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ANALYSIS OF THE CAPITALIZATION OF CASH CROPS IN ZAMBEZIA, 2019-2024, STATA APPROACH.

Análise da Capitalização das Horticulturas de Rendimento na Zambézia, no Período de 2019-2024, Abordagem ao STATA.

Análisis de la Capitalización de los Cultivos Comerciales en Zambézia, 2019-2024, utilizando Stata.

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ABSTRACT

The development of agricultural projects, in the context of Mozambican legislation, is considered risky; on the other hand, institutional aspects and factors related to markets, investment incentives and the business environment have not favored the structural transformation of agriculture and the economy. In fact, poor access to finance goes hand in hand with poor provision of services to producers, which means that there are still difficulties in strengthening the value chain in the production and marketing of agricultural products, with a greater focus on cash crops, especially vegetables. The lack of access to producer services in the production of horticultural crops makes Zambézia province

dependent on other provinces and neighboring countries, which results in a poor balance of trade and, consequently, low gross domestic production. It can therefore be concluded that the poor promotion of services to producers, in this specific case, the poor financing of agricultural projects, in terms of quantity and value, is considered a factor that limits the possibility of increasing production in Zambezia, which translates into the failure to promote agriculture through the application of public policies in this sector. From this approach, it can be seen that there is some tendency to finance projects in other sectors of activity, compared to the agricultural sector. Therefore, there is some correlation between the level of project financing in the

agricultural sector (number of projects versus amount of value financed and level of production), if analyzed in relation to the other sectors. Although investments in this sector (agriculture) are, on average, relatively high (around 3.61 million) compared to investments in other sectors (around 3.58 million), it can be seen that few (in the minimum column) projects consume greater amounts, or even, there may be overestimation among the few projects approved, with a strong correlation of $r = -0.8015$.

Keywords: Agricultural projects, horticulture, services to producers.

RESUMO

O desenvolvimento de projectos agrários, no contexto da legislação moçambicana, são considerados de risco; de outro lado, aspectos institucionais e factores relacionados com os mercados, incentivos ao investimento e ambiente de negócios não têm favorecido a transformação estrutural da agricultura e da economia. Com efeito, o deficiente acesso financiamento é acompanhado da deficiente provisão de serviços ao produtor, pelo que subsistem dificuldades no fortalecimento da cadeia de valor na produção e comercialização de produtos agrícolas, com maior enfoque para as culturas de rendimento, principalmente, as horticulturas. A prevalência do défice de acesso aos serviços aos produtores, na produção de horticulturas torna a província da Zambézia dependente de outras províncias e países vizinhos, o que resulta em uma balança comercial deficiente, e, conseqüentemente, a fraca produção interna bruta. Conclui-se, assim, que a deficiente promoção dos serviços aos produtores, neste caso específico, o fraco financiamento de projectos agrícolas, em termos de quantidade e em termos de valor, considera-se um factor que limita a possibilidade de aumento da produção, ao nível da Zambézia, o que se traduz pela não promoção da agricultura, por meio da aplicação de políticas públicas, nesse

sector. Com aquela abordagem, pode-se depreender que existe alguma tendência em financiar-se projectos que compõem os outros sectores de actividades, face ao sector da agricultura. Por conseguinte, existe alguma correlação entre o nível de financiamento de projectos no sector de agricultura (número de projectos versus quantidade de valor financiado e nível de produção), se analisado face aos outros sectores. Apesar de os investimentos neste sector (agrícola) serem, em media, relativamente elevados (cerca de 3.61 milhões) face aos investimentos em outros sectores (cerca de 3.58 milhões), observa-se que poucos (na coluna de mínimo) projectos consomem maiores valores, ou mesmo, poderá existir sobreavaliação de entre os poucos projectos aprovados, com uma forte correlação de $r = -0.8015$.

Palavras-chave: Projectos agrícolas, horticulturas, serviços aos produtores.

RESUMEN

El desarrollo de proyectos agrícolas, en el contexto de la legislación mozambiqueña, se considera arriesgado; por otra parte, los aspectos institucionales y los factores relacionados con los mercados, los incentivos a la inversión y el entorno empresarial no han favorecido la transformación estructural de la agricultura y la economía. De hecho, el escaso acceso a la financiación va de la mano de una deficiente prestación de servicios a los productores, lo que significa que sigue habiendo dificultades para reforzar la cadena de valor en la producción y comercialización de productos agrícolas, con una mayor atención a los cultivos comerciales, especialmente la horticultura. La prevalencia de la falta de acceso a los servicios al productor en la producción de cultivos hortícolas hace que la provincia de Zambézia dependa de otras provincias y de los países vecinos, lo que se traduce en una mala balanza comercial y, en consecuencia, en una baja producción interna

bruta. Por lo tanto, se puede concluir que la escasa promoción de los servicios a los productores, en este caso concreto la escasa financiación de los proyectos agrícolas, en términos de cantidad y valor, se considera un factor que limita la posibilidad de aumentar la producción en Zambezia, lo que se traduce en el fracaso de la promoción de la agricultura mediante la aplicación de políticas públicas en este sector. De este planteamiento se deduce que existe cierta tendencia a financiar proyectos que conforman los demás sectores de actividad, en comparación con el sector agrario. Por consiguiente, existe cierta correlación entre el nivel de financiación de proyectos en el sector agrario (número de proyectos frente a importe de valor financiado y nivel de producción), cuando se analiza en relación con los demás sectores. Aunque las inversiones en este sector (agricultura) son, por término medio, relativamente elevadas (en torno a 3,61 millones) en comparación con las inversiones en los demás sectores (en torno a 3,58 millones), se observa que pocos proyectos (en la columna del mínimo) consumen importes superiores, o incluso que puede haber sobreestimación entre los pocos proyectos aprobados, con una fuerte correlación de $r = -0,8015$.

Palabras clave: Proyectos agrícolas, horticultura, servicios a los productores.

Contribuição de autoria (por Luanda Aurélio Luanda):

A concepção da ideia, pesquisa e revisão de literatura, preparação de instrumentos, aplicação de instrumentos, aplicados informações resultantes dos instrumentos aplicados, compilação da informação resultante dos instrumentos, redação do original (primeira versão), revisão e versão final do artigo, correção do artigo, coordenação da autoria, tradução de termos ou informações obtidas, revisão da

aplicação do padrão bibliográfico aplicado, foi assegurado pelo autor da obra, Luanda Aurélio Luanda.

Contribuição de co-autoria (por Sónia Francisco Alfredo Savaio):

A análise estatística, preparação de tabelas, gráficos e imagens, preparação da base de dados, aconselhamento geral sobre o tema abordado, revisão da aplicação do padrão bibliográfico aplicado, foi assegurada pela co-autora da obra, Sónia Francisco Alfredo Savaio.

INTRODUCTION

Mozambique is a fundamentally agricultural country, with more than 70% of its population living in rural areas and working in agriculture. The Mozambican constitution defines agriculture as the basis for the development of the national economy. At present, agriculture contributes 24% of the gross domestic product (GDP) and is mostly practiced on small farms, which represent around 99% of all farms, and use rudimentary production practices, with very little use of modern inputs. The level of use of machinery and credit is also very low.

The development of agricultural projects, in the context of Mozambican legislation, is considered risky; on the other hand, institutional aspects and factors related to markets, investment incentives and the business environment have not favored the structural transformation of agriculture and the economy.

Although there are other cash crops practiced in Zambezia, such as “lettuce, garlic, eggplant, beet, onion, carrot, cabbage, cucumber, cabbage and tomato”, for which vegetable cultivation is vaguely used; tomato is one of the most important vegetables after the Reno potato.

From all the project funding, subdivided between agriculture and other sectors, it can be seen that in the area of agriculture there are fewer projects

approved, as well as a lack of funding for agricultural projects.

Therefore, it can be concluded that the poor promotion of services to producers, in this specific case, the poor financing of agricultural projects, in terms of quantity and value, is considered a factor that limits the possibility of increasing production in Zambezia, which translates into the failure to promote agriculture through the application of public policies in this sector.

From this approach, it can be seen that there is a tendency to finance projects in other sectors of activity, rather than agriculture.

Therefore, there is some correlation between the level of project financing in the agricultural sector (number of projects versus amount of value financed and level of production), when analyzed in relation to the other sectors.

Although investments in this sector (agriculture) are, on average, relatively high (around 3.61 million) compared to investments in other sectors (around 3.58 million), it can be seen that few (in the minimum column) projects consume greater amounts, or even, there may be overestimation among the few projects approved, with a correlation of $r = -0.8015$.

3.4 Mozambique's agrarian economy

Agriculture is key to broad-based economic growth, poverty reduction and food security in all sub-Saharan African economies (Chilonda, Machethe, & Minde, 2007). As the backbone of many economies, this sector generates on average 25% of the Gross Domestic Product (GDP) in Sub-Saharan Africa and contributes around 44% to employment generation in the region (Faria, 2021).

“Mozambique's economy is directly driven by the performance of the agricultural sector. From 2000 to 2016, Mozambique's Gross Domestic Product (GDP) growth was among the highest in sub-Saharan Africa, averaging 7.2% per year.

However, the fall in public investment and foreign direct investment over the last five years has slowed economic activity to an average of 3.7%, down from 6.7% in 2015,” (Ministry of Agriculture and Rural Development [MADER], 2024).

Despite the above proposition, Abbas and Mosca (2021, p. 105) argue that “the weight of agriculture in GDP [Gross Domestic Product] has remained unchanged, [as] the balance of trade in food and the agricultural sector remains in deficit”.

The cycle of low agricultural productivity is based on,

“research with few results of a technical nature and the sidelining of research in the social sciences with little influence on extension, which lacks financial, technical and knowledge capacity. Production is based on labor-intensive technology and on smallholdings, with very little access to capital-intensive technologies (machinery, more productive seeds and organic and inorganic inputs, irrigation, etc.). This reality necessarily implies low productivity and high losses in the field and post-harvest, resulting in poverty, malnutrition and food insecurity, low sales and income for families, which makes it difficult or impossible to access credit and, consequently, the factors that could most boost productivity and changes in the land structure.” *Idem* (p. 105)

The above position is mainly defended by the Ministry of Agriculture and Food Security (MASA), 2015, p.10,

“Mozambique is a fundamentally agricultural country, with more than 70% of its population living in rural areas and engaged in agriculture. The Mozambican constitution defines agriculture as the basis for the development of the national economy. At present, agriculture contributes 24% of the



gross domestic product (GDP) and is mostly practiced on small farms, which represent around 99% of all farms, and use rudimentary production practices, with very little use of modern inputs. The level of use of machinery and credit is also very low”.

According to (Embrapa Hortaliças [EmH], 2015, p. 22),

“in Mozambique's large urban centers such as Maputo, Beira, Nampula, Tete and Pemba, the consumption of vegetables and fruit increasingly forms the basis of food and nutritional security and increased community income. [Thus] the growing demand imposes the need for technological improvements and sustainable production methods”.

Agriculture, according to the Ministry for the Coordination of Environmental Action [MICOA], 2012, “is [...] rainfed, practiced on a slash-and-burn basis. The main crops include rice, maize, cassava, beans, peanuts, sweet potatoes and vegetables.”

The development of agricultural projects, in the context of Mozambican legislation, are considered risky, as is the case with the Project to Strengthen the Rice Value Chain in the ZEEA-L (Limpopo Special Economic Zone for Agribusiness) and in the Irrigated Areas of Sofala and Zambézia Provinces - Nicoadala District, whose project, as MADER, 2024, p. 13, points out,

“for the AfDB [African Development Bank] the project is classified as category 1, this category includes projects classified as high risk by national legislation or moderate risk projects financed by the Bank in a context of weak environmental and social implementation capacity or in a fragile context”.

The development of rice production activities, although as pointed out by Capaina (2022, p. 4) with a level of “low productivity, [caused] namely [by] the use of traditional cultivation practices; low use of inputs; plots cultivated using manual labour and tools; predominance of the rainfed system; minimal use of improved seeds and animal traction” will allow the emergence of other activities such as the production of horticultural crops, which would increase or develop the value chain, which is why this article analyses the capitalization of cash crops.

According to (MICOA, 2012, p. 5),

“Although agriculture in the district is essentially subsistence-oriented, some cash crops are also produced by the family sector, namely rice, copra and cashew nuts. The population also sells the surplus of crops that are normally considered subsistence crops (e.g. maize, sorghum, groundnuts, cassava and sweet potatoes). When it comes to producing food crops, the factors that limit their practice are floods (76%), pests (70%) and a lack of seeds (60%). There isn't much external investment in agriculture and families use natural and organic methods (organic fertilizer) to increase soil fertility”.

According to (Instituto Nacional de Estatística [INE], 2024),

“the staple food crops [in] Mozambique, 2019-2023 [were the following:] maize, rice, mapira, mexoeira, large groundnuts, small groundnuts, cassava, orange-fleshed sweet potatoes, non-orange-fleshed potatoes, butter beans, nhemba beans, yoke beans and boer beans. [However, for the same Authors, the] production of staple food crops [in] Mozambique, 2019-2023 [were as follows:] maize, rice, sorghum, millet, peanuts, cassava, orange-fleshed sweet potatoes, non-orange-fleshed sweet potatoes and beans. [Production of cash crops [in] Mozambique, 2019-2023

[includes] seed cotton, cashew nuts, sugar cane, macadamia, bananas, tea (green leaf), citrus fruits, copra, tobacco and sunflowers. [Meanwhile, the branch of] agro-industrial production [in] Mozambique, 2019 - 2023 [includes] sugar, molasses and black tea". (pp. 64-65)

However, according to MASA (2015, p. 41-46), the main cash crops in Zambézia are "cotton, tobacco, tea, sunflower, sesame and soya". [In turn, the vegetables grown are] "potatoes, pumpkins, onions, cabbage, watermelons, cucumbers, okra and tomatoes", *Idem*.

For its part, MADER (2024, p. 32) reported that in Zambezia there are around "3,734 small producers, 259 medium producers and 17 large producers, for a total of 890 farms".

The production of horticultural crops in Zambezia province, if not in Mozambique, is still very reticent, although since independence there has been a growing trend, which according to Abbas and Mosca (2021, pp. 104-105) "production per inhabitant of food crops has decreased, except for vegetables".

The above Authorss also argue that "institutional aspects and factors related to markets, investment incentives and the business environment have not favored the structural transformation of agriculture and the economy". (p. 106)

The above factors are added to by (Center for Democracy and Development [CDD], 2022, p. 2) by calling them "aspects of risk for small farmers [whose] risks include the weak power to negotiate the price of the product, poor access to the market and, more aggravatingly, the impact of rising fuel prices on production and transportation costs".

According to INE (2019, p. 35) "the main products of the processing industry [of agricultural origin] include soap, raw copra oil, oilseed cake, processed tea, cooking oil, corn flour and rice".

According to INE (2023, p. 42) and INE (2024, p. 43), although the food crops are the same as those advocated by INE (2024, pp. 64-65); the cash crops are "seed cotton, cashew nuts, macadamia, tea (green leaf), tobacco and sunflower".

However, data from the EmH (2015, p. 25) states that "tomatoes are one of the most important vegetables after the Reno potato", despite listing several of the main vegetables produced in Mozambique, such as "tomatoes, onions, cabbage, green beans, peppers, beet, garlic, lettuce, cabbage and carrots" (p. 27).

According to MADER (2024, p. 72), "Zambézia province produced 134,200 tons of tomatoes for a cultivated area of 6,710 hectares, while the onion crop produced 21,654 tons for a cultivated area of 2,406 hectares".

Below is a table of the relative importance of vegetables according to area and consumption in Mozambique.

Table 1: Relative importance of vegetables according to area and consumption in Mozambique.

Culture	Relative importance (%)
Tomato (<i>Solanum lycopersicon</i>)	77,9
Onion (<i>Allium cepa</i>)	13,0
Cabbages (<i>Brassica spp.</i>)	5,2
Green beans (<i>Phaseolus vulgaris</i>)	3,9

Source: Adapted from EmH (2015, p. 26)

However, Abbas and Mosca (2021, p. 30) point out that there are other cash crops grown in Zambézia, such as "lettuce, garlic, eggplant, beet, onion, carrot, cabbage, cucumber, cabbage and tomato", for which "improved seeds in the percentage of 1.6%" are vaguely used (p. 32). However, the same Authorss confirm that "Zambézia cultivates the largest area of sweet potatoes (22%), cowpeas (64%), sugar cane (27%), sunflower (50%) and soybeans (54%)". (p. 61)

Particularly with regard to soybean cultivation, in Zambezia (in Mocuba), according to Parruque and Manhique (2025, p. 6), the access to services for producers is unique in terms of technology,

“the use of agricultural mechanization was statistically significant at a 5% significance level, which suggests that there is a relationship between access to agricultural mechanization and the number of producers. Access to technological packages is another point of inequality”.

According to Abbas and Mosca (2021, p. 63), “Zambézia [stands out] in the production of bôer beans (58% of national production), soybeans (56%), sweet potatoes (33%) and rice (31%)”.

3.4.1 Analysis of producer services

The development of horticultural or even agricultural activities largely requires access to the financial system in order to obtain funding that would boost the production system.

The analysis of production data shows that “the levels of production and productivity achieved are not attractive or satisfactory, and various problems have led to low production, productivity and marketing”, EmH (2015, p. 24).

In this sense, according to Abbas and Mosca (2021, p. 17), services to producers are fundamental, and they include:

“(1) rural extension and the application of techniques transmitted by technicians; (2) knowledge of market prices; (3) membership of a form of associative organization; and (4) relations with the financial system (obtaining some form of credit, membership of a savings or credit group and access to banking services)”.

Well, services to producers are really essential, “because producers' access to markets for agricultural products and inputs is one of the critical aspects for increasing production and

productivity”, EmH (2015, p. 24-25). 24-25) and, if we analyze only the cotton, sesame, sunflower and soybean crops, we can see that some of these crops, although they are attractive to the market (local or foreign), although the Authors also argues that the “horticultural market is still quite informal and underdeveloped in Mozambique” (p. 24), so they still lack access to services for producers, in order to avoid production losses, in addition to being a mechanism to encourage large-scale production (see table 1 below).

In the opinion of MADER (2024, p. 35), only “24.8% of small and medium-sized horticulturists in Zambézia had access to extension services”, a considerable increase on the percentage of “12.5% access to extension services”, according to MADER (2021, p. 323).

For (Zambezi Valley Development Agency [ADVZ], 2019, p. 19),

“The provision of Business Development Services (BDS) is a very important means of supporting the development of micro, small and medium-sized enterprises (MSMEs), which are the basis for job creation, income generation and contribute to the economic growth and development of the region in particular and the country in general”.

According to EmH (2015, p. 24) there are still problems in the vegetable production chain, such as,

“a) high transaction costs due to frequent geographical dispersion and the weak organization of small rural producers into producer associations; b) poor access to markets at the community level - producers often need to travel long distances (more than 15 km) to be able to sell their vegetables or buy products they need; c) poor development of the transport network and other rural economic infrastructures; d) limited access to financial services; e) limited coverage of Rural

Extension Services; f) poor media coverage of much of the country, especially rural areas”.

According to (Ministry of Industry and Trade [MIC], 2019, p. 63),

“The constraints of agricultural marketing are found at each stage of the agricultural marketing chain, from production to the final consumer. These include the following: a) Poor access routes; b) Weak potential in transport logistics; c) Weak potential in the storage and conservation of agricultural products; d) Difficulties in accessing markets; e) Weak potential of agro-processing industries; f) Exponential increase in informal trade; g) Existence of unfair competition on the national market; h) Difficulties in accessing credit due to the lack of specific credit lines for agricultural marketing players”.

In Mozambique, “post-harvest is characterized by high losses, due to deficiencies in transport, conservation and disposal systems”, *Idem* (p. 26). In addition to these aspects, they point to the poor irrigation system, which “in horticulture uses small sprinklers with a radius ranging from 5 to 15 m”, *Idem* (p. 119).

In order to corroborate the above idea, MADER (2024, p. 34) states that the agricultural production process in Zambézia, in terms of the

Table 2: Relationship between percentages of sales over production, quantities sold (in tons) and farm size, in Zambezia province.

Culture	Farm size	Quantities sold (in tons)	Percentage of sales over production
Cotton	> 0,5	0	0,0
	0,5 – 1	0	0,0
	1 – 2	0	0,0
	2 – 5	0	0,0
	5 – 10	0	0,0
	10 – 50	0	0,0
Sesame	> 0,5	157	51,3
	0,5 – 1	1.970	74,2
	1 – 2	7.016	88,0
	2 – 5	6.194	87,1
	5 – 10	3.836	59,8
	10 – 50	312	53,8

use of modern technologies, is diversified into “irrigation (4.8%), chemical fertilizers (2.9%), pesticides (2.0%), herbicides (0.8%), manure (1.4%), tractors (1.0%) and animal traction (0.0%)”.

However, as Capaina (2022, p. 19) points out,

“One way of measuring production performance can be to analyze the relationship between the change in cultivated area and (the investments made) and the change in production obtained [in this case denoted by] a 15% investment in the use of improved technologies”.

The above ideas are corroborated by Coop (2015, p. 13), who states that,

“producers have limited knowledge of the characteristics of seeds; technical assistance to producers is poor; traditional vegetables are susceptible to diseases and pests; commercial relations between producers and intermediaries are governed by informal rules, with no contracts being signed; products are not subject to pre-processing, such as washing or proper packaging, which increases the risk of post-harvest losses. Too many sellers for too few buyers reduces the chances of greater financial gains for intermediaries and retailers”.



Sunflower	> 0,5	0	0,0
	0,5 – 1	43	54,9
	1 – 2	224	66,1
	2 – 5	341	70,3
	5 – 10	288	55,2
	10 – 50	0	0,0
Soya	> 0,5	865	73,0
	0,5 – 1	2.902	88,0
	1 – 2	3.725	70,5
	2 – 5	10.285	78,4
	5 – 10	5.093	90,6
	10 – 50	464	97,1

Source: Adapted from Abbas and Mosca (2021, p. 92-99)

According to Abbas and Mosca (2021, p. 103) “of the cash crops, sesame stands out, followed by tobacco, soy, sugar cane, sunflower and cotton”.

3.4.2 Analysis of national investments financed by the Investment Promotion Agency, with a focus on Zambézia

As mentioned above about the need for access to services and products, below is a specific analysis of the level of funding for agricultural projects in Zambezia province.

According to Coop (2015, p. 15), horticultural crops such as tomatoes, cabbage, carrots and peppers have long growing seasons: “Tomatoes: from March to June and from August to October; Cabbage: from February to May and from July to September; Carrots: from January to March; Peppers: the supply is almost constant”, so local producers could take advantage and capitalize on their income in the Mocuba market.

The following table illustrates the cash crops grown in Zambézia.

Table 3: Cash crop production, Zambézia Province 2019 - 2023.

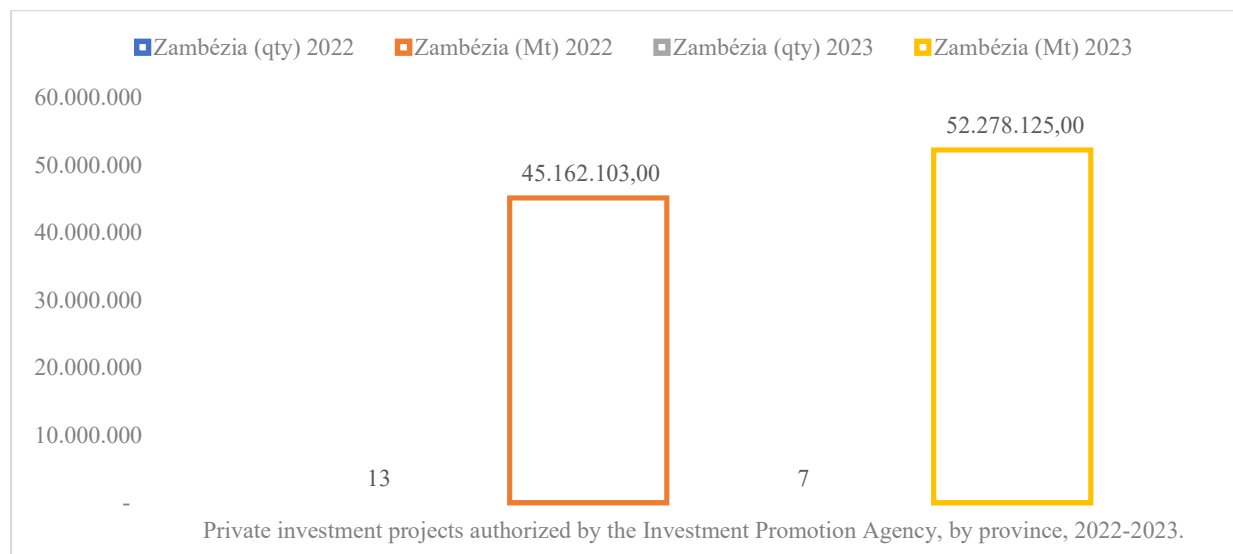
Cultures	Cultivated area (ha)				
	2019	2020	2021	2022	2023
Cottonseed	6,671	656	500	0	0
Cashew Nuts	15,768	14,554	15,267	16,352	20,432
Macadamia	0	515	827.3	1,044	753
Tea (green leaf)	3,901	4,876	4,507	5,043	4,701
Tobacco	16,996	11,452	12,145	12,514	12,603
Sunflower	59,077	7,125	2,642	2,566	2,496

Source: INE (2024, p. 43)

Despite Coop's (2015) approach to the vegetables produced in Zambézia and marketed in Mocuba and Quelimane, INE's (2024) data leads to an understanding of the production levels of these cash crops, and in its data reports on agricultural production (Zambézia's statistical yearbook for 2023), the information on vegetables is vague.

This points to the need to adopt serious policies to encourage the production and marketing of vegetables, which, being scarce for the market, can result in high yields.

Graph 1: Private investment projects Authorized by the Investment Promotion Agency, by province, 2022-2023.



Source: Adapted from INE (2024, p. 138)

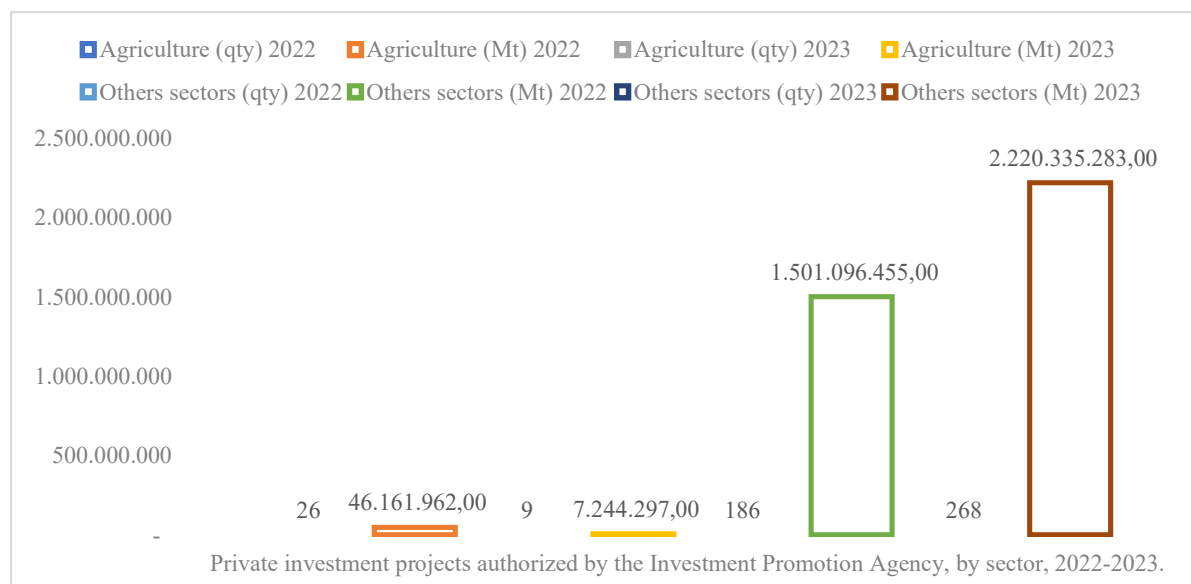
On the other hand, specific funding for the agricultural sector should also be analyzed, albeit on a national basis.

From the graph above, it can be seen that there are still serious gaps in policies to promote and encourage agriculture in general, and horticulture in particular, so the local market will continue to

demand products from other republics, coupled with low local production.

These facts can not only contribute negatively to the balance of trade, but also to the balance of payments and, consequently, to the gross domestic product.

Graph 2: National private investment projects Authorized by the Investment Promotion Agency, by sector, 2022-2023.



Source: Adapted from INE (2024, p. 138)

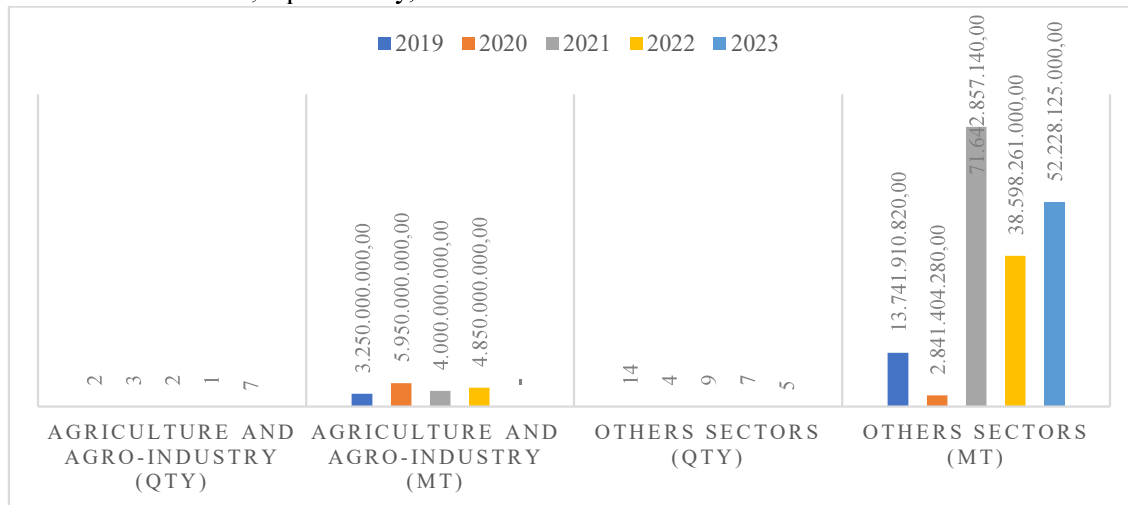
According to INE (2024, p. 138) “[sectors such as] banking and insurance [obtained insurance companies [obtained financing between 2022/2023, in the amounts of] (1/2), construction (13/16), industry (56/100), transport and communications (31/63), energy (4/2), tourism and hotels (24/44) and services (57/41)” are the most benefited from financing, in aggregate, at national level, compared to agriculture, which amassed 12.3% and 3.2% respectively between 2022 and 2023.

The most profitable horticultural crops in Zambezia's markets, specifically, Mocuba

and Quelimane, according to Coop (2015, p. 19) are “tomatoes, cabbage, peppers, carrots and green beans”.

Below is a more specific analysis of the quality of investments made in the agricultural sector compared to other sectors, specifically in the province of Zambézia.

Graph 3: Private investment projects Authorized by APIEX, according to economic activity, Zambezia Province, 2019 - 2023.



Source: Adapted from INE (2024, p. 138)

According to INE (2024, p. 57) “agriculture was the sector with the most projects approved in 2023 (7), although there were no disbursements”.

On the other hand, [sectors such as] “transport and communications had [project financing] in 2023 (0) against (5), in previous years, tourism and hospitality (0) in 2023, against (4) in previous years, industry (5) in 2023 against (23) in previous years, construction (0) in 2023 and (3) in previous years, and other (0) in 2023, against (3) in previous years”, *Idem*.

MATERIALS & MÉTHODS

The methodology followed in the design of this scientific article obeyed bibliographical consultation, that is, the bibliometric analysis, so as to compose important data for the study and the manipulation of data using *stata*.

“The present research was exploratory type, being they represent empirical research investigations that aims to formulate questions or a problem, with three purposes: to develop hypotheses, increase the familiarity of the researcher with an environment, fact or phenomenon, to carry out a future more precise research, or modify and clarify concepts”, Marconi & Lakatos, (2010).

Thus, based on official documents of the national statistical institute, it was possible to compose an interactive table of data, which were then manipulated using the *Stata* tool to obtain important correlations, according to Filho and Júnior (2009), in order to draw the conclusions existing in the concluding part of this article.

RESULTS & DISCUSSIONS

From the total financing of projects, subdivided between agriculture and other sectors, it can be noted that in the area of agriculture there is a smaller number of approved projects, as well as a deficit in the financing of agricultural projects.

From the table below, we can denote, an illustration of data, using *Stata*:

Table 3: Illustration of level of financing and production in the agricultural sector, compared to other sectors in Zambézia.

Variables	Observation	Average	Standard Deviation	Minimum	Maximum
Time	5	2021	1.581139	2019	2023
Agriculture (Projects)	5	3	2.345208	1	7
Agriculture (Financials)	5	3.61e+09	2.25e+09	0	5.95e+09
Agriculture (Production)	5	51223.86	28677.95	35934.3	102413
Others Sectors (Projects)	5	7.8	3.962323	4	14
Others Sectors (Financials)	5	3.58e+10	2.80e+10	2.84e+09	7.16e+10

Source: Authors (2025)

From the previous table, it can be concluded that the poor promotion of services to producers, in this specific case, the weak financing of agricultural projects, in terms of quantity and value, is considered a factor limiting the possibility of increasing production, at the level of Zambézia, which is reflected by the non-promotion of agriculture through the application of public policies in this sector.

Although investments in this (agricultural) sector are, on average, relatively high (about 3.61 million) compared to investments in other sectors (about 3.58 million), it is observed that few (in the column of minimum) projects consume higher values,

or even, there may be overevaluation of among the few approved projects (see table 4, $r = -0.8015$).

With this approach, it can be seen that there is a tendency to finance projects that make up the other sectors of activities, compared to the agriculture sector.

Therefore, there is some correlation between the level of project financing in the agriculture sector (number of projects versus amount of value financed and level of production) when compared to other sectors.

Note, the table below:

Table 4: Illustration of level of financing and production in the agricultural sector, compared to other sectors in Zambézia.

Variables	Time	Agriculture (Projects)	Agriculture (Financials)	Agriculture (Production)	Others Sectors (Financials)	Others Sectors (Projects)
Time	1.0000					
Agriculture (Projects)	0.5394	1.0000				
Agriculture (Financials)	-0.5331	-0.8015	1.0000			
Agriculture (Production)	-0.6870	-0.1838	-0.1253	1.0000		
Others Sectors (Financials)	-0.5986	-0.4574	-0.0431	0.8450	1.0000	
Others Sectors (Projects)	0.6366	0.1764	-0.4398	-0.4638	-0.0377	1.0000

Source: Authors (2025)



From the above table, it is understood that there is a strong negative correlation between the increase of projects financed in the agriculture sector, compared to the amounts approved for this purpose.

This means that few projects may be demanding more monetary values.

For Filho and Junior (2009, p. 119),,

“the Pearson correlation coefficient (r) varies from -1 to 1. The sign indicates positive or negative direction of the relationship and the value suggests the strength of the relationship between the variables. A perfect correlation (-1 or 1) indicates that the score of one variable can be determined exactly by knowing the score of the other”.

Based on the above assumption, it can be inferred that there is a strong negative correlation between the number of projects financed in the agricultural sector and their overall amounts, since their ratio indicates $r = -0.8015$.

However, from the previous table, it can be concluded that the other sectors of activity are in some way stimulating agricultural production (either by consumption of agricultural products or by some types of services or supplies), because its correlation $r = 0.8450$ is quite strong.

CONCLUSION

The development of agricultural activities, using public or private funding, in Zambézia is still a major challenge. The projects eligible for funding tend to be, in their majority, from different sectors of agriculture, that is, trade, industry, among others.

Indeed, poor access to finance is accompanied by difficult provision of services to the producer, so difficulties remain in strengthening the value chain in the production and marketing of agricultural

products, with a greater focus on yield crops, mainly, horticulture.

The prevalence of the deficit of access to services to producers, in horticultural production makes the province of Zambézia dependent on other provinces and neighboring countries, which results in a poor trade balance, and consequently the weak gross domestic production.

Despite this, the few agricultural projects that are financed denote a strong negative correlation, because the increase in the number of projects translates into a proportion of non-linear financing, since few projects consume more money.

Although investments in this (agricultural) sector are, on average, relatively high (about 3.61 million) compared to investments in other sectors (about 3.58 million), it is observed that few (in the column of minimum) projects consume larger values, or even, there may be overevaluation of among the few approved projects, with a correlation of $r = -0.8015$.

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