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# Land income and large capitalist planting of oil palm in the Brazilian Amazon

Renda fundiária e grande plantação capitalista do dendê na Amazônia brasileira

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**Abstract:** This article deals with the relationship between capitalist land rent and oil palm in the state of Pará. The objective of the research was to explain, based on the Marxist theory of land rent, why the state of Pará (with emphasis on the micro-region of Tomé-Açu) presents itself as the main producer and with the highest productive averages of Brazilian oil palm. To develop this analysis, the theory of land rent established by Marx (2017 [1894]) has been used, detailing the four modalities of land rent (monopoly rent, absolute rent, differential rent I and differential rent II), considering their theoretical and practical interactions. As an empirical procedure, secondary data on location, climate and soil conditions related to the development of the crop, as well as the size of the capital involved, were analyzed.

**Keywords:** Absolute income; Differential income; Land rent. Oil palm; Pará State.
**JEL Classification:** B51; O13; Q15.

**Resumo:** Este artigo trata da relação entre a renda fundiária capitalista e a dendeicultura no estado do Pará. O objetivo da pesquisa foi explicar, com base na teoria marxista da renda fundiária, por que o estado do Pará (com destaque para a microrregião de Tomé-Açu) se apresenta como o principal produtor e com as maiores médias produtivas da dendeicultura brasileira. Para desenvolver esta análise se fez uso da teoria da renda da terra estabelecida por Marx (2017 [1894]), detalha-se as quatro modalidades de Renda da Terra (Renda de Monopólio, Renda Absoluta, Renda Diferencial I e Renda Diferencial II) considerando suas interações teóricas e práticas. Como procedimento empírico fez-se a análise de dados secundários sobre localização, condições de clima e de solo relativos ao desenvolvimento da cultura, assim como do porte dos capitais envolvidos.

**Palavras-chave:** Renda fundiária; renda diferencial; renda absoluta; dendeicultura; Estado do Pará.
**Classificação JEL:** B51; O13; Q15.

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## 1. Introduction

The expansion of agribusiness in the Brazilian Amazon is one of the hallmarks of the current national and Latin American economic pattern (OSORIO, 2012; TRINDADE & OLIVEIRA, 2014, 2017; ASSIS, 2021; TRINDADE, 2022). This pattern is centered on primary-export productive specialization, one of the bases of which is the large-scale exploitation of agricultural commodities, the economic calculation of which requires the use of extensive arable land.

The theory of land rent provides a structural understanding of two fundamental phenomena: the link between agrarian production and the control of land ownership, and the logic of the growing occupation of the Amazonian hinterland by "plantations". As Astarita (2013, p. 198) observes, "it is a frequent mistake to deal with agrarian profitability as a whole, without distinguishing land rent from capital profit".

It is believed that it was native Africans who introduced the oil palm to Brazilian soil in the 17th century, near the coast of Bahia (BARCELOS, 1990). While they weren't in the sugarcane fields or other crops that were linked to the world market, as part of the international division of labor at the time, the captive workers extracted the oil from this palm tree and used it directly for their subsistence, thus incorporating it into traditional Brazilian cuisine. Palm oil has become an important agricultural commodity and a link in the international division of labor, whether as a raw material for the food industry (the main demand) or for the production of biodiesel, as we shall see.

Until the 1970s, the state of Bahia was Brazil's main producer of oil palm bunches, but it was, and still is, cultivated solely for extractive purposes, with low productivity and old palm trees (REBELLO, 2012). Through significant state action, in view of the oilseed's economic profitability (confirmed by domestic and foreign markets), large-scale production began in the Amazon. The state of Pará surpassed the production and productivity of the state of Bahia, currently accounting for more than 90% of national production, with a higher average productivity, especially in the Tomé-Açu micro-region, where the main Brazilian palm oil agro-industries are located, as can be seen in Table 1 below.

**Table 1 - Quantity of oil palm produced (coconut bunch) (Tons)**

| Brasil and UF | Year (%) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1991 | % | 2001 | % | 2011 | % | 2021 | % |
| Brasil | 525.968 | 100,0 | 772.097 | 100,0 | 1.301.192 | 100,0 | 2.887.696 | 100,0 |
| Pará | 330.018 | 62,7 | 582.797 | 75,5 | 1.082.348 | 83,2 | 2.846.023 | 98,6 |
| Bahia | 148.242 | 28,2 | 189.117 | 24,5 | 215.784 | 16,6 | 39.411 | 1,4 |

Source: IBGE - Municipal Agricultural Production. Own elaboration. Accessed at: https://sidra.ibge.gov.br/pesquisa/pam/tabelas.

It is considered that the capitalists linked to the palm oil agro-industries installed in the Amazon are also the landowners of the land on which the oil palm crop is planted, which makes it possible for them to appropriate not only normal profits, but also extraordinary profits resulting from absolute and differential land rents, as will be analyzed. It's worth noting that land rent plays an extremely important role, as it "organizes the spatial division of labor through its influence on the allocation of different moments, activities and sociotechnical forms of production" (SWYNGEDOUW, 2020, p. 437), in addition to the aspects of occupation and economic use of the Amazonian soil, which are dealt with in this work.

This article is based on the following questions: a) what is the relationship between capitalist land rent and the territorialization of the palm oil agro-industry? b) why has the state of Pará, and more specifically the micro-region of Tomé-Açu[3], become the main producer and has the highest levels of productivity in Brazil?

To develop this analysis, as already mentioned, we used the theory of land rent established by Marx (2017 [1894]), detailing the four types of Land Rent (Monopoly Rent, Absolute Rent, Differential Rent I and Differential Rent II), considering their theoretical and practical interactions. Land rent is understood as a social relationship that enables the permanent appropriation of a "super-profit" by the landowner, even though in not a few cases, as in the case of the subject of this article, the agricultural capitalist is also the landowner.

The analysis inferred data on the production and productivity of oil palm in the different Brazilian states, as well as in the producing micro-regions of Pará, taking a historical series of the last three decades (1989/2021), using data provided by the Municipal Agricultural Production Survey (PAM) of the Brazilian Institute of Geography and Statistics (IBGE). Documentary analysis is also used on the historical and spatial factors that made the capitalist development of this crop possible, the levels of economic and locational potential and its territorial repercussions.

The article aims to deal with the economic dynamics of oil palm cultivation, focusing on the hypothesis of the importance of land income in the territorialization of the palm oil agro-industry in the state of Pará. In addition to this introduction, the presentation is divided into three sections: the first deals theoretically with capitalist land rent in agriculture and its different economic forms (differential rent I, differential rent II, absolute rent and monopoly rent); the second section constitutes the core of the study, and analyses the influences of the forms of land rent on the territorialization of oil palm cultivation in Pará; and finally, the final considerations are presented.

[3] The Tomé-Açu micro-region is located to the south of the Belém metropolitan region (RMB) and is made up of five municipalities (Acará, Concórdia do Pará, Moju, Tailândia and Tomé-Açu), check: https://www.ibge.gov.br/geociencias/organizacao-do-territorio/estrutura-territorial/23701-divisao-territorial-brasileira.html?=&t=acesso-ao-produto.

## 2. Capitalist agricultural land rent

### 2.1 The four forms of Agrarian Income: Monopoly, Absolute and Differential I and II

Land is the universal object of human labor, as it provides the indispensable means for social reproduction. It is a fundamental means of carrying out the work process, either indirectly, when it provides the worker with the place to carry out his activities and his work process, the field of action, such as workshops and roads, or directly, such as the soil in agriculture or the waterfall for the production of electricity. In agriculture, the land is the basis of the work process, and there is no cultivation without the substrate of arable land, water as an input, more or less sunlight, depending on the type of crop, and the energies of the workforce that sows, plows, cultivates and harvests the produce. Two forces produce wealth: "labor is the father of material wealth (...) and the earth is the mother" (MARX, 2013 [1867], p. 121).

Lands are naturally and socially differentiated, they have peculiar qualities (temperature, rainfall, drainage, sunshine, fertility, etc.) which, for agriculture, are capable of conditioning the work process, making a particular place at once unsuitable for certain crops and exceptional for others. These are qualities that, unlike a machine or any other artificial object, cannot be reproduced at will by labor (MARX, 2017, [1894]), even though they can be economically altered through the use of various technologies and productive investments.

In the capitalist mode of production, where the agricultural branches are a link in the social division of labor and where land is a class monopoly, the determinations regarding the private appropriation of land and its specific productive and locational characteristics define land rent as the appropriation of extraordinary profit by landowners.

Private ownership of land is a form of monopoly that creates barriers to the accumulation of capital and its mobility (MARX, 2017 [1894]; HARVEY, 2013; FINE & SAAD FILHO, 2021). As accumulation and the credit system expand, it is given a price, thus acquiring an exchange value without, however, possessing value, since it is not a means of production reproducible by human labor, becoming a financial asset that can be traded as fictitious capital. But this irrationality, being the bearer of exchange value without possessing value, hides, as Marx (2017 [1894], p. 684) says, "a real relation of production", a production of value that is, through the conditions of capitalist competition, partly appropriated by the landowner[4].

An important aspect is how the so-called extra profit (or supplementary profit) is formed, a category that expresses a higher profit than is usual in a given branch, formed by the average profit established in the economic segment in question. In general terms, the

[4] In capitalist market relations, we see a series of "irrational prices", i.e. prices for goods that are not the result of human labor. Thus, the same aporia can be observed in the case of land as in the case of the price of labor or the price of capital. The solution proposed for the three aporias is quite similar: they are specific commodities with prices that cancel out that irrationality at the level of form and become explanatory of capitalist logic. In the case of land, we have the commodity-land with the price given by the land rent (MARX, 2013 [1867]; HARVEY, 2013; FINE e SAAD FILHO, 2021).

price is based on a production cost and an average profit established in the sector (Pp = Cp + Lm)[5]. Extraordinary surplus value, the origin of supplementary profit, can and does occur due to an exceptional condition that favors a specific capital that is able to increase its labor productivity, that is, that reduces its necessary working time below the social average, and is therefore a variant of relative surplus value (MARX, 2013 [1867]).

In industry, this exceptional condition is usually provided by the insertion of an improved machine or more intensive work organization which, because they are reproducible conditions, tend to dissipate when they are assimilated by other capitals, driven by competition in the industry, thus becoming social averages (average social work). Exceptionality, which was the monopoly of an individual capital and provided it with an extraordinary profit, fades with the socialization brought about by competition between capitals.

This process is different in agriculture because land is an obligatory condition for production, and higher quality land, which provides a greater quantity of products with the same amount of work employed in lower quality areas, is capable of providing extraordinary profits for the capital invested, but without dissipating, because they are advantageous conditions that cannot be reproduced, becoming fixed extra profits (MARX, 1980 [1905], p. 526). This is why the general price of production in a given agricultural sector is not regulated, as in industry, by the average, socially necessary conditions that prevail there, but by the worst soil, since for capitalist production to take place, it is enough for the costs of production to be covered and for an average profit to be made[6].

Differential land rent is the result of differences in labor productivity, obtained by the qualitative or locational conditions of the best soil, both because they require lower constant and variable capital costs compared to the worst, and because these non-reproducible conditions are monopolizable, fixed to their natural base. There are two soil differentials, which give rise to unequal yields and are therefore requirements for the existence and variation of differential income (MARX, 1980 [1905], p. 452): the quality of the land (its "fertility") and its location in relation to the markets. The more fertile and better located the land, the less work is required to produce and distribute goods.

[5] The debate concerning the theoretical elements of price formation in Marxist theory has historically been known as the "transformation problem" (FINE e SAAD FILHO, 2021; DESAI, 1979). In the second section of Book III of Capital, Marx (2017, [1894]) develops the "transformation of profit into average profit", establishing sectoral and intersectoral competitive conditions. The so-called Price of Production (Pp), "the transformed form that value takes on the surface of the capitalist economy", is the algebraic result of the sum of the Cost of Production (Cp), i.e. the mass of value advanced in the form of Constant Capital (C) and Variable Capital (V), plus the Average Profit (Lm), defined by Marx (2017, [1894], p. 192) as a "general rate of profit, which represents the average of all those distinct rates of profit".

[6] It is importante noting the difference between the theory of land rent developed by Marx and that proposed by Ricardo (1988 [1819]). According to Swyngedouw (2020, p. 432), for Ricardo “the origin of income lies fundamentally in the intrinsic characteristics of the soil (its fertility)”, for Marx “value does not arise from natural characteristics”, it results from socially necessary working time, being that the “fundamental relationship through which income arises is social”, otherwise, land income only manifests itself with the expansion of capital..

As the different areas of privately-owned land have different natural qualities and dimensions, where farms with unequal applications of capital are based, analytically it is necessary to distinguish the differential income into two types: into differential rent of the first type (RDI), whose unequal return is the result of the investment of capital of equal magnitude in land of the same cultivated area, but of naturally unequal qualities; and differential rent of the second type (RDII), whose unequal returns of individual capitals invested in equal areas result not from the natural difference of the land, but from the "industrial difference" (MARX, 1980 [1905], p. 526), that is, from the difference in capital investment. Here, the extra profit remains fixed because the investments of capital rest on a naturally unequal and irreplaceable element in agriculture which is the land, which, on the other hand, in addition to being a natural base, is a means of production that can be continuously improved, where a new application of capital does not cancel out the positive effects of the previous one, which differs from artificial means of production, thus, the "fixed capital invested in machinery etc. does not improve with use; on the contrary, it wears out (...). Land, on the other hand, when properly treated, improves continuously" (MARX, 2017 [1894], p. 841).

To illustrate these types of differential income, let's think of two plots of land of equal size: one better and one worse, A and B. With the same amount of capital, let's say "x", soil A will naturally have a higher productivity than soil B, resulting in a fixed extra profit, appropriated in the form of differential rent of the first kind (RDI). If society demands more products, thus increasing demand and the market price, in such a way that it covers the costs of exploiting a third piece of land, C, which is twice as bad as B, but which provides the usual rate of profit (thus making its price of production the market regulator and no longer the price of production of B), the new capital will be able to start producing on soil C or expand production on soil A.

In the first case, of extensive expansion, the extra profit would come from the differential productivity of naturally better land (A and B) and in the second, from the differential productivity of an intensive application of capital in A, which is fixed because the natural base where capital is applied remains uneven and the differential gains of technical progress have a permanent character when applied to the soil, precisely the substance of the second type of differential income (RDII).

In this sense, although the forms are different, the content remains the same: the differentials in labor productivity, since "the same soil performs the same task for a capital successively invested in different parcels as [...] different types of soil perform for the parcels - of equal size - of social capital invested in them" (MARX, 2017 [1894], p. 741).

The preferred lands for capitalist exploitation are those that offer soils that combine the best quality and the best location, as this increases profits, but the production of mainly agricultural products on a large scale requires conditions of land extensiveness, which projects rents of the absolute type, derived from the "imperfect mobility of capital as a result of fragmented and dispersed land ownership" (SWYNGEDOUW, 2020, p. 433).

In this way, even if a given piece of land has superior soil "fertility", which is naturally exceptional, but is poorly located, increasing transportation costs, it can be given up for another that is less "fertile" but better located. According to Marx (2017 [1894], p.714) "[...] it is clear that these two distinct reasons for differential income - fertility and

location - can act in the opposite direction. A piece of land can be very well situated and very unfertile, and vice versa."

In this sense, considering only the first type of differential rent, the movement of capital does not necessarily take place towards the less "fertile" lands (from the best to the worst), but also in the opposite direction, if compensated by location. This movement becomes even more complex if we consider capital-intensive investments, which working together with nature, improving the soil and the circulation of goods in space, create even greater possibilities for the territorialization and accumulation of capital. However, this does not cancel out its foundation (which is also its historical starting point): the naturally unequal base, which provides extra profits, i.e. RDI.

Capitalist expansion in agriculture is preferably carried out on the best soils, in view of their higher yields, from where, on this exceptional and diversified basis, the use of capital is intensified. Therefore, the spatial and temporal presupposition of the RDI is the RDI, in the sense that it continuously affects it in its base and in the location where it develops historically, so "differential income I is the historical base from which it starts [and] the movement of differential income II is only produced, at any given moment [by] the variegated foundation of differential income I" (MARX, 2017 [1894], p. 740).

Land ownership thus becomes a condition for intercapitalist competition, and the levels of income it provides guide capital in the countryside. It then goes beyond its passive role as a mere recipient of the surplus created and actively participates in coordinating its own production, as Harvey (2013) states, and this can also be seen in the expansion of Amazonian land markets, as Costa (2022) observes.

The selection and opening up of land for exploitation initiates a dispute over future surpluses, whether these come from ongoing production processes or those that are only in the imagination of investors. Therefore, land can be understood as a form of fictitious capital (HARVEY, 2013, p. 350), a security that is the fictitious representation of a capital (because it, like financial "roles", has no real value, only a price) that is traded on future rents. The capitalist land market, in this sense, emerges and develops from the immediate exploitation of the best land or to create a reserve for future, capitalized income.

The monopoly on the use of land, which on the one hand allows extra profits to be captured (or fixed) by certain capitals that exploit land of superior quality and that compete in the same industry, on the other hand prevents the surplus value that rises over agricultural production prices from participating in the act of leveling out profit rates in the competition between capitals from different industries and sectors. This opens up the possibility for even the worst soils to provide an income: absolute income.

In order to properly understand this form of land rent (which is absolute because its existence is independent of other land and is therefore present in any and all capitalistically exploited property [7]) it is necessary to take a closer look at why land ownership prevents such a leveling - of the different rates of profit to an average rate of profit - to the point of producing the following distortion: the generally more backward sector (in this case, the

[7] This also implies that it is not the productivity of agricultural labor that "produces" it (MARX, 1980 [1905], 473).

agricultural sector) appropriating the excess surplus value that rises over the average profit (MARX, 1980 [1905).

First of all, it must be clear that value and the price of production are not identical and that, above all, they are necessarily divergent and only coincide by exception, because they have dialectically distinct determinations. They are categories belonging to different levels of abstraction, with essential value being the theoretical and material foundation of the price of production, while the latter is a phenomenal expression of the former. In this sense, while value is determined by the conditions of production and average productivity, i.e. the amount of work socially necessary to produce all commodities (MARX, 2013 [1867]), thus expressing the production of social wealth, the price of production is determined by the average rate of profit plus individual costs and expresses, in turn, the appropriation by individual capitals of slices of this mass of socially produced wealth.

This differentiation is important for understanding absolute income, because as the production prices of goods fluctuate around their values, goods can be sold below or above them, so goods that have lower production prices than their values enable a surplus value (extraordinary profit) above the average profit, the substance of absolute income[8].

For this to be possible, the organic composition of capital in agriculture must be lower than that of the average social capital, which means that, proportionally, the variable part of capital, directed towards the payment of labor power, is higher than its constant part, relating to the means of production, compared to the social average, so that "by employing more living labor, such capital produces, with the same exploitation of labor, a greater surplus value, that is, more profit than an aliquot of the same magnitude of the average social capital" (MARX, 2017 [1894], p. 819).

Individual capitals operate in the various branches and sectors with different levels of productivity, some above average, others below, thus giving rise to very different individual values and, consequently, equally different profit rates. In the case of non-agricultural production, the rate of profit is equalized, forming the average market profit, and different compositions of capital tend to absorb different amounts of surplus value, in proportion to the mass of capital controlled.

However, in the case of agricultural production, land ownership creates a monopoly on the exceptional conditions of the soil, fixing the extra agricultural profit, it also engenders a monopoly on its own exploitation, preventing the equalization of the rate of profit by the average, due to land immobility. As the Organic Composition of Capital (OCC) of the agricultural sector is generally lower than that of the industrial sector (because land is not capital, its participation in the agricultural reproductive process works by reducing the organic composition), the surplus value that exceeds the average profit does not enter the process of leveling profit rates, but is distributed as absolute income to landowners. Thus, "land ownership confronts capital in its investments in land or, in other words, the landowner confronts the capitalist" (MARX, 2017 [1894], p. 822).

[8] Fine and Saad Filho (2021, p. 169-170) express the difference between production value and price algebraically, noting that this difference establishes Absolute Income, "due to its below-average COC (Organic Composition of Capital) in situations where real estate ownership obstructs accumulation".

Even when the capitalist entrepreneur becomes the owner of the land, the limitation imposed by land ownership on the flow of capital does not cease. Absolute rent continues to exist, because it is a social relationship, and the share of rent related to it is appropriated by the specific agricultural capitalist as perpetual extraordinary profit. Just as it is not the individual action of capitals that "creates" the surplus value over production prices, but the relations that are involved with the totality of capitals (their reciprocal actions in competition), it is not the action of the landowner that "creates" absolute rent, but rather the existence of private ownership of the soil, which prevents this surplus from entering the process of leveling out profit rates, allowing it to be appropriated by the landowner, all that is needed is for the market price to rise above the production price of the worst soil, as Silva (1981, p. 20) states, "always (...) a second-hand appropriation".

Differential income manifests itself with a certain peculiarity. The extra profits remain fixed, but instead of being converted into a share of the rent, they are amassed first-hand by the capitalists. What is unique is something that is particularly advantageous for capitalist exploitation. When there are no leases, long-return productive investments, especially in fixed capital (machinery and capital incorporated into the soil: roads, canals, leveling, etc.), can be made without fear of interception. In this sense, the dispute between land and capital over the appropriation of the second type of differential rent, which takes place around the length of lease periods, ceases, thereby increasing investments in fixed agricultural capital and the rationalization of production. In another context[9], these are limited by capitalist tenants, who avoid "any improvement and investment whose total return does not occur during the period of their lease" (MARX, 2017 [1894], p. 681).

Considering differential income and absolute income as a whole, as the reality manifests itself, we have the following condition: to the price of production of the worst class of soil (which does not provide differential income) is added a value relative to absolute income, the measure of which depends on the degree of technical inequality of the farm compared to the average dictated by industry and the dispersive fragmentation of land. So, on this composition, the best soils set extraordinary profits according to the gradients of labor productivity. Consequently, if "[...] the price of the product per unit area of the worst soil is = P + r [equal to the price of production plus the absolute rent], then (...) P + r becomes the regulating price of the market" (MARX, 2017 [1894], p 823-824).

Apart from the worst plots of land, which only provide absolute rent, the rest are carriers of both forms of land rent, but their significance for capital accumulation is not the same when the capitalist exploiter is also a landowner. As the productive forces of labor in a given agricultural branch advance (using the mechanisms for extracting relative surplus value, above all machinery), the second type of differential income becomes crucial, and this advance affects all farms, the importance of absolute income decreases. If the increase in the technical composition of an agricultural branch approaches the social average (defined by industrial capital), absolute income shrinks and, if it were to equal or exceed it,

[9] As a precaution: "Marx's methodological assumption about the separation between the landowner and the capitalist tenant is more linked to the particular characteristics of the English case than to any logical deduction from the theory of land rent." (SILVA, 1981, p. 19).

it would "disappear" (MARX, 2017 [1894], p. 825; HARVEY, 2013), as there would be no surplus value over agricultural production prices to be intercepted by land ownership.

However, within the framework of the capitalist mode of production, this form of income cannot be suppressed, as it is specific to it. The natural barriers imposed on the agricultural production process, which increase the turnover time of capital (due to the long production periods) and suspend the process of valorization (because production time is interspersed with non-working time, imposed by nature's time), can be annulled by technical progress, but the social barriers established by private property itself, which is fundamental to capitalist accumulation, represent a necessary but contradictory block to the free movement of capital in the countryside.

**Table 1 - Characterization of Land Income**

| Type of Income | Characteristics and causes | Influences | Spatiality | Temporality |
|---|---|---|---|---|
| Absolute | It exists primarily as a result of private land ownership and the inferior organic composition of agriculture. | It can absolve any difference between the value and the price of production. | It depends on the correlation between land supply and demand. | Permanent. |
| Monopoly | Presence of very particular characteristics that enable the appropriation of extraordinary profit. | It absorbs part of the surplus value produced in other segments. It is not a true land rent, as the extraordinary profit it generates is not part of the value of agricultural products. | It depends on specific morphological or locational conditions. | Temporary. |
| Differential I | It is the result of the different natural fertility and the different situation of the land being exploited in relation to the market, and is formed in the middle and better lands. | The higher quality of the soil makes it possible for the agricultural capitalist to make a permanent extraordinary profit. | It determines the allocation of land, both agricultural and urban, establishing a complex mosaic of land use. | Permanent. |
| Differential II | It results from investments and the application of technologies and social infrastructure. | Obtained through investment, the extraordinary profit stimulates competition between capitals and investment by the state. | Empowers the spatial factors of Differential Income I. | Temporary, depending on the fixed capital invested in the land and the length of the contract. |

Prepared by the authors. Sources: Marx (2017 [1894]); Fine and Saad Filho (2021); Harvey (2013); González (1977).

## 3. The forms of capitalist land rent and oil palm cultivation in Pará

In the world, oil palm is grown preferentially in places with a predominantly equatorial climate, as these areas provide the plant with the best conditions for its development, given that Elaeis guineensis, which originated in Africa, is particularly demanding in terms of sunshine, temperature and rainfall (MÜLLER; ALVES, 1997) and much less so in terms of soil quality.

In detail, the palm tree requires a minimum of 5 hours of sunshine a day, monthly average temperatures between 25ºC and 28ºC and no lower than 18ºC and, above all, abundant rainfall, regularly distributed throughout the year, so that drought does not last more than two months. Failure to meet these requirements means problems with foliage emission, the rate of photosynthesis, the maturity of the bunches, the quantity of pulp, the number of bunches and the oil content, in other words, lower production and productivity (MÜLLER, 1980; EMBRAPA, 1987).

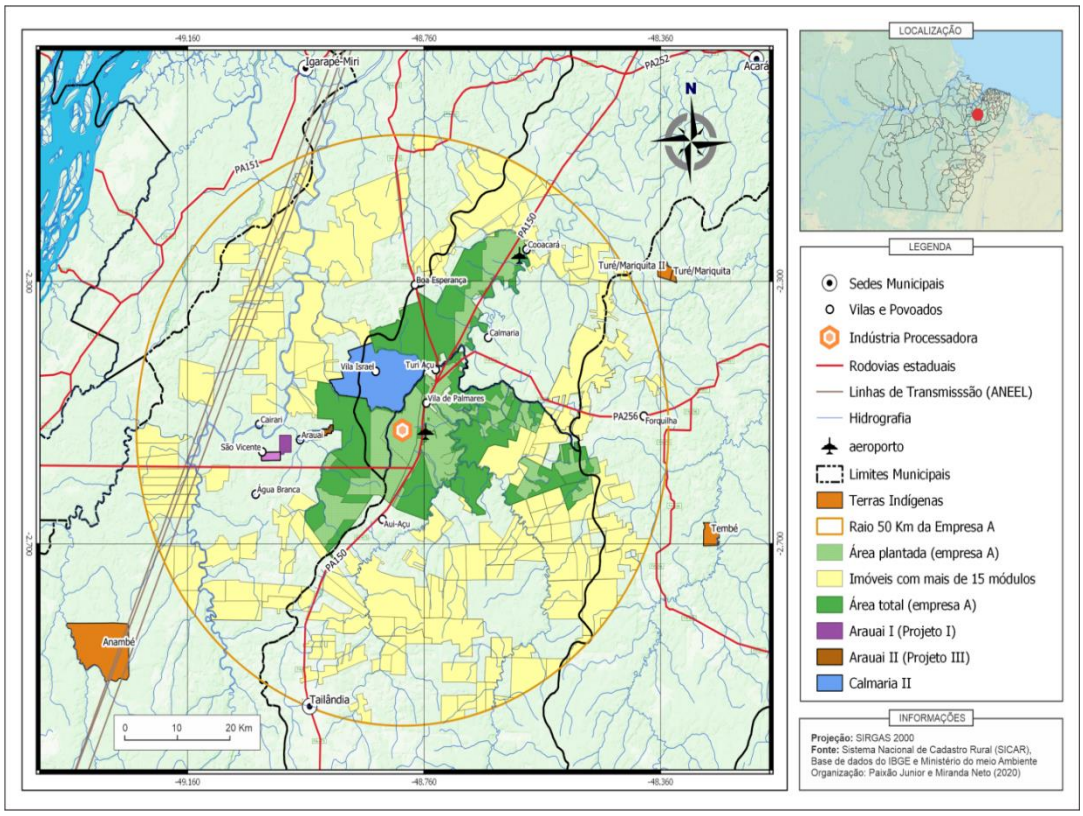
As for the quality of the soil, the most important aspect is its physical properties, since the oil palm is very resistant to acid and low-fertility soils (but intolerant of saline soils, which keeps them away from the coast). What is essential, then, is that they are permeable, deep soils that make it easier for the elongated, fasciculated roots to penetrate (MÜLLER, 1980; EMBRAPA, 1987).

Considering that climatic factors and the physical properties of the land cannot be reproduced or are difficult to reproduce by labor, the territorial basis for planting the crop firmly follows these natural circumstances, because the closer to them, the greater the plant's productive potential, and the further away, the greater the need for labor to compensate for it. The chemical properties of the soil (fertility and acidity or basicity), because they don't carry as much weight, i.e. because they aren't as restrictive to plant development and are more easily modified (corrected and improved) by labor, are second-order factors.

However, as we are talking about the capitalist production of oil palm bunches, which takes place on a large scale to supply the mills that extract crude palm oil, not only do we need soils of suitable quality (including the property of being mechanizable, having a flat or moderately flat topography so that the machines can operate), but also soils of suitable quantity and contiguity, capable of providing the economic viability of the enterprise and the measurement of normal profit.

The plantations must necessarily be within a radius of 60 to 100 km from the mills (CASTRO JUNIOR, 2012), due to the perishability of the tons of fresh fruit bunches demanded, which require processing in less than 24 hours. Below, in Figure 1, which illustrates the territorial orientation of the Agropalma company, in the sense of land grabbing and the monopolization of the territory in a given area, we can see the extensiveness of the area (50 km radius), the scope of the social impact (municipal seats, towns and villages) and the volume of the total area directly controlled by the company.

**Figure 1: Agropalma's Area of influence (Pará)**




Source: National Rural Registration System (SICAR). Prepared and organized: Paixão Junior and Miranda Neto (2020).

In Brazil, there are exceptional natural conditions (in terms of soil and climate) for this crop (EMBRAPA-CNPSD, 1983), with around 232.8 million hectares suitable (REBELLO, 2012). These areas are located in the south of Bahia, in a narrow strip parallel to the coast (MÜLLER, 1980) and, above all, in the Amazon, especially the states of Amazonas and Pará (EMBRAPA-SPI, 1995). However, while in Bahia the availability of land for large-scale capitalist exploitation is limited by the rugged topography (VEIGA; FURLÁN JUNIOR, 2001) and by the land ownership structure made up of small estates, in the Legal Amazon 31,233,196 hectares are available for exploitation, even with the subtraction of legal reserves and unmanaged areas, corresponding to 86.06% of the total suitable land, according to the "Agroecological Zoning of the Oil Palm" (RAMALHO FILHO et al., 2010).

Zoning also classifies land according to the level of natural limitation for the crop, but which provides the possibility of capital intensification through the use of machinery, and it is this level of management (management level C) that we will be focusing on.

The zoning classes are a) preferential, land with a naturally high potential for crop development, whose limitations do not represent significant adjustment costs; b) regular,

with limitations considered moderate for crop development, requiring greater capital investment (above all to correct water deficit) so as not to reduce average productivity; c) marginal, of low potential, where the restrictions are significant, so that only larger capitals are able to extract sufficient yields from the soil for the economic viability of the enterprise (obtaining the usual profit); and d) unsuitable, of very low potential, where the technical level achieved in cultivation does not allow these lower quality lands to be exploited profitably (RAMALHO FILHO et al., 2010).

The fewer the natural restrictions on plant development, the more suitable the land, which means that less capital is needed to correct them and the higher the differential income of the first type. Figure 2 below, taken from the aforementioned zoning process document, shows that, among the Amazon states producing oil palm bunches in 2010 (Pará, Amazonas and Roraima), the state of Pará offers the largest amount of land suitable for economic exploitation of oil palm cultivation.

**Figure 2 - Zoning class areas for oil palm production, by state in the Legal Amazon (Management Level C) (2010)**

| CLASSE | PREFERENCIAL (P) | | | REGULAR (R) | | | MARGINAL (M) | | | INAPTA (IN) | | | ÁREA EXCLUÍDA* | | ÁREA ESTUDADA DO ESTADO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ESTADO | ha | km² | % | ha | km² | % | ha | km² | % | ha | km² | % | km² | % | km² |
| AC | 735.677 | 7.357 | 4,48 | 574.630 | 5.746 | 3,50 | 193.511 | 1.935 | 1,18 | 307.785 | 3.078 | 1,87 | 146.026 | 88,95 | 164.158 |
| AM | 1.532.123 | 15.321 | 0,98 | 681.556 | 6.816 | 0,44 | 142.830 | 1.428 | 0,09 | 418.185 | 4.182 | 0,27 | 1.531.447 | 98,22 | 1.559.164 |
| AP | 20.334 | 203 | 0,14 | 123.843 | 1.238 | 0,87 | 23.169 | 232 | 0,16 | 127.271 | 1.273 | 0,89 | 139.868 | 97,94 | 142.813 |
| GO | 0 | 0 | 0,00 | 0 | 0 | 0,00 | 0 | 0 | 0,00 | 131.224 | 1.312 | 9,19 | 12952,07 | 90,73 | 14.276 |
| MA | 0 | 0 | 0,00 | 246,96 | 2 | 0,00 | 81.027 | 810 | 0,29 | 10.118.593 | 101.186 | 36,29 | 176.691 | 63,37 | 278.840 |
| MT | 220.920 | 2.209 | 0,24 | 6.700.985 | 67.010 | 7,42 | 486.836 | 4.868 | 0,54 | 13.168.156 | 131.682 | 14,58 | 697.591 | 77,23 | 903.283 |
| PA | 1.666.831 | 16.668 | 1,34 | 10.608.430 | 106.084 | 8,50 | 810.902 | 8.109 | 0,65 | 9.962.347 | 99.623 | 7,98 | 1.017.253 | 81,53 | 1.247.772 |
| RO | 2.930.252 | 29.303 | 12,33 | 2.733.292 | 27.333 | 11,50 | 352.365 | 3.524 | 1,48 | 1.845.535 | 18.455 | 7,77 | 158.976 | 66,91 | 237.591 |
| RR | 190.143 | 1.901 | 0,85 | 214.119 | 2.141 | 0,95 | 209.175 | 2.092 | 0,93 | 145.265 | 1.453 | 0,65 | 216.715 | 96,63 | 224.283 |
| TO | 0 | 0 | 0,00 | 0 | 0 | 0,00 | 0 | 0 | 0,00 | 2.949.021 | 29.490 | 10,63 | 248.133 | 89,41 | 277.537 |
| TOTAL | 7.296.279 | 72.963 | | 21.637.101 | 216.371 | | 2.299.816 | 22.998 | | 39.173.381 | 391.734 | | 4.345.652 | | 5.049.717 |
| % AM.L | | | 1,44 | | | 4,28 | | | 0,46 | | | 7,76 | | 86,06 | |

Note: Classes P and R suitable for oil palm, total 28,933,380 ha = 28,933 km2 = 5.74% of the Legal Amazon. * Legal reserves and non-deforested areas. Total zoning area after cuts: 604,066 km2 = approximately 13.94% of the Legal Amazon. A.M.L = Legal Amazon.

Source: Taken from Ramalho Filho et al. (2010, p. 61). Accessed at: http://www.abrapalma.org/pt/wp-content/uploads/2015/01/ABRAPALMA-Tudo-Sobre-Palma.pdf. Classes P e R aptas para o dendê, totalizam 28.933.380 há = 28.933 km² = 5,74% da Amazônia Legal. * reservas Legais e áreas não desmatadas. Total da área do zoneamento após os recortes: 604.066 km2 = aproximadamente 13,94% da Amazônia Legal. A.M.L = Amazônia Legal.

In addition to the availability of favorable soils, which includes the natural conditions of the soil, the reduction in the costs of preparing it, given that it is anthropized land and, due to its location, Pará has become more attractive to capitalist oil palm cultivation. These aspects set it apart from the other states in the Legal Amazon that produce oil palm bunches, offering the capital invested not only the advantages of extensiveness and "fertility", which are also present in other states, but also the advantages of location.

As location is relative to the market, referring not only to absolute distance, but especially to the conditions of the transportation and communication infrastructure that allow for a faster flow of goods, Pará is ahead of the other states, both in relation to national markets (especially São Paulo), due to a better and denser road infrastructure (highways and waterways), and in relation to international markets, due to its absolute proximity – 5,300 km from New York and 8,500 km from Europe, the main consumers of palm oil produced in Brazil (CRUZ, 2006) – and because it has an important fixed capital, the port of Vila do Conde, in Barcarena (PA), at the gates of the Atlantic Ocean. The capitals located in Amazonas and especially Roraima, despite their absolute proximity and the fact that they can access international markets via the Caribbean, have disadvantages due to their distance from land and the increased costs of surcharging foreign ports.

It is also worth noting the component of access to the labor market. Considering that palm oil agro-industries are fundamentally subdivided into an industrial sector, related to the extraction of crude palm oil (extraction plant), and an agricultural sector, related to the production of oil palm bunches, it is necessary to maintain an uninterrupted flow of labor forces of two types: of qualified and semi-skilled workers for the operation of the plant (engineers, technicians, machine operators, etc.) and a large mass of unskilled workers, handling agricultural tools (scythes, axes, etc.), as well as many others, fewer in number but increasing in number, more qualified (tractor drivers, agricultural technicians, agronomists). Thus, the location of the enterprises, which mainly require agricultural workers or "palmar rural" workers, as they are called, is close to the relatively supernumerary stocks of labor forces (MARX, 2013 [1867]).

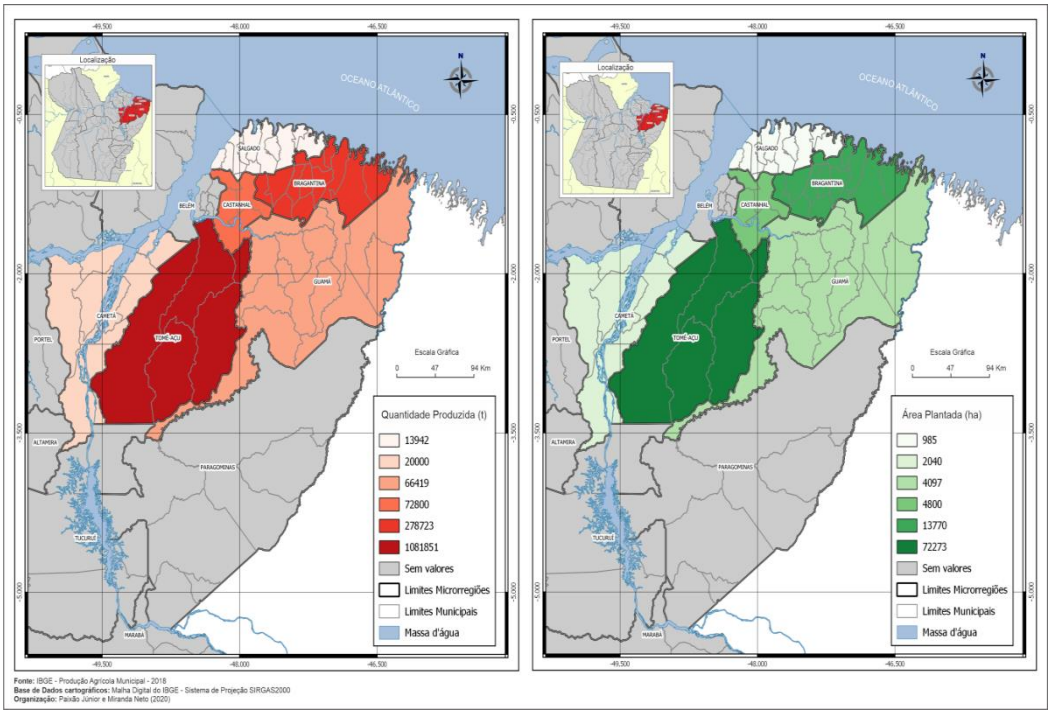
In this sense, the state of Pará has the best land, considering the combination of the two causes of the first type of differential income (location and "fertility"), which even though it has similarly favorable climate and soil conditions to other Brazilian states, in terms of location it has advantages over the rest of the Amazon, even if it is at a disadvantage to Bahia.

However, what is decisive in terms of the differential gains enjoyed by Pará's capital compared to Bahia's is the extensiveness of the Amazonian land, guaranteeing absolute and differential income gains. While Pará has large tracts of land that are suitable for large-scale enterprises, i.e. the scale required by capitalist production and the fact that they can be mechanized, Bahia, as mentioned above, is restricted due to its older occupation (which makes it difficult to plant in greater proximity) and its rugged topography.

In the state of Pará, two major oil palm production centers have been established (MÜLLER et al., 2006). The first, the oldest, is located on the outskirts of the Belém metropolitan region (RMB), comprising the municipalities of Santa Antônio do Tauá, Castanhal, Igarapé-Açu and Santa Izabel; and the second is located further south of the RMB, basically in the Tomé-Açu micro-region (FIGURE 3). Although the first pole is on land that is preferable for cultivation, considering soil and climatic factors and location (as it has better road infrastructure and greater absolute proximity to markets), it has, like the state of Bahia, limits to large-scale production, given the land structure dominated by smallholdings (CRUZ, 2006) that hinder extensive exploitation that guarantees the appropriation of absolute income. In turn, the second pole offers favorable land stocks, including in terms of prices, since oil palm cultivation there has advanced preferentially

over pasture areas, once farms in economic decline (RAMALHO FILHO, 2010), guaranteeing absolute and differential income gains, which drives the growing occupation of land.

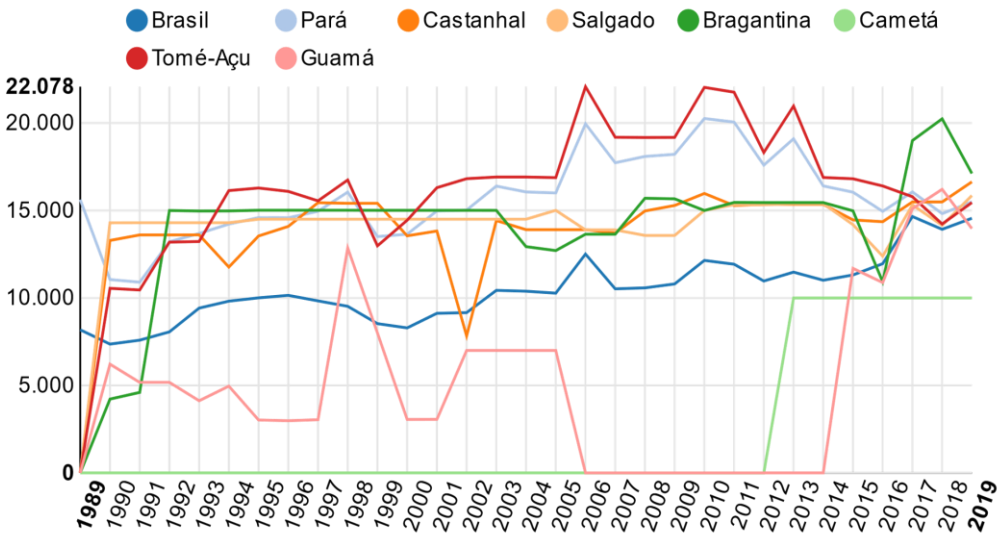
**Figure 3: Municipal distribution of oil palm (coconut bunch) production - Pará (2018).**




Source: IBGE – Municipal Agricultural Production. Accessed at: https://sidra.ibge.gov.br/pesquisa/pam/tabelas. Elaborated: Paixão Junior and Miranda Neto (2020).

The second pole, located in the micro-region of Tomé-Açu, is where the big capitals settled and, through the intensification of capital on a base that allows for the extensive expansion of farms, provided better conditions for the appropriation of absolute and differential rents, as they settled on land considered regular and marginal to the development of the crop and with a growing transportation infrastructure. Thus, with a greater capacity to invest capital, incorporate machinery and improve logistics by investing in waterways (using the Acará and Moju rivers), their own roads, terminals and pipelines, companies are compensating for possible unfavorable attributes, making this micro-region the main producer of palm oil bunches in the state, as well as the most productive, as can be seen in Graph 1.

**Graph 1 - Average Oil Palm Productivity (kilograms per hectare) in the Producing Microregions of Pará (1989 to 2019).**




Source: IBGE - Municipal Agricultural Production. Accessed at: https://sidra.ibge.gov.br/pesquisa/pam/tabelas. Own elaboration.

Graph 1 shows the increase in productivity from the 2000s onwards, due to advances in research specific to regional growing conditions (with Embrapa playing a key role) incorporated by the big companies, especially[10] and those that entered the industry stimulated by the incentives offered by the National Biodiesel Production Program[11] (PNPB), created in 2004, such as Belém Bioenergia (BBB)[12] and Biopalma[13].

Thus, these companies initially guide their capital through the level of the first type of differential rent, which acts as a kind of "production coordinator" (HARVEY, 2013, p. 335). By locating themselves in soils that are naturally more favorable to the appropriation

[10] The Agropalma Group, which belongs to the Alfa conglomerate, is the largest palm oil producer in Latin America. In 2007 it underwent a "corporate reorganization", becoming made up of "just two companies: Agropalma S.A. and Companhia Refinadora da Amazônia" (Information and quotes collected from: http://www.agropalma.com.br/quem-somos/a-agropalma).

[11] The PNPB was "an inter-ministerial program of the Federal Government (...) that aims to implement the production and use of biodiesel in a sustainable way, both technically and economically." (Visit: http://www.mda.gov.br/sitemda/secretaria/saf-biodiesel/o-que-%C3%A9-o-programa-nacional-de-produ%C3%A7%C3%A3o-e-uso-do-biodiesel-pnpb).

[12] Belém Bioenergia Brasil S/A (BBB) was created in 2007 through cooperation between Petrobrás and the Portuguese company Galp Energia. (Visit: http://www.belembioenergia.com.br/sobre/).

[13] Biopalma da Amazônia S/A, which belongs to the Vale Group, was founded in 2007 (Visit: http://www.biopalma.com.br/quem-somos).

of fixed extra profits, even if they are of relatively inferior quality and location (but of adequate extension and contiguity), the companies intensify their use of capital, making the land in the Tomé-Açu micro-region more productive. This indicates that the second type of differential rent is becoming the form with the greatest influence on competition between capitals in the industry, but the intensive expansion of capital in the region's oil palm industry has not yet exhausted the possibility of its extensive expansion, due to two aspects.

Firstly, because in agriculture not every application of capital is accompanied by an increase in production, which means that not every extra work is converted into extra product, and therefore into surplus value. In this case, "(...) it is not only a question of social productivity, but also of the natural productivity of labor (...) so that, despite technical development, the product is not cheapened [in terms of value], but only prevented from becoming even more expensive" (MARX, 2017 [1894], p. 827). Thus, in addition to the normal capital investment, which provides a normal profit, labor compensation is needed to avoid production losses related to changes in the climate, the incidence of pests and diseases, soil erosion, etc. Unlike industry, where results are very predictable, in agriculture the achievement of normal production is affected by natural factors where the productive forces of labor are not yet highly mastered[14].

The second reason for its relative delay is that capital encounters greater obstacles to its fluidity in agriculture than in industry, due to the very nature of the agricultural work process, whose production time is greater than its working time and whose production period is generally extended. For palm trees to produce their first bunches, they need three years of growth, from which their productivity increases until it reaches its peak in the eighth to eleventh year, when it stabilizes and then declines in the nineteenth year (EMBRAPA, 1987, p. 28).

The palm's long production period of three years for the first harvest, including an average of 16 days for the bunches to ripen and be harvested (EMBRAPA, 1987), in addition to the uneven returns on production over the course of the year (higher in the first semester, due to the rainy season) and depending on the plant's natural development (youth, peak and decline), also represents an obstacle to the desired fluidity, as it extends the capital turnover time, thus slowing down the return on investment[15].

The obstacles to the fluidity of capital in oil palm cultivation are related to the very existence of private land ownership, which in the case of the Amazon can be seen in the

[14] In oil palm growing in Pará, the most serious problem is fatal yellowing (AF), the only way to combat it is to cut down the infected palm trees. Until a better treatment is found, a hybrid cultivar has been used that is totally resistant to AF, resulting from a cross between the oil palm and the cauié *(Ealeis melanococca)*, a native American species, to replace the widely used and more productive Tenera-type cultivars, which are susceptible to the disease (EMBRAPA, 1995).

[15] Problems of synchronization between the natural reproduction of the palm tree and the industrial reproduction of the enterprise, i.e. the proportion between work forces and means of production according to each internal division of agricultural work and the seasonality that is specific to this production process (which involves larger and more precise stocks of work forces and means of production according to the variable needs required), and difficulties of synchronization between the agricultural process and the industrial process in order to maintain a constant flow of raw material (oil palm bunches) destined for the extraction plants.

growing appropriation and concentration of land, as can be seen in the evolution of land appropriation and commercialization observed between the 2006 and 2017 censuses. Costa (2022, p.7) observes that "the appropriation of new land was concentrated in Mato Grosso (41%) and Pará (36%), which together account for 77% of the total", and in these two units we can see the expansion of agribusiness, the logic of which is the extensive use of land, the basis of which is both the production of commodities and the financialization of land based on absolute income.

## 4. Final Considerations

The territorialization of palm oil agro-industries in the state of Pará is based on the extensiveness of the reproductive process, which makes it possible to obtain absolute income from palm oil agribusiness, without neglecting the increase in differential income. The trend, taking into account the determinants discussed, led us to observe that the movement of capital takes place by appropriating the best lands (in terms of fertility and location), expanding in a growing logic of appropriation of new lands, whose explanatory basis is the obtaining of extraordinary rents for absolute appropriation of the territory, constituting a conditionality both for the expansion of the palm oil agroindustry business and for the financialization and concentrated appropriation of the Amazonian land market, specifically in Pará, motivated by oil palm production.

The study revealed that the state of Pará has the best land, considering the combination of the two causes of differential income of the first type (location and "fertility"), and that the state of Pará has large tracts of land suitable for large-scale enterprises, i.e. the scale required by capitalist production and the condition that they can be mechanized. Thus, two major oil palm production hubs are concentrated near the metropolitan region of Belém (RMB) and in the micro-region of Tomé-Açu, and it can be seen that the advance of oil palm cultivation has guaranteed absolute and differential income gains, which is driving the growing occupation and concentration of land in this segment of agricultural production, with the characteristics of productive extensiveness, mechanization and the dismantling of small-scale agricultural production.

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