at field level of the pepper and its contribution to employment, income, production and food security. A photograph was also taken by using digital camera.



**Fig 1:** Pepper production by households (Photo by the Researcher, 2017)

The data gathered from key informant shown that there is a low rainfall in pepper production and productivity between especially after two year disease and pest attack disappears of pepper product development was many times reported. According to Key informants, pepper production has increased due to the introduction of purchasing pepper from market and increased income from pepper to buy more exchanging food items. Key informants also said that with the introduction of food security, there emerged changes in the way they use to get pepper product for their household income.

These changes are advantageous because it has brought about easy access to food consumption. Therefore, this pepper production contributed to the improvement of household livelihood and food security in the study area. According to survey result most of the respondents replied that in the study area the peppers cover high proportions on contribution to household income generation of production was selected households head. Based on the observation, generally pepper has a vital contribution to household food security in the study area. However, the pepper percentage contribution in household food consumption was almost the same in all three *kebeles* where the survey was undertaken (Table 2).

**Table 2:** Contribution of pepper for households

Contribution of pepper for HH	Frequency	Percent
It Increase Income	150	46.6
It avoids Purchasing Pepper from Market	35	10.9
It Increases Foreign Exchange Rate	4	1.2
All	133	41.3
<b>Total</b>	<b>322</b>	<b>100</b>

(Source: Field survey data, 2017)

*Productive Physical Asset Resources to Households***Landholding size**

Land holding size is considered as a critical production factor that determines the type of crops grown and the size of crop harvests. Moreover, availability of pastureland is an important issue for livestock rearing. Therefore, under subsistence agriculture land holding size is expected to play a significant role by influencing farm households' food security (Degefa, 2002). Land is one of the most important assets in the study area because of the major source of food obtained from own production. Hence, landholdings continually decline both in size due to redistribution among family members and quality is affected due to continuous cultivation leading to soil nutrient mining and erosion. Children share the holdings of their families as they get to adulthood. Due to population growth landholding size were reduced from time to time and considered as the major factor for food insecurity.

**Table 3:** Sample households land holding size

Total farm land size	Frequency	Percent
<= 0.5	32	9.9
0.51 – 1	126	39.2
1 - 1.5	83	25.8
1.5 – 2	42	13.0
> 2	39	12.1
<b>Total</b>	<b>322</b>	<b>100</b>

(Source: Field survey data, 2017)

As in most of the highlands of the country the landholding of the farmer in the study area is very small. Survey result indicated that from the total 322 sampled households 9.9% (32) have less than 0.5 hectare, while 39.2% (126) sampled households have between 0.51-1hectare, 1-1.5 25.8% (83), 1.5-2 13% (42) and sampled households have above two hectares account only for 12.1% (39) (See on Table 4.9 above). During the key informant interview in that was realized a study area *kebeles*, it was noted that the areas are characterized by very small and highly fragmented landholdings that derived from the higher density of population. Therefore, average landholding sizes have been steadily going down. All secondary information sources also confirm such finding. For instance, the *Woreda* Agricultural Development Office estimates the average landholding of Shashogo *Woreda* to be 0.5 hectares. Responds of sample households informed that population pressure consisted the major cause for the reduction of farm lands in the study area.

**Cultivated farmland holding size**

The results indicated that from the total sampled households 4.3% (14) had cultivated land size of less than or equal to 0.25 hectares, from the total sampled household 31.4% (101) had cultivated land between 0.25-0.5 hectares, 40.4%(130) 0.5-1 hectares, 13% (42) 1-1.5 hectares, and 10.9% (35) greater than 1.5 hectares. Survey result indicated that from the total 322 sampled households cultivating land holding size hectare in the study area. This reveals that land size in the study area considered one of the main factors as it consists the requirement to produce adequate amount of food items. This indicates that shortage of land for farming consists one of the most important challenge households' food security in the study area.

**Table 4:** Distribution of cultivated land size

Total Land Area Cultivated	Frequency	Percent
< 0.25	14	4.3
0.25 - 0.5	101	31.4
0.5 – 1	130	40.4
1 - 1.5	42	13.0
> 1.5	35	10.9
<b>Total</b>	<b>322</b>	<b>100</b>

(Source: Field survey data, 2017)

**Land Productivity**

Land productivity is one of the most necessity for growth in agricultural sector particularly, crop production. Land productivity is major determinant variable for agricultural productivity to the amount of yield obtained per unit of land. When, the amount of yield harvested from a plot of land rises without expanding of landholding. Food production could also rise through time. Hence, not only access to farm land matters, but also the quality of farm is important. The level of the farm land fertility determines crop productivity which also determines food status of the rural farmers. If we examine soil fertility condition, from the fertile soil, farmers are able to get more product than poor fertile agricultural land. Soil fertility highly affects agricultural production. Some of these thoughts were also highlighted by the survey respondents. Where sampled respondents were asked to give their land productivity condition depending on their different crop production, from the total sampled respondents only 4.7% indicated that their land was fertile while the 80.7% respondent indicated medium land soil fertility, 10.9% respondent said less fertile and remained 3.7% respondent said their land fertility was poor.

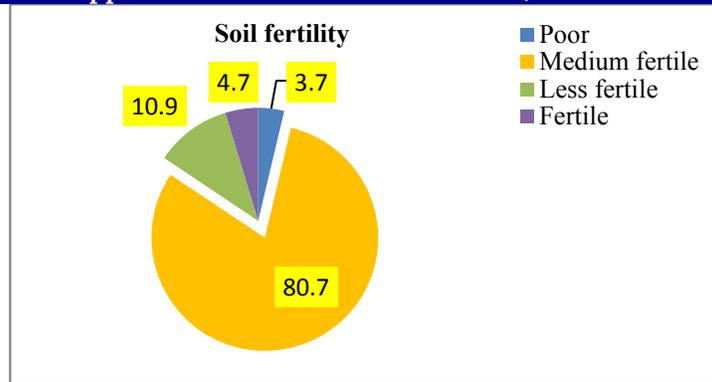


Fig 2: Distribution of soil fertility condition. (Source: Own construction based on field survey, 2017)

**Access to livestock and farm oxen ownership**

**Livestock ownership**

Livestock sub-sector determines the food security position of the peasants serving as a source of food, draft and transport purpose, cash earning sources, means of assets and manure as well as a means of crop production. In addition farmers use livestock to safeguard for sudden cash requirements to purchase food at the time of food shortage, to pay credit payment, for taxes and other purpose. The possible explanation is that livestock is the most important assets in the study area for different purposes. However, a significant number of the community had no adequate number of livestock population which could be one of the major challenges for food security in the study area. The Shashogo *Woreda* office of agriculture reported that livestock and livestock products contribute 35% for the annual cash income of the households.

Particularly from the livestock possession oxen are one of the critical assets in the study area but the oxen ownership is minimal due to poor asset possession status of households. In sampled *kebeles*, households who have no oxen are considered as poor, as a result the *kebele* administrators and different governmental and non-governmental organizations used the oxen possession for aid selection criteria. The main livestock types in the *woreda* are cattle, shoats, equine and poultry also the product like meat, milk, butter, and egg. To compare the flock size between the samples household groups (food secure and insecure), the herd size was changed in to Tropical Livestock Unite (TLU) based on Stock *et al.*, (1991), conversion factor.

Table 5: Livestock ownership of sampled households

Variable	No of food secure HH	No of food insecure HH	Total No of Sampled HH	Mean difference	t-value	P-value
Livestock possession	120	200	320	2.27166	4.916	0.000

(Source: Field survey data, 2017)

Accordingly, the represent holding of livestock in food secure households were 3.6939 TLU with the Std. deviation is equal to 2.4866 and food insecure households were 2.2667 TLU with the Std. deviation is equal to 1.67212. The t-value for this value (4.916) revealed that there is significant difference between food secure and insecure households at (p-value = 0.000) and the mean difference is equal to 2.27166 (see on Table 4.11 above). This clearly shows the significant role of livestock holding in food secure and food insecure households. This means that the ownership of more livestock increases the probability of improve food security. Livestock increases households income from sale of animal and farmers can finance their agricultural requirements easily from livestock income.

**Limited Access and Supply of Agricultural Input**

Inappropriate technological application and poor input use contribute a great share to low agricultural productivity. Therefore, it leads to low food production and erodes the capability of households to feed their family from own production. According to survey results showed on (see on Table 4.13 below), from total sampled households in 2016/2017 production year lack of improved seed access 37.3% (120), lack of income sources 24.2% (78), lack of fertilizer access 18.3% (59) and lack of farm oxen 20.2% (65).

Table 6: Rational agricultural farm input of sample households

Rational agricultural input	Frequency	Percent
Lack of income sources	78	24.2
Lack of farm oxen	65	20.2
Lack of fertilizer access	59	18.3
Lack of improved seed access	120	37.3
Total	322	100

(Source: Field survey data, 2017)

The survey result also depict that unsuitable application of limited access agricultural farm inputs such as lack of fertilizer access, lack of improved seed access, lack of income sources and lack of farm oxen rural household's agricultural production and productivity. But the agricultural inputs that used for their farm in the study area are not enough. Key informant interview the problems of sample households to use modern agricultural inputs to enhance better productivity for their households, such as extension services and lack of improved seed access were inadequate to rural farmers enable to access credit service to purchase agricultural farm inputs. The main reason for this problem is not enough household lack of income sources, lack of fertilizer access, poor rural credit system and high modern agricultural input costs.

### Conclusions

The study revealed that less proportion of the sampled households could ensure their daily recommended kilocalories, but high proportions of the sampled households were not able to meet their daily recommended kilocalories as household food balance model analysis indicated that only 10.8% sampled households could ensure their daily recommended kilocalories, but 89.2% respondents could not. Among this, 8.4% sample households were marginally food insecure, 10.9% moderately food insecure and 69.9% severely food insecure as household food balance model analysis revealed. Households with various income sources have a chance to improve household food consumption and are less vulnerable to food insecurity. As the area is prone to drought in different seasons creating alternative sources of income and diversifying it will enhance farmers' food security status. For many years farmers were exposed to a flood which displaces them from their land during the water logging at summer season. Pepper is also one of the incomes earned by farmers to overcome their food shortage problem in the area.

In addition to this helping the farmers to focus on pepper production and raising its productivity will serve as insurance for shortage of cash and lack of food during the drought season. As it is indicated by the study results, large amount of households was not food self-sufficient. Depending on their food self-sufficiency observation, from the total sample respondents' majority of households about does not produce their own food sufficiently for their family in the study area. Therefore, sample households suffer from transitory and chronic food insecurity problems. Furthermore, the logistic regression model study has shown that the major factors affecting the food security situation of rural households were sex of the households, age of the households, family size, total farm land size, drought, disease and pest condition, livestock holding condition and shortage of improved seed were identified as a major rural households' food security problem in the study area. Study also indicated, livestock holding, land holding size and disease and pest condition have a significant and positive influence on the state of household food security.

It is also observed in the study that, livestock rearing has a vast contribution for rural households food security situation while, different challenges prevent farmers to rear different variety and to possess sufficient number of livestock to fill their household food gap. Therefore, harms like shortage of grazing land, shortage of rural credit and disease prevalence problems considered as a livestock rising challenges and significantly associated with households' food security situation. Similarly, survey result indicated that, a number of problems rural households' crop production and productivities are drought, disease, poor improved seed, and low rainfall amount, insufficient land holding size and price fluctuation have statistically significant association with households' food security situation. In conclusion, food security models relate to food availability identified by using household food balance model, food accessibility by using household food insecurity access scale model and food utilization through using household dietary diversity score models are addresses the rural household food insecurity level of the study area.

### Recommendations

Based on the finding of the study recommendation of the following issues are forwarded as recommendation to enhance rural households' food security situation in the study area. As study results showed one of the major problems of the households to ensure food security. Therefore, based on the researcher finding the following recommendations were forwarded:

Population numbers increase from time to time whereas land holding size and soil infertility are declining. Therefore, to alleviate this problem providing training regarding to family planning is essential. To reduce the problem of more sever land scarcity in the Shashogo *Woreda* to where there is available land within the region. Hence, Shashogo *woreda's* government bodies should take this action into consideration. Enhancing the indigenous knowledge on preservation and storage of food, post-harvest period saving, and diversifying income sources. To maximize agricultural production government should facilitate access of agricultural inputs in credit basis.

In addition to that, to alleviate input cost problem, using compost instead of chemical fertilizers support poor households. Government should give high emphasis to increase food production and productivity of the farmers through improving better access and availability to improved agricultural technologies: promoting strategies such as crop diversification, providing of subsidized farm inputs to enhance households' food production and productivity. Livestock holding is one of the factors affecting the food security status of households in the study area. Therefore, based on the results of this study to improve production and productivity of the livestock, this will eventually increase food security situation of the rural households.

**References**

- Acquaah, G, (2004). Horticulture: Principles and Practices. Second edition. Prentice Hall of India Private Ltd. New Delhi, India. pp.787.
- Bosland, P., and E. Votava, (2000). Peppers: Vegetable and Spice Capsicums. CABI Publishing. New York, USA.
- Channabasavanna, A. S and R. A Setty, (2000). Influence of different Irrigation interval on growth and yield of pepper pp 9.
- Dereje Muluneh (2008). Women Empowerment through Microfinance, The case of Village saving and loan association in Grawa district of Easter Oromiya, Ethiopia. An M.Sc. Thesis presented to the school of Graduate student of Alemaya University.
- FAO. (2005). Agricultural statistics for 2005. United Nations, Rome
- FAO. (2009). FAOSTAT Database for Production of Peppers. <http://faostat.fao.org/site/339/default.aspx>
- FAO. (2007). Production yearbook. Food and Agriculture Organization of the United Nations, Rome, Italy.
- FAO. (2007). Guidelines for measuring household and individual dietary diversity Version no 3 pp50-52.
- FAO. (2010). The State of Food Insecurity in the World. Addressing food insecurity in protracted crises. Rome.
- Hoddinott, J., (2001). Choosing outcome indicators of household food security. IFPRI, Washington, DC.
- Mazourek, M., Pujar, A., Borovsky, Y., Paran, I., Mueller, L. and Jahn, M. M, (2009). A dynamic interface for capsaicinoid systems biology, Plant Physiology. 150:1800-1881
- Sanjeet.K, Yu-yu. C, Hsueh-ching .S, Andreas. W. E, Shih-wen. L , Ravza. M, Albert. R, Abdou. T, Victor Afari-Sefa and Paul A. G, (2013). Pepper (Capsicum spp.) Germplasm Dissemination by AVRDC – The World Vegetable Center: an Overview and Introspection. Chronica Horticulture. 53(3): 21-27
- SWANRO. (2016). Annual Progressive Report of Shashogo Woreda Agricultural and Natural Resource Office. Bonosha: Unpublished.
- Degefa Tolossa. (2002). Household Seasonal Food Insecurity in Oromia Zone: Causes.Paper Presented on Organization for Social science Research in Eastern and Southern Africa (OSSREA). Research Report No. 26, . Addis Ababa University.
- Tweneboah, C. K, (2000). Vegetables and Spices in West Africa with special reference to Ghana. Co-Wood Publishers Accra, Ghana. pp 84 – 86.