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CHALLENGES AND OPPORTUNITIES IN RICE PRODUCTION IN LOWER ZAMBEZI: THE CASE OF ZAMBÉZIA PROVINCE

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RESUMO

O estudo pretende contribuir para os debates sobre a tomada de decisões e acções desenvolvidas no âmbito da melhoria dos meios de vida das populações rurais. O seu objectivo é identificar e analisar a cadeia de produção de cereais na província da Zambézia, tendo como unidade de análise o arroz. Para tal, foram realizados inquéritos e entrevistas aos pequenos produtores e outros actores relevantes na cadeia de valor deste cereal. Os resultados indicam que, devido a uma má abordagem das políticas e estratégias sobre o arroz, ocorreram intervenções desajustadas e descontinuadas relativamente à assistência técnica e provimento de infra-estruturas de apoio à produção, secundarizando, assim, as necessidades produtivas do pequeno agricultor e, consequentemente, a oferta do arroz como produto local.

Palavras-chave: Arroz, Mopeia, Namacurra, pequeno produtor, Zambézia

ABSTRACT

The study aims to contribute to the debates on decision-making and actions taken in the context of improving the livelihoods of rural populations. The aim is to identify and analyse the cereal production chain in Zambezia province, with rice as an analysis unit. To this end, surveys and interviews were conducted with small producers and other relevant stakeholders in the value chain of this cereal. The results indicate that, due to a poor approach of policies and strategies on rice, there were unadjusted and discontinued interventions in relation to technical assistance and provision of production supporting infrastructure, thus neglecting the productive needs of the small producer, and, consequently, rice supply as a local product.

Key words: Rice, Mopeia, Namacurra, small producer, Zambezia

INTRODUCTION

Despite the low productivity of rice in the country, the Government increased the annual production goal of 260,000 tons in 2010 to 5100,000 tons in 2020. Thus, productivity would increase from 1.1 Ton/ha to 2.0 Ton/ha (MINAG, 2011:68). In 2012, 97.7% of national rice production was carried out by the family sector, but its productivity was low when compared to the commercial sector (MASA, 2016). Overall, production and productivity remained low, with the country ranking the lowest in Southern Africa, despite having optimal agro-ecological conditions for the production of this cereal (MINAG, 2011). For agricultural development, PEDSA (2011-2020)[1] identifies 15 strategic value chains, seven of which include rice and are considered priorities.

A combination of factors cause low production, namely: use of traditional cultivation practices; low use of inputs; plots cultivated using manual labour and tools; predominance of the rainfed system; low use of improved seeds and animal traction (TIA, 2008); low use of improved technologies; low access to infrastructure and support services; poor water management capacity in fields; inadequate financial services (MASA, 2016); low pre-basic and basic seed production (USAID, 2016; Mabaya *et al.*, 2017) and, consequently, poor availability of certified seed; poor use of key water resources and irrigated perimeters; and weak intersectoral articulation to respond to the entire chain (MINAG, 2013).

Aware of this situation, the Government assumed the development of irrigation as one of its priorities for agricultural growth, calculating that, with irrigation, the expected average productivity would be 2.7 Ton/ha in rice (MINAG, 2013). In order to respond to the goals outlined in PNISA (2013-2017)[2], the *sub-programme to support rice production* is identified, with the central objective to intensify production in the low-lying areas of Zambézia and Sofala provinces, which have about 90% of the total area cultivated with rice; Nampula and Cabo Delgado with 7% of the rice cultivated area, and 3% in the South of the country, particularly Gaza and Maputo.

It is referred (MINAG, 2013:21) that rice production will be carried out using three technological packages, namely: a) PT[3] 1, based on the use of improved seed; b) PT2, use of improved seed, fertilizers and herbicides; and, c) PT3, which is the use of PT2 under irrigation conditions. To implement the sub-programme, some actions were formulated, of which the following stand out: (*i*) availability of certified seed; (*ii*) contracts with specialized companies to guarantee the production of certified seed of the most productive varieties and adapted to the production areas; (*iii*) support to small rice producers in the selection, treatment and conservation of own seed for subsequent campaigns; (*iv*) support to seed producers' associations in seed multiplication and processing; (*v*) raising the awareness of producers to carry out early sowing; (*vi*) availability of fertilizers at subsidized prices; and (*vii*) dissemination of the use of organic fertilizers.

The cost of the sub-programme was budgeted at 6.331 billion meticais, corresponding to 64.9% of the total overall budget for the food crops programme under PNISA (MINAG, 2013). In order to reinforce the production and productivity of rice, and other cereals, the Government announced that it would support *the production of pre-basic and basic seed to prevent the degeneration of varieties, mainly in the family sector; improvement and maintenance of varieties*

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[1]. Strategic Plan for the Development of the Agricultural Sector for the period 2011-2020.
[2]. National Investment Plan for the Agricultural Sector, for the period 2013-2017.
[3]. Technology Package.

through agronomic trials to evaluate new varieties in order to identify the most productive ones and those that are adapted to local conditions; dissemination of released and to-be-released varieties, and the respective agronomic techniques for their cultivation.

However, until the first half of the 2010s, the adoption of improved rice seed by farmers as a result of pre-basic and basic seed was less than 10% (USAID, 2016; Mabaya et al, 2017). In 2014, national rice production almost quadrupled compared to the previous 10 years, rising from 113,000 tonnes in the 94/95 cropping season to 433,752 tonnes. This growth was mainly due to the expansion of cultivated areas, while the average yield per hectare remained stagnant (MASA, 2016). When compared to neighbouring countries, Mozambican agriculture has remained predominantly rainfed and low productivity (FAO, 2016).

A basic assumption has been that government policies influence the prospects of raising production, productivity and incomes for producers, whether family or private sector. Thus the present research aimed to identify the main challenges and opportunities in rice production in the Zambezi valley. Considering the Zambezia province, the intention was to answer the following starting question: *has rice production really been a priority sub-sector in public policies in Mozambique?*

The document is structured in six sections. In addition to the introduction, which presents the situation of rice in the country and the objective of the study, the second section refers to the methodology used in the study. The third section characterizes the study area, with a description of the past and present of rice farming. The fourth section presents the the socioeconomic profile of the sample studied. The fifth section refers to rice production in the study area, addressing some elements of the value chain and associated factors. The last section presents the conclusions. Finally, the consulted bibliography is presented.

METHODOLOGY

The study focuses on the period from 2015 to 2020, and the methodology followed several stages. In the first stage, a literature review was conducted on production statistics, policies and other national normative instruments, among others. In the second stage, work was carried out through surveys and interviews at central and provincial levels. In the third stage, fieldwork, interviews were conducted with technicians from SDAEs and other organizations with some connection to the rice value chain in each district, key informants in the communities, and focus group discussions with local producers. Two data collection instruments were developed and applied: surveys[4] and (semi-structured) interview guides.

This was followed by the analysis of the results, taking into account the information obtained from the documents consulted and the interviews and discussions; and finally the systematisation of the information in the form of a report. The research focused on the districts of Mopeia and Namacurra. Its choice was based on two facts: 1) Mopeia is located in the Zambezi River belt and therefore fits into the Zambezi basin; Namacurra, despite being located in the Lower Licungo, has been included in the initiatives designed and/or implemented by entities that work on the

[4]. Some questions in the questionnaire were multiple answer questions, which is reflected in some of the charts presented where, obviously, the sums will be greater than 100% as they reflect the frequency with which the question was answered in that sense.

Zambezi, such as the Zambezi Valley Agency, which has been financing machine parks; 2) because in government reports, they have been presented as some of the most productive in this cereal The criteria for selecting the communities visited was the number of producers, the existence of infrastructure to support production (as well as other services), their functionality and producers´ access, including the presence of producer associations/groups. The target group consists of 75 farmers, men and women, residing in the identified communities, whose profile allows us to address the question raised. In addition to the survey, 15 interviews were conducted, five of which were collective interviews with members of the associations Paz, Regantes de Mutange, Nilibena Olima, Momola 1 and Momola 2. In the individual interviews, in addition to the members of the associations, the manager of IMPERE, technicians of the Provincial Directorate of Agriculture and Fisheries, technicians/extensionists of the SDAEs and members of Civil Society were interviewed.

BRIEF CHARACTERIZATION OF THE STUDY AREA

Hydrography

The Zambezi River originates at Kalene Hill (Zambia) and runs for a distance of 800 km in Mozambican territory, being the largest river that crosses the country, with flow levels of about 106 km^3/year or about half of the total water flowing through the country (Petersen, 2012). The Zambezi valley represents, for Southern Africa, the largest water reserve and the area with the best agricultural potential, in terms of size and soil quality.

The Mozambican side of the basin covers an area of 225 000 km^2, about 11.6 % of the total area [5]. With about 52 % of the country's water resources, in the valley 2.5 million hectares have been identified for agriculture, of which about 1.5 million hectares are for intensive, irrigated agriculture, including just over half a million hectares for rice, which would require about 20 % of the river's flow (Petersen, 2012).

Although crossed by the river of the same name, the district of Namacurra has the Licungo River as its main watershed. With a length of about 336 km, the Licungo river originates in the mountains, between the districts of Gurué and Milange, and flows into the Indian Ocean in the region of Nante, district of Maganja da Costa.

The Licungo river basin has an area of approximately 22 800 Km^2, bordered to the South by the Zambeze and Namacurra river basins, and to the North and East by the Raraga and Melela river basins. The shape of this basin is open at the headland and with a narrow outlet, from the confluence with the Lugela River and, towards the end, its right bank borders the Namacurra district[6]. Its plains are basically flood plains and offer substantial potential for the development of irrigated agriculture and, in particular, rice [7].

[5]. According to Petersen (2012), from its source to its outlet in Mozambique, the Zambezi River basin covers an area of 1.4 million km^2 and is shared by eight countries, with the largest portion being in Zambia (41.9%), followed by Angola (18.2 %), Zimbabwe (15.9 %) and Mozambique (11.6 %).
[6]. Interview with a technician from the Provincial Agricultural Services, Quelimane, on 16.09.2021
[7]. Interview with a member of Civil Society, Quelimane, 16.09.2021.

BRIEF HISTORY OF RICE CULTIVATION IN ZAMBEZIA

Rice cultivation is an old activity in the study region, practiced by families and/or heirs of Paiva Raposo, Silva Beirão, Caetano Lubrino, Emílio Linder, Francisco Lacerda, Macanji Tricanji, among others. In 1941, it was introduced as a compulsory crop with the intention of making Mozambique self-sufficient in a key food product (Vail & White, 1980 *aput* Negrão, 2006). In 1942, the *Sociedade Comercial e Industrial do Zambeze e Chire* was established as the concessionaire for the production and commercialisation of rice produced by rural families, and established a husking plant and an experimental field of rice seed varieties (Negrão, 2006).

In Mopeia-sede, production takes place on land that belonged to the *Companhia de Assucar de Moçambique*, owned by John Peter Hornung who, in 1920, founded the Sena Sugar Estates and only in the 1960s abandoned part of that land, which would be used by some settlers under the Zambeze Development and Planning Mission (*Missão de Fomento e Planeamento do Zambeze)* (Negrão, 2006). Here, one of the settlers established in Thewe used an irrigation system through a pump that was attached to a tractor. The tractor could carry out the ploughing activities and, in situations of water shortage, move the pump to other channels (ZAMIRRI, 2021b).

The new Portuguese occupants produced mainly rice since the beginning until the national independence. In this (colonial) period, the populations produced more maize and beans for their regular diet and sale[8]. After independence, the civil war, that immediately affected the region, had a great destabilizing effect on the local economy and led the population to move to safer areas. Those who remained in the village of Mopeia were confined to a small perimeter and therefore agricultural production, in general, was not significant[9]. After the civil war, these lands passed into the hands of the populations who, individually and/or organized in associations, continued with rice production (ZAMIRRI, 2021b)[10].

In the case of Posto Campo, rice production starts in the swampy areas of Momola and Namanda, created by a basin where the Lualua, Rimba and Lima rivers end. In the last century these areas were frequented by buffaloes, but with the civil war, strong human pressure and years of human-wildlife conflict, these herbivores migrated to the region of Maimba[11], in the locality of Micaúne. Due to the high grass and existence of large trees, which produced shade, and the abundance of water, these animals were on the land where most rice is produced today [12].

The history of rice in Namacurra is not different. With the division of *Fomento Orizícola*, created in 1942 (Negrão, op.cit.), starts the massification of production in Namacurra, although it was an old crop[13]. The Divisão do Fomento Orizícola was the institution of the colonial state, created as a strategy to increase the agricultural system of forced rice production by African peasants who, compulsorily, had to sell it at prices and quantities stipulated by the state. This institution supervised the companies and settlers responsible for the distribution of production inputs, purchase, hulling and marketing of rice.

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[8]. Interview with a group of producers, Mopeia-sede, on 09.09.2021.
[9]. Interview with a producer, Mopeia-sede, at 08.09.2021.
[10]. Interview with a group of producers, Mopeia-sede, on 08.09.2021.
[11]. Interview with a member of Civil Society, Quelimane, 17.09.2021.
[12]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[13]. Interview with a group of producers, Mutange, on 14.09.2021

The Companhia do Boror, the company Lopes & Irmãos and some settlers, distributed seeds and sacks for bagging the rice after harvest, and each man had to cultivate an area larger than that of his wife, or else he could go and work for the Company[14]. At that time, a person could pay the *mussoco* [tax] in products, such as rice and coconut [15]. In addition to coconut trees, Boror also owned rice and other crops, and Lopes & Irmãos owned rice farms and a husking plant in Maganja da Costa, adding to its production the rice bought from the farmers[16].

In this regard, the rice should be sold by the peasant only to the concessionaire or lessee (Boror, Lopes & Irmãos and the settlers who provided the inputs). Thus, the farms of the peasants produced for the consumption of their own families[17] and, and fed the rural population through the cantineiros [18] , but also the workers of the Companhia do Boror [19] and the populations of the urban areas of Quelimane and Mocuba [20].

The issues of land tenure, technological development of the peasants, credit and agricultural commercialisation were directly associated with rice production in the Zambezi. In 1947, the Economic Plan of the Colony of Mozambique was drawn up, which concluded that cereals and cassava were the basic products on which the economy and food depended and, as such, recommended the availability of land for rural families (Negrão, 2006).

The *land fund* policy of the 1960s relegated the peasant to the land with fewer possibilities or facilities for irrigation and with inferior soil quality, but took an interest in their training, seed selection and mechanization, and the installation of machinery parks was planned in which the machinery should be appropriate to the type of agriculture developed by the peasants. Investments were made in research and propagation of improved seeds, in development and regeneration of local varieties, and in local reproduction of imported seeds. At the time, concerns included credit and other infrastructure to support peasants, and the system of State investment in general expenses was developed in areas inhabited by rural families (Negrão, 2006)[21].

These concerns prevailed for decades, and it is estimated that, between 1982 and 2018, the rice sector in Zambezia had an investment of USD 38 million in interventions mainly in three areas: irrigation, agricultural extension and value chain (ZAMIRRI and HVA, 2020). In the first area, institutions were successively created, such as the Zambezia Hydraulic Company and the Zambezia Hydraulic Nucleus, and projects were implemented, such as the small-scale irrigation (SSIP) and food security programme in Sombo.

In the area of agricultural extension, the project schools in farmers´ farm and the PANA programme in Lower Licungo-Intabo were implemented. Regarding the value chain, the construction of the rice husking and processing plants in Namacurra (FAPROARNA) and the Empresa Orizícola da Zambézia (EOZ) in Nicoadala (ZAMIRRI and HVA, 2020) stand out. All these

[14]. Interview with a producer, Mutange, on 14.09.2021.
[15]. Interview with a producer, Mutange, on 14.09.2021.
[16]. Interview with a producer, Mutange, on 14.09.2021.
[17]. Interview to a group of producers, Mutange, on 14.09.2021.
[18]. Interview with a producer, Mutange, on 14.09.2021.
[19]. Interview with a producer, Mutange, on 14.09.2021.
[20]. Interview with a member of Civil Society, Quelimane, 16.09.2021.
[21]. Negrão says that in 1940 the Indigenous Rural Credit Fund was created with the aim to cover the credit demand of "natives who have reached a level of civilization incompatible with the habits and customs of others" and who were "good natives" but that, notwithstanding, no individual loan had materialized.

interventions were carried out through the technical and financial support of international cooperation. The activities that took place in the 1980s had no impact on the countryside due to the civil war that was escalating in the province [22].

For the period under review, one of the instruments/options that expresses concerns about rice is the PNISA (2013-2017). Regarding irrigation infrastructure, this plan envisages two levels of approaches: small irrigated lands (less than 200 ha), and medium/large irrigated lands, (equal to/greater than 200 ha). The vision envisages the development of wetlands[23],, as in low-lying areas, for agriculture. The exploitation of these lands involves drainage infrastructure and good water management practices, with low-cost technologies that are easily mastered by producers (MINAG, 2013).

In the last decade, the implementation of the irrigation programme in Zambezia has included interventions such as those of the Sustainable Irrigation Development Project *(Projecto de Desenvolvimento de Irrigação Sustentável)* (ProIRRI 2011-2018), where three river basins, Búzi, Pungoé and Zambezi, were covered (WB, 2011). With a total cost of USD 90 million, the project was funded by the World Bank with USD 70 million, the Mozambican government with USD 5.7 million, and a Japanese grant of USD 14.2 million.

The project´s objective was to increase agricultural production and improve the productivity of farmers in new and rehabilitated irrigation systems in Sofala, Manica and Zambézia. The project would have 16,000 farmers as main beneficiaries, and indirect beneficiaries of about 80,000 (WB, 2019; WB, 2011), through the implementation of new or rehabilitated irrigation systems in the three provinces over an area of 5,500 ha, with a focus on rice production in an area of 3,000 ha (WB, 2011; MASA, 2018; WB, 2017).

The project followed a scheme that covered 70% of the cost of acquiring a production kit, composed of seeds, fertilisers and pesticides, for an average area per farmer of about 0.2 hectares. The remaining 30% would be borne by the farmer. Similarly, the project would co-finance 85% of the total cost of acquiring equipment for animal traction and agro-processing machinery. In Zambézia province, the focus of ProIRRI was on rice production, one of the priority crops in PEDSA (WB, 2011; WB, 2017; WB, 2011).

For the Japanese government, ProIRRI is part of its Programmes of *(a) Support to agrarian technology, which aims at developing and strengthening the system of technological diffusion, training extension workers, organising and strengthening the system of organisation of producers, increasing agrarian productivity by supporting the orientation and learning of appropriate technologies and methods of agrarian management, increasing the income and improving the lives of small producers, as well as support to improve the capacity of local governments for the development of agriculture and the agrarian zone, thus contributing to increase the income of producers;* and (b) *Coalition for Rice Development in African (CARD) which aimed to double rice production in 10 years (2008 to 2018)*[24]*.*

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[22]. Interview with a member of Civil Society, Quelimane, 16.09.2021.

[23] . Wetlands are ecosystems at the interface between terrestrial and aquatic, continental or coastal environments. They can be natural or artificial, periodically or permanently flooded.

[24] . See Activity Development Plan for the Republic of Mozambique. Prepared in April 2017. At https://www.mz.emb-japan.go.jp/files/000360347.pdf. Accessed on 23.05.2021.

In addition to these two global programmes, there is also the Projecto de Aumento da Produtividade do Arroz (ProAPA) for Zambézia Province, which is executed with technical and financial support from Japan, through JICA, with the national counterpart represented by the then Direcção Nacional de Extensão Agrária (DNEA). The project is being implemented in six districts, namely, Quelimane, Nicoadala, Namacurra, Maganja da Costa, Mopeia and Inhassunge, with a duration of 5 years (2016-2021).

To ensure the continuity of this challenge of repositioning irrigation in the country´s agrarian development, it was assumed that ProIRRI would be continued and consolidated by IRRIGA for the period 2018-2024, adding Nampula province (MASA, 2018). According to MASA (2018), the main difference between ProIRRI and IRRIGA is that the latter promotes more infrastructure for irrigated land and focuses more on intensification and market linkages, allowing beneficiaries of the former (ProIRRI) to better market produce and shift from subsistence to commercial farming.

IRRIGA is expected to provide improved irrigation services and market linkages for smallholder farmers on 5,000 ha of irrigated land, cultivated by about 12,000 smallholder farmers, in the four provinces. An additional 3,000 hectares of land is added that will have been developed under ProIRRI (MASA, 2018:5).

In 2016 the National Rice Development Programme (NRDP 2016-2027) was approved, whose main strategy involves the intensification of the use of agricultural inputs and appropriate technologies for rice production by smallholder farmers. Its general objective is to increase the production, productivity and competitiveness of rice cultivation for domestic consumption and income generation for producers (MASA, 2016:21).

It should be noted that the NRDP aims to increase productivity, through the value chain approach, from 1.15 Ton/ha to 1.8 Ton/ha by 2027 and increase total production from 371,176 Tons in 2016 to 980,592 Tons by 2027. One of NRDP´s objectives is to increase the yields of producers of rice in rainfed from 1.2 to at least 1.8 Ton/ha, and of rice under irrigation from 2.8 to at least 5.0 Ton/ha (MASA, 2016).

The Zambézia province is characterised by rainfed production in the lowlands, where production is conditioned by both droughts and floods (Walker *et al.,* 2006). At the time of the design of the two programmes, ProIRRI and ProAPA, the province was considered the country´s largest rice producer[25]. In the 2018/2019 agricultural campaign, rice production was estimated at 161 266[26] tons, about 47.32% of the national production, which was estimated at 340 800 tons (MASA, 2019), which placed the province as one of the largest producers of this cereal.

According to MASA (2019), there are 3,750 hectares with irrigation infrastructure, but 1,220 hectares (32.5%) were used in the 2018/19 cropping season. Out of the 11 existing irrigation systems, 3 were in full operation namely: Limane (Mopeia), Mungonhane and Mutange (Namacurra); and 9 were partially used: Chiverano and Paz (Mopeia), Moriri (Morrumbala), M'ziva, Mucelo and Ilalane (Nicoadala), Itabo and Munda-Munda (Maganja da Costa).

[25]. Interview with a technician from the Provincial Services of Agriculture, Quelimane, 16.09.2021.
[26]. About 31.9% of the total cereals in the province, where the largest contribution was maize with 299 855 tons (MASA, 2019).

The possible reasons for this partial operation of the infrastructure can be attributed to the lack of investment for the rehabilitation of irrigation systems and periodic maintenance work[27], infrastructure with technical-operational elements that are little known to small producers, associated with the poor management of funds, which translate into a partial rehabilitation and with a significant negative impact on the satisfaction of the producers' needs (ZAMIRRI and HVA, 2020).

Government efforts for the development of the rice value chain in Zambezia led to the mobilization of foreign investments and the construction of the Namacurra rice husking plant (FAPROARNA), completed in 2012, with an initial capacity to process 150 tonnes of rice per day and 34 000 tonnes per year. This investment had a total cost of USD 9 million financed by China and was built by a company from that country[28].

FAPROARNA intended to create the necessary conditions for rice farming in Zambezia, namely to absorb locally produced rice, with emphasis on the districts of Maganja da Costa, Mopeia, Namacurra, Nicoadala and Quelimane. From its inauguration in 2013 until it was stopped in 2015, the factory never operated regularly due to constant breakdowns, poor management and insufficient raw material for processing[29]. These malfunctions would lead to the occurrence of two fires, having the second fire occurred in August 2017, when the factory was already paralysed[30].

Regarding the institutional support and the organisation of small producers, a strategy for rural financing and agricultural marketing was launched in 2001 which, among other things, provided for the establishment of a cooperative bank and an agricultural marketing cooperative. In order to increase rice production and productivity, the cooperatives formed in lower Zambezia formed the Empresa Orizícola da Zambézia (EOZ). Through EOZ, a rice husking plant was built in Nicoadala, for the acquisition of rice, its husking and subsequent marketing. With a husking capacity of 16 000 tonnes per year (ZAMIRRI, 2021a), it was estimated that it would buy primarily from members of the affiliated cooperatives[31].

The purposes of the creation of the EOZ and the construction of the husking plant in Nicoadala were only observed for a short time, when organizational and patrimonial constraints immediately arose [32]. Without the knowledge and endorsement of the main partners, the management team contacted other entities and obtained funding on behalf of all partners (ZAMIRRI and HVA, 2020) which, in reality, was not applied for EOZ´s objectives[33], creating, in this sense, gaps in the institutional structure.

With Gapi, IMPERE - a rice marketing company - was introduced, with Gapi itself as the sole shareholder. It occupies the premises (factory, warehouse and offices) of the Empresa Orizícola da Zambézia (EOZ) and buys rice from producers in only four districts of Zambézia, namely: Maganja da Costa, Mopeia, Namacurra and Nicoadala, and does not buy in the other districts with

[27]. Interview with a member of Civil Society, Quelimane, 17.09.2021
[28]. Interview with a technician from the Provincial Services of Agriculture, Quelimane, 16.09.2021
[29]. Interview with a member of Civil Society, Quelimane, 17.09.2021
[30]. Interview with a technician from the Provincial Services of Agriculture, Quelimane, 16.09.2021.
[31]. Interview with a group of producers, village of Mopeia, district of Mopeia, on 08.09.2021.
[32]. Interview with a member of Civil Society, Quelimane, 17.09.2021
[33]. Interview with a member of Civil Society, Quelimane, 02.09.2021. This matter is in the courts.

productive potential[34], such as Inhassunge and Quelimane, which, with the four above, are covered by ProAPA.

However, IMPERE has never managed to collect enough rice for processing in the Nicoadala factory. The factory has the capacity to process 60 tons per day (ZAMIRRI, 2021a), but currently only processes an average of 20 tons per day. One of the factors given for this was that the One of the factors given for this was that the rice produced by small producers is of low quality and may deteriorate if processed in large quantities, so only quantities are purchased and processed according to market availability[35]. But the weak financial capacity of the factory was also highlighted, which does not allow it to purchase enough rice (MASA, 2019) and the conflict that has arisen between Gapi, a shareholder of IMPERE and the small rice producers over the ownership and management of the factory[36] .

On the other hand, Gapi has been, since the year 2019, trying partnerships with other institutions, such as AGRA [37], with which it intends to implement and catapult the MozArroz programme [38]. In this programme, Gapi seeks to structure the rice value chain with a focus on market access. In the model adopted, the figure of the "village-based agent" was introduced, which ensures the supply of inputs to producers and the purchase of production for collecting centres and subsequent supply to processors.

The Zambezi Valley Development Agency (ADZ) has associated with Gapi to launch a line of credit for financing the rice value chain, called LIFINCA. However, the mismanagement observed in the loan granted by ADZ for the acquisition of 3,000 Ton of rice in the 2017-2018 campaign precipitated the relationship between these two institutions[39]. Currently, the ADZ in Zambezia seems to be more focused on medium-sized producers, namely in the creation of machinery[40], parks, granting them tractors, agricultural implements and cash credit [41].

With the stoppage of the husking plant in Namacurra and the insufficiencies found in IMPERE´s operation, a new approach sought: the installation of small processing units that will be allocated on credit to the small Emerging Agriculture Producer (Produtor Agrícola Comercial Emergente - PACE) or Local Development Agent (Agente de Desenvolvimento Local - ADL). Under SUSTENTA, the PACE or ADL is the small producer and/or trader who, through a line of credit in equipment and financial resources, will be the agent who will support other local producers on a commercial basis. This includes production and marketing assistance, procuring and/or facilitating the processing and transportation of the final product[42].

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[34]. Among the group of districts in Zambézia with potential rice production, we can include Chinde.
[35]. Interview with the head of IMPERE, Nicoadala, on 15.09.2021.
[36]. See Canal de Moçambique, 10.06.2019. Rice cooperatives in Zambezia in conflict with Gapi.
[37]. Alliance for a Green Revolution in Africa (Aliança para uma Revolução Verde em África). However, still no results.
[38]. Interview with the head of IMPERE, Nicoadala, on 15.09.2021
[39]. Interview with a member of Civil Society, Quelimane, 02.09.2021. This matter is in the courts
[40]. As understood in this work, this is an agricultural infrastructure composed of a set of equipment, such as tractors, agricultural implements, etc. The most structured machinery parks have a workshop for maintenance and repair of equipment and a warehouse for spare parts with a higher turnover during maintenance. Machine operators and mechanics are generally organised independently from other business sectors. There are also companies or economic agents whose function is to provide agricultural mechanization services.
[41]. Interview with a member of Civil Society, Quelimane, 17.09.2021
[42]. Interview with an agricultural extensionist, Posto Campo, on 10.09.2021.

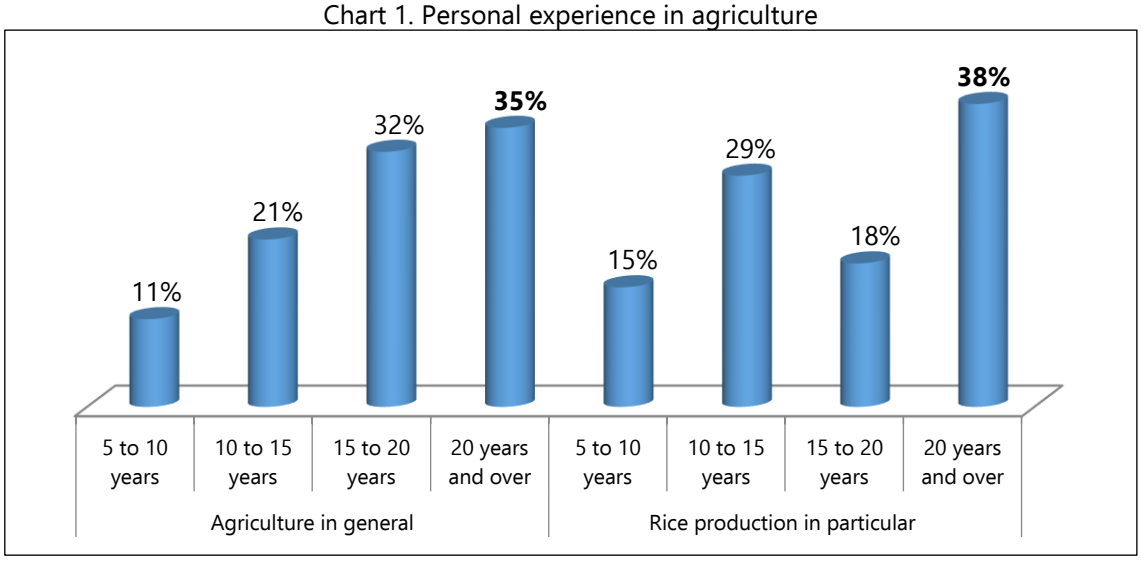
SOCIO-ECONOMIC CHARACTERISATION OF THE SAMPLE

Out of the 75 individuals who constitute the sample for this research, 44.5% are in the 50-60 age group. An equally considerable portion of the respondents (29.5%) are in the 40-50 years' age group. Another part of the respondents (29.5%) is in the 40-50 age group. Respondents aged 60 and over represent 17% of the sample and those aged between 30 and 40 represent 9% of respondents.

Out of the total sample, 54.2% are male and 45.8% are female. Out of the two districts studied, Mopeia presents a sample with a significant gender difference, with men representing 69%, while in Namacurra there is no considerable difference, in a proportion of 52% men to 48% women.
Regarding schooling, a considerable part of the sample (40%) had completed primary level education, 25% of the respondents had no schooling at all, and the same portion of the sample had basic education. Only 10% had technical-vocational education. In the relationship between gender and educational level, in general, the difference is markedly large, with men representing the majority (83.7%).

With regard to experience in agricultural activities (Chart 1), 35% of the respondents have more than 20 years of work in this activity, 32% have 15 to 20 years of work, and 11% declared having between 5 and 10 years of experience. Regarding the experience in rice production, in particular, 38% declared to have worked in rice for more than 20 years, 29% indicated having between 10 and 15 years of experience, 18% stated having between 15 and 20 years and 15% had only up to 10 years of experience.

Chart 1. Personal experience in agriculture



Source: survey data

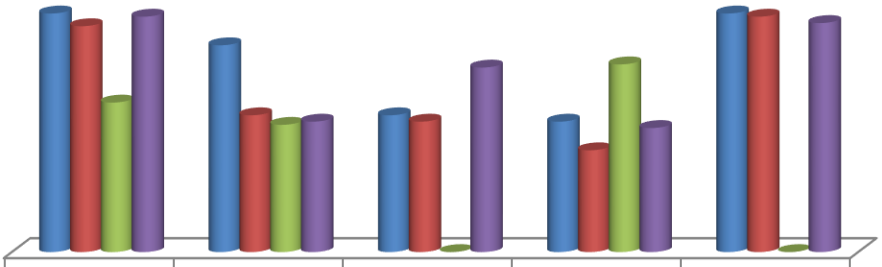
Figure 1. 1. Marks of time: Mrs. Maria de Lúcia T. Aleixo, rice producer in the Zambezi Delta

Source: 1. unknown author, Mopeia, 1996

2. Author of the research, at 09.09. 2021

With regard to the factors influencing the preference for production (Chart 2), respondents highlighted, in the case of rice, the existence of favourable land (75%), being a cereal grown since the past in the region (75%) and support received (65%). For maize and beans, the existence of suitable land and the fact that they are crops with a great tradition in local consumption, particularly in Mopeia, were mentioned as preference factors. For sesame, despite the fact that there are not very favourable soils (47%), it is the best price (59%)[43] for producers in Mopeia.

Chart 2. Relevant factors in production



	Favourable land	Received support	Local consumption base	Best selling price	Historical culture
Rice	75%	65%	43%	41%	75%
Beans	71%	43%	41%	32%	74%
Sesame	47%	40%	0%	59%	0%
Maize	74%	41%	58%	39%	72%

Source: survey data

[43]. For prices, see section on Marketing.

AGRICULTURAL PRODUCTION

Production costs

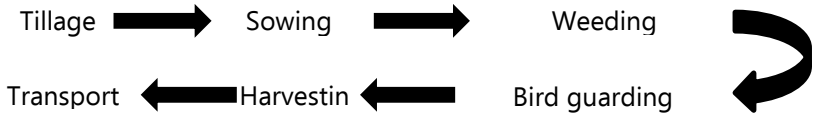
It is known that the costs incurred in the production of a good are the basis for the formation of the final price of the product to be marketed arising from the inputs and the steps observed in the production of that good. According to some authors (Nwahia, 2021; Tripathi, 2017; Udemezue, 2018), cost analysis allows the producer to control his performance, which leads to better organize, economically and financially, the activities performed in the production of a particular crop in a given agricultural season.

Costs in agricultural production are divided into fixed and variable. Fixed costs are those that have to be paid even if the production unit does not produce anything and do not vary even if production changes. Variable costs are those that vary when the level of production changes (Samuelson and Nordhaus, 2005). The former include wages of permanent workers, maintenance of animals used for farm work, depreciation of production equipment. Variable costs include tillage, purchase of inputs such as seed, fertilizers, agro-chemicals, payment of seasonal labour, interest on working capital, and purchase or lease of land, if applicable (Nwahia, 2021; Tripathi, 2017; Udemezue, 2018).

A good production can have low unit costs, where contributing factors are the efficient use of resources, including capital, labour and land factors. Other factors that contribute to low unit costs are the prices of inputs, the technique used, the scale of the area worked, the ecosystem (Tripathi, 2017), and the efficient combination of capital and labour factors. A comprehensive cost analysis exercise for rice would have to be separated for irrigated and rainfed rice.

The producers contacted in this research are not aware of the existence of a specific technological guide[44] for the small producer, which would allow them to perform the calculation of all the costs incurred during the production process. However, a trial calculation has been made, highlighting the various stages that take place from the start of the campaign to the post-harvest transport phase for storage (Fig. 2).

Figure 2 - Diagram for calculating rice production costs



Source: survey data

The calculations presented are basically for tasks carried out manually. Depending on the condition of the soil, between the ploughing and sowing phases, the levelling activity of the ploughed area takes place. The pests to be controlled are generally birds and locusts. From the farm, the rice is transported first by hand (head loading) and then by bicycle to the storage area. If tractor is used, unloading the rice has a separate cost. Table 1 shows that, on average, the

[44]. The technology chart constitutes the basis for planning the resources (material, human and financial) that make up the agricultural production plan. Its main objective being the rational execution of activities, it is important to determine the needs in material resources, inputs, volume of work and labour for each task, the period required and the costs incurred.

producer spends about MZN 29,700.00 per hectare for rice cultivation. The locality of Mutange presents the highest estimates for rice cultivation, while Mopeia presents the lowest values.

Table 1. Estimates of production costs of rice per hectare (in meticais)

Task	Unit of analysis	Average cost per task	Per task/location		
			P. Campo	Mutange	Mopeia
Ploughing	hectare	5,000	5,500	5,000	4,500
Sowing	hectare	3,500	3,500	4,500	2,500
Weeding	hectare	4,000	3,000	5,000	4,000
Transplanting	hectare	4,000	7,000	5,000	
Bird guarding	hectare	1,500	1,000	1,500	2,000
Harvesting	hectare	3,667	2,000	5,000	4,000
Cleaning and bagging	hectare	3,422	1,765	4,500	4,000
Transport	hectare	4,607	7,000	3,600	3,220
Total cost per hectare of rice		**29,695**	**30,765**	**34,100**	**24,220**

Source: survey data

Cultivation area

The development of agriculture depends, among other factors, on land ownership and size, and capacity for its adequate use. In the two districts studied, almost all of the respondents (82%) own one hectare of rainfed land and another in the irrigated zone; a small part of respondents (13%), carry out their activity only in the rainfed zone and totally dependent on the rains registered in each agricultural season.

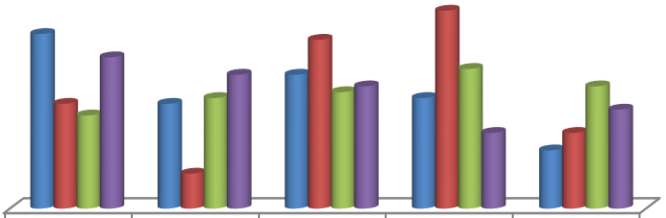
Mopeia district has the highest average area per respondent (8,5 HA)[45] than Namacurra. Of the total respondents (Chart 3), the majority (30%) cultivated up to 1 hectare, 23% cultivated 2 to 5 hectares and another 19% cultivated 5 to 10 hecatres. A small proportion (10%) worked an area of more than 10 hectares.

When disaggregated by crop (Chart 3), the data shows that 76% of the respondents devoted at least 2 hectares area to rice production, of which 34% cultivated between 5 and 10 hectares of rice, 29% devoted plots of 2 to 5 hectares to rice and another 10% ploughed more than 10 hectares. By localities, the average area cultivated with rice per farmer in Mopeia-sede was 4.8 hectares, in Mutange it was 2.3 hectares and in Posto Campo 1.7 hectares.

However, it should be noted that the smaller the size of the plot that the producer has, the greater the intensification in its use, that is, without space for fallow. For those who used the totality of the land for all the crops practiced (rice and other crops), chart 3 shows that 26% have up to 1 hectare and 23% have up to 2 ha of land. Also in this range, 21% are in the class of those who own between 2 and 5 hectares and the remaining 17% own more than 10 hectares of land.

[45]. With emphasis on Mopeia-sede, where 8 farmers declared to own about 15 hectares each, although part of these plots is not used.

Chart 3. Plot size and use for rice and other crops



	Up to 1 ha	Up to 2 ha	2 to 5 ha	5 to 10 ha	More than 10 ha
Area under cultivation (total)	30%	18%	23%	19%	10%
Dedicated to rice	18%	6%	29%	34%	13%
Dedicated to other crops	16%	19%	20%	24%	21%
Dedicated to all crops	26%	23%	21%	13%	17%

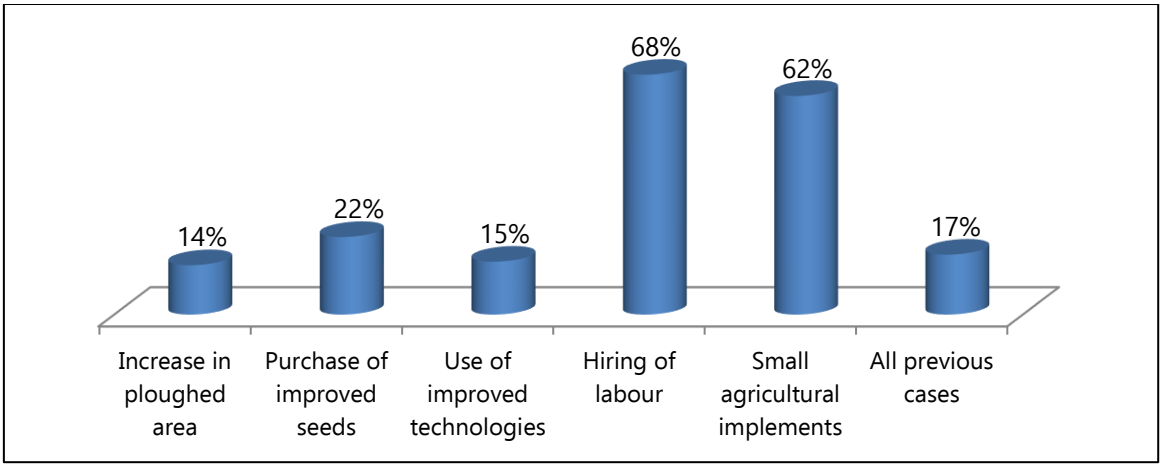
Source: survey data

Investment

Investment presents itself as another factor for the development of agriculture. It is estimated that between 1984 and 2019, the agricultural sector in Zambézia province had investments to the amount of USD 38 million, about 56% for the irrigation sub-sector and 44% in the extension and value chain (ZAMIRRI and HVA, 2020). These investments intended: (1) the rehabilitation of some irrigated areas and construction of new ones; (2) the installation of rice husking units; (3) the establishment of a machinery park; and (4) the introduction and dissemination of production technologies and improved seeds of national and/or imported origin, depending on the country of origin of the cooperation agency involved in the investment.

From the analysis of the survey data (Chart 4), it was found that the largest investment made by the small producer was traditional, that is, the hiring of labour (68%) and the acquisition of small agricultural implements (62%), such as hoes, machetes, axes, etc. Low investment was observed in inputs, such as improved seed (22%), in improved production technologies (15%) and, finally, in increasing the cultivated area (14%).

Chart 4. Investments made



Source: survey data

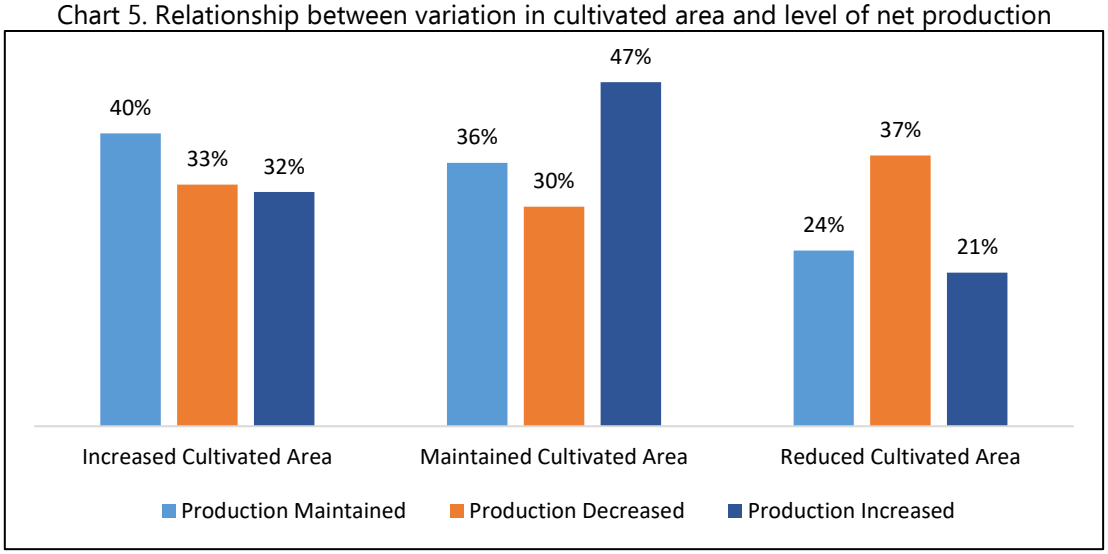
One way of measuring performance in production can be to analyse the relationship between the variation in the area cultivated and (the investments made) and the variation in the production obtained. The survey data indicate that 51% of respondents maintained the cultivated area, others (29%) reduced the size of the area, while 20% increased the cultivated areas by about one hectare on average.

Chart 5 shows the relationship that exists between the variation in cultivated area and the (primary) results at harvest. The data indicate that of the 51% of respondents who worked the same size of land, 37% claimed to have increased production, 33% maintained production volume and 30% saw their production reduce.

For those who reduced the areas tilled, 47% claimed to have observed a reduction in production, 32% claimed to have maintained the same production and 21% of respondents claimed to have increased production. Finally, for those who increased the ploughed area, 40% of respondents had the same production, 36% saw their production reduce and 24% claimed to have increased production.

This shows that there was no positive relationship between the increase in the area ploughed by the producer, the investment and the volume of its production. On the one hand, the enlargement of the ploughed area did not translate into an increase in production, highlighting the decline in production. On the other hand, most of those who kept the ploughed areas are small farmers with plots up to 5 hectares, which makes it easier to master the production operations. Associated with the type of investment, basically small tools, such as hoes, bags and manual sieves; and hiring labour, which depends on the financial capacity of the producer and, in general, was for the phases of ploughing, weeding, harvesting and transportation of rice.

Chart 5. Relationship between variation in cultivated area and level of net production



Source: survey data

The seed generally influences the efficiency of other inputs used (Uaiene, 2015). According to this author, benefits in the use of improved seed include reduced use of pesticides and herbicides, and increased yields and profits. Therefore, increased production can lead to significantly more food and farmers will have more income from the sale of surpluses and thus can improve investment levels.

The same is true with the use of improved technologies. Their adoption contributes to increased production and productivity (Eneji, Weiping e Ushie, 2012). It should be noted that for the 2017/2018 campaign, the authorities recommended late sowing, using short and medium cycle varieties so that water requirements are met, mainly in the vegetative and flowering stages that should coincide with the transition of the OND and JFM[46] period, focusing on the varieties Macassane, ITA 312, IR-64 and Chupa [47], and even considering the introduction into rice cultivation of varieties originating from and/or supported by countries that provide technical assistance, as in the cases of Japan [48] and Vietnam (ZAMIRRI and HVA, 2020).

It is in this line that ProAPA fits in. It aims to introduce to small producers the varieties normally used locally, known as aromatic, with a good smell and which may have greater market value, specifically the Chupa, Nené and Mocuba varieties[49]. Research would be developed to bring varieties that are more productive and adaptable to local conditions [50]. This has been the work of the IIAM, which is committed to crossing local varieties with others that resist disease and/or have a higher yield, having produced pre-basic and basic seed [51].

However, in the field, it was found that most producers reject adopting imported varieties because of the taste that is not accepted locally [52] and the lack of prospects for the continuity of each programme/financier [53]. The producers continue to use the seed taken from the production of previous agricultural campaigns, from their own farm [54] or purchased from other farmers [55]. According to ZAMIRRI and HVA (2020), in Zambezia, rice seed is selected and stored by the producer and used the following year. There are informal systems of mutual aid and sale of the seed because there is trust between people in the communities, a situation that is observed in more than 97% of cases.

Production

As mentioned, the level of investment and the factors targeted by the investment improve agricultural production and productivity per hectare. Most respondents produced up to one ton of rice and other crops per agricultural season. In the case of rice in the study area, although the most used conditions and production system is rainfed, chart 6 indicates that, 39% of respondents produced more than two tons of rice and 22% stated that they produced up to two tons.

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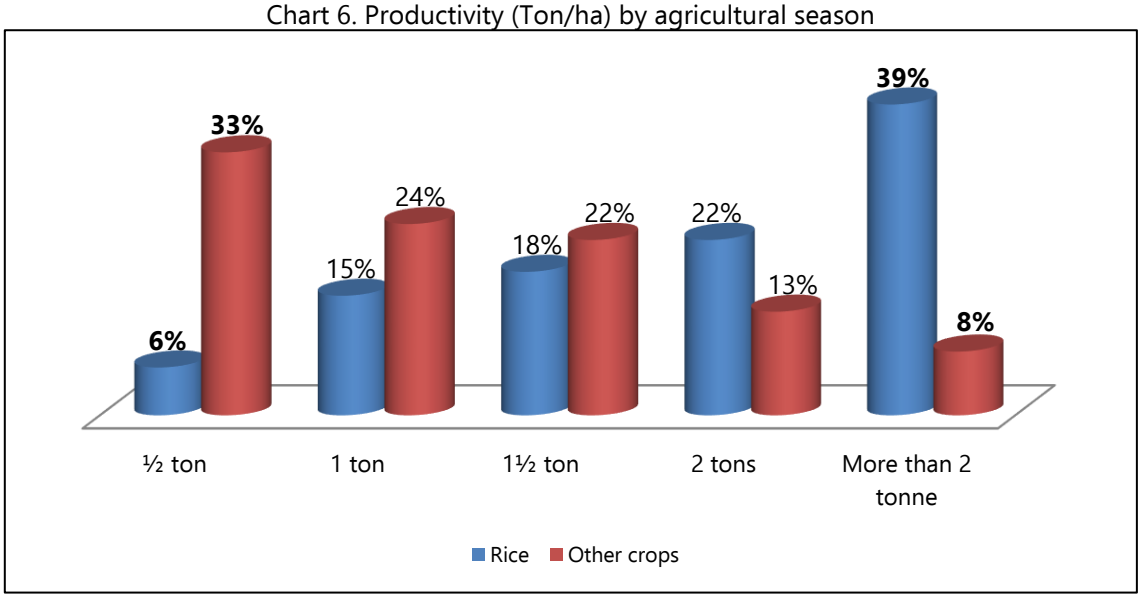
[46]. October, November and December; January, February and March.
[47]. Information letter of the Ministry of Agriculture and Food Security. Folha Verde No. 219, October 2017.
[48]. JICA Technical Manual for Rice culture in Africa - Review of CARD implementation 2008-2018. At https://riceforafrica.net/ Accessed 30. 06. 2021.
[49]. Interview with a member of Civil Society, Quelimane on 17.09.2021
[50]. Interview with a technician at the Provincial Agricultural Services, Quelimane on 16.09.2021.
[51]. Interview with a technician at the Provincial Agricultural Services, Quelimane, 17.09.2021.
[52]. Interview with a producer, Mopeia-sede, on 09.09.2021.
[53]. Interview with a producer, Mopeia-sede, at 08.09.2021.
[54]. Interview with a group of producers, Mopeia-sede, on 08.09.2021.
[55]. Interview with a producer, Mutange, Namacurra, on 15.09.2021.

It is also noteworthy that 18% of the respondents produced up to 1.5 tons of rice. While for other crops, such as maize, sweet potato, beans and sesame, the chart shows that 33% of the respondents obtained the equivalent of half a ton; 24% obtained up to one ton, and only 8% of the respondents claimed to have obtained more than two tons from other crops.

Chart 6. Productivity (Ton/ha) by agricultural season



Source: survey data

It should be noted that, over time, the initial weight of rice (in sack) decreases significantly [56], taking into account two main factors: the quality of the final product after threshing and transport to home barns, and the drying process (sun) followed by storage without the recommended conditions of humidity and temperature control[57].

In a disaggregated manner, the highest average productivity was found in Posto Campo, where the survey data shows that in the last two agricultural campaigns, rice production reached 3.5 tons per hectare. These results are noteworthy considering that production in this area is mainly rainfed and totally dependent on the rains that increase the flow of the rivers, which, in turn, flood the fields of small local producers. When the flooding is above the desirable level for farmers, they carry out a second sowing to compensate for the low production of the first season of the agricultural campaign [58].

It is known that the productivity of a crop depends, in addition to the quality of the seed, on soil and climate factors, especially the natural fertility of the soil and the levels and annual distribution of rainfall (MICOA, 2007). Regarding soil fertility, using artificial methods, small farmers rejected the use of fertilizers proposed by the different partners that have been working locally, putting forward factors such as: lack of clarity about the origin (country of production) and its quality[59]; lack of guaranteed market access and availability of these fertilizers when needed and likely impacts on soil quality and, consequently, on future soil productivity[60].

[56]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[57]. Interview with a SDAE technician, Posto Campo, on 10.09.2021.
[58]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[59]. Interview with a group of producers, Mopeia-sede, on 09.09.2021.
[60]. Interview with a group of producers, headquarters of the Associação Paz, Mopeia, on 08.09.2021.

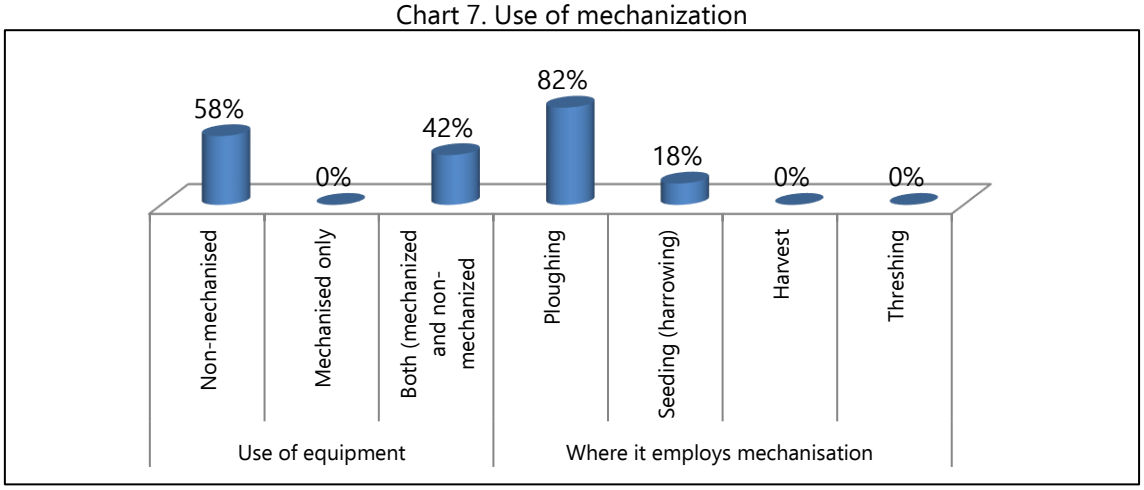
Mechanization

Agricultural mechanization in the execution of tasks in rice cultivation, through the use of machines, tools and other mechanical means that, while decreasing the time in agricultural tasks and allowing raising productivity and production, was generally low. As can be seen below, almost all tasks in the production cycle were carried out by hand or using rudimentary tools, such as hoes, knives, sieves, tarpaulins and others[61].

The field survey data indicate that 58% of respondents do not use mechanization, with 42% saying they practice mechanized and non-mechanized agriculture (Chart 7). When the data is disaggregated by zone, mechanization was most observed in Mopeia-sede (52%), followed by Mutange (37%) and, lastly, the Posto Campo zone (11%). In this last zone, it was only in the 2019/2020 campaign that some farmers carried out mechanised tillage.

However, it should be noted that none of the locations studied has machine parks; interested producers have to resort to individuals who own tractors[62] or to machine parks in other districts or localities[63], which raises costs, namely with fuel and feeding the tractor driver. For example, producers in Namacurra have used tractors from a machine park located in Nicoadala district.

Chart 7. Use of mechanization



Source: survey data

With regard to the crops where mechanisation is most used, the survey data indicate that it was most employed in rice cultivation (77%) and 23% in other crops. The activities that used mechanisation, through tractors, were simple ploughing (82%), namely cleaning the fields and harrowing for incorporation of the seed (18%).

[61].Interview with a technician from the Provincial Services of Agriculture, Quelimane, 17.09.2021. Interview with a member of Civil Society, Quelimane, 17.09.2021.
[62]. Interview to a group of producers, Mopeia-sede, on 08.09.2021.
[63]. Interview with a group of producers, headquarters of the Associação Paz, Mopeia, on 08.09.2021. Interview with a group of farmers, Mutange, on 14.09.2021. Interview with a technician from the Provincial Agriculture Directorate, Quelimane, on 17.09.2021.

As for sowing, there is an initiative found in the field. Through ProAPA, a direct seeding sower was introduced in dry field that, in addition to reducing the amount of seed to be used, allows fertilization and regulation of the density of plants per hectare. It also reduces labour and time in the transplanting process [64].

The seeder has a furrower that allows two rows to be sown at the same time (fig. 3). Afterwards, the covering of the seed in the soil is done manually. According to the farmers interviewed, the main constraint in using this seeder is its inability in humid soils[65], three scenarios that generally occur in the areas studied[66].

Figure 3: Rice seeder

Source: photos by the author of the research (Posto Campo, Mopeia, on 10.09.2021)

[64]. JICA Technical Manual for Rice culture in Africa - Review of CARD Implementation 2008-2018. At https://riceforafrica.net/ Accessed 30. 06. 2021.
[65]. Interview with a group of producers, Posto Campo, Mopeia district, on 10.09.2021.
[66]. Interview with a group of producers, Mutange, Namacurra district, 15.09.2021.

Irrigation

Rice cultivation in Zambezia is carried out according to three methods of establishing the crop: direct sowing on dry soils; nursery and transplanting; and direct sowing on wet soils. The first method is used in areas (river plains) with total dependence on the rainfall pattern; the second is followed in areas with frequent flooding, but with insecurity as to the level of water[67]; and, the third is practised in areas, such as the Zambezi delta, influenced by the tides that rise up the delta[68].. The use of the tidal influence occurs in the Nhacatiwa area and, in colonial times, this process was tried in the Sombo irrigation area.

In the study area, producers practise the last two production systems together. Therefore, the production system is mainly rainfed (89%), where a small part (11%) stated that they use both systems (irrigation and rainfed). Of those who practice the two systems, almost all (85%) of the respondents use more the rainfed system and only 15% resort to irrigation, in the regions of Mopeia-sede and Mutange. This particularity is related with the need to use water that is observed only in times when the rains are irregular, resorting to irrigation systems existing in these areas.

Irrigated agriculture depends on canals and dams that allow the circulation, distribution and storage of water[69].. During the second half of the 1990s, associations of irrigators were formed in the study area, aiming to take advantage of local water resources for agriculture. During the first half of the 2000s, the Small-Scale Irrigation Project (SSIP) was started which, in Zambezia, covered the rice sub-sector, and the Thewe irrigation schemes in Mopeia and Mungonhane in Namacurra were built (ZAMIRRI and HVA, 2020).The two irrigation systems presented initial differences in size and structure. The Thewe, with 400 hectares, was built with a technically complex pumping station and a water distribution system through underground pipes. In Mungonutane irrigation, with a dimension of 45 hectares, a simple water distribution system with open (surface) channels was chosen. Later, the Mungonhane system was modified by introducing underground pipes to transport water (ZAMIRRI and HVA, 2020).

In the district of Namacurra, locality of Mutange, is located the irrigation system with the same name, which, according to the local government[70], has the capacity to cover an area of 150 hectares of rice cultivation, but has only a very small area was used, due to problems in levelling the main channel, which causes the water to feed only three of the nine existing blocks in the irrigation system[71] .

These infrastructures were handed over to the management of local producers, organised in groups and/or associations, and have partially functioned due to their complexity (ZAMIRRI and HVA, 2020) and irrigators´ lack of knowledge who, for example, were not trained to maintain and operate the system[72]. In addition to these problems, there is a lack of clarity in the entry and exit of economic partners sponsored by the government, which generally result in conflicts with the

[67]. There is a high incidence of floods and droughts in these areas, combined with inefficient water management, which contributes to increased risk (IIAM, 2006).

[68]. Interview with a technician from the Provincial Services of Agriculture, Quelimane, 17.09.2021. Interview with a member of civil society, Quelimane, 17.09.2021.

[69]. Interview with a technician from the Provincial Agriculture Directorate, Quelimane, 17.09.2021.

[70]. Government of Namacurra District (2019). Proposal of the Social Economic Plan - 2019.
Government of Namacurra District (2019). Proposal of the Social Economic Plan - 2018.

[71]. Interview with a group of producers, Mutange, on 14.09.2021

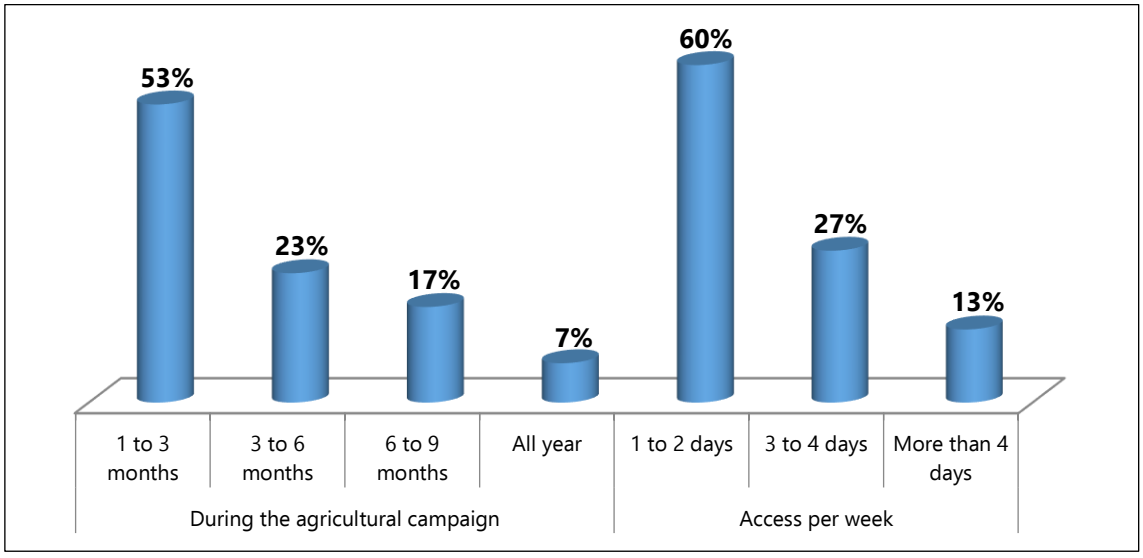
[72]. Interview with a group of producers, Mopeia-sede on 09.09.2021.

members[73]. According to a group of producers, after the rehabilitation of the Thewe irrigation system by OLAM, this infrastructure was not formally transferred to the Irrigators' Association, which had been the "owner" since its construction[74]. This will have been one of the causes that led the association to assume few responsibilities in the irrigation [75].

In all the infrastructures visited in this research, the pumping systems installed present a challenge for local management (producers' associations) and the payment of operating costs, namely the payment of electricity[76], fuel [77] and the accessibility of the production fields when the peak rainy season arrives [78]. When floods or cyclones occur, flooding of access roads in Thewe is aggravated by the weak *marrach* structure around the fields (ZAMIRRI, 2021b).

Regarding water use, there is, on the one hand, the availability of water during the agricultural campaign and/or vegetative cycle of the crop and, on the other hand, the plants must receive the necessary amount of water at key moments of the cycle. The survey data (Chart 8) reveals that most producers (53%) have access to water for only 3 months per campaign, 23% had access for up to 6 months. The chart also indicates the percentage of farmers with access to water during the week. Just under 15% reported having access to water during the entire week, highlighting those who had access between 1 and 2 days (60%), due to insufficient fuel[79]and electricity that arrived irregularly to the irrigation facilities[80].

Chart 8. Access and time of use of water on farms



Source: survey data

[73]. Interview with a producer, Mopeia at 09.09.2021.
[74]. Interview with a group of producers, Mopeia on 09.09.2021.
[75]. Interview with a farmer, Thewe agricultural fields, Mopeia on 08.09.2021.
[76]. Interview with a group of producers, Mopeia-sede, on 08.09.2021.
[77]. Interview with a group of producers, Mutange, on 14.09.2021.
[78]. Interview with a group of producers, Mopeia-sede, on 09.09.2021.
[79]. Interview with a group of producers, Mutange, on 14.09.2021.
[80]. Interview with a group of producers, Mopeia on 08.09.2021.

It should be noted that irrigation is used when rainfall is scarce, and it is necessary to resort to river water. In general, irrigated and rainfed rice cultivation differ in soil preparation, sowing methods and water management (Yuan, 2009; Kajisa and Payongayong, 2008; Oikeh *et al.*, s/d). Insufficient water in either of the two systems leads to crop damage (Bouman *et al.*, 2007; Tajima, 1995), which is reflected in productivity.

In the survey area, about 49% of the respondents stated that they did not receive enough water through the irrigation system. This is due to inadequacies in electricity supply[81], payment of energy, problems with underground pipes of the irrigation system associated with poor placement of hydrants that are too low relative to the level of the fields where the farms are located (ZAMIRRI, 2021b). In addition, the levelling of the field and the soil arrangement by *marracha* are constantly inadequate[82].

It is known that climate and soil conditions restrict the options of crops that can be grown without irrigation and determine the risks of salinization for irrigated crops, which greatly depends on soil and water management (Bouman *et all.* 2007). The crops mentioned in the two districts - with emphasis on Mopeia, which produces other crops besides rice - require controlled water consumption, taking into account the cultivated areas and the water requirements of each crop. However, the dilemma in the two districts, along with others in this region of the country, is related to their vulnerability to the occurrence of floods in the rainy season (MPD, 2013; MICOA, 2007), a situation that has occurred regularly without producers having technical knowledge, for example on protection measures including water management[83] techniques and maintenance of irrigation systems [84].

Agricultural services and products

The availability of differentiated services and products to the producer, by public or non-public entities, is important for agricultural production and productivity. These services are the responsibility of the public sector, but are also provided by non-public stakeholders, such as the private sector, NGOs and international cooperation partners. One respondent mentioned that, in the communities, the public sector with its cooperation partners is working with producers to transmit them improved techniques to increase rice production levels[85].

The outsourcing of some agricultural tasks can provide, on the one hand, the (re)organisation of agricultural work and of the business structure itself, and, on the other hand, the emergence of a set of services to agriculture, offering an opportunity for multi-activity to farmers who, according to circumstances, decide what to produce.

Thus, in addition to directly benefiting producers in the selected districts, ProAPA appears to aim to empower public extension technicians through training to guarantee continuous and more qualified technical assistance to producers. In Namacurra district, the Macuse Agrícola, a private

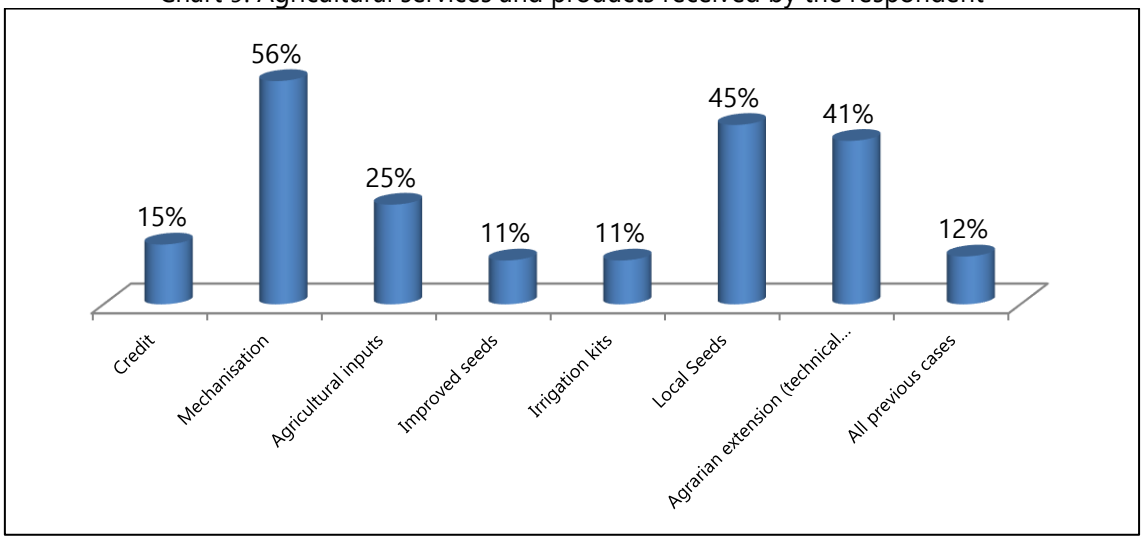
[81]. Interview with a group of producers, Mopeia-sede, on 08.09.2021. They mentioned they had a problem with the invoice by the public company - EDM. This problem was resolved by the Chinese partner, who paid the bill, but when the system resumed pumping water, it was too late for some producers.
[82]. Interview with a farmer, Thewe agricultural fields, Mopeia on 08.09.2021.
[83]. Interview with a member of Civil Society, Quelimane 01.09.2021.
[84]. Interview with a farmer, Thewe agricultural fields, Mopeia on 08.09.2021.
[85]. Interview with a technician at the Provincial Agricultural Services, Quelimane on 16.09.2021.

company, is providing services to producers. For the machinery park of Nicoadala, the tractors ere supplied also to a private economic agent, under the agricultural mechanization program (PROMAG) of the Zambezi Development Agency.

According to the documents consulted[86], extension products and services have been made available to producers. Highlights include: the construction of a regional service centre for agricultural machinery in Namacurra[87]; training and assistance in matters of improved production technologies; post-harvest conservation; the organisation of rice seed multiplication fields and CDRs for locally priority crops under the agricultural technology transfer programme (PITTA)[88].

This survey indicates that mechanization (56%) in farming, support in the provision of local seeds (45%), agricultural extension (41%) and support in the provision of agricultural inputs (25%), such as fertilizers and pesticides, were the most frequently mentioned services and products (Chart 9). There was little mention of factors that constitute and/or drive the adherence to technological packages recommended for agricultural development, namely improved seeds, irrigation kits and credit.

Chart 9. Agricultural services and products received by the respondent



Source: survey data

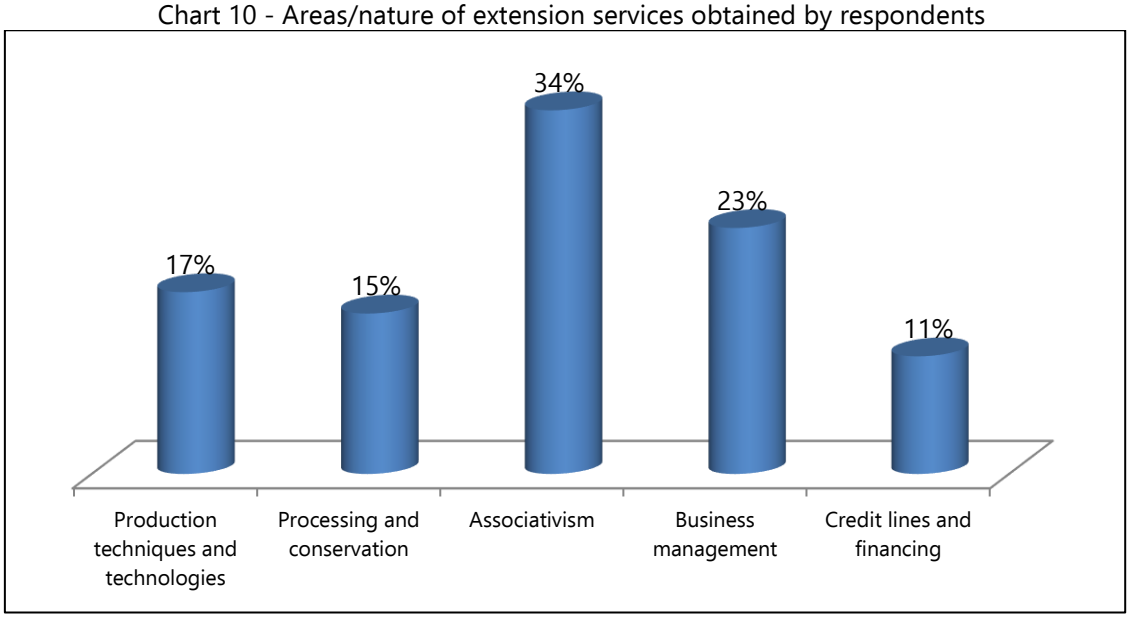
A point raised to the respondents was on what type of institution provided the extension products and services. NGOs (48%) and the private sector (35%) were mentioned as the entities with the greatest presence on the ground in the last two agricultural campaigns. Public services appear in third place (17%), the reason for this weak state presence being insufficient technical and financial resources[89].

[86]. Namacurra District Government (2019). Proposal of the Social Economic Plan - 2019.
Namacurra District Government (2019). Implementation report of the Social Economic Plan - 2018.
[87]. Namacurra District Government (2015). Proposal of the Social Economic Plan - 2015.
[88]. Mopeia district government (2020). Social Economic Plan Execution Report - 2019.
Namacurra District Government (2018). Proposal of the Social Economic Plan - 2018.
[89]. Interview with a technician at the Provincial Services of Agriculture, Quelimane on 16.09.2021.

It is noteworthy that the communities refer to NGOs, cooperation partners such as JICA and other non-governmental entities, and the private sector, consisting of small tractor owners who are based in the local community or other areas within or outside the reference district, and enable mechanical ploughing. The machine parks, which should drive agricultural mechanisation, have little relationship with smallholder rice producers[90].

Respondents who had access to services (Chart 10) highlighted subjects such as association (34%), business management (23%) production techniques and technologies (17%), post-harvest processing and conservation (15%) and, lastly, credit lines and financing (11%), despite the almost non-adherence to credit services. These data suggest an insufficiency in the availability and access by producers of extension services directly related to improving production and productivity (introduction and transmission of appropriate production and processing techniques, financing, etc.)

Chart 10 - Areas/nature of extension services obtained by respondents



Source: survey data

It should be noted that the expectation that existed in the SUSTENTA project is beginning to disappear for small producers. In addition to the general eligibility criteria of the PACEs and ADLs, such as, for example, that there cannot be two PACEs within a 5 km² radius, contributing to the continued difficulties of these producers[91]; and, on the other hand, rice, which is one of the most widely grown crops in lower Zambezia, is not a priority in this project[92] , and the machinery and financial support lines have benefited people who are not small producers but who have some financial capacity[93] and other agendas[94].

[90]. Interview with a group of producers, Mopeia-sede, on 09.09.2021.
[91]. Interview with a group of producers, Posto Campo, on 10.09.2021. As part of the challenges, the non-allocation of a PACE to serve the producers in this area of Posto Campo was pointed out, as it was not prioritized.
[92]. Interview with an extensionist, Posto Campo, on 10.09.2021.
[93]. Interview with a group of producers, Mutange, on 14.09.2021. Interview with a group of producers, Mopeia-sede, on 08.09.2021.
[94]. Interview with a member of civil society, Quelimane, 17.09.2021.

Processing

The value chain comprises a sequence of activities from production and processing to marketing of the product. It involves, among other stakeholders, producers, input suppliers, investment providers, processors, transporters, and consumers. There are several value chains in agriculture. In general, they extend from the farmer upstream to the consumer downstream. In between are other actors and processes. Each plays its own role that adds value to the product along the chain.

Smallholders will thus be connected in the value chain when they "offer" their product to the processing industry and/or when they sell their agricultural products in local markets or to outside traders and/or consumers. For smallholder production, it can be said that cereal processing offers good opportunities for business at that level when raw materials are available and of quality, most equipment is accessible and products are properly selected, so having these products in good demand could be profitable for smallholder producers in particular (FAO, 2013; UNIDO, 2004).

According to UNIDO (2004), cereal processing can be categorized into: a) primary processing (post-harvest operations including drying, cleaning, husking...); and, b) secondary processing (e.g., the rice roasting process, widely rooted in Lower Zambezia), when the raw materials from primary processing are transformed into a wide range of value-added products that are attractive and add variety to the human diet. This second processing can be, for example, the process of roasting the rice, which brings an aromatic flavour, and the transformation of rice into *matago*[95], which is very widespread in lower Zambezia.

The two types of processing are, firstly, dependent on the period and conditions of the harvest. In the area studied, rice is generally ready for harvesting 30 days after flowering[96]. This optimum time for harvesting is observed when 80-85% of the grains are straw coloured and the grains in the lower portion of the panicle are in the hard stage and with a grain humidity between 20 and 24%[97].

After harvesting, manual threshing is carried out, followed by drying in the sun, which can begin in the fields and/or in producers' homes using tarpaulins and bags[98]. It is known that for proper storage and husking, rice should have a moisture content ranging between 11 and 13% (Oikeh *et al.*, s/d; Mora and Chinchilla, 2009). But the proportion of broken rice in processing units will be higher if the paddy rice is too dry (IDE Mozambique, 2014).

The rice that arrives at the plant is subjected to cleaning and moisture percentage reduction processes with the aim of creating a good preparation for storage and husking. Generally, this is the task of the processing company and not the small-scale producer[99]. The survey shows that the majority of respondents (67%) stated that they sell the paddy rice, while another part (28%)

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[95]. Generally, green, fresh rice which, after harvesting and threshing, is immediately toasted and piled hot, becoming a kind of flake. As you can see, this is a home-made product that is obtained by hand by compacting and sieving the rice.

[96]. Interview with a group of producers, Mopeia, on 09.09.2021. Interview with a group of producers, Mutange, 14.09.2021.

[97]. Interview with a technician at the Provincial Services of Agriculture, Quelimane on 16.09.2021.

[98]. Interview with a group of producers, Mopeia-sede, on 09.09.2021. Interview with a group of producers, Posto Campo, on 10.09.2021.

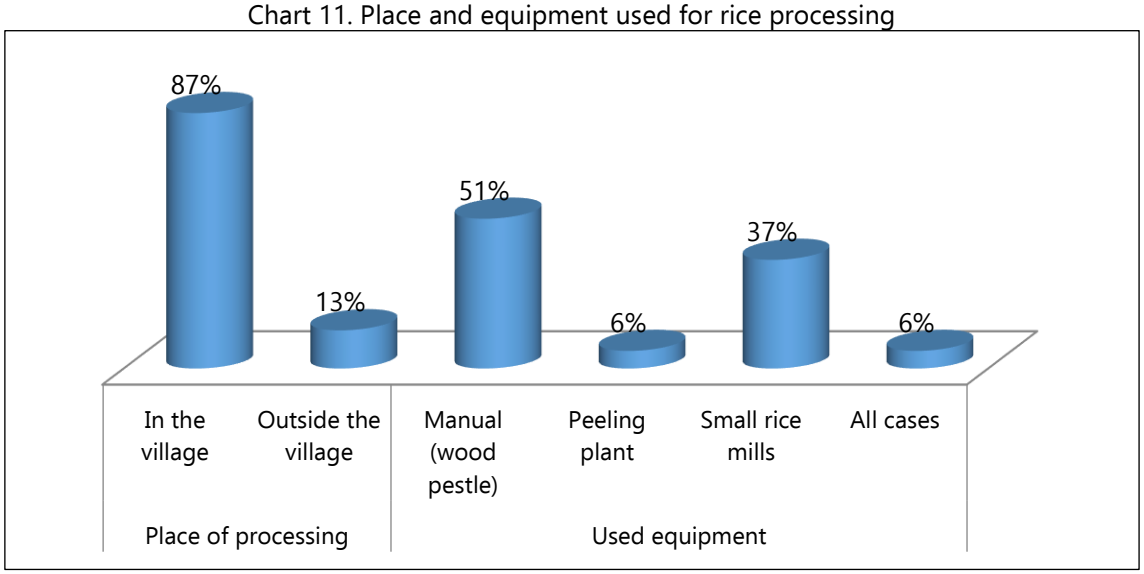
[99]. Interview with a group of producers, Mutange, on 14.09.2021.

sell the paddy and/or cleaned (without husk) rice, and only a not very significant percentage (5%) sell the rice after a second processing.

However, between primary and secondary processing there has been a reduction in the quantities of whole rice. First, because in local mills[100] is higher percentage of broken, which is due to the low quality of rice[101] and mills[102]. Secondly, it is due to the shortcomings observed in drying and storage[103], with undesirable degree of humidity and pests of rats[104], longer stay of rice in the barn until it is sold[105].

Chart 11 shows that most of the respondents (87%) process - in this case secondary processing - their rice at local level and only a small proportion (13%) process outside the village. Regarding the processing methods, the majority (51%) use the pestle for husking their rice, 37% use small processing machines (commonly known as rice milling), which are found in the villages/neighbourhoods. Only 6% of the respondents stated that they took their rice to the husking plant in Nicoadala.

Chart 11. Place and equipment used for rice processing



Source: survey data

In the particular case of Mopeia, local producers had hoped that OLAM would build a rice husking factory in Mopeia [106]. This started the promotion of rice production in local farmers [107], selling the final production to Mozfoods (MIA) in the south of the country and to the Empresa Orizícola da Zambézia in Nicoadala. Until 2014, the project did not show significant developments (IDE

[100]. Interview with a producer, Mopeia-sede, at 08.09.2021.
[101]. Interview with a shelling mill operator, Mopeia, at 09.09.2021.
[102]. Interview with a group of producers, Mopeia, on 08.09.2021.
[103]. Interview with a group of producers, Mopeia, on 08.09.2021.
[104]. Interview with a group of farmers, Mutange, 14.09.2021. Interview with a technician at the Provincial Services of Agriculture, Quelimane on 16.09.2021.
[105]. Interview with a producer, Mutange, on 14.09.2021.
[106]. Interview with a group of producers, Mopeia, 08.09.2021.
[107]. Interview with a group of producers, Mopeia, 09.09.2021.

Moçambique, 2014) and, in 2016, it was already paralysed [108], and the company had abandoned its rice activities.

Commercialisation

One of the objectives of this study was to find out about the rice commercialisation circuit, in order to verify the degree of integration of the producer in the value chain of this cereal. As already mentioned, [109] for rice farming in Zambezia, there have been several initiatives aimed at channelling local production to the market through marketing via the husking industry.

Generally, three categories of traders are found, according to the volume of business namely:

- Wholesale traders, those who buy large quantities, i.e., more than one ton of agricultural production. These are the processing and marketing companies (IMPERE, OLAM and others) that supply the national market and export. In this group, there are the non-local traders who arrive to the production areas and stay until they acquire the desired quantities, then take them to the market [110] (generally also involved in the sesame and maize trade). There are also local producer-traders who, after harvest, add to their production products purchased from other producers and/or small traders.
- Semi-wholesale traders are those who buy quantities of up to one ton of agricultural produce. They are traders, local or not, who establish buying points in the main production areas and in rural markets, transporting the products to intermediate markets in other regions, including to sellers who then sell to retail on the sides of Estrada Nacional nº1, mainly in Namacurra [111].
- Retail traders are those who buy small quantities, the main characteristic being the sale of processed rice in small buckets and/or bowls, and have, as a market, the areas near the point of purchase of rice (as in the case of Namacurra). Generally, they are local traders who carry, on bicycles or on their heads, small quantities of up to one bag of rice.

The survey data indicate that important quantities of rice are informally sold to stakeholders from outside the district, especially buyer-consumers from other parts of Zambezia, Maputo, Sofala and Tete, mainly at harvest time[112].

Chart 12 shows that 36% of the respondents sell their product locally, 23% sell within the district and 21% sell their rice to buyers in Zambezia province [113], mainly to the city of Quelimane.

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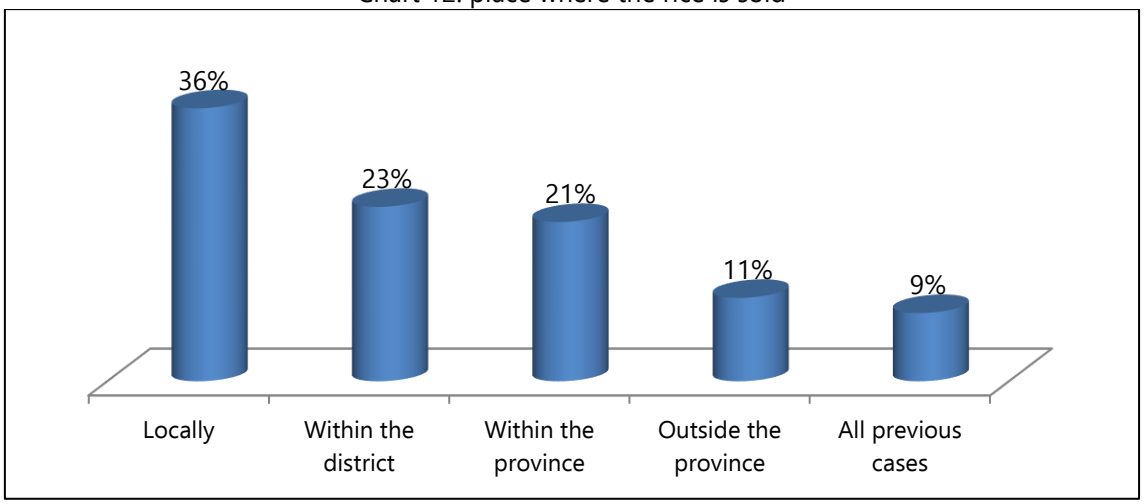
[108]. Interview with a farmer, Mopeia-sede, on 08.09.2021.
[109]. See General characterization of the study area.
[110]. Interview with a group of producers, Mopeia, 09.09.2021.
[111]. Interview with a rice trader, Namacurra-sede, on 16.09.2021.
[112]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[113]. Including for traders from districts and regions bordering the surveyed districts.

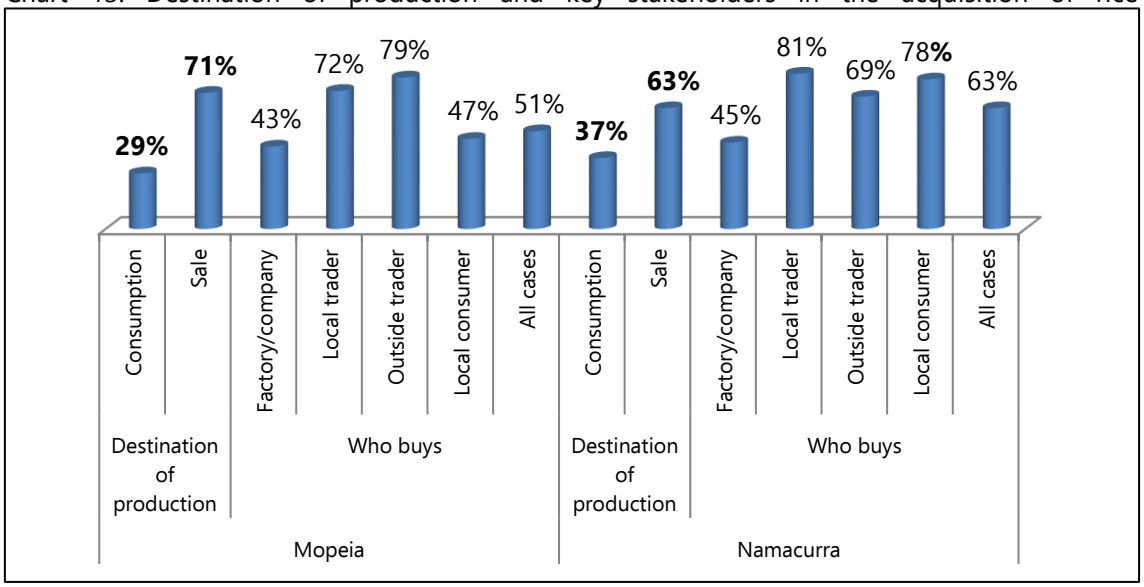
Chart 12. place where the rice is sold



Source: survey data

Chart 13 shows that there is a significant difference in the destination of the rice produced by smallholder farmers. More than a third of the respondents from Mopeia stated that they sell their rice, while 29% reserve some part for consumption. In Namacurra, 63% of respondents said they sell almost all their production, while 37% said they reserve enough for consumption.

Chart 13. Destination of production and key stakeholders in the acquisition of rice



Source: survey data

The small differences noted in the chart are related, among other factors, to the role that rice cultivation plays in each of the two districts. In Mopeia, it is mostly a cash crop, although recently sesame has become more important in marketing. In Namacurra, rice has a primary function in local food consumption and also appears strongly in the marketing component.

Regarding the main stakeholders involved in the purchase of rice from smallholder farmers, the survey data show that there is a significant difference between the two districts. In Namacurra, local traders (81%), local consumers (78%), traders from outside the district (69%) and companies/factories (45%) are involved in marketing. In Mopeia, there are traders from outside

the district (79%), local traders (72%) and companies/factories (43%), such as IMPERE and OLAM[114].

However, on many occasions, these producers were forced to sell their rice at a low price[115] or keep the production in the barn[116]. For some producers, trading paddy rice seems almost non-existent, due to the price offered[117]. IMPERE was offering the purchase price to producers of 17.00 meticais per kilogram of paddy rice, against the producers' intention of obtaining 25.00 meticais per kilogram[118].

The price of 16.50 to 17.00 meticais/kg was fixed by the government which says it is good for producers (MASA, 2019:26), which does not correspond to the views of producers and civil society [119]. While the small farmer relates the market price of rice to the cost of its production, the government does not take these costs into consideration in its pricing policy[120].

The selling price has been one of the motivations for the producer's involvement in the production chain of a particular crop. The profitability of production is largely determined by the prices charged on the markets. Table 2 shows the prices charged by respondents for the sale of major crops. The table indicates that local processed rice tends to be sold at a price of 67.50 meticais/Kg. However, there were few producers who, with the product in good condition, processed their rice and managed to sell at the desired price**[121]**. As mentioned above, only 6% of respondents took their rice to the dehusking plant (Nicoadala) and these have generally been producers who previously had delivery commitments**[122].**

Table 2. Prices (Meticais/Kg) of the main agricultural products, 2020/2021 campaign

Local production					**Imported**
Product	Rice in the husk	Rice without husk	Maize	Sesame	Imported rice
Average price	25,00	67,50	7,50	60,00	50,00

Source: survey data

On the market side, there is low demand for local processed rice due to competition from imported rice (50.00 meticais/Kg). Local producers are affected by the prices of this imported grain, which are lower than the cost of local production, which does not encourage the production of this grain[123]. In most of the delta and lower Zambezi, the consumption of imported rice is greater than that produced in the province, reflecting to some extent the strength of the network

[114]. Interview with a producer, Mopeia-sede, on 09.09.21.
[115]. Interview with a group of producers, Mutange, Namacurra, on 14.09.21.
[116]. Interview with a group of producers, Mopeia headquarters, on 09.09. 2021.
[117]. Interview with a producer, Mopeia headquarters, at 08.09. 2021.
[118]. Interview with a group of producers, Mopeia sede, on 08.09.2021. Interview with a group of producers, Posto Campo, on 10.09.2021.
[119]. Interview with a member of Civil Society, Quelimane, 02.09.2021
[120]. Interview with a member of civil society, Quelimane, 17.09.2021.
[121]. Interview with a group of producers, Mopeia-sede, 08.09.2021. Interview with a member of civil society, Quelimane, 17.09.2021.
[122]. Interview with a member of civil society, Quelimane, 17.09.2021.
[123]. Interview with a group of producers, Mopeia, 09.09.2021.

of importers of grain[124] that, with the price charged, inhibits a potential penetration of local production.

According to one group of producers ``the rice we produce is of good quality, everyone likes to eat it, but with the price[125] we charge after dehusking, no one buys it. People prefer to buy that rice that is sold by the *Bengalis*, because it is cheaper[126]``. This rice is imported from India, Thailand and other countries[127], which are considered low-cost producers and therefore dominate the export line as surplus production and government interventions generally encourage lower domestic prices[128].

In the face of competition, producers prefer to store their production and retail at rural fairs (fig. 4). In these fairs, at most, one can sell only four [129] to five [130] bags of 50 kg each, at a price that varies between 1,100.00 and 1,250.00 meticais/bag. However, and as observed in the field, the bags referred to reach weights of 60 kg or a little more [131], which depends on the pressure that is placed by the buyer on the producer [132].

Figure 4: Rice (photo 4.1 stored in the barn; photo 4.2 commercialized at the Mutange fair)

Source: Research author (Mopeia, on 09.09.2021 and Mutange, on 14.09.2021)

[124]. Interview with a member of civil society, Quelimane, 02.09.2021,
[125]. It is mentioned that obviously the selling price increases with the costs incurred, among others, for transporting and processing the rice.
[126]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[127]. Interview with a member of civil society, Quelimane, 02.09.2021,
[128] . See Rice Industry Review. In https://assets.kpmg/content/dam/kpmg/ng/pdf/audit/rice-industry-review.pdf Accessed on 24.09.2021.
[129]. Interview with a group of producers, Mutange, Namacurra, on 14.09.21.
[130]. Interview with a group of producers, Posto Campo, 08.09.21.
[131]. Interview with a group of producers, Posto Campo, on 10.09.2021.
[132]. Interview with a farmer, Mutange, on 14.09.2021.

Competition was also one of the aspects mentioned by IMPERE in order to offer a low price to small producers. According to the person in charge of this company, there are several factors that influence the prices charged by the company when buying rice from local producers, namely: the precarious condition of access roads, transport costs, high processing costs and market price [133].

CONCLUSION

The objective of the research was to analyse the effects of public policies on rice production in the Zambezi valley, seeking to answer the following question: has rice production been a priority in public policies in Mozambique? Although Zambézia is the largest national producer, the study concludes that rice is not a priority in public policy options and concrete actions to promote the product throughout the value chain.

The investments made in mills, equipment and infrastructure were discontinued and, even then, were not in line with local knowledge and needs, becoming inoperative or of little use. Equally misadjusted and not adopted by most producers, were the inputs that were intended to be introduced, either by companies or by cooperation agencies.

It can be noted, among the factors analysed, that the introduction and adoption of technological packages related to rice seeds, irrigation system infrastructures with low-cost technologies that are easy for producers to master, for the growth of agriculture, in general, and rice in particular, were not observed in the survey area. In contrast, complex irrigation systems were installed that were beyond the handling and maintenance capabilities of smallholder farmers.

These irrigation systems are paralysed or semi-paralysed, in part, due to insufficient maintenance of infrastructure. In this sense, it is recommended the installation of small systems, which existed in the past in some areas, with simple water pumping mechanisms whose model can be adopted, together with irrigation kits that can be easily handled by small producers. We recommend water management techniques that observe conservation methods through irrigation or management systems, which should be of little complexity, in use and maintenance, in such a way that they are under the control of the producers.

The refusal of small producers to experiment with fertilisers, due to cost, accessibility and lack of knowledge in application, can be minimised by an adequate and regular soil analysis, very important for the evaluation of nutrient deficits, acidity, texture, which allows some precision on quantities and types of fertilisers to be used in each agricultural season. The availability of fertilisers must then be guaranteed in the medium and long term, together with an approach to their dissemination and massification, according to the characteristics of the soils.

The official documents always refer to the facilitating role of the public sector and the link between the private sector and the productive activities of the small producer. This presupposes, for example, an alignment between public priorities for investment in infrastructure, credit and the intervention of the business community with the producer in the areas prioritised by the government and partners, according to local needs previously identified and diagnosed local needs.

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[133]. Interview with the head of IMPERE, Nicoadala, on 15.09.2021.

This research shows that this is not always the case. An example of this is the fact that public and partner investment in irrigation infrastructure is concentrated in some communities, while the main marketing and processing stakeholders are concentrated in other communities. In contrast, the mechanization service delivery stakeholders are in areas where the priority and business options are not rice.

In addition to land preparation, mechanization is important for harvesting and threshing. In the area of study, these two processes are carried out manually, making the removal of rice from the farms time-consuming and consequently there are considerable losses of product. It is recommended, similar to the exercise done with seeders, the introduction of small-scale harvesters to minimize the difficulties encountered in harvesting rice. This can be complemented with the installation of low-cost processing units in the communities for husking and processing the grain, investing, for example, in the use of solar energy.

Finally, among several factors that contribute to the production and productivity of rice, the selling price from the producer to the first buyer, namely companies/factories, was also mentioned as a factor that could compensate for the production costs. Thus, an adjustment in prices and the political will to enforce this goal may be the first step towards redirecting efforts and focus on small producers in rice farming.

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130	**Produção Agrícola e Empoderamento de Mulheres em Contextos Rurais: análise do projecto AgriMulheres em três povoados da província de Nampula (2018- 2021)**	**Neuza Balane e João Feijó**	**Setembro de 2022**
129	Modelos de desenvolvimento agrário em Moçambique	Yara Nova e Rui Rosário	Setembro de 2022
128	**Variações do extractivismo em Moçambique: um mundo inteligente ao clima e a emergência do extractivismo verde**	**Natacha Bruna**	**Agosto de 2022**
127	Caracterização das condições socioeconómicas dos deslocados internos no Norte de Moçambique ao longo do ano de 2021	João Feijó, Jerry Maquenzi, Daniela Salite e Joshua Kirshner	Agosto de 2022
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125	Terra da abundância, terra da miséria. Usurpação sinergística de recursos em Massingir	Natacha Bruna	Junho de 2022
124	**Dinâmicas na produção agrícola no vale do Limpopo: o caso do arroz**	**Nelson Capaina**	**Maio de 2022**
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122	Evolução dos Preços dos Bens Alimentares (2021)	**Yara Nova e Jonas Mbiza**	**Março de 2022**
121	**Ingredientes para uma revolta de jovens - Pobreza, sociedade de consumo e expectativas frustradas**	João Feijó, Jerry Maquenzi e Aleia Rachide Agy	**Fevereiro de 2022**
120	Caminhos para a segurança alimentar em moçambique: Uma abordagem de sistemas de produção	Máriam Abbas	Janeiro de 2022
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96	**Micro-simulações dos impactos da COVID-19 na pobreza e desigualdade em Moçambique**	**Ibraimo Hassane Mussagy e João Mosca**	**Julho de 2020**
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86	***"senhor, passar para onde?"* Estrutura fundiária e mapeamento de conflitos de terra no distrito de Nhamatanda**	**Uacitissa Mandamule**	**Fevereiro de 2020**
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59	Estruturas de Mercado e sua influência na formação dos preços dos produtos agrícolas ao longo das suas cadeias de valor	Yara Pedro Nova	Fevereiro de 2018
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15	Os efeitos do HIV e SIDA no sector agrário e no bem-estar nas províncias de Tete e Niassa	Luís Artur, Ussene Buleza, Mateus Marassiro, Garcia Júnior	Abril de 2015
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12	**Anatomia Pós-Fukushima dos Estudos sobre o ProSAVANA: Focalizando no "Os mitos por trás do ProSavana" de Natalia Fingermann**	**Sayaka Funada-Classen**	**Dezembro de 2013**
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8	**Agricultural Intensification in Mozambique. Opportunities and Obstacles—Lessons from Ten Villages**	**Peter E. Coughlin, Nicia Givá**	**Julho de 2013**
7	Agro-Negócio em Nampula: casos e expectativas do ProSAVANA	Dipac Jaiantilal	Junho de 2013
6	**Estrangeirização da terra, agronegócio e campesinato no Brasil e em Moçambique**	**Elizabeth Alice Clements e Bernardo Mançano Fernandes**	**Maio de 2013**
5	Contributo para o estudo dos determinantes da produção agrícola	João Mosca e Yasser Arafat Dadá	Abril de 2013
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1	Porque é que a produção alimentar não é prioritária?	João Mosca	Setembro de 2012

O OMR é uma Associação da sociedade civil que tem por objectivo geral contribuir para o desenvolvimento agrário e rural numa perspectiva integrada e interdisciplinar, através de investigação, estudos e debates acerca das políticas e outras temáticas agrárias e de desenvolvimento rural.

O OMR centra as suas acções na prossecução dos seguintes objectivos específicos:

- Promover e realizar estudos e pesquisas sobre políticas e outras temáticas relativas ao desenvolvimento rural;
- Divulgar resultados de pesquisas e reflexões;
- Dar a conhecer à sociedade os resultados dos debates, seja através de comunicados de imprensa como pela publicação de textos;
- Constituir uma base de dados bibliográfica actualizada, em forma digitalizada;
- Estabelecer relações com instituições nacionais e internacionais de pesquisa para intercâmbio de informação e parcerias em trabalhos específicos de investigação sobre temáticas agrárias e de desenvolvimento rural em Moçambique;
- Desenvolver parcerias com instituições de ensino superior para envolvimento de estudantes em pesquisas de acordo com os temas de análise e discussão agendados;
- Criar condições para a edição dos textos apresentados para análise e debate do OMR.

Patrocinadores:

Schweizerische Eidgenossenschaft
Confédération suisse
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