



Production and Marketing Trends of Soybean in Mozambique



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Abstract

The present study looked at the actual trends of soybean production and marketing in Mozambique. The data were collected through a review of literature using different sources. The data analyses were based on generating figures, tables and simple average calculations. The results showed that there is a great deficit to meet actual domestic demand for soybean in Mozambique. The provinces of Zambézia, Tete, Manica and Niassa produce 99% of the total of soybeans produced in the country, due to their good agro-ecological conditions. The average level of productivity in Mozambique is 0.63 ton/ha which is below the actual research level in Mozambique (2.0 ton/ha) and even around Southern Africa Region (1.6 to 2.2 ton/ha), creating shortage on supply and competitiveness. The levels of future prices predicted regularly by national authorities are able to attract new entrants into this business and improvements in soybean productivity can serve as a source of income and employment for the marketers. The major problems of soybean production and marketing in Mozambique include weak coordination of agricultural institutions that are supporting soybean smallholder farmers and hence low productivities which affects the volumes produced. Given this, efforts should be made to reduce the constraints to soybeans production and marketing in Mozambique and all necessary measures are already indicated in the Strategic Plan for Development of Agricultural Sector of the Ministry of Agriculture and Rural Development available since 2022.

Keywords: Soybean; Production and Marketing; Future prices; Mozambique

Introduction

The demand for soybeans in Southern Africa is rapidly growing. In Mozambique soybean production and utilization is increasing rapidly given the high demand for it. Based on [1] soybean can be used for food, livestock feed, oil and milk production. In the country the demand for soybeans has originated with many farmers participating in its production. Due to this trend of farmers switching to soybean production, often there is a claim of lacking access to the necessary inputs needed to improve productivity. The Government of Mozambique as reported by [2] considers soybean as a cash crop and necessary measures are already in the ground to support soybean production. The main constraints identified that are still reducing soybean production are low productivity and consequent poor production and competitiveness that results from the poor adoption of improved technologies (good agricultural practices and use of improved seeds), poor knowledge of varieties adapted to the country's different agro-ecological regions, weak access to credit, weak access to market and agro-processing, weak extension network, poor use of the main water resources, weak inter-sectoral articulation to fully respond to the production chain. To meet the expected domestic demand for

soybean in a sustainable manner, the Mozambican Government has allowed some Non-Governmental Organizations to help supporting soybean farmers such as Solidaridad, IITA and others by setting up significant programs across potential provinces. With this effort, the aim was to increase the soybean volumes produced by smallholder farmers through the promotion of soybean seed production and soybean production to strengthen supply chain as well as to improve social and economic development. These organizations in the ground are developing programs consisting of business skills, seed multiplication, sustainable production and sustainable use of pesticides so that farmers have necessary skills to sustainably continue to produce with high returns per money invested across impacted communities in the identified districts across potential provinces in soybean production [3].

Despite the importance of soybean production to address problems of food insecurity and improve well-being of smallholder farmers to promote social and economic development in the country, little is the information in literature reporting actual trends of soybean production and marketing in Mozambique. This study is the review that brings the status and trends of production

and marketing of soybean with a purpose of generating information that help understand and evaluate the system of soybean production in Mozambique. The general objective was to review the actual status and trends of production and marketing of soybean in Mozambique, by reporting the status and trends of soybean production, productivity and marketing as well as the major existing constraints. The theoretical framework that soybean farmers are supposed to use is the profit maximization theory that focuses on achieving the level of output that maximizes profit. According to [4] a soybean producer chooses both its inputs and its outputs with the sole goal of achieving maximum economic profits, so that the difference between its total revenues and its total economic costs be as large as possible. That is:

$$\pi(q) = p(q) \cdot q - C(q) = R(q) - C(q) \quad (1)$$

The derivative of equation (1) with respect to q.

$$d\pi / dq = \pi'(q) \Rightarrow dR / dq - dc / dq = 0 \Rightarrow dR / dq = dC / dq \Rightarrow MR = MC \quad (2)$$

Equation (2) is the first-order condition for a maximum and it is only a necessary condition. For sufficiency condition, it is required that equation (2) be,

$$(d^2\pi) / [dq]^2 (q = q^*) < 0 \Rightarrow (d^2\pi) / [dq]^2 (q = q^*) < 0 \quad (3)$$

The marginal profit must be decreasing at the optimal level of output q. The true maximum profit is achieved if this condition

holds. In addition, this condition holds if marginal revenue is constant or decreasing in q and marginal cost is increasing in q. In this context, the profit will be maximised as,

$$Max\pi(q) = q^* p(q) - [TC]^V - [TC]^F \Rightarrow Max\pi(q) = q^* (p - o + \phi) - ([TC]^V + [TC]^F) \text{ First order condition,}$$

$$[\pi(q)]' = [q^* (p - o + \phi)]' - ([TC]^V + [TC]^F)' = MR - MC \quad (4)$$

A soybean farmer maximises profit at a point where MR=MC, that is

$$[q^* (p - o + \phi)]' = ([TC]^V + [TC]^F)'$$

A farmer should continue selling when the second order for profit maximisation holds. That is,

$$[q^* (p - o + \phi)]' < ([TC]^V + [TC]^F)' \quad (5)$$

Methodology

Study Area

Mozambique is divided into ten provinces and one capital region. The country occupies an estimated land area of 799,380 km² with an estimated population of 30 million. On average it is low at an average of 345 meters elevation above sea level. In Mozambique this study concentrated its attention on the provinces who are the major producers of soybean such as Zambézia, Tete, Manica and Niassa, as indicated in Figure 1.

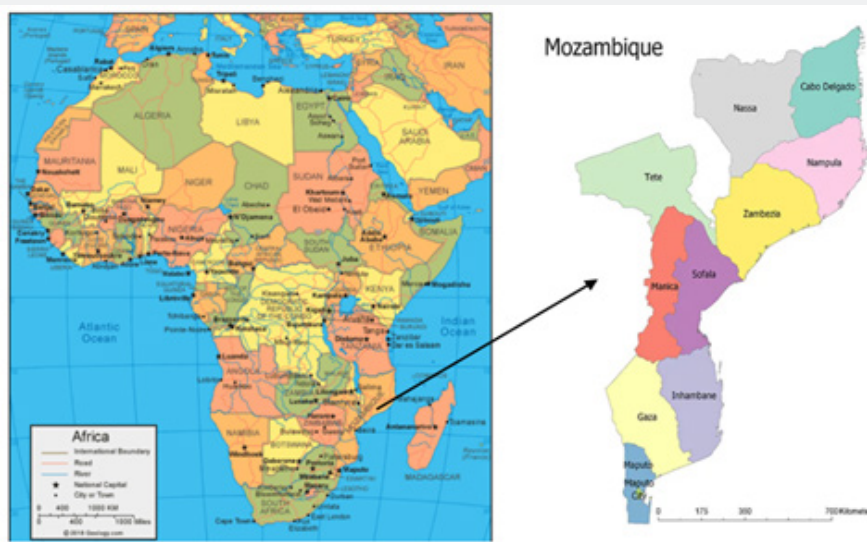


Figure 1: Mozambique map.

Methods of Data Collection and Analysis

The data collected and interpreted were obtained from primary and secondary sources (mainly from integrated

agricultural survey 2020 of the Ministry of Agriculture and Rural Development, research output of the high education graduates and FAOSTAT). Different research results have been used to assess the current situation of soybean production and marketing in

Mozambique, including major constraints. Hence, from the raw data obtained from organizational sources, statistical analyses were employed for the justification of the reported results (figures, tables and simple averages).

Results and Discussions

Soybean Production in Mozambique

Soybean is considered in Mozambique as a cash crop (PNISA, 2013). The production and marketing of this crop is encouraged by the Government and partners operating in the agricultural sector [2]. The demand for soybean in Mozambique is high as previously

indicated and the actual levels of supply are not enough to meet domestic demand. The actual quantities produced are not well documented in literature and this study collected information using different sources, as in Figure 2, and report so that interested bodies have a base for future regarding soybean production. In the rain-fed season 2019/ 2020 (November 2019 to April 2020) the quantity of soybean produced in the country is estimated to be 51,757 tonnes in a planted area of 90,833 hectares mainly coming from smallholder farmers since 97.8% of all agricultural sector is dominated by this group of farmers [5].

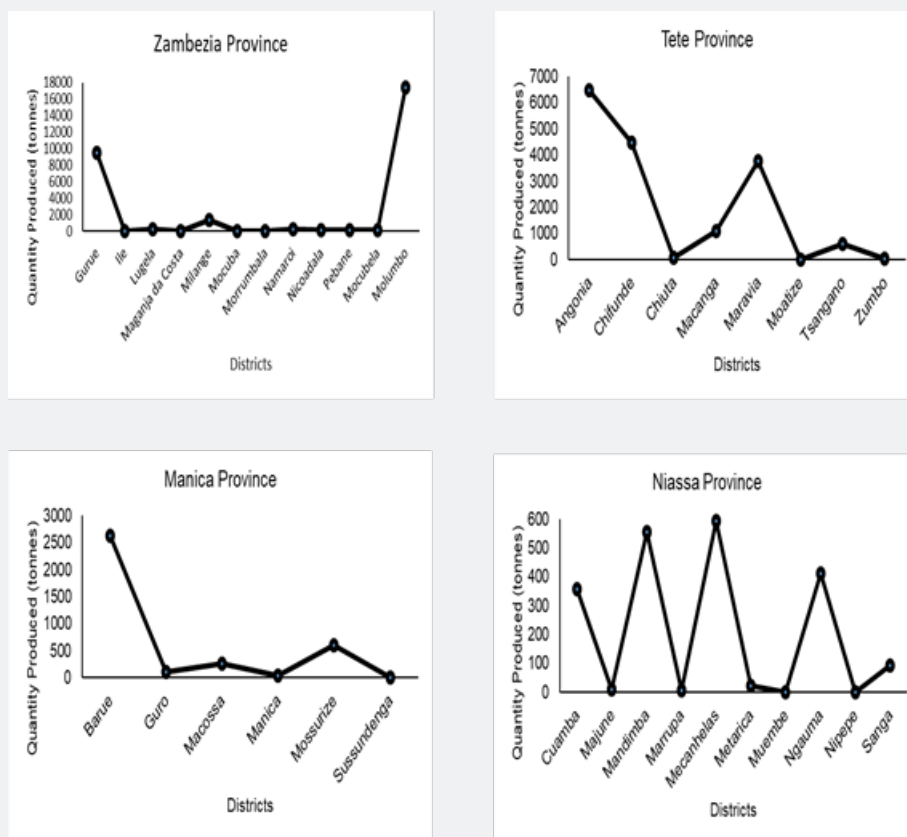


Figure 2: Soybean trends production in Mozambique. Source: Mader [5].

Disaggregating this amount produced by provinces, as indicated in Figure 1, Zambézia, Tete, Manica and Niassa provinces are the leading growers of soybean due to their good agro-ecological conditions and jointly produce almost 99% of the total that is produced in the country. Among these provinces, there are significant districts that are mostly contributing to soybean production in the country and need attention in terms of addressing more investment in order to subsidize main inputs so as to improve productivity and increase quantity produced and

in this way approach the actual domestic demand. The districts that have demonstrated good agro-ecological conditions and are potential for soybean production are Gurue, Milange and Mocubela (Zambézia province), Macossa, Bárue and Sussundenga (Manica province), Tsangano, Angónia, Chifunde and Maravia (Tete province), Mandimba, Cuamba, Mecanhelas, Ngauma and Sanga (Niassa province), Figure 1. Information not well published from Solidaridad (Non-Governmental Organization) has recognized the potential of Angónia and Gurue districts for soybean production.

Estimated Soybean Productivity in Mozambique

As indicated, the provinces of Zambézia, Tete, Manica and Niassa are producing 99% of the total soybean produced in Mozambique. Consulted the recent Strategic Plan for Development of Agricultural Sector in the country of the Ministry of Agriculture and Rural Development [6] one of the main constraints to agricultural sector is low productivity. In Table 1 from the data collected it was estimated the average productivity of soybean for each province and for the four provinces under study. In fact, the productivity encountered is low and for the country on average it was found 0.63 ton/ha with Zambézia registering the maximum of 0.86 ton/ha. The agronomic research on soybean taken by [7] in Angónia district, has found a productivity of 2.0 ton/ha

with all inputs controlled, mainly 100 kg/ha of fertilizer NPK. Additionally, data from [8] regarding soybean productivity on the Southern Africa Region, Figure 3, indicate relatively high average productivity of soybean (1.6 to 2.2 ton/ha) compared to an average of 0.63 ton/ha obtained in Mozambique, mainly by smallholder farmers that need support on agricultural technologies to improve their performance in production. Therefore, dissemination of the demonstrations of the research results such as that obtained by [7] can promote the improvements in productivity, the main constraint to agricultural enterprises. A study conducted by [10] also found a low level of soybean productivity in Ethiopia. The average productivity level of soybean in Ethiopia during the last 15 years was 1.4 ton/ha which is low compared to the research level estimated to be 4 ton/ha in Ethiopia.

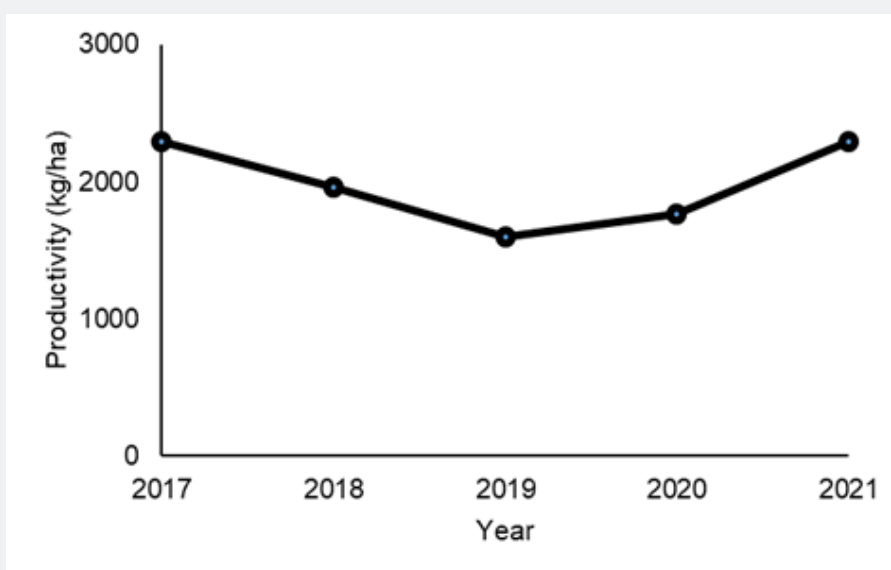


Figure 3: Soybean Productivity in Southern Africa Region. Source: FAOSTAT [8].

Table 1: Estimated soybean productivity in Mozambique. Source: Mader [5] and preliminary analysis from the Author.

Province	Area (ha)	Production (t)	Estimated Productivity (t/ha)
Zambézia	33949	29080	0.86
Tete	25000	16503	0.66
Manica	20205	3647	0.18
Niassa	2518	2050	0.81
Average	-	-	0.63

Soybean Market Information

It is known that market information is important in stimulating production and particularly for soybeans the information on price is scarce in literature. But the Ministry of Agriculture and Rural Development regularly provides information on price for soybean mainly based on future prices given that soybean is a cash crop,

and its price should be known widely. Future prices are the prices agreed in the 'present' for the purchase and sale of the product at a 'future' date. Figure 3 shows the future price predicted by [9] through Weekly Agricultural Marketing Reports. Figure 4 provides future prices of three different years (2021, 2022 and 2023) to compare the evolution of soybean prices. Based on the same period, where the soybean product is available after rain-

fed production harvest, in 2022 the price has increased and later decreased in 2023. Therefore, in general the price is stable and if

smallholder farmers produce in an organised manner following all the protocols, that achieve 2.0 ton/ha, this business is profitable.

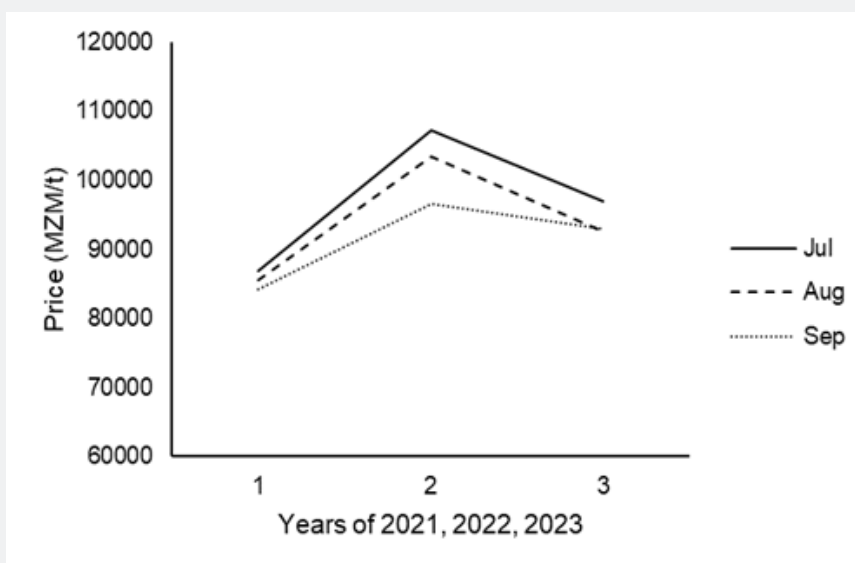


Figure 4: Future price of soybean in Mozambican Meticals (MZM) per one tone. Source: Mader [5].

Constraints

The main constraints to soybean production in Mozambique are:

- i) Low levels of soybean productivity, production and competitiveness.
- ii) Weak knowledge of sustainable management of soybean production.
- iii) Limited information on soybean markets.
- iv) Weak coordination of agricultural institutions that are supporting soybean production and marketing.

Conclusion and Recommendations

The study showed that soybean marketing is profitable given the high domestic demand, but actual levels of productivity are low compared to the average obtained from the research levels in Mozambique and from the Southern Africa Region. The levels of future prices that are predicted regularly can even attract new entrants into this business and improvements in soybean productivity can serve as a source of income and employment for the marketers. The major problems of soybean production and marketing in Mozambique include weak coordination of agricultural institutions that are supporting soybean smallholder farmers and hence low productivities which affects the volumes produced. Given this, efforts should be made to reduce the constraints to soybeans production and marketing in Mozambique

and all necessary measures are already indicated in the Strategic Plan for Development of Agricultural Sector of the Ministry of Agriculture and Rural Development available since 2022.

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