www.kosmospublishers.com
contact@kosmospublishers.com

Research Article Advances in Agriculture, Horticulture and Entomology AAHE-115
ISSN 2690-1900

Determinants of production and market supply of Korarima (Aframomum Corrorima (Braun) Jansen)) in Kaffa zone, Southern Ethiopia

Ejigu Mulatu[1*], Andualem Gadisa[2]

[1]*Southern Agricultural Research Institute, Bonga Research Center Socio economics research division: Bonga, Ethiopia*
[2]*Southern Agricultural Research Institute, Bonga Agricultural Research Center: Crop research division Bonga, Ethiopia*

Received Date: April 03, 2020; **Accepted Date:** April 14, 2020; **Published Date:** April 24, 2020

[*]**Corresponding author:** Ejigu Mulatu, Southern Agricultural Research Institute, Bonga Research Center Socio economics research division: Bonga, Ethiopia. Tel: +251910140961; Email: ejigum61@gmail.com

Abstract

Korarima in a Kaffa zone could be explained as the most popular spice as it's widely production and prolonged socio-economic importance. Relevant information on production and marketing of korarima is needed for improving productivity and design of effective policy. This study was conducted with specific objectives: to assess status of korarima production, to identify factors affecting market supply of korarima and to identify constraints in production and marketing of korarima in Kaffa zone, Southern Ethiopia. The study was based on the data collected from 116sample households selected through multistage sampling technique. Descriptive statistics and econometric model were used to analyze the data. A multiple linear regression model was employed to assess the factors affecting of households' market supply of korarima output. Major constraints in production and marketing of korarima in the zone includes disease, animal and pest damage, low yield due to climate change effect, low productivity of existing varieties, poor extension support, lack of improved korarima production practices, lack of well-designed output marketing center, and traditional harvesting and post-harvest handling techniques. Econometric model result showed that sex, education level, land size, credit use, farm income and experience in korarima production were found to be significant in influencing the market supply of korarima. The result suggests that research institutions should give attention on developing improved varieties and agronomic practices to improve the production, productivity in order to exploit the existing opportunity and see farm households' life improved.

Keywords: Determinants; Kaffa zone; Korarima; Multiple regression model; Production

Introduction

There are around 40 to 50 spices of global economic and cooking importance known **[1]**. Ethiopia has a great potential for spices production which have major part in the production system and in the foreign earnings of the country. Spices have great contribution in transforming farming system for being market oriented than producing merely for subsistence **[2]**.The spice, known as korarima, Ethiopian cardamom, or false cardamom, grown in various parts of the country; Kaffa, Jimma, East and West Wollega, Sidamo, Bale, South and North Omo, Illubabour, East and West Gojam, Gamugofa **[3]**.

Korarima as one of major spices in the country which is considered as a potential substitute for the Indian cardamom, is endemic to the rainforests of the country, particularly south west region **[4]**. The moist montane forested land of the southwestern part of

Ethiopia and Kaffa zone in particular is dominated by forests that contribute to provide shade for different herb plants, like korarima, coffee and different fruits, firewood and timbers. This cultural practice helps the farmers to conserve the natural forest that played high role for better performance of the spice in the area **[5]**.The importance of spice ranges from being traditional medicinal plant for humans and cattle up to a source of income for producers as its seeds reach high prices in local and export markets. However, it is endangered species of Ethiopia due to various reasons **[6, 7].**

The problems related with spice production are mainly related with lack of awareness on production, processing, storage and marketing. This resulted in traditional farming practices and very low yield. Furthermore, the marketing system is not managed through organized efforts as price is not determined by the demand, supply and price information **[8]**. Lack of high yielding improved verities, irregular supply with poor quality of output, lack of proper post-harvest handling practices for drying and storage, and lack of appropriate spices development strategic interventions were some of factors affecting production of spices in Ethiopia **[9]**.

In order to have good performance the spice, having shady locations and wild, moist, well-drained and open woodlands is needed in the same climate areas as wild coffee via plantation and cultivation **[10]**. However, reports showed that, korarima production in the country is declining mainly due to destruction of plant's natural habitats and other production practices related factors such as non-improved variety, non-adapted agronomic practices and lose caused due to biotic and a biotic stress **[11, 12]**. Regarding marketing of korarima, several opportunities and constraints can be identified. The spice seems to be sufficiently available, both in agro forestry systems and the wild forest. However, sustainable supply still challenged by large distances, potential forest distraction, wild animals, small volumes and seasonal fluctuations **[13]**.

Kaffa zone is one of potential korarima producing areas in the region as its' farming system is characterized by crop-livestock mixed farming with the two dominant perennial crops, Enset and coffee are grown in a friendly association with other crops. Korarima production in a zone could be explained as the important income generating spice to producers **[14]**. Despite the facts that the spice remained potential cash commodity in the area, little research and development attention was given so far. Relevant information on production and marketing of korarima is needed for improving efficiency of the sector and the design of effective policy involvement. However, there is no study undertaken on this area in a zone and this study was believed to analyze determinants of production and marketing of korarima with specific objectives**;** to assess status of korarima production, to identify factors affecting market supply of korarima and to identify constraints in production and marketing of korarima in Kaffa zone, Southern Ethiopia.

Methodology

Description of the Study Area

Gimbo district is located 18 km far from Bonga, 722km from regional town, Hawassa, and 442km from Addis Ababa. The total population for this district is 117,588 and from which 58,559 were men and 50,059 were women. The district has total area coverage of 88,129 hectares. From this, 1064 hectare is arable land, 28,240 hectares is forest cover, 30,531 hectares is covered by permanent crops, and 10,177 hectares is covered by annual crops, grazing land covers 855hectares, wetlands cover 7257 hectares, and plantation forest (private) covers 1,259 hectares. Agriculture is the main source of income for majority of rural households. Maize, pepper, coffee, finger millet, sorghum, rice, tea, and common bean are major crops cultivated in the district **[15]**.

Decha district is located in 26km away from zonal town Bonga, 737km from regional town Hawassa and 486km from Addis Ababa. There are total of 19,662 households in the district with 18260 are male headed and 1402 are female headed. The district has total population of 161,844 and from this population 80, 952 are females and 80, 892 are males. The district agroecology is categorized as 20 percent high land, 45 percent midland altitude and lowland reaches 35 percent and average rainfall lies between 1800-2200mm.

Total area of the district covers 308, 684 hectares. From this coverage annual crop covers 34,067.4, permanent crop covers 22,971.62, natural forest land covers 54,848, plantation forest covers 71.55, forest coffee covers 18,000, arable land covers 95,628, grazing land covers 11,559.24 hectares and the rest is covered by others. Major crops grown in the district are enset, coffee, banana, maize, barley, faba bean, field pea, sweet potato, potato and teff **[16].**

Sampling Techniques and Sample Size Determination

In this study multistage sampling technique was employed to select sample respondents. In the first stage two districts were randomly selected from korarima producing districts in a zone. In the second stage three kebeles from each district were selected purposively based on their potentials and accessibility in the condition that they represent the districts. In the third stage by taking the list of korarima producing farmers from each selected district as a sampling frame, total of 116 producers were randomly selected in probability proportion to size of each Kebele's population.

Data Sources and Methods of Collection

In this study, both primary and secondary data sources were used to gather necessary data regarding the demographic and socio-economic profile of korarima producers and situations of the spice production and marketing. Structured questionnaire was used to collect the primary data from the selected sample producers. The primary data was collected from the selected representative sample respondents. In addition, focus group discussions (FGDs) and key informants interview also used to collect necessary information. Furthermore, secondary data was obtained from published and unpublished documents of different organizations.

Method of Data Analysis

Both descriptive and econometric model analysis were used in this study.

Descriptive Statistics

The sample respondents' demographic and socio-economic conditions analyzed using descriptive statistics like mean, standard deviations, frequency and percentage by using Statistical Package for Social Science (SPSS) and STATA software.

Multiple Linear Regression Model

To analyze determinants of market supply of korarima, multiple linear regression model was used. Multiple linear regression Model was specified as follows.

$$Y_i = \beta_0 + \beta_1 SEX + \beta_2 FAMS + \beta_3 LANSIZE + \beta_4 EDUCN + \beta_5 CREDT + \beta_6 FAINCOM + \beta_7 DMARKET + \beta_8 EXTEN + \beta_9 MKTINFN + + \beta_{10} EXPKO + \mu$$

Where, Yi is, market supply of korarima, $\beta 0$ *is*, Intercept, $\beta 1 - \beta 10$ Denote, Coefficients to be estimated in relation to associated explanatory variables, SEX is sex of household heads, FAMS is family size, LANSIZE is total land size in hectares, EDUCN is household education level in years, CREDT is credit used by a households, FAINCOM is annual income of households, DMARKET is distance from nearest market center, EXTEN is extension contact, and μ is Random error term.

Variables	Descriptions of variable	Types	Expected sign
Dependent			
MRKSUPLY	Market supply of korarima in Kilogram	Continuous	
Independents			
SEX	Sex of household head (male=1, female=0)	Dummy	+
EDUCATION	Education level of household head	Continuous	+
FAMSIZE	Family size	Continuous	+
LANDSIZE	Land size (ha)	Continuous	+
DISTANCE	Distance to nearest market (Km)	Continuous	-
EXTENSN	Access to extension service (yes=1, No=0)	Dummy	+
MRKTINFO	Access to market information (yes=1, No=0)	Dummy	+
CRDTUSE	Households' use of credit (yes=1, No=0)	Dummy	+
FAINCOM	Farm income of household	Continuous	+
EXPEKO	Farmers experience in korarimaa production	Continuous	+

Table 1: Summary of definitions of variables and working hypotheses.

Result and Discussion

Descriptive Statistics

Socioeconomics Characteristics of Sample Respondents

The sample respondents were composed of both male and female-headed households. From the total sample, 85.3 percent were male headed households and 14.7percent were female headed households. The mean education level of sample households in years of class was 2.84, showing lower education level of households. Small and fragmented land ownership of households seen in the district

with maximum of 8 hectares owned by a farmer and mean of 3.25 hectares. Average total family size of respondents was 6 persons with maximum of 14 and minimum of 2 persons. Since korarima production is known by its huge labor employment, this condition would be considered as good opportunity if participated in the spice production efficiently. Households traveled 8.07 km on average to reach nearest market for farm output marketing with maximum distance of 18.75 km **(Table 2)**.

Dummy variable		Frequency		Percent	
Sex of household head	Male	99		85.30	
	Female	17		14.70	
Continuous variables		Mean	Maximum	Minimum	Std. Deviation
Age (years)		40.59	85	22	14.728
Education level (year of school)		2. 845	12	0	2.391
Family size		6.11	14	2	2.194
Total land size (ha)		3.25	8.00	0.75	1.747
Farm income (birr)		8777.95	42000.00	550	6892.45
Distance from market in km		8.07	18.75	1.25	4.00
Source: own survey result (2015)					

Table 2: Socioeconomics characteristics of sample respondents.

Korarima Cultivation

Average land size covered by korarima per household was 0.25 hectares with maximum of 1.05 hectares. However, producers mentioned that production and productivity has been declining over time due to different factors. It was clearly observable around the field that in some farmers fields more of the korarima plantation was not effective as it become out of production due to lack of effective management of field. In both districts forest plantation seems more common than garden plantation as more of land coverage and korarima production also obtained from forests. Average land size covered by garden korarima per household was 0.12 hectares with maximum of 0.52 hectares. Average land size covered by forest korarima per household was 0.21 hectares with maximum of 0.75 hectares **(Table 3)**.

Parameters	Mean	Maximum	Std. Deviation
Area coverage in hectares	0.2524	1.05	0.270
Garden plantation in hectares	0.1213	0.525	0.175
Forest plantation in hectares	0.2136	0.75	0.197
Source: own survey result (2015)			

Table 3: Households korarima cultivation.

Land Preparation

Nearly half of korarima producers practiced land preparation with oxen plough. On the other hand, 41 percent of producers used pit dig without oxen plough and few farmers used both oxen plough and pit digging. Since the culture of korarima cultivation is intermingled with forest expansion, land under forest is difficult for oxen plough. Due this condition farmers clear land to remove some large grasses and bushes and let korarma sucker to expand around the area freely on the cleaned land without any management practices **(Table 4)**. Land preparation before the spice plantation got little attention in the area. Reports from other parts of Ethiopia also showed that one of the factors limiting production of spice in Ethiopia is sub-optimal agronomic practices. Despite land preparation has great impact on the productivity of spice crops, farmers give prior attention to food crops (cereal, pulse and oilseeds) while giving little attention to spice crops production [17].

Which Land preparation method used?	Frequency (N=116)	Percent
Oxen plough	57	49.1
Pit digging without plough	48	41.4
Both oxen and pits dig	11	9.5
Source: own survey result (2015)		

Table 4: Land preparation for cultivation

Planting Material and Plantation Method

It is surprising that there was no improved varieties of the korarima spice and all farmers used long stayed local. The absence of improved variety limited producers' production and productivity improvement capability as they were simply struggling with local variety coupled with problems of diseases, pests, low yield and climate change effect. The korarima species can easily be planted or propagated from both rhizomes and seeds **[18]**. In the study districts, most of producers used land clearing with removing of some large grasses and bushes and let korarima sucker to be propagated around the area freely through its rhizomes.

According to the report from the survey result, almost 93 percent of respondents were familiar with this practice. Due to this practice, the use of seed for plantation was weak as only very few farmers practiced. During focus group discussion, participants mentioned that fields of plantation of suckers from seed via nursery management gives high yield than directly sucker propagated field. However, most of farmers didn't use seed for plantation. Reports showed that little attention was given regarding establishment of new plantations in the sector **[18]**, shown below **(Table 5)**.

What planting materials used?	Frequency (N=116)	Percent
Seed	2	1.7
Sucker	108	93.1
Both seed and sucker	6	5.2
Source: own survey result (2015)		

Table 5: source of planting material.

Harvesting and postharvest handling

More than 71 percent of korarima producers use smoke drying method, five percent used sundry method and 23 percent used both sun and smoke drying **(Table 6)**. Some of respondents mentioned that depending on the availability of firewood, smoke drying has advantage of simplicity during rainy season as the whole process is completed inside a home. Surprisingly, one of the respondents who participated in this study told that it was possible to dry korarima inside two days by smoke; however, he was not confident about the quality of korarima he supplied. Sun drying has advantage of supplying quality korarima and to some extent it has trader preference over smoke dry; however, smoke dry korarima has attractive color.

Survey result showed that on average farmers wait 19.2 days for korarima drying via smoke. During focus group discussion, participants mentioned that most of farmers prefer smoke drying, but traders prefer sun drying. If a korarima is sundry, loss of quality was low and no need of trader to drying again the product. If korarima is smoke dried, loss of quality was higher and traders sometimes needed to dry again a korarima to recover its quality. Smoke dry has better color and weight, while Sundry has color problem.

Most of respondents revealed immature capsules harvesting of korarima at green stage affected the quality of output and increased loss of the product. Due to this and other management problems, on average farmers suffer 10.05 percent of lose of quality with maximum of 50 percent due to production, harvesting, processing, storage and marketing related problems (Table 6). However, little attention was given from stake holders on quality production, supply and marketing of korarima and as consequence weak value chain development was revealed in the sector.

How dry korarima?	Frequency		Percent	
Sun drying	6		5.2	
smoke drying	83		71.6	
Both sun and smoke dry	27		23.3	
	Mean	Max.	Min.	St. Deviation
Average drying time (days)	19.2	60	2	10.68
Korarima loss in percentage	10.05	50	5	10.298
Source: own survey result (2015)				

Table 6: harvesting and drying process of korarima.

Sale of korarima

Average sale of korarima producer in a year 2015 was 100.68 kilogram with maximum of 400 and minimum of 1 kilogram. Decha district has better potential than Gimbo as more of market supply was seen from Decha. Maximum market supplier (400 kg) was seen from Decha and minimum (1 kg) from Gimbo district **(Table 7)**.

How much korarima did you sell in year 2015?	Mean	Max	Min	St. Deviation
sale of korarima (kg)	100.68	400	0	85.764
Source: own survey result (2015)				

Table 7: Sale of korarima in year 2015.

It is not doubtful that market information is important of effective and efficient production and marketing of a commodity. Regarding access of market information, nearly 35 percent of respondents told that they had no market information. On the other hand, those farmers who had access also hesitate about the quality of information they got. Major source of information were traders and neighboring famers **(Table 8**).

		Frequency (N=116)	Percent
Did you get market information	Yes	75	64.7
Source of information	Trader	30	-
	Farmer	15	-
	Both trader and farmer	30	-
Source: own survey result (2015)			

Table 8: Market information and source.

Major Constraints in Korarima Production and Marketing

Respondents mentioned some constraints in production and marketing of korarima in the study districts. Disease, supply of low quality korarima, low yield due to animal damage (monkey), climate change effect related with rainfall and sun effect, low productivity of existing varieties, poor extension support, lack of improved korarima production practices, lack of well-designed output marketing center, weak monitoring of existing traders from concerned government bodies, lack of firewood for korarima drying process, traditional harvesting and post-harvest handling techniques were some of major challenges in production and marketing of the spice.

In line with these findings different studies revealed constraints in the spice production. For instance, **[2]** study in Shey bench district indicted that lack of use of appropriate modern technologies, unlicensed traders and brokers disturbance, poor training program, lack of organized market information service, lack of proper post-harvest handling practices and lack of improved varieties a as major bottleneck. **[19]** Study also showed consistent findings lack of adequate agricultural inputs, problem of marketing and finance, inappropriate capsule collection and pests affected productivity as well as the role of korarima in Ethiopia.

Korarima production is challenged by lack of improved varieties and destruction of the plant's natural habitat **[3]**. According to **[20]**, some of major insect pests were distributed and recorded with high infestation rate and damaging level in southwest Ethiopia.

Determinants of Market Supply of Korarima

From 10 explanatory variables expected to affect households' market supply of korarima, six variables which found to be significant were discussed under this section as follows **(Table 9**).

Sex of household head showed positive relation as a prior hypothesis. The model output showed that, if a dummy changed from being female to male headed households, the market supply of korarima product increases by 30.48 kg, ceteris paribus. This might be due to the reason that, men usually own larger farm lands and have better practice of income diversification compared to women. In addition, production of korarima is mainly related with forest expansion and it needs continuous labor participation. Regarding this being male headed household puts relatively in a better position for management, production and marketing of the output.

Total land size owned by household affected the market supply of products positively and significant at 10% level of significance. For a one hectare increase in land size, the market supply of output increases by 8.16 kg, ceteris paribus. Farmers who owned larger

land size would have probability of owning more plantation forest tree and which in turn provides good opportunity for producing korarima in larger area than those with small size of land size. Since korarima is marketable commodity, the probability of supplying the entire output harvested in the production season to the market is high as home consumption was in insignificant amount.

Farm income affected the market supply of korarima positively and significant at 1 % level of significance. This showed that if households' farm income increases by one birr, the supply of output to the market will increase by 0.017 kg holding other things remain constant. A farmer with higher annual income has better opportunity to cultivate korarima in larger amount by employing all necessary inputs and supply more output to the market than those with lower farm income.

Credit access influenced market supply of korarima positively and significantly at 5 % level of significance. This shows that if households had access and used credit, the supply of korarima to the market will increase by 39.612 kg holding other things remain constant. This is because korarima producers who are lacking labor and finance need to use hired labor for field management, harvesting and post-harvest processing/handling. To do this they use credit to pay for labor to produce in larger amount. In line with this finding **[21]** also revealed the importance of credit on korarima production and marketing.

Education level of household head affected market supply positively and significant at 10% level of significance. A one-year class increase in education level increases the household's market supply by 14.92 kg, keeping the other things remains constant. This is because, being literate may put households in a relatively better position to gather, understand and realize information on production and marketing of korarima spice.

Experience in korarima production affected the market supply of korarima positively and significant at 1 % level of significance. The model output showed that if household have one year more experience in korarima production, the supply of output to the market will increase by 2.67 kg, holding other things remain constant. A farmer with more experience has better opportunity to cultivate korarima in larger amount with help of indigenous knowledge which lowers quality loss and supplies more output to the market than those with lower experience.

Variables	Coefficient	Std. Error	t-value
Sex of household head	30.482	17.854	1.707*
Family size	1.482	3.341	0.444
Total land size	8.167	4.518	1.808*
Farm income	0.017	0.001	13.970***
Distance to market	0.375	1.828	0.205
Extension contact	-21.636	14.226	-1.521
Market information	-2.300	14.385	-0.160
Credit use	39.612	16.317	2.428**
Education	14.92	7.57	1.972*
Experience of korarma production	2.679	0.942	2.843***
Constant	-85.866	33.384	-2.572**
Number of observations = 116 F (10, 103) = 45.21 R-squared = 0.84 Prob > F = 0.0000 Adj R-squared = 0.82			
Source: own survey result (2015)			

Table 9: Determinants of market supply of korarima.

Conclusion

Korarima production in a Kaffa zone is popular practice playing important role in households' socioeconomic improvement. Forest plantation seems more common than garden plantation as more of land coverage and korarima production also obtained from forests. However, it was clearly observable around the farm that more of the forest korarima plantation showed lower productivity as it got lower attention regarding management at before, during and after plantation by some growers than garden plantations.

Major constraints in production and marketing of korarima in the zone includes disease, animal and pest damage, low yield due to climate change effect, low productivity of existing varieties, poor extension support, lack of improved korarima production practices, lack of well-designed output marketing center, and traditional harvesting and post-harvest handling techniques. Econometric model result showed that being male headed household, having more education level, owning more land size, credit use, better farm income and more experience in korarima production were found to be significant in influencing the market supply of korarima.

Recommendations

It was not controversial that korarima has significant contribution and the same will be for future as the spice has potential to improve the rural lives of farm households. Thus, attention should be given from extension, research and other development partners on production associated constraints via introduction, generation, evaluation, and demonstration of demand-driven technologies for producers.

Since lack of strong and effective market chain was one of major problem affecting supply of quality korarima, development of well-designed market center and expansion of cooperative establishment is needed for improving farmers' ability of production, marketing and bargaining power along the value chain. Awareness creation for farmers who have lower experience on improved agronomic practices, harvesting, post-harvest handling, and marketing which is coupled with solutions for disease and pest problem is needed from both research and extension service provider institutions in the area.

Credit access provides additional source of finance for producers lacking labor and who are in need of finance to use hired labor for field management, harvesting and post-harvest processing/handling. Therefore, credit service provider microfinance institutions in the area should focus on reaching korarima producers as one of their priority areas.

Education level and experience in korarima production showed positive relation to market supply. This is because, as it is source of information and helping easily in application of improved management practices and market participation in spice production. Therefore local government bodies via extension agents has to find promotion mechanism and experience sharing platform in order to make household heads who are uneducated and having weak experience could better benefit from the spice.

References

1. Douglas M, Heyes J, Smallfield B (2005) Herbs, spices and essential oils: post-harvest operations in developing countries. UNIDO and FAO, 61.
2. Negera DG (2015) Analysis of factors determining the supply of Ethiopian cardamom spice (Aframomum corrorima): a case from Bench Maji zone of SNNPR, Ethiopia. European Journal of Business and Management, 7: 56-63.
3. Mohammedsani Zakir (2018) Review on Korarima (Aframomum Corrorima (Braun) P.C.M. Jansen) Research Achievements, Challenges and Future Prospective in Ethiopia. International Journal of Research Studies in Agricultural Sciences 4: 29-36, 2018.
4. Tefera W, Wannakrairoj S (2004) A Micropropagation Method for Korarima (Aframomum corrorima (Braun) Jansen). Science Asia 30: 1-7.
5. Chombe D, Bekele E (2018) Genetic diversity analysis of cultivated Korarima [Aframomum corrorima (Braun) PCM Jansen] populations from southwestern Ethiopia using inter simple sequence repeats (ISSR) marker. Journal of Biological Research-Thessaloniki, 25(1), p.1.
6. Demisew SA (1993) description of some essential oil-bearing plants in Ethiopia and their indigenous uses. J Essent Oil Res 5: 465-479.
7. Tefera W, Wannakrairoj SA (2004) Micro propagation method for korarima (Aframomum corrorima (Braun) Jansen). Sci Asia 30:1-7.
8. Goshme D, Ayele T (2019) Factors Affecting Production and Marketing of Spices in Ethiopia: A Review", International Journal of Forestry and Horticulture (IJFH) l: 14-18.
9. Masresha Yimer (2010) Market profile on spices in Ethiopia. Addis Ababa, Ethiopia.
10. Kinfu S, Alamerew S, Addisu M, Ambo E (2016) Genetic diversity studies on yield and its related traits in korarima [Aframomum corrorima (Braun) Jansen], germplasms. Journal of Biology, Agriculture and 6: 2016.
11. Girma HG, Digafie T, Edossa E, Belay Y, Wondifraw G. Spices Research, 2008a.
12. Eyob S, Appelgren M, Rohloff J, Tsegaye A, Messele G (2007) Chemical composition and physical properties of essential oils from fresh plant parts of korarima (Aframomum corrorima) cultivated in the highland of southern Ethiopia. J Essent Oil Res 19: 372-375.
13. Agize M, Zouwen L (2016) Spice and Medicinal Plants Production and Value Chain Analysis from South-West Ethiopia. Journal of Pharmacy and Alternative Medicine (www. iiste. org), 10.
14. Woldeyes F (2011) Home gardens and Spices of Basketo and Kafa (Southwest Ethiopia): Plant Diversity, Product Valorization and Implications to Biodiversity Conservation. PhD Thesis, Addis Ababa University, Addis Ababa.
15. Gimbo District Office of Agriculture and Rural Development (GDOARD) (2018) Report on socio economic profile and background information of the district, accessed 19 March 2018.
16. Decha District Office of Agriculture and Rural Development (GDOARD) (2016) Report on socio economic profile and background information of the district, accessed August 2016.
17. Tesfa T, Bayu W, Gashaw A, Beshir H (2017) Spice Production, Marketing, and Utilization in South Wollo, Ethiopia. East African Journal of Sciences 1127-1136.

18. Adilo M, Woldemariam T, Yadessa A (2005) Counting on forests: non-timber forest products and their role in the households and national economy in Ethiopia. In Proceedings of the 8th annual conference of agricultural economics society of Ethiopia. February 2005.

19. Israel Petros M, Firew A, Samuel PM (2019) Socio-Economic and Environmental Values of Korarima [Aframomum corrorima (Braun) P.C.M. Jansen]. International Journal of Agriculture Innovations and Research. 2019.

20. Daba T, Mitiku H, Hailemichael G, Jibat M (2018) Insect pests infesting korarima (Aframomum corrorima) (Braun) PCM Jansen in southwestern part of Ethiopia. International Journal of Veterinary Sciences and Animal Husbandry 3: 10-13.

21. Gebreazgaabher FG, Negash ZM (2015) Analysis of Major Factors Affecting Production and Marketing of Korarima (Aframomum Corrorima (Braun) PCM Jansen) in Ethiopia. People, 6(19). Journal of Economics and Sustainable Development6: 1957-1961.

Citation: *Mulatu E, Gadisa A (2020) Determinants of production and market supply of Korarima (Aframomum Corrorima (Braun) Jansen)) in Kaffa zone, Southern Ethiopia. Adv Agri Harti and Ento: AAHE-116.*