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Keyword: CPI. Factor analysis. Douglass North. CEPLAC. Rondônia. Brazil.

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Abstract

Objective: *to analyze the path dependence effect of Douglass North from the construction of the cocoa production index (IPC) using quantitative methods, aiming to contribute to the discussions on the "conservation and development" trade-off in the Amazon.* ***Methods:*** *this is a hypothetical-deductive study. The CPI was calculated following the factorial analysis techniques presented by Hair et al [11], Santana [12,13) and Cavalcante [14] and the SPSS (Statistical Package for Social Sciences) was used.* ***Results:*** *in*

Brazil the level of performance of cocoa production, when considering the number of cocoa producing municipalities and the indicators, area destined to harvest (hectares), quantity produced (ton), average production yield (kilograms per hectare) and value production (thousand reais) is very low, almost inefficient. Rondônia follows the logic found in Brazil. ***Conclusions:*** *despite the importance of cocoa production, there are still no regional development centers for cocoa cultivation in Rondônia. All cocoa producing municipalities had low levels of PCI performance. The fact that CEPLAC develops its actions exclusively in the East Rondoniense portion of the State only reinforces the analysis in this direction, which helps to understand the path dependence character of the cocoa policy in Rondônia.*

Keywords: CPI. Factor analysis. Douglass North. CEPLAC. Rondônia. Brazil.

I. INTRODUCTION

The study follows the theoretical precepts of Douglass North's institutionalist view. According to this theory, institutional models tend to reinforce themselves, even when they are socially inefficient. It is easier for individuals to adapt to existing rules than to try to modify them. When development takes a certain direction, the organizational culture, customs and mental models of the social world reinforce this trajectory, that is, they propel it to move in the same direction [1].

North [1] uses the example of piracy. According to him, the fact that a society whose institutional matrix rewards piracy, pirate organizations will tend to prosper. As highlighted by Toyoshima [2], this example shows that developed institutions are not necessarily efficient for the economic development of countries, given that institutional arrangements are shaped, in large part, by the interests of those who have bargaining power. If pirates have such power in society, institutions tend to serve their interests primarily. In this way, this activity starts to work only as a form of wealth distribution that annihilates the right to property and, with that, eliminates the necessary feedback for the recognition of a whole process involved in the design of a product, which when made available to the market in an unofficial way, ends up destroying an entire scientific and technological apparatus capable of positively boosting societies to a more mature stage of development.

North's work [1] clearly illustrates the different trajectories followed by countries such as the United States, which historically had a strong institutional heritage from England, based on the solid tendency to reduce transaction costs, and from Third World countries that, unlike the first, they were influenced by personalism in economic and political relations and property rights, often inadequately defended by Portuguese and Spanish crowns. Thus, for North if such self-reinforcing mechanisms work, the past history of the institutions is important for determining the present institutional structure, and this, in turn, will influence the future institutional matrix. The connection of the past with the present and the future is given by history, and it means that institutions have path dependence characteristics [2].

In this sense, institutions come to occupy a central place in the analysis of the economic development process, because they define the environment in which the economy works and facilitate the interaction

between individuals, and because institutional change defines how society evolves over time. [3]. In this way, aspects inherent to the relationship of space and power from an environmental perspective may be acting in order to dictate the rules and the direction of development in Rondônia.

Oliveira et al [4] stated that the socioeconomic development of Brazilian regions occurred at a different pace throughout history and solidified a scenario of profound regional inequalities. The implementation of policies to counteract the forces of concentration of development and recent phenomena, such as the economic opening of the Brazilian economy and the increase in global globalization, have not been effective in significantly changing the profile of inequalities and increasing the economic dynamism of places less prosperous in the national territory [4].

According to Mota, Gazoni [5], the accelerated economic growth has generated great benefits to human society, promoting, at the same time, the compromise of a large part of the available natural resources, causing damage, many irreversible, to ecosystems and local communities. In addition, the loss of environmental services has promoted socioeconomic losses, especially in nations less prepared to face these changes. In this context, debates on the commitment of basic resources are intensified, including those present in the territory of the Amazon.

For Allegretti [6], the policies implemented in the Amazon in the last decades resulted from the search for solutions to problems external to the region. In the case of colonization projects, the Amazon was seen as an empty space and as a way to avoid carrying out agrarian reform in the Center-South. Thus, in the case of agricultural and mineral projects, the Amazon came to be understood as a resource frontier for economic sectors established outside the region. The activities implemented in this period disaggregated the environment and did not increase regional income [6]. Historically, there has always been a large gap between public policies for economic development and those for environmental protection, which contributed to the high degree of deterioration of ecosystems in Brazilian territory [7].
Becker [8, 9] highlights that public policies for the Amazon express divergent and conflicting interests. To illustrate this aspect, the author states that, on the one hand, some are based on favoring new support infrastructures for economic development, especially large-scale agribusiness, and, on the other hand, other public policies appear focused on interests of local populations and socio-environmental sustainability.
Within this focus, Becker [8,9], when studying the regional occupation process, affirmed that it followed an exogenous model, through public investments in infrastructure and private investments in agribusiness. Today, however, due to the demands of local groups, national interest and / or national and international environmental pressures, the endogenous model is rescued in territorially differentiated projects, through local-global relations that are established through information networks. The author also points out that two parallel and conflicting public policies induce these models. The compatibility of conservationist and developmental interests, that is, of the two models, is essential to achieve sustainable development.

In this context, political leaders can play a vital role as catalysts in the development of institutions. Functional leadership can encourage deliberative processes that allow public policies and institutions to

adapt to the needs and demands of society with great potential for strengthening institutional performance. However, leadership can also be ineffective. Rather than contributing to institutional development, ineffective leaders can have the opposite effect. The accumulation of power allows them to get things done, but at the expense of weakening institutions, as pointed out by the Inter-American Development Bank - IDB [10].

The focus of our interest is the policy of the Executive Committee of the Cacao Plantation Plan (CEPLAC) in Rondônia. CEPLAC is a public research institution linked to the Ministry of Agriculture, Livestock and Supply of Brazil. It was created in 1957, a time when the cocoa economy was going through a serious crisis, and its activity, in its beginnings, was basically focused on supporting cocoa culture.

CEPLAC has its competences established by law and among these competencies are I - to propose and implement plans, programs, projects, information systems, actions and activities aimed at promoting in the cocoa-producing regions of Brazil: a) sustainable rural development, research , innovation, technology transfer, technical assistance, rural extension, agricultural technological qualification, certification and territorial and socio-productive organization; b) fundraising and access to rural credit; and c) the improvement of the cocoa production chain and the associated agroforestry systems; II - formulating proposals and participating in negotiations and entering into agreements, contracts and other similar instruments, concerning the development of the cocoa crop and associated forest systems in conjunction with the relevant units of the ministry; III - coordinate the preparation, promote the execution, supervision, monitoring, inspection, audit and evaluation of plans, programs and actions in the middle and end areas of its competence; IV - manage the resources from the General Cocoa Fund; and V - guide and coordinate activities related to the Regional Superintendencies for the Development of Cacao Crop.

Given the above, it is worth highlighting the following epistemological questions of this work. Does the policy of regional development of cacao cultivation in Rondônia, through the policy triggered by CEPLAC, during its activity in the territory of Rondônia, present a characteristic path dependence, according to the institutional theory of Douglass North? From the point of view of CEPLAC's institutional matrix and organizational vision, in Rondônia, how do these characteristics relate to the mesoregional aspects of the State? The cocoa policy in the regional scenario obeys the logic of recovering degraded areas, which would be linked to those areas already deforested, or adopts a logic of income generation as a mechanism for improving the quality of life, allowing even those areas still considered environmentally preserved can benefit from the benefits of the same policy? These are the questions that guided the research.

The research aims to analyze the path dependence effect of Douglass North from the construction of the cocoa production index (CPI) using quantitative methods, aiming to contribute to the discussions on the "conservation and development" trade-off in the Amazon.

II. METHODS

This research was structured based on aspects of interdisciplinary research given the complexity that surrounds the theme. This is a hypothetical-deductive study. Graphs and tables were constructed using

SPSS, version 22, based on data from the Brazilian Institute of Geography and Statistics - IBGE (municipal agricultural production). The CPI was calculated following the factorial analysis techniques presented by Hair et al [11], Santana [12,13) and Cavalcante [14]. The statistical tool SPSS (Statistical Package for social sciences) was used, which enabled the application of mathematical knowledge and allowed the construction of the cocoa production index (IPC) based on the indicators adopted in the research, which were: area for harvesting (hectares), harvested area (hectares), quantity produced (tons), average production yield (kilograms per hectare) and production value (thousand reais).

2.1 ANALYTICAL RESEARCH MODEL

Method: Construction method of Cacoa Production Index (CPI)

The method used in this study followed the logic of factorial analysis, which can be seen in the matrix form as in Dillon and Goldstein[15]:

$$X\backslash=\alpha F\backslash+\varepsilon \quad X\backslash=\alpha F\backslash+\varepsilon \quad (1)$$

Then

X = is the p-dimensional vector transposed from observable variables, denoted by $X = (x_1, x_2,..., x_p)$;

F = is the q-dimensional vector transposed from non-observable variables or latent variables called common factors, denoted by $F = (f_1, f_2,..., f_q)$, where $q < P$;

ε = is the p-dimensional vector transposed from random variables or unique factors, denoted by $\varepsilon = (e_1, e_2,..., e_p)$;

α = is the array (p, q) of unknown constants, called factorials loads.

According to Gama *et al*[16], Santana[17], in the factorial analysis model it is assumed that specific factors are orthogonal, among themselves, with all common factors. Normally, $E(\varepsilon) = E(F) = 0$ and $Cov(\varepsilon, F) = 0$.

According to the authors, the initial structure used to determine the array of factorials loads, in general, may not provide a significant pattern of variable loads, so it is not definitive. This initial structure can be done by several methods of rotation of the factors, as Dillon and Goldstein[15], Johnson and Wichern[18]. It was used the VARIMAX method of orthogonal rotation of the factors for this study.

The VARIMAX method is a process where the reference axes of the factors are rotated around the source until some other position is reached. The objective is to redistribute the variance of the first factors to others and to achieve a simpler and more theoretically significant factorial [19,11,13,16,17].

The choice of factors was carried out through the technique of latent root. So, the array of factorials loads, which measures the correlation between the common factors and observable variables, is determined by means of the correlation matrix, as Dillon and Goldstein [15].

For determining cacoa production index (IPC) it was used the matrix of factorials scores estimated by the orthogonal base factorial rotation process, as pointed out by Santana[20]. The factorial score puts each observation in the gap of the common factors. For each factor f_j, the i-th factor score extracted factorial score is defined by F_{Ij}, expressed as follows [15]:

$$F_{IJ} \backslash = \mathbf{b_1} x_{i\backslash 1} \backslash + \mathbf{b}_2 x_{i\backslash 2} \backslash + b_p x_{ip} \; F_{IJ} \backslash = \mathbf{b_1} x_{i\backslash 1} \backslash + \mathbf{b}_2 x_{i\backslash 2} \backslash + b_p x_{ip} \quad (2)$$

Then:

b_i = are the estimated regression coefficients for the *n* Common factorials scores;

x_{Ij} = Are the *n* Observations of *p* Observable variables.

i = 1.2,...N.

j = 1,2,...,p.

To reach the equation that is the perception index [16], [17], show the sequence evolution of the formulas from the previous equation. It turns out that even if the variable F_{Ij} is not observable it can be estimated through the factorial analysis techniques, using the matrix of observations of the vector *x* of observable variables. In factorial notation, equation 2 becomes:

$$F_{(n\backslash q)} \backslash = X_{(n\backslash q)} b_{(p\backslash q)} \; F_{(n\backslash q)} \backslash = X_{(n\backslash q)} b_{(p\backslash q)} \quad (3)$$

In Equation 3, *F* is the matrix of the estimated regression from the *n* Factorials scores and it can be affected by both the magnitude and the measurement units of the variables *x*. To work around this kind of problem, replace the variable *x* by the standard variable *w*, given the ratio of the deviation around the average and the standard deviation of *x*, as follows:

$$\frac{x_i - \bar{x})}{S_x}$$

With these values, Equation 3 is modified making equation 4 possible, then:

$$F_{(n\backslash q)} \backslash = W_{(n\backslash q)} \beta_{(p\backslash q)} \; F_{(n\backslash q)} \backslash = W_{(n\backslash q)} \beta_{(p\backslash q)} \quad (4)$$

Based on equation 4, the beta weights matrix (β) with *q* standardized regression coefficients, replaces *b*, given that the variables are standardized on both sides of the equation. Pre-multiplying both sides of equation 4 by the value $\frac{\mathbf{1}}{n}\frac{\mathbf{1}}{n}\boldsymbol{w'}$, in which *n* Is the number of observations and *W* is the transposed matrix of *w'*, it makes it possible to reach the following equation:

$$\frac{\mathbf{1}}{n} \; w'_{(p,n)} \; F_{(n,q)} = \frac{1}{n} \; w'_{(p,n)} \; w_{(n,p)} \; \beta_{(p,q)} = \; R_{(p,p)} \; \beta_{(p,q)} \quad (5)$$

The Matrix $\frac{\mathbf{1}}{n}\frac{\mathbf{1}}{n}\boldsymbol{w'w,}$ therefore is the matrix of intercorrelated variables or correlation matrix among the observations of the matrix *x*, designated by R. The Matrix $\frac{\mathbf{1}}{k} w' F \; \frac{\mathbf{1}}{k} w' F$ It represents the correlation between the factorials scores and the factors themselves, denoted by Λ. With this, rewriting the equation 5, one must:

$$\Lambda_{(p\backslash q)} \backslash = R_{(p\backslash p)} \beta_{(p\backslash q)} \; \Lambda_{(p\backslash q)} \backslash = R_{(p\backslash p)} \beta_{(p\backslash q)} \quad (6)$$

If the matrix R is non-singular, one can pre-multiply both sides of equation 6 by the inverse of R, obtaining:

$$\beta = \mathbf{R}^{-1}\Lambda \quad \beta = \mathbf{R}^{-1}\Lambda \quad (7)$$

Substituting the β vector into equation 4, we obtain the factorial score associated with each observation, as follows:

$$F_{(n,q)} = w_{(n,p)} R^{-1}_{(p,p)} \Lambda_{(p,q)} \quad F_{(n,q)} = w_{(n,p)} R^{-1}_{(p,p)} \Lambda_{(p,q)} \quad (8)$$

The main formula of the perception index is reached where the IP is defined as a linear combination of these factorials scores and the proportion of the variance explained by each factor in relation to the common variance. The mathematical expression is represented by the following formula:

$$\mathbf{IP}_i = \sum_{j=1}^{q} \left(\frac{\lambda_j}{\sum_j \lambda_j} \mathrm{FP}_{ij} \right) \quad \mathbf{IP}_i = \sum_{j=1}^{q} \left(\frac{\lambda_j}{\sum_j \lambda_j} \mathrm{FP}_{ij} \right) \quad (9)$$

Then:

i = 1.2,...n.

λ = is the variance explained by each factor;

∑ λ = is the total sum of the variance explained by the set of common factors.

The factorial score was standardized (FP) to obtain positive values from the original scores and allow the hierarchies of the cities as the values of the performance index are located between zero and one. The formula that allows this tiering can be seen by the following equation:

$$FP_i = \left(\frac{F_i - F_{min}}{F_{max} - F_{min}} \right)$$

It can be seen that F_{min} F_{min} And F_{max} F_{max} are the maximum and minimum values observed for the factorial scores associated with the parameters observed in Brazil e Rondônia. It is based on this understanding that it was possible to calculate the production index adopted in this study.

2.2 SCALE LEVELS

The classification used by the research to express the results achieved by the IPC is described in table 1.

Table 1: Analysis scale adopted by the research.

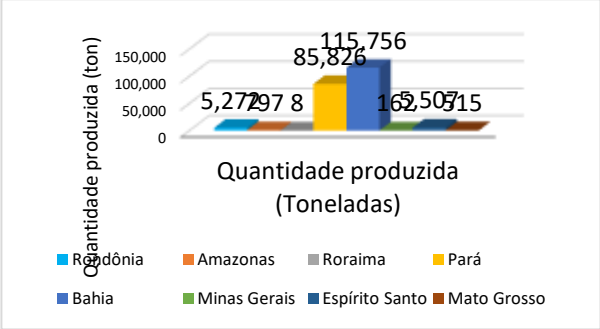
Scale	**Description IPC**
0.801 a 1.000	Great
0.601 a 0.800	Good
0.401 a 0.600	Regular
0.201 a 0.400	Bad
0.000 a 0.200	Terrible

Source: Own Elaboration.

III. RESULTS AND DISCUSSION

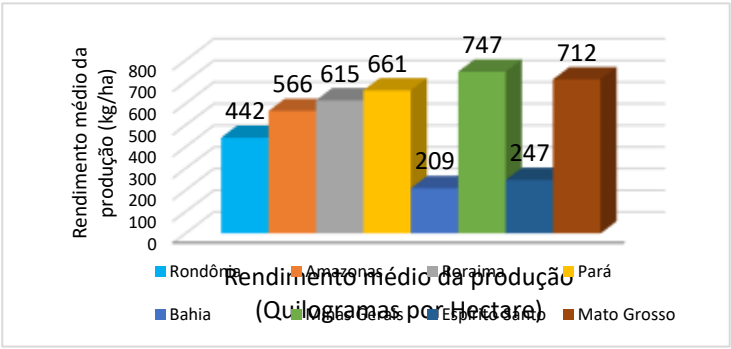
3.1 Cocoa production in Brazil

The production potential of cocoa in Brazil, based on the last survey available by the IBGE in 2016, was concentrated in the state of Bahia (115,756 tons), responsible for 54.13% of cocoa production in Brazil and the state of Pará (85,826 tons), responsible for 40.14% of Brazilian production. Cocoa production in the states of Bahia and Pará represents 94.27% of cocoa production in Brazil that year. (graphic 1).



Graph 1 - Quantity of cocoa produced (tons), by State, in 2016.
Source: IBGE (Municipal agricultural production).

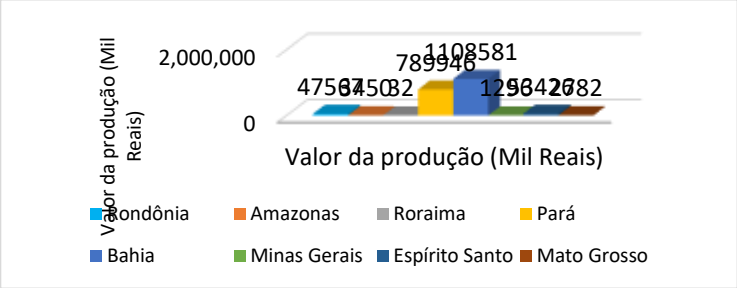
The highest average yields of cocoa production in Brazil were registered in the state of Minas Gerais (747 kg / ha), followed by Mato Grosso (712 kg / ha), Pará (661 kg / ha), Roraima (615 kg / ha) , Amazonas (566 kg / ha) and Rondônia (442 kg / ha). The lowest average cocoa yields are registered in the state of Bahia (209 kg / ha) and Espírito Santo (247 kg / ha). (graph 2).



Graph 2 - Average yield of cocoa production (kg / ha), by State, in 2016.
Source: IBGE (Municipal agricultural production)

The state of Bahia (Northeast region of Brazil) obtained the highest value of cocoa production with more than 1 billion and 100 million reais (Brazilian currency). The state of Pará (Northern Brazil) moved production in the amount of approximately 800 million reais for the same period. The State of Espírito Santo (Southeast region) handled approximately 53.43 million reais and Rondônia (North region), profited R $ 47.6 million reais from the sale of cocoa in 2016. The states of Amazonas and Roraima (North region),

Minas Gerais (Southeast region) and Mato Grosso (Midwest region) obtained incipient values of cocoa production. (graph 3).



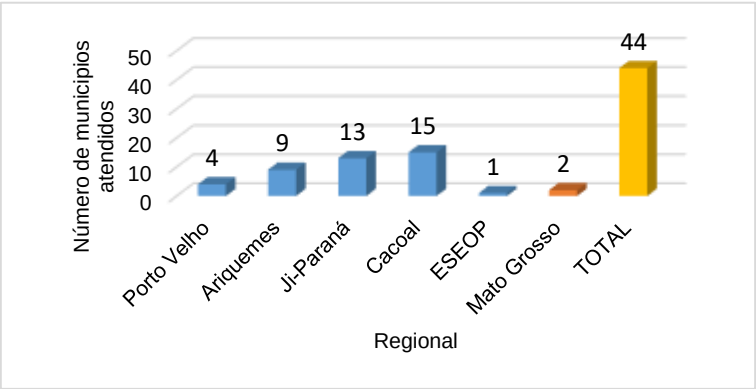
Graph 3 - Value of cocoa production (Thousand Reais), by State, in 2016.
Source: IBGE (Municipal agricultural production).

3.2 Cocoa production in Rondônia

The Development Superintendence of the Cocoa Region of the State of Rondônia (SUERO), CEPLAC's unit in Rondônia, from an institutional point of view, operates in five regions of the State and another region in the state of Mato Grosso. The regions of Rondônia are: Porto Velho, Ariquemes, Ji-Paraná, Cacoal and Ouro Preto do Oeste Experimental Station (ESEOP). In addition to these there is also a region served in Mato Grosso. This spatial distribution helps to configure the institutional matrix of competence of CEPLAC's Superintendence in Rondônia.

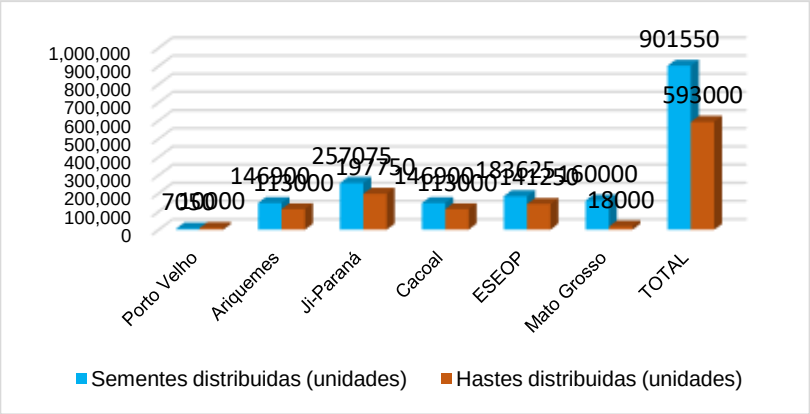
With this spatial distribution of CEPLAC's performance, it is evident that the cocoa development policy in the state of Rondônia is located on the East Rondoniense axis, along the federal highway BR 364. In this configuration, the institutional presence of the agency was not observed in relation to the Madeira-Guaporé Mesoregion, which represents the most preserved region of the state of Rondônia.

In 2018, 44 municipalities were served by cocoa policy, through CEPLAC's Superintendence in Rondônia, from the 5 regional offices. The Porto Velho regional serves 4 municipalities, the Ariquemes regional serves 9 municipalities, the Ji-Paraná regional, 13 municipalities, the Cacoal regional, 15 municipalities, the Ouro Preto do Oeste Experimental Station, 1 municipality and the State of Mato Grosso, 2 municipalities. (graph 4).



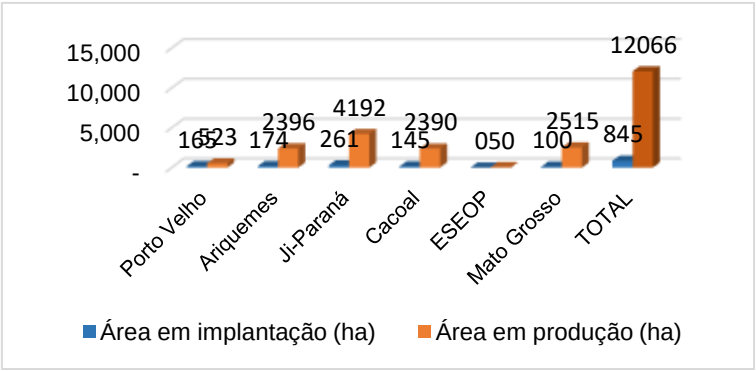
Graph 4 - Number of municipalities served by CEPLAC / RO regional offices, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018.

In 2018, approximately 901.5 thousand seeds and 593 thousand stems were distributed, with the Ji-Paraná region receiving the most seeds and stems (approximately 257 thousand seeds and 197.5 thousand stems), followed by the Ouro experimental station Preto do Oeste (183.6 thousand seeds and 141.3 thousand stems), Mato Grosso (160 thousand seeds and 10 thousand stems), Cacoal (146.9 thousand seeds and 113 thousand stems), Ariquemes (146.9 thousand seeds and 113 thousand stems) and Porto Velho (7 thousand seeds and 10 thousand stems). (graph 5).



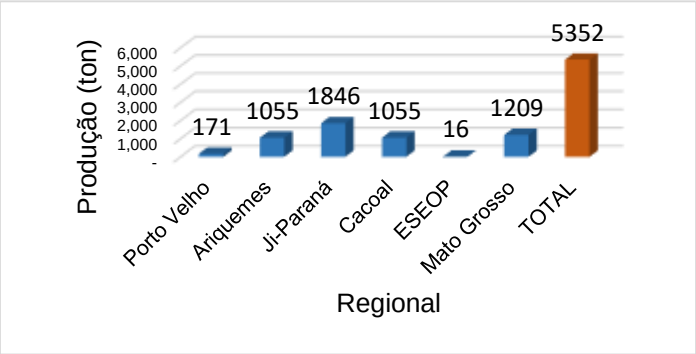
Graph 5 - Cocoa seeds and stems distributed, total and by regional CEPLAC, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018.

Under the jurisdiction of SUERO / CEPLAC there are just over 12 thousand hectares of consolidated areas of cocoa in production, the largest records being for the region of Ji-Paraná (4.2 thousand ha), Mato Grosso (2.5 thousand ha) , Ariquemes (2,400 ha), Cacoal (2,400 ha), Porto Velho (523 ha) and the Ouro Preto do Oeste experimental station (50 ha). (graph 6).



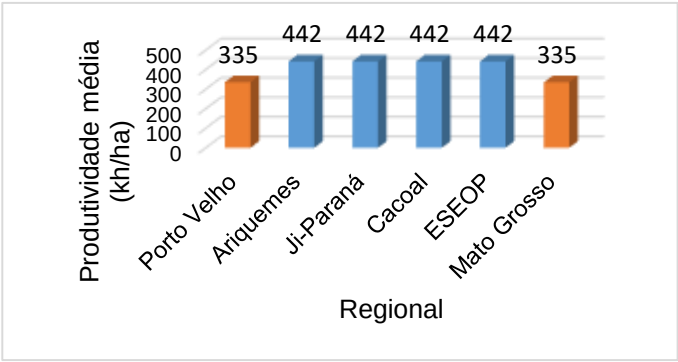
Graph 6 - Area under implantation and production of cocoa (hectares), total and by regional of CEPLAC, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018.

In 2018, approximately 5.4 thousand tons of cocoa beans were produced in the SUERO / CEPLAC area of influence. The largest productions were in the region of Ji-Paraná (1.8 thousand tons), Mato Grosso (1.2 thousand tons), Cacoal and Ariquemes (1.1 thousand tons each), Porto Velho (171 tons) and station Ouro Preto do Oeste (16 tonnes). (graph 7).



Graph 7 - Cocoa production (tons), total and by regional CEPLAC, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018

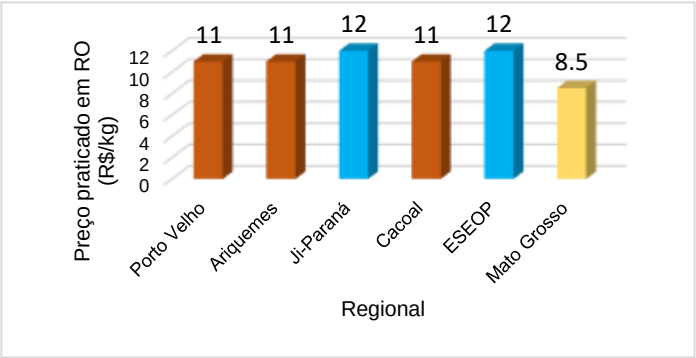
From the point of view of average yield, a pattern was found in the regions of influence of SUERO / CEPLAC, where the regions of Ariquemes, Ji-Paraná, Cacoal and ESEOP had an average yield of 442 kg / ha and the regions of Mato Grosso and Porto Velho yield was slightly lower, at 335 kg / ha. (graph 8).



Graph 8 - Average cocoa productivity (kg / ha), by CEPLAC regional, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018.

With regard to the price charged by the market for the purchase of cocoa beans, there was little variation in Rondônia, where the price in reais per kilo reached R$ 12.00 in the region of the Ouro Preto do Oeste experimental station and Ji- Paraná and R$ 11.00 in other regions of the State.

In Mato Grosso, a significantly lower value of R$ 8.50 was observed. The fact that the main buyers are located near the Ouro Preto do Oeste and Ji-Paraná regions may be influencing this price dynamics, which partly justifies the lower value purchased in Mato Grosso, where transportation ends up exercising a greater influence over price. (graph 9).



Graph 9 - Price charged in Rondônia (R$ / kg), by CEPLAC regional, in 2018.
Source: CEPEX / CEPLAC / SUROM, June 2018.

Currently there are 4.010 families in Rondônia and 22 entrepreneurs registered in the cocoa industry. The region of Ouro Preto do Oeste, where CEPLAC's main and only experimental station is located in the State, has 649 registered families. (table 2).

Table 2: Main cocoa producers in the state of Rondônia.

Main producers			
Register	**Families**	**Businessmen**	**TOTAL**
4.010	4.010	22	4.032

Source: CEPEX / CEPLAC / SUROM, June 2018.

The main consumers of cocoa, that is, the buyers of this raw material are located in Ouro Preto do Oeste (80%) and in Jaru (20%), which places the two regions in a strategic position in relation to the activity market. cacao in Rondônia. (table 3). Regarding the suppliers of inputs for the activity, it was found that 75% of them are located in the municipality of Ouro Preto do Oeste and 25% in Mirante da Serra. (table 4).

Table 3: Main cocoa consumers in Rondônia.

Main consumers	
Company nome	**Source**
Barry CallebautLtda	Ouro Preto – Rondônia
Cerealista Vale do Cacau Ltda	Ouro Preto – Rondônia
Casa do Cacau Ltda	Jaru – Rondônia
Cargill Agrícola S.A.	Ouro Preto – Rondônia
C.F. Rondônia Ltda - ME	Ouro Preto – Rondônia

Source: CEPEX / CEPLAC / SUROM, June 2018.

Table 4: Main suppliers of inputs for cocoa activity in Rondônia.

Main Suppliers of Inputs	
Company nome	**Source**
Casa da Lavoura e Máquina e Imp. Agr. Ltda	Ouro Preto/RO
Fernandes & Costa Pr. Agr. Ltda	Ouro Preto/RO
Nunes & Galdencio Ltda – ME	Ouro Preto/RO
Barrela Agr. S. e Prod. V. Ltda – ME	Mirante da Serra/RO

Source: CEPEX / CEPLAC / SUROM, June 2018.

From the market point of view and within the scope of the cereal market, it was observed that 100% of the raw material (cocoa beans) are traded in the region of Rondônia. (table 5).

Table 5: Coverage of the cereal market in Rondônia.

Market coverage (%) – scope of cerealists				
Region	**State**	**National**	**International**	**TOTAL**
100	0	0	0	100

Source: CEPEX / CEPLAC / SUROM, June 2018..

From the perspective of the processed products market, 5% is destined for the Rondônia market and 95% for other Brazilian states. In Rondônia, cocoa products are sold to small industries and chocolate shops. (table 6).

Table 6: Coverage of the processed market in Rondônia.

Market coverage (%) – scopo of processors				
Region	**Stado***	**National**	**International**	**TOTAL**
0	5	95	0	100

(*)Small industries and chocolate shops.

Considering CEPLAC's policy, triggered in Rondônia at the beginning of the colonization process in the State and its strategy of consolidating cocoa culture in the territory of Rondônia, it ended up being directed to the most impacted regions resulting from agricultural activities. In view of this scenario and considering that today cocoa culture can serve as an action to correct environmental liabilities, that is, the cocoa culture can be used in actions to recover degraded areas, which in addition to fulfilling its environmental role in recovering soil quality, it can represent economic gains for the producer, it only reinforces the self-reinforcing vision of perpetuating its regional development policy in the East Rondoniense region of the State.

Therefore, even if some still use the argument that the decision of the agency to settle in the East Rondoniense mesoregion arose from the poverty of the soils of the Madeira-Guaporé mesoregional portion, now it no longer seems to make sense, considering that the aforementioned cacao culture can be used for the recovery of degraded areas, therefore, indicated for areas with characteristics of weak soils and of low quality. As a result, it is evident that soil poverty is not the reason for CEPLAC's territorial distribution in Rondônia, but rather to see it historically as a culture linked to the correction of environmental liabilities resulting from agribusiness. In the face of this scenario, the cocoa policy followed in the footsteps of the agricultural sector, which pulled the policy in its direction.

Thus, the cocoa culture, institutionally established in the early 1970s, seems to have impacted CEPLAC / RO's planning and actions in focusing its efforts on the most economically dynamic region of Rondônia, since it is exactly in these regions that the major problems of soil degradation were more worrying. Therefore, the fact already demonstrated by Cavalcante [14], in which the Madeira Guaporé mesoregion is based on the main environmental policy of the State, where, like the municipality of Guajará-Mirim, represents 92.06% of its territory [21], helps to further understand this scenario of institutional vacuum in these more environmentally preserved regions.

Everything indicates that CEPLAC / RO's vision of action is more linked to the context of recovering degraded areas than as a regional development policy. But this can be better discussed when analyzing the cocoa production index - CPI, built by this research and which can bring new perspectives of analysis in this regard, when analyzing the Rondônia scenario, in particular.
This aspect explains the fact that in these nearly 50 years of CEPLAC's existence in Rondônia, it is still possible to verify its institutional presence, exclusively in the East Rondoniense mesoregion in the state of Rondônia. The municipality of Nova Mamoré, distant approximately 40 km from Guajará-Mirim, today accounts for the second largest cattle herd in the state, which, by logic, now becomes a priority area for CEPLAC actions, as the municipality in question has demonstrated the main prerequisite for this, the increase in degraded areas. Nova Mamoré is located in the Madeira-Guaporé mesoregion (outside the axis of the BR 364 highway). This CEPLAC vision of action only reinforces the self-reinforcing characteristics based on Douglass North's institutional theory.

Even in this direction, efforts to expand CEPLAC to the Madeira-Guaporé mesoregion are still inefficient, but this may be linked to other factors. In part, conditioned by the very culture established in the body that seems to plaster such an initiative, maintaining its action structure along the BR 364 highway in East Rondoniense. On the other hand, it is worth mentioning other external factors such as the federal government's contingency policy, where many agencies have been suffering budgetary and financial cuts, which hampers any initiative to expand and invest in new infrastructure.

The cocoa production index - CPI, built and designed for the Brazilian municipal level, which covered all cocoa producing municipalities, in relation to 2016, helps to understand this scenario a little more.

3.3 Cocoa Production Index - CPI

The results of the IPC at the national level will be presented below.

CPI for the state of Amazonas. In the state of Amazonas of the 20 cocoa producing municipalities, only the municipalities of Humaitá (CPI 0.187), Codajás (CPI 0.172) and Pauini (CPI 0.160) stand out with the best results of the CPI. These indexes for the classification of the level of the scale adopted are considered (CPI Very Bad). The other 17 municipalities also have poor CPI. There were no major differences in performance between the municipalities, which tends to notice a certain pattern considered to be low in performance. (table 7). The municipalities of Humaitá and Codajás stood out in the average production yield indicator (kilograms per hectare), with yields of 1000 and 900 kg / ha, respectively.

Table 7: CPI of municipalities in the state of Amazonas.

Municipalities	CPI	Municipalities	CPI
Alvarães	0.139	Itacoatiara	0.129
Apuí	0.140	Itapiranga	0.101
Autazes	0.101	Jutaí	0.104
Barcelos	0.115	Manicoré	0.127
Boca do Acre	0.110	Nova Olinda do Norte	0.086
Borba	0.136	Novo Aripuanã	0.147
Coari	0.146	Pauini	0.160
Codajás	0.172	Silves	0.115
Fonte Boa	0.114	Tefé	0.141
Humaitá	0.187	Urucará	0.147

Source: Own elaboration.

CPI for the 111 municipalities in the state of Bahia. The municipalities of Ilhéus (CPI 0.432) considered as a Regular performance index, Ibirapitanga (CPI 0.246), Wenceslau Guimarães (CPI 0.211) and Una (CPI 0.209), indexes considered Bad are the municipalities that stand out in the state of Bahia. 108 cocoa producing municipalities in the state of Bahia have a very poor CPI. (table 8).

Table 8: CPI of municipalities in the state of Bahia.

Municipalities	CPI	Municipalities	CPI	Municipalities	CPI
Aiquara	0.115	Ibirapitanga	0.246	Mucuri	0.089
Alcobaça	0.062	Ibirataia	0.179	Muniz Ferreira	0.104
Almadina	0.101	Igrapiúna	0.121	Mutuípe	0.164
Amargosa	0.105	Iguaí	0.119	Nazaré	0.072
Amélia Rodrigues	0.067	Ilhéus	0.432	Nilo Peçanha	0.148
Apuarema	0.103	Ipiaú	0.135	Nova Canaã	0.087

Arataca	0.187	Itabela	0.108	Nova Ibiá	0.171
Aratuípe	0.072	Itabuna	0.145	Nova Redenção	0.104
Aurelino Leal	0.129	Itacaré	0.196	Nova Viçosa	0.054
Barra do Rocha	0.124	Itagi	0.133	Pau Brasil	0.112
Barreiras	0.097	Itagibá	0.182	Piraí do Norte	0.151
Barro Preto	0.118	Itagimirim	0.059	Porto Seguro	0.072
Belmonte	0.150	Itaju do Colônia	0.067	Potiraguá	0.072
Boa Nova	0.088	Itajuípe	0.167	Prado	0.121
Bom Jesus da Lapa	0.096	Itamaraju	0.207	Presidente Tancredo Neves	0.119
Buerarema	0.116	Itamari	0.163	Santa Cruz Cabrália	0.096
Caatiba	0.080	Itambé	0.097	Santa Cruz da Vitória	0.077
Cachoeira	0.066	Itanhém	0.087	Santa Luzia	0.157
Cairu	0.115	Itapé	0.072	Santo Amaro	0.075
Camacan	0.149	Itapebi	0.083	Santo Antônio de Jesus	0.130
Camamu	0.175	Itapetinga	0.073	São Francisco do Conde	0.086
Canavieiras	0.116	Itapitanga	0.103	São José da Vitória	0.086
Candeias	0.061	Itororó	0.109	São Miguel das Matas	0.132
Caravelas	0.082	Ituberá	0.135	Simões Filho	0.115
Coaraci	0.129	Jaguaquara	0.114	Taperoá	0.114
Cravolândia	0.107	Jaguaripe	0.094	Teixeira de Freitas	0.092
Dário Meira	0.133	Jequié	0.142	Teolândia	0.124
Dom Macedo Costa	0.072	Jiquiriçá	0.161	Terra Nova	0.115
Elísio Medrado	0.131	Jitaúna	0.115	Ubaíra	0.142
Eunápolis	0.099	Jucuruçu	0.100	Ubaitaba	0.117
Firmino Alves	0.079	Jussari	0.092	Ubatã	0.115
Floresta Azul	0.095	Laje	0.153	Una	0.209
Gandu	0.184	Macarani	0.087	Uruçuca	0.189
Gongogi	0.099	Maraú	0.174	Valença	0.144
Guaratinga	0.115	Mascote	0.128	Varzedo	0.112
Ibicaraí	0.097	Mata de São João	0.083	Vereda	0.087
Ibicuí	0.123	Medeiros Neto	0.115	Wenceslau Guimarães	0.211

Source: Own elaboration.

CPI for the 39 municipalities in the State of Espírito Santo. Of 39 cocoa-producing municipalities, only the municipalities of Aracruz (CPI 0.204), Linhares (CPI 0.246), São Domingos do Norte (CPI 0.268) stand

out as poor performance indexes. 36 cocoa producing municipalities in the state of Espírito Santo are in accordance with the classification scale with very poor CPI. (table 9).

Table 9: CPI of the municipalities of the state of Espírito Santo.

Municipalities	CPI	Municipalities	CPI
Afonso Cláudio	0.115	João Neiva	0.081
Águia Branca	0.164	Laranja da Terra	0.104
Alfredo Chaves	0.129	Linhares	0.246
Anchieta	0.129	Marilândia	0.142
Aracruz	0.204	Nova Venécia	0.078
Baixo Guandu	0.094	Pancas	0.181
Barra de São Francisco	0.139	Pinheiros	0.079
Boa Esperança	0.079	Rio Bananal	0.087
Cachoeiro de Itapemirim	0.100	Rio Novo do Sul	0.129
Colatina	0.135	Santa Leopoldina	0.127
Conceição da Barra	0.075	Santa Maria de Jetibá	0.139
Ecoporanga	0.186	Santa Teresa	0.059
Fundão	0.172	São Domingos do Norte	0.268
Governador Lindenberg	0.073	São Gabriel da Palha	0.062
Guarapari	0.064	São Mateus	0.068
Ibiraçu	0.092	São Roque do Canaã	0.086
Iconha	0.132	Serra	0.115
Itaguaçu	0.129	Sooretama	0.101
Itarana	0.084	Vila Valério	0.083
Jaguaré	0.081		

Source: Own elaboration.

The best CPIs in the state of Mato Grosso, represented by the municipalities of Novo Mundo (0.215) and Alta Floresta (0.209) have CPIs considered Bad and the other 9 cocoa producing municipalities have CPIs considered to be Poor. (table 10).

The municipalities of Alta Floresta and Novo Mundo stood out in relation to the average production yield (kilograms per hectare), with yields of 1,200 and 1,120 kg / ha, respectively.

Table 10: CPI of municipalities in the state of Mato Grosso.

Municipalities	CPI	Municipalities	CPI
Alta Floresta	0.209	Novo Mundo	0.215
Aripuanã	0.101	Porto Estrela	0.115

Brasnorte	0.186	Rondolândia	0.104
Carlinda	0.100	Terra Nova do Norte	0.129
Colniza	0.111	Nova Monte Verde	0.158
Cotriguaçu	0.116		

Source: Own elaboration.

The state of Minas Gerais, despite not having a CEPLAC Superintendence, is one of the Brazilian cocoa producing states. The CPIs of the municipalities of Minas Gerais are considered to be Poor due to the scale provided in the research. (table 11). The municipalities of Bandeira and Jordânia stood out in relation to the average production yield (kilograms per hectare), with yields of 833 and 840 kg / ha, respectively.

Table 11: CPI of the municipalities in the state of Minas Gerais.

Municipalities	CPI
Almenara	**0.152**
Bandeira	**0.163**
Jordânia	**0.164**
Mantena	0.130
Palmópolis	0.145

Source: Own elaboration.

The municipality of Medicilândia in the state of Pará is the largest cocoa producer in Brazil, being the only one with CPI considered Excellent (CPI 1,000). The municipalities of Uruará (CPI 0.361), Placa (CPI 0.335), Tucumã (CPI 0.266), São Félix do Xingu (CPI 0.258), Novo Repartimento (CPI 0.239), São Geraldo do Araguaia (CPI 0.237), Brasil Novo (CPI 0.233), Altamira (CPI 0.229), Cumaru do Norte (CPI 0.216) and Vitória do Xingu (CPI 0.215) are municipalities considered to have a poor performance index. The municipalities of Medicilândia and Uruará stood out for their area for harvesting, harvested area and quantity produced.

Of the total of 56 cocoa producing municipalities in the state of Pará, 45 municipalities have CPI on the analysis scale, considered a poor performance index. (table 12).

Table 12: CPI of municipalities in the state of Pará.

Municipalities	CPI	Municipalities	CPI	Municipalities	CPI
Abaetetuba	0.088	Igarapé-Miri	0.097	Placas	0.335
Acará	0.151	Inhangapi	0.188	Porto de Moz	0.163
Água Azul do Norte	0.187	Irituia	0.115	Prainha	0.151
Alenquer	0.121	Itaituba	0.122	Rurópolis	0.171
Almeirim	0.156	Itupiranga	0.159	Santarém	0.117

Altamira	0.229	Jacareacanga	0.115	São Domingos do Araguaia	0.173
Anapu	0.196	Limoeiro do Ajuru	0.109	São Domingos do Capim	0.118
Aveiro	0.118	Medicilândia	1.000	São Félix do Xingu	0.258
Baião	0.103	Mocajuba	0.124	São Geraldo do Araguaia	0.237
Bannach	0.169	Moju	0.108	Senador José Porfírio	0.129
Barcarena	0.104	Monte Alegre	0.150	Tailândia	0.110
Brasil Novo	0.233	Muaná	0.100	Tomé-Açu	0.220
Breu Branco	0.137	Nova Ipixuna	0.115	Trairão	0.135
Cametá	0.190	Novo Progresso	0.187	Tucumã	0.266
Castanhal	0.160	Novo Repartimento	0.239	Tucuruí	0.184
Concórdia do Pará	0.143	Oeiras do Pará	0.130	Uruará	0.361
Cumaru do Norte	0.216	Ourilândia do Norte	0.180	Vitória do Xingu	0.215
Eldorado do Carajás	0.175	Pacajá	0.163	Xinguara	0.121
Gurupá	0.174	Parauapebas	0.159		

Source: Own elaboration.

In the state of Rondônia, the CPI of the 44 municipalities has indexes considered to be very poor. The municipalities of Seringueiras (CPI 0.158) and Nova Mamoré (CPI 0.199) stood out in relation to the average production yield (kilograms per hectare), with yields of 800 and 1083 kg / ha, respectively. (table 13).

Table 13: CPI of the municipalities of the state of Rondônia.

Municipalities	CPI	Municipalities	CPI
Alta Floresta D'Oeste	0.118	Alto Alegre dos Parecis	0.092
Ariquemes	0.152	Alto Paraíso	0.072
Cabixi	0.094	Buritis	0.125
Cacoal	0.089	Novo Horizonte do Oeste	0.095
Cerejeiras	0.100	Cacaulândia	0.086
Colorado do Oeste	0.085	Campo Novo de Rondônia	0.087
Corumbiara	0.088	Castanheiras	0.082
Espigão D'Oeste	0.115	Cujubim	0.086
Jaru	0.116	Governador Jorge Teixeira	0.103
Ji-Paraná	0.106	Ministro Andreazza	0.087
Machadinho D'Oeste	0.090	Mirante da Serra	0.122
Nova Brasilândia D'Oeste	0.084	Monte Negro	0.080
Ouro Preto do Oeste	0.125	Nova União	0.125

Pimenta Bueno	0.115	Parecis	0.115
Porto Velho	0.113	Primavera de Rondônia	0.100
Presidente Médici	0.127	São Felipe D'Oeste	0.114
Rio Crespo	0.082	Seringueiras	0.158
Rolim de Moura	0.085	Teixeirópolis	0.113
Santa Luzia D'Oeste	0.115	Theobroma	0.127
Vilhena	0.100	Urupá	0.138
São Miguel do Guaporé	0.125	Vale do Anari	0.123
Nova Mamoré	0.199	Vale do Paraíso	0.117

Source: Own elaboration.

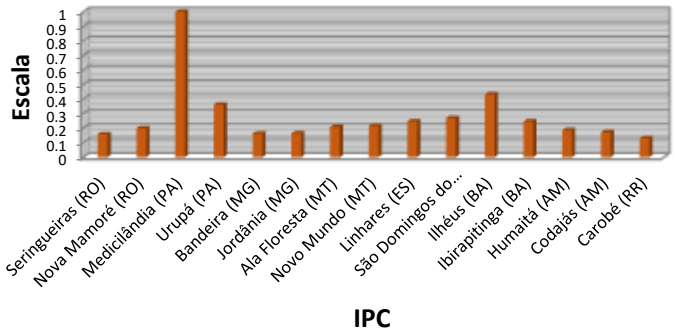
In the state of Roraima, only the municipality of Caroebe has cocoa production. In Caroebe, the CPI index of 0.131 was observed, considered very poor. (table 14).

Table 14: CPI of the municipality of the state of Roraima.

Municipalities	CPI
Caroebe	**0.131**

Source: Own elaboration.

In summary, Graph 10 represents the best municipal CPI performances by State and region of Brazil served by CEPLAC actions and which registered cocoa production in 2016. This result does not only take into account the volume of production or size of area produced, in isolation, as initially shown in this work. Here, it is a look at the sector's performance considering the studied variables, which after factor analysis, using multiple regression methods, allowed the construction of the cocoa production index in Brazil (CPI). Based on this result, it was possible to verify that certain municipalities with little expression in cocoa production performed better than those from more traditional regions based on cocoa activity. This is because the factor analysis used allowed to capture statistical variations considered important and that give weight to these variations. This explains, for example, the case of the municipality of Nova Mamoré showing the best performance in Rondônia, even though its productive area was low in relation to other municipalities in the state. The point is that the productive yield was decisive, in our view, for this fact, since it is practically double that observed for the other cocoa producing regions. It is worth mentioning that the data used in the factor analysis for the production of the CPI were all researched by the IBGE, and that, therefore, they were constructed according to official data from Brazil.



Graph 10 - Municipalities with the highest CPIs by cocoa producing states.
Source: Own elaboration.

The representation of the municipalities with the highest CPIs by cocoa producing states in Brazil (graph 10) helps to understand that the most dynamic municipalities in Brazil are Medicilândia, state of Pará and Ilhéus, in Bahia. Thus, in view of the Brazilian scenario, in general, and in the Rondônia scenario, in particular, with the exception of Medicilândia basically, there are no development poles for the cocoa crop in Brazil, since the performance presented by the IPC is, in general, very low. This helps to highlight, once again, the scenario of stagnation in which the sector lives, despite a promising horizon. The Brazilian performance index (CPI) shows a deficit. It is noticed that there is a low level in terms of performance of cocoa production in the country.

Brazil with continental dimensions in the state of Bahia historically producing cocoa has 111 producing municipalities, Pará with 56 municipalities, Rondônia with 44 municipalities, Espírito Santo with 39 municipalities, Amazonas with 20 municipalities, Mato Grosso with 11 municipalities and Roraima with only 1 municipality .

Thus, with regard to the state of Rondônia, which follows a national logic, it allows us to realize that there is room for growth in the face of an increasingly demanding market for cocoa raw materials, especially for the chocolate industry. However, based on what has been discussed in relation to the state of Rondônia in this work, it is more evident that, at the level of that state, there is still no development pole for cacao cultivation, since the results indicate a certain standardization at a low level of performance . Thus, the vision, discussed here, of looking at the sector as a means of recovering degraded areas makes it difficult to act in favor of the economic dynamics of cocoa.

Given this scenario, cocoa production in Rondônia is no longer a "protagonist" of regional development for a "supporting" stance in this process. This view allows us to see the cocoa policy going after the negative effects of agribusiness in the state of Rondônia. This view helps to explain the concentration of efforts in the East Rondoniense mesoregion, leaving an institutional vacuum of cocoa policy in the Madeira-Guaporé mesoregional portion, which if it were not for the logic of the policy for the recovery of degraded areas, there would probably be a presence most effective in this region. This analysis is corroborated by

Cavalcante, Góes [21,22], Cavalcante et al [23]. In this direction are the interpretations of [25], [26]. The basis of the research analysis is supported by North [27, 28, 29, 30].

Aiming at correcting this process, a project was launched, in partnership with CEPLAC, for the Technological Showcase of cocoa at the Guajará-Mirim University Campus of the Federal University of Rondônia - UNIR. This initiative aims to strengthen cocoa policy at the local level, outside the axis of the federal highway BR 364. However, many obstacles need to be overcome, despite the good interinstitutional relationship between the Academic Department of Social and Environmental Sciences, the Study Group and Research in Social and Environmental Sciences and Public Policies - GEPCAP and CEPLAC / RO.

V. CONCLUSIONS

Despite the importance of cocoa production, there are still no regional development centers for cocoa cultivation in Rondônia. All cocoa producing municipalities had low levels of IPC performance.
The fact that the organ in question is located exclusively in the eastern Rondoniense portion of the state only reinforces the analysis in this direction, which helps to understand the path dependence character of the cocoa policy in Rondônia.

The view that the cocoa culture can and should be stimulated as an action for the recovery of degraded areas, throughout the history of CEPLAC / RO, has impacted the organ's strategic vision aimed at correcting the negative impacts caused by the advance of the agribusiness in the State. And that view ended up "covering up" another view based on "protagonism" as an agent of social change and regional development.

The inversion of this logic seems basic, but it is believed that it will have a logical weight of completely different objectives and goals, since the look starts to contemplate the economic aspect, without forgetting its environmental function. However, not as a corrective action, as it is today at CEPLAC / RO, but as a proposal for a development model that can improve the quality of life of the population and with capillarity for the generation of jobs and income, besides, of course, its environmental importance. What is perceived here is a mistake to consider this activity only as a recuperator of degraded area and to leave the economic issue to the background. It is exactly the reverse that we are pointing out.
Without reversing this logic, the path dependence effects will continue to dictate the rules of the game and the organizational culture will continue to focus on cocoa policy as an activity for the purpose of correcting environmental liabilities. In this regard, areas consolidated with agriculture and livestock, which suffer the consequences of years of inadequate use of natural resources, will continue to be seen as priority areas by the agency. However, the view suggested here, on the other hand, may result in different regions of the State benefiting from the cocoa policy, since the focus is no longer on recovering a degraded area, but simply believing in cocoa activity as a driver of the regional development, through the consolidation of a solid and viable economic matrix.

The logical inversion of these visions would, for example, allow the municipality of Guajará-Mirim to come under this policy, since currently, due to the fact that it has more than 92% of its territorial area in the form of nature conservation units and indigenous lands, makes it a non-priority region in terms of cocoa policy in the State.

The municipality of Nova Mamoré, approximately 40 km from Guajará-Mirim, which in recent years has stood out in livestock production, occupying the post of second cattle herd in Rondônia, which when experiencing the loss of quality of its soils due to the aforementioned livestock activity, is included in the ranking of priority municipalities for cocoa policy. Only now?

Well, it is hoped, with this, to have contributed to the discussion on cocoa policy in Rondônia and the strategic vision that CEPLAC / RO has been demonstrating throughout its institutionalization in the State. However, it is not intended to abandon the agency's policy for purposes of environmental liabilities, it is believed that this is even one more opportunity in terms of strengthening the sector. But this should not be the main focus of cocoa policy. It is much more than that. Cocoa culture needs to be seen as a regional development strategy, with quality and performance indexes monitored based on the vision of the local productive arrangement. Without this perspective, unfortunately, this activity in the State will continue as a "trailer" for the agricultural sector.

Therefore, what is expected is that CEPLAC / RO occupies the "leading role" of regional development in Rondônia and conducts a policy for all regions that see cacao as a source of opportunity and life change.

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