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Edfranklin Moreira da Silva[1] | Renato Linhares de Assis[2] | Adriana Maria de Aquino[3]

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[1] PhD in Science, Technology and Innovation in Agriculture (UFRRJ).
Professor at the Federal University of Pará.
Cametá-PA, Brazil.
E-mail: edfranklin@ufpa.br

[2] PhD in Applied Economics (UNICAMP).
Researcher at Embrapa Agrobiology.
Nova Friburgo-RJ, Brazil.
E-mail: renato.assis@embrapa.br

[3] PhD in Agronomy (Soil Sciences) (UFRRJ).
Researcher at Embrapa Agrobiology.
Nova Friburgo-RJ, Brazil.
E-mail: adrianaembrapa@gmail.com

ABSTRACT

This article analyzes changes in land use and socioproductive strategies adopted by quilombola[1] farming families in their agroecosystems in the Eastern Amazon. The empirical reference for this research was the Quilombola Community of Oxalá de Jacunday, in Moju, Pará. The method adopted was the Analysis-Diagnosis of Production Systems, combining the application of questionnaires in 10 family production units, interviews with seven key informants and participant observation, from 2018 to 2023. Three phases of changes in land use were identified from 1960 to 2023, involving a decrease in productive diversity over the years, and adoption of agroforestry systems as the main socioproductive strategy for land recovery. It was concluded that the peasant logic of production persists, since the centrality of family projects has been the social reproduction of the family. There is a tendency to consolidate diversified production systems, in order to ensure greater autonomy and, therefore, agroforestry systems assume a central role in the socio-productive strategies of quilombola families, in addition to promoting improvements in soil health in the local perception.

Keywords: Peasantry. Agricultural Practices. Productive Diversification. Agroforestry Systems. Northeast Pará.

1 "Quilombos" were spaces of resistance to slavery, organized secluded rural communities formed by people who escaped slavery when it was legal in Brazilian history. Many of them endure to this day in Brazil. "Quilombola" is any person or concept relative/originary to quilombos.

RESUMO

Neste artigo, analisam-se as mudanças no uso da terra e as estratégias socioprodutivas adotadas por famílias agricultoras quilombolas em seus agroecossistemas na Amazônia Oriental. A referência empírica da pesquisa foi a Comunidade Quilombola Oxalá de Jacunday, Moju, Pará. O método adotado foi a Análise-Diagnóstico de Sistema de Produção, combinando aplicação de questionários em 10 unidades produtivas familiares, entrevistas com sete informantes-chave e observação participante, no período de 2018 a 2023. Identificaram-se três fases de mudanças no uso da terra; diminuição na diversidade produtiva ao longo dos anos; adoção dos sistemas agroflorestais como principal estratégia socioprodutiva de recuperação das terras. Conclui-se que a lógica camponesa de produção persiste, visto que a centralidade dos projetos familiares tem sido a reprodução social da família. Os resultados apontam uma tendência para consolidar sistemas de produção diversificados porque podem garantir maior autonomia, o que leva os sistemas agroflorestais a assumir a centralidade das estratégias socioprodutivas das famílias quilombolas, além de promover a melhoria da saúde do solo.

Palavras-chave: Campesinato. Práticas Agrícolas. Diversificação Produtiva. Sistemas Agroflorestais. Nordeste Paraense.

INTRODUCTION

This article aims to analyze changes in land use and socio-productive strategies adopted by quilombola family farmers in their agroecosystems in the municipality of Moju, Pará. To this end, it is based on a systemic analysis – *soft system* (Pinheiro, 2000), based on the analysis of family production systems and their cultivation subsystem, but mainly ensuring a dialogical process, with the protagonism of the subjects of the field and their demands, in order to understand the socio-productive strategies and how they can point to possible paths in the construction of sustainable territories.

The municipality of Moju has a territorial area of 9,094 km^2 and an estimated total population in 2022 of 84,095 inhabitants, as recorded by the Brazilian Institute of Geography and Statistics - IBGE. Of this demographic total, 64% live in rural areas and 36% in urban areas, with a population density of 9.25. The municipality's economy is predominantly agricultural, with emphasis on the cultivation of cassava, açaí and *dendê*[1] oil palm, in addition to timber extraction, charcoal production and livestock (IBGE, 2022).

Land use dynamics in the municipality of Moju have been strongly influenced by the expansion of *dendê* oil palm cultivation, which in recent years has transformed the local landscape with immense areas

1 *Elaeis guineensis*, originary from the Guiné Gulf in Africa, bred in many countries including Brazil.

of oil palm monocultures (Nahum; Santos, 2016). It is estimated that there are 21 thousand hectares of area planted with this crop in the municipality. This process involves family farmers through integration systems, which has generated significant changes such as the reduction in the production of food crops, as analyzed by Silva e Navegantes-Alves (2017), putting into question the food security and sovereignty of these farmers.

In addition, since the 1990s, family production systems have faced a profound crisis in the slash-and-burn system (Conceição, 2002; Hurtienne, 2005), due to the reduction in fallow time and the weakening of land due to the decrease in organic matter. The use of fire has been harshly criticized for the negative consequences it causes to the soil, biodiversity and the emission of gases that contribute to the greenhouse effect (Pedroso Jr.; Murrieta; Adams, 2008).

All of this leads local family farmers to seek productive alternatives that guarantee the permanence of their production systems in territories that they have traditionally occupied for at least 150 years, as reported by the oldest residents. Thus, the questions that this study aimed to answer are: how have local family production systems evolved? And, what strategies have been adopted by quilombola farming families for social reproduction in the territory?

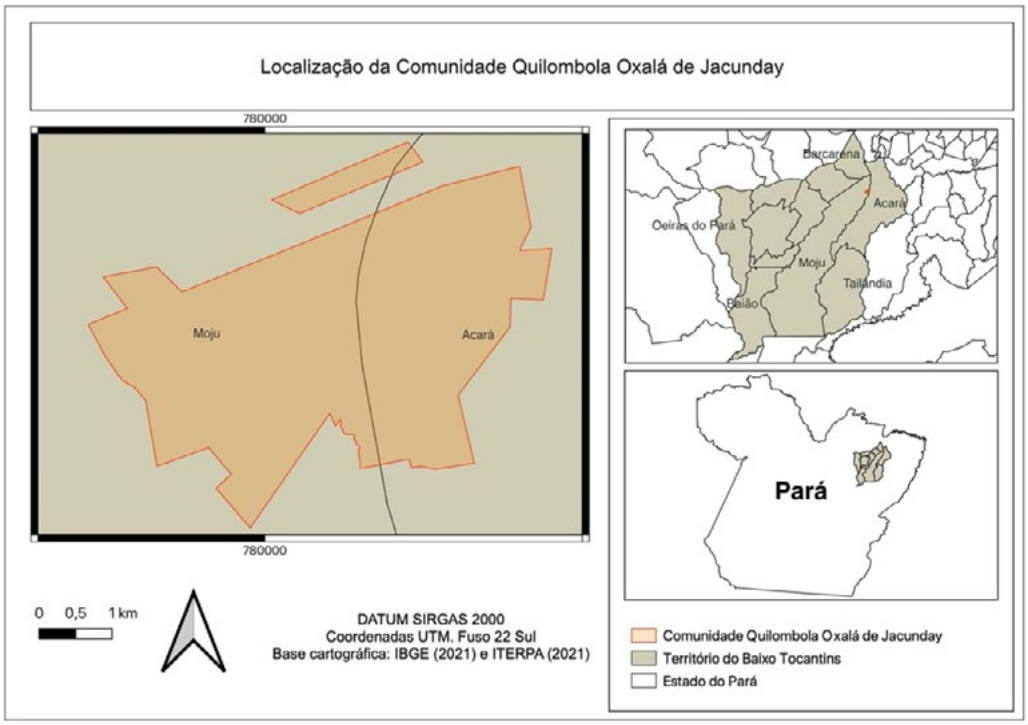
It is understood here that studies on land use dynamics can provide insights for the construction of projects that favor more sustainable processes in territories. From a scientific point of view, this work provides an analysis of the transformations that have occurred in production systems, identifying the internal and external factors that influence such changes, as well as evaluating agroecosystems, describing their structure and the logic that guides them.

METHODOLOGICAL ITINERARY

EMPIRICAL CONTEXT

The empirical reference for the research was the Quilombola Community of Oxalá de Jacunday, Moju, Pará (Figure 1), where a total of 120 families reside and occupy an area of 1,701 hectares, recognized by the Pará Land Institute (ITERPA) since 2006. This community, along with 14 other communities, make up the quilombola territory of Jambuaçu .

Figure 1 | Map of the Community of Oxalá de Jacunday in the State of Pará.



Source: IBGE (2021) and ITERPA (2021). Ellaborated by the authors.

This territory has experienced intense territorial conflicts with business groups that produce and process palm oil (dendê oil) in the region since the early 1980s (Santiago, 2018). There are reports of contamination of water resources by pesticides and deforestation caused by dendê oil palm monoculture, as reported by Nahum e Santos (2013). The Evandro Chagas Institute, commissioned by the Public Ministry of the State of Pará, carried out analyses of surface water and sediments in 18 municipalities in the area of expansion of oil palm cultivation in Pará, and 80% of the samples showed contamination by edosulfan, an insecticide used to control pests in dendê oil palm plantations.

The predominant vegetation cover in the region is dense ombrophilous forest, with areas of woods, floodplains and igapós[2]. Part of this region is intensely anthropized because it is an area of older colonization compared to border regions such as the South and Southeast of Pará and the Trans-Amazonian region (intensely colonized since 1970). According to the Köppen classification, the climate is Ami (hot and humid), with an average annual temperature in the range of 25.5°C. The relative humidity of the air approaches 85% and the months of January to June are its rainiest season, with rainfall of 2,000 to 3,000 mm/year (IBGE, 2022).

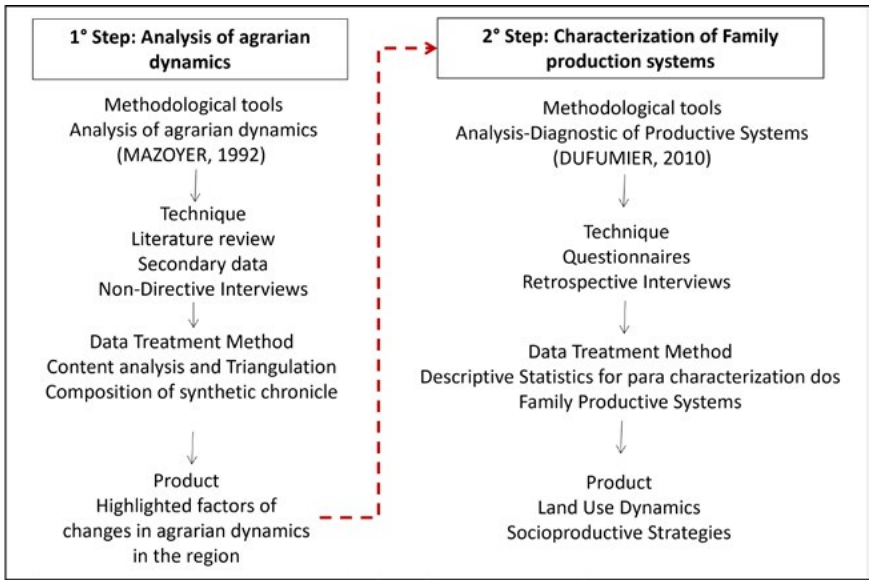
2 Blackwater-flooded forests in the Amazon biome. While the floodplains are seasonally flooded, the igapós remain flooded throughout most of the year, its vegetation being adapted to its conditions.

METHOD

The theoretical-analytical framework adopted in the research was the analysis-diagnosis of the production system, as proposed by Dufumier (1996). It was based on a bottom-up approach, based on the observation of the socio-productive practices of quilombola farmers related to soil management, the understanding of the logics of social reproduction and the consequences for the sustainability of agroecosystems. The aim was to contemplate the experiences of the peasants from a perspective of complexity and interdisciplinarity (Morin, 2005; Sá; Kanashiro; Lemos, 2014). The methodological premise was to value the experiences of quilombola farmers, in light of scientific knowledge and traditional knowledge and practices, as well as to analyze the limits and possibilities of these experiences.

In this sense, a combination of quantitative and qualitative tools and techniques was used to evaluate management practices and understand the processes of change inherent to production systems and the perceptions of those involved in the research regarding the sustainability of agroecosystems. The methodological arrangement adopted combined several scales, both in time and space. Data collection took place in two stages: (1) analysis of agrarian dynamics and (2) characterization of family production systems, as represented in Figure 2.

Figure 2 | Summary diagram of the methodology adopted in the study of transformations in the dynamics of land use in the Quilombola Community of Oxalá de Jacunday, Moju-PA.



Source: ellaborated by the authors. (SP: production system)

DATA COLLECTION AND SYSTEMATIZATION

The research was developed in the period from 2021 to 2023, however, the temporality analyzed was from 1960 to 2023, as that is how far the retrospective analysis methodology (Moulin *et al.*, 2008) allowed us to reach, based on the empirical survey.

Initially, an analysis of regional agrarian dynamics was carried out, based on previous studies and secondary data from official bodies such as the IBGE and municipal secretariats. The collection of secondary data was carried out by consulting historical, demographic, cartographic and statistical documents on the occupation of agrarian space in different contexts. This data served to assemble an overview of social, economic and environmental aspects. The objective was to understand the possible factors that could influence peasants' perception of soil management, as well as to identify the main events that contributed to changes in production systems.

Furthermore, for this first stage, interviews were conducted to obtain historical information, conducted with key informants (five local leaders and two technicians). The interviews conducted with the key informants were of the non-directive type (Hoffmann; Oliveira, 2009), this type of interview allows the subjects to express themselves freely, so that it is possible to understand the interlocutor's perception of reality, without interference or induction from the researcher. The objective was to identify the technical, ecological and social elements that influenced the evolution of land use forms, following the methodologies of Dufumier (1996) and Navegantes-Alves *et al.* (2012).

In the second stage , production systems were characterized by applying a semi-structured questionnaire to 10 families in the community. The objective was to obtain data that could allow analysis of the structure and functionality of the agroecosystems. The criteria for choosing the sample were the representation of the diversity of local agroecosystems and the availability to participate in the research. The questionnaires contained questions about production activities, cultural practices, available resources, work organization, relationship with the market and other questions about production that arose during the dialogue.

After the questionnaires were administered, historical interviews were conducted to obtain data for retrospective analysis (Moulin *et al.*, 2008) of the 10 families that volunteered for the study. The objective of the retrospective analysis was to identify the reasons for changes in agricultural practices, and the

coherences and contradictions that explained the transformations in the dynamics of land use. Information was also sought regarding the criteria for choosing cultivation sites, environmental differentiation, what is considered good land for cultivation, and knowledge about soil.

The most measurable data were entered into a Microsoft Excel database so that they could be analyzed using descriptive statistics (maximum, minimum, mean and frequency) and thus create graphs that would demonstrate the structure of the production systems and support the analysis of the production logic adopted by the families. The qualitative data were organized into a historical framework to create a chronicle, in which the changes that occurred and the factors that influenced such changes would be evident. The most significant statements that demonstrated changes or factors that influenced them were also organized to highlight the main transformations that occurred.

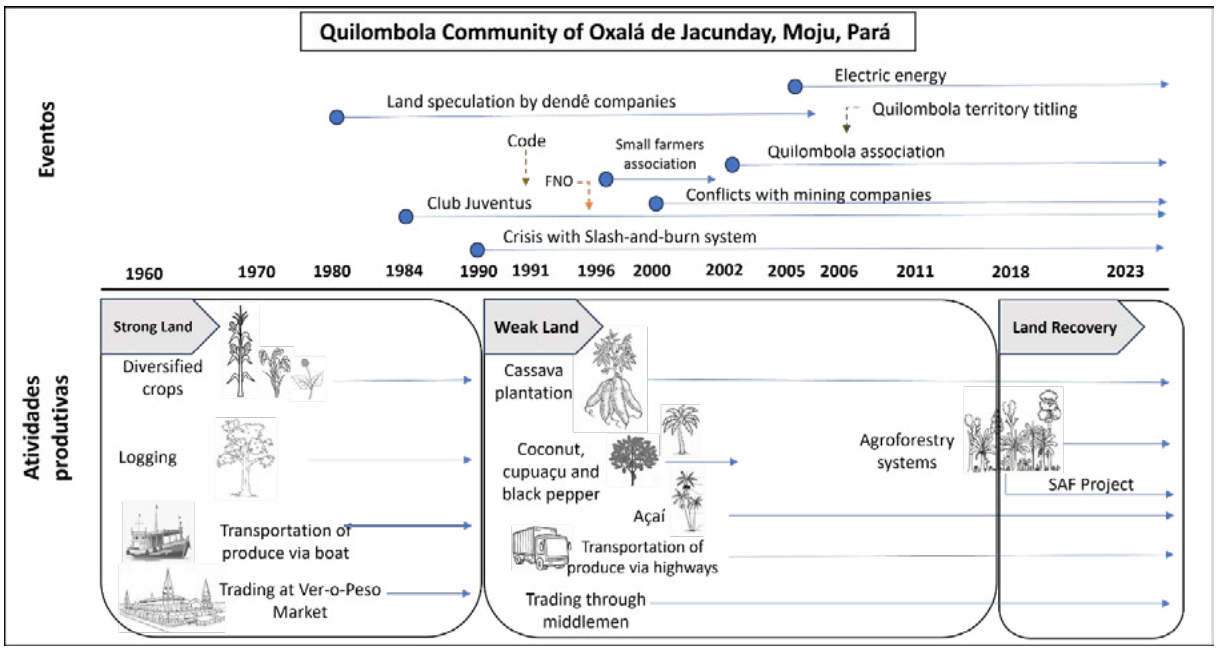
All ethical procedures were taken, the research project was submitted to the state ethis committee Brasil Platform and approved by the Research Ethics Council (CEP) of the University of Iguaçu (Rio de Janeiro), with Number: 5.706.405 on October 18, 2022. Thus, the Free and Informed Consent Form (TCLE) was presented to the research participants who were able to ask questions and sign it, giving authorization to carry out this work.

RESULTS AND DISCUSSION

CHANGES IN THE PRODUCTIVE AND TERRITORIAL DYNAMICS OF THE QUILOMBO OF OXALÁ DE JACUNDAY

Three phases of change were identified between 1960 and 2023 in the productive systems of quilombola families in the community: (I) Strong land (1960 to 1990); (II) Weak land (1991 to 2017); and (III) Land recovery (from 2018 onwards). These periods are represented below in the form of a summary chronicle (Figure 3), in which one can observe the main events that contributed to the transformations in the forms of land use. All phases are related to the local perception of the condition of the biophysical environment for the production of biomass as a central part of fertility management in agroecosystems. Thus, land can be considered weak or strong based on the resilience condition of a given agroecosystem. But not only that, the perception that agricultural practices have a direct impact on this condition favors the adoption of new technologies that can help recover “weak lands” such as the adoption of fire-free farming and agroforestry systems.

Figure 3 | Summary chronicle of transformations in family production systems in the Quilombola Community of Oxalá de Jacunday, Moju-Pará.



Source: empirical research data. Ellaborated by the authors.

The transformations in local production systems were influenced by several factors that can be classified as internal and external to agroecosystems. For the first, soil degradation and family aspects — such as available labor force and family project (family goals) — are key in the decision-making process regarding land use. For the second, the relationship with the market, conflict with companies interested in land traditionally occupied by families, public financing policies, identity recognition and land titling, were fundamental in shaping the agrarian dynamic with three distinct phases, as analyzed below:

I. Strong land phase (1960 to 1990)

During this period, family production was based on both the exploitation of hardwood and the production of food crops for self-consumption and for sale to generate income. Two sawmills were set up in the community with workshops for making boats, used to transport produce from the farm and for cutting wood for sale in the ports of Belém, especially at the Ver-o-Peso fair.

In the Amazon, it is common for traditional communities and migrant settlers to establish commercial relations with loggers as a strategy to generate income for consumption and investment in the realization of their life projects (Oliveira; Almeida; Silva, 2011). This is largely due to the abundance of native forest species and the absence of public policies for family farming (Martins *et al.*, 2014).

The land was considered strong due to its high capacity for regeneration and production of plant biomass, which when burned provided good fertility to the cultivated plant species. The size of the areas used for the cultivation of the fields was 10 *tarefas*[3] (equivalent to 3.3 hectares), that is, the fields were large both in terms of the spatial size they occupied and the diversity of plant species that were cultivated. During the retrospective interviews, it was possible to record 22 types of plants that were cultivated in the fields (Table 1), 21 of which were of an alternative nature, that is, consumption and sale, which strengthened the food security and sovereignty of the community.

Table 1 | Diversity of plants cultivated during the strong soil phase, in the fields of the Community of Oxalá de Jacunday, Moju - Pará. Purpose: Co (consumption), Sa (sale).

Ethnospecies/Popular name	Scientific name	Purpose
Pumpkin	*Cucurbita pepo L.*	Co, Sa
Peanut	*Arachnids hypogaea L.*	Co, Sa
Ariá	*Goeppertia allouia (Aubl.) Borchs . & S. Suárez*	Co, Sa
Rice	*Oryza sativa L.*	Co, Sa
Banana	*Musa sapientum L.*	Co, Sa
Potato	*Ipomoea batata (L.) Lam .*	Co, Sa
Sweet potato	*Ipomoea batata (L.) Lam .*	Co, Sa
Cará	*Dioscorea alata L.*	Co, Sa
Caruru	*Amaranthus sp.*	Co, Sa
Chicory	*Eryngium foetidum L.*	Co, Sa
Fava	*Phaseolus lunatus L.*	Co, Sa
Bean	*Phaseolus vulgaris L.*	Co, Sa
Sesame	*Sesamum indicum L.*	Co, Sa
Jambu	*Spilanthes oleracea L.*	Co, Sa
Papaya	*Carica papaya L.*	Co, Sa
Cassava	*Manihot esculenta Crantz*	Co, Sa
Gherkin	*Cucumis anguria L.*	Co, Sa
Watermelon	*Citrullus lanatus (Thunb.) Matsum. and Nakai*	Co, Sa
Corn	*Zea mays L.*	Co, Sa
Okra	*Abelmoschus esculentus L. Moench*	Co, Sa
Tobacco	*Nicotiana tabacum L.*	Sa
Roselle	*Hibiscus sabdariffa L.*	Co, Sa

Source: empirical research data. Prepared by the authors.

3 "Tarefa" (or "tarea" in Spanish) is an agrarian measure used in many Latino-American countries, equivalent to 2,500 to 3,000 square meters, depending on the place.

All products were transported via river, since the only means of transport available at that time was by boat, and there was no road access to the community. The main point of sale for products was the Ver-o-Peso fair in Belém. According to those interviewed, the journey from the community to the place where the products were sold took around two days.

The arrival of palm oil producing companies in the region, from 1980 onwards, gave rise to land trading, with several families selling off their traditionally occupied areas. This also led to serious conflicts with land grabbers, loggers and other social actors interested in land speculation. This meant that the areas used for large-scale cropping operations decreased, and consequently the fallow period had to be reduced so that the families that remained in the region could grow their crops. With the reduction in the fallow period from 15 to 20 years to 2 to 5 years, the areas no longer had the same response in terms of plant biomass production in their regenerative process, and as a result, crop productivity decreased and the number of crops declined.

The end of this phase is characterized by the reduction of primary forest areas and the weakening of the land, observed by farmers due to the decrease in crop productivity, especially rice, which according to farmers does not grow in capoeira[4] areas. This was also observed by Rocha e Almeida (2013) in a study with family farmers in the Trans-Amazonian region (southwest of the state of Pará).

II. **Weak Earth Phase (1991 to 2017)**

This phase is characterized by a crisis in the slash-and-burn system, with a reduction in fallow time; the capoeira areas could no longer produce the same amount of plant biomass as when the fallow time was longer. Families have observed that crop productivity has decreased over the years, and they attribute this to the weakening of the land, as can be seen in the statement of one of the farmers interviewed: "*over time, we stopped planting many crops because the areas were no longer as productive as before. I don't know why, maybe it's the climate or the weak soil, or deforestation*" (farmer, 45 years old).

4 "Capoeira", in this particular context, refers to small vegetation – varieties of grass and shrubs – characteristic of land not completely recovered from the "coivara", traditional process of slash-and-burn of the primary vegetation (virgin forest), crop plantation, and fallow, leading to forest regeneration to its primary vegetation.

With the “weakening” of the land, farmers observed the emergence of phytosanitary problems that did not exist before, such as the rotting of cassava roots, with reports of cases of loss of up to 80% of the planted cassava.

In terms of changes in the way produce is transported, the opening of a road in 1991 created a new dynamic for the flow of products and new actors emerged, such as middlemen. Thus, what was previously a direct relationship with fairs began to be mediated by transporters going to the community to buy products, especially cassava flour. This also contributed to the reduction of productive diversity, causing families to prioritize the production of cassava for making flour, a product demanded by new buyers.

Also, at this stage, the community had access to credit, via the Constitutional Fund for Financing the North (FNO), from 1996 onwards. As a result, some families planted plots intercropped with black pepper (*Piper nigrum* L.), coconut (*Cocos nucifera* L.) and cupuaçu (*Theobroma grandiflorum* (Willd. ex Spreng.) K. Schum.). Others invested the credit resources in other non-agricultural objectives, which led families into debt. According to the farmers, there was no technical guidance for implementing the consortium projects in their production units, so they received the money, but did not know the appropriate cultural practices for the crops, as they did not have rural extension technicians to monitor and provide appropriate guidance. As a result, there were problems related to the management of the plots, in addition to difficulties in selling the production, which led to the abandonment of the consortiums, leaving only two families that maintained the plots implemented.

The FNO credit policy in the State of Pará forced families to invest in commercial plant species to meet market interest (Tura; Costa, 2000). Thus, farmers faced difficulties due to lack of experience and/or distance of these investments from the families’ life projects.

Since the 2000s, the increased demand for açaí (*Euterpe oleracea* Mart.) production has motivated families to invest in this crop. In 10 production units, the plots of land in the aforementioned consortium were replaced by açaí palms, but some families did not want to take the risk and focused solely on producing cassava to make flour. Both açaí and cassava cultivation maintain their alternative nature, which is a great motivator for families to invest

as their main activity. As farmers reported, with black pepper, coconut and cupuaçu, families are held hostage by the market and cannot consume as they do with cassava flour and açaí.

Thus, the production of cassava and açaí act as regulators of production systems because they assume numerous functions that ensure greater resilience to agroecosystems (Bourgeios, 1983). The production of black pepper, coconut and cupuaçu exclusively for the market drastically changes the relationship between production and consumption units, which can compromise the autonomy of families (Chayanov, 1974).

In order to sell their production and face the attacks by oil palm companies in the region, the families created the association of small farmers (in 1996), which, with the arrival of the policy of recognizing traditionally occupied territories, became the association of the remnants of the Quilombo of Oxalá de Jacunday in 2002. However, this recognition was only received through collective land titling in 2006. Thus, one farmer reported: "*if it weren't for the association, it would all be oil palm*" (farmer, 47 years old).

III. **Land recovery phase (from 2018)**

This phase is characterized by a change in the use of fire to prepare areas for cultivation. As seen previously, over the years, families experimented with a variety of productive activities and noticed a decline in the natural fertility of the areas. As a result, they came to the conclusion that fire was harmful, because the more an area was burned over the years, the time for regeneration increased and, in some cases, there was no recovery. As an example, farmers reported on "stuck" capoeira areas, in which natural regeneration had stagnated, that is, no trees were developing, only shrubs and there was no thickening of the stems, always looking like a recently recovered area, as if it were a one-year-old secondary forest. But in fact, it was over 40 years old and had not evolved.

In their search for productive alternatives, farmers learned about the experiences of agroforestry systems (SAF) developed in the municipality of Tomé-Açu. They also received encouragement from the neighboring quilombola community of São Manoel, which had started its SAFs in 2012. As a result, they made several visits to the experiments in Tomé-Açu

and the Community of São Manoel, obtained seeds and, in 2018, began building nurseries and preparing six experimental areas, until today they reached the total of 20 areas of agroforestry systems in the community.

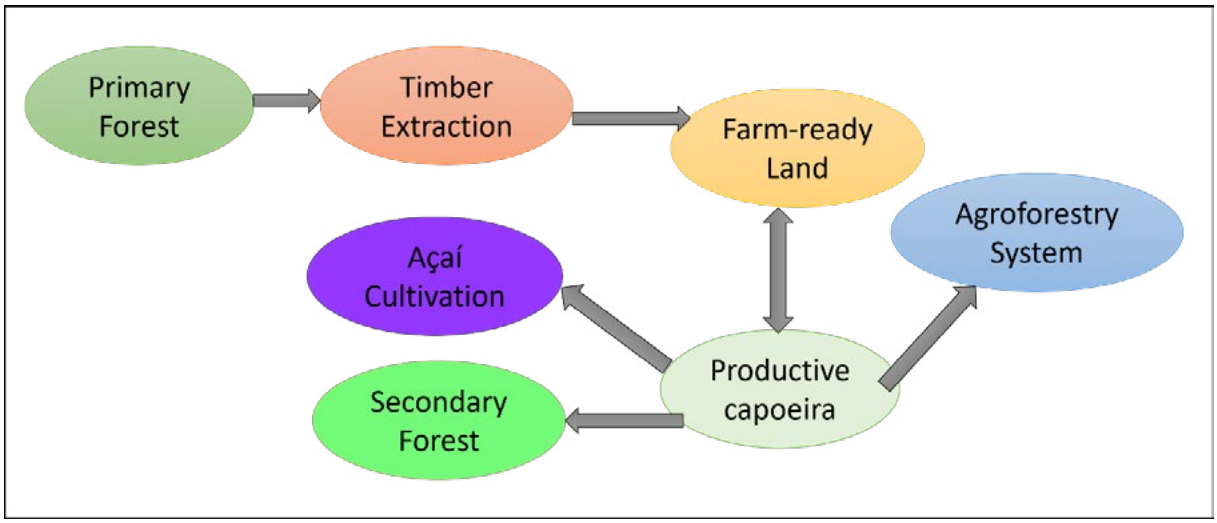
The adoption of fire-free farming is a significant change, because fire is traditionally part of the management of fertility, where the capoeiras considered to be in a state of readiness for slash-and-burn, based on the amount of biomass they produce, can fertilize the area for planting crops. In the new model, capoeiras still play a central role, but instead of cutting them down and burning them, farmers manage them to enrich the soil with agricultural plants.

Technical innovations related to no-burn farming are not just about replicating techniques, but have a close relationship with the dynamics of each territory and its subjects. The more "peasant" the family logic, the more interested they seem to be in innovations of "fixation of farmland for consumption" (Matos; Martins; Silva, 2019).

LAND USE TRANSFORMATION DYNAMICS

The evolution of the dynamics of land use in the community is related to the various productive and territorial factors analyzed. Thus, it was observed that the primary forests were completely transformed, with the first step being to remove timber and then transform it into a farm (Figure 4), through the slash-and- burn system. After the harvest of the farm products, the area was left fallow and transformed into "productive capoeira" when it began to be inserted into the production logic in which these areas assumed a central role in the management of fertility. This was also observed in the study by Tavares and Veiga (2006) on the management of natural fertility in the region of Marabá (southeast of the state of Pará), as well as Silva and Oliveira (2014) in a study on secondary forests in the region of Altamira (southwest of the state of Pará).

Figure 4 | Dynamics of the evolution of land use by quilombola families in the Community of Oxalá de Jacunday, Moju-Pará.



Source: empirical research data. Ellaborated by the authors.

The dynamics of land use observed in this study differ from the hegemonic model of land occupation in the Amazon, where the forest is cut down to create pasture (Walker *et al.*, 1998; Silva; Navegantes-Alves, 2017), following a cycle: deforestation – livestock farming – capitalized agriculture for export, as observed by Mello e Théry (2001). This occurs because the community managed, through its mobilization and political organization, to confront several attacks by land speculators and maintain its presence in the territory, where it was consolidated with the policy of territorial recognition, through collective titling as a remaining quilombo area.

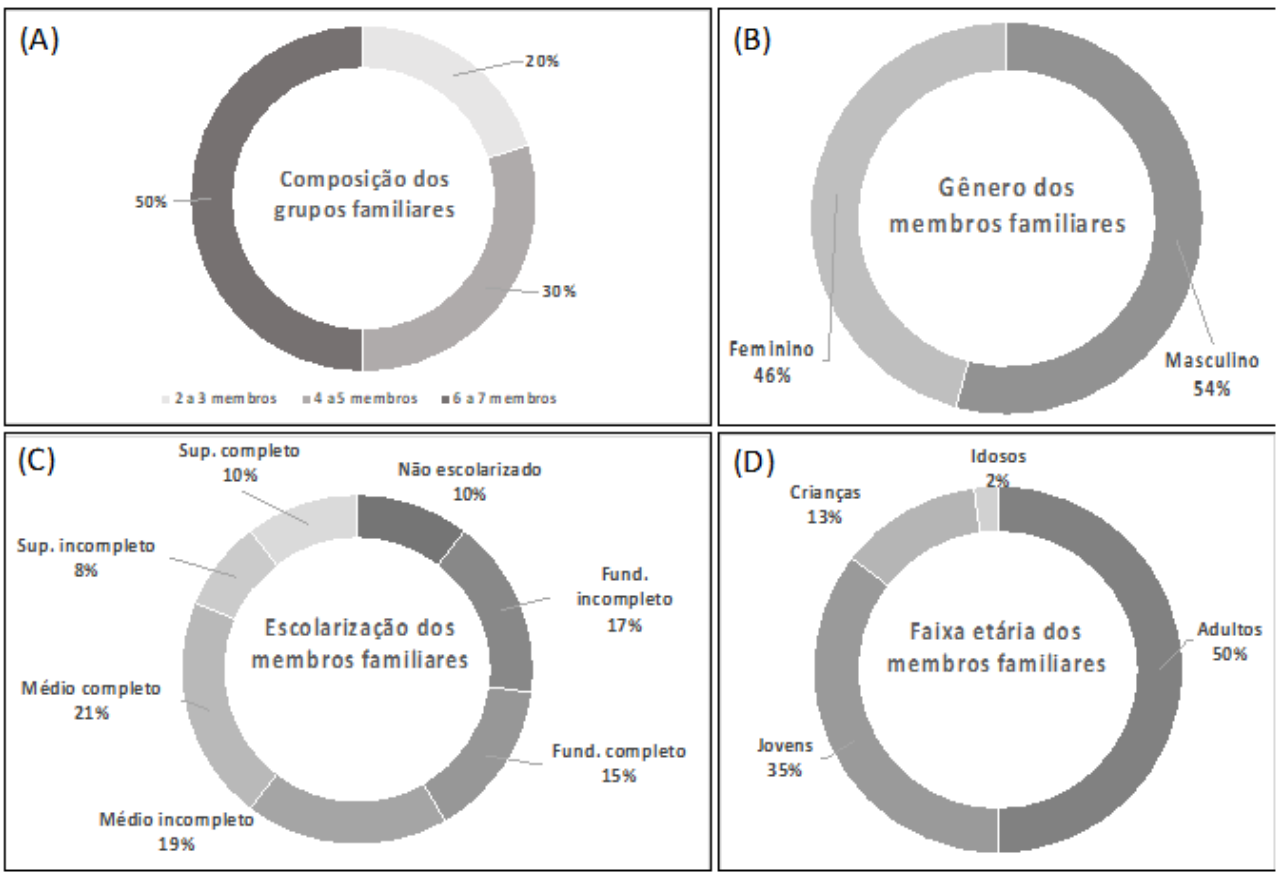
It can be observed that, on the one hand, there is a tendency for agroforestry systems to expand, as well as açaí palm plantations, and on the other hand, the permanence of productive plantations and secondary forests becomes a bottleneck, because, at the same time that cassava is central to the productive systems, the traditional production model is in decline and demands technological changes to remain. In addition, it is a threat to the remaining secondary forests, since environmental policy is pushing for the creation of reserve areas, so that, in 2023, the community collectively obtained the Rural Environmental Registry (CAR).

CHARACTERIZATION OF FAMILY AGROECOSYSTEMS TODAY

FAMILY GROUPS

In the Community of Oxalá de Jacunday, nuclear families predominate (families composed of a father, mother and children), with compositions ranging from 2 to 7 members, with a prevalence of family nuclei of 6 to 7 members (50%), as shown in Figure 5. This data corroborates the study on family and domestic group carried out by Mota (2014) in the Northeast of Pará, with 269 family groups analyzed, where nuclear families with a large number of members stood out.

Figure 5 | Description of the family groups of the Community of Oxalá de Jacunday, Moju-Pará.



Source: empirical research data. Prepared by the authors. (A) total composition; (B) gender; (C) education; (D) age group (child: 0 to 14 years; young person: 15 to 24 years; adult: 25 to 59 years; and elderly: from 60 years).

In family groups, the age group of adults (50%) and young people (35%) was the most representative in the community. This may indicate the availability of labor in production units. The number of family members, as well as age and gender ratios, influence the socio-productive strategies adopted, because they affect productive factors, such as the availability of family labor in the production unit, as well as that of consumers.

Studies on the productive dynamics of quilombola farmers have shown the female protagonism in both the management of productive activities and in political mobilization (Freire; Barbosa, 2012; Silva, *et al.*, 2018). In this study, it was also possible to observe the prominence of women's work, although in work activities related to agroforestry systems, their work has been limited to preparing food on days of collective work.

Regarding education, it is worth noting that, in the Community of Oxalá de Jacunday, 90% of the members of family groups attended school. This was due to the mobilization of farmers in the fight for education, which led the Pará State Government to hire a teacher in the 1950s to meet the local literacy demand. In the 1980s, the community's first school was built in a wooden shed, which in the 2000s was replaced by a masonry school built by the city government.

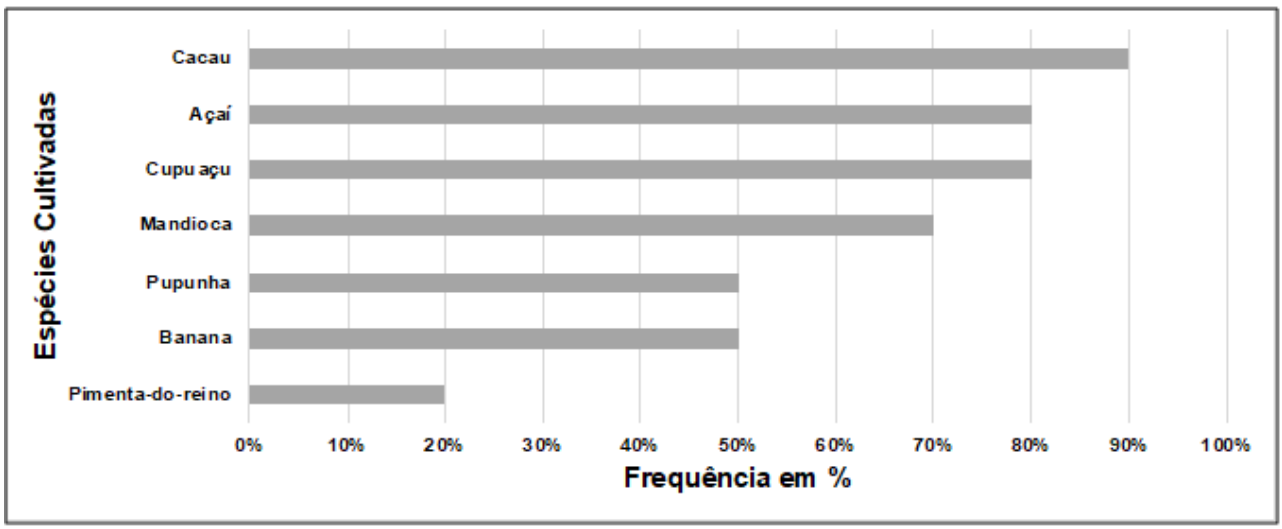
The community stands out for its youth mobilization and participation in work and planning actions for the community's continuity. For example, the Perpetuar Project[5], conceived and implemented by the community's youth as an instrument to encourage culture and reading. An interesting fact is that it is estimated that more than 50 youth from the community have already studied or are studying higher education at public universities in the state of Pará, encouraged by the affirmative action policy with special selection processes for traditional peoples and communities developed by these institutions.

5 Project conceived and led by the quilombola youth of the Jambuaçu Territory, Moju, Pará. Activities include reviving the tradition of storytelling by griots, cultural exhibitions with dance, quilombola cinema, political education for youth and debates on the sustainability of quilombola territories. Information about the project can be found on the page: https://www.instagram.com/projetoperpetuar?igsh=MTl2dmowb2owbjZ5ag== .

CULTIVATION SYSTEMS

Seven plant species that occur in the farming systems of quilombola families were identified (Figure 6), with emphasis on cocoa, present in 90% of the agroecosystems studied. Cocoa cultivation has stood out in Pará, being the state with the largest production of cocoa beans in Brazil, with a production of 145 thousand tons in the 2021/2022 harvest (IBGE, 2022).

Figure 6 | Frequency of species present in the cropping systems of the Oxalá de Jacunday Quilombola Community, Moju-Pará.



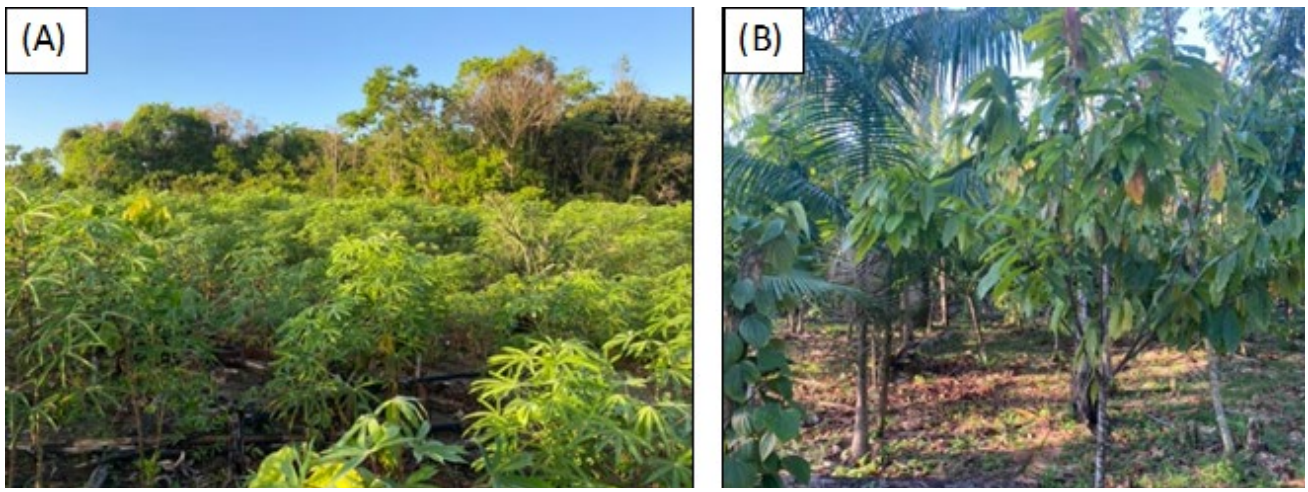
Source: empirical research data. Prepared by the authors.

Açaí and cupuaçu crops were grown in 80% of cases in the community's agroecosystems, thus demonstrating the central role that regional fruits have played in production systems. The açaí palm provides one of the most important fruits in the diet of rural communities in Pará. In addition to family consumption, açaí stands out due to its growing demand for export as a promising market, as the following report demonstrates: "açaí is good because there is no shortage of buyers. If you put three small ones in front of you, people will be appear asking for how much we will sell it" (farmer, 53 years old).

Cassava cultivation was recorded in 70% of the agroecosystems studied. This agricultural activity is emblematic because it represents a traditional activity of family farming in Pará. However, there is a tendency for this production to decrease in the community. This is justified by the various factors presented in the previous sections, especially the crisis in the slash-and-burn system and the phytosanitary problems related to root rot.

Thus, the cropping systems observed in this study also present significant diversity of agricultural species (Figure 7), with the majority serving as alternatives (family consumption and sale to generate income), such as cassava and fruit trees (açaí, cupuaçu, pupunha and banana). The farms have undergone transformations, especially with the reduction in the number of plant species, but the logic of diversity is still present, since families have sought alternative systems based on productive diversification. Agroforestry systems stand out as a possibility for continuing this logic that prioritizes the diversity present in family farming in Pará. This is because productive diversification allows for greater autonomy and resilience in the face of crises, as explained by Ellis (2000).

Figure 7: Different cultivated plots in the Community of Oxalá de Jacunday, Moju-Pará. (A) Traditional cassava plantation; (B) Agroforestry system (cocoa, açaí, black pepper).



Source: authors (2023).

AGROFORESTRY SYSTEMS AS A LOCAL SOCIO-PRODUCTIVE STRATEGY

In 2018, when the families began work to implement the first agroforestry systems, the choice of location represented a strategy to prevent actions by other actors who were entering community areas to plant crops. Thus, the first six plots (each one hectare) were implemented on the edge of the territory, seeking to prevent people who are not part of the community from entering to use the area.

With the adoption of agroforestry systems, families resumed socio-productive practices that were no longer practiced, such as the “mutirão” - collective work. The practice of mutirões is an important aspect of peasant sociability, widely studied as a principle of family production logic based on concepts such as giving (Mauss, 2003) and reciprocity (Sabourin, 2009).

The resumption of the mutirões was important because it brought families closer together, which led to discussions about the need to create the “Grupo de Agricultores Quilombolas Muti-Roça Sem-Fogo” (Muti-Crop No-Fire Quilombola Farmers Group). In the name chosen for the group, they highlighted the collective work and the non-use of fire. Thus, the SAFs embodied collective work and agriculture that is moving towards sustainability, when they adopted practices to restore the strength of the soil, which had been weakened.

Thus, agroforestry systems have become the main strategy for social reproduction in local quilombola agriculture. Care was taken to involve young people in all production processes, given the concern for the continuity of activities and the community. Social reproduction is understood here as a process that combines the permanence of the family on the land, the maintenance of ecological conditions and cultural and social relations (Conceição, 2002; Woortmann; Woortmann, 1997).

FINAL CONSIDERATIONS

The methodological arrangement adopted made it possible to compose data for the analysis of changes in quilombola family production systems and the socio-productive strategies adopted by them over time, between 1960 and 2023, as discussed throughout the article. Thus, the objective proposed in this work was achieved.

The transformations in land use dynamics were influenced by events internal to agroecosystems, such as the decrease in crop productivity due to land weakening, and by external events, such as the arrival of companies in the oil palm sector, the opening of roads and public rural credit policies.

The data showed that there was a drastic reduction in agricultural crops used for family consumption, weakening the food security and sovereignty of families and the autonomy of production systems in the community. This opens up possibilities for research on the topic with the community.

Despite this, the peasant logic of production endures, since the focus of family projects has been on the social reproduction of the family. There is a tendency to consolidate diversified production systems to ensure greater autonomy and, therefore, agroforestry systems assume a central role in the socio-productive strategies of quilombola families. However, further studies are needed to understand to what extent collective labor management (mutirões) enhances the consolidation of new management practices.

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