Research Article

Assessment of Production Constraint and Marketing Status of Sunflower Production in South Omo Zone Southern Ethiopia

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Abstract

This study aimed to assess the production constraints and marketing status of sunflower production in the South Omo zone, specifically with the specific objective of identifying factors affecting the production and productivity of sunflowers; analyzing the market status of sunflowers; and assessing major constraints and opportunities of sunflower production and marketing in the study area. A total of 120 farmers from four kebeles in two districts were sampled using a multi-stage sampling technique. A semi-structured interview schedule, checklists, and focus group discussions were used to collect data from both primary and secondary sources. Both descriptive statistics and econometric models were used. The multiple linear regression model indicated that the lack of improved seed, market price, and distance to the nearest market affect the production and productivity of sunflowers negatively and significantly. Moreover, annual income affects the production and productivity of sunflowers positively and significantly. Birds, climate change, lack of improved seed, price decline (harvesting time), no regular buyer, lack of awareness, disease, and pests, no attention given by the extension of the district government, and lack of transport are the most important constraints identified in the study area. Therefore, it needs adaptive research and demonstration trials to boost production and productivity to achieve exportable supply and train farmers and extension agents by subject matter specialists.

Keywords: *Multiple linear regression; Sunflower; Marketing*

Introduction

Sunflower is the world's fourth-largest oil-seed crop, and its seeds are used as food and its dried stalks as fuel. It has already been used as an ornamental plant and was used in ancient ceremonies (Harter et al., 2004; Muller et al., 2011). It is grown for its edible oil and fruits, both for human and livestock consumption. The total production of sunflowers is approximately 45 million metric tons and the area under its cultivation is 26 million hectares in the world. Also, the average yield of sunflowers was 1.78 metric tons per ha (Sema, 2017). Sunflower is grown in Ethiopia in different agro-ecologically suitable parts. Most of the time, it can grow in the agro-ecologically suitable areas where maize can grow. In the last cropping season, about 14704.73ha of sunflower were grown in Ethiopia, with a production of around 17,530.591 tons annually with an average productivity of 1.19 tons/ha (CSA, 2018). Although it is high in oil, the high-yielding crop that gives high returns to the farmers, no serious effort has been made to increase the local production of sunflower. Consequently, the sunflower acreage declined from 17,860.16ha in 2007-2008 E.C to 14,704.73 ha in 2009-2010 E.C and the production from 21,620.4 tons to 17,530.59 tons and

the average productivity declined from 1.21 tons/ha to 1.19 tons/ha during the same period (CSA, 2016). This implies that the area cultivated, the production, and the productivity of sunflower crops are decreasing from time to time.

Sunflower in the South Omo zone is potentially produced by smallholder farmers in some agro-ecologically suitable areas of Male, Salamago, Hammer, South Ari, and Benatsemay districts. Smallholder farmers in the zone use sunflowers for income generation and home consumption but not for oil production. In the last cropping season, more than 712.1 tons of oily sunflower crops from the zone were exported to Addis Ababa and other regions of Ethiopia (South Omo Zone Trade &Industry Dep't, 2010 E.C). In the past five consecutive years in Benatsemay and South Ari districts, about 1,173.375ha of sunflower has grown with a production of around 1,151.075 tons with an average productivity of 0.9 tons/ha (Kutoya et al., 2018). Compared with the actual yield in the world and Ethiopia, its production and productivity are decreasing. Market demand and the average market price of oily sunflowers are increasing in the local market. But the supply of sunflower production is decreasing due to human consumption and exports to the central market. Even though sunflower is an economically important crop, no adequate studies have been conducted in the study area. Therefore, this study will focus on factors affecting production and market status/chain of smallholder farmers in potential sunflower-growing areas of the South Omo zone, southwestern Ethiopia.

Research Methodology

Method of Collection and Data Source
Both primary and secondary data sources were used. Formal and informal methods of data collection were implemented to acquire primary data. Among the informal data collection tools, key informant interviews and focus group discussions with pre-defined social groups (elders, model farmers, women, DAs) were conducted. Formal data were collected from sample respondents (smallholder farmers) through structured questionnaires.

Sampling Technique and Sample Size
A two-stage sampling technique was employed. In the first stage, two sunflower cultivating districts were selected purposively based on sunflower production potential. In the second, from each district, two kebeles were selected purposively. Following this, the sample size determination formula of Yamane (1967), which was described below, was used to determine the sample size.

$$n = \frac{N}{1 + N * e^2}$$

Where, n=the sample size, N=total number of smallholder sunflower-producing households found in the woreda, e=acceptable sampling error, and the value of 'e' is 95% confidence level and it's assumed to be e=0.05. Accordingly, a total of 120 sample households were selected and interviewed for the study.

Data analysis
Simple statistics and econometric models were used. Descriptive statistics such as measures of central tendency and dispersion were used. The econometric analysis was used to analyze factors affecting sunflower production and productivity.

The regression model was expressed as:
Y= β0 + β1X1i + β2 X2i + …. + βnXn +ε. Where: Independent variable Y= the production per unit (Quintal of sunflower crops per hector), Independent variable Xi = factors affecting sunflower production and productivity β0 is the Y-intercept, β1 to βn the slope coefficients, and ε the error terms.

Result and Discussion

Socio-economic characteristics of the sample household
The results in table 1 revealed that, of the total of 120 sampled households, about 85.8% were male and 14.2% were female. In terms of marital status, 95% of the sample households were married, and only 5% of the households were single. The education of the sample respondents was believed to be an important factor that determines the readiness of respondents to accept new ideas. Based on education categories, the data indicated that 64.2% of sample respondents were illiterate, 32.5% were in primary school, and the remaining 3.3% attained secondary education. The average family size was about 7 members. The average age of the respondents was found to be 35.72 years. The average total farm size is 13.5 timads.

Production and marketing of sunflower

### Area coverage and productivity of sunflower
Figure 1 below, shows the area of land under sunflower production declined in 2009 and 2010, but in the study area, the area under sunflower production increased from 2890 ha in 2013 to 4263.7 ha increased in 2016 and significantly from 4263.7 ha in 2016 to 2738.8 ha in 2019

Variables	Response	Frequency	Percent
Sex	Male	103	85.8
	Female	17	14.2
Marital status	Married	114	95.0
	Single	6	5.0
Education of the respondent	No formal education	77	64.2
	Primary	39	32.5
	Secondary	4	3.3
Main occupation	Farming	118	98.3
	Self- employed	2	1.7

Variables	Observations	Mean	Std. Deviation
Age of respondent	120	35.72	8.311
total Family size	120	7.48	4.215
size of total farm (timad)	120	13.53	12.900
	120		

Source: survey data, 2021

Table 1: *Socio-economic characteristics of the sample household.*
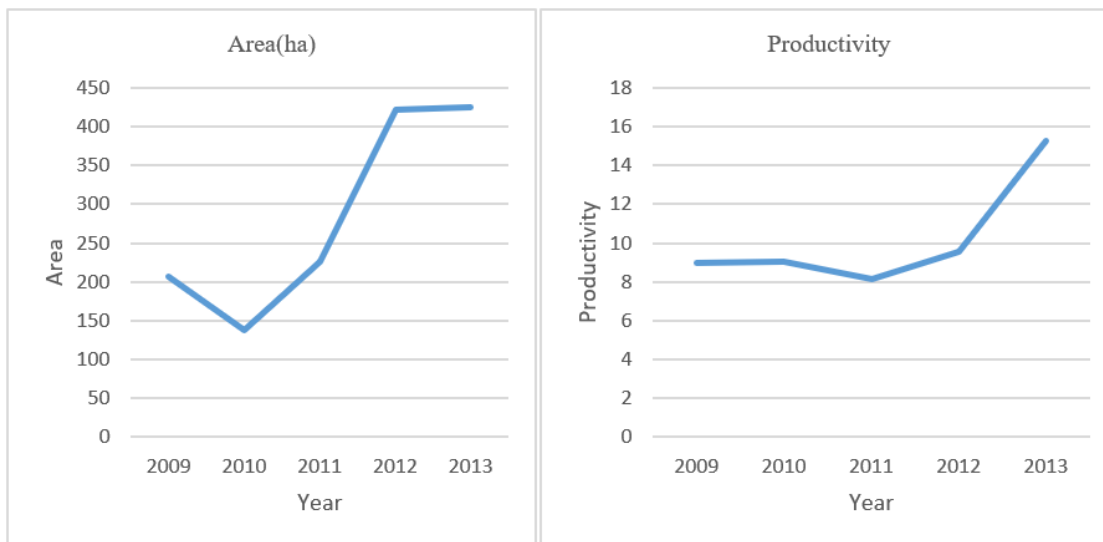
Source: Zone agriculture and natural resource management office, 2021

The result in the table below shows that 80% of the respondents get seeds from our farms and the remaining 20% buy seeds from other farmers. Regarding negotiation on price during sunflower seed selling, the majority (35%) of sample respondents indicated that the price-set was made by buyers, 32% by farmers, and the rest (32%) was made by negotiation. This result indicates that the sunflower seed producers have poor bargaining power in the sunflower seed market in the study area, which has made them price takers. Farmers have been producing the local sunflower seed because no improved varieties have been introduced. The main constraints on the production of sunflower seeds were quality problems, disease, and poor harvesting practices. According to the respondents, there are poor support services for sunflower producers in terms of the provision of credit access, transportation services, market information, and poor extension services, i.e., they mainly focus on other crops rather than sunflower seed production. According to the respondents, there was no value-adding activity in the study area; they only sold sunflower seeds.

Land is the most important resource, as it is the basis for any economic activity, especially in rural areas and in the agricultural sector. The survey revealed that the average landholding was about 1.7 hectares in the area. Of the total land owned, about 18.24% was covered by sunflower production, with an average area of 0.31 hectares under sunflower production for sampled households. While the average productivity of sunflowers is 10.77 quintals per hectare.

Variable	Response	Frequency	Percent
Seed source	From own farm	96	80.0
	Buy from other farmers	24	20.0
Means of transport	Head carrying	65	54.2
	Bicycle/Motorcycle	54	45.0
	Ox-cut	1	.8
Buyers of sunflower	Small trader/ broker	119	99.2
	Lager trader (vehicle)	1	.8
Markets for selling sunflower	On-farm	1	.8
	Village	69	57.5
	Neighbouring village/ location/road/junction	31	25.8
	Nearby township	19	15.8
Participates in marketing sunflower	Men	21	17.5
	Women	56	46.7
	both men and women	34	28.3
	Men with little involvement of women	1	.8
	Women with little involvement of men	8	6.7
Price sets	Seller (farmer)	39	32.5
	Buyer	42	35.0
	Negotiation between seller and buyers	39	32.5
Family labor	Yes	115	95.8
	No	5	4.2
Seed	Local Variety	120	100.0
Fertilizer	Manure fertilizer	10	8.3
	no fertilizer application	110	91.7
Product normally sell	Sunflower seeds	120	100.0

Source:-survey data, 2021

Table 2: Production and marketing of sunflower.

Production related variables	Mean	Std.	Min	Max
Total land owned (ha)	1.70	1.61	.5	10
Land allocated for sunflower hectares	.31	.188	.063	1.0
Sunflower productivity (quintal)	10.77	1204.84	2	80
The total quantity of sunflower seed produced per hh in Qt	2.59	2.26	0.4	20
The total quantity of sunflower marketed per sample hh in Qt	2.3	1.77	0.2	8
unit price per unit Qt	10.31	0.87	8	13

Source:-survey data, 2021

Table 3: Production related variables.

The sample respondents during the survey indicated that almost all respondents have been involved in sunflower seed production as well as marketing. The average quantity of sunflower seed produced and marketed per individual sampled household head was about 2.59 qt. and 2.3qt., respectively.

Access to Institutional Services of Farm Households

Finance is the crucial element starting from sunflower seed production up to harvesting and marketing of the product. As depicted in the table, about 96.7% of sampled producers had no access to credit, while only 3.3% had access to credit in the study area. According to the sample respondents, the reasons for not receiving the credit were high-interest rates, lack of collateral, fear of inability to repay, and lack of services. According to the respondents, about 82.5% didn't have access to the extension, whereas only 17.5% of the sample respondents had access to extension services for sunflower seed production. Of the types of extension services that have been provided to the sample respondents in the study area, 81.8% were training, 9.1% were technical support, and 9.1% were advisory or moral building for those who get extension services. This indicates that the extension service provided about sunflower seed market price information was very limited as compared to other types of extension services provided for crops in the study area. According to sample respondents, the majority (95.8%) market their products and inputs in the study area, and 4.2% said there was no market for their products and inputs.

Variable	Respons	Frequency	Percent
credit services	No	116	96.7
	Yes	4	3.3
extension services	No	99	82.5
	Yes	21	17.5
types of extension services	Training	18	81.8
	Technical support	2	9.1
	Advisory or morale building	2	9.1

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The market for products and inputs	No	5	4.2
	Yes	115	95.8
demand for the products in the local market	No	8	6.7
	Yes	112	93.3
weather road in your business area	No	63	52.5
	Yes	57	47.5
price fluctuation in different seasons	No	10	8.3
	Yes	110	91.7

Source:-survey data, 2021

Table 4: *Access to Institutional Service of Farm Households.*

Constraints and opportunities of sunflower production and marketing

From individual interviews, the following constraints were identified and prioritized: According to the survey results, the most significant constraints identified in the study area are birds, climate change, a lack of improved seed, a price decline (harvesting time), a lack of a regular buyer, a lack of awareness, disease and pest, a lack of government attention, and a lack of transportation.

Constraints	Frequency	Percent	Rank
Climate change	24	20.0	2
disease and pest	6	5.0	7
Lack of improved seed	20	16.7	3
no attention is given to gov't	5	4.2	8
price decline	15	12.5	4
Lack of awareness	7	5.8	6
Bird attack	32	26.7	1
no regular buyer	8	6.7	5
lack of transport	3	2.5	9

Source:-survey data, 2021

Table 5: *Constraints identified and ranked.*

Despite the above constraints, in the study areas, there are also opportunities for sunflower production and marketing. The opportunities identified in the study area are:

- Used as a source of income (cash crop), especially for women, and consumed like oil for wot making and also used as feed for the egg-laying hens.
- Presence of suitable agro ecology, which is suitable to produce sunflowers.

- Availability of land for sunflower production
- Suitable for intercropping with cereal crops like maize and sorghum
- Short-period crop (early mature)

Analysis of Econometric Results

Econometric analysis was used to investigate factors affecting sunflower production in the study area. In this study, the variables that have a relationship with sunflower production are sex, age, educational level, experience, annual income, market price, improved seed, family lobar, extension, distance to road, and distance to market. The relationships of these variables with sunflower production were discussed as follows.

Variable	Coef.	dy/dx	Std. Err.	z	P>z
Sex	-.0248234	-.0248234	.11328	-0.22	0.827
Age	.0242465	.0242465	.02001	1.21	0.226
Experience	-.0164903	-.0164903	.01729	-0.95	0.340
Market price	-.2433382***	-.2433382	.06933	-3.51	0.000
Education	.0934684	.0934684	.11643	0.80	0.422
Lack of Improved seed	-.0013577***	-.0013577	.00021	-6.49	0.000
Annual income	.0008638***	.0008638	.00006	13.87	0.000
Family labor	-.0882156	-.0882156	.15443	-0.57	0.568
Extension	-.3364971	-.3364971	.21662	-1.55	0.120
Distance to road	-.0002362	-.0002362	.00084	-0.28	0.778
Distance to market	-.003205**	-.003205	.0013	-2.46	0.014

Source: -survey data, 2021

Table 6: *Econometric Results.*

Conclusion and Recommedetion

Sunflower in the South Omo zone is potentially produced by smallholder farmers in some agro-ecologically suitable areas of Male, Salamago, Hammer, South Ari, and Benatsemay districts and marketed to Adam Naziret. The marketed supply of sunflower production was identified as 88.8%, which shows that sunflower is the major cash crop produced for the market. Smallholder farmers

in the zone use sunflowers for income generation and home consumption. Though there are potential opportunities for sunflower production and marketing, the sunflower subsector is constrained by many factors. Some of the constraints identified include lack of improved seed varieties, lack of timely and accurate market information, lack of extension services, inability to explore the potential sunflower market, bird attacks, and climate change were a few of the problems mentioned during the study. The econometric result of the multiple linear regression model indicated that the lack of improved seed, market price, and distance to the nearest market affect the production and productivity of sunflowers negatively and significantly. Moreover, annual income affects the production and productivity of sunflowers positively and significantly.

Based on the study results, the following recommendations that could call for policy measures (interventions) to improve sunflower production and marketing are forwarded: Despite the availability of local varieties (lack of improved varieties), the yield of sunflower in the South Omo zone was very low compared to the yields in other areas of the country. Hence, it needs adaptive research and demonstration trials to boost production and productivity to achieve exportable supply. Agricultural extension is believed to boost production and productivity. The study's findings, however, confirmed that there was no or little extension support for sunflower producers and marketable supply in the area. There was no knowledge difference between sunflower producers and extension agents. Hence, the training of farmers and extension agents into subject matter specialists.

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