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# Family farming in Mozambique: are the programs and strategies contributing to the achievement of food self-sufficiency?

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ABSTRACT

This research aimed to examine the policies and programs of the agriculture sector in Mozambique, assuming that it is considered a pillar of development and a source of food in the countries of sub-Saharan Africa. In Africa, this sector underwent a process of modernization, using the top-down approach characteristic of the intervention processes that became known as the Green Revolution, which used the arguments that production levels would double to end hunger. The literature review shows that policies based on the innovation diffusion model cannot produce enough food to meet the food needs of African families. Mozambique serves as evidence for importing, annually, large quantities of cereals to ensure the food security of the population. The research was supported by studies of rural sociology, and it generated results that suggest that Mozambique needs to design policies and programs based on its specific social, economic, and ecological contexts. To reduce shortcomings in policies and programs, it is necessary to prioritize the participation of farmers, to ensure that the objectives are aligned with the demands and contexts in which the subjects are inserted.

**Index terms**: agricultural development, international cooperation, itinerant agriculture, technology.

**Core ideas**

- Green Revolution in Mozambiquean family farming was not well succeeded and the country continued importing food.
- Agriculture on Mozambique has been oriented to produce crops aimed at agroindustrial processing and export as a raw material.
- Mozambique's family farming has been struggling in face of weak market connections, low use of external inputs, and high transaction costs.
- The reduced size of the farm and low adoption of technologies would not be able to guarantee food self-sufficiency as well as lift the population out of poverty in Mozambique.
- Mozambique needs to develop coherent policies and strategies capable of lifting the population out of hunger and poverty through the government support of the family farming.

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## Agricultura familiar em Moçambique: será que os programas e as estratégias estão a contribuir para o alcance da autossuficiência alimentar?

RESUMO

A presente pesquisa tem por objetivo examinar as políticas e programas do setor agrícola em Moçambique, partindo do princípio de que é considerado um pilar do desenvolvimento e uma fonte de alimento nos países da África Subsaariana. Em África, esse setor passou por um processo de modernização usando a abordagem *top-down* característica dos processos de intervenção que se tornaram conhecidos como a Revolução Verde, que se valeram dos argumentos de que os níveis de produção duplicariam para acabar com a fome. A revisão de literatura mostra que as políticas baseadas no modelo de difusão de inovações não conseguem produzir alimentos suficientes para a satisfação das necessidades alimentares das famílias africanas. Moçambique serve de evidência, por anualmente importar grandes quantidades de cereais para garantir a segurança alimentar da população. A pesquisa teve como respaldo estudos de sociologia rural e gerou resultados, os quais sugerem que Moçambique precisa desenhar políticas e programas baseados nos seus contextos sociais, econômicos e ecológicos. Para reduzir as deficiências das políticas e dos programas, é necessário priorizar a participação dos agricultores, para garantir que os objetivos estejam alinhados com as demandas e contextos em que os sujeitos estejam inseridos.

**Termos para indexação**: desenvolvimento agrícola, cooperação internacional, agricultura itinerante, tecnologia.

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## INTRODUCTION

In sub-Saharan Africa (SSA), the practice of agriculture provides food and participates in the poverty reduction of families in this region, contributing from 20% to 30% of the gross domestic product (Drechsel & Olaleye, 2005; Aker, 2011; Mutimba, 2014; Gassner et al., 2019). Approximately 70% of Africans depend on this activity for their livelihood (Khan & Akram, 2012; Mutimba, 2014). However, the production does not cover demands, putting some families in a situation of food insecurity (Otekunrin et al., 2020). This situation challenges African governments to adopt public policies aimed at increasing investment in the agrarian sector, to stimulate production and, consequently, influence the reduction of levels of food insecurity and poverty. In contemporary times, some actions have not been successful (Ssozi et al., 2019).

It is worth mentioning that a considerable part of the SSA countries have projected the allocation of 10% of the total of their budgetary resources to agriculture and rural development (Ssozi et al., 2019). Some initiatives are based on the industrialization patterns of the agrarian sector as a way to satisfy the international cooperation (Oliveira, 2016). In the case of developing countries like Mozambique, increasing the potential and efficiency of the intervention of technicians and the application of financial resources in this sector involve the strengthening of the rural extension services (SER), from a perspective that these actions privilege the participation and promotion of farmers' knowledge.

The objective of this study was to analyze the Mozambican agriculture, its link to international policies, and its contribution to food self-sufficiency.

## METHODOLOGICAL PROCEDURES

A literature review was performed in articles, books, and theses available in the Google Scholar database. Additionally, other sources of information were used, such as reports, and agrarian policies, to enrich the discussion. The following keywords were entered in the Google Scholar search: agricultural development, agricultural technology, international cooperation, and agriculture in SSA. This process allowed of the download of 72 articles, three books, and seven theses; then, screening was carried out, culminating in the selection of 49 articles, one book, and four theses. The selected literature presents relevant matters of the agrarian sector in the SSA, particularly in Mozambique.

The analyses of these scientific contributions from different researchers served as an analytic basis for the discussion and deepening policies and strategies that guide the agrarian sector, and they brought important reflections that can contribute to the future of this sector in the Mozambican reality. The literature review of material that discusses a certain topic is a method that allows of the analysis and production of robust results, contributing to science (Severino, 2013).

## RESULTS AND DISCUSSION

In this section, the trajectory of agriculture in SSA is presented and discussed. Thus, the Green Revolution is presented as the greatest historical milestone intended to modernize the agricultural sector, using technology (mechanization and inputs) to end hunger in that region. However, there is little positive evidence of this process in some SSA countries, such as Mozambique.

### The Green Revolution: The path of modernization of the agrarian sector

The work begins by analyzing the Green Revolution, an important historical milestone of agriculture, which seeking to "modernize" agriculture, changed some patterns by spreading the use of agrochemicals, and improved seeds and machinery to increase productivity levels (Serra et al., 2016).


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The initial idea of the Green Revolution arose in 1943 because of an agreement between the special studies office of the Mexican Ministry of Agriculture and the American Rockefeller Foundation (Matos, 2010). After the World War II, that is, after the second half of 1945, some chemicals used in the war began to be applied in the production of pesticides directed at agriculture for pest control. Such production sustained the functioning of the industry that was previously dedicated to the production of armaments. Pesticides, such as dichloro-diphenyl-trichloroethane (DDT), produced in this "war" input industry, were also widespread and applied on the African continent (Matos, 2010).

In a historical line, it is clear that the transformations of agriculture in developing countries, especially in Latin America and Asia, followed an accelerated course from the 1960s onwards. In this period, the industrialized countries, especially the United States of America (USA), promoted a diffusionist approach in these places, based on mechanization, the use of modern seed varieties, and other agrarian techniques, in the context of agriculture modernization.

In this sense, William Gown (1966) considered the Green Revolution as a mechanism capable of alleviating the suffering of the people, by replacing human labor with technology and hybrid varieties of high productivity (Andrades & Ganimi, 2007; Calderan & Fujita, 2010; Matos, 2010).

The Green Revolution envisaged, among other actions, to replace human labor with machines, and those poor and archaic farmers in developing countries, unable to adopt new technologies, would migrate to the cities and integrate the workforce into industries. This revolution spread throughout the world through diffusionism, as a practice of rural and agricultural extension, disseminating technological packages supposedly of universal application, to maximize agricultural yields (Matos, 2010; Guanziroli & Guanziroli, 2015).

Goodman et al. (2008) consider that the Green Revolution included technological packages of genetic, chemical (fertilizers and pesticides), and mechanical (agricultural machinery) innovations, implementing industrial countries since the post-war period to give a new impetus to the growth of agricultural productivity by increasing surpluses.

On one hand, in regions such as Latin America and Asia, the role of the Green Revolution, in that period, is perceived as having resulted, , in greater agrarian productivity, improvement of the agricultural management using innovation programs, diffusion of technologies, expansion of irrigated areas, and the implementation of monocultures.

On the other hand, these transformations have caused the rural exodus, the growing dependence on these technological packages by farmers, environmental impacts, increased poverty, and the deterioration of life in cities (Sitoe, 2010a).

It is worth mentioning that the supposedly convincing results of the Green Revolution, in the 1960s and 1970s, using technological packages that mainly fostered an increased productivity in countries such as India, Mexico, and Brazil, were trumpeted as a model to follow. However, it should be noted that this transformation, as previously stated, was accompanied by a series of impacts and ills (Calderan & Fujita, 2010). In addition, this model stimulated the resurgence of the informal economy and the precariousness of work that generates low income, constituting an obstacle to development (Oliveira, 2016).

Diao et al. (2008) and Schopping (2015) point out that the significant increase in yields was verified in India in 1988, by the tripling of cereal production from 50 to 150 tonnes in one harvest, through the combination of the Green Revolution technologies and pro-agricultural policies. Despite this reality of increased productivity, it is important to say that the Green Revolution had a market perspective and it did not solve the problem of hunger; hence, poor countries should be very cautious when following this model (Sitoe, 2010b).

The transformation of agriculture by the Green Revolution reached the African continent in the 1960s and 1970s, after the independence of a considerable part of the countries in this region. Through

this historical milestone, the year 1960 was considered the year of Africa because 17 countries won their independence (Diallo, 2011).

On one hand, the development policies for the rural world, inspired by the Green Revolution, made African governments adhere to the model practiced in other continents, whose objective was to increase production, by taking inspiration from this model. On the other hand, it led to a heavy reliance on State institutions that provided subsidies and inputs (Nin-pratt & Mcbride, 2014).

However, these transformations came only to a relatively wealthy (economically stable) minority that managed to adopt the modernization of agriculture. Thus, the region continues with low production rates and, consequently, still needs to import cereals (Diao et al., 2008; Dawson et al., 2016).

Therefore, it is possible to recognize that this proposal for revolution did not take into account the social, economic, cultural, and environmental conditions of the farmers in this region. The theories of change that guided the agricultural growth in the SSA are not focused on the direct impacts on the rural poor, but on the promotion of the agricultural input industry (Dawson et al., 2016). This reality destroyed the harmony between farmers and local production systems appropriate for the socioeconomic standards of family farmers (Oliveira, 2016).

According to Filimone (2012), the African Green Revolution relied on the involvement of farmers' associations to massify the process of dissemination of agricultural technologies. Even so, Kodama et al. (2016) points out that some farmers have not adopted the technologies because of their high costs and financial unfeasibility.

For Diao et al. (2008) and Dawson et al. (2016), the implementation of the Green Revolution in the SSA, through the encouragement of the use of modern agricultural technologies, such as improved seeds and inorganic fertilizers, led to the supposition that there would be an increase of production, and that the surplus of the production of crops such as corn, rice, and tubers would increase by up to 50%. However, these authors consider that the option of diffusionism, a model adopted to make these technologies available, did not consider local conditions, the socioeconomic context of farmers, the fragile institutional capacity, or environmental issues.

For instance, the use of chemical fertilizers and pesticides can disrupt local social practices, trade, and cultivation patterns (Dawson et al., 2016). The agrarian policies in the SSA should be differentiated or formulated according to the heterogeneity of the production units, and interventions should be directed according to the needs and objectives of each group of farmers (Gassner et al., 2019).

It is worth noting that the use of industrialized inputs in agriculture is generally aimed at obtaining immediate results and does not take into consideration the sustainability of the agricultural production process. In addition, the cost of technology is not always compensated, due to the dependence of this activity on agroecological conditions (precipitation level and soil fertility) and on the existence of markets with prices that vary constantly, thus increasing the risks of the activity (Coelho, 2014).

The capitalist companies focused on conventional agriculture, without considering sustainability issues or even the realities and the financial conditions of farmers (Siderky, 2013; Coelho, 2014; Cuenin, 2019). This way, it can be observed that the technologies financed by these companies disconnect farmers from their social, cultural, and economic environment. For instance, the use of improved seeds in agriculture constrain the farmer to maintain his relationship with the market of inputs of the technological package, to ensure the maintenance of the productivity levels of this crop, generating a relationship of dependence between the farmer and the companies producing these inputs. This reality, brought about by these technologies, induces a new configuration between men and their relations with nature.

Moreover, it is naïve to think that in agriculture, technology generates increased productivity and, therefore, income. Therefore, it is necessary to perceive the context in which the activity is


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carried out, and the social, environmental, economic, political, and ecological factors that influence it (Cuenin, 2019).

One example is that, in 2007, to overcome the rise of prices of basic foods and reduce hunger, the Mozambican government had to reconsider the commitments to use fertilizers and other agricultural inputs approved at the African summit in Abuja (Nigeria's capital). Thus, it would go on to implement the "New African Green Revolution" based on the use of high-yield seeds, irrigation, and inorganic fertilizers, following the models of the Green Revolution of the 1960s. However, there was no adequacy of rural extension policies, research, and funding to help farmers improve their incomes (Sitoe, 2010b).

**A brief history of Mozambique in the field of agriculture**

Agriculture in Mozambique has always been attributed to the role of food generator, source of income, and employment, impacting the social and economic development of the country. However, during the colonial era (1895-1975), the landowners (colonial agrarian companies) appropriated the lands of Mozambican family farmers to produce crops aimed at industry and the market, such as sugarcane, sisal, coconut, cotton, and tea (Mosca, 1996).

These products were destined for export, mostly using the ports of the northern region of the country. Due to this, road and rail infrastructures were not prioritized to connect the north and south of the country (Cavane et al., 2013). According to Mosca (1996), in the second half of the 1950s, settlers began to allow Mozambican farmers to occupy some parcels of land for the practice of agriculture.

In this period, the production of family farmers was about 70% of the national production; 55% of this was destined for self-sustenance and 15% for marketing. Production systems were based on traditional techniques. Few farmers used modern technologies, but also, the investments allocated to the sector were low, and agriculture was focused essentially on self-sustenance (Chichava, 2011). This trend spreads to the present times (2023), evidencing that national independence has not been able to bring coherent legal and political instruments that would allow reversing the scenario.

With the proclamation of national independence on June 25, 1975, the nationalization of all resources occurred, ceasing to be the property of Portugal and becoming part of the Mozambican state. The land was nationalized on July 24, 1975 (Mandamule, 2017). Following this, the large colonial companies abandoned about 2000 farms, and they were converted into State Agrarian Enterprises (EAE) (Gêmo, 2009; Mosca, 2017). In this context, Gêmo (2009) states that, in the period between 1976 and 1982, several financial resources, mechanical equipments, improved agricultural inputs, and technical personnel were allocated to the EAE. Mozambique received support from the Union of Soviet Socialist Republics (USSR) and China, which boosted the development of the EAE of Moamba, in Maputo province, and Matama, in Niassa province (Amanor & Chichava, 2016). These companies concentrated high volumes of investment, which allowed of the establishment of agriculture as the basis of the country's development (Rosário, 2020). In this period, some of the primary products were exported and processed in industrialized countries. However, such reality reduces the possibility of creating jobs and other services in countries that supply raw materials.

In this context, Oliveira (2008) considers that the African states inherited from the colonial metropolises an economy focused on the export of primary commodities, mainly of agricultural origin. Commercial transactions at the international level deteriorated from the mid-1970s, and African countries, including Mozambique, were found it difficult to develop based on the export of these commodities (Oliveira, 2008; Sitoe, 2010a). At that time, other developing countries in Latin America and Asia began to dominate the supply of these products to the international market (Sitoe, 2010a).

Subsequently, in 1983, the EAE collapsed (fell into crisis), thus initiating the reform based on the following issues: 1) the distribution of the land of some of these companies to family farmers; and 2) the structuring of rural extension networks for technical support and supply of inputs (Agricultura…, 2008; Mosca, 2014).

This intervention by the State aimed to respond to what is provided for in the Constitution of the Republic of Mozambique – that agriculture is the basis of development. Thus, during the full operation of these companies, the first actions inherent to rural extension were carried out, in the form of agrarian cooperatives, in the scope of the socialization of the countryside (Gêmo, 2009). It is worth mentioning that, in 1979, the People's Assembly of the Republic approved that the EAE assume the role of diffusion centers of agrarian techniques (improved seeds, inorganic fertilizers, mechanization) with farmers on nearby farms.

Subsequently, after the collapse of the EAE, the government's attention turned to family farmers, which culminated in the creation of the "Serviço de Extensão Rural" (SER) in 1987 (Gêmo & Davis, 2015). These services were created by the ministerial decree 41/87 and were given the name of the National Directorate of Rural Development (DNDR) (Bias & Donovan, 2003). The government has given this sector the responsibility of transforming agriculture in the country.

The prioritization of family farmers as the main public to benefit from the SER is justified by the fact that they are preponderant. Otherwise, about 99% of the total farms are worked by these subjects, in an 1.7 ha average area (Eicher, 2002; Moçambique, 2021). This sector is characterized by weak connections with the market, low use of external inputs, poor access to conservation infrastructures, high post-harvest losses, transportation difficulties, and high transaction costs in the marketing of the surplus, and, paradoxically, since SER was created to serve farmers, low access is still experienced. The reduced average size of the farm allowed Oliveira (2016) to point out that family farming would not be able to guarantee food self-sufficiency nor to lift these subjects out of poverty.

It should be noted that, among the countries of the Development Community of Southern Africa (SADC), in the period between 1961 and 2017, Mozambique stood out for its low adoption of technologies, such as improved seeds and fertilizers, and because of this fact, it had lower maize yields than Malawi, Zambia, and South Africa (Hamela & Pimpão, 2021). Even with this unfavorable scenario, family farmers contributed about 70% of the national volume of corn crop production (Moçambique, 2021).

Comparing the degrees of production of the three regions (south, center, and north) of the Mozambican territory, it can be observed that the southern region has a limited agricultural production, which can reach a grain deficit on the scale of 600,000 tonnes/year, while the center and north have a surplus of most food commodities, and can export them to Malawi, Tanzania, and Zambia. This reality occurs in a situation in which the main source of food is self-production (Bias & Donovan, 2003). Regarding the low production in the south, it should be noted that it is covered by agro-ecological regions one, two, and, three, which are characterized by the predominance of sandy-textured soils, low fertility, and an average annual rainfall ranging from 600 to 800 mm (Moçambique, 2015b).

In addition, Mosca (1996) points out that, during the colonial era, this region was prioritized as a reserve of labor for mines in South Africa, and approximately 35% of the male working population had to migrate for mining in this neighboring country. This reality has given rise to a greater engagement by women in the agricultural activity. In 2017, agriculture was practiced by about 67% of the economically active population; 78,4% of which are women (INE, 2019), and it is important to note that this rate can vary depending on the area of residence, with the practice of agriculture by 45% of the population in urban areas and by 90% in rural areas (Moçambique, 2011, 2015b).

Although the sector employs the majority of the rural population, it does not yet produce enough for the food and nutritional security of its people. Consequently, the country still imports large quantities of food (Rosário, 2020). As an example, in 2018, the Mozambican state spent US$ 41.530 million on maize imports. Moreover, in the same year, it spent US$ 208,800 million on wheat imports to avoid food insecurity that affects more than half of Mozambicans (Moçambique, 2021). These data show that self-sustaining agriculture cannot guarantee the satisfaction of the food and nutritional needs of the population (Urban et al., 2020).


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As stated earlier, from the point of view of the agricultural pattern, Mozambican agriculture is predominantly rainfed and intended for self-sustenance, consisting essentially of the family sector (INE, 2011; Silici et al., 2015; Makate et al., 2018). This agriculture, when practiced with the support of public policies and coherent strategies, can fulfill the role of the economic developer in several regions of a country, especially in those close to urban centers, especially counting on the effective functioning of the SER and the value chain (Benfica et al., 2019).

Even though the SER had already been in some way functioning since the 1980s in Mozambique, these services came into force effectively after the signing of the first General Peace Agreement in 1992. Since then, the rural extension sector has outlined, as its main strategies, the diffusion of technologies with a focus on improved seeds, the use of agrochemicals, agricultural mechanization, and irrigation (Gêmo, 2009).

Still, in the 1980s, the first approach adopted in the extension was Training and Visit (T&V). With financial support from the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP), the World Bank, the International Food for Agriculture Development (IFAD), and the Danish International Development Agency, in the first decade of the twenty-first century, the SER used the Farmer Field School (FFS) (Bias & Donovan, 2003). The change from the T&V approach to FFS is one of the major reforms to make these services more notable among family farmers, as this change seeks to privilege the participation of farmers in the identification and resolution of their problems.

**Access to land and family farming in Mozambique**

The mother law of the Republic of Mozambique, in Article 109 of the Constitution of the Republic, states that (1) the land is owned by the State, (2) the land must not be sold or mortgaged, and (3) the use and enjoyment of the land is the right of all Mozambicans (Moçambique, 2004).

Article 12, concerning the Land Law (1997), says that the right to use and enjoy the land is acquired: 1) by occupation by natural persons, by local communities, according to customary norms and practices, without contravening the constitution; and, 2) by occupation by persons of good faith, who have occupied the land for at least ten years. In paragraph 2 of Article 13, the absence of a title does not affect the right to use and enjoy the land (Moçambique, 1997). The Ministry of Agriculture (Moçambique, 2010) points out that Mozambique has more than 36 million hectares of arable land, but only 10% of it is being used for agricultural activities.

This availability of this resource, associated with the land law that allows the occupation of agricultural holdings by local communities, gives a lot of freedom to family farmers to practice itinerant agriculture. This type of agriculture caused the deforestation of 65% of the area that is being exploited for agricultural activities (Moçambique, 2019). However, this law does not protect family farmers, which leads to the occurrence of conflicts related to land use, especially in rural areas where many have poor knowledge of the laws and low negotiating capacity (Oliveira, 2016). To give way to the implementation of investment projects, which occupy extensive areas of land, in most cases the compensation mechanisms have not guaranteed livelihoods for the survival of rural families, generating land conflicts that affect poor farmers, women heads of the FA, and widows (Bruna, 2023).

In this context, Alfredo (2009) considers that the law is lax and lacks reforms to reduce conflicts on land use. So much so that there is a strong dispute between family farmers and companies that invest in the agrarian branch (landlord). The population works the land, seeking survival, and the companies profit. This conflict over land use occurs mainly in well-located land, that is, close to access roads, rivers, and shopping centers, as these are the most sought-after areas. In this context, due to the limitation of financial resources, farmers face difficulties in dealing with the documentation of the official occupation of the land, so they continue to use the land based on customary law (Bellucci, 2012).

It should be noted that the Right to Use and Exploit the Land is an important element that can affect the performance of farmers. Thus, secure land tenure can influence more investments, as well as soil conservation practices, and allow of the sustainability of agricultural activity (Uaiene & Arndt, 2007). In general, there is a need to strengthen mechanisms to protect the rights of family farmers, especially women, who are the most vulnerable (Mandamule, 2017). Thus, Mozambique needs to assess the advantages and disadvantages of the current land law, especially for the practice of family farming.

**The reforms of the Ministry of Agriculture, programs and strategies of the sector**

Before the national independence (1975), the Ministry of Agriculture was composed of three national directorates: the National Directorate of Forestry, the Directorate of Geography and Cadasters, and the Directorate of Veterinary – the latter supported by two agronomic and veterinary research institutions. After the independence, the ministry was assigned the mission of developing the agricultural production based on the following principles: 1) guaranteeing the improvement of the living conditions of the peasants, with a diet capable of supplying the food and nutritional needs; and 2) supporting, with agricultural raw material, the industrial sector (Abdula, 2006).

After the civil war (1992), the Ministry of Agriculture and Fisheries was created. This Ministry was abolished in 2000, after which there was the creation of the Ministry of Agriculture and Rural Development (MADER). Already in 2005, this Ministry became the only Ministry of Agriculture (MINAG), and the functions of the National Directorate of Rural Development were transferred to the Ministry of Planning and Development (MPD) (Abdula, 2006). Subsequently, in 2015, the Ministry of Agriculture and Food Security (MASA) was created by the presidential decree nº. 1/2015, of January 16 (Moçambique, 2015a). In addition, after the last presidential elections in 2019, it was changed to the Ministry of Agriculture and Rural Development.

In this post-independence period, the Ministry of Agriculture implemented some programs and strategies seeking to meet the demands of the sector. The first one created was the National Agrarian Development Program (Proagri I), implemented between 1998 and 2006. In the period between 2006 and 2011, the second version of this program – the Proagri II – was implemented. The Proagri I was operationalized by the Action Plan for the Reduction of Absolute Poverty (PARPA) and had as its strategic vision the reduction of absolute poverty, with agriculture being one of the pillars to achieve this aspiration. Moreover, for the operationalization of Proagri II, the Action Plan for Food Production (PAPA) was implemented between 2008 and 2011. The National Investment Plan for the Agrarian Sector (PNISA) was designed for a period of four years (2013–2017) to operationalize the Strategic Plan for the Development of the Agrarian Sector (PEDSA) implemented between 2012 and 2020 (Mogues et al., 2012; Mogues & Rosario, 2016).

Regarding the Proagri I, it is worth saying that it was characterized by a lack of balance between the process and the expected result. That is, phase I was focused on the institutional strengthening of public agencies, and for this, it spent millions of dollars; however, there was no achievement of improvements in the provision of services and much less in the well-being of farmers, resulting in the weakening of the government's commitment to the program (Mogues & Rosario, 2016). These programs and strategies failed to increase agrarian incomes, and poverty levels remained almost constant (Cunguara & Kelly, 2009; Moçambique, 2011). Phase II of Proagri ended up changing the focus of institutional investment and placing emphasis on the direct financing of services (Mogues & Rosario, 2016).

Regarding the time of implementation, the programs (Proagri I and Proagri II) had a duration between six and eight years, while the strategies (PARPA, PAPA, and PNISA) had a duration that varied between three and four years. The failure of these programs and strategies may not be related only to the period of their implementation, but also to a set of sociocultural, economic, institutional, and infrastructure (roads and warehouse) factors that affected, above all, the humble population living in rural areas. Consequently, the most recent data indicate that between the years 2014 and 2015, about 49.2% of the Mozambican population lived below the poverty line (that is, on less than US$ 1.9 per day) (Maquenzi, 2021).


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In this context, the institutional decentralization of the functions of the Ministry of Agriculture of Mozambique is one of the challenges it has faced regarding its reforms and modernization of agriculture, which follows the principle that the main responsibility for the development of national policies and strategies, monitoring, and evaluation of their impacts would be at the central level, according to Abdula (2006). However, national and generalist policies cannot solve the concerns of groups of farmers from different regions (agro-ecological zones) and/or those who present different characteristics, especially when the operationalization of these policies depends on international cooperation partners (Amilai, 2008).

It is in this sense that Mogues & Rosario (2016) consider that, in most African countries, the process of planning, budgeting, and execution diverges from the real processes because they do not always come to consider the activities in the districts. For the most part, local plans are marginalized. Cooperation partners face difficulties in channeling support or resources through the Mozambican State Budget, due to reduced confidence in the efficient management of public funds within the government, as they are restricted from controlling the use of funds (Mogues & Rosario, 2016). Therefore, some programs tend to be carried out with the direct participation of partners.

In the context of international cooperation, in 2010, the first agricultural research in the Nacala corridor began under the Tripartite Cooperation Program for the Development of the Tropical Savannas of Mozambique (ProSavana). This program aimed to work with family and commercial farmers in that corridor, replicating the Japanese-Brazilian Cooperation Program for the Agricultural Development of the Cerrados (Prodecer), implemented in the Brazilian Cerrado (Zanella & Castro, 2017). From the perspective of revolutionizing the agriculture of the Nacala corridor, the program aimed to produce on a large scale for export using modern technologies (Avelhan, 2014). This corridor is located in the northern region of the country, presenting favorable agro-ecological conditions and high soil fertility, which gives it potential for agricultural practice (Nkala, 2012).

In turn, Lopes (2014) points out that these two regions – the Brazilian Cerrado and the Nacala Corridor – have some similar characteristics because they are located at latitude 13º South. The Brazilian program Prodecer, in which ProSavana was inspired, had the support of the Japanese Government in the 1970s (Shankland & Gonçalves, 2016; Zanella & Castro, 2017).

The trilateral agreement between Japan, Brazil, and Mozambique, for the agricultural development of the Savannah of Mozambique is classified as an instrument of cooperation (North)-South-South because the interests of developed states were present in this instrument of solidarity and horizontal partnership with developing countries (Toledo, 2015). In addition, Toledo (2015) points out that in the case of Mozambique, ProSavana had sovereign acceptance as a model of agricultural development by the methodological coincidence with PEDSA. As the Mozambican bureaucrats did not favor a participatory process, ProSavana ended up falling like a "bomb", surprising the Mozambican population. The researcher considers that due to the ineffectiveness of democracy, Mozambique accepted the offer of ProSavana, idealized by Brazil and Japan and, consequently, technicians from these two countries were largely responsible for its planning and implementation in the Mozambican territory. Thus, the poor consideration of human issues and farmers' livelihoods that characterized ProSavana is attributed to the absence of Mozambican technicians and farmers in the construction of this program. For this reason, ProSavana can not be considered an example of horizontality, it is rather an instrument of the top-down performance of North-South cooperation models (Toledo, 2015).

In this context, the absence of the participation of Mozambican technicians in the elaboration of ProSavana contributed to the program being the target of criticism, such as the lack of community consultation and transparency of the processes of occupation and exploitation of the lands. The possibility of supporting family farming was also not clear in this program (Avelhan, 2014). Therefore, the Mozambican civil society asked about the operationalization of the program, and the answers were not satisfactory. As a result, the National Union of Peasants (UNAC), after consulting the documents that report the effects of Prodecer, alerted the Mozambican farmers to the danger to which they were subject by accepting the said program. The following risks were listed as: farmers losing

their land, encouraging rural exodus, and an exacerbated increase of the urban crisis with consequent impoverishment of rural communities in the Nacala Corridor (Lopes, 2014; Toledo, 2015).

In 2012, family farmers in the Nacala Corridor region, with the support of civil society and some non-governmental organizations (NGOs) began to resist ProSavana (Oliveira, 2016). Now, Chichava et al. (2013), point out that the Mozambican government had many expectations when receiving donations and technologies, assuming politically that this was the way to promote agricultural development. However, the strong intervention of the Mozambican civil society, based on the experiences of expropriation of farmers' land and flagrant negative environmental effects in the Brazilian Cerrado, resulted in the paralysis of the design of the master plan and all other activities inherent to ProSavana in the year 2020.

Based on these experiences, as analyzed by Fan et al. (2009), African countries should have their agricultural development strategies, investment in agricultural research, rural infrastructure, and education to promote impacts on agricultural productivity and growth.

In the same vein as the increase of productivity, at the end of 2010, the heads of some African states, including Mozambique, signed the agreement of the Comprehensive Africa Agriculture Programme (CAADAP), committing to allocate 10% of the total budget to agriculture, to achieve 6% annual growth in the agricultural sector. Thus, in the case of Mozambique, in the period between 2013 and 2017, the National Investment Program of the Agrarian Sector (PNISA) aimed to operationalize the CAADP. PNISA had a budget of about US$ 2.5 billion. The average per capita expenditure was US$ 39.7 per rural inhabitant during the year (Mogues & Rosario, 2016; Benfica et al., 2019).

It is worth mentioning that the PNISA has set ambitious goals for the period of its operationalization (2013 - 2017), including the doubling of the participation of agriculture in public spending (Benfica et al., 2019). In this context, Mogues & Rosario (2016) consider that the PNISA was based on the Strategic Plan for the Development of the Agrarian Sector (PEDSA) that exposed the vision of transforming the agricultural sector, especially concerning the reality of family farmers, to make the sector competitive and sustainable, contributing to food security and increasing the income of family farmers. However, even with this investment, the results were not visible.

In turn, in 2020, the Ministry of Agriculture and Rural Development began to implement the "Sustenta" Program, aiming at improving the production and income of family farmers (Moçambique, 2019). A timeline from the creation of rural extension, through the programs and strategies developed by the Mozambican agrarian sector is described below for the period between 1987 and 2020 (Figure 1).

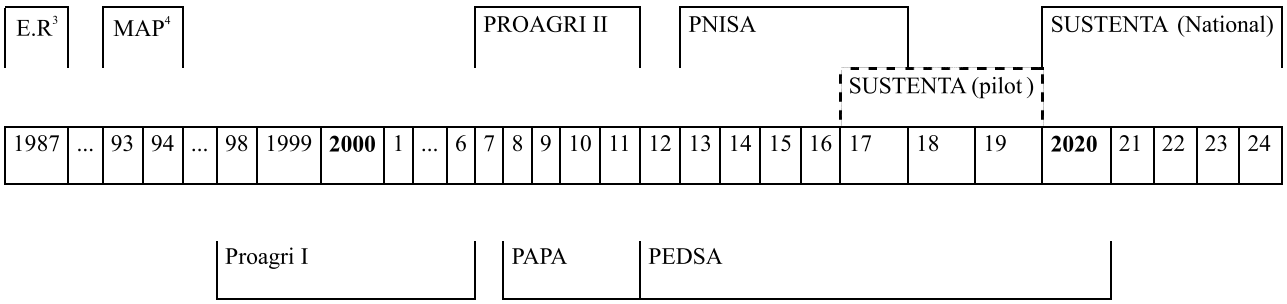


**Figure 1.** Line of the Mozambican agrarian sector from the year 1987. Source: Mogues et al. (2012), Mogues & Rosario (2016), Moçambique (2019).

It is important to highlight that "Sustenta" has created (and continues to create) many expectations for Mozambicans. This program includes credit lines to the actors in the production chain and predicts the increase of the productivity of corn from the baseline from 1.1 ton/ha to 2.1


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tonnes/ha in the 2023/24 agrarian campaign, and the baseline of beans from 0.4 ton/ha to 1.2 tonnes/ha. The program not only aims to reduce chronic malnutrition from 43% to 35% by the year 2024, but also aims to reduce poverty from the current 46.1% to 31.2% in the year 2024. Taking into account the results of other programs in the agrarian sector and rural development, these projected goals in the "Sustenta" can be quite ambitious and unachievable by the year 2024.

## FINAL CONSIDERATIONS

The diffusion approach of technological innovations to family farmers has not been able to combat hunger in countries such as Mozambique, which continues to face difficulties of food self-sufficiency, resorting to cereal imports to cover the deficit and ensure food security. Family farming has been playing a social and economic role since the colonial period. The first milestone was in 1950, when the Portuguese began to return some land to family farmers. In turn, they began to develop agrarian systems in their domain to ensure social reproduction. After the national independence, farmers received technical assistance from the EAE, an act that culminated in the creation of rural extension services.

The predominance of the use of a farm, with an average area of approximately two hectares, and a poor connection to the market do not offer a condition to guarantee the self-sufficiency of family farmers or to reduce poverty. The greater participation of women in agricultural activities is historical – since in the colonial times, men from the southern region of Mozambique, for instance, migrated to work in the mines of neighboring South Africa. This fact placed women as a key element in the processes of family reproduction. However, among the weaknesses in the agrarian sector, the land law stands out, which tends to put family farmers at a disadvantage compared to the landowner, and to the constant reforms of the Ministry of Agriculture, and short periods of implementation of programs and strategies that are carried out in the country. These elements contribute to a weak contribution to poverty reduction.

On one hand, the facts reported in this research suggest the implementation of long-term programs that are decentralized, since national policies have difficulties in solving the problems of farmers who reside in different areas. On the other hand, this work considers it necessary for the Mozambican government to increase the budget for the agrarian sector to approximately 10% of the budget. For future studies, it is interesting to discuss and deepen the contribution of investments allocated to the agricultural sector toward food self-sufficiency.

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