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AGROFORESTRY SYSTEM AND THE PROCESS OF PRODUCTIVE DIVERSIFICATION IN FAMILY FARMING

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Revista ARACÊ
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ABSTRACT
This paper aims to present the initial actions that were taken to implement an agroforestry system in a family farming establishment in the municipality of Governador Mangabeira, located in the state of Bahia, specifically in the Recôncavo region. To this end, we sought to observe the development of the crops that were implemented in the system, the main challenges faced during periods of long droughts, and how the farmers who work on the project see the changes that have occurred in the system since the beginning of the implementation of this system. This study also discusses the economic contexts that can be achieved by family farmers in the long term by implementing an agroforestry system in their establishment. Given this aspect, it is possible to conclude in this study that when family farming begins to work in favor of nature with actions and practices that contribute to environmental sustainability, the results begin to be fundamental in terms of food production, and agroforestry contributes positively to the development of the agricultural sector, mainly for the diversification of production.

Keywords: Agroforestry. Diversity. Sustainability.

Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

This paper aims to contextualize the importance of food production in an agroforestry system in a family farming establishment in the Recôncavo region of Bahia, addressing the practices carried out in the establishment and the transformations that have occurred since the beginning of the implementation of the system, significantly highlighting the importance of agroecological management for the construction of an agroforest.

In this context, family farming positively represents great importance for the preservation of the environment, since most production is carried out more sustainably, in small establishments that do not expand their production space excessively in areas of vegetation because they have small areas for agricultural production, which contributes to the preservation of the environment and biodiversity (Silva, Gomes and Monteiro, 2021). According to Padovan's reflections (2022), agroecology, like other areas of research, has guiding principles that guide and contribute to the adoption of techniques and practices in the production process, in a diversified and healthy way, where the “diversified landscape” is the first point for those who work with the agroecological production process, which ends up prioritizing the diversity of crops, livestock, and activities developed on the property.

Foods that come from agroecological production are healthier, as this model does not use chemical products that are harmful to human and animal health, which ends up benefiting both end consumers and the farming family through self-consumption of food and by not using agrochemicals in the activities developed. This article is structured in five sections, starting with this introduction and followed by the methodological approaches, presenting the path adopted to carry out this research. In the third section, we present the literature review, pointing out several theoretical reflections presented by other researchers. In the fourth section, we present the main results achieved based on the implementation of agroforestry, followed by the fifth and last section, presenting the final considerations of this study, presenting some reflections on the results achieved in this research.

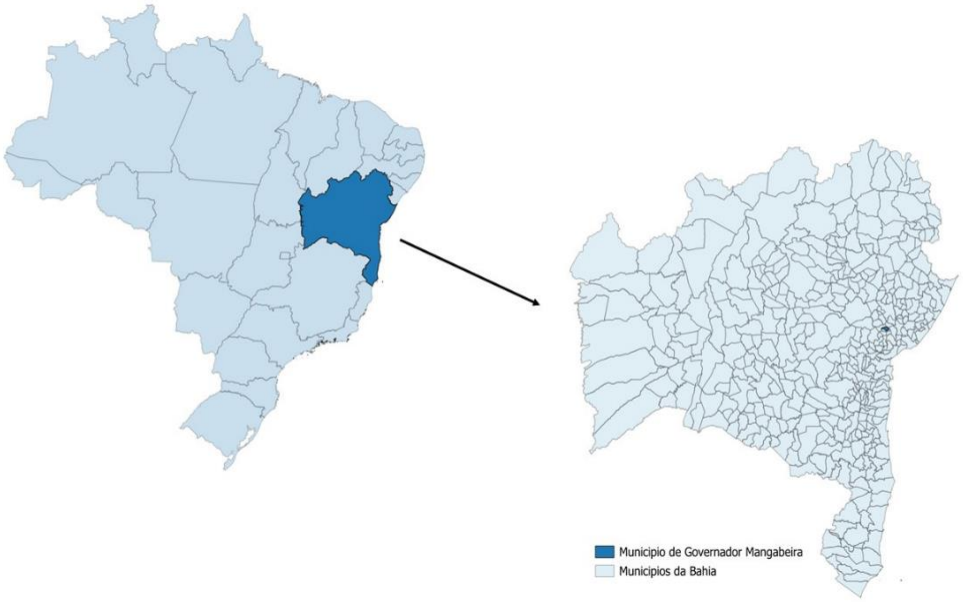
METHODOLOGICAL APPROACHES

This study is a report of experiences of the practices carried out in the construction of agroforestry in a family farming establishment in the rural area of Meio de Campo, in the municipality of Governador Mangabeira, located in the Recôncavo territory in the state of Bahia. There, dialogues were held with the farmers, building a timeline related to the

Revista ARACÊ
ISSN: 2358-2472

production system since the period in which the project began to be implemented, bringing reflections and comparing how the entire system is currently in relation to the beginning.

Figure 01- Location of the municipality of Governador Mangabeira



Source: Prepared by the authors using data from field research (2024)

To contribute to the reflections, a bibliographic survey was carried out with approaches related to agroforestry and the management practices that should be adopted for production in agroforestry, through the reflections of several researchers who work in the field of research that corroborate the actions that were carried out in this work.

LITERATURE REVIEW

According to Ribeiro et al, (2022), agroforestry backyards are characterized as resilient systems that are fundamental for properties that are in agroecological transition, given this requirement, it is possible to see that several results can be achieved from the implementation of a system such as i) diversification of production; ii) income generation; iii) short, medium and long-term production; iv) conservation and maintenance of local biodiversity; v) guarantee of popular health, security and food sovereignty, factors that are considered fundamental for environmental sustainability.

As highlighted in the study by Franco (2017), agricultural production carried out through agroforestry practices is an activity considered advantageous and can be positive for family farming because it can contribute benefits in two main contexts that contribute to the development of family farming, namely economic and environmental. However, thinking

Revista ARACÊ
ISSN: 2358-2472

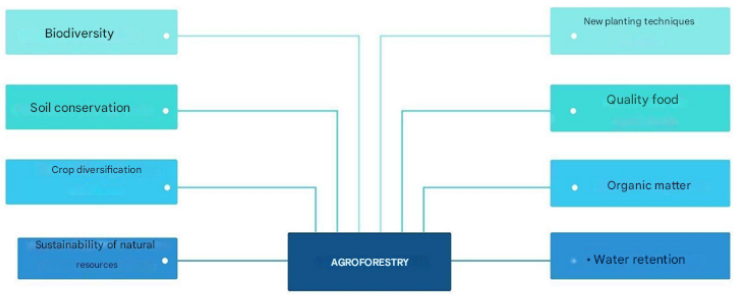
about agroecological systems involves several issues, such as i) addressing the territorial reality; ii) knowledge accumulated by several farmers; iii) agricultural production relations; iv) circulation of goods; v) social conflicts, mainly in ecological relations, etc. (Lombardi and Zarref, 2022).

Agroforestry systems, through their potential, produce plant residues that are important for soil cover, as well as for the maintenance and improvement of organic matter, where they enable the improvement of physical, chemical, and biological attributes, which, through their potential, contribute to the recovery of degraded soils, making them more productive (Padovan 2022).).

> In the face of environmental degradation, concepts such as sustainability, environmental conservation, environmental restoration, natural resource management, sustainable agriculture, agroforestry systems, and others, have gained great visibility in national and international discussions on environmental protection. These concepts assume great importance, as practices that aim at the least possible impact on the environment, seeking to achieve the highest quality of human life. They also create spaces for integrative thinking that aims to reconcile economic growth and environmental conservation, thus aligning the forms of actions on nature on a sustainable basis to guarantee survival and a better quality of life, (Felix, 2018, p. 15).

According to Lombardi and Zarref, (2022), however, agroforestry practices can be considered one of the forms of agriculture that was used in past centuries, which was generally known as slash-and-burn agriculture, and stump farming, among other characteristics. As well as several other studies, the authors highlight that carrying out this practice on an agroecological basis is capable of contributing positive results to the management of fertility and biodiversity in a production that is truly considered sustainable and resilient.

Figure 2- Main characteristics of agroforestry production



Source: Prepared by the authors (2024)

Revista ARACÊ
ISSN: 2358-2472

An agroforest has several characteristics, as shown in (figure 2) because when agricultural practices are carried out correctly, they contribute to biodiversity, soil recovery, and the valorization of family production, as well as several other contributions.

The application of an AFS provides several advantages, such as the recovery of degraded areas and the conservation of biodiversity, in addition to reducing deforestation, desertification, and soil, water, and air pollution, and does not produce waste generated by chemical inputs, as occurs in conventional agriculture. AFS also contributes to the preservation of water resources, food security, environmental conservation, microclimate regulation, protection against water and wind erosion, and improving the quality of life of family producers, and may even increase their income (Oliveira et al, 2018 p. 1).

The agroecological management used in agricultural production enables the production of healthy food and acts in harmony with nature, which positively indicates that the level of ecological balance is being achieved (Souza, 2015). As Primavesi (2016) points out, healthy soil is aggregated (constituent solid particles), which must have a macroporous system that holds at least 10%, since it is in this type of soil that air and water enter and circulate and roots can penetrate more easily. The author also highlights that compacted soil causes a lack of oxygen for the plant, which ends up resulting in several negative effects on the development of the crops that are being cultivated.

When it comes to ecological soil management, Souza (2015) achieves this by implementing actions that promote the enrichment of the plantation, which are most often used from the natural resources that are present in the establishment itself, such as composting, green manure, and direct planting in straw, as these actions help in the recovery of microorganisms in the soil.

RESULTS AND DISCUSSIONS

In order to highlight the reflections on the practices carried out to build agroforestry as an important tool for valuing agricultural production in family farming and for achieving positive results through family production, in this section we will demonstrate in a clear and objective manner some of the activities carried out.

According to Righi and Bernardes (2015), agriculture is still the main and most important human activity. Given this, Agroforestry Systems currently represent the newest frontier in the advancement of research and agriculture itself, highlighting the tropical region. However, as it is one of the oldest forms of land use, it has only recently begun to

Revista ARACÊ
ISSN: 2358-2472

gain attention focused on the practices of agricultural activities. To implement agroforestry on the property, we first carry out strategic planning on how to carry out the task. After this planning, we define which crops will be planted, how much, and how to acquire them for planting. We begin by correcting the soil with limestone. After that, we begin planting little by little to increase production. To insert the seedlings into the soil, we dig holes and place cow or chicken manure and organic materials in the holes so that when we insert the seedlings, the soil is already prepared to receive them.

This section will present the agroecological management practices carried out on the family farm. Since all agricultural work is important, soil management practices are essential for obtaining positive results in fruit production. Soil management actions are one of the essential activities carried out by farmers.

INSERTION OF BANANA SEEDLINGS (MUSA SSP) IN AGROFORESTRY

The insertion of banana plants (MUSA SSP) in the agroforestry process had the initial objective of obtaining organic matter to work on soil recovery, contributing to the recovery of microorganisms, since the soil was very depleted and compacted at the time.

As highlighted in (figure 3 A), the banana seedlings were purchased by the owners of the establishment at Embrapa Mandioca Fruticultura located in the municipality of Cruz das Almas, which had sold the seedlings that came from the micropropagation or in vitro propagation technique, according to Embrapa (2016), this production technique is already a trend considered consolidated worldwide and when analyzing the issue in Brazil, the panorama is no different, where more than 90% of the areas that are used for banana production in irrigation centers adopt this technology. Currently, it can be said that family farming has been using these products despite numerous challenges, as is the case of the establishment resulting from this study.

Highlighting the importance of acquiring laboratory-propagated seedlings Serejo, Souza, and Souza (2012) highlight that in addition to surviving longer in the field, they grow faster in the first stages of development compared to conventional seedlings. Another important piece of information highlighted by the authors is that propagated seedlings produce a greater number of offspring per year in a shorter amount of time. They also provide superior harvests compared to plants that come from conventional propagation. This information highlighted by the authors is by the statement of (farmer C) “Acquiring banana seedlings from Embrapa was the best thing we did because the fruits are so

Revista ARACÊ
ISSN: 2358-2472

beautiful and have an amazing quality. There are some Prata bananas that if you don't look at them you think are plantains. Some of the neighbors, when they find out that they have bananas, order them to eat because they are so good. Unfortunately, the only problem we have is water, because if it were irrigated production it would be a success in the municipality." After purchasing the seedlings, they were planted in plastic bags (figure 3 B) with substrates prepared with sheep manure from the establishments themselves, to reach the final stage to be inserted into the field. When the seedlings were ready, they were inserted into the soil as shown in (figure 3 C), which contributed to the fruits grown and to keeping the soil covered with vegetative materials and the fibers of the banana trees inserted into the soil. Given this, it is possible to see that one of the project's creators took a course offered by the company where he acquired several varieties of seedlings to include in the project, namely: i) Maçã; ii) Princesa; iii) Terra Maranhão; iv) Pacovan; v) Prata Catarina; vi) Prata-Anã; vii) Angola among other crops that the farmers do not remember the name of the variety at the time of the research..

Figure 3- A, B, C) Insertion of banana seedlings into the agroforestry system

Revista ARACÊ
ISSN: 2358-2472

Source: Authors' private collection (2016-2020)

According to Senar (2010), farmers who are going to plant bananas must be aware of the soil requirements for banana crops, which states that they require deep soils rich in organic matter and without waterlogging, as farmers must be careful and avoid planting in soils that are poor in organic matter, sandy soils and even those with low water storage capacity, as these are factors that would prevent the plants from developing.

According to the approaches of farmers on the property (farmer D), “the inclusion of banana trees in the system contributes significantly to crop diversification, soil recovery and the development of other seedlings included in the system, as in addition to contributing to reducing the amount of sunlight on the seedlings of some fruit trees that are included, it facilitates some management practices such as mulching”. One of the most important practices is the issue of shoring. According to Lima, Alves, and Silveira (2012), shoring is intended to prevent the loss of bunches, which usually occurs due to breakage, the plant falling over due to strong winds, the weight of the bunches, improper handling, such as the disorderly arrangement of seedlings, among other cases. Farmers were facing these challenges due to the weight of the bunches and the winds. Farmer B emphasizes that: “the plan for 2025 is that we will plant gliricidia seedlings next to the banana trees to serve as tutors and we will tie them when production begins, which will make it easier to prevent the trees from falling over.” In (figure 4 A, B) below, we present the cultural

Revista ARACÊ
ISSN: 2358-2472

practices and the quality of the size of one of the bunches harvested by the farmers, which reaffirms the reflections presented in the previous paragraphs.

Figure 4- A) Management and cultural treatments at the establishment B) Qualities and sizes of the bunch harvested by farmers.

Source: Authors' private collection (2016-2020)

> Bananas are the most consumed and produced fruit in the world, and the second most produced in Brazil. Its importance in national agriculture is well represented by numbers: more than one million people employed, around seven million tons produced, and a production value of 7.5 billion reais, the result of the hard work of more than 200 thousand producers (Vilarinhos, 2021, p. 5).).

Given this situation, highlighting the commercial reflections of bananas in this study is a fundamental factor for the final approaches that will guide this section, therefore Rocha, Gerum, and Santana, (2021, p. 7) highlight in their research, through their approaches that:

> The domestic market consumes practically all of the national banana production (around 99%, on average). However, the production centers in the Northeast (Baixo Jaguaribe-CE and Vale do Açu-RN), in the Southeast (North of Minas Gerais, Vale do Ribeira-SP), and in North of Santa Catarina, in the South, have the potential to increase the share of Brazilian banana exports.

On the farm, 200 banana plants of various varieties were identified, such as a) Maçã; ii) Princesa; iii) Terra Maranhão; iv) Pacovan; v) Prata Catarina; vi) Prata-Anã; vii) Angola, among others. An important finding is that each plant has approximately five to six

Revista ARACÊ
ISSN: 2358-2472

plants, and from the quantity already available, other seedlings can be made to be inserted into the system, according to the planting plan.

Farmers sell the fruits to neighbors and middlemen, but they do not always have the fruits frequently. When there is high production and little demand to sell, the fruits are supplied to the farm's animals, such as pigs, sheep, and poultry (free-range chickens and ducks). However, in the future, the intention is to increase the number of banana plants to offer the market a quantity that is not small. However, there is still a long way to go to achieve the objectives.

The following are reflections on the inclusion of cocoa in the agroforestry system and prospects for achieving positive results in production/marketing.

INCLUSION OF COCOA IN AGROFORESTRY

Regarding cocoa planting, Brainer (2021) highlights in his study that it is traditionally found in the northernmost areas of Brazil, the North and Northeast. When analyzing the Southeast, most of the production is located in the North of Espírito Santo and North of Minas Gerais, areas that, together with the Northeast, form the largest cocoa region in Brazil. Referring to the issue of the production area of the state of Bahia, it is worth noting that it is the only producing state in the Northeast Region, representing 69.7% of the national area (403 thousand ha). In the North of Minas Gerais and North of Espírito Santo, 2.8% of the national harvested area is found, but equivalent to 94.7% of the harvested area in the Southeast, as it is the second largest Brazilian exporter of cocoa and its products, after the Northeast, which becomes an important factor for analyzing the issue of the level of production in different regions of Brazil, in addition to contributing to reflections on the development of the culture in rural establishments, especially those of family farming.

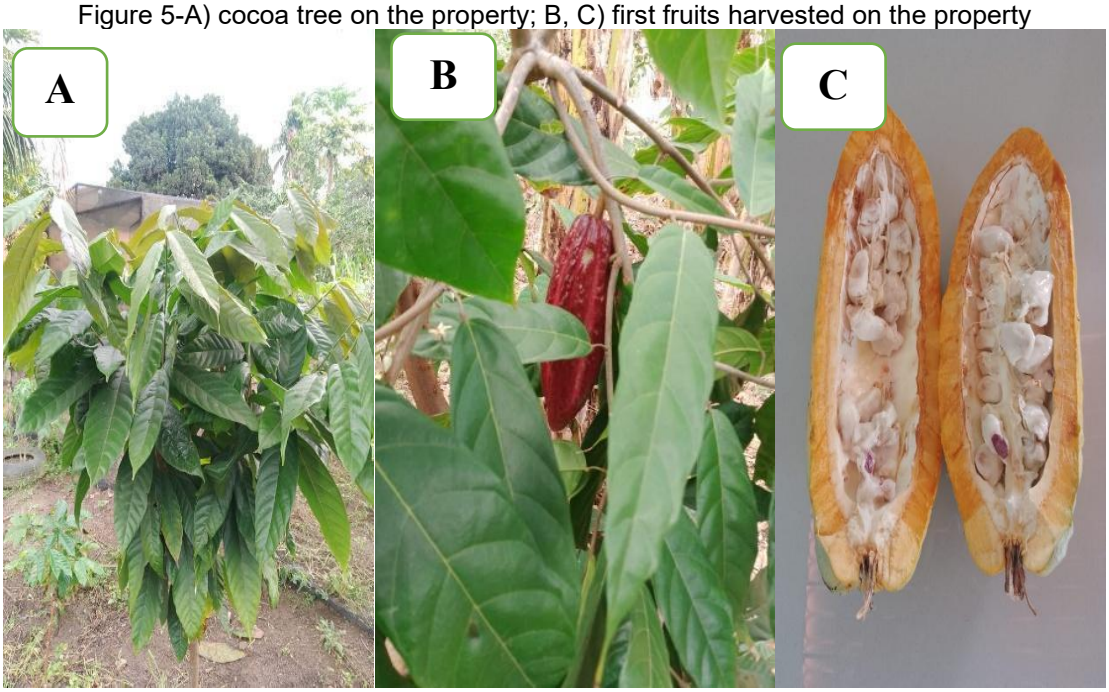
According to Gontijo, (2020), the cocoa production chain is considered one of the oldest, most profitable, and complex to be developed in Brazil. A culture that, through the agro-industrial system involved in the production of cocoa, facilitates the industrialization of its derivatives, with chocolate standing out as the main product originating from cocoa. However, it is possible to see that the cocoa chain has reached a position of rare occurrence.

In the establishment, the cocoa seedlings planted, in addition to diversifying the cultivated products, are a new alternative and culture in the community, since most farmers work with the planting of cassava and citrus fruits, there is no productive diversity in the

Revista ARACÊ
ISSN: 2358-2472

community, requiring projects that contribute to a greater appreciation of local agricultural production.

Figure 5-A) cocoa tree on the property; B, C) first fruits harvested on the property



Source: Author's private collection (2024)

In the research we carried out, we detected 17 cocoa trees, some of which are still in the initial stages of production. The farmers/owners of the establishment are carrying out projects to insert new cocoa seedlings, to contribute to greater productive diversity.

However, another factor considered fundamental that is not yet present in the establishment is the issue of the lack of productive infrastructure and logistical complications, which require planning. The property does not yet have troughs or dryers for processing the almonds, as the trees are only starting to produce in 2024 and there are not enough fruit trees for large-scale production.

INSERTION OF CITRUS, ORANGE (CITRUS SINENSIS) AND LEMON (CITRUS x LIMON) IN AGROFORESTRY

When it comes to Brazilian fruit growing, citrus growing is represented as the largest and most valuable production chain, as it is considered the third largest among countries in the world. Although the large production is concentrated in the state of São Paulo, citrus farming also has a strong presence in the Brazilian tropical region, with the state of Bahia

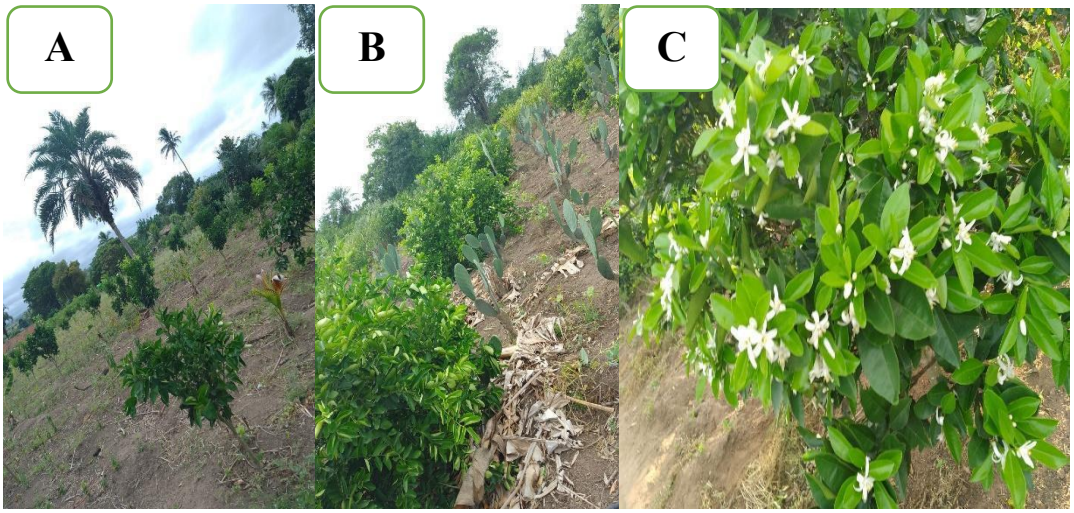
Revista ARACÊ
ISSN: 2358-2472

standing out as the second largest national producer of oranges. The region is highlighted by the territory of Recôncavo Baiano (Ramos, Passos Brandão, 2014).

According to Vidal (2024), Brazil is considered the world's largest producer of oranges. However, a high percentage of the fruit grown is destined for the industry to make by-products derived from the fruit. As a result, the country is also the largest supplier of orange juice in the world, reaching approximately 76% of the global market for the beverage, thus becoming a crop that contributes significantly to the income generated by the majority of family farmers in the state.

Demonstrating the importance of citrus cultivation, Rodrigues (2018) highlights in his study that the state of Bahia occupies a prominent position in citrus production, as it is considered the fourth largest producer in the national context and the first in the North and Northeast regions.

Figure 6- A) orange trees at the beginning of production; B) lemon trees at the beginning of production; C) flowering in citrus.



Source: Author's private collection (2022).

Regarding citrus consumption and production, Vidal (2024) points out that increasingly, agricultural practices that are linked to environmental sustainability are being adopted. Another important factor is that consumers need to link their consumption with environmental responsibility, which is added to both companies and products derived from citrus farming. Therefore, not only agricultural production but also the industry that works with citrus processing needs to invest in production systems that adopt sustainable practices.

Revista ARACÊ
ISSN: 2358-2472

The images above demonstrate the important stages of citrus farming, where (figure A) shows the orange plantations developing, (figure B) shows the lemon trees, but with mulch through the use of vegetative material from banana trees, and (figure C) shows the flowering of the trees, which requires care and dedication in management to attract bees so that they can pollinate the flowers to obtain the fruits. In an analysis carried out on the property, a quantity of 552 citrus trees were identified, but when separated by variety, a quantity of 405 orange trees were identified, with 3 pink lemon trees, 129 Tahiti limes, 6 limes, and 9 tangerines. It is possible that after the analysis carried out in 2024, this quantity will change due to the death of seedlings and the insertion of new varieties.

In the municipality, the vast majority of farmers work with monoculture production or produce only oranges or lemons; there is no diversity. When they include another crop, it is cassava until the trees grow and reach a high level of stability, which demonstrates the difference in the property, where there are citrus trees, but intercropped with other crops.

FINAL CONSIDERATIONS

The objective of this study was to contextualize the importance of agroforestry as a process of productive diversification in family farming and its contribution to the development of agrobiodiversity and environmental sustainability. Given this situation, it is possible to see from the reports presented throughout this study that it is important to note that agroforestry production carried out in family farming plays an important role in the valorization of agricultural production and the development of family farms that adopt this work method.

It is important to note through the study that in order to achieve diversification and for the new crops introduced into the system to develop well, they must be compatible with the agroecosystem in order to strengthen the environment. It is possible to see that there is still a long way to go for the farmers of the establishment studied to insert production into fairer marketing channels without the presence of middlemen and to achieve the long-awaited construction of the agroindustry to insert by-products from the food grown on the establishment.

The practices carried out in agroforestry have contributed to strengthening agrobiodiversity and the valorization of productive diversity in the community. We hope that through the experiences presented here, other farmers in the community will adopt this work method and increasingly value local agriculture.

Revista ARACÊ
ISSN: 2358-2472

REFERENCES

1. Brainer, M. S. C. P. (2021). Produção de cacau. Caderno Setorial ETENE, 6(149).

2. Embrapa. (2016). Manejo de mudas micropropagadas de bananeiras. Empresa Brasileira de Pesquisa Agropecuária.

3. Felix, D. B. (2018). Sistemas agroflorestais como alternativa para conservação ambiental: uma revisão bibliográfica. Trabalho de Conclusão de Curso Superior em Gestão Ambiental, Universidade Federal da Paraíba.

4. Franco, F. S. (2022). Agroflorestas: princípios e aplicações na agricultura familiar camponesa. In J. G. Carvalho, R. S. Borsatto, & L. L. Santos (Orgs.), Formação de Agentes Populares de Agroecologia (pp. xx–xx). Editora UFSCar.

5. Gontijo, F. J. C. (2020). A cadeia produtiva do cacau brasileiro sob a perspectiva do desenvolvimento rural sustentável. Projeto de pesquisa do curso de Especialização em Gestão de Políticas Agropecuárias, ENAP – Escola Nacional de Administração Pública.

6. Lima, M. B., Alves, E. J., & Silveira, J. R. S. (2012). Práticas culturais. In M. B. Lima, S. O. Silva, & C. F. Ferreira (Eds.), Banana: O produtor pergunta, a Embrapa responde (2ª ed., pp. xx–xx). Embrapa.

7. Lombardi, A. C., & Zarref, L. (2022). Apresentação. In A. C. Lombardi (Org.), Agrofloresta e a prática agroecológica (pp. xx–xx). Editora Expressão Popular.

8. Oliveira, L., Barros, A. B., Teixeira, A. L., Campanerut, G., & Alves, V. P. (2018). Agrofloresta e seus benefícios: salientando as vantagens ambientais. In Anais do IX Congresso Brasileiro de Gestão Ambiental (pp. xx–xx). São Bernardo do Campo, SP.

9. Padovan, M. P. (2022). Agroecologia, agricultura familiar e o desenvolvimento local e regional sustentável. Open Science Research, 9, ISBN 978-65-5360-235-9. Editora Científica Digital.

10. Primavesi, A. (2016). Manual do solo vivo: solo vivo, planta sadia, ser humano sadio (2ª ed.). Editora Expressão Popular.

11. Ramos, Y. C., Passos, O. S., & Brandão, L. S. (2014). Citricultura no Estado da Bahia: produção e comercialização no período de 1999 a 2011. Embrapa Mandioca e Fruticultura, Cruz das Almas, BA.

12. Ribeiro, D. S., Silva, F. O. C., Silva, J. P., & Jesus, M. O. (2022). Implantação dos quintais produtivos agroecológicos nos assentamentos do extremo sul da Bahia: biodiversidade, soberania e segurança alimentar. In A. C. Lombardi (Org.), Agrofloresta e a prática agroecológica (pp. xx–xx). Editora Expressão Popular.

13. Righi, C. A., & Bernardes, M. S. (2015). Cadernos da disciplina Sistemas Agroflorestais (recurso eletrônico). Piracicaba.

Revista ARACÊ
ISSN: 2358-2472

14. Rocha, S. L., Gerum, A. F. A. A., & Santana, M. A. (2021). Canais de comercialização de banana in natura no Brasil. Embrapa Mandioca e Fruticultura, Cruz das Almas, BA.

15. Rodrigues, L. S. S. (2018). Diagnóstico fitossanitário participativo: ferramenta para o manejo de pragas da citricultura do recôncavo baiano. Dissertação de Mestrado Profissional em Defesa Agropecuária, Universidade Federal do Recôncavo da Bahia.

16. Senar. (2010). Banana: A cultura da banana (Coleção Senar 148). Serviço Nacional de Aprendizagem Rural.

17. Serejo, J. A. S. S., Souza, A. S., & Souza, F. V. D. (2012). Micropropagação. In M. B. Lima, S. O. Silva, & C. F. Ferreira (Eds.), Banana: O produtor pergunta, a Embrapa responde (2ª ed., pp. xx–xx). Embrapa.

18. Silva, E. F., Gomes, M. L. M., & Monteiro, J. V. (2021). Importância social, econômica e sustentável da agricultura familiar. Congresso da Fatec Mococa. Recuperado de https://congresso.fatecmococa.edu.br/index.php/congresso/article/view/153

19. Souza, J. L. (2015). Agroecologia e agricultura orgânica: princípios, métodos e práticas (2ª ed.). Incaper.

20. Vidal, M. F. (2024). Citricultura (Laranja). Caderno Setorial Escritório Técnico de Estudos Econômicos do Nordeste - ETENE, 9(328).

21. Vilarinhos, A. D. (2021). Apresentação. In S. L. Rocha, A. F. A. A. Gerum, & M. A. Santana (Eds.), Canais de comercialização de banana in natura no Brasil.