

## **Infrastructure in Amazonia: what is the pattern of development promoted by the Program to Accelerate Growth (PAC) of the Brazilian government?**

Beatriz Macchione Saes, Bruno Peregrina Puga, Joana Salém Vasconcelos, Paula Bernasconi

### **Introduction**

The Amazon has the biggest tropical forest area in the world and also it holds the greatest biodiversity on the planet. Moreover, the region has great potential in the generation of ecosystem services, especially in climate and water regulation of all the rains in the Southeast. The region also boasts the largest number of indigenous areas of the world, as well as populations with traditional ways of life, whose main activity is the forest harvesting.

The environmental and social reality of the region conflict with its development, built along the country's history and more intensely in the second half of the twentieth century. From the late nineteenth century until the mid-twentieth century, the prosperity of the rubber, which was the key raw material for both American and European industries of the period, did not accelerate the diversification of activities and the forms of settlement in the region. The interests were concentrated on mono-production (rubber), and its trade and operation were concentrated in the hands of foreigners.

The economic integration of the Amazon to the national economy only occurred during the 60's and 70's. The Brazilian dictatorial government of 1964 promoted federal policies that, on one hand, had the strategic goal of defending the territory and, on the other, served the effervescent interests of national and international capitals, which found great opportunities of primitive capital accumulation. Thus, in this period, the government invested considerable amounts in infrastructure (especially roads<sup>1</sup>) and gave numerous tax incentives that enabled the development of colonization (occupation of territory) and, especially, agricultural activities (interest of national and international capital). Overall, in the period, the strategies adopted by the federal government disregarded the needs of the Amazon populations and the specificities of the environment.

---

<sup>1</sup> The road option gave continuity to the historic commitment of Brazilian governments with the auto industry started in the Juscelino Kubitschek government (1956-1961) and not broken until today.

From the mid-70's, during the second Brazilian National Development Plan (II PND), the federal government assumed the explicit strategy of subsidizing the energy to promote the exporting industries, highly energy intensive. In the Amazon, at that time, were built the first large hydroelectric power plants in order to meet this demand from minerals sectors. In this context, stands out Tucuruí Hydroelectric Power Plant in Pará built to provide energy to alumina and aluminum production, which degraded the environment, displaced traditional populations and subordinated the regional interests to the goals of international capital.

In recent decades, with the increasing energy demand from these industries, and exhausted the capacity of hydroelectric power generation in the rest of Brazil, the Amazon became the focus of plans to increase this supply of hydroelectric power. Moreover, the growth of world demand for grains and meat became the Amazon the frontier in agricultural production with high growth potential. However, intensification of production provides high rates of deforestation and displacement of populations. Between 1988 and 2007, 82% of Amazon deforestation was located in the states of Mato Grosso, Pará and Rondonia due to high concentration of soy, meat and minerals in the region.

In this context, in the second administration of President Luis Inácio Lula da Silva (2007-2010), is launched the Program to Accelerate Growth (PAC), under the coordination of Dilma Roussef Minister, in order to promote institutional measures and implement projects of infrastructure (energy, logistics and urban) that improve the investment environment in the country. The PAC is reissued in 2010 and is launched the PAC II, reinforcing the guidelines of the first program. In the states within the Legal Amazon<sup>2</sup>, the program envisages major investment in sectorial projects focused on energy generation and transportation.

However, when considering the historical dimension of Amazonian development, questioning the policies should go beyond the immediate objectives of PAC (for which the industrial investments are mechanisms for heating the economy). That is, it is necessary to reflect the extent to which governmental action in the Amazon tends to reinforce the contradictions of development pattern produced by federal policies in the second half of the twentieth century.

---

<sup>2</sup> The Legal Amazon is composed of the states of Acre, Amapá, Amazonas, Mato Grosso, Pará, Rondônia, Roraima and Tocantins and part of the state of Maranhão.

Therefore, in order to discuss how the projects of infrastructure provided by PAC reinforce the primary export model in the Amazon, reproducing the social and environmental contradictions of regional development in the Amazon, we divided the work into five parts: i) first, we analyzed the pattern of Amazonian development in the second half of the twentieth century; ii) then, we describe briefly the social and environmental contradictions of this process; iii) thirdly, we describe the general objectives and main PAC policies; iv) finally, we analyze the possible effects of the program for the pattern of development in the Amazon, v) and we complete the work with a brief conclusion of the discussion.

## **2 - Economic integration of the Amazon and reproduction of structural heterogeneity: government policies from 1964**

To understand the process of incorporation of the Amazon to the national economy is necessary to observe the development of Brazilian capitalism from the mid-twentieth century. During this period, the State acted in the region by creating institutions, financing plans of regional development, policies of colonization, infrastructure and investment projects. As we shall see, this process provided by the military government from 64 was responsible for the intensification of geographic penetration in the region, but not necessarily create better living conditions for workers. Rather, produced social inequalities and regional disparities and increased environmental degradation. (Leitão, 2009)

In this context, the capitalist relations of production in the Amazon were developed; transforming activities that previously were heavily influenced by the production for consumption (extraction, agriculture and livestock) and strengthening the market. Thus, in addition to producing increasingly surplus to the national and international markets, it is developed in Amazon a market more attractive for industrial producers from the Center-South of the country and abroad. Therefore, we can say that the changes taking place over the 60's and 70's in the Amazon have made the region contribute in an increasing scale to the capital accumulation of national and foreign industry. (Cardoso, 1977; Ianni, 1979)

Until then, the Amazon meant little to the capital accumulation of the country and had very little role to create new channels of investment. The rubber was a historical example of how to produce the structural heterogeneity from the capitalist

"integration" in the Amazon. By focusing on capital-intensive mono-production technology, which was traded by foreign investors, without diversifying the regional production, without integrating other sectors to increase productivity and without reverse any social benefit to the region, internal disparities of the Brazilian economy have become even more dramatic with the rubber. Only in the 40's and especially with the construction of the Belém-Brasília road (1957-60), it is started some diversification of activities, mainly from the growing demand for minerals, which generated new forms of settlement in the region. (Cardoso, 1977)

From 64, with the military coup, it is redefined the foundations of the development process in Brazil, marked by greater concentration of capital and a larger articulation of the local economy with international markets - both in terms of emphasis on expanding exports as the interests of international capital investments in industrial, mining and agro-exporters. Thereafter, a combination of State, local capitalists and international capitalists interests, which already existed in the past, intensifies and becomes a key factor in the accumulation in Brazil. The export of agricultural goods and minerals, increasingly encouraged by economic policy, becomes essential to cope with the increasingly external deficits caused by imports of capital goods (machinery, tools and industrial inputs). In this context, to the Amazon region - only integrated in the export model by some mineral resources - is assigned an important role in the national economy. (Cardoso, 1977)

Thus, arises in the 60 and 70 in the Amazon, large number of bodies, agencies, plans, technicians and officials who had, in general, the goal of promoting development, occupation and integration of the North Brazilian economy. In addition, the State power became present even in more remote locations in the region. From these institutions, the government funded the displacement of domestic and foreign private capital for minerals exploration and agricultural enterprises, which did not conflict with the ideological military objective of Amazon occupation (for affirmation of nationality). (Ianni, 1979) Thus, the State in the region, except for the INCRA, acted almost at enterprise level - through institutions such as SUDAM and BASA -, leaving the Amazon population unprotected in the face of the domestic and foreign companies. (Cardoso, 1977)

The Superintendency of Development of Amazonia (SUDAM) replaced the Superintendency of Economic Recovery Plan of the Amazon (SPVEA) in 1966 and became the principal organ of the federal government to revitalize the economy of

Amazonas. The SUDAM was within the group called "Operation Amazon," created by the military government in 1967, which established projects with the objective of territorial occupation and the exploitation of raw materials and regional work. The function of SUDAM was to coordinate federal action in the Amazon and to draft the implementation of the Recovery Plan for the region (approved by the Constituent Assembly of 1946), using as a financial agent the Bank of Amazonia S. A. (BASA). The SUDAM provided tax incentives to support investments made by private initiative in industrial, agricultural, farming or basic services. (Stella, 2009) Table 1 presents SUDAM tax incentives from 1965 to 1973, which led to a policy of supporting the private sector increasingly focused on agriculture:

**Table 1 - Tax Incentives Released SUDAM annually  
Distribution by Sector (Millions of \$ Cr)**

<b>Year</b>	<b>Agricultural Sector</b>	<b>Industrial Sector</b>	<b>Basic Services Sector</b>
1965	–	11,9 (100%)	–
1967	104,9 (34,5%)	201,9 (65,69%)	0,5 (0,18%)
1969	757,2 (50,48%)	67,9 (45,30%)	63,3 (4,22%)
1971	1682,6 (50, 42%)	134,9 (40,48%)	304,0 (9,10%)
1973	1741,9 (50,27%)	1537,1 (46,51%)	124,6 (3,22%)
<b>TOTAL</b>	<b>8101,8 (50, 6%)</b>	<b>6332,4 (41,5%)</b>	<b>1276,5 (7,9%)</b>

Source: D.I.; D.P.I.; SUDAM (statistical control of tax incentives administered by SUDAM). In: Cardoso, 1977.

From 1973, the trend already manifested in growing centralization of agricultural investments in the Amazon region becomes more evident and central to the development of federal policies. In an article published by the newspaper *O Estado de São Paulo*, Colonel House Sena, SUDAM superintendent of the period, clearly expresses this view: "The Amazon is a region made for livestock, with excellent pastures and ample space for expansion of the sector and therefore will have on farming the main line of the economic integration." (Estado de São Paulo, 4/15/73) The investment program of BASA, which complemented the investments made by SUDAM, reinforced the pastoral vocation of the region already in the end of the Medici government:

**Table 2 - Application Program of BASA  
(1975-1979)**

	Millions of Cr\$	%
<b>Rural Credit</b>	<b>4040,90</b>	<b>56,6</b>
Livestock	3485,8	49,0
Commercial Crops	292,4	4,1
Green Belt	60,6	0,8
Rubber	202,1	2,8
<b>Industrial Credit and other</b>	<b>3059,0</b>	<b>43,3</b>
Strategic Industries	1346,0	18,9
Small Industries	223,0	3,1
Working capital	776,0	10,9
Infrastructure	668,0	9,4
<b>TOTAL</b>	<b>7100,0</b>	<b>100</b>

Source: Cardoso (1977).

In 1970, the National Integration Plan (PIN) is created aiming to finance infrastructure in the Brazilian North and Northeast regions in a context of growing social tensions resulting from a dryness of great proportions in the Northeast. The first stage of the Plan was the construction of the Transamazônica and the Cuiabá-Santarém roads. Moreover, colonization and economic exploitation of the expropriated areas along these roads would also be made with funds from the PIN. (Stella, 2009) These policies were articulated with the goals of INCRA (National Institute for Colonization and Agrarian Reform), specially the implementation of agrarian reform, the promotion of colonization and the particular implementation of official colonization. The construction of Amazonian highways was a way to reduce the existing tensions due to severe dryness of 1970. The opening of roads should be done with workers from Northeast, promoting a great migration to North. (Cardoso, 1977)

However, colonization in the Amazon had a minor role when it furthered the presence of private interests and, above all, the government itself found it necessary to modify the occupation policy to boost the private sector dynamism. In 1973, the Planning Minister, J. P. Reis Velloso, stated:

So far the Transamazônica emphasized the settlement, but the need to avoid predatory occupation, with a consequent process of deforestation, and promote the maintenance of ecological balance lead us to invite large companies to undertake the task of developing in this region. (See Opinião, paragraph .85, p.4)

From that moment, was reduced the number of families that would be installed in the Transamazônica road settlement area and significantly increased the presence of

large national and international companies. Moreover, many industrial and financial groups, as well as traditional landowners of the south, began to open farms in northeastern Mato Grosso, northern Goiás and southern Pará. Therefore, from the 60's, the arrival of the peasants in the Amazon was given simultaneously to the land concentration: while increased the area of large landowners, grew the number of smallholders (Leitão, 2009).

This tendency is reinforced during the First National Development Plan (I PND), from September 1974, when is launched the PDA (Amazon Development Plan), which reinforced the guidelines of the PIN to stimulate production to foreign markets and to develop agriculture as a way of occupying the region through the creation of infrastructure and colonization. The II PDA (1975-1979), in turn, launched during the II PND, abandoned the colonization initiatives and encouraged the projects of large companies producing for the export market (Leitão, 2009).

In this context, the Amazonian Agricultural and Agromineral Program Poles (POLAMAZÔNIA) arises, providing the implementation of 15 priority areas of development and increasing economic and political State presence in the region, but also in the same proportion, the alliance with private and foreign enterprises. (Ianni, 1979) Under the POLAMAZÔNIA, the government created the North Electric Centrals in 1973 (ELETRONORTE) and defrayed all the construction costs of the Tucuruí Hydroelectric Power Plant and of the transmission lines to Barcarena in Pará, where there was alumina and aluminum production. This subsidy of energy was an explicit strategy of II PND, which sought to promote the production and exportation of highly intensive electrical energy industries.

In the mid-80's, at the end of authoritarian regime, there was a worsening of the government's fiscal crisis and a downturn in the pattern of regional financing of the State. In the Amazon, there was a reduction of public investment, which reduces much of the infrastructure and colonization projects in the region and weakened the role of SUDAM until its extinction in 2001. In 90's, this scenario was not reversed: with the rise of neoliberalism, the State became unable to resume the national planning and started to favor, increasingly, the national and transnational corporate interests. In the Amazon, these interests were secured mainly through the National Integration and Development Axes (ENIDs), launched in 1996, which represented an adaptation of State intervention to the logic of international market and of the transnational groups interests. The ENIDs stimulated the export of commodities, especially soy, mainly from

the construction of infrastructure for the flow of production towards the port of Maranhão and also Bolivia and Venezuela (Leitão, 2009)

### **3 - Social and environmental consequences of the development pattern of the Amazon in the second half of the twentieth century**

The model of regional occupation implemented from mid-twentieth century had a high social and environmental cost. The several plans for the region favored economic growth, at the expense of better living conditions. They caused also intensification of social conflicts concomitantly to increased pressure on natural resources. The focus on attracting capital to the region was carried out despite the needs of local people and migrants attracted by the policy of colonization.

This model has caused a lot of destruction of the Amazon rainforest in favor of the agricultural frontier expansion. Only considering the areas of farming, excluding the pastures, the border of Central Brazil and the Amazon extended more than 7 million hectares between 1970 and 1997, an increase of 335% (Gonçalves & SOUZA, 1998). Even during a period of nationally retreat of the crop area in 90 years, the agricultural frontier continued its advance in a clear replacement of older areas in the other regions. It indicates the persistence of the old problem of shifting cultivation, which was well studied by Celso Furtado.

According to Furtado (1972, 1959) as modern agriculture expands, it increases its need for land, expulsing to the interior other rural activities, such as livestock or unproductive latifundios. It generates a continuous marginalization of small producers and also a failure to compete with that export structure, increasing the deforestation, intensifying internalization and generating structurally a huge factory of social misery.

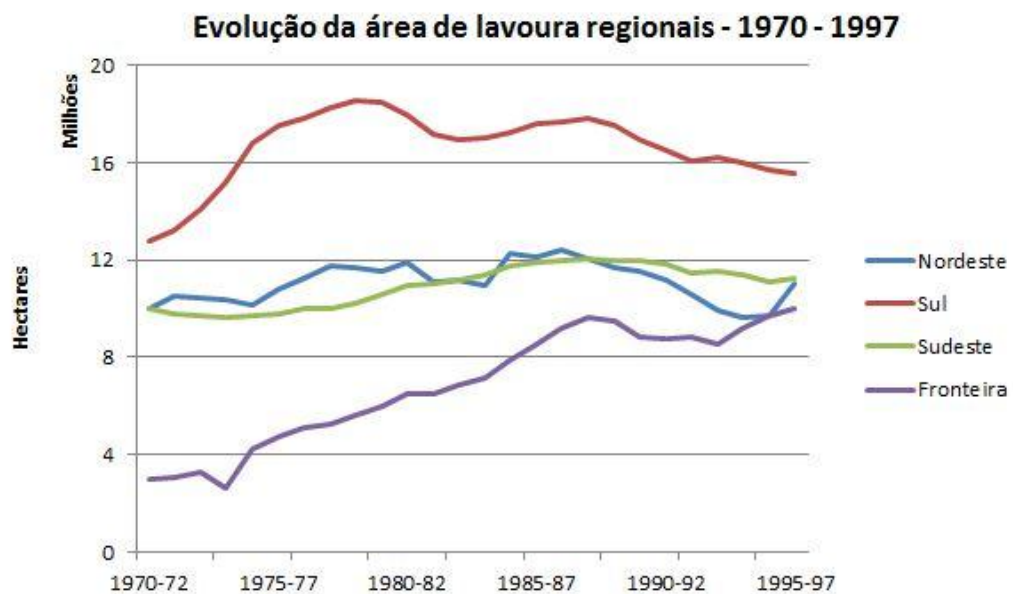
As stated by Furtado, one of the central problems in overcoming the shifting agriculture is its modernization, however, Gonçalves and Souza (1998) show that the challenge persists despite the modernization. They argue that the modernization even extended this process, allowing the substitution of old production areas by new areas that used to be disposable before the existence of technological advances. The phenomenon of itinerancy and its role in the advance of agricultural frontier can be seen in the chart that shows the development of crop areas in the South, Southeast and Midwest and North (border). It explains the great increase of crop areas between 1970



and 1997 at the border, while in other regions the situation remains stable or even fall, as in the south.

The occupation of these lands new replaces the old parts now requires increasing amounts of public resources to cope with the construction of infrastructure. The occupation of the border, fueled by the boom of crops, value quickly when equipped with modern public infrastructure, promoting expressive gains to its owners (Gonçalves & SOUZA, 1998). These authors state that nothing indicates that there is rationality in the process of expansion as a national project. That leaves a range of serious social problems, which has expanded to Argentina, Paraguay and Bolivia.

Figure 1: Evolution of regional crops.



Red Line: South Region; Green line: Southeast; Blue line: Northeast; Purple line: frontier. Source: IBGE. Adapted from Gonçalves & Souza, 1998

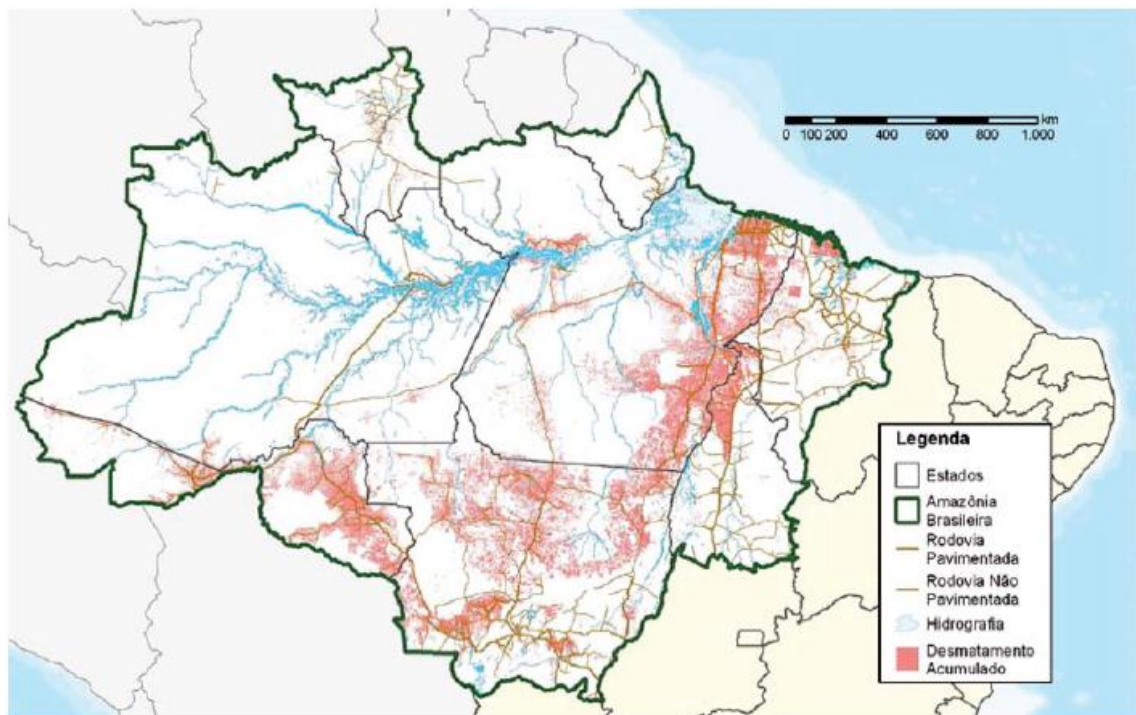
The mining and metallurgical clusters of the region, implemented with a view to international demand for mineral products, brought a very limited development to the region. They also concentrated capital and income and required large government subsidies, which paid the costs of energy infrastructure, logistics and urban areas. Moreover, they intensified the destruction of the environment directly (exploitation of deposits and contamination of rivers) and indirect (building dams).

Another point of conflict was increasing the number of agricultural latifundios in the Amazon region, concentrating land and income, which caused an intensification of

land conflicts in the region. Moreover, the social impact of the growth of the agricultural sector in terms of employment generation was very modest. In the Amazon region, an employee was engaged in an average of 275 head of cattle and the cost of each new job was Cr\$318,000.00 - which contrasted with the cost of generating employment in the industrial projects approved by SUDAM, which was Cr \$ 180,000, 00. (CARDOSO, 1977)

Another consequence of the expansion of agricultural latifundios was the deforestation, more precisely in the regions of intense expansion of these activities (Para and Mato Grosso). As can be seen in the figure below, deforestation covers the western Maranhao, eastern Pará, Mato Grosso and Rondonia - a region that is called "Arc of Fire." From mid-twentieth century this region has focused investment in transportation and infrastructure, which favored the large national and transnational capital. (Leitão, 2009).

**Figure 2 – Accumulated deforestation in Brazilian Amazon (2008)**



Source: Presidência da República, 2008. In: Leitão, 2009.

#### **4 - The Growth Acceleration Program (PAC) in the Amazon**

Launched in the beginning of the second mandate of President Lula (2007), the Growth Acceleration Program (PAC) aims to promote conditions to enabling Brazil's growth by means of large investments in infrastructure and institutional changes. The

coordination of this program was under the command of Dilma Rousseff, what was then Minister, consisting initially of 36 institutional and legislative actions in five areas: investment in infrastructure, promotion of credit, improvement of investment, tax relief and long-term fiscal improvements.

Sicsú (2007) defines the PAC as an attempt to recover the control over the targeted public investment, but without adopting the concept of crowding out, in which public investment is supposed to drive out private investment. The idea is crowding-in, in which such investment would act as an attraction of private investment, making room for expansion. Yet, it must not be seen as a development plan, such as the PND, due to its limited coordination with other areas, and nor as a government program in the strict sense (DIEESE, 2007).

However, the PAC was not a plan thought regionally. Regarding the Amazon, there is clear controversy regarding the real beneficiaries of the works of energy infrastructure and logistics, which have unpredictable environmental and social impacts due to the complex dynamics of the region. Persivo (2007) states that the plan only reaffirmed the government's priorities for the Amazon, that is "an emptiness for federal planning." It also states that there are not new projects, but projects that should have been completed earlier, but due to environmental, political or budgetary interference, were not.

Leitão (2009) indicates that the PAC only demonstrated the tradition of the Brazilian state with respect to the action within the territory "via projects without any planning, filled with speeches that displaced the practice to effectively propose and the motivations that actually based". Moreover, its discourse and its practices are disconnected.

In Table 3 we can see the distribution of investments provided in the presentation of the PAC. In particular, we emphasize that the majority of investments in the North is related to logistics and energy, such as waterway terminals (Amazonas and Tucuruí), the paving of BR-319 and BR-163, and the rail and intermodal expansions aiming a better flow of grain production from producers of the Amazon frontier to the port in Pará.

Table 3 - Initial budget of the PAC (billion dollars).

<b>Region</b>	<b>Logistic</b>	<b>Energy</b>	<b>Social and Urban</b>	<b>Total</b>	<b>% of Total</b>
---------------	-----------------	---------------	-------------------------	--------------	-------------------

<b>North</b>	6,3	32,7	11,9	50,9	10,10
<b>Northeast</b>	7,4	29,3	43,7	80,4	15,96
<b>Southeast</b>	7,9	80,8	41,8	130,5	25,90
<b>South</b>	4,5	18,7	14,3	37,5	7,44
<b>Central-West</b>	3,8	11,6	8,7	24,1	4,78
<b>National</b>	28,4	101,7	50,4	180,5	35,82
<b>Total</b>	58,3	247,8	170,8	503,9	100,00

Source: Presidência da República, 2007.

In 2009, in an effort to sustain the effective demand in the crisis scenario, there was the addition of new projects to the PAC program, bringing the investment to \$ 646 billion. In the energy sector, the increase was in the order of \$ 20.2 billion, logistics, from \$ 37.7 billion, and in social and urban, from \$ 84.2 billion (see Table 4).

Table 4 - Prediction of public and private sector by the PAC (in billions of dollars).

<b>Infra-structure</b>	<b>Initial prediction 2007-2010</b>	<b>% (initial prediction)</b>	<b>Updated prediction 2007-2010</b>	<b>% (updated prediction)</b>
<b>Logistic</b>	58,30	11,57	96,00	14,86
<b>Energy</b>	274,80	54,53	295,00	45,67
<b>Social e Urban</b>	170,80	33,90	255,00	39,47
<b>Total</b>	503,90	100,00	646,00	100,00

Fonte: Comitê Gestor do PAC (in Leitão, 2009).

Although there are dozens of hydroelectric projects under implementation in the Amazon and been the Belo Monte dam as a priority for the federal government, Leitão (2009) states that there is no plan for a transmission line of this energy in the east-west but rather north-south. This fact clearly defines the role of hydroelectric dams in the Amazon as just to meet the demand of industrial projects in the South. The potential energetic will not be used to expand the potential of the northern region and yes the already industrialized regions in the south. This is just another example of what is conventionally named "internal colonization" in Brazil, due to structural heterogeneity, which generates primary-exporting regions and industrial consumers regions within the same nationwide.

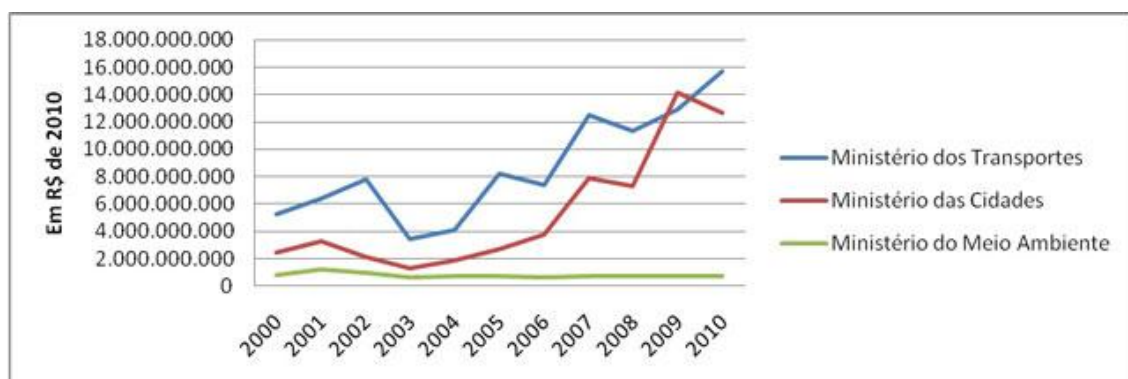
Leitão (2009) discusses to what extent the PAC projects tend to reiterate the historical contradictions of state action in the Brazilian territory, and specifically in the case of Amazon, giving to it a subordinate role in the development of Brazil. The concept of territory granted by PAC follows the logic of private needs, in which the

territorial dimension is not addressed with their specific requirements. It is only a "local for investments", condemning the national space "an inexorable tendency to fragmentation."

Given the ability of dynamism in such projects, the investments of the PAC in the Amazon could bring improvements. However, as seen in FNRU (2010), the logic behind these projects is based on the possibility of improving urban productivity, which does not concern most of the Amazonian reality outside the capital. This can be seen from the priority given to the Light for All Program and the areas of sanitation, housing and water resources. Paradoxically, despite being a major supplier of electricity to other regions, one of the oldest demands from local social movements is just the fulfillment of basic electrical infrastructure for isolated communities.

While the expenses with the PAC were hearty, according to Young (2011), there was no effective monitoring of the Brazilian environmental policy. By comparing the evolution of the level of ministries expenses, the author affirms that while the expenditure of ministries linked to the PAC had a considerable growth, the spending of the Ministry of Environment deteriorated (see Figure 2). This once again demonstrates the fallacy of indiscriminate use of the concept of sustainable development set by the government, used even within the framework of the initial PAC.

Figure 2 - Evolution of selected ministries expenses.



Blue line: Ministry of Transportes; Red Line: Ministry of Cities; Green Line: Ministry of Environment. Source: Young

Aguiar (2011) shows that several PAC's projects overlaps with protected areas, priority areas for conservation or even Federal Conservation Units. In many cases, even without such overlap, it is clear the pressure exerted over those areas. Along with that, it is worrying the decline in investment in Environmental Policy and the dismantling of

environmental control function performed by IBAMA. One example was the Provisional Measure n ° 542, sanctioned by President Rousseff on the 15th of August this year, changing the boundaries of three national parks in the Amazon, with the clear intention to facilitate the construction of dams and the building sites of power plants dams under the CAP. Moreover, the mineral exploration was allowed in two of these areas that were identified as priorities for conservation.

## **5 - PAC: strengthening the 'primary export model 'in the Amazon**

As shown, the PAC is sustained by a neo-developmental ideology, inspired by strategies to strengthen the private sector through the state. The prefix "neo" implies that its content is more privatizing than the "original". The PAC prioritizes development strategies primarily focused on a model of export economy and reproduces the international division of labor in the face of globalization trends (Katz apud LEITAO, 2010) and in a context of reprimarization the Brazilian economy.

By incorporating the ENIDs projects, PAC reiterates the approach to the provision of infrastructure corridors of production transport, especially for export, assuming a territorial development strategy based on the inclusion of regional areas of the country on the international circuits of the economy. It tends to reproduce a model centered on the country's role as a commodities exporter (Leitão, 2009).

The conclusion of the BR-163 paving, for example, connecting the soybeans producing region in Mato Grosso to the Cargill Port in Santarém, tends to set up the largest grain export corridor of the country. It highlights the project priority to care of economic interests of soybean farmers in absence of a prevention against social and environmental impacts. Some of these impacts are: deforestation, land concentration and illegal activities already occurring in the region (mining and illegal logging in protected areas and indigenous lands).

Likewise, the complex of locks of Tocantins and the project of the North-South Railroad will take the grain production in the Midwest and agriculture in southern Pará to the port of Vila do Conde. This Port is strongly oriented to export the production of aluminum companies Albras and Alunorte and these mechanisms support the tendency to reproduction of regional and social inequalities (Leitão, 2009).

Muradian & Martinez-Alier (2001) warn about the fact that an economy specialized in the exploitation of natural resources of low income elasticity, such as the grain export, can generate a specialization trap. It occurs when these economies want

to boost revenue through agreements among exporters, which is difficult, or by increasing supply, which produces a counter pressure on prices and deteriorate terms of trade. In addition, these products with a low processing level does not promote technological innovations or development of worker skills staying behind the creation of new forms of wealth creation.

These authors also reproduce the argument of CEPAL on the inescapable trend of deteriorating terms of trade for commodities. As productivity increases in the production of ores, metals, oil and agricultural commodities, the gains do not reflect an increase in wages due to the large supply of cheap labor. Moreover, while the market for these commodities are competitive markets for imported manufactured goods or services are more oligopoly and productivity gains in the rich countries are not translated into lower prices, but usually at higher wages due to the existence of unions more organized.

The realization of state investments in the Amazon region is legitimated given the poor local infrastructure, but what we question is the type of intervention strategy that reproduces models of predation and the creation of projects with very low potential for development social development and a strong legacy of environmental degradation.

The emphasis in this model creates opportunities for private appropriation of state land and resources for the benefit of private interests, especially agribusiness and transnationalized mining and metallurgy. These are the sectors that actually will benefit from state investment in the region, dictating the subordinate role the Amazon plays in economic and territorial development of the country (Leitão, 2009).

To Muradian & Martinez-Alier (2001), since not all competitive advantage has equivalent consequences if the South follows the neoclassical advice it will remain specialized in products intensive in natural resources, and would be condemned to remain economically backward. So it is necessary to change the emphasis from "competitive advantages" for "changing competitive advantages", promoting strong domestic markets and non-primary industrial development, and this is far from what the PAC is encouraging.

## **6. Belo Monte Dam, engine of PAC: power for whom?**

In 2005, the project of construction of the Belo Monte power plant, buried in 1989 due to the Xingu Indian resistance, was taken by the government arguing that there was a possibility of blackout in followed years. The Belo Monte dam plant represents the most voluminous investment of PAC. Amplified advertising about the "Light for All" program in 2006 election was important to produce a logical association between the need of the plant and the supposed democratization of electricity. Introduced thus distorted the debate. There would, on the one hand, those who support the "progress" and the democratization of power and therefore want to build Belo Monte. On the other hand, environmental groups sensitized to the social impact of the plant, which would be against the displacement of traditional native populations, and were treated by the press and government as authentic "defenders of the delay." The dichotomy versus delayed progress does not advance the strategic debate in Brazil. The controversy actually exposed an irreconcilable clash of paradigms about the role of energy in economic development and understanding it is essential to explain the function of PAC in Brazilian society.

Celio Bermann, who was adviser to the Ministry of Mines and Energy between 2003 and 2005 in the management of the at the time Minister Dilma Rousseff, collaborated with a broad study by nearly 40 experts on the plant of Belo Monte, called *Expert Panel - Critical Analysis of the Study Environmental Impact of the Belo Monte Hydroelectric (2009)*. This study addresses the environmental, social and economic consequences of the project and concludes that all three have more negative impacts. According to the study, the primary function of Belo Monte is to be a energy source for the primary export sector, giving rise to a predatory environmental development model with high social impact and no significant impact on the democratization of energy. According to Bermann, there are two large private interests that support the hydroelectric project in Brazil: (1) the electro-intensive industries, which are responsible for the larger energy consuming country, and (2) national builders, which gets huge profits whit the works. Therefore, the interest in the plant structure corresponds to an unevenpower consumption. Bermann said in an interview with Time Magazine that "today, six industrial sectors consume 30% of the electricity produced in the country. Two of them are more related to the domestic market, cement and chemical plants. But the other four have a considerable part of production for export, steel, primary aluminum, ferroalloys and cellulose." (2011) As



shown in Table 5, while these sectors consume 30.8% of the energy produced in Brazil, corresponding employment generation represents only 16.8% of the total.

**Table 5 – Energy Indicators and its economic relation<sup>3</sup>**

Description	Employment per million	% VA of GDP	% tep Of total consumption	INT.ENERG.
				tep/ thousand U\$ 2000
<b>TOTAL</b>		100,0	100,0	0,231
Services		55,8	40,7	0,168
Others Services	20	52,4	6,0	0,026
Transport	5	3,4	34,8	2,348
Agricultural	23	8,2	5,3	0,151
Industrial		31,3	44,6	0,329
<b>Mining</b>	<b>4</b>	<b>0,5</b>	<b>1,7</b>	<b>0,746</b>
Processing		30,8	42,9	0,322
<b>Non-metallic</b>	<b>5</b>	<b>1,0</b>	<b>4,7</b>	<b>1,084</b>
<b>Metallurgy</b>	<b>1,5</b>	<b>2,7</b>	<b>15,2</b>	<b>1,318</b>
<b>Chemistry</b>	<b>2,5</b>	<b>3,7</b>	<b>4,7</b>	<b>0,294</b>
Foods and beverages	8	3,6	9,1	0,576
Textile	13	0,5	0,8	0,351
<b>Pulp and paper</b>	<b>3,8</b>	<b>1,0</b>	<b>4,5</b>	<b>1,030</b>
Others Industries	20	18,2	3,9	0,049
Energy	1	4,8	9,4	0,451

Source: <http://ecen.com/eee35/energ-econom1970-2000.htm>

The Belo Monte construction would particularly benefit these export sectors electro-intensive. For example, the Aluminium produced in North region 70% of its total exported. To Fearnside, however, the biggest beneficiary of Belo Monte would be China, from chinese-Brazilian Refinery in Bacarena ABC, which claims the position of the largest in the world (2009, p. 113). The contradiction of the aluminum industry with national interests is a ludicrous example of how the hydroelectric strategy can be technically problematic and economically unbalanced. The export sector has generated productive convergence in the internal market, behaving much more like scavengers cheap raw materials. Bermann (2011) stated that the distortion between domestic market and market for export is such that private companies in Brazil exporting aluminum produced in the country for \$ 1,500 a metric ton of frame, but there is a shortage of aluminum in the domestic market, which is then imported for twice the price, \$ 3,000 a

<sup>3</sup> VA: value added. Tep = total energy produced.

ton. The situation is blatant irrationality. To scale the inequality of power consumption, while the production of one ton of aluminum uses about 16,000 kilowatt-hours, a Brazilian household consumes an average of 180 kilowatt hours per month. It is concluded that development model is requiring Belo Monte, not Brazilian families. Philip Fearnside said that although government says that energy from Belo Monte would be mainly to the homes of the country, "the projects began to devote most of the energy for alumina and aluminum plants, the state of Para, once it became obvious that transmission costs to Sao Paulo would be excessive "(2009, p. 112)

Japan has adopted an opposite strategy of energy development in 80's, induced reduction of its primary aluminum production from 1.6 million ton to 30.000, and also moved its manufacturing plants for Latin America and managed the end of the production chain specialized electronics producing high added value. Consequently, it created a favorable trade balance and preserved its energy resources at the expense of others (Bermann, 2011). For the same reason, the European timber sector was transferred to exploit the forest resources of Latin America, like the famous Finnish Botnia, generating an economic and environmental conflict between Uruguay and Argentina.

Bermann criticizes another argument for the construction of Belo Monte: what he calls the Blackout Syndrome. For him, the argument that people may be with no light at home without Belo Monte construction "is a fallacy. "Would be 77 hydroelectric projects in the Amazon who use only the 'Blackout Syndrome' as main reason. [...] It is true that we are on the verge of collapse energy. It is true that we are on the verge of a blackout "(2011). The true function of Belo Monte, therefore, would produce energy for the aluminum, sites that generate little revenue, too few jobs, which export their currencies to the arrays, which concentrate income in Brazil and apparently are not interested in the domestic market.

Finally, the most serious problem is that the sectors interested in the works of Belo Monte depend on a huge transfer of public resources. The project valued at U.S. \$ 4.5 billion in 2006, is now estimated at \$ 32 billion. Few companies are interested in providing services to the sale of energy, because most lucrative slice of the process is just the work itself. After that the consortium was joined with 50% of Eletrobrás and Eletronorte, the Brazilian construction companies interested again. Another agreement between the public and private sector rekindled interest in private work determined that 80% of the costs would be guaranteed by public money.

Philip Fearnside reminds us that Belo Monte is just a plant, from a complex of six power plants designed in the 70s (Fearnside, 2009, p.109). The current Environmental Impact Report in 2009 simply did not mention whether the other five dams would be built or not on the Xingu River. Even if the National Energy Policy Council has stated on July 17, 2008, that no other dam would be built, experts say that Belo Monte alone, without its complex composed of the five plants, is an "aberration technique." Therefore, the same way that violated a constitutional provision in 2005, when Congress passed Belo Monte disregarding any democratic debate with the most affected, it is expected that a statement like this is easily forgotten when it comes time to announce a new project same complex. Fearnside argues that "the project goes toward a 'planned crisis', which, once built the Belo Monte, the need to build also Barbaquara / Altamira [another dam complex] will suddenly be discovered, and this work very more damaging, will then be realized "(2009, p.112). Fearnside also states that contrary to what is propagated, the dams are not the cleaner alternative energy, they produce methane, a gas 25 times more harmful than carbon dioxide in the creation of gases (2009, p.110).

There is a questioning about the real need of intense growth in the aluminum industry. Bermann said it was "absolutely undesirable for aluminum production to double over the next 10 years, or steel production triple in the next 10 years, or the production of cellulose is increased threefold in the next 10 years. And that is what is being referred to officially. "(2011). Here is revealed the clash of paradigms of development. What is taken as obvious that industrial growth is necessarily positive in the process of national economic development, is not so obvious. There are industries whose growth does not benefit the whole society, and deepen the structural heterogeneities. Belo Monte would be especially these service sectors.

## **7. Conclusions**

The objective of this study is to strengthen the hypothesis that current infrastructure projects of the PAC in the Amazon region is an effort to capitalist accumulation framed in a model of exporting primary development, playing the oldest international division of labor in a modernized version. Although the extraction of raw materials is industrialized, and the agriculture meets modern technological conditions, and the processes of initial processing of these raw materials have international technical standards, the primary export model remains the engine of reproduction of

structural heterogeneity and at this stage represents a direct threat to the renewal capacity of the environment. The highest levels of productivity of electro-intensive industries, for example, do not benefit the Brazilian population in a homogeneous way; however, guide the main flow of public investment. The investment in technology and infrastructure provided in the PAC carries with it the myth of development, and in fact benefit a limited amount of people, who commands specific sectors of production, which will be offered to foreign consumers or exclusive national sectors. Taking control of the latest stages of international production chains is what allows the production of higher value added products, and the sophistication of the production of raw materials does not change the role of industry in providing inputs to the international industry. Moreover, there is a structural contradiction between the productive convergence impressive external (primary exporting sector specific industrial with the international market) and the precarious internal productive convergence (these industries with local markets and traditional communities).

From this strategy, several projects technically daring, with possibly irreversible impacts on the biosphere Amazon, and imposed an authoritarian manner to the people directly affected, are justified by the false argument that would be essential to national development. BNDES plays a strategic role in this neo-developmental paradigm: to finance the private sector nationally and internationally, enable projects of high economic risk, creating a regional infrastructure in South America for the disposal of commodities and to the viability of the FTAA. However, the consideration of public wealth production is negligible, while the social, economic and environmental effects can be disastrous and will be inherited by all. The Amazon has become one of the main comparative advantages Brazilian to integrated circuits of capitalist accumulation in the international and non-renewable reserves of value, but their exploitation serves the interests of a minority. Nobody knows how to calculate the environmental cost of this development strategy, but the consequences may be irreversible and affect everyone in the future, even the industries that support it.

## **8. Bibliography**

AGUIAR, Cristiane Diniz. *Sobreposição entre Políticas Públicas: obras do PAC e unidades de conservação no corredor de biodiversidade da Serra do Mar*. Master's Dissertation. Centro de Desenvolvimento Sustentável. Universidade de Brasília, Brasília. 2011.

BERMANN, Célio, Entrevistado por Eliana Brum, “Belo Monte, nosso dinheiro e o bigode do Sarney”. In: *Revista Época*, **31/10/2011**.

CARDOSO, Fernando Henrique. *Amazônia: Expansão do capitalismo*. São Paulo: Editora Brasiliense, 1977.

DIEESE. *Principais Aspectos do Programa de Aceleração do Crescimento*. Nota Técnica Número 41, Janeiro/2007 - DIEESE. Available in [www.dieese.gov.br](http://www.dieese.gov.br). Accessed in 18/11/2011.

FEARNSIDE, Philip, “O Novo EIA-RIMA da Hidrelétrica Belo Monte: justificativas goela abaixo”. In: SANTOS, Sônia M. S. B. Magalhães et alli (org.), *Painel de Especialistas – Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidroelétrico de Belo Monte*. Belém, 2009.

FÓRUM NACIONAL DE REFORMA URBANA (FNURU). O PAC e a Amazônia. 30 out. 2010. Available in <http://www.forumreformaurbana.org.br/index.php/documentos-do-fnuru/41-cartas-e-manifestos/120-o-pac-e-a-amazonia.html>.

FURTADO, Celso. *Análise do “modelo” brasileiro*. Rio de Janeiro: Fundo de Cultura, 1972.

FURTADO, Celso. *Formação Econômica do Brasil*. Rio de Janeiro: Fundo de Cultura, 1959.

FURTADO, Celso. *O Mito do desenvolvimento Econômico*. Rio de Janeiro: Paz e Terra, 1974.

GONÇALVES, José Sidnei, e SOUZA, Sueli Alves Moreira de. *Modernização da produção agropecuária brasileira e o velho dilema da superação da agricultura itinerante*. Informações Econômicas, SP, v.28, n.4, abr. 1998.

IANNI, Octavio. *Ditadura e Agricultura*. Rio de Janeiro: Civilização Brasileira, 1979.

LEITÃO, Karina Oliveira. *A dimensão territorial do Programa de aceleração do Crescimento: um estudo a partir do PAC no Estado do Pará e o lugar que ele reserva à Amazônia no desenvolvimento do país*. PhD Thesis. Faculdade de Arquitetura e Urbanismo. Universidade de São Paulo, 2009.

MARTINS, Edílson. *Amazônia, a última fronteira*. Rio de Janeiro: Codecri, 1981.

MURADIAN, Roldan. MARTINEZ-ALIER, Joan. *Trade and the environment from a ‘Southern’ perspective*. Ecological Economics, v.36. 2001.

O ESTADO DE S. PAULO, 15/04/73. In: CARDOSO, Fernando Henrique. *Amazônia: Expansão do capitalismo*. São Paulo: Editora Brasiliense, 1977, p. 158.

OPINIÃO, nº.85, p.4. In: CARDOSO, Fernando Henrique. *Amazônia: Expansão do capitalismo*. São Paulo: Editora Brasiliense, 1977, p. 158.

PRESIDÊNCIA DA REPÚBLICA. Plano de aceleração do crescimento 2007-2010. Brasília, 22 de janeiro de 2007.

SANTOS, Sônia M. S. B. Magalhães et alli (org.), *Painel de Especialistas – Análise Crítica do Estudo de Impacto Ambiental do Aproveitamento Hidroelétrico de Belo Monte*. Belém, 2009.

SENHORAS, Elói e GUZZI, André, *A Amazônia, o Pacífico, e a problemática da integração infraestrutural regional na América do Sul*. Available in: <http://www.santiagodantassp.locaweb.com.br/br/arquivos/nucleos/artigos/eloi01.pdf>,

São Paulo, s/d. Accessed in 18/11/2011

STELLA, Thomas Henrique de Toledo. *A Integração Econômica da Amazônia (1930-1980)*.

YOUNG, Carlos Eduardo Frickmann Young. Enquanto o PAC engorda, gastos ambientais estão estagnados. *O Eco*, Rio de Janeiro, 01 nov. 2011.