Research & Development
2024; 5(1): 1-4
http://www.sciencepublishinggroup.com/j/rd
doi: 10.11648/j.rd.20240501.11
ISSN: 2994-7057 (Online)

Analysis of Determinants of Soybean (Glycine max.) Market Supply in the Case of Assosa Zone of Benishangulgumuz Regional State, Ethiopia

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To cite this article:
Alemayehu Keba Beyene. (2024). Analysis of Determinants of Soybean (Glycine max.) Market Supply in the Case of Assosa Zone of Benishangulgumuz Regional State, Ethiopia. *Research & Development*, *5*(1), 1-4. https://doi.org/10.11648/j.rd.20240501.11

Received: November 21, 2023; **Accepted**: December 6, 2023; **Published**: January 11, 2024

Abstract: One of the most significant and essential oilseeds for domestic use, commercial markets, industrial input, and cash cropping is soyabean. Thus, the purpose of this study was to examine the variables influencing the supply of soybean farmers to the market. The study was conducted in Homosha and Assosa woreda of Assosa zone in Benishangul Gumuz regional state of west Ethiopia. Assosa city is 683 km far from the capital Addis Ababa in west of the country. The study was conducted in the seven kebeles (Selga 24, Afasizm, Amba 01, Amba 10, Algela, Dareselam and Ashura) which found in Homosha and Assosa Woreda, Assosa zone, Western Ethiopia. Both primary and secondary sources provided the data. Using a structured questionnaire, individual interviews were used to gather the primary data. 194 randomly chosen households in the Assosa and Homosha districts provided the primary data for this study, which were then gathered through interviews. The multiple linear regression models' results show that, as predicted, the number of oxen owned and the size of the land sold for soybeans had a significant impact on the amount of soybeans that households marketed. Therefore, if the market supply needs to be increased, special attention must be paid to these variables. The government ought to be enticing farmers by spreading knowledge about the benefits of using oxen and how to manage their land.

Keywords: Cash Crop, Commercial, Multilinear Regression, Benishangul Gumuz, Ethiopia

1. Introduction

Around the world, soybeans are a major source of protein and oil [14]. According to FAO [11], result in order to meet growing demand, global agricultural production has been steadily increasing over the past 20 years. Between 2000 and 2021, the production of primary crops increased by 54%, the production of meat by 53%, and the production of milk by 58%. According to the study's findings [4], smallholder farming is still crucial to African agriculture.

The agricultural sector, which accounts for a large portion of the GDP, employment, and foreign exchange earnings in Ethiopia, dominates the country's economy [9]. One of the most important oil seed crops in the world, soybean (Glycine max L. Merril) has many advantages for human consumption as well as increased soil productivity [5]. Soybeans are a type of legume crop that can be grown for food and animal feed in temperate, tropical, and subtropical regions [7]. The key to producing soybeans on a large scale and ensuring a consistent supply on the market is Ethiopia's tremendous potential and appropriate agro-ecology, as explained by research findings [15]. Age of the household head, educational attainment of the household head, land size, frequency of Extension contact, and ownership of transport facilities were found to have a significant impact [10].

The fact that the majority of people in Africa depend on agriculture for their livelihoods indicates the importance of this industry, but the continent also faces high rates of malnutrition, unstable food supplies, and poor livelihoods due to climate change, which lowers productivity levels [8].

The research results [16] indicate that some areas were not able to produce soybeans due to insufficient early season rains, which prevented the crop from being sown in time. Owing to the harsh effects of climate change, farming activities have become more intense (using more irrigation, fertilizers, and pesticides, expanding cropland), and production technologies

have improved (better farming techniques, high-yield crops, etc.) [11].

The research findings [7] indicate that soybean productivity and production are low, and that a household's ability to improve productivity and production is largely dependent on how well it implements the suggested production technologies.

The quantity of market supply is determined by institutional, demographic, and socioeconomic factors. Previous studies found that the amount of market supply was affected by factors such as production levels, proximity to the nearest market, gender of the household head, frequency of interaction with agricultural extension agents, and membership in cooperatives [1].

Furthermore, fluctuation in soybean prices and marketing acted as the primary barriers to producers' ability to produce soybeans sustainably [12]. Farmers won't plant soybeans unless they are able to make a profit [13]. The research findings from [2] also indicated that poor barriers, low market prices, credit bureaucracy, a lack of inputs, and weak producer bargaining power were the problems with soybean marketing.

Numerous studies have been carried out on the variables affecting farmers' market supply across the country, with a particular emphasis on low-land oil and crops like bread wheat, maize, and teff [3]. Researchers also investigated the limits on soybean cultivation and marketing.

In order to improve the contribution of soybeans to income and livelihood, this research was done with the purpose of identifying the factors affecting smallholder market supply.

2. Methodology

The study was conducted in Homosha and Assosa woreda of Assosa zone in Benishangul Gumuz regional state of west Ethiopia. Assosa city is 683 km far from the capital Addis Ababa in west of the country. The study was conducted in the seven kebeles (Selga 24, Afasizim, Amba 01, Amba 10, Algela, Dareselam and Ashura) which found in Homosha and Assosa Woreda, Assosa zone, Western Ethiopia. Those kebeles have been selected purposively based on their potential Soyabean production. Primary data was collected from 194 households using structured questionnaire. Qualitative data also collected using Focus Group Discussion (FGD) and Key Informants (KII). Moreover, secondary data was also collected from different published and unpublished documents. The sample keeping the proportion to each kebeles were selected by using [17] sample size formula.

Econometric Model Used for Analysis

Various factors can influence the supply of soybeans on the market. One method to determine these factors is by using the OLS model, but this approach is only effective if all participants are involved in the marketing of the product. If some participants are excluded, using the OLS model can lead to biases in the study. In the Assosa zone, most farmers grow soybeans for selling rather than for personal consumption. The study area used multiple linear regression analysis to examine the factors that impact soybean supply because the amount available for purchase is continuous, and all respondents in the sample produced and supplied their soybean products to the market during the specified cropping season. Similar studies have employed multiple linear regression models to estimate the factors that influence the supply of onions and sesame [6]. Hence, the multiple linear regression model is a valuable tool for analyzing the variables that affect the availability of soybeans for sale. The matrix notation below presents the econometric model for this supply function.

$$Y = X'\beta + U$$

Where Y represents the quantity of soybean supplied to the market, X represents the explanatory variables that impact soybean market supply, β represents the parameters to be estimated, and U represents the disturbance term, which includes unobserved factors that affect market supply but are not observed by the researcher.

3. Results

3.1. Demographic and Socio-Economic Characteristics of Respondents

The survey's findings are shown in Table 1, which shows that the sample household heads' average age was 47.18 years, their average distance to the farmers' cooperative was 1.68 minutes, their average distance to an extension agent was 2.84 minutes, their average distance to the local market was 13.69 minutes, their average amount of land allotted for soyabean was 0.5 ha, their average number of owned oxen was 0.34, and their average level of education was 2.09 years. The distance to the local market, cooperative, and extension agents (FTC) presented challenges for the farmers in the area, even if they were producing teff, in terms of increasing crop productivity in the study area.

Table 1. *Socio-economic and demographic characteristics of sample households.*

Variable	Mean	Std. Dev.	Min	Max
Age of house hold	47.18	17.28	0	88
Distance to market (Minute)	13.69	10.39	0	45
Distance to cooperative (Minute)	1.68	7.49	0	100
Distance to extension (Minute)	2.84	22.61	0	300
Owned Oxen	0.34	0.74	0	4
Land allocated for soyabean (ha)	0.51	0.68	0	7
Selling pricing of soyabean (birr)	1.33	2.85	0	15
Education of house hold	2.09	1.19	1	5

Survey Result of 2019

3.2. The Determinant Factors Affecting Soybean Market Supply

The independent variable which were significantly affect the soyabean market supply were explained here below:

There was a substantial positive correlation between the supply of soybeans and the coefficient of oxen power (measured in oxen-day) employed by farmers who produced soybeans. The coefficient of oxen power was significant at the 10% level of significance, and the positive production

elasticity suggests that the amount of soybean output in the study area can grow by 41.2 percent for every 1% increase in oxen power.

Land used for soyabean production is a continuous variable that represents the amount of land farmed by the family in the 2018/19 growing season. The availability of more cultivated land has a favorable and significant impact on the volume of soybean provided to the market at ($p < 0.01$). Soybeans supplied to the market grew by 0.696 tons for every hectare of cultivated land. Farmers can reserve more farmlands for the cultivation of soybeans if they own more cultivated land. If farmers only have modest amounts of cultivated land, they cannot set aside territory for soybean growing since they also plant a range of food crops for national use in addition to income crops.

Soybean sales prices are continuously fluctuating and are measured in birr per kilogram. As anticipated, the price of the product has a considerable and beneficial impact on the number of soybeans available for sale ($p < 0.01$). The high price of soybeans the previous year encouraged farmers to produce more and flood the market with more commodities the next year, so they decided to dedicate more of their lands to soybean farming. The results of the OLS model indicate that whilst the crop's market price increased by 1 birr per kilogram the year before, the supply of soybeans increased by 0.242 tons.

Table 2. *Regression results of factors affecting quantity of soybean market supply.*

Variable	Coef.	Std. Err.	t	P>t
Sex of house hold	-0.067	0.329	-0.20	0.838
Education of house hold	-0.139	0.157	-0.89	0.377
Age of house hold	-0.004	0.012	-0.35	0.726
Farm experience	-0.009	0.017	-0.55	0.582
Distance to market	0.011	0.016	0.68	0.497
Distance to cooperative	0.022	0.024	0.90	0.369
Distance to extension	-0.004	0.008	-0.47	0.639
Owned Oxen	0.412*	0.246	-1.68	0.095
Land allocated for soyabean	0.696*	0.248	2.80	0.006
Selling pricing soyabean	0.242***	0.061	4.02	0.000
Constant	0.779	0.957	0.81	0.417

N = 193, R2 = 0.9205, Adj R- squared = 0.8870 ***, **, * are significant levels at 1%, 5% and 10% respectively

4. Conclusions and Recommendations

One of the most significant and essential oilseeds for domestic usage, commercial markets, industrial input, and cash cropping is soyabean. Thus, the purpose of this study was to examine the variables influencing the supply of soybeans from growers to the Assosa zone in the Benishangul Gumuz region. Both primary and secondary sources provided the data. Using a standardized questionnaire, individual interviews were used to gather the primary data. 194 randomly chosen families in the Assosa and Homosha districts provided the core data for this study, which were then gathered through interviews. Multilinear regression in an econometric model was used to conduct the investigation. Every household in the sample produced soybeans. The multiple linear regression models' results show that, as predicted, the number of oxen owned and the size of the land sold for soybeans had a significant impact on the amount of soybeans that households marketed. Therefore, if the market supply needs to be increased, special attention must be paid to these variables. The government ought to be enticing farmers by spreading knowledge about the benefits of using oxen and how to manage their land.

Conflicts of Interest

The authors declare no conflicts of interest.

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