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FLORESTAVIVA

Panorama of Cocoa Cultivation in the Southern Coastal Territory of Bahia

2015-2019

INSTITUTO FLORESTA VIVA - IFV

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1. Cocoa. 2. Diagnosis. 3. Dynamics of agriculture. I. Chiapetti, Jorge. II. Rocha, Rui Barbosa da. III. Conceição, Alessandro Santos da. IV, Baiardi, Amilcar. V. Floresta Viva Institute. VI. Santa Cruz State University VII. Federal University of South Bahia. VIII. Brown University.

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Introduction

The Floresta Viva Institute was founded in 2003, the result of initiatives by the Institute of Socio-Environmental Studies of Southern Bahia (IESB) in the northern region of Ilhéus between 1996 and 2002, bringing the cause of nature conservation closer to social and economic inclusion in the context of the Bahian Atlantic Rainforest.

With the objective of integrating conservation and restoration of forests with the increase of agricultural production and the diversity of products in rural communities, IFV created a pioneering application in Brazil regarding the Payment for Environmental Services (PES) tool between 2002 and 2005, associating added income and compliance with good practices in land use and childhood education management, with support from Itacaré's municipality hotel industry. IFV has received awards and recognition from Estado de São Paulo and Gazeta Mercantil newspapers, Super Interessante Magazine, TV Cultura and Globo Reporter television program, World Bank, National Council of the Biosphere Reserve - UNESCO, Caixa Econômica Federal bank and ASHOKA NGO.

IFV has, over the years, developed learnings and skills in technical assistance to rural communities, adoption of PES mechanisms, restoration of forests, sandbanks and mangroves, cultivation of Atlantic Forest native species, creation and support for the management of protected areas, ecotourism, support for scientific research, training of young professionals, governance and promotion of social capital, improvement of public policies and development of civil institutions. IFV's works has been committed to democracy and the maturation of civil instruments of public and private co-responsibility in Brazil, such as the careful management of common assets.

This report, in cooperation with the cocoa and chocolate production chain, represented by the CocoaAction Brasil initiative, is an important step in the journey of services provided by IFV to society.

This work had the scientific leadership of Leah VanWey, Stephen Porder, Jorge Chiapetti, Dimitri Szerman, Rui Barbosa da Rocha and Daniel Piotto, who deserve our appreciation; and the intense cooperation and support from fellow researchers of the Santa Cruz State University (UESC), Federal University of South Bahia (UFSB), and Brown University (USA) that provided resources, direct and indirect, for the completion of this research study.

These studies would not have been possible without the direct support of João Moreira Salles and Branca Vianna, which brought together researchers and institutions, and enabled the fundamental resources to conduct the field work through all of the years of research.

It is also important to mention and thank the crucial role of the field researchers, the majority of which agronomical engineers having recently graduated from UESC. The teams were composed of research supervisors: Alessandro Santos da Conceição, Henrique Megi de Souza, Joanna Paula Guimarães and Tayrone da Rocha Moreira and by field researchers: Alessandro Ferreira Seara, Bruna de França Ferreira, Carolina Amorim Santos, Daniel Bonfim da Silva Dias, Fernanda Ribeiro Bispo, Jadiel de Santana Souza, Jean Souza Coelho, Larissa Argôlo Magalhães, Luana Santos Souza, Monna Lysa Teixeira Santana, Nairane Miranda Chaves, Rafael Conrado dos Santos, Ramiris de Jesus Pereira, Rene do Nascimento Silva, Tayla de Almeida Silva, Walter Lima de Sousa, senior researcher Pedro José Montalvão Machado and to organize the data Emerson Batista and Flávio Malagutti. As supporting staff, there was the Floresta Viva Institute team: Marcos Roberto Penna Nascimento, Luciana Bulhões Sandes, Celio Haroldo Jesus de Sousa, Nilson Antônio Santos, Mario Celso Rodrigues Costa, Gerson Jose de Sales Neto, Jose Marcos Brito de Sena, Renata Santos de Oliveira, Ivanildo Silva dos Santos, Mateus dos Santos and Juliana Santedicola Andrade. To all of them our sincere appreciation for their expertise, responsibility and proactive atittude.

Support

This report has been developed with support from CocoaAction Brasil, in answer to a collective demand by the cocoa chain for more data and information about the Brazilian cocoa-producing sector. The need for more information about cocoa growing in Brazil is a consensus, in order to enable better decision-making by the industry and private sector, as well as to guide the development of adequate public policies.

The report, developed by Floresta Viva Institute (IFV), provides rich data related to several aspects of cocoa production and its growers, that contribute for an overview of cocoa growing in the Southern Coastal Bahia Territory. It also serves a source of updated information for the various actors of the value chain that can collectively monitor it and contribute for its sustainable development.

CocoaAction in an initiative of the World Cocoa Foundation (WCF), which acts as the convener and strategy holder for this voluntary strategy that aligns key stakeholders to address regional priority issues in cocoa sustainability.

CocoaAction Brasil started in 2018, as a pre-competitive, public-private initiative of the Brazilian cocoa sector, with the goal of promoting sustainability with a focus on the cocoa grower. The initiative has an estimated duration of five years, and its priorities are to enable knowledge exchange and synergies with existing projects, to improve productivity and growers's profitability, as well as to generate data about the sector for the benefit of all supply chain players. CocoaAction Brasil currently has eight cocoa and chocolate companies as members, apart from several partners in all cocoa producing states. The intitiative is based on collective action, and is open for new entrants.

The World Cocoa Foundation (WCF) is a global nonprofit organization dedicated to cocoa sustainability. WCF members include cocoa and chocolate manufacturers, processors, supply chain companies, and other private sector companies, representing more than 80% of the global cocoa market. WCF's activities benefit farmers and their communities in cocoa-growing regions of Africa, Southeast Asia, and the Americas. WCF's vision is a thriving and sustainable cocoa sector, where farmers prosper, communities are empowered, and the planet is healthy. Over the next five years, WCF is focusing on three key outcomes: increasing farmer income, combating child and forced labor, and ending deforestation in the cocoa supply chain.

This report has been sponsored by:

CocoaAction Brasil participating companies

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CocoaAction Brasil participating entities:

instituto arapyaú · RAINFOREST ALLIANCE

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Executive Summary

The report on the Panorama of Cocoa Cultivation in the Southern Coastal Territory of Bahia – 2015/2019 is a research effort of extensive primary data collected over 4 years in a panel format. Panel data collection is essential to understand the investigated situation, since it enables the understanding of the decisions made by the producers, and also of the context of stimuli generated by the market and institutions. In total, 3,090 rural producers were interviewed in 26 municipalities in the Southern Coastal Identity Territory of Bahia (TILSB), with one round of interviews conducted per year. The database for the research was built from the rural census sector approach of IBGE (Brazilian Institute of Geography and Statistics). The twenty-six municipalities of the TILSB have 500 rural census sectors, of which 150 sectors were chosen and visited by researchers, using a simple random sample. A registry of all of the rural establishments visited by the researchers was compiled by means of investigation and collection of information from the farmers of each census sector. For this study, only the census sectors with 25 properties between 4 and 300 hectares were selected.

Of the 3,090 interviewees, 2,443 producers are engaged in cocoa farming and were selected, making up the sample for the analyses of this report. The sample is statistically significant from the universe under study, with a 95% confidence level and estimated margin of error of 2.22 percentage points, upwards or downwards, based on the overall results.

The report is organized in topics so that the reader can better interpret the reality of the TILSB'S cocoa farming activity. The indicators addressed compose the "backbone" of cocoa production, and can serve as source of information for the development of strategic plans and subsequent studies. The indicators not only show the current reality, but also make a connection with the historical past and with the imagined future, enabling better decisions in the present time.

Chapter 1 clarifies the scope and representativeness of the research in the 150 census sectors, in the 26 TILSB municipalities, and the profile/size of rural establishments. Data shows that 55% of the establishments have an area smaller than 20 hectares; with 79% of the establishments with areas under 50 ha. Only 18.6% of them are in the 50 to 300 ha category. In relation to land use and occupation, there is a predominance of cocoa crops (32.6%), followed by pastures (24.8%). The average area occupied by cocoa is 12 hectares per establishment, with 50% of establishments having areas greater than 5 hectares of cocoa.

Chapter 2 presents the socioeconomic profile of cocoa producers. These are 62 years old, on average, with less than seven years of education; 11% of them have never attended school. Each household has three people, on average, and although 40% of the rural producers live in urban areas, agriculture is the main occupation of 70% of them. Cocoa is predominantly sold to warehouses (69%), middlemen (19%) and to processing industries (12%). Cocoa represents 79% of the income of rural establishments in the territory, with 50% of the establishments having a monthly income below R$ 1,606.00. In relation to the composition of the household income, retirement pension stands out among smallholders, and contribute with 42% of their income. The low participation of producers in representative civil associations was also noted, with 66% of them not engaged in any type of association.

In Chapter 3, gender, childhood and youth in rural life are observed, with special attention to occasional child labor. Life in rural areas, especially for women, the elderly, children and young people, says a lot about the well-being and dignity of a society. One of the most notable aspects is the migration of youngsters from the countryside to the cities, in search of work. As for child labor, the data shows that the non-participation of youngsters in property-related activities is explained by their school attendance, from the age of seven. In some cases, work occurs sporadically, or regularly, on weekends. The regular work of teenagers, however, occurs in some cases, especially from the age of 16.

Chapter 4 addresses work and housing conditions, access to goods and services – both by property owners and workers. Particular attention was given to the labor force regarding the presence of permanent workers and sharecroppers by size of establishment. Although 78% have electricity in their establishments, power outage complaints are frequent. As for water supply through the general grid, only 29% are contemplated and 77% have sanitary sewer through a rudimentary cesspool. Permanent workers were present in 35% of the establishments, with an average of 0.8 permanent workers per establishment. As for sharecroppers, their presence is noted in all strata of establishments.

Chapter 5 describes the cocoa production system, management and productivity, as well as the crops cultivated with cocoa, the cultivation systems, and the management and use of agricultural inputs. Particular attention was given to productivity, both by size of establishment, by cultivated variety, and by municipality. The "cacau-cabruca" system is present in 78% of establishments, of which 21% are unaware of the precise territorial area of their property. There is an average of 10.9 hectares of cacau-cabruca per establishment, with a productivity of 11.8 @/ha/year (the general average among the various cocoa cultivation systems was 12.6@/ha/year). (@ = arroba = 25 pounds or 12 kg). Banana is the crop most cultivated in consortium with cocoa in "cabrucas", occurring in 72% of the areas. There is a low use of techniques, equipment and machines in the activity – 56% have never done a soil analysis and 53% of establishments have not used any type of fertilizer.

Chapter 6 addresses the processing of cocoa and the structures and techniques used, mainly of the cocoa bean fermentation. The cocoa drying structures are present in most establishments. 57% of the properties have "barcaças" (a raised platform with a moving roof on rails) and 36% have dryers. As for cocoa bean fermentation structures, only 27.5% have fermentation houses. When they do have fermentation, it is done from 5 to 8 days in 20% of establishments and 78.3% complete this process in less than 5 days. The average fermentation time obtained was 3.5 days.

Chapter 7 presents the frequency of technical assistance and the use of credit by rural establishments: 75% of respondents report that they have never received it in the past nine years, 20% sporadically and only 5% receive technical assistance on a regular basis. As for credit, the research shows that 63% did not receive credit and 37% did at some point.

Chapter 8 addresses the evolution and management of the landscape of the territory under study. One of the issues researched was the rural environmental registry, where 37% of producers were unaware of the CAR registry (called SEFIR, in Bahia). However, 28% know about it, did not register, but want to register. A smaller but significant number, 17%, has already done it by public initiative, and 8.5% has already done it, but by private initiative. As for the forest domain and its evolution over time, the sizes of only two types of vegetation were observed – Forest Formation and Pasture, surveyed by MAPBIOMAS (showing that Forest Formation includes "Cabrucas" and Cocoa Agroforestry Systems). We can see that the municipalities do not present structural changes in the landscape (in numbers), as believed, motivated by eventual extensive cattle ranching over "cabrucas" and forests. This occurred, but on a moderate and concentrated scale in a few municipalities, thus revealing the relative stability of the forest and agroforestry cover characteristic of this territory.

Technical Research Specifications

Overview of research study

With the objective of knowing the situation of cocoa production in the Southern Coastal Identity Territory of Bahia (TILSB)[1], we used the database of a survey conducted by Floresta Viva Institute (IFV), with the participation of professors Jorge Chiapetti and Rui Barbosa da Rocha of Santa Cruz State University (UESC), Daniel Piotto of the Federal University of South Bahia (UFSB) and Leah VanWey, Stephen Porder and Dimitri Szerman of Brown University (USA), which carried out a socioeconomic and environmental diagnosis with a sample of three thousand rural establishments, distributed in twenty-six municipalities (26) that belong to the TILSB.

The database for the research was created from the rural census sectors of the IBGE, which defines them as territorial units established for purposes of cadastral control, formed by continuous areas, with dimensions and number of households that allow the survey by an enumerator. The twenty-six municipalities of the TILSB have 500 rural census sectors, of which 150 sectors were chosen in a simple random sample. Since IBGE does not provide a registry of rural establishments, it was necessary to mark, in loco, the geographic coordinates of all rural establishments before carrying out the survey.

Thus, for five months, four researchers visited the 150 selected sectors, identifying and registering rural establishments through research and information from farmers in the census sectors. Sectors with less than 25 rural establishments were discarded and replaced by others. Finally, it was necessary to register rural establishments in 270 sectors, totaling 9,537 establishments, of various profiles - family farming and/or large operations/businesses.

Sampling was carried out using the simple probabilistic random sampling method, with the aid of R software version 3.6.0, whereby, first, 150 census sectors were randomly selected, with at least 25 rural establishments per sector. Subsequently, for each sector, 20 establishments were randomly chosen, resulting in 3,000 rural establishments.

As for the criterion for replacing the establishments drawn due to the absence of the person in charge, the rule was that they should only be replaced after five (5) interview attempts. After the beginning of the interviews with the 3,000 sampled establishments, there were substitutions of establishments due to the interviewee's withdrawal from participation or due to other reasons, totaling a sample of 3,090 rural establishments.

The research was coordinated by sociologist and Ph.D. Leah VanWey, from Brown University, who approved the questionnaires (set of questions for the interviews) in alignment with its Ethics Council, and had the participation of a multidisciplinar team of researchers from the study's partner institutions -- composed of agronomical engineers, ecologists, geographers, political scientists and economists -- who together contributed with their multiple competencies and experiences with the regional reality of agriculture and also with qualitative and quantitative research.

1 The TILSB is composed of 26 municipalities: Almadina, Arataca, Aurelino Leal, Barro Preto, Buerarema, Camacan, Canavieiras, Coaraci, Floresta Azul, Ibicaraí, Ilhéus, Itabuna, Itacaré, Itaju do Colônia, Itajuípe, Itapé, Itapitanga, Jussari, Maraú, Mascote, Pau Brasil, Santa Luzia, São José da Vitória, Ubaitaba, Una and Uruçuca.

From the established database, 4 teams were assembled, each consisting of a coordinator and three field researchers; and two senior researchers to assist all teams, guide and test the consistency of the research data and a professional to tabulate and organize the data. All coordinators and researchers had the title of agricultural engineers, graduates of UESC, with extensive knowledge of cocoa cultivation.

The 150 sectors were divided in 4 regions (North, South, East and West) and each team was responsible for an average of 38 sectors and 750 rural establishments, which were surveyed by the same team once a year for 4 years, which characterized it as a panel survey.

Technique

The research approach used was the in loco application of a structured and standardized set of questions to the person in charge of the rural establishment. The questions were directed to collect information from the owners and the establishments, with prior knowledge of who the owners would be, to know if this person would also be manager of the establishment. When the owner was not the manager, after the survey was conducted and with the owner's consent, data was then collected directly from the manager of the establishment.

Information collected from the owners were related to: migration, characteristics of the household and its members, assets of the household, family and personal income and expenses, family history, race and gender, educational level, etc. In relation to the establishments, the questions dealt with land use, production, technology, goods, labor, characteristics of the household, type of transport used, road conditions, production, agricultural income, commercial & market relations, degree of rationality in economic decisions, risk propensity, etc. During the research, a scope of questions to address specific issues of the cocoa economy was designed in order to understand the challenges of this productive system.

The question forms were prepared with the participation of researchers from each institution involved in the project, and had previously been applied in pilot tests to adapt the questions and train the field researchers.

Data collection took place between 2015 and 2019, with each producer being interviewed once a year, always in the same period. It is important to consider that some variables were collected in the four stages of the research; others were collected in just one or two steps.

In order to better understand the graphs, the four (4) stages of the research are: Base 1 (B1): 2015/2016; Base 2 (B2): 2016/2017; Base 3 (B3): 2017/2018 and Base 4 (B4): 2018/2019.

Research sample of establishments that produce cocoa

Among the 3,090 rural establishments that make up the research sample, 2,443 establishments were identified to have agricultural activity related to the production of cocoa beans; these were selected and make up the sample for this report analysis. The sample is statistically significant from the universe under study, with a 95% confidence level and with an estimated margin of error of 2.22 percentage points more or less under the overall results.

Content organization

The presentation of this report has been organized in general topics so that the reader can have a better interpretation of the reality of TILSB'S cocoa

farming activity. The system of indicators worked on is the backbone of cocoa cultivation and can serve for the elaboration of strategic plans. The system of indicators not only shows the current reality, but also makes a connection with the historical past and with the imagined future, enabling better decisions.

TOPIC 1
SAMPLE PROFILE
Clarifies the scope and representativeness of the research in the 150 census sectors in the 26 municipalities of the TILSB, as well as the distribution by size category of establishments.

TOPIC 2
COCOA PRODUCER'S SOCIOECONOMIC PROFILE
Explains how the establishment is organized according to the manager's data, documentation of the establishments, household and agricultural production income.

TOPIC 3
GENDER AND YOUTH IN RURAL AREAS
Soughts to clarify gender related issues and working schemes in rural cocoa production, paying special attention to child labor.

TOPIC 4
WORKING AND LIVING CONDITIONS
Contemplates the need to capture the condition of access to goods and services from the households, both for the owners and workers. Particular attention was given to the labor force, regarding the presence of permanent workers and sharecroppers by size of establishment.

TOPIC 5
COCOA PRODUCTION, MANAGEMENT AND PRODUCTIVITY
Explores the agricultural activities cultivated with cocoa, the cocoa cultivation systems used, as well as the management and use of fertilizers in the activity. Particular attention was given to productivity, related to size of establishment, cultivated variety, and municipality.

TOPIC 6
COCOA PROCESSING
Addresses the processing structures and techniques used, mainly related to the fermentation of beans.

TOPIC 7
TECHNICAL ASSISTANCE AND RURAL CREDIT
Registers the frequency of technical assistance in establishments and the identification of the technical agents. In relation to rural credit, the analysis quantified the establishments that had received it and investigated how the credit was used.

TOPIC 8
LANDSCAPE OF COCOA AREAS
Tackles the issues of environmental registry, deforestation and expansion of cocoa crops.

TOPIC 9
FINAL CONSIDERATIONS
Conclusions from this report.

This report finally presents an annex (Annex A), in the form of a guide to the most used indicators in each topic, so that a quick read is possible, without compromising the understanding of the researched situation.

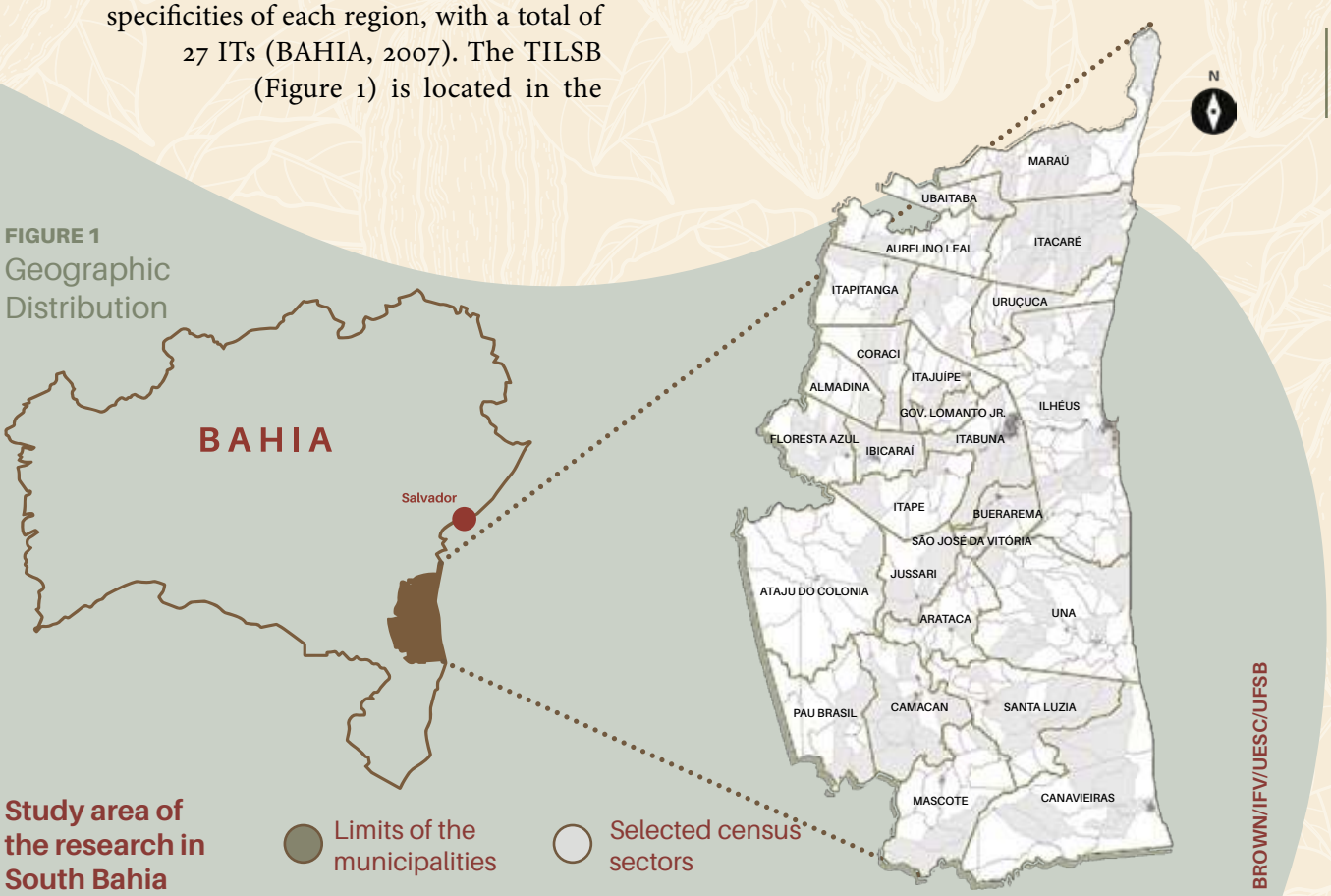
Sample Profile

A territory is a socially constructed economic space, endowed with natural resources and the historical process of the men and women who inhabit it, through the convention of values and rules, institutional arrangements that give them expression and social forms of organization of production (Diniz and Lemos, 2005; Santos, 2005, 2006; Oliveira, 2014). As a social space, the territory is a field of conflicting political and economic forces, with structures of power and domination. The knowledge of space has as its starting point the relationship established between society and space, understanding space as a means of producing reality (Santos, 2000).

The state of Bahia adopted the concept of Identity Territories (IT) from 2007 on, based on the specificities of each region, with a total of 27 ITs (BAHIA, 2007). The TILSB (Figure 1) is located in the Southern Coastal Region of the State, composed of 26 municipalities (Brazil, 2015b; 2010), spread over an area of 15,886 km2, covering a population of approximately 772,683 (IBGE, 2010 Demographic Census). It has a humid tropical climate, and its natural attributes influence the patterns of land use and, consequently, the regional economy. Figure 1 represents the geographical limits of the municipalities and each municipality, the geographical limits of the census sectors and the surveyed census sectors.

The TILSB has several agricultural activities led by the cultivation of cocoa, and most of the remaining areas are considered Atlantic Forest. Its rural population includes indigenous people, quilombolas, family farmers, employer farmers and agrarian reform settlers. This is what characterizes it with a high diversity and cultural complexity and diverse

FIGURE 1
Geographic Distribution



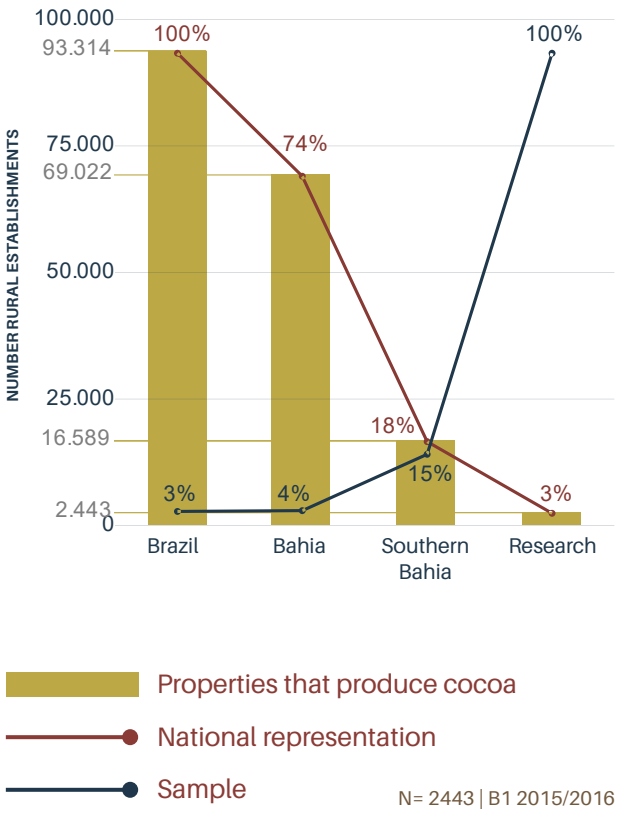
socioeconomic structure. At the end of the 1980s, this region experienced a significant social and economic crisis, due to external factors - such as the rise of new cocoa producing countries and the drop in international cocoa prices and internal factors - such as the reduction of agricultural financing by the State and the outbreak of the Witches' Broom disease (Chiapetti, 2009; 2014).

During the entire crisis period, despite the significant reduction of cocoa production at the TILSB, it was not enough to disorganize the system of agricultural production of cocoa in general. According to Figure 2, cocoa is still the main regional agricultural product, as 79.1% of respondents grow cocoa on their properties.

A relevant issue in all research is the representativeness of the sample in relation to the universe. According to IBGE (2017), Brazil has 93,000 rural establishments that produce cocoa. Bahia has 69,000 establishments that grow cocoa (74%), of which 16,000 establishments (18%) are in the TILSB. If we extrapolate the data, our survey represents 3% of Brazilian establishments, 4% of Bahian and 15% of TILSB establishments (Figure 3).

FIGURE 3

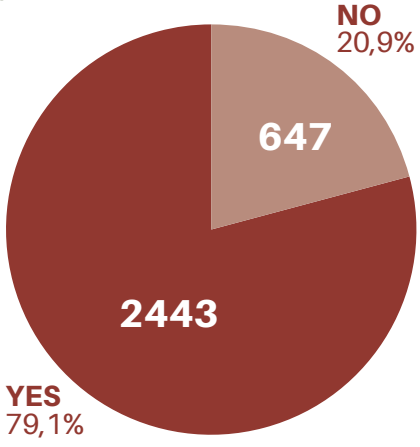
Representativeness of the sample in relation to the number of cocoa-producing establishments



N= 2443 | B1 2015/2016

FIGURE 2

Do you produce cocoa?



n= 3090 | B12015/2016

Similarly to IBGE (2017) that classifies the distribution of cocoa-producing establishments in the TILSB, showing that 15% of the establishments are in the municipality of Ilhéus, the survey achieved the same proportionality of representativeness (Figures 4 and 5).

FIGURE 4

Distribution of cocoa-producing properties in the Southern Coast of Bahia

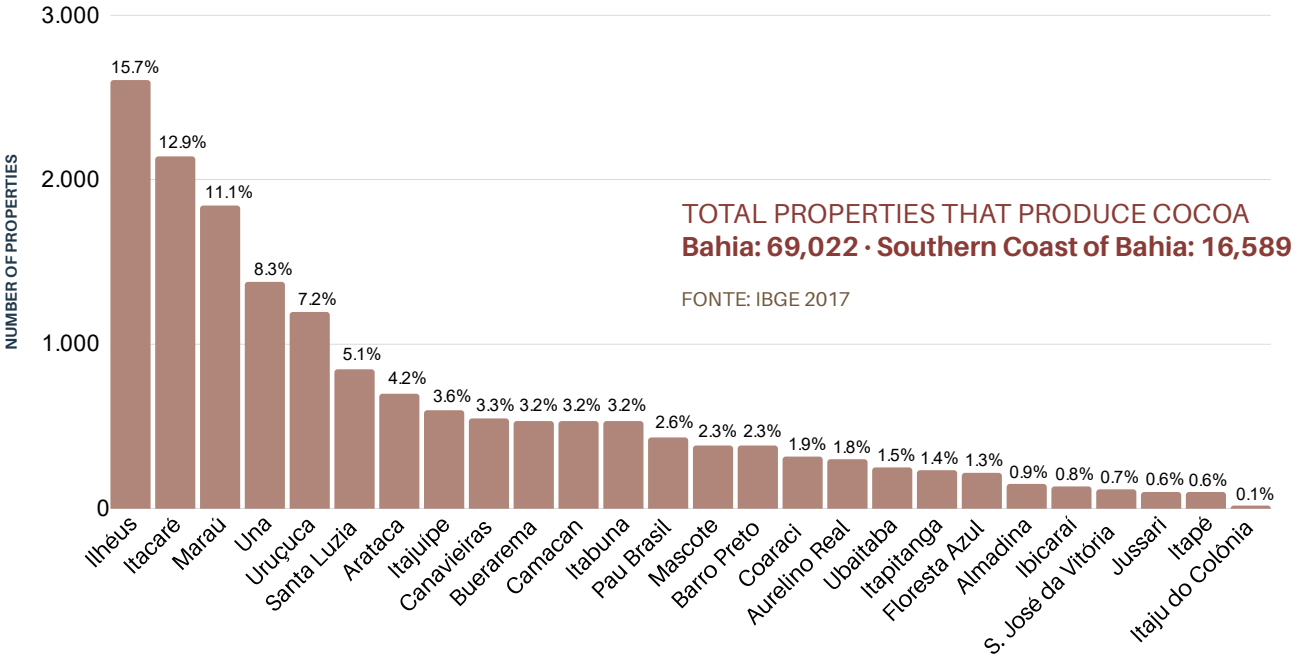
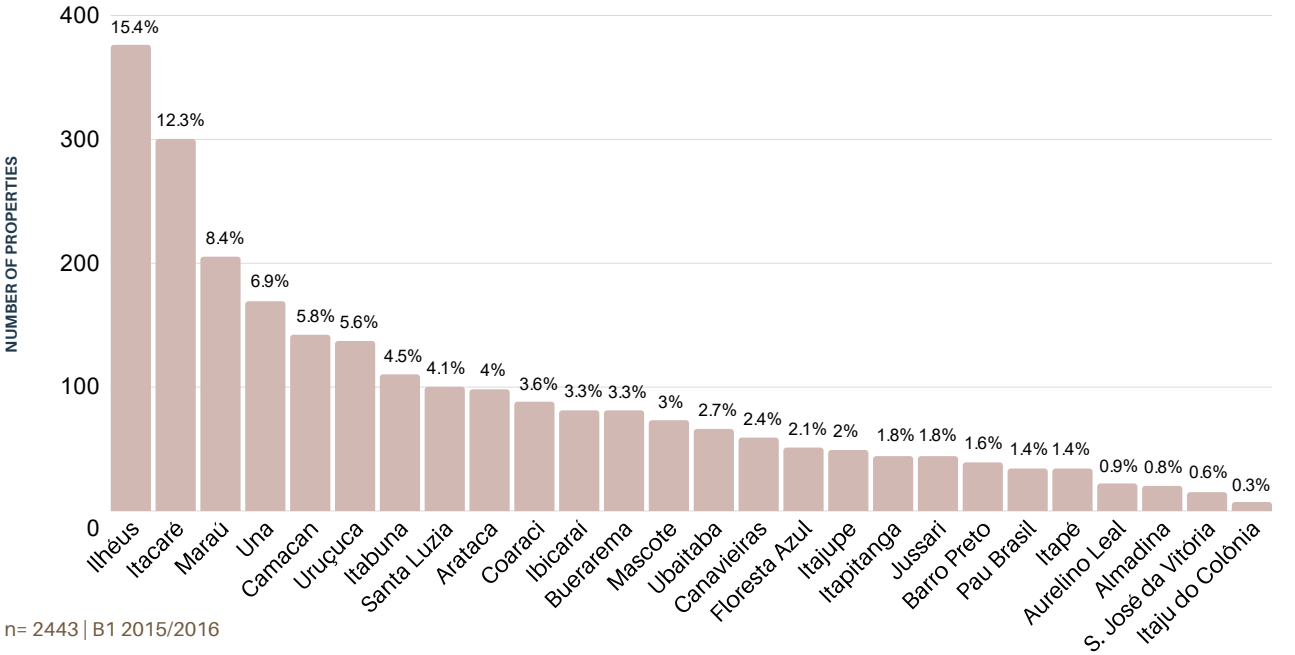


FIGURE 5

Distribution of the research samples



n= 2443 | B1 2015/2016

The difference between small, medium and large rural establishments is defined by the number of rural modules in Brazil: small has up to 4 rural modules, medium has 4 to 15 rural modules and large has over 15 modules. Incra (National Institute of Agrarian Reform) determines the module size for each region of Brazil, through its own methodology. For the TILSB, one module is equivalent to 20 hectares, so an establishment considered small has up to 80 hectares.

For a better classification and understanding of the variables, the research defined a detailed approach and stratified growers in five classes, based on property size (Figure 6). The size ranges defined were: 0-10 hectares; 10-20 hectares; 20-50 hectares; 50-100 hectares and 100-300 hectares.

If we aggregate the data up to 50 hectares, we end up with 79% of the properties in that range, or with 55% of the rural establishments with areas smaller than 20 hectares, demonstrating the predominance of smaller sized rural establishment in the territory.

FIGURE 6

Size class of cocoa-producing properties in the TILSB

n= 2443

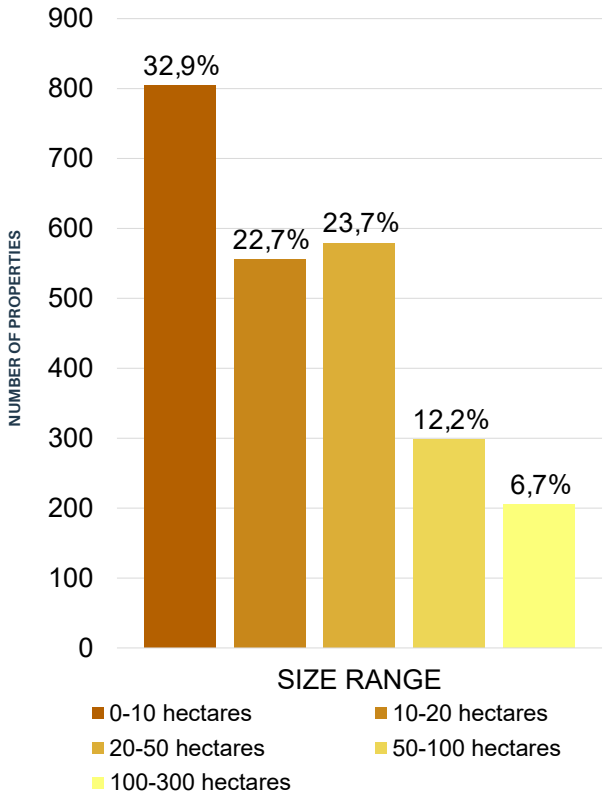
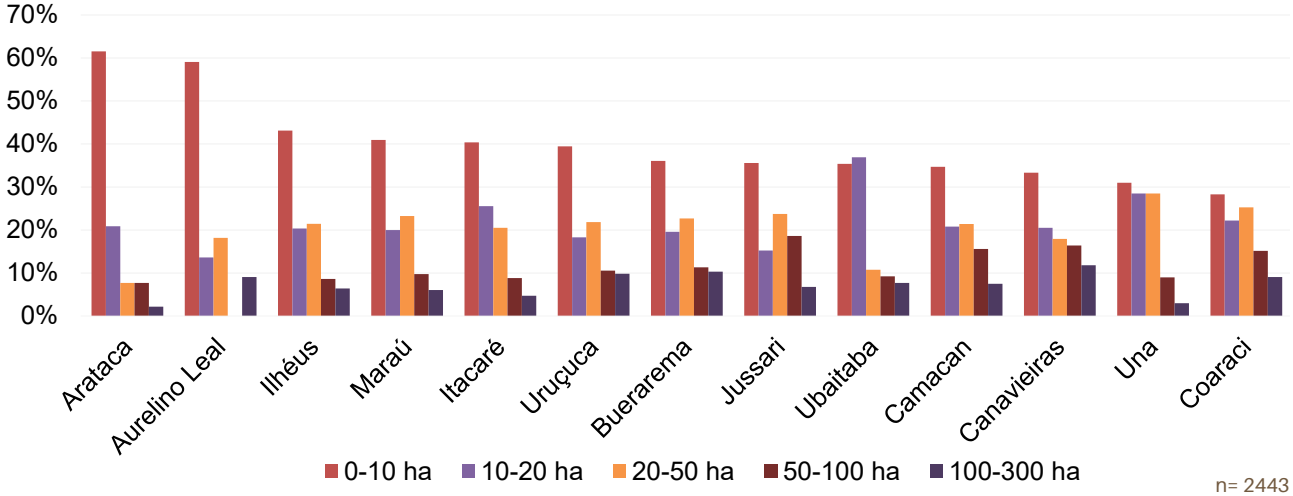


FIGURE 7

Size class of cocoa-producing establishments by municipality



n= 2443

FIGURE 8

Size class of cocoa-producing establishments by municipality

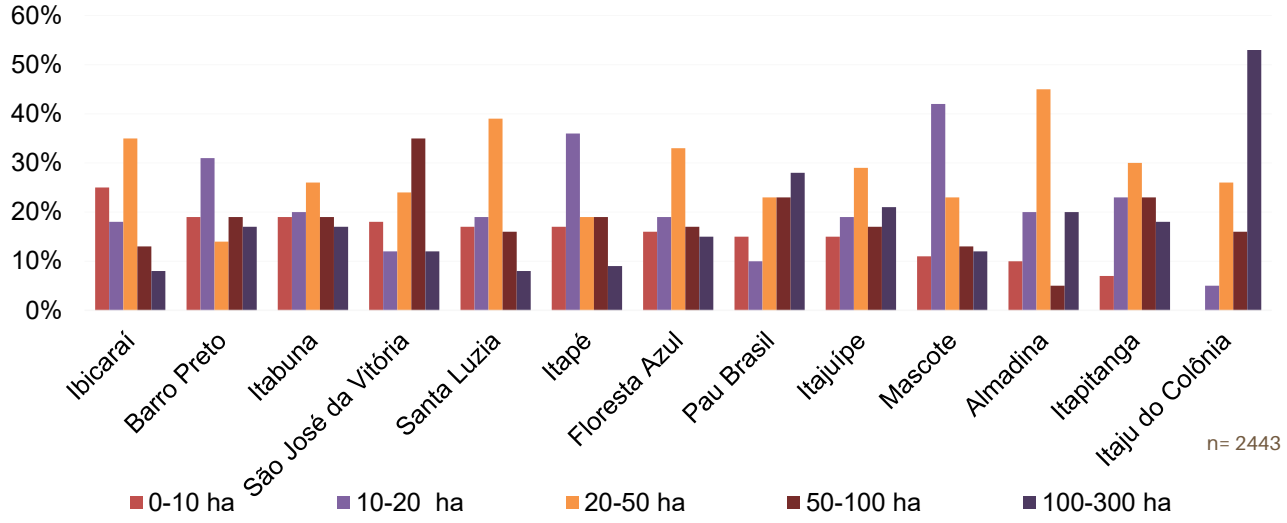
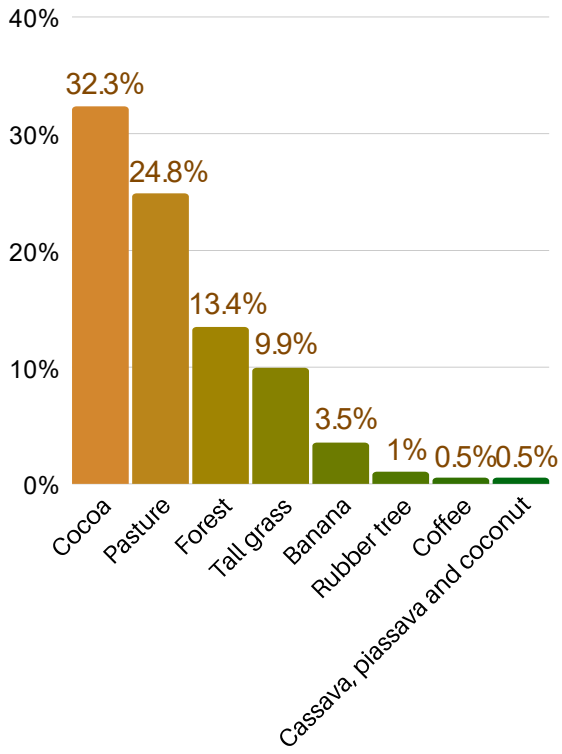


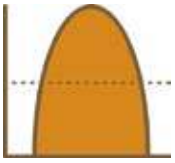
FIGURE 9

Land occupation and use



n= 1740* | B4 2018/2019 * Number of cocoa-producing establishments interviewed in the 2018/2019 harvest season

The production system of a territory is always different according to the edaphoclimatic conditions. Figure 9 shows the use and occupation of land in the establishments, with a predominance of cocoa crops followed by pasture land. The average area occupied by cocoa is 12 hectares per establishment, with 50% of establishments having areas greater than 5 hectares of cocoa. Pasture areas have always existed marginally on cocoa farms as food reserve for draft animals, but in recent decades there has been an increase in this activity at the TILSB, also because the low prices of cocoa have led to cocoa land devaluation, and to value increase of pasture areas. If, on one hand, data shows us a change in the profile of land use, on the other hand, it presents an opportunity to increase the cocoa areas.

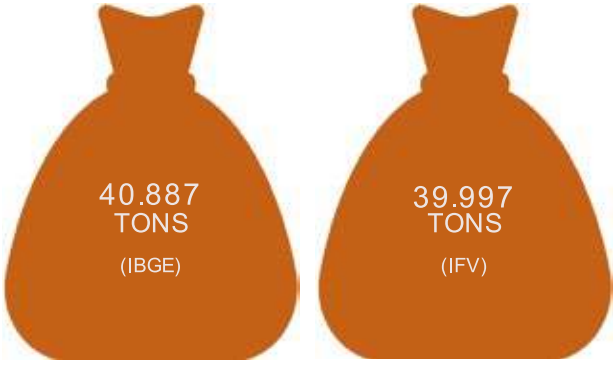


The average size of the establishment is **30 hectares**

Median: 5 hectares
Average: 12 hectares of cocoa per establishment

1.3% of cocoa farmers do not know the size of the establishment; **10% do not know** the size of the cocoa area

FIGURE 10
Estimated cocoa production at the TILSB in years 2018/19 by Floresta Viva Institute (IFV) and IBGE



B4 2018/19

Cocoa Producer's Socioeconomic Profile

This chapter describes the socioeconomic profile of rural producers based on their age, family composition, education level, income, occupation, property's documentation and method of land acquisition.

Although there is a natural variation in the universe of respondents, it is safe to generalize that the producers in the area are over 50 years of age, have 2 to 3 family members at home; with a noticeable sharp decline in the birth rate, with the young people leaving the household to work or study from the age of 16. The presence of men predominates; with little formal education, many obtained the land as inheritance or donation. The occupation of rural producers with other activities (not related to cocoa) is common, with retirement being an important share of the income, and income being visibly low.

Farmers are older, on average (around 62 years old), regardless of the rural establishment size. Figure 11 reveals that they are mostly over the age of 50, despite the existence of some young farmers, especially in smaller rural properties. Households have 3 people, on average, this being slightly higher in smaller properties, with 3.1 people per household; and 2.6 people per household in the group of average properties, as shown in Figure 12.

FIGURA 11
Média de idade e boxplot da idade do cacauicultor por faixa de tamanho

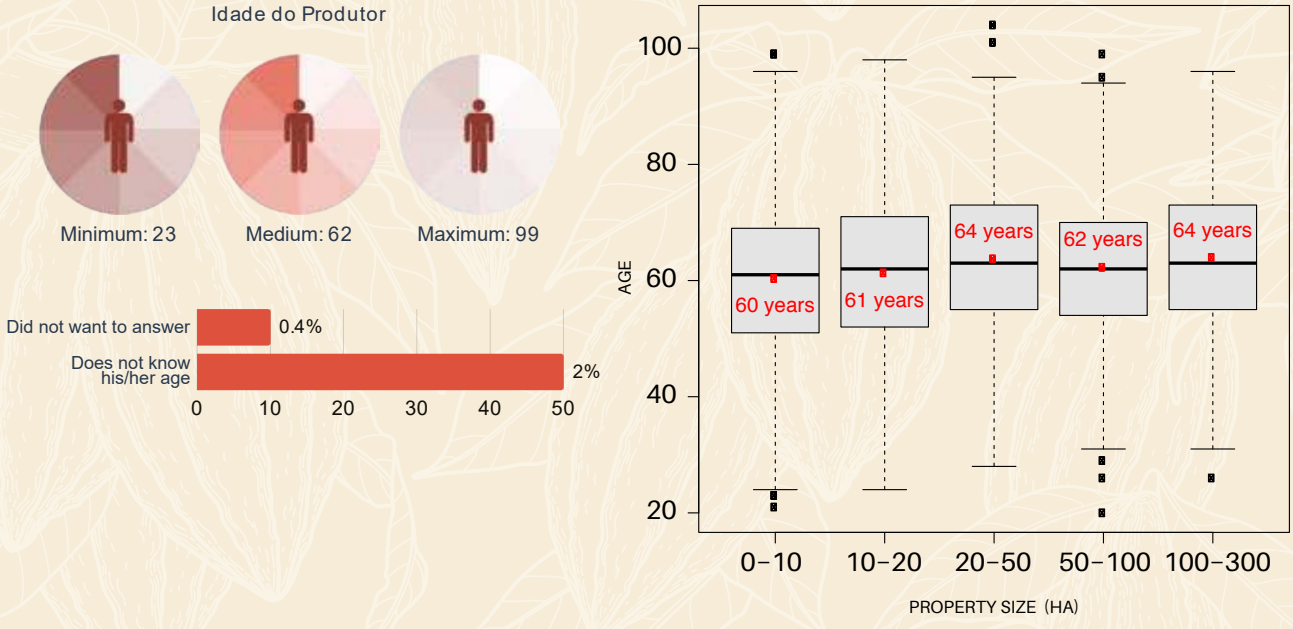
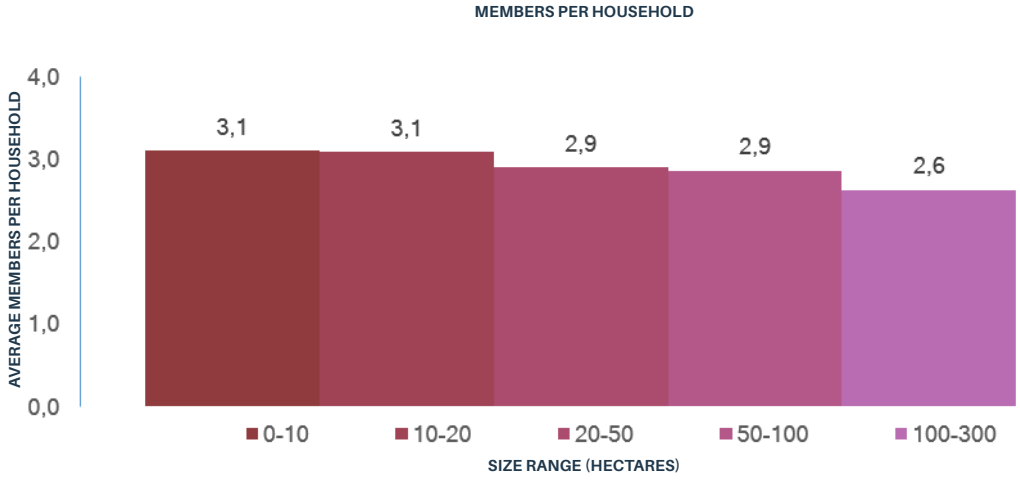


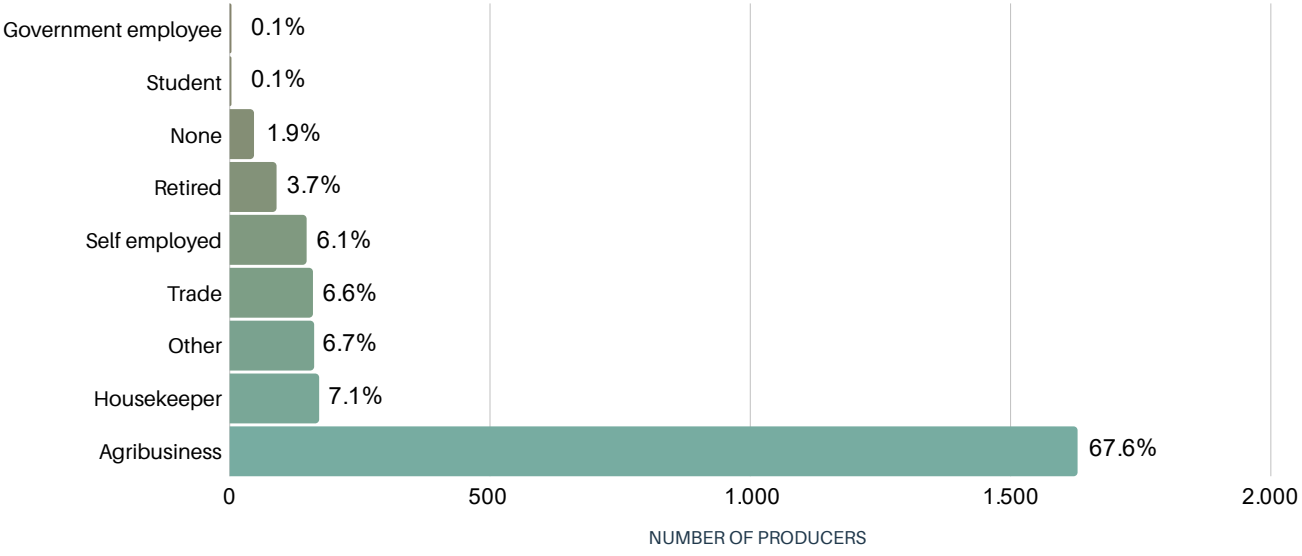
FIGURE 12
Average number of members per household



Although 40% of the rural producers live in urban areas, their main occupation in agriculture, with almost 70% of them having this activity as the most important nowadays (Figure 13). However, involvement in retail/trade, autonomous activities, domestic activities or retirement make up for the remainder of the producers' priority income. This does not mean that other activities are not on their secondary agenda, but that their main activity is the management of the establishment; and that a higher portion of the income indeed comes from the rural production. Therefore, the traditional idea that cocoa farmers are usually involved with other activities is demystified, thus explaining the region's productive fragility. During the research we found that yes, there is a dependence and concrete involvement with this activity, by the vast majority of producers.

FIGURE 13
Main occupation of the cocoa producer

n= 2408* | B1 2015/2016 *Number of establishments that informed the occupation of the person in charge



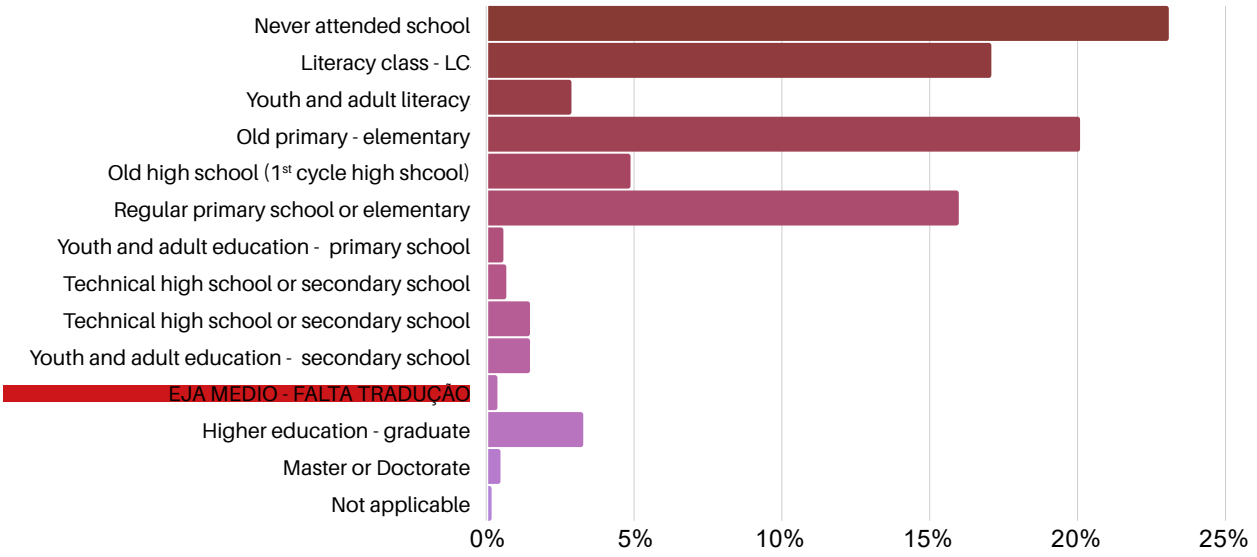
The level of formal education of producers in the municipalities studied, who responded to the Agricultural Census of IBGE (Brazilian Institute of Geography and Statistics) in 2017, is very revealing and explanatory in the region's productive context. The IBGE reveals something that was also detected in the field research. It must be said that this data does not evaluate the performance of the level of education, per se, but rather the level of access to formal education present in the territory.

Figure 14 presents education data obtained by the Agricultural Census, it is self-explanatory, but deserves an observation: the majority of rural producers in Bahia has had very restricted access to formal education, with the complete primary education being the maximum level that 50% of the producers obtained from schooling, and more than 1/5 of them have never attended school in their lives.

FIGURE 14

Education level of rural producers in Bahia

FONTE: IBGE



FONTE: IBGE 2017

Figure 15 presents data collected by this field research, which detected the same weakness of access to education identified by IBGE's data, but saw important differences between groups of producers, according to the land size. In general, the data confirms that those who did not known how to answer, never studied, and those who reached incomplete primary or complete primary educational level accounted for 52.6%, corroborating data from the 2017 Agricultural Census.

This percentage, however, is even higher when the producers of the smallest establishments are selected (those between 0 and 10 hectares and between 10 and 20 hectares). In the group from 0 to 10 hectares, 65% of the producers did not go beyond the complete primary education level, 22% never studied and 6.6% did not know how to answer what was their education level. In the group of 10 to 20 hectares, these numbers remain high - 23% never studied and 58% did not go beyond the complete primary education level. Again, the number of those who could not answer is significant: 5.4 %.

The groups of producers with larger rural properties, however, such as those in the 20 to 50 hectares range, 50 to 100 hectares and 100 to 300 hectares, present an almost similar educational reality.

The segment that never studied and those that reached the complete primary education level is, respectively, 11.3% and 42%. Although these numbers are high, they point to another scenario: the greater number of producers who have completed higher education, something insignificant in the smallest rural properties: 10.6 %.

The two other property size groups (50 to 100 hectares and 100 to 300 hectares) widen this difference in access to basic and higher educations. In the first case, 26.5%, and in the second case, 38.5%, respectively, reached the higher educational level. In these groups, the cases of producers who had never studied or reached the complete primary education level fall sharply - 3.8% and 3.5% had never studied, in that order, while 19% and 11% add up to the complete primary education level, respectively.

Accessibility and formal acquisition of land are among the issues that offer a measure of social and economic dynamism, including the degree of impact and quality of public credit, land tenure and agrarian reform policies.

In this case, the data exposes a double reality: a high dynamism in the purchase and sale of properties - with 48% of these having been acquired by current rural producers - and also of land transfers by inheritance or direct donation, total of 43% in these cases (adding 31.5% and 12%, respectively). On the other hand, 7% of rural producers obtained the land through agrarian reform public policies. This last data confirms the relevance of this group of producers in the territory, given that there are formally dozens of rural settlements established since 1986, until the present day. In South Bahia, the presence and continuity of settlers in rural properties reveals how much cocoa cultivation attracts and sustains rural families, being a topic for further study, including other types of access for workers to obtain land ownership.

The formalization of land tenure is another key theme in the debate on rural development in the territory, which expresses the degree of legal order and access to public land regularization policies.

Among respondents, 19% do not have a formal land ownership document; 21.6% have a title, 46.4% have a public deed and 14% are included in other categories of documentation (ITR, INCRA's ownership letter, purchase receipt, etc.).

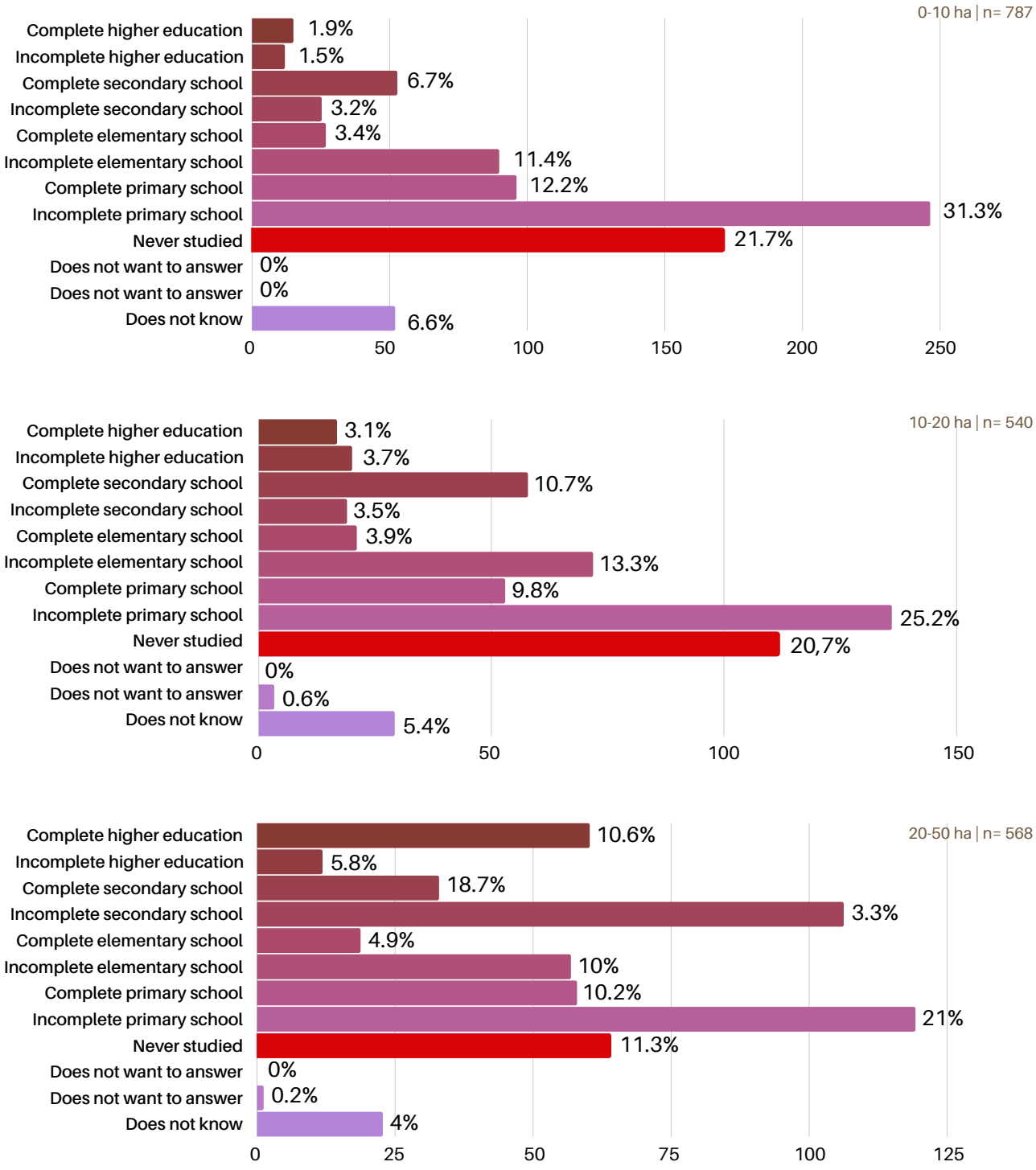
Considering that the land title is the safest legal instrument of land tenure, and seeing that only 21.6% of producers have this documentation, it appears that there is a wide gap of services related to land regularization in the territory, an opportunity that could stimulate credit instruments, technical assistance, contracts for environmental services, purchase and sales, and more substantial productive investments in properties.

The presence of many agrarian reform settlements has also not converted into land tenure regularization among the settlers in this territory, since they have been neglected a definitive owner documentation, based on arguments that this would generate the parceling and sale of lots, rural areas, or even land reconcentration. The slow autonomy of the settled producers demonstrates how deficient the agrarian policy of farmer's emancipation is.

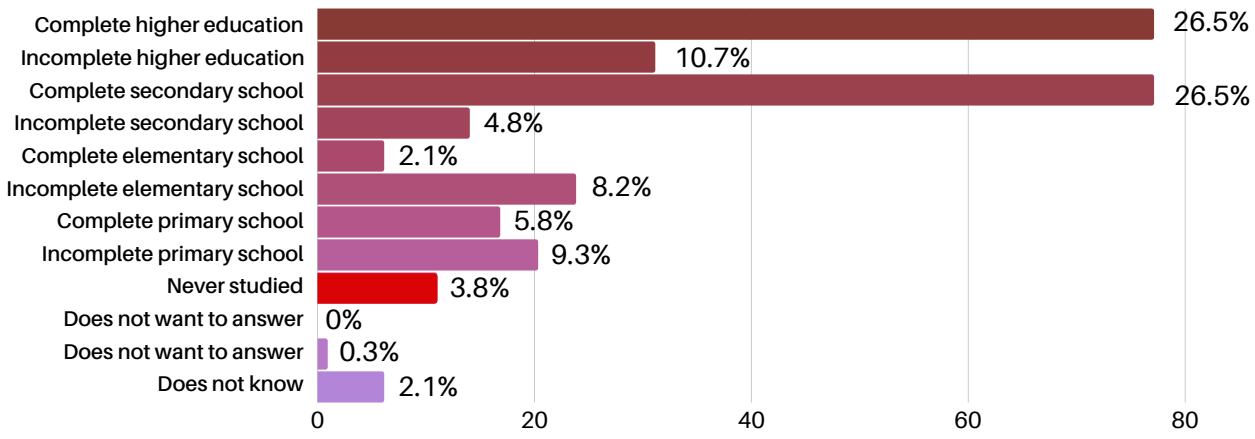
When relating the types of possession documents with the rural establishment's type of acquisition it is noticeable that each form of acquisition has a documentation profile. As the figure below explains, inheritance, purchase and acquisition by agrarian reform are the most common forms of acquisition. The purchased property uses the public deed and the title, while the inherited establishment has public deed, the title or even no documents at all. Those who were given the land or obtained it through land reform are, in most cases, undocumented.

FIGURA 15

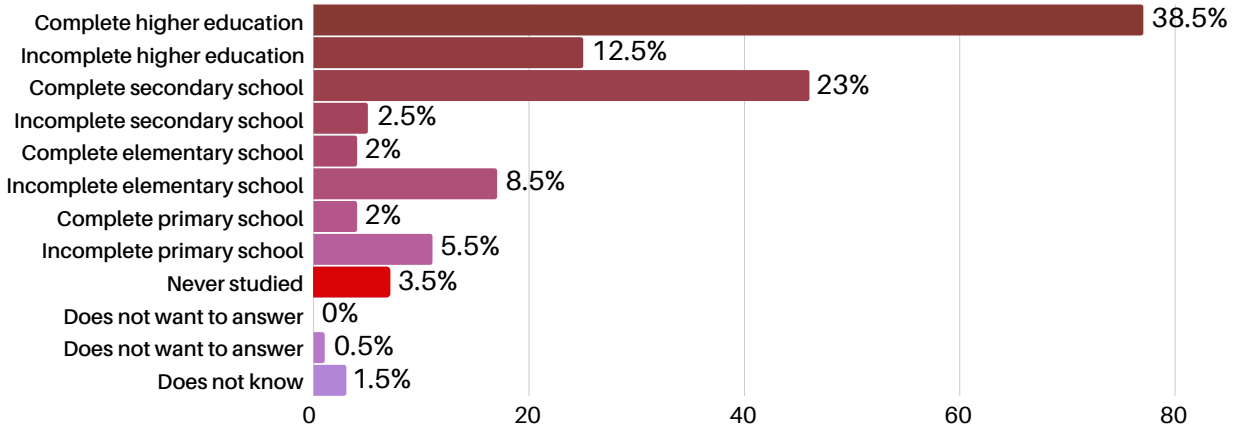
Escolaridade do cacauicultor por tamanho de estabelecimento



50-100 ha | n= 787



100-300 ha | n=200



GERAL | n= 2443

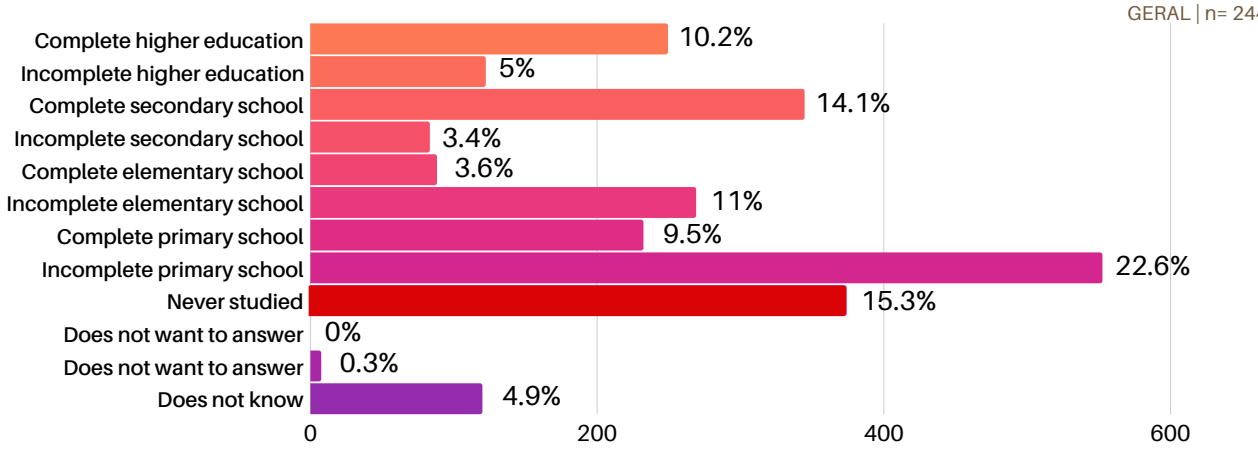


FIGURE 16

Method of land acquisition

n= 2443 | B1 2015/2016

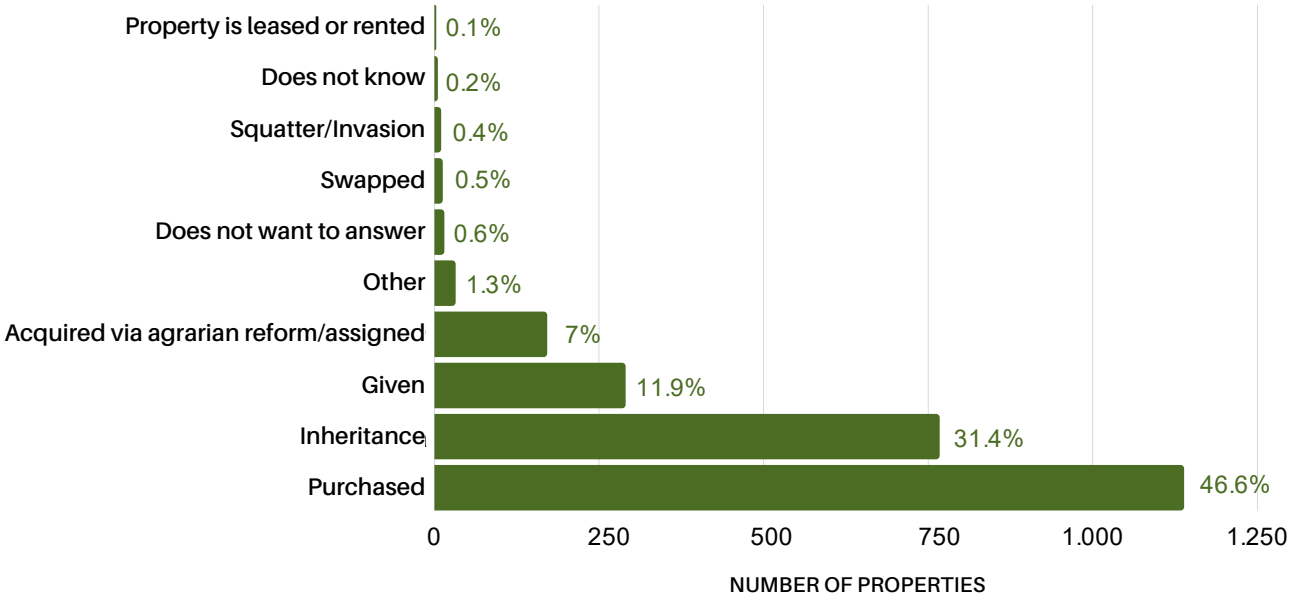


FIGURE 17

Documentation of the establishment

n= 2443 | B1 2015/2016

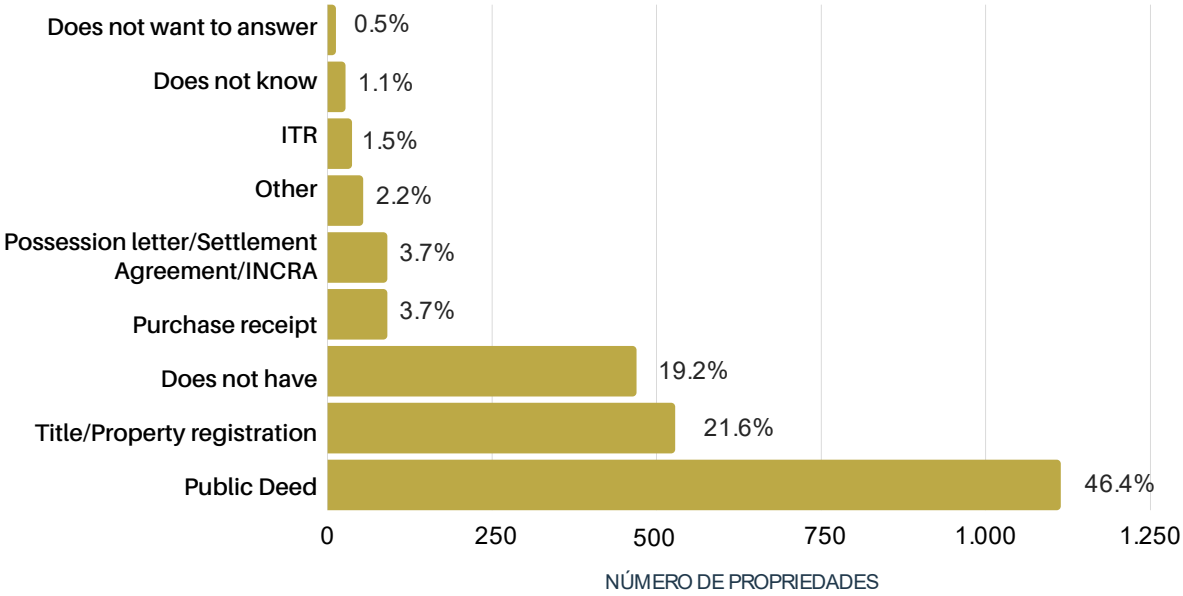
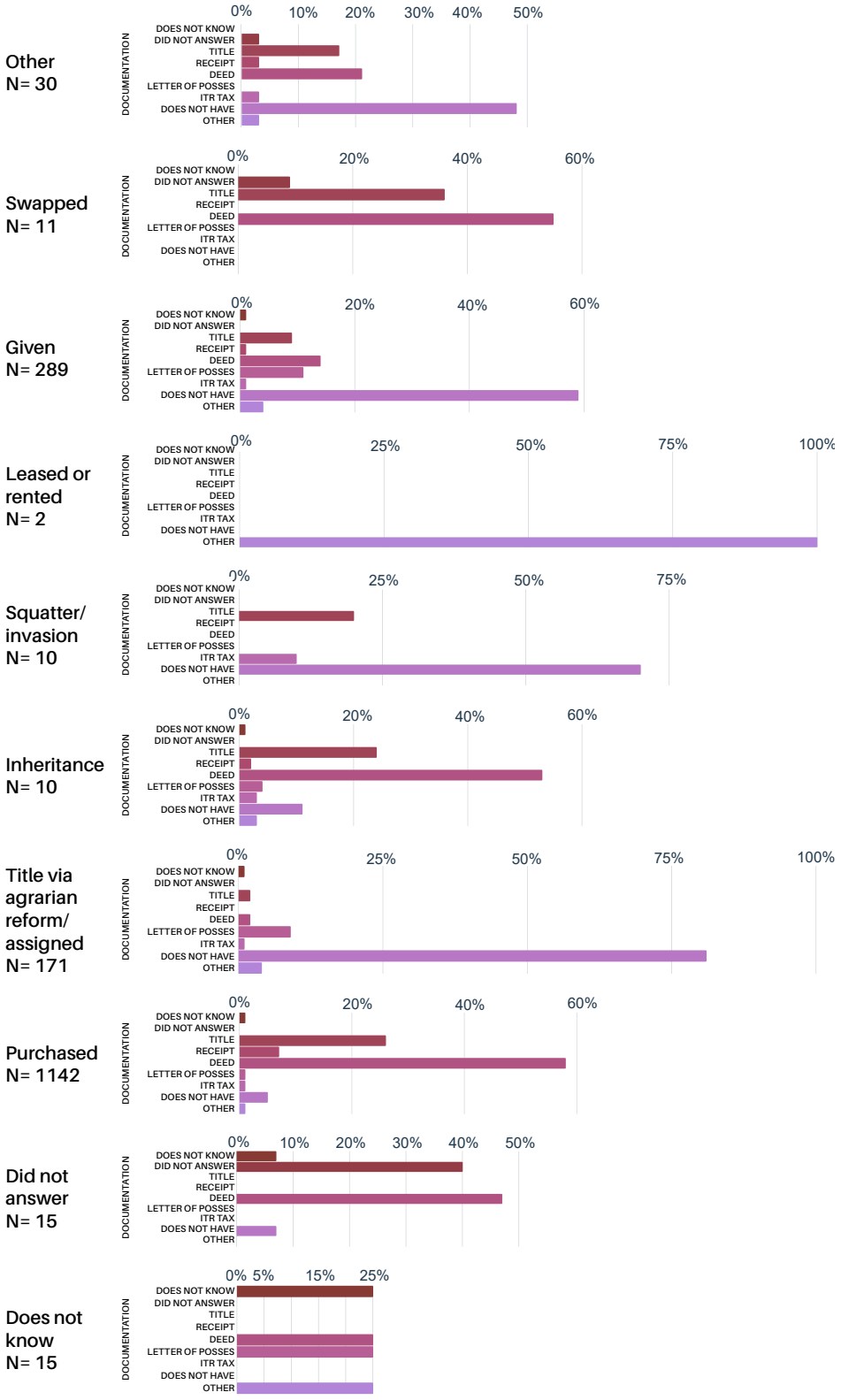


FIGURA 18

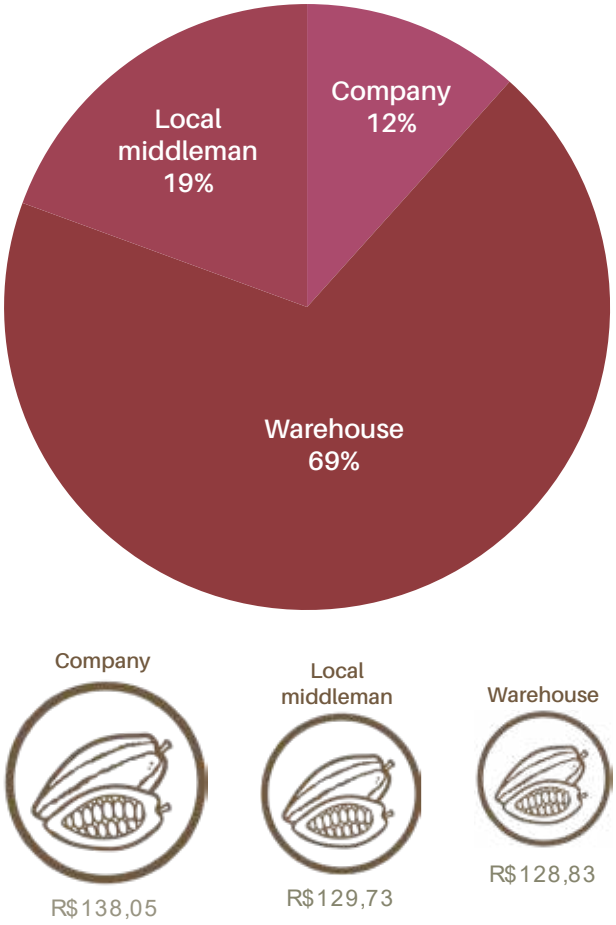
Rural establishment's documentation x type of acquisition



In relation to cocoa commercialization, rural producers are divided into three categories, according to their convenience. Direct sales to milling companies account for 12%, to local middlemen 20%, but the vast majority of sales, 71%, are done to warehouses. Prices practiced are different, as shown in Figure 20. According to respondents, companies offer about 6% more than local warehouses and middlemen, who are responsible for logistics and capillarity in municipalities and districts.

FIGURE 19

Commercialization and average price of the cocoa arroba (15 Kg bag) (2018/19 harvest)



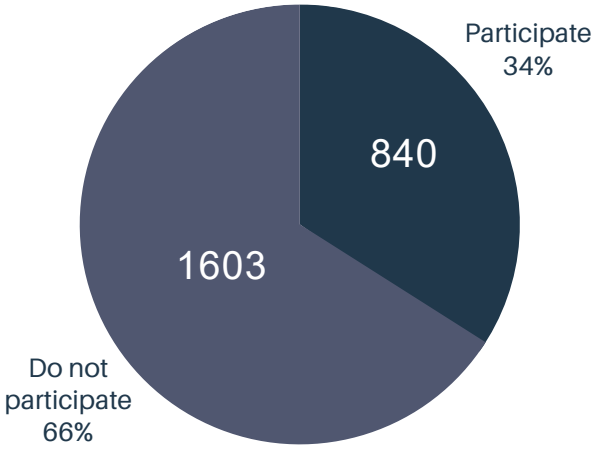
B4 2018/19

Since this issue has the potential to qualify the socioeconomic activities of producers, the research evaluated the level of producers' participation in associations and cooperatives. From a sample of 2,443 producers interviewed, 1,603 of them or 66% did not participate in any type of civil association, and only 34% were linked to a producer organization.

Considering the producers engaged in any organization, 55% are members of associations, 36% of unions and only 8% are linked to cooperatives. These numbers indicate the potential of expansion of these types of organizations in this territory while having a larger role in the lives of producers.

FIGURE 20

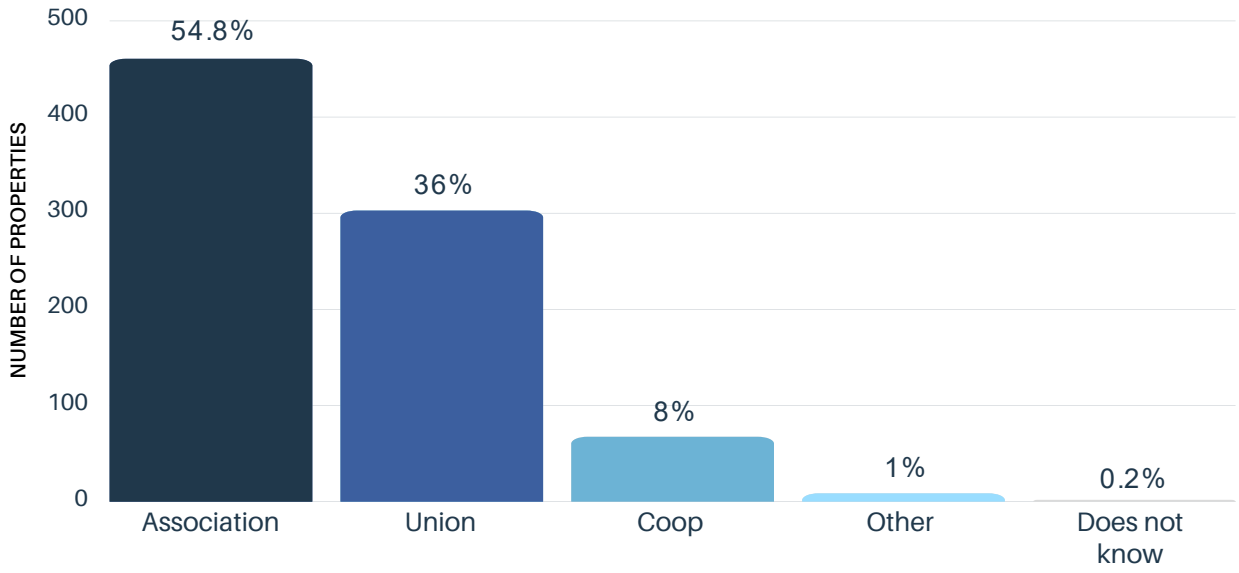
Participation of the TILSB cocoa producers in social organizations



n= 2443 | B1: 2015/2016

Of those that participate, what type of organization is it?

n= 840 | B1: 2015/2016



Several services such as technical assistance, sales of inputs and products, processing and industrialization, improvement of infrastructure and other services could be provided by cooperatives, unions and associations. Rural producer organizations can play an important role in improving the social capital presence in the territory, attracting new knowledge and a spirit of cooperation between producers and society.

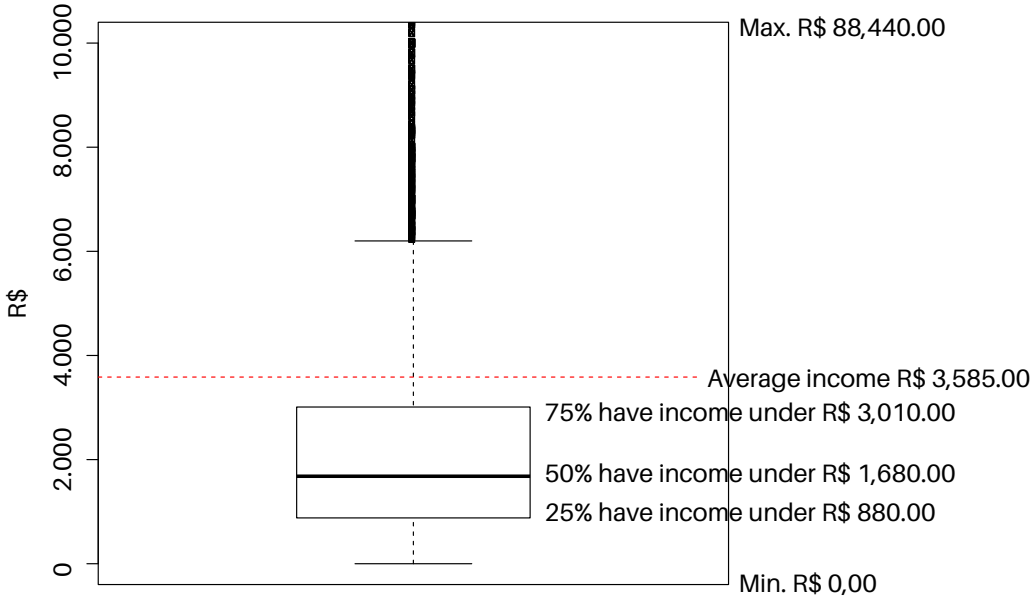
The economic situation of rural producers, measured by the household monthly income, is shown at the end of this chapter; the data refers to the monetary value obtained, in two moments of the survey: 2015/2016 and 2018. To obtain this data, in a confidential and impersonal way was a sensitive point of the research; the answers reveal the economic fragility of the TILSB rural area, as well as the strong differences between groups of producers, according to the size of their establishments/properties.

In the first phase of the survey, in the 2015/2016 period, the average monthly income of the producers, as shown Figure 21, was R$ 3,585.00, although the maximum declared amount was R$ 88.440,00 - obviously from a business-oriented profile - and the minimum, R$ 0. Eliminating the extreme cases, findings show that 75% of the producers had a monthly income between R$ 880.00 and R$ 3,010.00; this group of producers obtained an average of R$ 1,680.00 monthly, thus expressing the monetary reality of the majority of producers. Note: the Brazilian minimum wage was R$ 880.00 in year 2016, R$ 937.00 in 2017, R$ 954.00 in 2018 and R$ 998.00 in 2019.

Two years later, new interviews were conducted to check for possible changes, including crop fluctuations, due to climate conditions or other factors (there were severe droughts during the summer of 2015/2016 in this region). So, data revealed that there was indeed a slight drop in the average monthly income (to R$ 3,211.00) and a drop in the average income of the majority of producers, to R$ 1,606.00 in 2018. The lowest income in this group was R$ 937.00 and the maximum was R$ 2,877.00. The maximum amount declared among all producers was R$ 61,000.00.

FIGURE 21

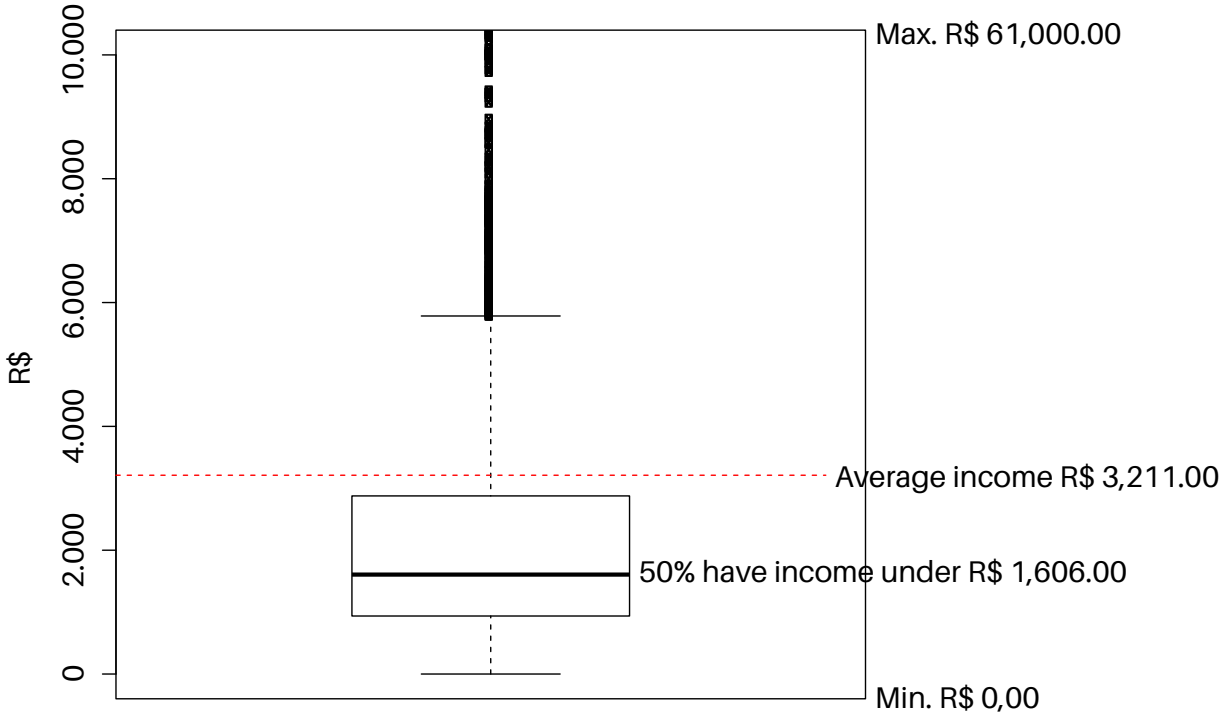
Monthly household income in 2015/16



n= 2443 | B1 2015/2016

FIGURE 22

Average monthly household income (2017/2018)



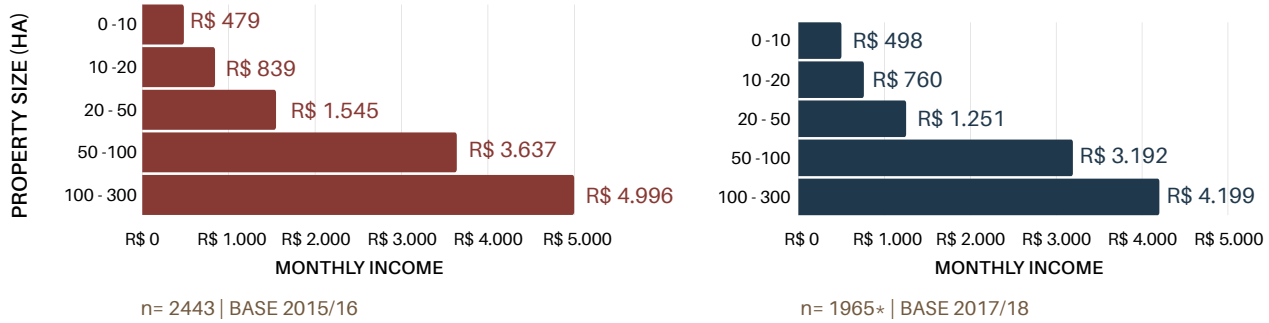
The composition of sources of income in the household is another relevant data. It appears that state pension payments (due to retirement) and other sources of income have a very high weight in the overall income of households, and this weight is extended to producers who have the smallest rural establishments (in size). Overall, in 2018, producers obtained less than half of their income from rural activity, with pension payments, wages and other income having the largest share, combined, in the household income. These numbers and percentages change if we analyze the composition of income according to size groups, but they still represent a large portion in all size groups. Small property owners, in general, depend substantially on these other types of income, with state pension being the most important source -- up to 42% of the smaller producers originate their main income from state pension/retirement. In larger establishments, this percentage drops by half, but it is still very significant. This phenomenon, of the socioeconomic role of elderly people in sustaining life in rural areas, and the role of social security income for keeping people in rural areas, is a reflection of the national reality, demonstrated in many surveys -- rural retirement is the mechanism that transfers most income from society to a social category.

The role of other types of income, such as salaries, commercial activities and others, should not be underestimated. It is common for rural producers of small properties to work in nearby establishments, including other rural regions, in harvesting or planting activities. Together, these other sources of income are higher than the share of retirement, which reveals the degree of income diversity in the economy of rural producers in the cocoa region of Bahia.

The global numbers, related to household income or per capita income, indicate how much the producers' financial situation has declined, either due to the low profit from cocoa production and sales in rural areas, or to low income from state pension, other jobs, etc. Income differences between producers in the extremes are known, but data shows that, on average, producers have a very low household income, between 1 and 4 minimum wage (units), and that the average per capita income, by size of establishments, is between 0.5 and 10 minimum wage (units) in 2015/2016, with a slight drop in the last survey, conducted two years later.

FIGURE 23

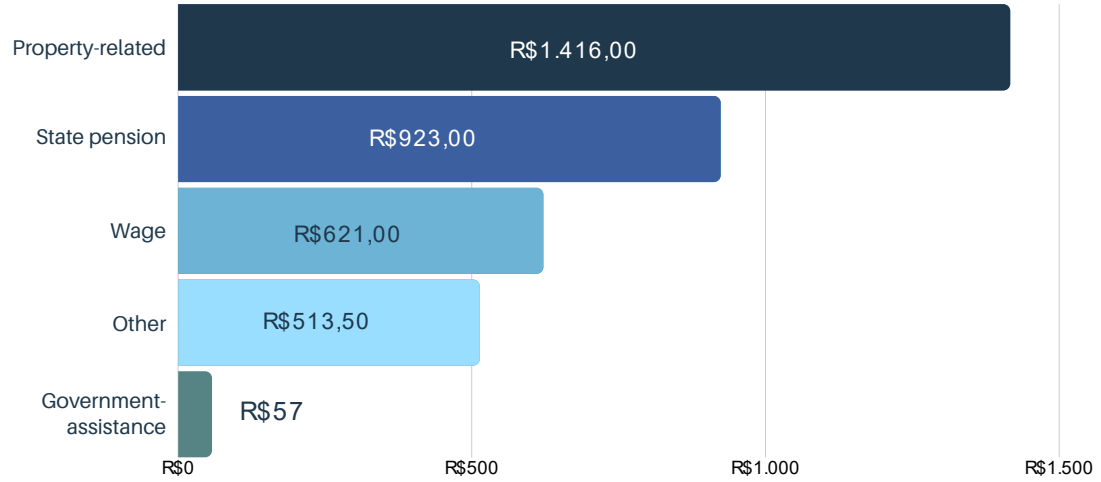
Average per capita income x size of establishment



* NUMBER OF COCOA PRODUCER ESTABLISHMENTS THAT INFORMED THE INCOME AND THE SOURCE OF THE INCOME IN THE 2017/2018 PERIOD

FIGURE 24

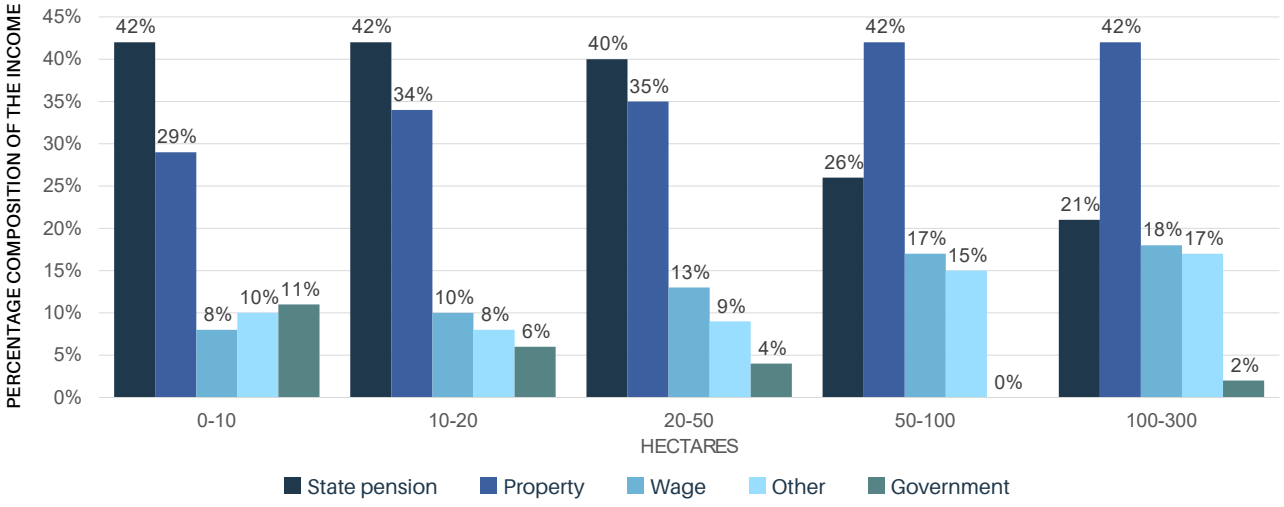
Distribution of average monthly household income by category



n= 1749⁎ | B3 2017/2018 | ⁎NUMBER OF COCOA PRODUCER ESTABLISHMENTS THAT INFORMED THE INCOME AND THE SOURCE OF THE INCOME IN THE 2017/2018 PERIOD

FIGURE 25

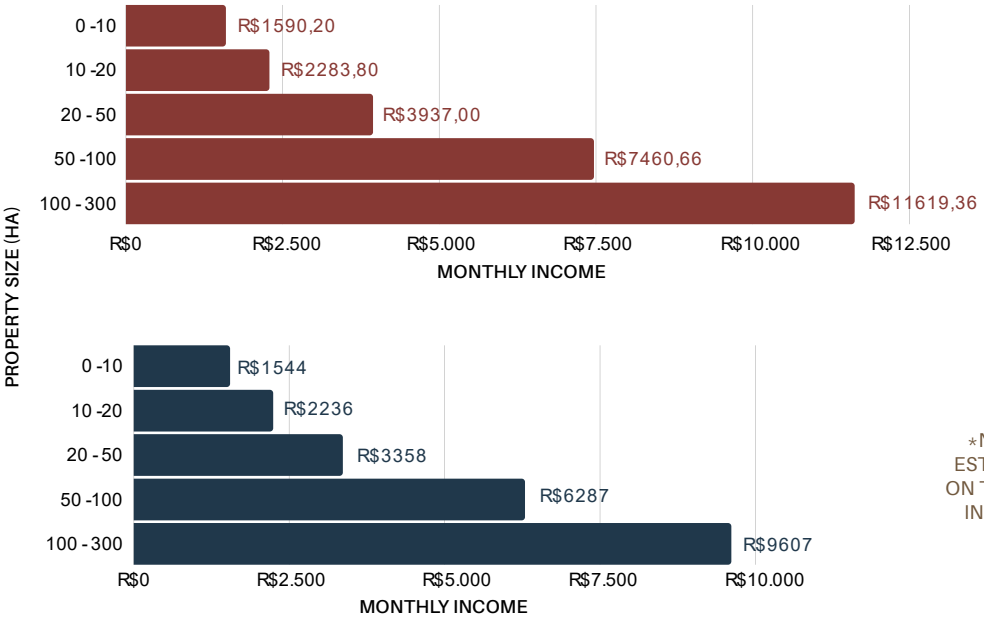
Composition of household income x property size



n= 1749⁎ | B3 2017/2018 | ⁎QUANTIDADE DE ESTABELECIMENTOS PRODUTORES DE CACAU QUE INFORMARAM A RENDA E A ORIGEM DA RENDA NA ETAPA 2017/2018

FIGURE 26

Average income per household x size of establishment



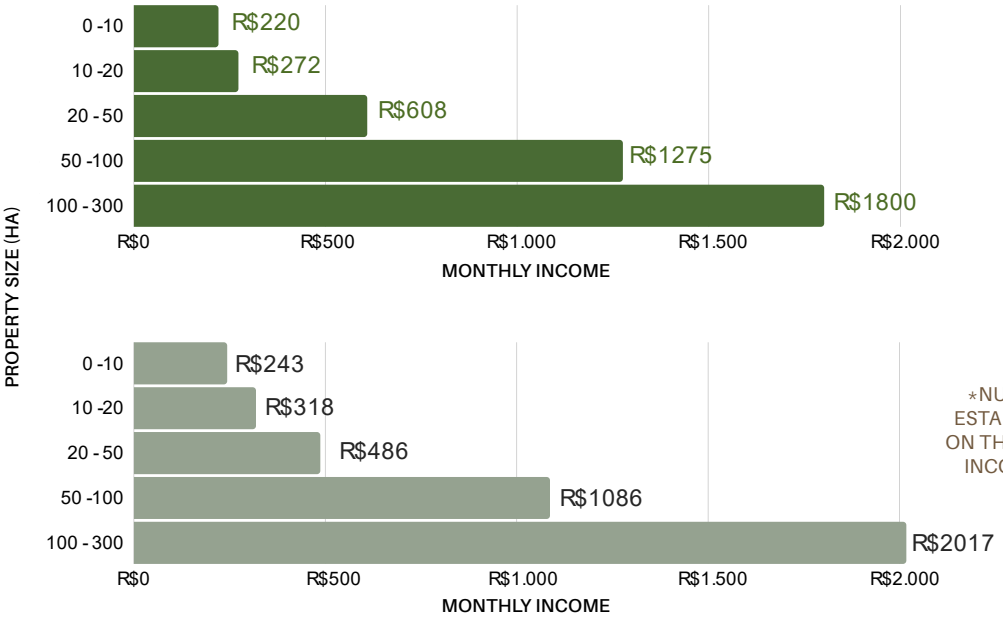
n= 2443 | BASE 2015/16

n= 1965⁎ | BASE 2017/18

⁎NUMBER OF COCOA-PRODUCING ESTABLISHMENTS THAT REPORTED ON THE SIZE OF THE PROPERTY AND INCOME IN THE 2017/2018 PERIOD

FIGURE 27

Average per capita income x size of establishment



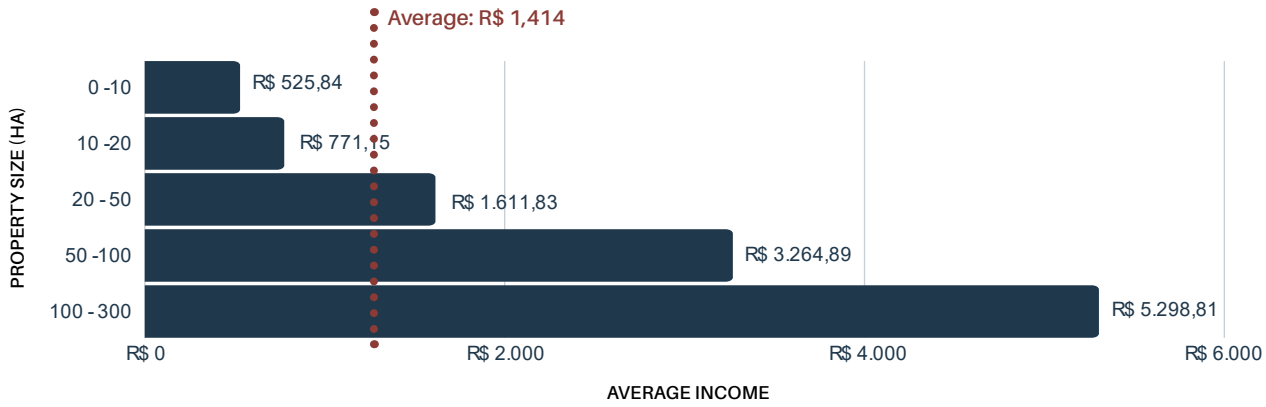
n= 2443 | BASE 2015/16

n= 1965⁎ | BASE 2017/18

⁎NUMBER OF COCOA-PRODUCING ESTABLISHMENTS THAT REPORTED ON THE SIZE OF THE PROPERTY AND INCOME IN THE 2017/2018 PERIOD

FIGURE 28

Average monthly income from rural production by size of establishment



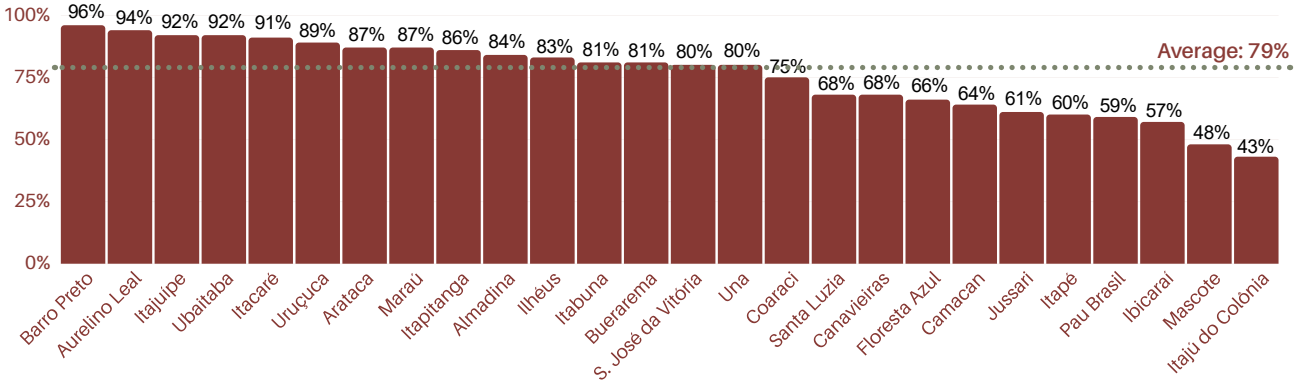
n= 1769 | B4 2018/2019

To capture the economic role of cocoa in the composition of the property's income, including the differences between the municipalities of the territory, the analysis also considered the share of income from cocoa in the total income of cocoa establishments in the Southern Coast of Bahia. Cocoa has an expressive weight in the totality of the agropastoral income of rural producers – percentages above 40% – even in the municipalities located in the transition zone from cocoa to livestock, such as Jussari, Itapé, Pau Brasil, Mascote and Itaju de Colônia. Cocoa represents 79% of the income of rural establishments, considering the average of the entire territory, but this percentage is above 90% in municipalities such as Barro Preto, Aurelino Leal, Itajuipe and Ubaitaba (Figure 29).

Nonetheless, the income of the households analyzed are low, in general, except for the most successful producers. The household income is key to assess the state of the economy in the territory's rural area, after 33 years of stagnation of cocoa production, since the end of the 1980s. Changing this picture requires an understanding of the limitations present in the rural environment of this territory during this time - which involves understanding the relation between socioeconomic variables and production factors, as well as cultural and institutional aspects of this rural sector. In the following chapters, data related to other factors involved in the production system complement and better explain these economic findings and the contemporary reality of cocoa in Southern Bahia.

FIGURE 29

Share of cocoa in the income of the rural establishments



n= 1459* | B4 2018/19 | *NUMBER OF ESTABLISHMENTS THAT REPORTED PRODUCTION AND PRICE OF THE COCOA SOLD

Gender and Youth in Rural Areas - School and Family Work

Life in rural areas, especially for women, the elderly, children and youngsters, says a lot about the well-being and dignity of a society. This chapter gives special emphasis to the situation of children and youngsters in their relationship with school and rural work. This topic is widely discussed in Brazil and abroad, especially when it comes to the risk of illiteracy due to the lack of school access when children are growing up, as well as child labor that compromises the health and integrity of childhood.

It is important to mention that the interviews were conducted in a discreet and frank way, after an environment of trust was established with the producers. All of the researchers were previously capacitated in pilot tests, and had been capacitated in ethics before conducting the interviews. These interviews, although based on a structured questionnaire, were conducted in a way that the producer narrated his/her own life story and connection to the rural property, and told the interviewer the day-to-day lives of the family and the household members. The producers, as they told their stories, were directed by the researchers to answer the questions, which involved several aspects, related to social, environmental, agronomical, political and other themes, always with the commitment by the researches of not disclosing the interviewees' identity, and preserving the confidentiality of the information.

Based on the data collected it was possible to develop an age pyramid (Figure 30), which is an instrument for analyzing how society is behaving in demographic terms. Here, it shows the number of inhabitants in the households, interviewed by age and gender.

The age pyramid found in the analyzed households reveals an expressive participation of members over the age of 50, extending up to 90 years, at the same time that the base of the pyramid, slightly smaller, shows family members in the infant and youth phases -- possibly due to the continuous reduction of birth rate over the last decades.

In the middle of the age pyramid, there is a smaller presence of adults between the ages of 25 and 54, probably attracted to the cities due to economic activities and a different place to live. The male presence is predominant in the rural environment, representing 53% of the TILSB rural population (women are 47%). It is also noted that the male presence is predominant in all age groups, especially among the elderly.

Therefore, there is evidence of a smaller participation of women in the rural environment, and of new generations in the composition of society in rural areas, which signals a current and future fragility to sustain the cocoa productive activities. It is worth mentioning that the data is also dynamic and reveals a moment and context of society at this moment, which may change in the future, if other stimuli are adopted in the territory.

Figure 31 supports the previous information and shows the role of women in work related to the rural property, excluding domestic work which was not included in this study. Around 20% of the rural establishments have women participating in management activities, while 80% of them have men in this function. The average productivity of properties managed by women is 10.6 @/ha, while the ones managed by men is 12.69@/ha, which is low for both cases (there are not great differences in relation to performance of production per cultivated area). There were also not too many differences identified in the work performed by men and women in the

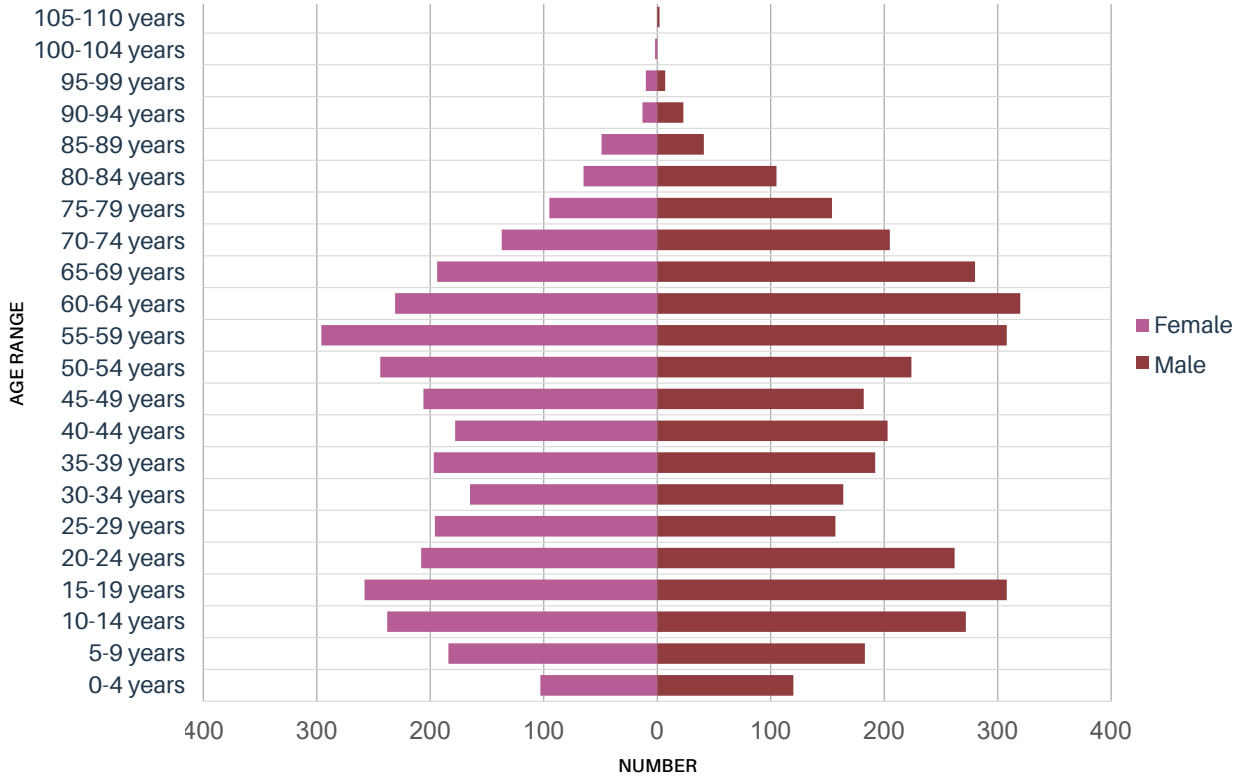
"sporadic" or "on weekends" categories, although data shows that there is a male predominance in the regular work system, and also in the management of the cocoa producing properties of the TILSB.

This study observed that the children and teenagers of rural areas in the TILSB are enrolled and attend school and that they also relate to work in the cocoa producing establishments; the participation of children and teenagers in work-related activities were classified as: only on weekends, esporadic work, regular work, do not work, or work related to managerial activities. Although this study was not focused on investigating child labor (which would require a deeper and specific survey), it investigated the daily lives and routine of youngsters in the rural property, which enabled an overview and general assessment of the situation and rural reality of the territory. The large presence of minors enrolled in school (regular attendance) shows, at first glance, a positive scenario, with youngsters not present in the child labor category, despite the fact that some of them can perform sporadic activities related to labor, when accompanying their parents.

Among the universe of cocoa producers interviewed, only 35% of the households had children and teenagers between the ages of 4 and 17. Figure

FIGURA 30

Pirâmide etária dos membros do domicílio (2015/2016)



n= 2443 | B1 2015/2016

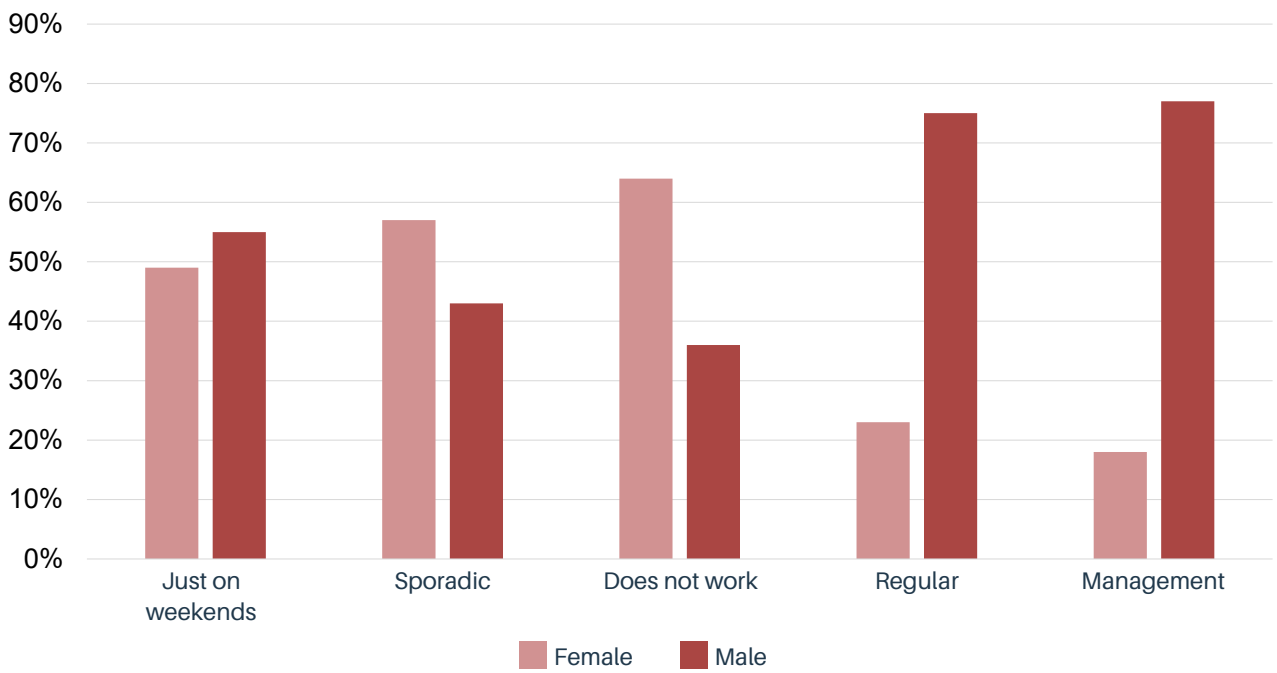
32 shows that the non-participation of youngsters in property-related activities is explained by their school attendance, from 7 years of age on. In some cases, as stated, work/help in the property occurs sporadically, or regularly, on weekends. The regular work of minors, however, does take place in a few cases, especially from the age of 10, and more frequently from the age of 16.

An important data that must be addressed in this report is the large presence of youngsters attending school. Figure 33 is a picture of this reality – the category 4 to 6 years old shows a higher percentage of children that do not study, which was expected due to the characteristics and challenges of the rural context when sending a child to pre-school, given the low availability of such schools in the rural environment of the TILSB. Four-year old children usually do not attend school in the rural areas, their enrollment taking place in the first grade, when they have completed 6 years. This way, the index of enrolled children is higher after 7 years of age, since the period of enrollment takes place in the beginning of the year (children who are still 6 in January/ February are not able to enroll and have to wait until the following year to be enrolled).

Data therefore reveals, in general, that children and teenagers, from 4 to 17, in this territory and in the context of cocoa farming, have a very small participation in

FIGURA 31

Gender and rural work regimen



rural work; when it does occur, it is noted especially on weekends or sporadically. A final aspect to be mentioned is the demographic trend of youngsters leaving rural areas in search of work in the cities, and of activities in the service sector, such as retail (stores) and public services. This phenomenon heightens the risk of a systematic evasion of human resources from cocoa to other economic activities, given the disconnection between the education offered to children and adolescents in the TILSB districts and cities and the agricultural practices/methods adopted by their parents and grandparents.

Unfortunately, the willingness of children and young people to remain in rural areas, and under which circumstances, was not captured by this study; it deserves further investigation in the future, considering that it is as a critical factor for the continuity of cocoa farming and other rural activities in this territory.

FIGURE 32

Minors (under 18) enrolled in school, and their work relation with the rural establishment

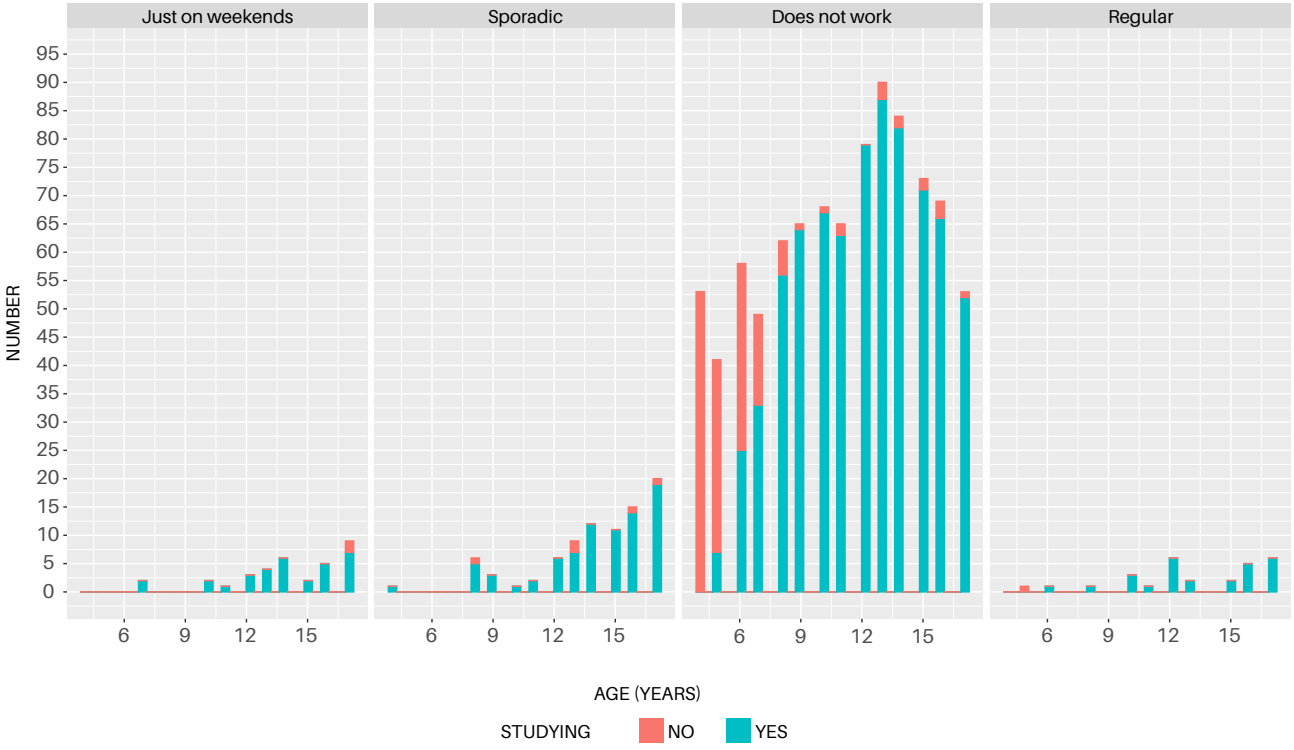
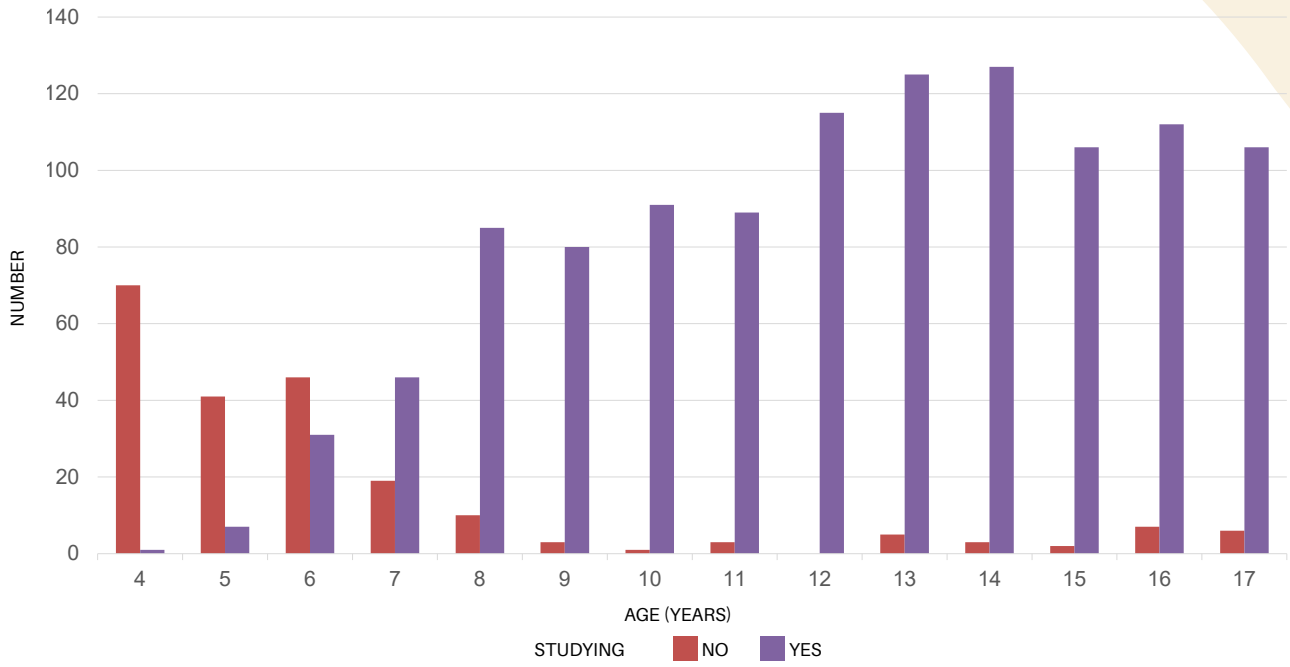


FIGURE 33

Presence of children and youngsters in school (4-17 years of age)



Working and Living Conditions

The 17 Sustainable Development Goals (SDGs) of 2015 establish guidelines for healthy living[2]. Objective 6 deals with access to potable water and states that the supply of water and the availability of sanitation for each person must be continuous and sufficient for personal and domestic uses. One of the problems in Brazilian rural areas is the precarious coverage of sanitation and water supply services, directly interfering in the quality of life, health and well-being of the population, in addition to fostering the propagation of diseases.

In this regard, data from this research draws a concerning picture, as only 29% of the properties have water supply through the public system (general GRID), and the majority have water obtained from a well or spring, without treatment that guarantees water potability. The poor reality of the water supply conditions observed are similar to those of sanitary facilities (existence of an adequate bathroom and sewage system) for the establishment's main house, as well as for the worker's house, showing the precariousness of rural dwellings (Figures 36 to 39).

Although only 911 establishments do have workers housing on site, Figure 38 shows that a large share of them, 32% (considering the main house and the worker's house) do not have a bathroom; the researchers considered as valid only the bathrooms located inside the house.

In Figure 39, the existence (or inexistence) of a bathroom was stratified by size of establishment, the larger the establishment, the greater the presence of a bathroom. It is important to note that houses of rural establishments often only serve as shelter during the workday, not as housing, given that in 40% of the cases in this study, workers actually lived in nearby urban centers.

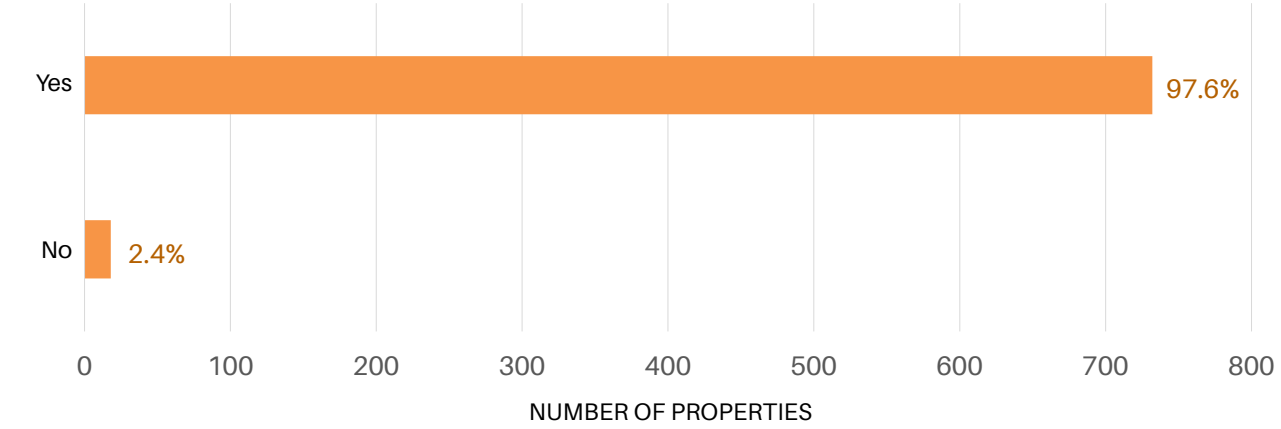
In relation to the basic infrastructure of a rural establishment, the supply of electricity has a greater weight and a fundamental role, as without it, living and working conditions are severely impaired. The development of a territory necessarily involves broad access to electricity supply. Although data shows that 78% of the properties interviewed have electricity (Figures 34 and 35), when two open questions were asked – "What are the worst problems in the region?" and "What do you want for the region in the future?" – electrical energy was prominently present among the responses. Therefore, we note that although there is supply of electricity, the service still needs regular maintenance to avoid power failures. In addition to constant power drops, there were many reports from the interviewees that the establishments had been out of power for over two months.

2 UN. Transforming our World: the 2030 Agenda for Sustainable Development, 2015.

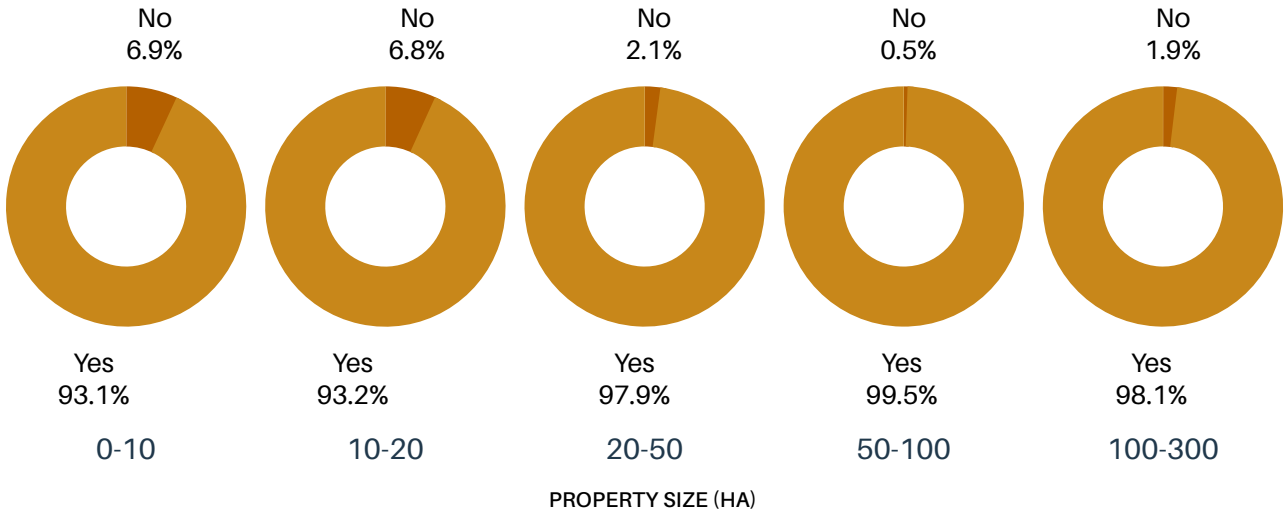
FIGURA 34

Among the properties that have electricity in the establishment, how many have energy in workers' houses?

IS THERE ELECTRICITY AT THE WORKERS' HOUSES?



DATA STRATIFIED BY PROPERTY SIZE



n= 744 | B1 2015/2016
*QUANTIDADE DE ESTABELECIMENTOS QUE POSSUEM ENERGIA ELÉTRICA E POSSUEM CASAS DE TRABALHADORES

FIGURE 35

Electricity in the establishment's main house

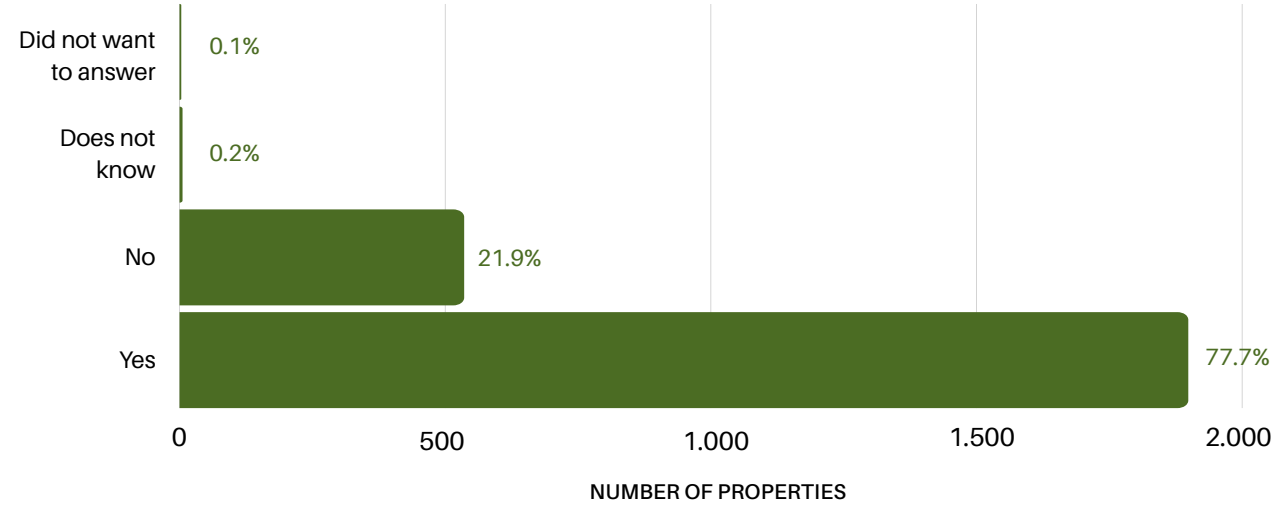
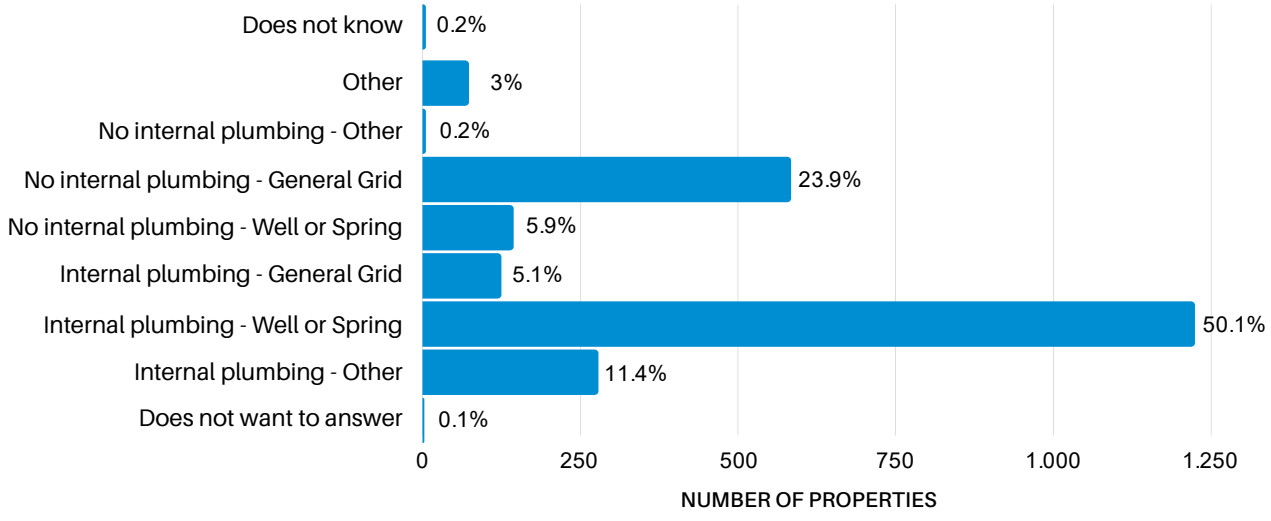


FIGURE 36

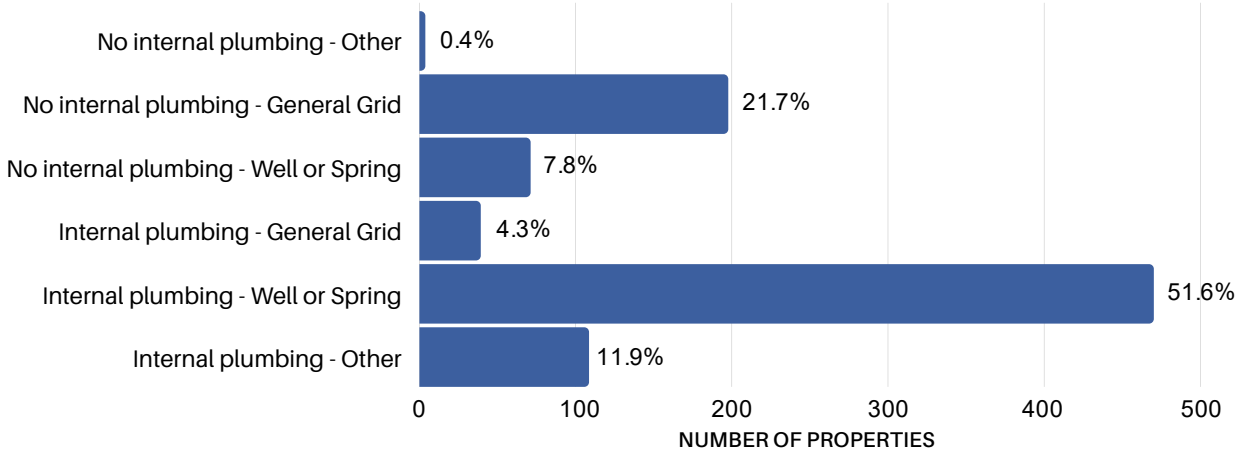
Water supply at the main house of the rural establishment



n= 2443 | B1 2015/2016

FIGURE 37

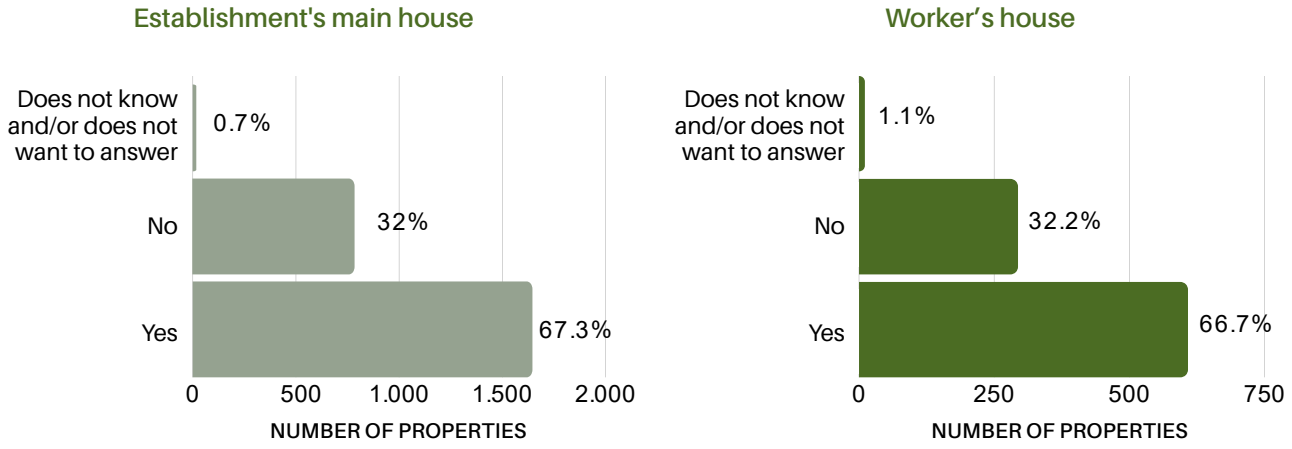
Water supply at the worker's house



n= 2443 | B1 2015/2016

FIGURE 38

Bathroom in the house



n= 2443 | B1 2015/2016

FIGURE 39

Bathroom in the worker's house x size of the rural establishment

B= 911 | B1 2015/2016

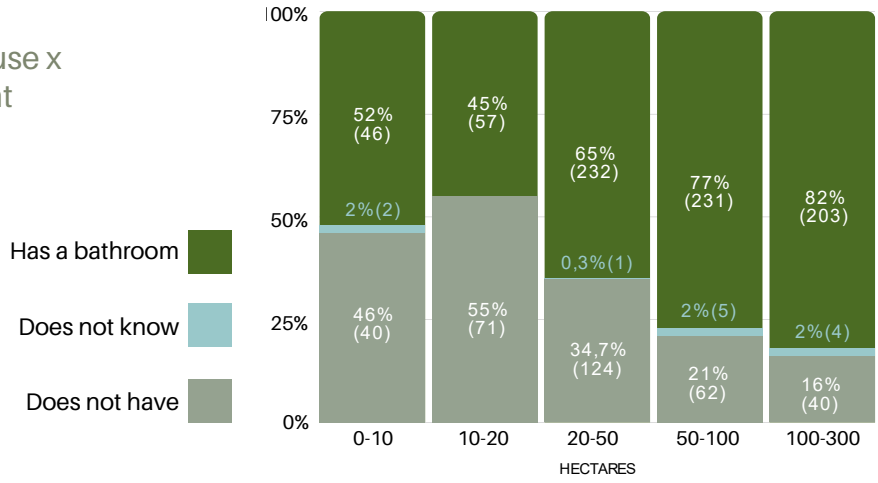
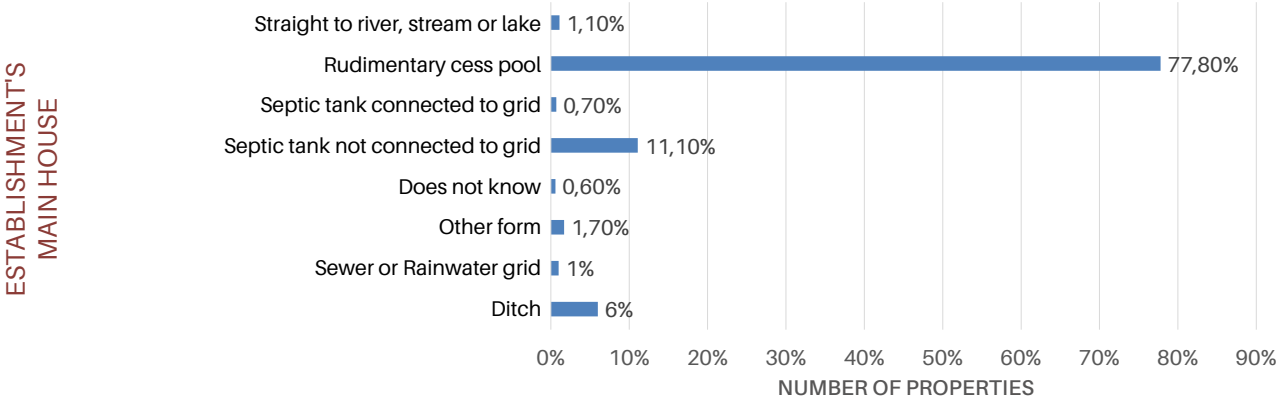
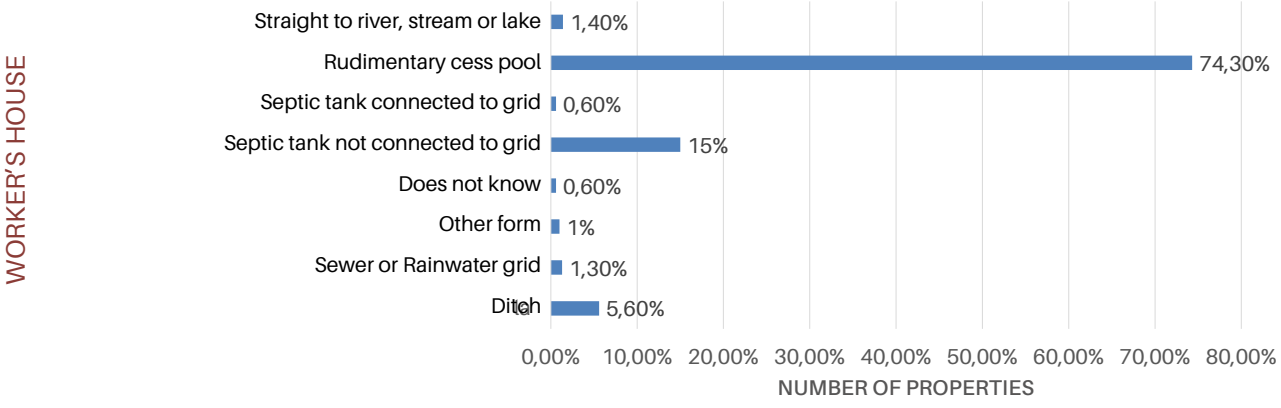


FIGURE 40

Domestic sewage system



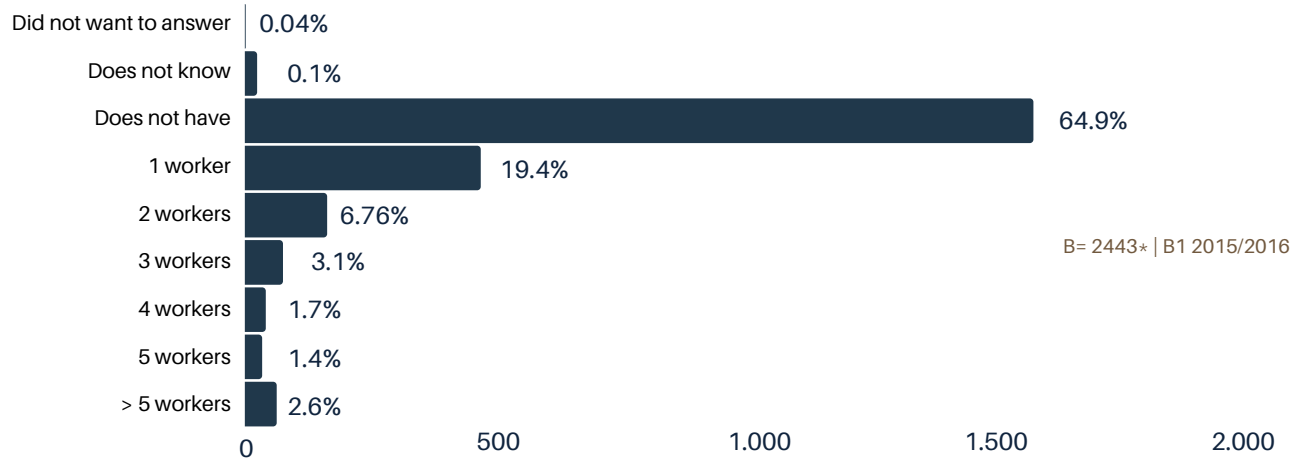


B= 911* | B1 2015/2016

To estimate the number of permanent workers per establishment, the non-family permanent worker criterion was adopted. The cocoa industry is labor intensive and has a low level of mechanization and even though the TILSB has the presence of a large number of small properties (55% of rural establishments are under 20 ha), which are establishments managed by the proprietor that rely exclusively on family work, data related to the 2015/2016 period showed 35% of establishments with permanent workers, with an average of 0.79/permanent worker per establishment. However, in the 2017/2018 period, there was a reduction of 1.5% in the number of establishments with the presence of workers, which dropped to 33.5%; and a reduction in the average number of workers per establishment, which dropped to 0.69/permanent

FIGURE 41

Number of permanent workers per establishment

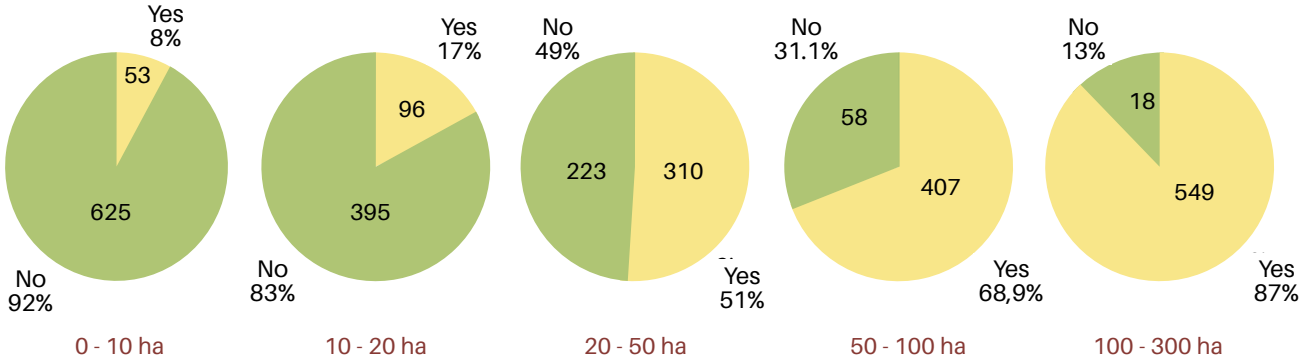


B= 2443* | B1 2015/2016

Average of **0.79 permanent workers** per establishment

FIGURE 42

Presence of permanent workers by size of establishment

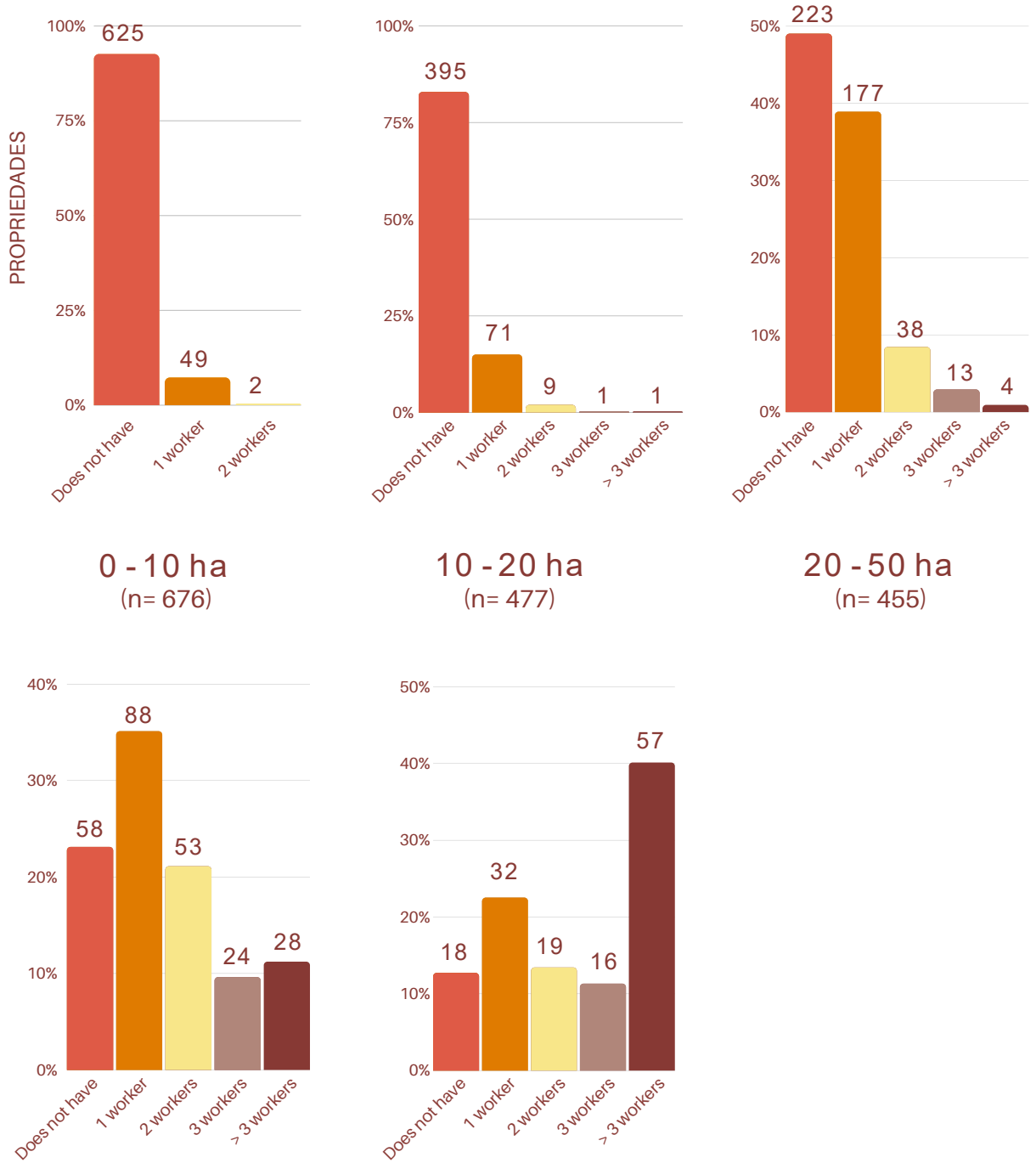


Average of 0.69 permanent worker per establishment
66.5% of establishments do not have permanent workers

n= 2001 | B3: 2017/2018

FIGURE 43

Number of permanent Workers by Size of Establishment



0 - 10 ha
(n= 676)

10 - 20 ha
(n= 477)

20 - 50 ha
(n= 455)

50 - 100 ha
(n= 251)

100 - 300 ha
(n= 142)

n= 2001 | B3: 2017/2018 | *NÚMERO DE ESTABELECIMENTOS PRODUTORES DE CACAU QUE INFORMARAM SOBRE MÃO DE OBRA PERMANENTE NO PERÍODO 2017/18

worker per establishment. The presence of permanent workers was, obviously, directly related to the properties' size (Figures 41 to 43).

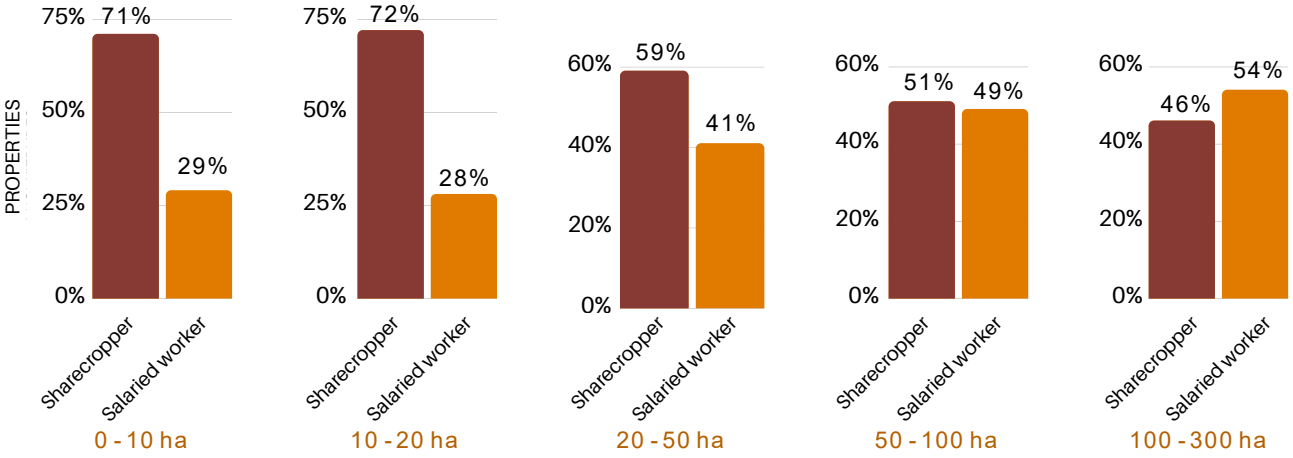
The agricultural partnership system has long been used in the cocoa agricultural activity [3]. The partner, or more commonly known as a "sharecropper" in the TILSB, is a constant agent in cocoa production, present in 60% of the establishments that have permanent workers. Currently, CEPLAC recommends that each sharecropper is responsible for an area between 5 and 7 hectares, depending on the family composition unit that will handle the work. The salaried worker is present in 46% of the properties that have permanent non-family labor, their presence has a direct relationship with the size of the establishment, that is, the larger the establishment, the greater their presence, since sharecroppers appears in all the strata of establishments, but with a predominance in the smaller strata, or up to 50 hectares (Figures 43 and 44).

The partnership system was established in the early 1990s, after the cocoa crisis in Bahia. This was a period of restructuring and adaptation to the new cocoa production conditions that multiplied in establishments throughout the region, as a way of survival for employees and semi-abandoned rural establishments. According to Figure 45, it is possible to note the presence of sharecroppers in all strata of establishments, but although the partnership may present an advantageous model in the production of cocoa, being practiced in many farms with some efficiency, in a scenario of productive decay and low investments, the sharecroppers actually survive, satisfied by appropriating part of the production without owning the land and still able to freely decide on their time, selling their labor force to other

3 The legal support of the Agricultural Partnership is the Land Statute, Law 4.504 of 11/30/1964, in articles 1.118 and 1.415.

FIGURE 44

Permanent workers' system in rural establishments



Each sharecropper manages an average of 11 hectares of cocoa

n= 683⁎ | B3: 2017/2018 | ⁎NUMBER OF ESTABLISHMENTS WITH PERMANENT WORKERS

activities in "slower" times. The landowner, on the other hand, has the guarantee of his rural patrimonial asset, without taking too many risks.

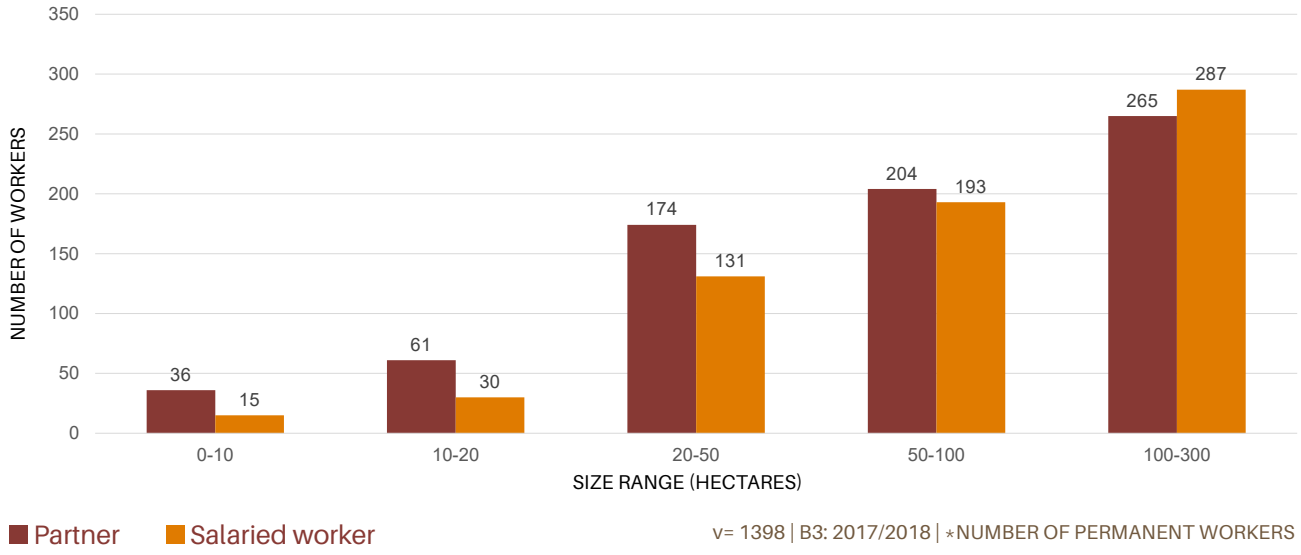
But, a partnership system without investments and technical guidance is not efficient, since the agricultural activities necessary for the proper management of the cocoa crop, with the exception of clearing and harvesting, are defined by sharecroppers, according to their willingness and time, and the natural conditions that rule the activity, all of which contribute to low cocoa productivity.

In terms of amount received for the work, the usual scenario is: the sharecropper receives an average of 50.3% of the total cocoa revenue, while the salaried worker receives an average of 1.06 minimum wage units. The average age of workers identified was 45 (sharecroppers 48 and salaried workers 43 years old). As for the place of residence, 73% of the workers (sharecroppers and salaried workers) live in rural areas and 74% of these have a family member living with them at the property. The average number of members in the worker's household was 2.6 members, with 50% of workers having less than 2 family members living in the rural property with them. However, in only 6% of the cases there is help from more than one family member in the rural work and 56% of the workers do not receive family help in rural activities.

Another important agent in the cocoa production system in the TILSB is the daily (temporary) worker, which was present in 41% of the properties, with an average of 25 days of work hired per property, throughout the year.

FIGURE 45

Number of partners (sharecroppers) and salaried workers x size of the property



v= 1398 | B3: 2017/2018 | *NUMBER OF PERMANENT WORKERS

Cocoa Production Systems, Management and Productivity

The Southern Coastal Identity Territory of Bahia, due to its edaphoclimatic heterogeneity, has several systems of agricultural production. The region's cocoa farming is no exception, it has several production systems, which include the intensive cultivation of cocoa in full sun, as well as consortia cultivation and agroforestry systems. The agroforestry ecological system called "cacau-cabruca" is predominant, present in 62% of the rural establishments in the territory. The "cabruca" system consists of the economic exploitation of an agricultural crop grown in the sub-forest of the Atlantic Forest, enabling the preservation of fragments of the primary tropical forest and the conservation of water resources and of the diverse fauna (LOBÃO and VALERI, 2009).

According to data in the present study, cacau-cabruca is present in 78% of the cocoa-producing establishments, of which 21% are unaware of the territorial area of their property (Figure 46). There is an average of 10.9 hectares of cacau-cabruca per establishment, with a productivity of 11.8@/ha/year of cocoa (@ = arroba = 25 pounds or 12 kg), and an average property monthly income of R$ 1,582.00. A total of 3% of respondents did not want to answer questions about production and income, and 9% of them did not know their annual cocoa production. The lack of knowledge about the rural establishment, by the producer, demonstrates a weakness in the management of the establishment, which lowers the capacity of effective management of the crop, causing productivity to be low, and far below its productive potential.

Banana (Musa spp.) is the crop most cultivated in consortium with cocoa in "cabrucas", occurring in 72% of the areas. It represents an alternative to complement/increase profits of the rural establishment, due to its adaptability to the productive system and the farmer's experience with the crop in this region.

Among the 22% of cocoa farmers that do not have "cabruca", the main agricultural crops grown in the TILSB are: cocoa, banana, rubber tree, cassava and coconut, which are represented in ascending order in the wordclouds illustrated by Figures 47 and 48.

The most consortiated crops identified were cocoa-rubber tree and cocoa-banana (Figure 49). Banana was the most frequent crop in consortium with cocoa trees outside of the "cabruca" system, present in 60.6% of the consortia, followed by rubber tree, in 41% of the consortia crops.

The cocoa-rubber tree agroforestry system, considered by many to be "the perfect marriage", had its expansion in southeastern Bahia in the early 1980s. The rubber tree (Hevea brasiliensis Müell. Arg.) was

FIGURE 46
TILSB establishments that have cocoa in the "cabruca" system

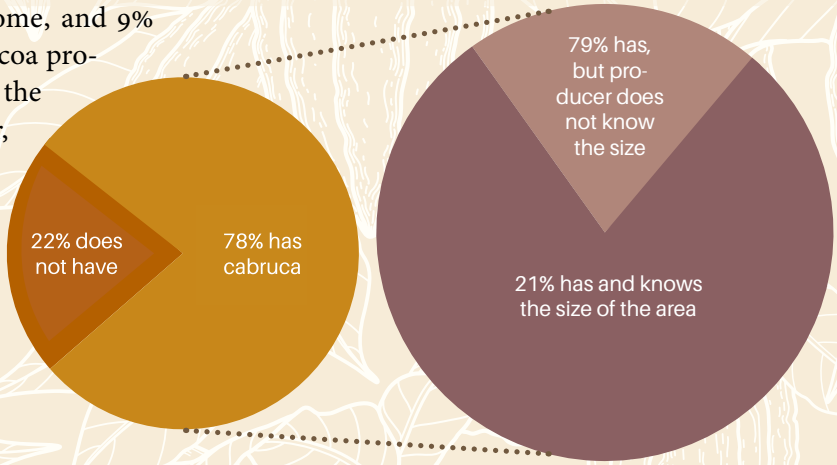


FIGURE 47

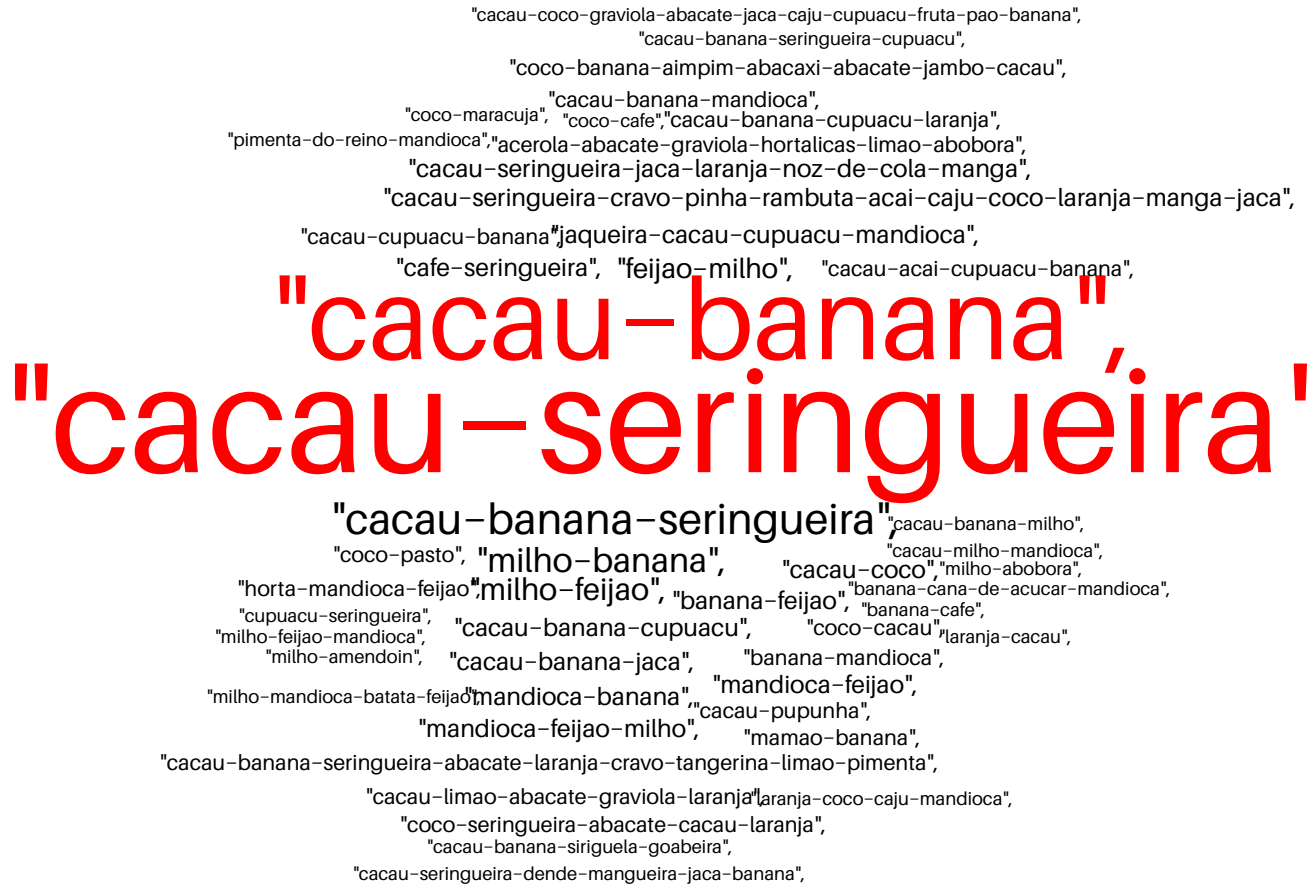
Wordcloud of the main crops cultivated by cocoa farmers in the TILSB outside cabruca

FIGURE 48

Wordcloud of the main crops cultivated by cocoa farmers in the TILSB outside the cabruca (removing cocoa)

FIGURE 49

Consortia most used by cocoa farmers in the TILSB



adopted as a shading tree for the cocoa tree, which was planted between the lines of the rubber plant, initially at 7x3m spacing, which has a density of approximately 476 cocoa plants and 476 rubber trees per hectare, which led to good results in the region. Currently, there are several recommended spacing models for this zonal agroforestry system (SAF), of which the 17x3x 2.5m of rubber trees, with cocoa in 5 rows of 3x3m at 2.5m distant from the rubber tree stands out, with a density of 833 cocoa plants per hectare, and 400 rubber trees. The advantages of this system, which has two commodities, include: better income distribution throughout the year, due to the continuous exploitation of latex (from the rubber-tree), less susceptibility to price fluctuations in the commodities market, rational land use, increased conservation of the soil and biodiversity, enabling higher productivity and providing greater profit per unit area (Virgens Filho, 2017, publication).

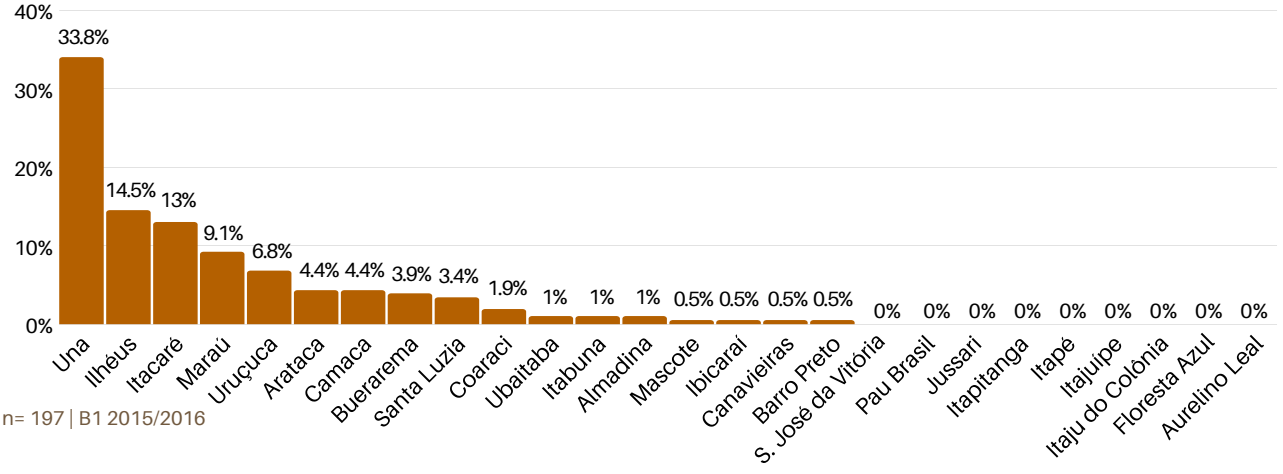
The cocoa-rubber tree agroforestry system occurs in 8% of the properties, most of them in the coastal strip of the territory, with the municipalities of Una, Ilhéus, Itacaré and Maraú as the main producers (Figure 50). The average cocoa productivity in establishments that have a cocoa-rubber tree agroforestry system is 13.4 @/ha, and the average monthly revenue from agricultural production is R$ 871.80.

Among TILSB's cocoa producing establishments, 8.7% adopted the intensive single cocoa cultivation system, or full sun. With an average occupancy of 7.5 hectares per establishment, and 50% of the establishments with areas under 3.5 hectares. Its incidence is well distributed in the territory and does not follow a climatic pattern of distribution, since it is present from the humid climate, which encompasses the coastal strip of the territory, to the transition strip, from sub-humid to dry climate, which comprises municipalities located farther from the coast. Cocoa growers' lack of information in this production system also deserves to be mentioned, as 27% of the properties were unable to inform the size of the cultivated area. This system had an average property monthly revenue of R$ 1,257.00. Itacaré, Ibicaraí, Coaraci and Camacan municipalities stand out as the ones with the greatest adoption of this cultivation system (Figure 51).

The average cocoa productivity in the full sun system in the TILSB was only 15@/ha/year. However, the municipality of Ilhéus stood out in terms of productivity, with an average of 104.3@/ha/year,

FIGURE 50

Distribution of the cocoa x rubber tree agroforestry system (outside cabruca) by municipality



n= 197 | B1 2015/2016

FIGURE 51

Distribution of establishments with cocoa cultivation in full sun

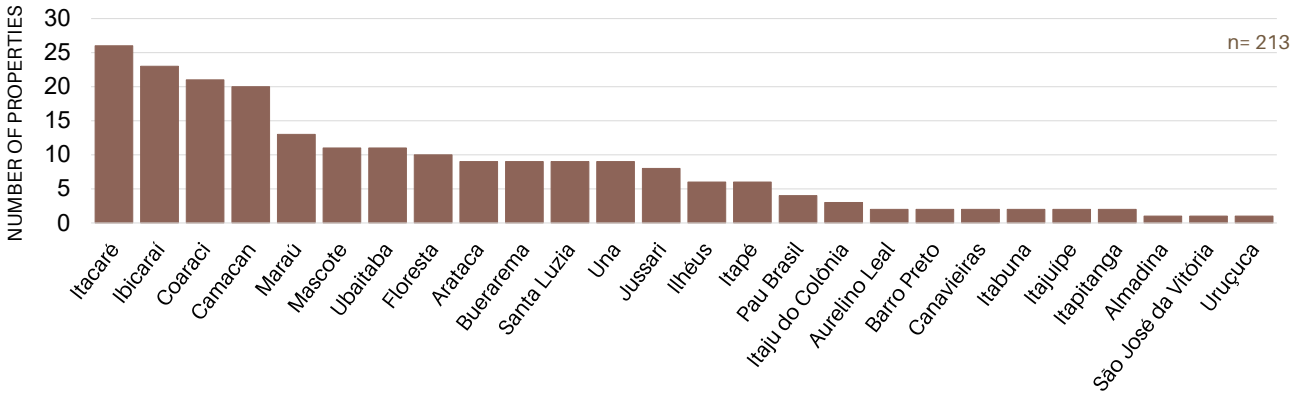
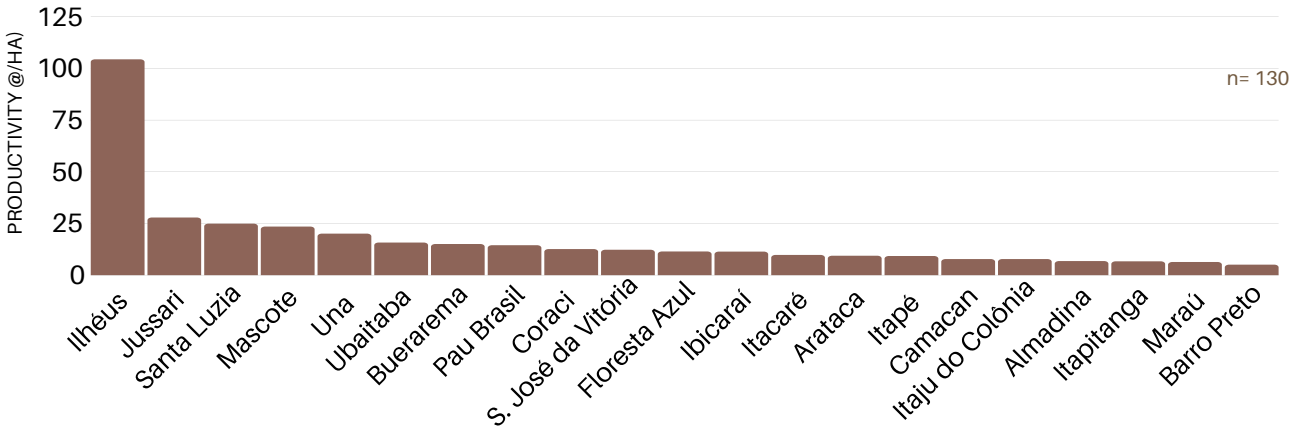


FIGURE 52

Average cocoa productivity in full sun by municipality in the TILSB



a productivity 695% higher than the average of this system in the TILSB. The same did not happen with other municipalities, which showed relatively low productivity, as shown in Figure 52.

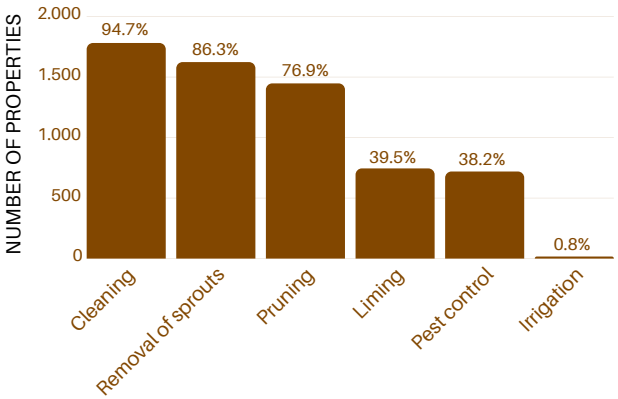
In relation to crop management, data accounted for its practice or not during the entire year, even if only a small part of the property received handling/management. Data collected shows that the most widely adopted practices were clearing, sprout thinning and pruning (Figure 53). Pest control was done in 38.2% of the properties, with the control of anthills and termite mounds being the most frequent.

The TILSB has low technological adoption at field-level; the sprayer was the only equipment used in more than half of the properties, while only 38% of the establishments used brush cutters and chainsaws, at least once a year. Tractors are used by only 8.6% of the properties, which implies a greater need of labor, which defines regional cocoa production as a labor-intensive activity (Figure 54).

Soil fertility analysis, essential management practice and indispensable tool in the liming and fertilizing processes, has never been done by 56% of the TILSB cocoa farmers, it is practiced occasionally by 42% and frequently done by 2% of the establishments. Among the producers who already carried out the practice, 48.8% of the establishments had conducted it more than 7 years before, while 27.2% had conducted the last analysis 2 or 3 years before and 12.3% of the establishments had done the last analysis sometime in the previous 3 to 6 years (Figure 55).

FIGURE 53

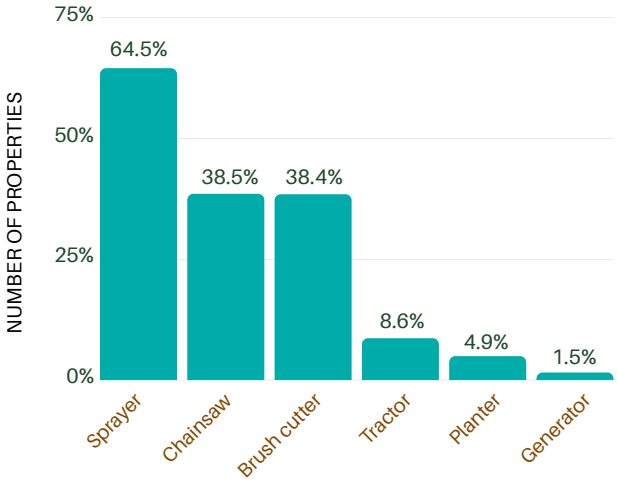
Crop management adopted in cocoa producing establishments in the TILSB



n= 1880 | B3

FIGURE 54

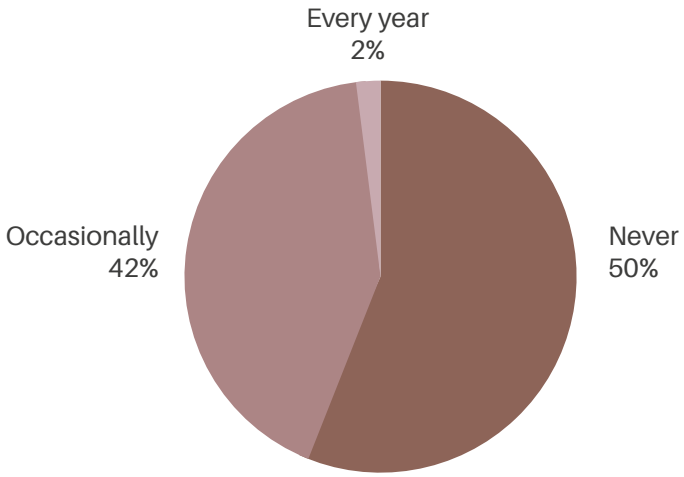
Equipment and machines used by cocoa producing establishments in the TILSB



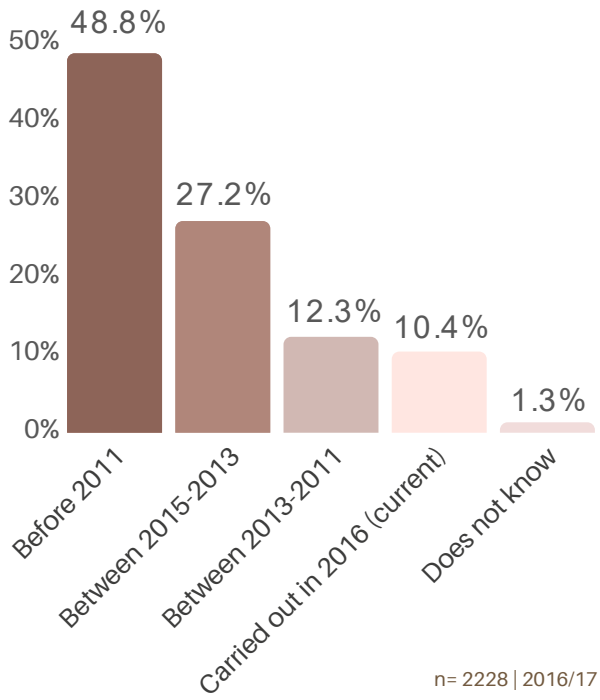
n= 1840⁎ | B4: 2019/2018 | ⁎NUMBER OF COCOA-PRODUCING ESTABLISHMENTS THAT REPORTED THE USE OF MACHINERY AND EQUIPMENT

FIGURE 55
Soil analysis in cocoa producing establishments in the TILSB

How many properties have already carried out soil analysis?



Of those that did, when was the last time they had the soil analyzed?

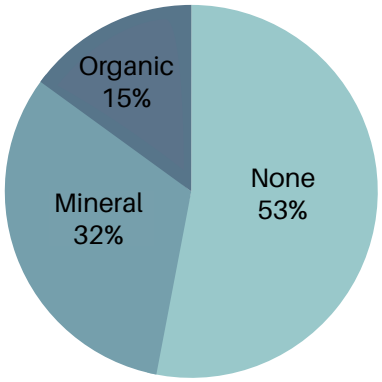


n= 2228 | 2016/17

To estimate the use of fertilizers, the survey took into account the application of fertilizers, at least once, in any fraction of the productive area. The results showed that the majority, 53% of the establishments, did not use any type of fertilizer. Organic fertilizers were used by 15% of the properties and mineral fertilizers by 32% (Figure 56). These numbers are low for an agricultural activity, since the continued soil use with crops leads to nutrient reduction, which must be reintroduced to maintain soil fertility and the system's nutrient balance. Another factor to be considered is that although a good part of the cocoa nutrients are found in its shell, and it usually remains in the production site, this does not mean that there is a replenishment of the nutrients at the place of origin, since there is extraction of nutrients within the productive system, and a concentration of pod breaking and husking (waste shells) in a specific area where the leftovers are deposited.

FIGURE 56

Use of fertilizers

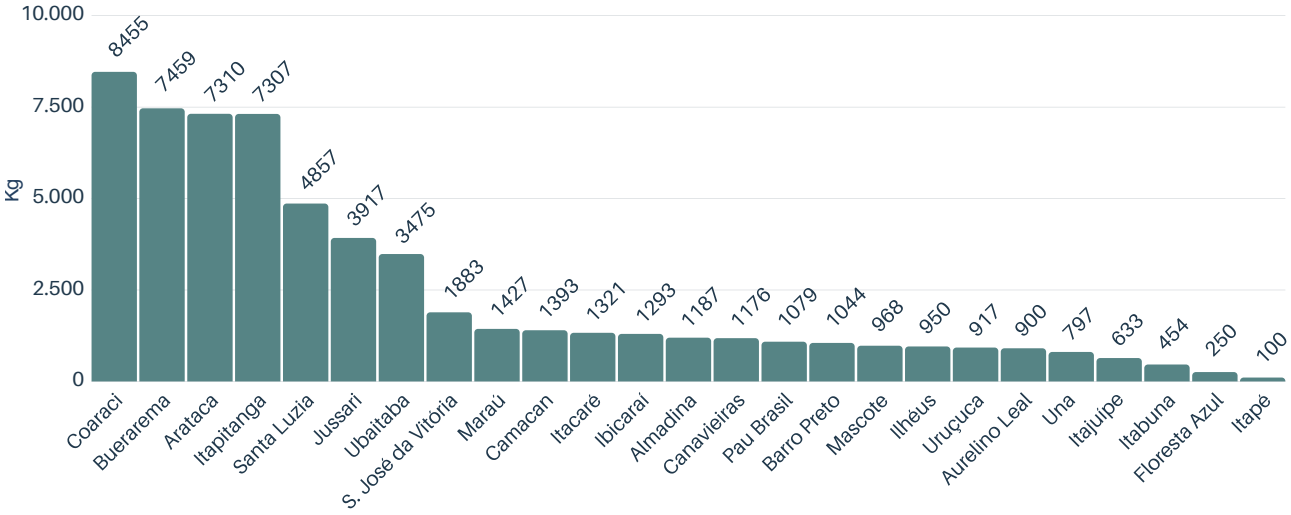


n= 2044 | B3 2017/2018

Among the establishments that had used fertilizers, 27.5% were unable to inform the quantity used (in the year analyzed). The 72.5% of producers who reported the largest fertilizer use, in volume, were located in the municipalities of Coaraci, Buerarema, Arataca and Itapitanga (Figure 57).

FIGURE 57

Average quantity of fertilizers used per municipality



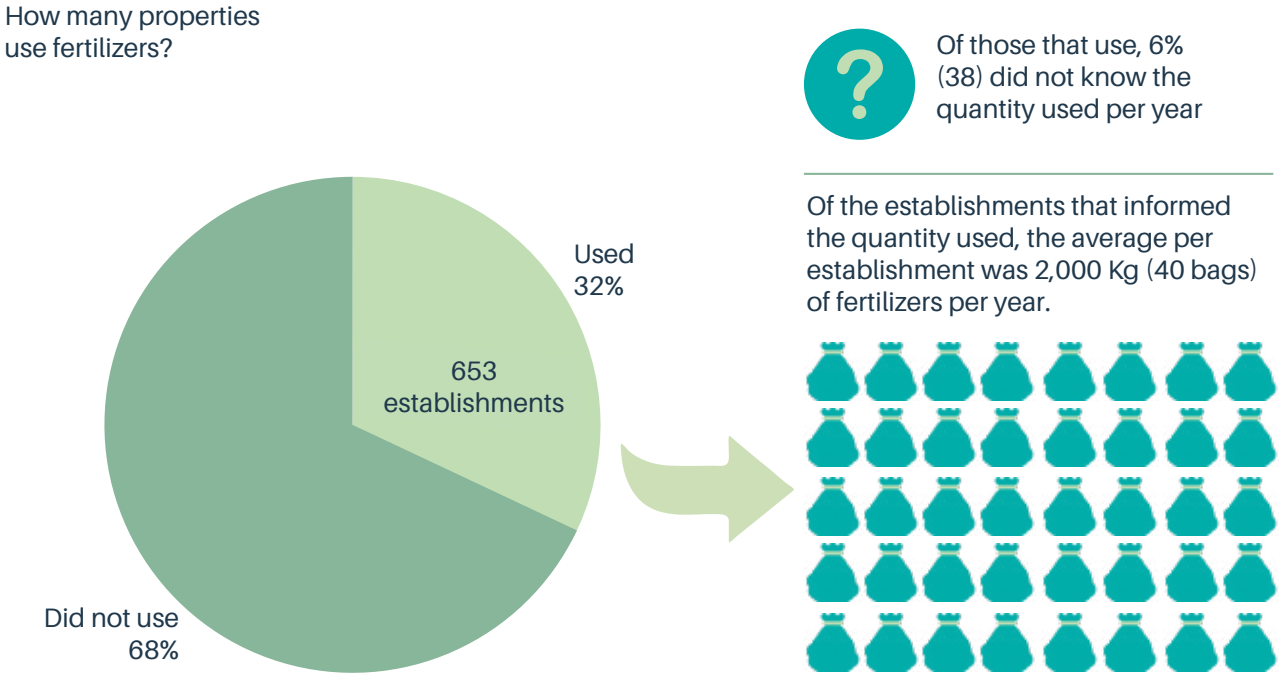
n= 653 | B3 2017/2018

Among the 32% of establishments that used mineral fertilizers in the 2017/18 period, 6% were unable to inform the quantity used. Of the remaining 94% who were able to inform the amount applied, the average was 2,000 kg/year per establishment (Figure 58).

The use of fertilizers in the 2018/2019 period was slightly lower than the previous period, being carried out by 26% of the establishments. However, in 81% of the cases the producer did not use parceled application (Figure 59). According to CEPLAC (Executive Committee of the Cocoa Farming Plan), the official cocoa technical assistance body, that owns the largest cocoa research center in the world, mineral fertilizers should be applied in fractions, and done at least three times, for crops in formation, and at least twice for crops in production.

FIGURE 58

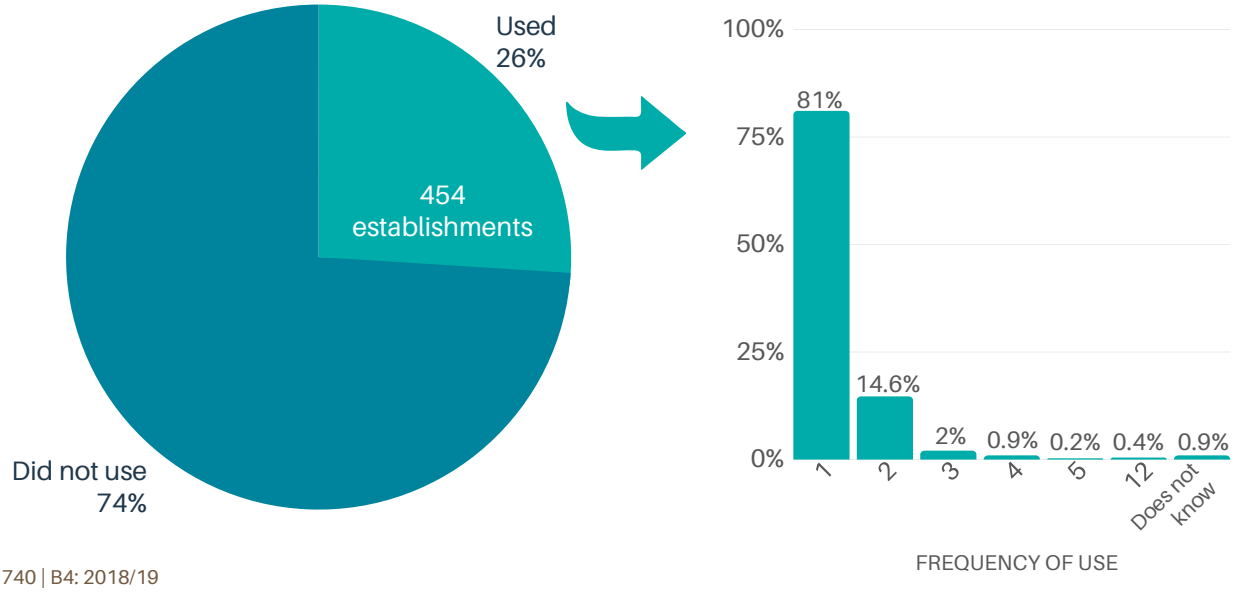
Use of mineral fertilizers in cocoa producing establishments in the TILSB



n= 2044 | B3: 2017/18

FIGURE 59

Use of mineral fertilizers and number of applications per year in cocoa producing establishments in the TILSB



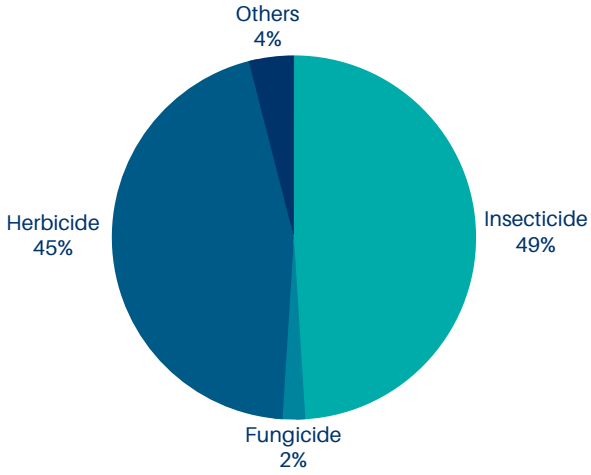
n= 1740 | B4: 2018/19

In order to investigate whether the TILSB cocoa farmers carried out pest and disease prevention, the number of establishments that used pesticides was identified (Figure 60). Data collected shows that only 2% of the establishments used fungicides and that 45% used insecticides, the latter being mainly composed of products to control and prevent ants.

The main diseases that affect TILSB's cocoa trees were also investigated for this report. As expected, Witches' Broom, a disease caused by the Moniliophthora perniciosa fungus, was the most frequently mentioned, present in 94% of the cocoa properties, followed by the brown rot, a disease caused by the Phythopthora spp. Fungus, which affects 76% of the establishments. Less frequent was the ceratocystis wilting or Mal-do-machão, as it is popular known, a disease also caused by a fungus, Ceratocystis cocoafunesta, with an incidence rate of 24% among the establishments (Figure 61).

FIGURE 60

Use of agrochemicals



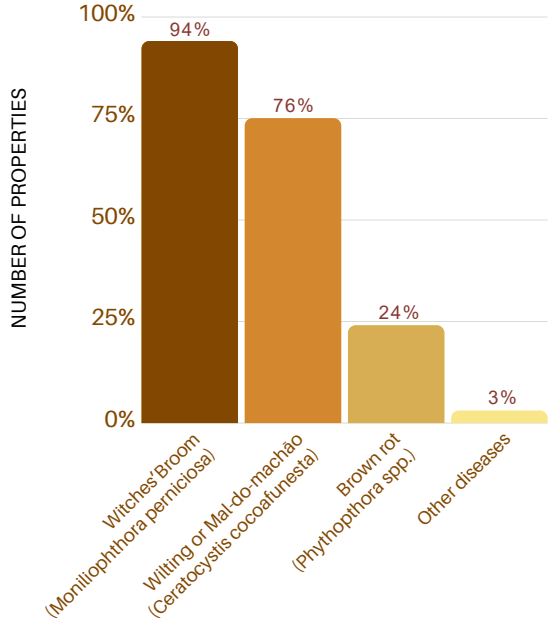
n= 1840 | B4

As a measure of disease control, Figure 62 shows the management practices adopted by cocoa farmers. It is possible to see a high rate of properties that do not adopt any method of disease control. Pruning has been the most adopted practice to control Witches' Broom, by 56.9% of establishments, followed by the use of resistant genetic materials by 11.4% of them, which is currently the most effective method of disease control.

The high incidence of witches' broom corroborates with data on the cocoa varieties used in the properties, as 95% of the establishments have the common varieties (such as Pará, Parazinho and Maranhão), as shown in Figure 63, which are very susceptible to Witches' Broom. Again, there is a high level of misinformation by the farmer, as 22% of them have no knowledge of the genetic materials used in their planted areas.

FIGURA 61

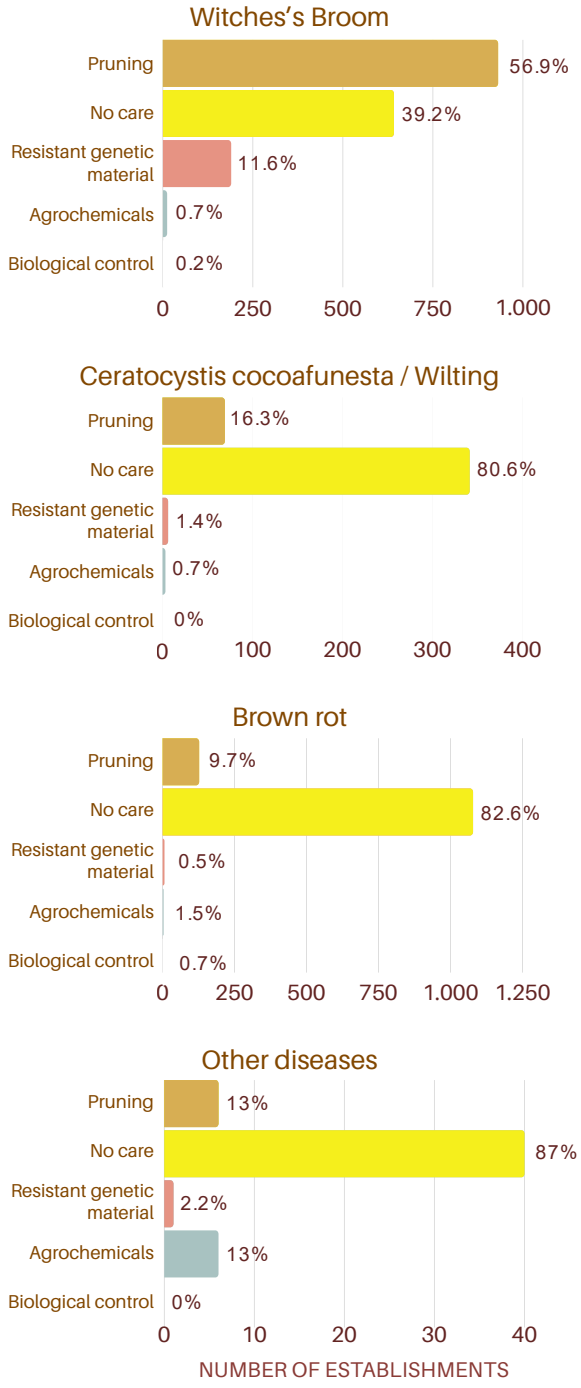
Incidence of cocoa diseases in producing areas



n= 1740 | B: 2018/19

FIGURE 62

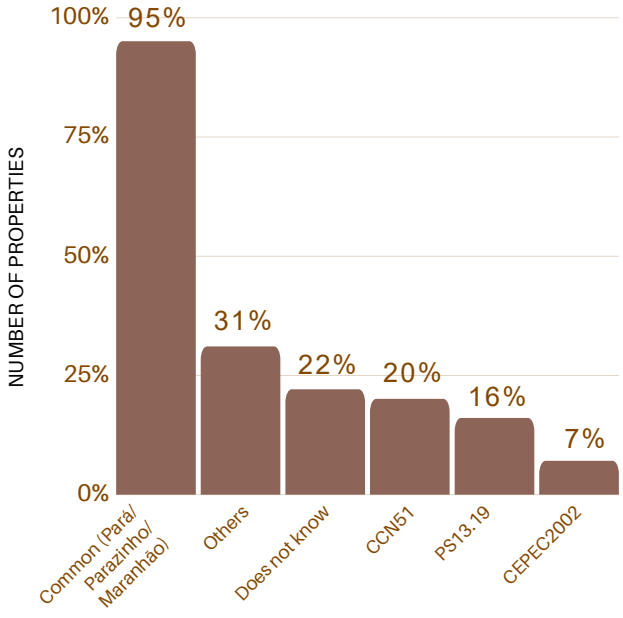
Disease control in cocoa producing establishments in the TILSB



n= 1740 | B: 2018/19

FIGURE 63

Cocoa varieties used in producing establishments in the TILSB



n= 1880 | B3

Cocoa plantations are predominant in the TILSB, the crop occupies an average area of 11 hectares per establishment, with 50% of the establishments having, at least, 5 ha of area. Nevertheless, the poor knowledge of the cocoa farmer regarding productive systems, combined with low access to resources and techniques, lead to low productivity. Figure 64 shows the average cocoa productivity in @/ha of establishments stratified by size ranges. It is possible to note that there is a relationship between productivity and the size of the establishment, and it can be said that the smaller areas have the higher productivity, on average.

Figure 65 shows productivity by municipality; there are higher productivity levels in municipalities farther from the coast, which have newer, less weathered and, consequently, more fertile soils. However, more in-depth research of the establishments in relation to productivity is required to better understand all the variables, and their correlations, which are many, involved in the process.

In order to better understand the productivity ratio by municipality, a boxplot was made (Figure 66). It is visible that there are overestimated productivity averages, like the case of Itajú do Colônia, where only one establishment with high productivity affects the average of the municipality. Nonetheless, the municipal averages are well distributed, and there are 12 municipalities with average productivity above the regional average.

FIGURE 64

Productivity in @/ha of cocoa x size of establishment

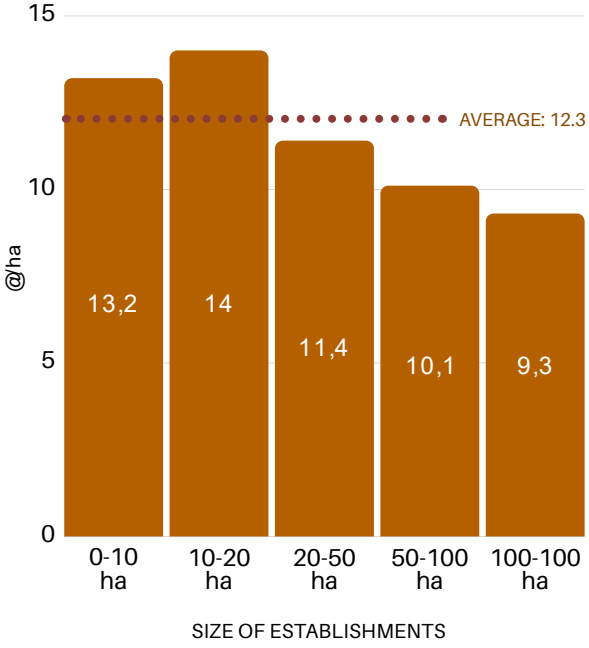


FIGURE 65

Average cocoa productivity by municipality

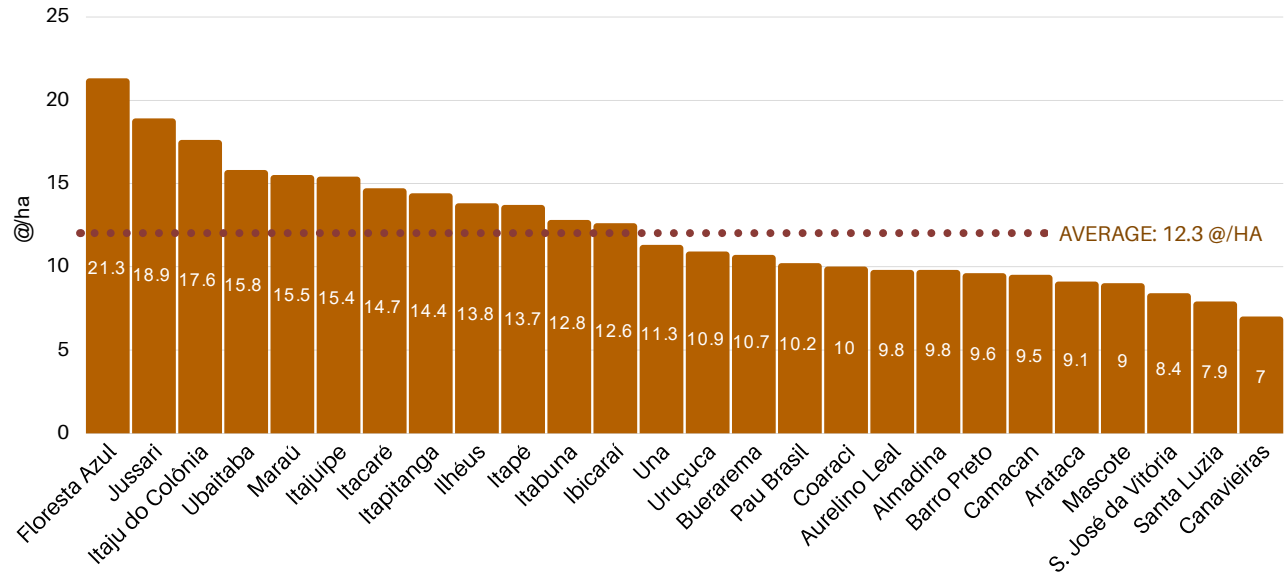
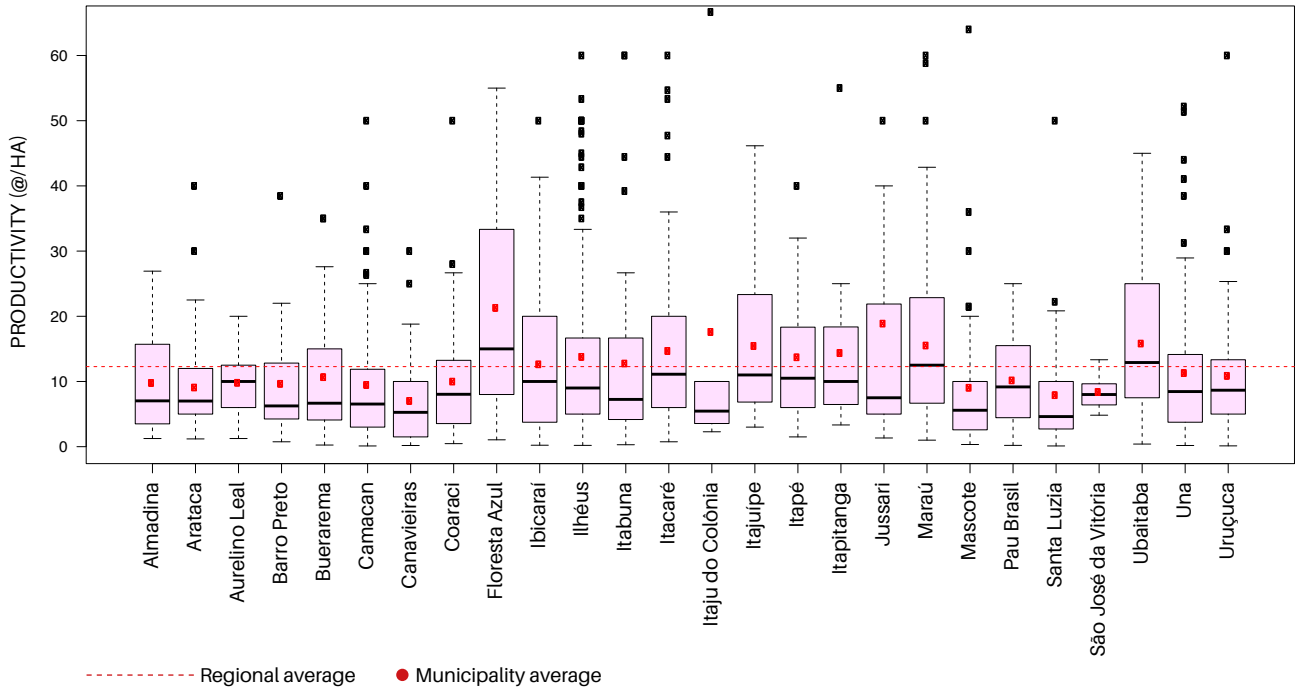


FIGURE 66

Boxplot of cocoa productivity by municipality



Overall, it is possible to say that the properties that have the cocoa varieties CCN51, PS13.19 and CEPEC 2002, even if cultivated in only small areas of the property, presented better yields in relation to the other establishments (Figure 67).

Among the factors that had a correlation with productivity, production increases were not expressive. Among the establishments that used fertilizers, average yield was 14.8@/ha, and 11.27@/ha for those that did not use it; average of 15.5@/ha for properties that used fungicides and 12.2@/ha for those that didn't use it. Average yield was 15.7@/ha among properties that had received technical assistance; and 12.2@/ha for properties that did not. Considering crop management practices, clearing was the practice that most influenced productivity, increasing productivity by 73% among producers who performed it (Figure 68). The location of the producer's dwelling was another factor correlated with productivity, since those residing on the property presented lower productivities compared to producers living in urban areas or with the producers who resided in other rural properties (Figure 69).

FIGURE 67

Average productivity in 2018/2019 x presence of the cocoa variety in the establishment

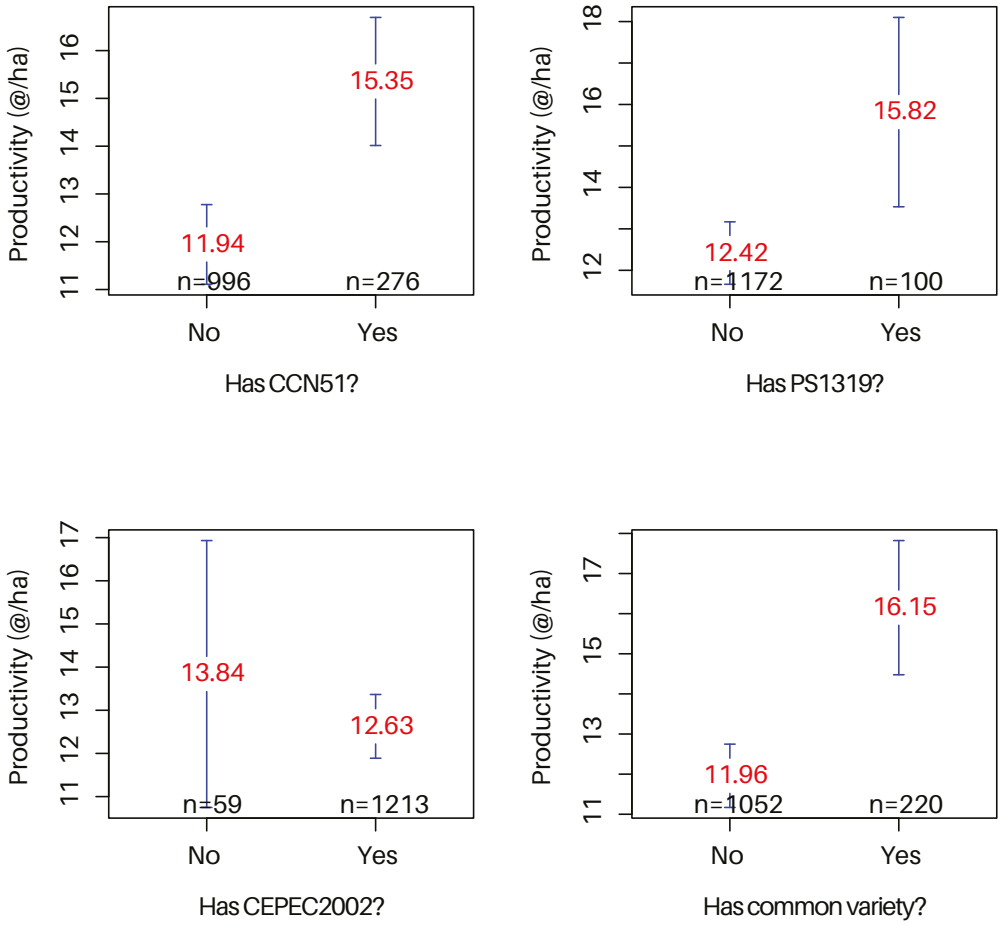


FIGURE 68

Average productivity in relation to clearing practice

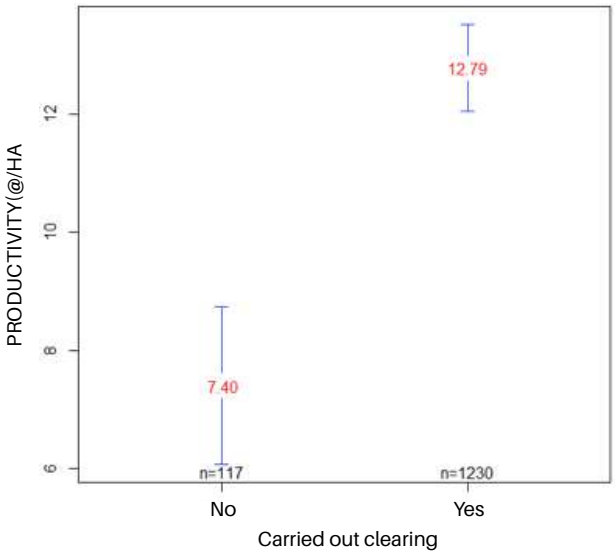
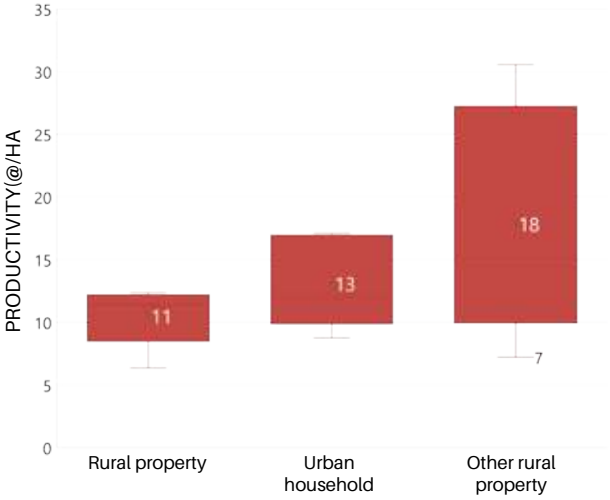


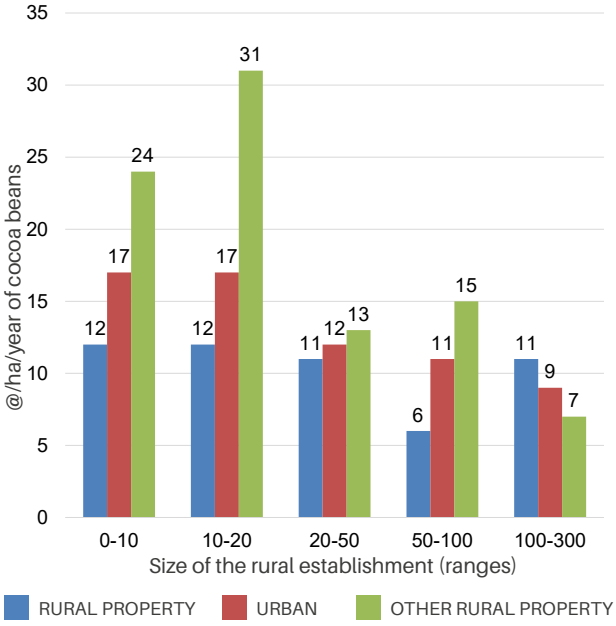
FIGURE 69

Productivity according to the rural producer's home location

Cocoa productivity per housing location of the rural producer



Cocoa productivity per housing location of the rural producer stratified by size of the rural property



n= 1840 | B4 2018/19

Cocoa processing

Cocoa processing highly affects the overall quality of the beans. Although other factors, such as genetics, productivity and climate conditions do influence quality, harvesting, fermentation and drying processes have the greatest influence on the final quality of the cocoa bean.

Cocoa fermentation is usually done using wooden boxes, where the beans are deposited with the pulp that surrounds them. In Southern Bahia, farms have buildings that house the wooden boxes, known as fermentation houses, which protect the boxes from the outside weather, and enable better storage conditions and temperature control. After breaking of the cocoa pod, the fresh beans are stored in boxes for fermentation to occur. The fermentation process takes from 5 to 8 days, depending on the humidity conditions and local temperature, in addition to the bean properties, such as pH and brix degree. Fermentation occurs naturally from the action of yeasts and lactic acid bacteria in the first days, known as the anaerobic phase of the process, and by acetic bacteria in the final stage, known as the aerobic phase, where cocoa beans are transformed into almonds given the death of the embryo, combined with enzymatic reactions leading to taste and aroma. Whenever more technical approaches are adopted, thermometers are used to monitor temperature, so that the cocoa mass can be revolved at the ideal/exact timing. Revolving is essential, in order to incorporate more oxygen into the process and control its temperature. In places with limited technology conditions, this procedure can be carried out 48 hours after fermentation begins, and be repeated every 24 hours until the desired fermentation is reached; which should not surpass 7 to 8 days, so that there is no excessive fermentation and loss of bean quality (FERREIRA, 2017; MARTINS, 2012). In a nutshell, the fermentation process is very important for the quality of the bean, because it is during fermentation that the permeability of the shell is broken, moisture is reduced, and acidity and bitterness of the cacao is decreased.

Since processing is key for the quality of the cocoa beans, this report also investigated the post-harvest cocoa infrastructure, as well as the processes carried out by the cocoa farmers.

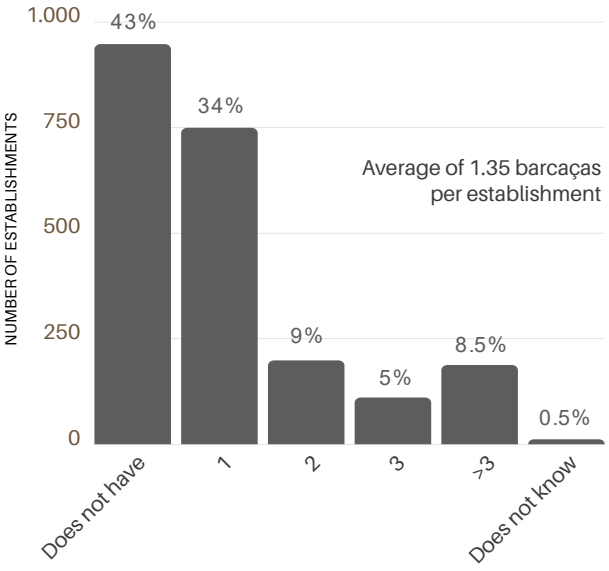
The cocoa drying structures are present in most establishments: 57% of the properties have "barcaças" (Figure 70) and 36% of them have dryers (Figure 71). "Barcaças" are by far the most frequent processing structures in the TILSB, with an average of 1.35 "barcaças" per establishment. Dryers were present at an average of 0.41 per property.

Structures for cocoa fermentation are present in a small share of the establishments, only 27.5% of them have fermentation houses (Figure 72). There is an average of 0.32 fermentation houses per establishment in the territory.

The survey also investigated how many establishments carried out cocoa fermentation (Figure 73). It was possible to observe that most establishments do ferment cocoa. However, 27% of the establishments, almost a third of the properties do not do it. Among the reasons for not conducting fermentation, were: 30.5% of the establishments reported that the procedure does not add value to the product, 22% reported that it is a lot of work, 3% said they did not know the procedure and 56% reported other reasons, such as the little volume of cocoa produced and the urgency to commercialize the product because of the financial returns; in these places only the drying process was carried out before commercialization.

FIGURE 70

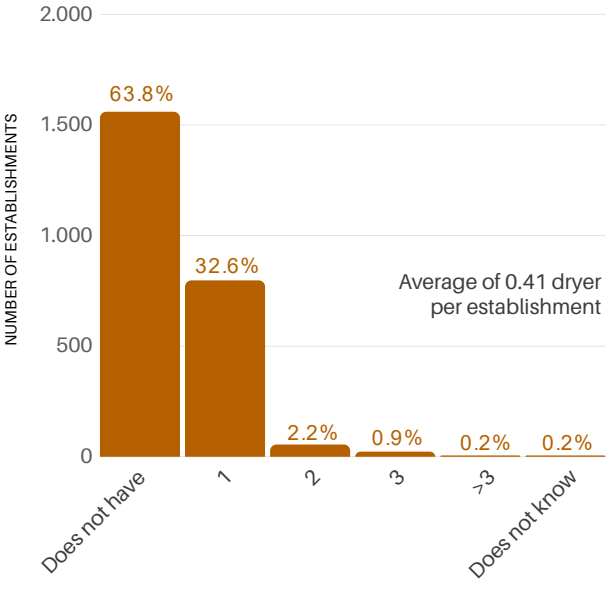
Number of "barcaças" per cocoa producing establishment



n= 2203 | B1: 2015/16

FIGURE 71

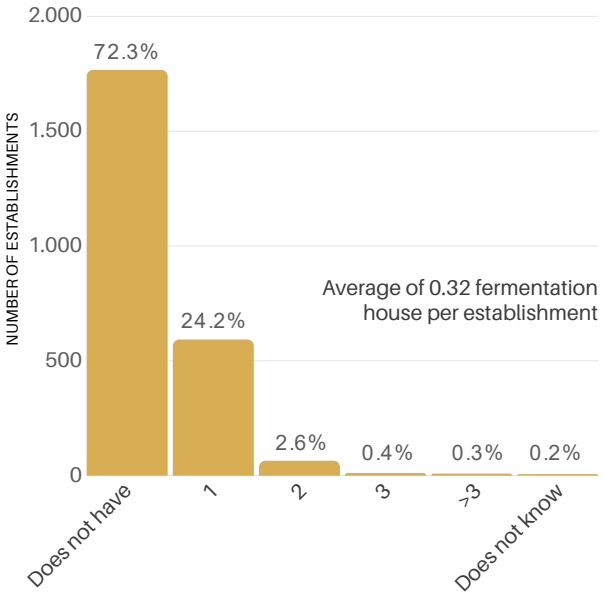
Number of dryers per establishment



n= 2442 | B1: 2015/16

FIGURE 72

Number of fermentation houses per establishment



n= 2442 | B1 2015/16

Among the producers who did conduct fermentation, 42% used boxes, 18% carried it out within the plantation (a stack of cocoa beans, either covered with banana leaves or not), 21% of the establishments put the seeds in bags to ferment, and 22% of them held other types of fermentation.

Fermentation is conducted along 5 to 8 days in 20% of the establishments in the TILSB, 78.3% of them conclude fermentation in less than 5 days. The average fermentation time obtained was 3.5 days (Figure 74).

Finally, the survey verified how many establishments revolved the cocoa mass or controlled the temperature of the fermentation process among those that conducted fermentation (lasting more than 4 days) (Figure 75). Of these 252 establishments, only 10% carried temperature control and 21.8% of them revolved the cocoa mass. In general,

only 3.16% of the cocoa producers carry out the fermentation process between 5 to 8 days and revolve the mass, which is the recommended procedure.

After fermentation, beans undergo the drying process, the stage in which humidity and acidity levels are reduced. There are several structures for drying cocoa in the TILSB, but the "barcaça" (a raised platform with a moving roof on rails) is the most commonly found in the properties.

FIGURE 73

Cocoa fermentation

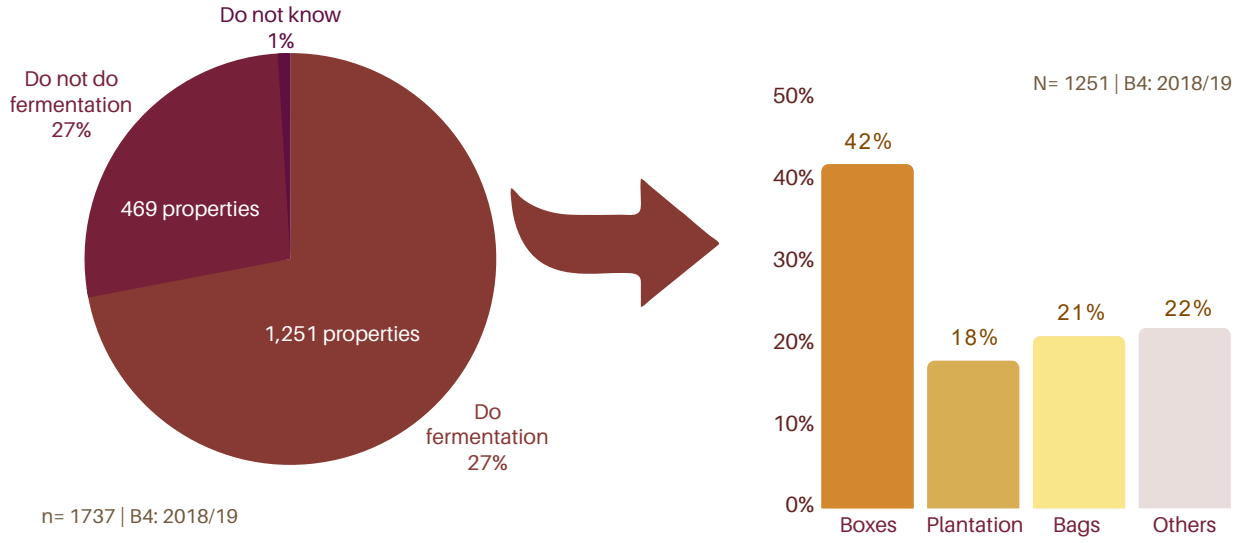


FIGURE 74

Cocoa fermentation time in the TILSB establishments

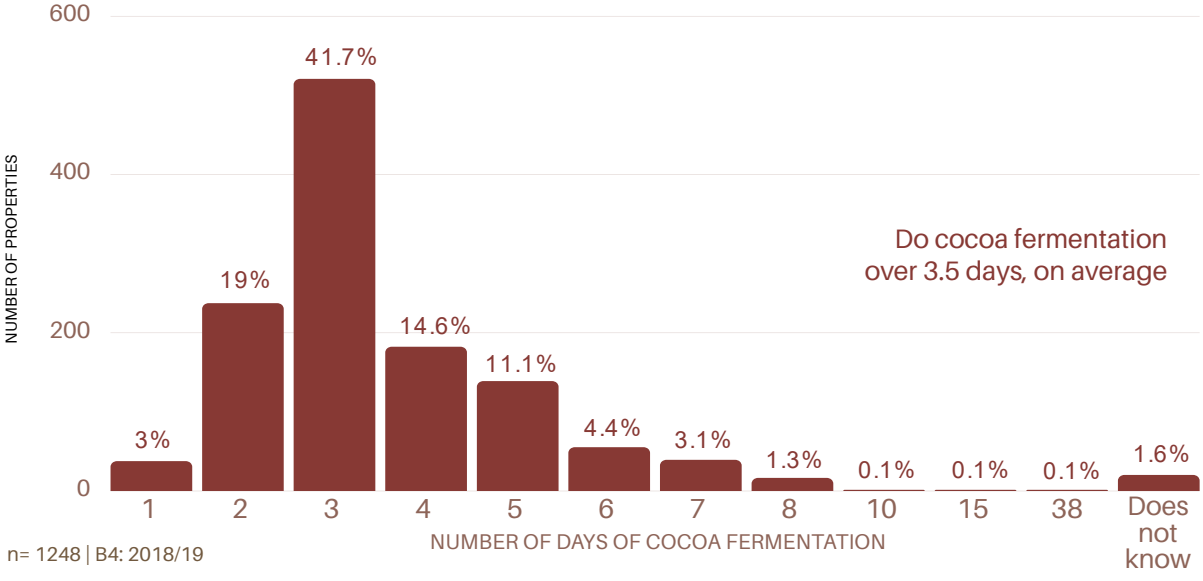
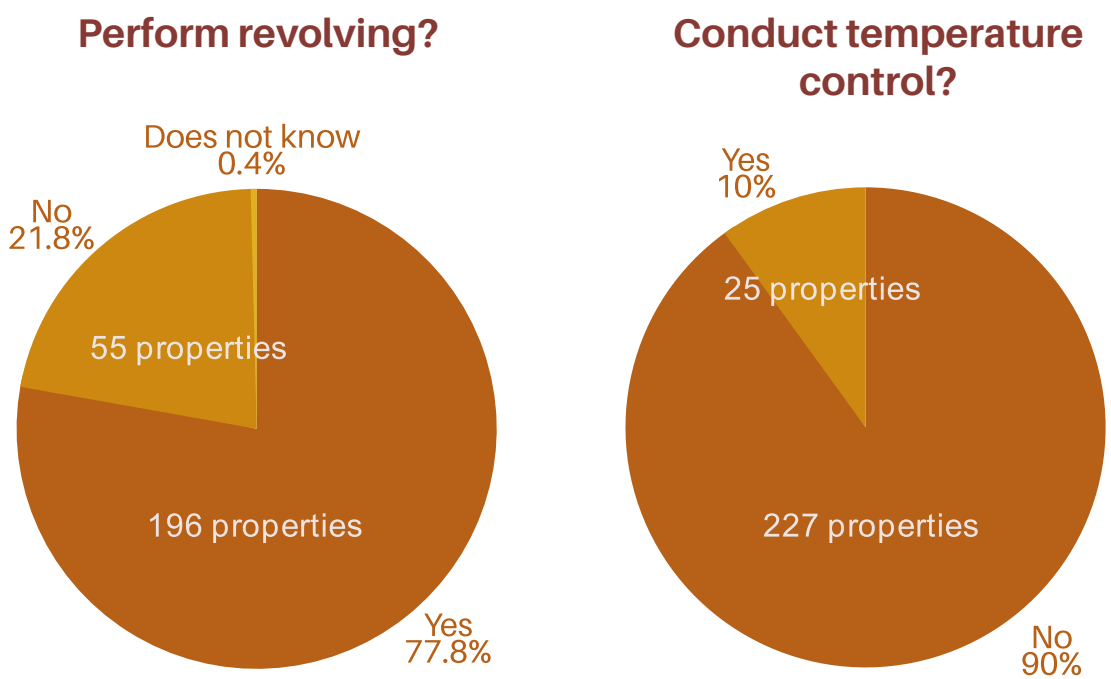


FIGURE 75

Among the establishments that ferment cocoa for more than 4 days, how many perform revolving and temperature control during the fermentation process?



n= 252 | B4 2018/19

Technical Assistance and Rural Credit

Technical assistance (both public and private) has played a fundamental role in the history of Brazilian agriculture enabling agricultural production, access to public policies (directed to the primary sector) and, consequently, quality of life for farmers. It is key, especially when rural producers have low educational level -- the case of the TILSB – and there is great availability of new productive technologies.

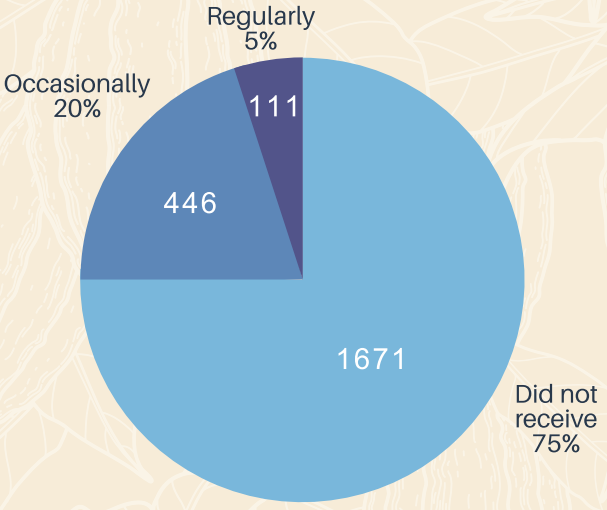
Technical assistance in the TILSB has always been the responsibility of the state government, through the former Northeastern Rural Credit and Assistance Association (ANCAR-BA), the Rural Technical Assistance and Extension Services Institution (EMATER) and, more recently, the Bahia Agricultural Development Company (EBDA) and CEPLAC, with its Extension Center (CENEX). CEPLAC's staff of extensionists has been greatly reduced in recent years, which affected its action reach; EBDA was extinguished in 2015 and replaced by the Bahian Superintendence of Rural Technical Assistance and Extension Services (BAHIATER), a new state-led organization, which has restricted its extension activities to the mere hiring of services from the private sector, NGOs and private companies, through public notices. For some time now, technical assistance has been developed in the TILSB by legal associations of agrarian science professionals specialized in rural technical assistance and extension services (known as ATER).

However, this new model of technical assistance has not been disseminated throughout the territory. It is a system that depends on requests for proposals by the state government, works with projects that have specific timelines and often faces challenges with the discontinuity of services in rural communities, due to state bureaucracy to release funds, and to inspections. It is a system of technical assistance mainly adopted by large producers and, to a lesser extent, by smallholders. A large number of growers and sharecroppers are not reached by this type of service.

Problems identified by this survey, such as low use of inputs and inadequate management of pests and diseases, are directly related with the lack of technical assistance and translate into low productivity, so much so that 75% of the respondents reported that they had never received technical assistance (over the past nine years); only 5% of them stated that they regularly receive technical assistance (Figure 76).

FIGURE 76

Establishments that received technical assistance between 2011 and 2017



n= 2228 | B2 2016/2017

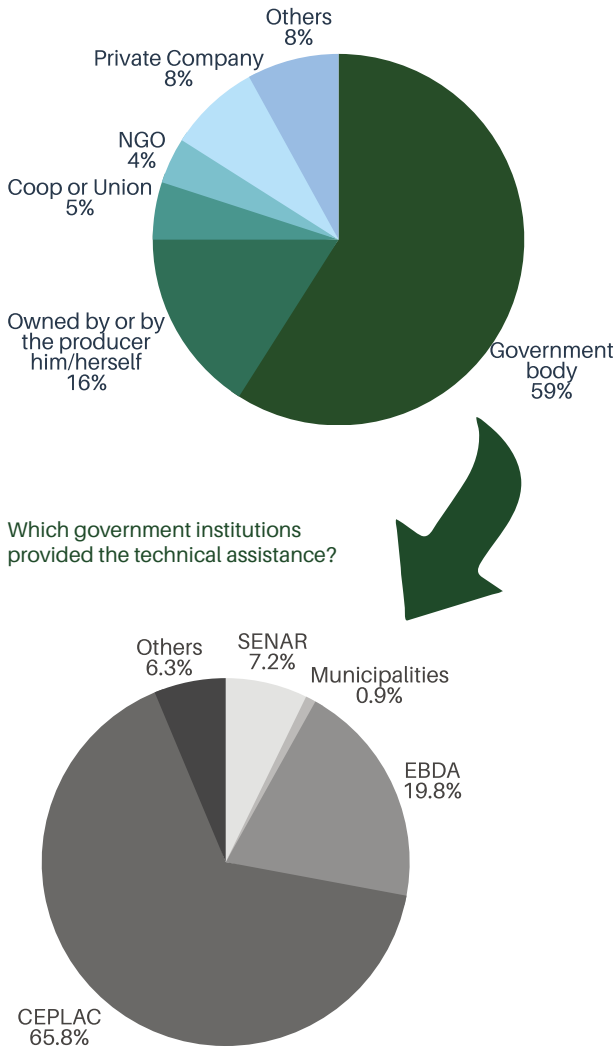
Figure 77 provides an overview of technical assistance in the TILSB. Despite the difficulties faced by CEPLAC, given the challenges faced by its extension body to provide a broad technical assistance to cocoa producers, among those who had actually received any assistance at some point in their life, 59% were carried out by CEPLAC. Considering the governmental technical assistance, CEPLAC, EBDA and SENAR were mentioned as institutions that exercised and exercise technical assistance at some point.

It is also worth mentioning the low effectiveness of the municipalities, and their secretariats of agriculture. These local secretariats should play a more important role in providing technical assistance, given that their technicians are those with the greatest proximity and knowledge of the reality of farmers within the municipalities.

The low frequency of assistance received by the establishments is one of the major problems in cocoa production, since the farmer cannot solve the problems related to low fertility, pest and disease control by him/herself. As such, if we add low access to credit with the poor technical assistance (Figure 78) received by the producers, the issue of low productivity begins to be revealed. Cocoa farmers do not have access to two elements that are key for the good management of their activities, and consequently, are unable to reach the means for their families to stay in the rural areas and continue the activity.

FIGURE 77

Origin of the technical assistance provided to cocoa producing establishments



n= 333 | B2 2016/2017

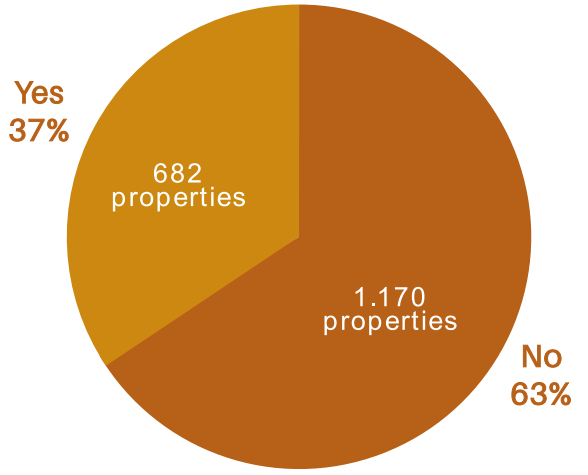
One of the factors that stand out in this survey is that the use of financial credit resources for cocoa is not significant in the TILSB, among properties of all sizes (Table 2): only 37% (682 establishments) received credit and among these, only 41% (n= 280) used it for cocoa farming (Figure 79). In a territory where the vast majority of producers are small and where is relatively easy to obtain the Declaration of Aptitude to PRONAF (ADP)[4], an easily obtainable credit[5], with low interest rates and of simple negotiation, the lack of access to it, combined with other factors previously discussed, can explain the low productivity of cocoa crops.

Although the Northeastern region is the poorest in Brazil, national data about access to finance resources shows that PRONAF is more accessed by rural growers in the South and Southeast, due to their greater organization and also because they meet the specifications to obtain the credit[6]. This is relevant and somewhat explains the anomy and low organization of cocoa producers.

FIGURE 78

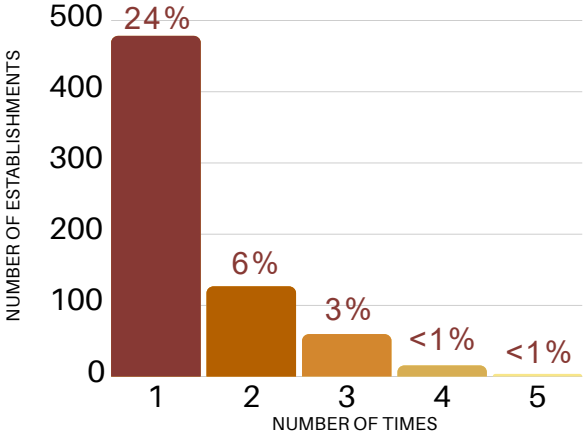
Number of establishments that have received credit at some time in their lives

Among properties that produce cocoa, how many have received credit at some point?



n= 1852 | B3 2017/2018

How many times have they received it?



Credit for cocoa is still scarce in the region

25% Have not paid it
32% Are still paying for it
42% Have already paid it off

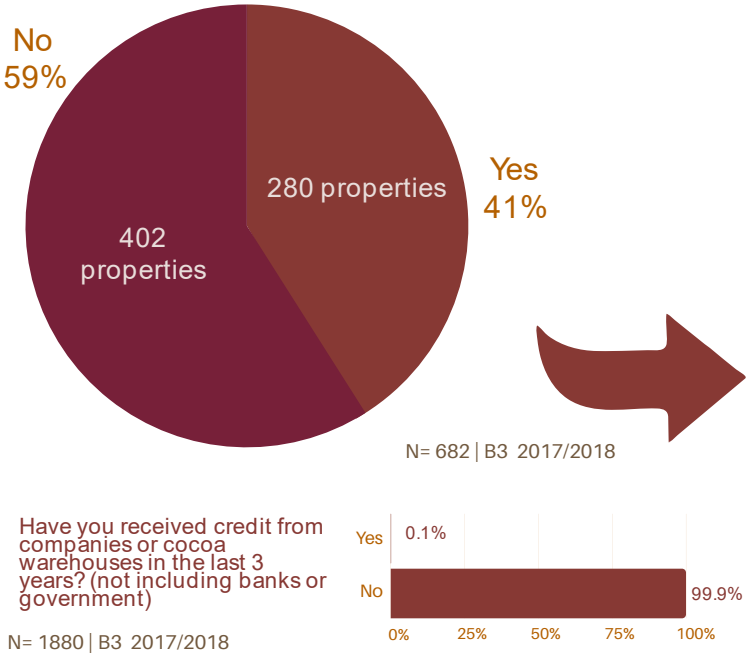
4 To get the DAP it is necessary for the farmer to go to an authorized issuing agency, which are the state companies of Rural Technical Assistance and Extension, the unions of rural workers and municipal agriculture secretariats, with only the identity card, the taxpayer number (CPF) and in the case of married persons, the documents of the spouse.

5 The basic requirements for obtaining PRONAF credit are: to live on or near the rural property. Exploit the land, either as owner, squatter, leaseholder, partner or concessionaire of the National Agrarian Reform Program (PNRA). Have the basis of work in family farming itself to maintain it. Have at least 50% of the gross family income from rural activity, whether agricultural and livestock or not. Have a gross family income of up to R$ 360 thousand in the last 12 months of production (this amount does not include social security benefits for rural activities and related earnings). Have a maximum of 4 tax modules for agricultural activity or 6 for livestock activity and use third-party labor only based on seasonality of production (if the employees are permanent they must be fewer in number than family members).

6 There is a PRONAF modality practiced by Banco do Nordeste called "Agroamigo" (Agrofriend), which is easier to access since it has less requirements vis-à-vis other credit modalities.

FIGURE 79

Access and use of credit in cocoa producing establishments



Of 1,871 properties that produce cocoa, 280 (15%) obtained credit for this crop (at some point in their life)

43% of producers do not remember the year when they received it. Of those that did remember the year, only 48 (17%) producers received credit for cocoa between 2011 and 2016.

The average credit amount for cocoa was R$ 25,600.00. Banco do Brasil and Banco do Nordeste were the greatest sources of credit (>98%).

n= 280 | B3 2017/2018

TABLE 2

Access to credit by size of the establishment

SIZE RANGE (HA)	HAD ACCESS TO CREDIT
0-10	34,6%
10-20	35,5%
20-50	35,7%
50-100	34,8%
100-300	39,6%

Landscape of the Cocoa Region

The reality of tropical forests is a recurring theme on the media and in scientific literature, when observing the relationship between ecology, agriculture, society and eco-systemic services. In order to understand the suitability of rural establishments to the Brazilian Rural Environmental Registry, linked to the Brazilian Forestry Act, and to evaluate the presence of forest cover in the municipalities analyzed, secondary data from reliable sources was adopted. In this chapter there are data and images from the MapBiomas project that cover the evolution of forest cover between 1990 and 2018, used as a complementary methodology for this study.

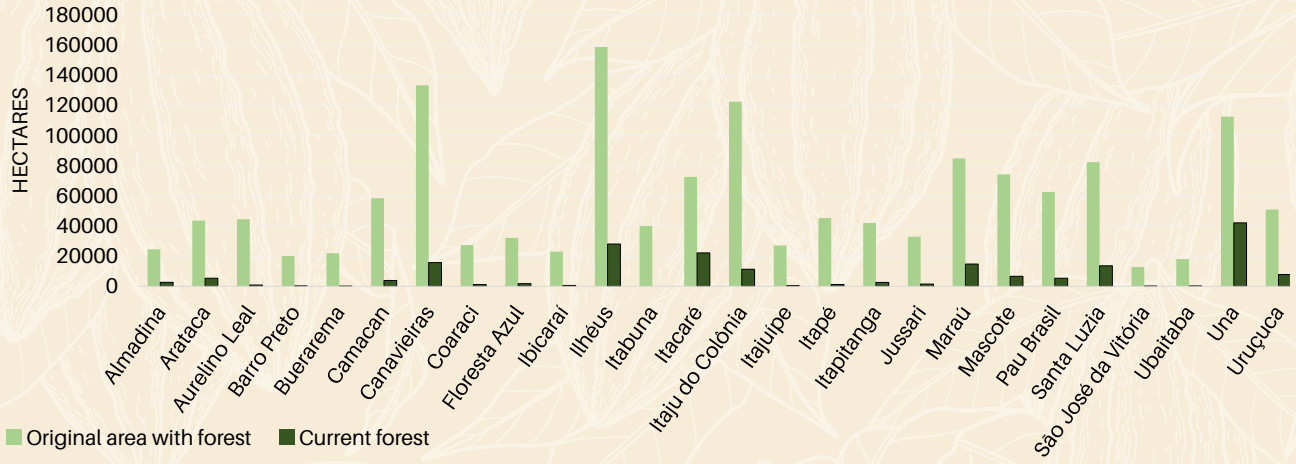
Cocoa, in all producing regions of the world, is grown within environments of tropical forest, whether in the Amazon, Central America and the Caribbean, West Africa, Southeast Asia or the Atlantic Forest. South of Bahia, inserted in the middle of the Brazilian Atlantic Forest with a high biodiversity of trees, primates, reptiles and amphibians, small and medium mammals, relies on cocoa as one of the most relevant land uses to sustain its agroforest and native forest landscape still present in the 21st century.

Both cocoa agroforestry systems and native forests offer important ecosystem services that are interdependent, whether due to the water cycle and climate, soil conservation, balance between insects, fungi and bacteria, or among larger animals, such as birds, primates, felines, rats and snakes. Understanding the evolution of the forest and agroforest landscape, therefore, is essential to promote the sustainability of the economy and of life in cities of these tropical regions, like the TILSB.

SOS Mata Atlântica Foundation and INPE have been studying the evolution of the landscape of this biome in the states and municipalities that comprise it, since the 1980s -- through the Atlas of the Atlantic Forest Remnants program. The percentage of remaining forests is very unequal among municipalities, as concluded by the graph and table below, but in general, they reveal a low percentage of forests in almost all municipalities in 2018 (Figure 80).

FIGURA 80

Áreas de florestas originais e áreas de florestas remanescentes



FONTE: SOS MATA ATLÂNTICA

The municipalities with the greatest presence of forests are Una and Itacaré, with more than 30% of forest coverage, although practically all other municipalities have less than 20%, as defined by the Forestry Act, if only the requirements for forest reserves in rural properties are considered. Some of the municipalities presented very small forest areas in 2018, less than 5% of their territories, such as Itabuna, Buerarema, Barro Preto, Aurelino Leal, Coaraci, Ibicarai and São José da Vitória. However, the difficulty to separate "cabrucas" from forests may have affected these numbers, especially in municipalities that have a mix of "cabruca" and forest.

An additional data is the sum of the areas identified as deforestation in the 2010-2018 period. It is not clear whether the Atlas recorded fires, which may be overlapping in the same location, or whether the areas had a gradual and successive deforestation process in these municipalities. That being said, the area identified as deforestation exceeds 3,770 hectares, if we count the eight years after 2010. Canavieiras, Santa Luzia, Ilhéus and Una are the municipalities that stand out.

The causes or motivations of deforestation have not been studied in the SOS and INPE surveys, but it is assumed that, in the 2010-2018 period, cocoa was not the driver of deforestation, considering that the regional cocoa crisis has not offered economic stimuli for expansion of new cocoa areas, and the renovation of older cocoa areas were done using cloning or high-density planting techniques.

MapBiomas, the Brazilian biome verification platform -- that has SOS Mata Atlântica and INPE as partners in a consortium with several public and private institutions -- also monitors forest cover, presented here in four moments, and organized for this study (1990, 2000, 2000 and 2018), comprising all forest environments, including cocoa agroforestry systems. The data shows, that in a way, the cocoa region has not experienced major changes over these 28 years, as presented in Figure 81.

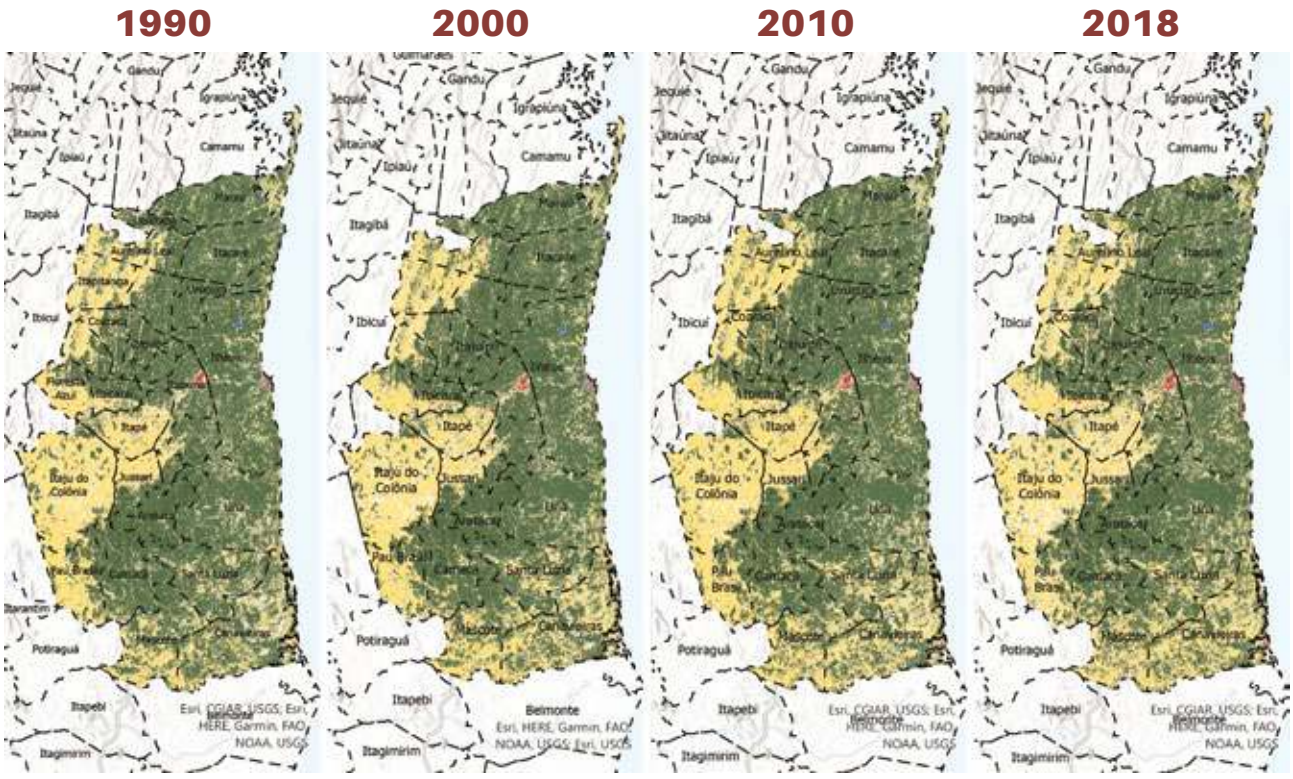
TABLE 3

Data on deforestation in the TILSB between 2010 and 2018

Municipality	Original area (hectares)	Forest (hectares)	% Forest	Deforested area (hectares) 2010-2018
Almadina	24.523,6	2.664,4	11	14,73
Arataca	46.596,2	5.401,9	12	0,00
Aurelio Leal	44.539,7	874,5	2	11,74
Barro Preto	20.158,6	219,0	1	0,00
Buerarema	21.948,7	2,4	0	0,00
Camacan	58.484,8	3.892,9	7	6,25
Canavieiras	133.430,1	15.753,3	12	1.607,48
Coaraci	27.450,0	1.172,0	4	0,00
Floresta Azul	32.101,3	1.789,4	6	9,38
Ibicaraí	23.095,3	549,9	3	0,00
Ilhéus	158.855,4	28.074,9	18	641,92
Itabuna	40.102,8	0,0	8	0,0
Itacaré	72.626,6	22.159,2	31	93,44
Itaju do Colônia	122.529,4	11.321,2	9	52,56
Itajuípe	27.075,1	380,9	1	0,00
Itapé	45.314,4	1.256,7	3	0,00
Itapitanga	42.066,1	2.604,6	6	9,81
Jussari	32.919,0	1.476,0	4	0,00
Maraú	84.888,5	14.813,4	17	62,03
Mascote	74.268,9	6.659,8	9	72,27
Pau Brasil	62.630,6	5.366,7	9	26,50
Santa Luzia	82.446,2	13.602,4	16	650,19
São José da Vitória	12.792,5	115,5	1	0,00
Ubaitaba	18.110,2	152,5	1	0,00
Uma	112.673,4	42.103,1	37	519,28
Uruçuca	51.009,9	7.799,0	15	0,00
Território Litoral Sul	1.469.637,2	190.250,65	13	3.777,57

SOURCE: INPE E SOS MATA ATLÂNTICA

FIGURE 81
Map of forest cover from 1990 to 2018



- 1.1.1. Forest formation
- 1.1.2. Savanna formation
- 1.1.3. Mangrove
- 1.2. Planted forest
- 2.3. Salt marshes
- 2.5 Other non-forest natural form
- 3.1. Pasture
- 3.3. Agriculture and Pasture Mosaic
- 4.1. Beach and Dune
- 4.2. Urban Infrastructure
- 4.3. Mining
- 4.4. Other Non-Vegetated Area
- 5.1. River, Lake and Ocean

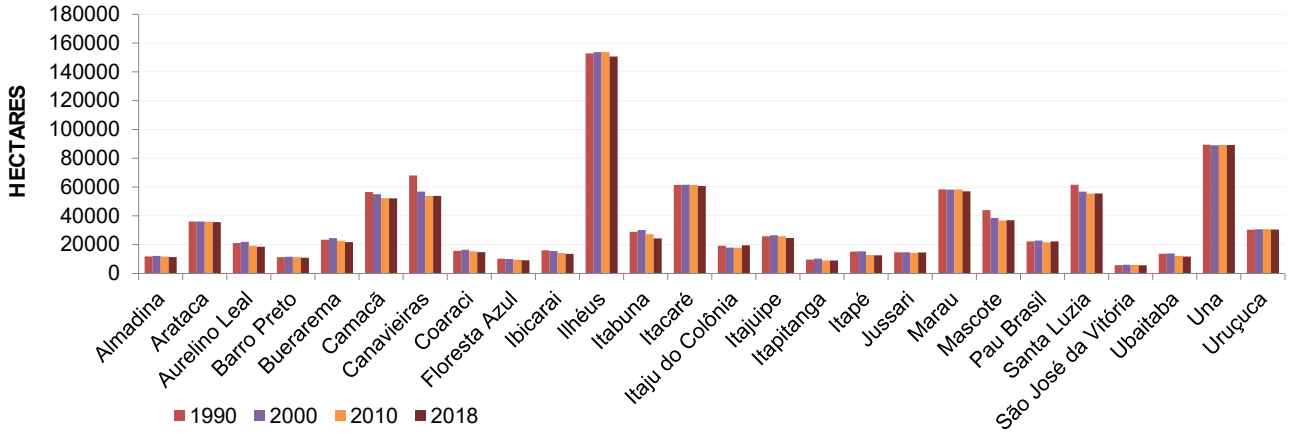
SOURCE: PROJETO MAPBIOMAS - COLEÇÃO COBERTURA E USO DO SOLO DA SÉRIE ANUAL DE MAPAS DE COBERTURA E USO DO SOLO NO BRASIL, ACESSADO EM 01/6/2020 ATRAVÉS DO LINK: HTTPS://MAPBIOMAS.ORG/COLECOES-MAPBIOMAS-BR

If we analyze the numbers related to only two types of vegetation - Forest Formation and Pasture, identified by MapBiomas, and knowing that the Forest Formation includes “Cabrucas” and Agroforestry Systems of cocoa mixed with planted trees, we realize that the municipalities have not presented structural changes in landscape, as believed due to eventual extensive cattle ranching over the areas with “cabrucas” and forests. This indeed occurred, but at a moderate scale, apparently, thus sustaining the large numbers (areas) of forest and agroforest cover that are characteristic of this territory.

The graph above, showing the evolution of forests and agroforests between 1990 and 2018, in each municipality in the territory, shows that in many municipalities there has been a strong stability of tree coverage, such as Una, Itacaré, Uruçuca, Arataca and

FIGURE 82

Forest and agroforest areas in the municipalities of the Southern Coast of Bahia



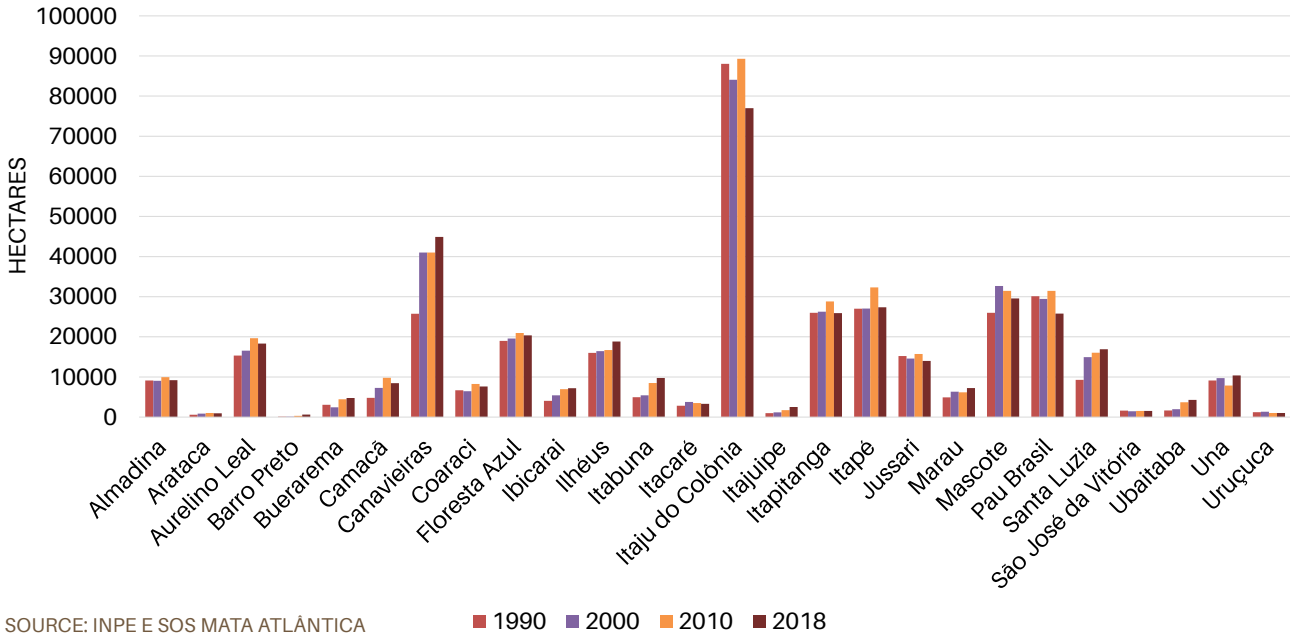
SOURCE: INPE E SOS MATA ATLÂNTICA

Maraú. At the same time, municipalities that had higher losses of forests, such as Canavieiras, Camacã and Aurelino Leal, clearly associated with cattle ranching in agroforest and forest areas, do not affect the relative stability of most municipalities.

Although pastures have presented a general increase, also within municipalities, they turn out to fluctuate, consolidating in very few municipalities, such as Itaju de Colônia and Canavieiras; pastures have remaining restricted to smaller areas in most municipalities, with occasional regression.

FIGURE 83

Pasture areas in the municipalities of the southern coast of Bahia (1990, 2000, 2010, 2018)

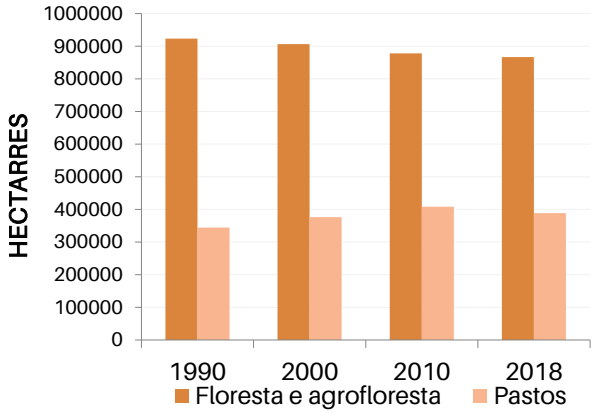


SOURCE: INPE E SOS MATA ATLÂNTICA

Data in summary reveals that the Southern Coast of Bahia, roughly speaking, has experienced loss of forests and agroforests, whatever the platform and methodology observed, but it has occurred in a smaller scale than the general public believes. By systematizing summed data from all municipalities

FIGURE 84

Evolução de ambientes florestais e de pastagens no território Litoral Sul da Bahia



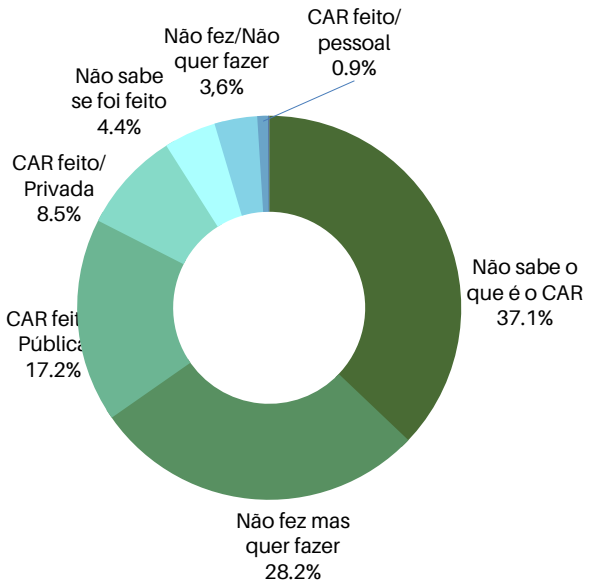
FONTE: INPE E SOS MATA ATLÂNTICA

in the territory, we see that the area of pastures increased from 330,000 hectares to 400,000 hectares between 1990 and 2010, with a small area reduction in 2018. Forest environments decreased from 923,000 hectares (in 1990) to 866,000 hectares, following the same data from MAPBIOMAS, analyzed by this research. These figures, although worthy of further verification (with methodological adjustments by GIS resources), show that the forest, agroforest and pasture landscape in this territory has not undergone changes as structural as perceived by the general public. It is worth noting that other territories of Southern Bahia, such as Lower South and Extreme South were not considered in this study.

Finally, the interviews conducted within the TILSB to investigate the level of involvement of rural establishments with the Brazilian and Bahian environmental agendas, through the Rural Environmental Registry (CRA), inquired producers about the adoption of the CRA. Results, as seen in Figure 85, show a low level of engagement with this public policy.

FIGURE 85

Condições dos estabelecimentos em relação ao Cadastro Ambiental Rural (CAC)



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In most cases, or 37% of the total, producers were unaware of the CAR. However, 28% knew about it, had not registered, but wanted to. A smaller but significant number, 17%, had already done it by public initiative, and 8.5% has done it, by private initiative.

In brief, this reveals how far the territory can advance in terms of environmental adequacy, reforestation and forest conservation programs, along with the development of the cocoa and chocolate production chain. The design of sustainable landscapes that massively include payment for environmental

services, including maintenance and expansion of forests, replanting of cocoa in agroforestry systems or cocoa in full sun, combined with reforestation, are possible paths that will position Southern Bahia as a suitable territory for the conservation of natural resources, biodiversity, climate and the Atlantic Forest.

This chapter has received contributions from researcher Tássio Moreira, associated with IFV and a geography PhD student at UFMG, in the production of maps and systematization of MapBiomas data.

Final Considerations

As we conclude this report, it is worth summarizing key aspects that we as researchers that "live and breathe" this territory find valuable to guide choices and future decisions. The document obviously allows for multiple interpretations with different focuses, it is up to the reader to observe those that he/she considers revealing, and draw his/her own analyses and conclusions. We do not intend to end the debate here, nor to reduce interpretation efforts, but to point a few convergence points, pathways or suggestions of an achievable future.

A general message, initially, is of real hope toward this territory, for where it stands after centuries of multi-ethnic colonization, and of course, interracial as well, integrating the remaining original populations of Southern Bahians and countryside ("sertão") people, the European settlers and the descendants of the African populations, after several challenges and threats already experienced and outlasted since the XVI century. The development of this society amidst the Bahian tropical landscape is noticeable, with multiple economic, cultural and environmental activities. We hereby find a very dynamic, creative and extremely resilient territory, that values its identity and perseveres in the construction of solutions in several areas of knowledge, some of them notably inspiring to the planet in the XXI century, being the centennial cocoa culture its largest and most expressive inspiration.

We are in the awakening of a new cycle of accomplishments, after 30 years of post-crisis experiences. This historical fact is not negligible – the cocoa territory has resisted a devasting crisis, which involved acute decrease of credit availability and of technical assistance, combined with the fall of international prices and the increase of cocoa supply from African origins, a fungus disease that led to decreased productivity and lower production levels, higher production costs, lower demand for chocolate post Sovietic Union, climate change and a severe rural exodus. A succession and sequence of unfavorable facts and circumstances over these 30 years.

In 2020, however, we can look forward and see that South Bahia is acknowledged by many investors as a promissing territory for the cocoa economy, integrating people, nature, culture, history and territorial governance. The territory's potential is so expressive that we can project substantial results in all areas, combining knowledge that promotes increases in capital and labor productivity, improvement of quality of services and products, increased income with higher equality and diversity of inclusive businesses, and boost of education and science in areas with territorial vocation, specially those related to cocoa production in agroforestry systems, including improvements of natural conditions with all of the ecosystemic services that it promotes – from biodiversity, climate and regular rainfall pattern and water resources, luxurious tropical landscape and soil fertility.

South Bahia presents a unique landscape with resilient forest and agroforest formations. The narrow interface between cocoa and the forest, with all of the sinergies and challenges of management, requires a sofisticated planning among forests and agroforests, combining factors such as soil improvement, higher density of plants, constant pruning, polinization, processing and qualitification of its products. It is valid to mention that the South of Bahia, amidst the Brazilian Atlantic Forest, is internationally known for its unique and exceptionally biodiverse landscape, with primates such as the Golden lion tamarin ("mico leão dourado"), or rare birds like the Harpia, legendary and endangered trees, like the Bahia Jaracarandá, Pau Brasil, Vinhático and the pink Jequitibá. It is necessary to connect the good agricultural practices in cocoa to the system of conservation units and permanent protection areas,

with all of the environmental and ecosysistemic services that feed the rural and urban economies, giving them both visibility and interdependency, in a contemporary context of what is called bioeconomy.

We also think that both the social and institutional capital of the territory deserve special attention. Governance is needed so that institutional investments, articulated, may expand productivity, quality, processing, and the diversity of food products to the market – in order to promote a favorable business environment, with increased rural income, and to improve overall living conditions.

A careful reading of the survey results show how the differences among rural producers present peculiarities until then invisible to traditional economic analyses, but which make a lot of difference in the innovation approach to be used with the productive systems. It is vital to identify the roles of family farmers, of the agrarian reform settlements, of the cooperatives, of the indigenous territories, of the innumerous and disperse sharecroppers, of the salaried workers, with their multiple competencies, and of the family businesses and their general and particular interests. It is obvious that economic results will come together with the quality of the governance of all of the factors involved and new institutional arrangements.

As we travelled around the territory's 26 municipalities, we noticed that inhabitants of the rural and urban zones in South Bahia are interconnected, through their various relations and hierarchy, from the urban centers of Ilhéus and Itabuna to the villages and remote settlements, in the mountains, estuaries and beaches. In relation to the acute inequalities present in the territory, there is a relative familiarity of all people with the same challenges and proposals of solutions – from the resilience of cocoa production to access to water and good roads, to techical and scientific development. The general need for better quality of life comprises all – from sharecroppers to salaried workers, from smallholders and medium ruralbusinesses, to big chocolate industries. To integrate everyone based on shared goals that promote cooperation and co-responsibility, in an environment of trust becomes, then, one of the most important tasks in the present and future.

The South Bahia territory has registered intense migration to the cities over the past years. Nonetheless, although urbanization has increased, a large share of its population mantains regular contact with the rural area. This bond suggests another model of contryside-city relation in which it is possible to invest for better quality of living based on a good interface between the two environments. The appreciation of the rural zone, specially the works there developed to improve productivity and quality, may lead to a huge difference in income and quality of life, education and labor already existent or prone to be created. It is key to involve the new generation of producers/farmers in the cocoa activity. Cocoa is a crop that when handled properly, with good agricultural practices and technology, shows good productivity and generates income to the producer (the income per hectare is higher in cocoa than many other crops). It could be a solution to poverty/regional development but depends on a reorganization of the activity, mainly related to access to credit, technical assistance, technology and, more importantly, modern inputs.

As we know, the unique demographic condition, with great capillarity because of the modus operandi of cocoa production since the XVIII century, has shaped an infrastructure that includes water transportation, roads, airports and ports, not be disregarded, but in need of continuous renovation, improvement and expansion. During this survey, we made use of a very broad road system, that went from high quality paved roads to a vast network of side roads that albeit their importance were in degrading

conditions; the coming and going of people, services and product can and should be improved, being an investment of the utmost importance to both the economic health and the well-being of the entire society, with implications to education, health, labor, social relations, technical progress and life, as a whole.

Therefore this report is a common thread that enlightens many itineraries, it is a baseline and starting point to better perceive the reality, the desires and what it is possible to achieve in order to transform the future. We hope that many people can make good use of it, and hence guide decision-making, promote new questions and answers, orient investments and plans in this territory, in Brazil and in the world.

There is an opportunity here to deliberate on new complementary studies, using the same database or collecting additional data, and also as a starting point to monitor the evolution of the indicators already presented. Other studies can and should be developed, very soon, with guidance and succesful trends already noticed in the cocoa business, for a prospective vision of the future, with social, economic and environmental equity.

In this search, we cannot set aside certain relevant characteristics perceived in the cocoa activity, that for over 200 years have attributed an identity to the South Bahia territory, nor ignore the existing challenges for its innovation and reinvention.

Finally, the reflexion of a Bahian, one of our best scholars of world geography, who used to say that the territory always presents itself complex since it is the place of daily activities, of encounters and disagreements, of political actions of multiple interest, but it is in it that life happens:

> *(...) it is the territory that constitutes the connecting link between the immediate past and future. It has to be perceived – and the expression is (...) by François Perroux – as a force field, as the place of exercise, of dialectics and contradictions between vertical and horizontal, between the State and the market, between the economic and social use of resources (Milton Santos, 1999, p.19).*

The challenges exposed by this survey, at last, demand integrated solutions at various fronts. A large part of the problems cannot be solved alone, by any entity/public institution or company alone. The union of the cocoa chain is key to find solutions to the innumerous challenges presented, and fundamental for us to develop this productive chain, using the enormous potential that lies within it.

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Annex A

Reference of topics with answers (summarized)

Questions	Answers
Author and institutional arrangement	Instituto Floresta Viva – IFV CocoaAction Brasil
Description of research methodology	Simple random probabilistic sampling 2,443 cocoa producing establishments in 26 municipalities in the Southern Coastal Identity Territory of Bahia (TILSB) Representation: 3% of Brazilian cocoa farmers, 4% of Bahia and 15% of the TILSB
Data on cocoa reality by municipality and region (average per municipality)	-AVERAGE PRODUCTIVITY: 12.3@/ha/year COCOA AREA: Average 12 hectares Median 5 hectares
Data stratified by property size	Hectares - Average productivity 0 to 10 ha - 32.9 13.2@/ha/year 10 to 20 ha - 22.7 14.0@/ha/year 20 to 50 ha - 23.7 11.4@/ha/year 50 to 100 ha - 12.2 10.1@/ha/year 100 to 300 ha - 8.4 9.3@/ha/year
Data by cocoa production model, measuring variations of the cocoa systems of the system: Cabruca, Full Sun, Agroforestry System	Productive system - Productivity Cabruca: 78 11.8@/ha/year Agroforestry System: 08 13.4@/ha/year Full sun: 8.7 15.0@/ha/year
Estimate of the volume of cocoa produced in the region by the 26 municipalities of the TILSB	IBGE = 40,887 tons Research = 39,997 tons
Analysis regarding working, health and housing conditions	Owner's residence: - 40% urban area - 60% rural area

Questions	Answers
Presence of electricity on the property?	77,7%
Properties with access to drinking water?	- 29% of properties have potable water in the main house. - 26% of properties have potable water in the worker's house.
Presence of bathroom and running water in the residence?	- 22.5% of the owners' houses do not have running water and a bathroom. - 22% of workers' houses do not have running water and a bathroom.
Houses with basic sanitary facilities?	- 67.3% of the owners' houses - 66.7% of workers' houses
Type of basic sanitation?	- 77.8% Cesspool - 11.8% Septic tank - 6% Ditch - 1.1% Bodies of Water - 1% Sewer system - 2.3% Other types
Average age of owners and sharecroppers	Owner = 62 years old Sharecropper = 48 years old
Owner's education level?	- 15.3% never studied - 22.6% Incomplete Primary Education - 9.5% Complete Primary Education - 11% Elementary School Incomplete - 3,6% Elementary School Complete - 3.4% Incomplete High School - 14.1% Complete High School - 5% Higher Education Incomplete - 10.2% Higher Education Complete

Questions	Answers
Average monthly income per person and average household income?	- Renda média/domicílio.....R$ 3.585,00 - Renda mediana/domicílio.....R$ 1.680,00 - Renda média per capita.....R$ 1.237,50 - Renda mediana per capita.....R$ 356,30
Family unit - how many people are there in the family?	Average of 3 members
Use of agricultural implements in cocoa production?	- 64.5% Sprayer - 38.5% Chainsaw - 38.4% Brush Cutter - 8.6% Tractor - 4.9% Manual Planter
Area of the property managed by the sharecropper?	Average 11 hectares
Percentage of area planted with cocoa and other crops?	- 32.3% Cocoa - 24.8% Pasture - 13.4% Forest - 9.9% Tall grass (Capoeira) - 3.5% Banana - 1.0% Rubber Tree - 0.5% Coffee - 0.5% Cassava, piassava and coconut
Income from cocoa and other crops?	- Cocoa = 79% of the property's income - Other crops = 21% of the property's income.
Number of employees/sharecroppers?	- 34.9% have permanent workers, of these 52% are partners/sharecroppers and 48% are salaried workers. - 41% hire temporary labor (average of 25 days worked/year)

Questions	Answers
Salary level of property employees?	<1 minimum wage unit---------- 4.5% 1 minimum wage unit ---------- 64.0% > 1 - 1.5 minimum wage units --- 27.5% > 1.5 - 2 minimum wage units ----- 2.2% > 2 - 2.5 minimum wage units ----- 1.6% >2,5 minimum wage units--------- 0.2%
Producers organization?	- 64% do not participate in any organization - 34% have participated (54.8% association; 36% unions; 8% cooperatives and 1% others)
Data on youth, women and family succession	- 20% of rural properties have female participation in management functions. - 31% of the properties were family inheritance. - 14.4% of the properties have youngsters (4 to 17 years old).
What about child labor?	- 87% of children under 18 do not help in rural work. - 2% of children under 18 help in rural work. regularly, however they are enrolled and attend school, helping only during their free time. - 8% help sporadically. - 3% help on weekends.
Attendance and number of children in schools?	- 83% of children under 18 study, average age of 12. - 17% do not study and have an average age of 6.
Access to credit?	- 63% did not access credit. - 37% had access to credit at some point.
Property documentation?	- 19.2% do not have documentation of the rural property - 21.6% have land title or property registration - 46.4% have a public deed - 3.7% have a purchase receipt - 3.7% have a possession letter - 2.2% have other documentation

Questions	Answers
In which municipalities is productivity higher?	Floresta Azul and Ubaitaba (municipalities where the median production exceeded the regional average).
Cocoa productivity of in relation to the producer profile?	- Producers residing on the property 11@/ha/year - Producers residing in urban areas 13@/ha/year - Producers residing on another property 18@/ha/year
What practices can be associated with higher productivity in rural areas?	- The presence of high productive clones in the cultivated area raised the average productivity. - Clearing was the practice that most influenced productivity (73% increase in productivity compared to those that did not do it).
Productivity by producer size	Size range (ha). Productivity (@/ha/year) 0 to 10 — 13.2 10 to 20 — 14 20 to 50 — 11.4 50 to 100 — 10.1 100 to 300 — 9.3
Do producers ferment cocoa properly? If so, how many?	72% affirmed to carry out fermentation (average of 3.5 days of fermentation), of these only 42% have a box and 20% ferment between 5 to 8 days.
Do the producers have a drying structure (dryer, box, etc.)? If so, how many?	- 56.5% have barcaças (raised platforms) | Average of 1.35 raised platforms per property. - 36% have dryers | Average 0.41 dryer per property. - 27.5% have a fermentation house | Average of 0.32 fermentation house per property.
Property management	Only 20% have some type of control/management
Do producers carry out disease and pest prevention?	- 2% of producers apply fungicides for disease control - 49% apply insecticides (mostly ant pesticides)

Questions	Answers
How many producers receive technical assistance?	- 5% received technical assistance regularly. - 20% received occasionally. - 75% did not receive
Who provides this assistance?	- 66% CEPLAC - 20% EBDA - 7% SENAR - 7% other entities
Use of fertilizers (volume used and frequency of application).	- 53% did not use - 32% used mineral fertilizers - 15% used organic fertilizers - Average of 2000 kg of fertilizers per property
Is there pruning?	- 76.9% performed pruning at least once a year
What about the use of agrochemicals?	- 49% use insecticides (predominantly ant pesticides) - 45% use herbicides - 2% use fungicides - 4% use other agrochemicals
What about other types of crop management?	- 94.7% cleared at least once a year in any fraction of the property. - 86.3% removed sprouts at least once a year in any fraction of the property. - 39.5% applied lime at least once a year in any fraction of the property. - 0.8% had irrigation.
Density - cocoa plants per hectare	There is no knowledge of density of planting.

Questions	Answers
What are the varieties of cocoa used?	- 95% have common varieties (Pará, Parazinho or Maranhão). - 20% CCN51 - 16% PS13.19 - 7% CEPEC2002 - 31% Others - 22% didn't know
Do producers receive any type of financing for crop management?	- 15% of producers had already received credit for cocoa at some point. - 2% of producers had access to credit for cocoa in 2016.
What about deforestation?	The TILSB has a low dynamic landscape, with both increase and regression of pastures in recent years. The forest and agroforest environment is relatively stable.


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