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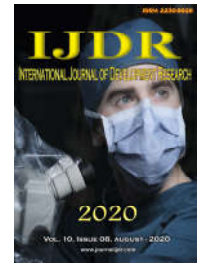
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LARGE HYDROELECTRIC PROJECTS IN THE ARAGUARI RIVER BASIN: TERRITORIALITIES, IMPACT AND RESISTANCE OF AMAPÁ'S FISHING (AMAZON, AMAPÁ, BRAZIL)

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ABSTRACT

This article points out the case of fishing communities in the Araguari river basin, placed in the Amazonian state of Amapá (Northern Brazil). This is a classic case study of socioenvironmental conflict between small traditional communities against large structural projects set up within a territorial planning that do not consider local territorialities. Mining and mainly large hydroelectric power plants threat traditional fisherman way of life. This research provides a historical geographical and social context background, focusing in territorial policies, and later shows socioeconomic characteristics of the fishermen workers and communities, and its resistance strategies.

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INTRODUCTION

Living from fishing in the Amazonian rivers is challenging and it requires resistance to the attacks of big corporations. The reproduction of the traditional riverside way of life regarding to natural resources fishing community's dependence is a social practice that has endured the Amazonian modernization process of the last four decades. The energy sector, an important stage of this modernization process, has strengthened natural resources automated exploitation. Within this context of struggle between the "modern" and the "ancient", at the current scenario of fishing activities and hydroelectric plants in the Amazonian rivers, we developed a research in Araguari river basin, the main basin in the state of Amapá (Northern Brazil). In the Araguari river, artisanal fishing is the main families' activity. In addition, families also practice agriculture, commerce, public service and others.

In the middle course of the river, where are placed the municipalities of Porto Grande and Ferreira Gomes this is far more visible. There, artisanal fishing is very important and may be a livelihood source or a families' income complement. There are in the Araguari river basin three main hydroelectric power stations: Coaracy Nunes, Ferreira Gomes and CachoeiraCaldeirão. The first one was built in the 1970s, while the other two were built in the last two years. Regarding to the Amazonian state of Amapá's geographical organization changes, we initially used the concepts proposed by Raffestin (1993) and Gonçalves (2001), in order to observe the circumscribed territorial production of the Amazonian territory. Viana (2017) points out that despite being important for national electric power system, dams in general became a social and environmental problem, and that is the case of the state of Amapá. Also, artisanal fishing territorialities are affected by them, according to Silva (2006).

It shows the controversy involving hydroelectric plants. By one hand, they have been seen as part of strategic policies for local and regional economic development strengthening mining infrastructure (SILVA et al., 2018). By other hand, this policies cause socio-environmental conflicts and problems to artisanal fishing (SOMBRA et al., 2018). This paper covers hydroelectric projects issue within Amazonian policies context and impacts on fishing activities. For this purpose, we analyze local fishing activity in the municipality of Porto Grande, an area where there is a fishing colony¹: the colony Z-16. This area is surrounding by the CachoeiraCaldeirão Hydroelectric Plant. At first, we discuss the main aspects regarding to artisanal fishing within the context of energy projects. At second, we describe transformations that have taken place, and culminated in an impact on artisanal fishing.

MATERIALS AND METHODS

This article is based on bibliographic and documentary research on the theme of Amazonian large projects of natural resources exploitation, in most cases interacting negatively with local communities. We made three fieldworks in order to make empirical observations, investigate their laboring methods and conduct surveys and interviews, which completed the process of gathering data. The surveys were applied with fishermen emphasized socioeconomic information and fishing activity technical aspects. This data allowed us to make a fishermen profile and identification activity's main problems. And then, we make maps and graphs to show data.

DISCUSSION

Territory and territoriality: The current Amazonian space modernization context is an outcome of development policies applied to this territory. This may be interpreted through Raffestin's concepts or "syntagmatic actors" that shape territorial imagens built upon power relations. This a geopolitical approach that considers the dialect relation between forces of production and relations of production. It this way we can observe Amazonian space territorial configuration searching power relations that based development policies that shaped that space. We need to start from a standpoint that space and territory are not equivalent terms. Space is prior to territory, and territory results of actions made on space. We opted to work with the concept of territory derived from the action performed, from an appropriation of space by the syntagmatic entity that can be a company, organization, state or any other at any level (Raffestin, 1993), in which case the space is understood as an element that will be transformed according to an energy. If we understand energy as the effort or work applied to materials in the space sphere, the Amazon also became conventional as a material, as a "source of resources". One of that classical vision is to consider Amazon as the lungs of the world, a vision of space to be occupied and opened up to others. Information or perspectives on this space will promote the development region programs and projects creation. However, Amazonian space broad extension has always been a concern from sovereignty management and maintenance viewpoint. In the past, such size was a concern from development perspective.

During most part of the Twentieth century, Amazonian natural resources was not a government concern. Forest itself was seen as an obstacle to economic development. During the Brazilian Military Dictatorship (1964-1985), the first condition to obtain investment from the institutional Amazonian development agency² was to deforest the land. It was called the bare land condition. Therefore, there was a contradictory imaginary created establishing an image about the region of how it is, in other words, for those who inhabit the Amazon it is diverse, multifaceted and for those from outside the region is seen as being homogeneous (Gonçalves, 2001). The economic cycles experienced in the region show the aspects addressed by Raffestin (1993) and Gonçalves (2001), in which the first when addressing the territory as the scenario of power reveals aspects of territorial production, highlighting the actions of syntagmatic actors: these can be multiple, taking into account that the State is always organizing the national territory; however when it comes to the Amazon space, the second highlights the criteria " from outside " to identify the region from a certain economic activity explored in the area. The modernity speech when directed towards Amazonia tends to characterize it as obsolete, which fuels the ideology that it needs to be developed, to break the ties with traditional aspects that shape it as such, and also to incorporate elements of progress and modernity, causing shocks with its strategy in the several power relations (Raffestin, 1993). To improve in such a way reminds us of the loss of local societies' autonomy, which are seen as incapable of overcoming the deficit, or of breaking their relations with the natural environment, so such development is stimulated by external or exogenous actions from the local reality.

The geography of the Amazonian space was modified in the 1960s with the roads as the axis of its structure, replacing rivers that had this function until there. The new phase of modernization was supported by South-central region and international investments. This period reconfigured Amazonian economic system: if in the past it was based on the exchange system, now it would have to live with the exploitation of financial and industrial capital that will compete for natural resources (Gonçalves, 2001). Building this new period in Amazonian economic demands structural changes in geographic space. Roads and energy supply became essential conditions to this. The state did not negotiate with local and regional elites, who assumed a secondary role on that geographical reorganization (Loureiro, 1985). All old Amazonian economic forms were considered outdated and a modernization discourse imposed by the national state created

²Superintendência do Desenvolvimento da Amazônia (SUDAM) means "Superintendency of Development for the Amazon", and it is a local authority of the federal government of Brazil aiming to promote the development of the Amazon region by creating special financial and tax incentives. SUDAM was established in 1966 during the military government of Castelo Branco. Its purpose was to promote the development of the Amazon region, creating special financial and tax incentives to attract private investors, national and international. SUDAM replaced another municipality called the Superintendency of Economic Recovery Plan of the Amazon (Superintendência do Plano de Valorização Econômica da Amazônia, the SPVEA), created by Getúlio Vargas in 1953. The SPVEA also had the objective of developing the Amazon region. On August 24, 2001, President Fernando Henrique Cardoso, in Interim Measure No. 2.157-5, abolished SUDAM, thanks to the numerous allegations of corruption surrounding the organization. (Reportedly nearly 2 billion dollars were stolen from SUDAM.) In its place, he created by the Amazon Development Agency (Agência de Desenvolvimento da Amazônia, the ADA). The ADA is responsible for the management of development programs relating to the Amazônia Legal region. In August 2003, President Luiz Inácio Lula da Silva announced the recreation of SUDAM.

¹ Fishing colonies are organizations created by Brazilian navy force in the 1920s to organize fishing and make services for fishermen. The fishing colony in municipality of Porto Grande answer by code Colony Z-16.

the conditions for the new territorial ordering. The decay of the traditional elites affected communities that survived from extractive activities. So, there was a radical change in the use of land and natural resources on the part of these new policies. Since the 1970s, other referential factors have been adopted, such as the selective valorization of one or another resource, according to the profile of the logger, cattle rancher and miner, thus the two Amazonian space patterns of organization – the old one based on rivers, and the new one based on roads – are intense and unequal (Gonçalves, 2001). The new Amazonian space pattern of organization introduced since the 1970s has not allowed time for adaptations by the local communities. It is ruled by the high-impact technological standard, determined by national and international industrial and financial circuits that promote the deforestation, building dams and mining, causing danger, pollution and socio-environmental conflicts. Roads and hydroelectric power stations reveal a greater natural resources transformation capacity completely changing the dynamics. Amazon communities often have been reproducing a way of life where social relationship is intertwined with environmental issues. There is an ecological and territorial rupture, and within this crisis social movements emerge in order to guarantee the right of living and reproducing in/the territory. Ensuring the maintenance of its territorialities supported by local knowledge. That is the time when collective identities such as, rubber tappers, chestnut-trees workers, fishermen, women who break coconuts arise and struggle for their rights (Gonçalves, 2001). Currently, the civil society have been unable to promote public policies aimed at meeting these demands that permeate the social movements. The State apparatus under the continuous control of those above also strengthened the idea of the Amazon.

Integration and development strategies for the Amazonian economy: The geographical space organization and the development model set up was based on a huge distance between the economic poles poorly articulated, which developed an external relationship between the metropolis and the colony, that were also called “the archipelago economy”. This model was used in the colonial period, as observed in the north-east sugarcane plantations, southeast coffee industry and the Amazon in the production of rubber. This lack of integration characterized Brazilian territory and that remained prevalent until mid-20th century. The decentralized accumulation of this period made it possible for some economic complexes to industrialize at different levels outside the Rio-São Paulo cluster, and industrialization was based in natural resources and traditional agricultural and livestock. The Southeast industrial development was based on coffee industry capital, and following a pattern of accumulation, the industrial sector would progressively take over the national economy command, moving the agroexports to a subordinate position, while consolidating as classes the bourgeoisie and the urban-industrial workers (Vainer; Araújo 1992).

As the coffee capital was then concentrated in the southeast, it became industrialized, forcing other regions to adapt, which is when projects with integration and development biases are implemented, stimulated by the purpose of inserting the Amazon into the area of development. In the 1970s, the State sought to adapt and structure the territory to the new stage of industrialization and to its “Brazil Empowerment Project”(Becker, 1999). This integration and development policy is at the heart of the actions aimed at integrating and

occupying the Amazon, through a policy of integration by highways, in which the region was intensely affected by the “programmed network”. Due to the richness of its natural resources and its extension, combined with low demographic densities, its occupation was considered a priority in terms of strategy and economic exploitation (Becker, 1999). The National Integration Plan was conceived with the objective of promoting greater integration of the national economy in the areas covered by the activities of the Superintendence of Development of the Amazon (SUDAM) and the Superintendence of Development of the Northeast (SUDENE), whose first stage had as its objective the construction of Transamazon highways (BR-230) and Cuiabá - Santarém (BR-163), as well as promoting the productive occupation of those areas. In addition, other actions were proposed, including the irrigation project in the northeast. The measures for regional economic development in the Amazon can be subdivided into two categories: state action and private action. The first provides infrastructure and the second is based on a policy of financial subsidies, as a way of establishing a phased understanding (KOHLHEPP, 2002). This way, the past thirty years of development policies in the Amazon can be generally understood in two major stages: the first consists of planning the development of the axes, where the construction of highways such as the Transamazon highway and the Northern Perimeter, Cuiabá-Santarém (BR-163) and Cuiabá-Porto Velho-Manaus (BR-364) took place. These served as migration routes to the Amazon and were planned as a development path route.

In a second moment, with the establishment of the Amazon Pole Program from 1974-1980, which refers to poles of economic development, predominantly of a private nature sponsored by the State through fiscal benefits, economic islands were created and they used to attract labor, further aggravating the social and regional inequalities. The exploitation of mineral resources was one of the central goals of the region’s development programs. The extraction of the manganese in Amapá and Rondônia in the mid 1950-1960s, the iron mining in Carajás, the bauxite in the river Trombetas and also the gold and diamond were the main drivers for the projects to be initiated and disseminated in the mid-1980s. The program did not have its expected outcome, based on development and the reduction of regional disparities, the exogenous interference and the territorial reorganization of the region led to the precarization of adjacent areas and of the quality of life. The integrated development program deals with perspectives centered on the participation of regional populations in the processes of colonization decisions, but in fact it disguised and legitimized the new settlements, the implantation of enclaves, the territorial reorganization and the environmental and social impacts, mainly on indigenous and riverside populations. Examples of this disastrous occupation are the cases of Rondônia and northwestern of Mato Grosso, the so-called POLONOROESTE, which have been financed by the World Bank. It has intensified the problems in the settlements, conflicts in the countryside and increased impacted lands. Another example was the Grande Carajás Program, in which a great dependence on world market conditions was established. The core of this context was to create a superstructure for the exploitation of iron ore such as the construction of roads, railways, ports and power stations; all this apparatus attracted an intense spontaneous migration flow, creating a chaotic and inconsistent picture of the so-called development.

With the goal of harmonizing the development and use of natural resources, a German proposal was introduced, promoting through actions in local communities in the Amazon the maximization of the environmental benefits of forests in a way that was consistent with the growth of Brazil. Another recent program, the one called "AvançaBrasil", had a planning that would last until 2007. This program proposed that the development should be allied to the sustainable perspective, based on a study of the projects that already have existed. It envisioned the consideration of the development axes where there are certain economic and potential activities for the development of the regions, in which the desired objectives are found: the international integration of the North region, logistics in the Madeira-Manaus region, Central Brazil and the energy generation. AvançaBrasil's development perspective of the development axes is very similar to the discourse of the 70's, by the National Integration Program. Regarding the establishment of Major Projects in the Amazon region from the 1970s onwards, the concept that development plans designed for the Amazon region did not result in benefits for indigenous communities, but rather in the implementation and spread of interference in the flow of capital into and out of the Amazon region, resulting in conflicts arising from the local re-arrangement and exploitation of natural resources.

On the actions and planning established by Kohlhepp (2002), he addresses that the exploitation of natural resources in the Amazon is strongly impregnated with misuse and takes place, in large extent, in an illicit manner. Growing social tensions contributed to the outbreak of violent conflicts. On the contradictions of the so-called development Monteiro (2002) analyzes half a century of manganese mining in Serra do Navio- Amapá. The exploitation of this resource occurred in the 1950s being operated by the Industry and Trade of Minerals (ICOMI). It is pointed as a means to promote the development of the region. However, the author understands that such exploration has not contributed in a satisfactory way to regional development, due to the establishment of fiscal political relations or fiscal favors, which could be converted into benefits by exempting or reducing the tax on profits. The mineral activity is intertwined in large investments considering that it does not have the intention to extend the means of production to broader segments of society, they are not in line with the idea of local development, but it does require massive investment in machinery and infrastructure (MONTEIRO, 2002). This explains the need for energy enhancement in the Amazon region in Amapá, which began in the 1970s, when the Coaracy Nunes hydroelectric station was installed in the Araguari River. Based on this project, numerous other constructions were implemented in the Brazilian Amazon in its general context, causing impacts of different proportions and gradations.

As for Amapá specifically, in the current scenario, there is an advance in the use of energy from rivers in the region, especially those related to the Araguari basin, which currently includes, in addition to the Coaracy Nunes hydroelectric station, the Ferreira Gomes and CachoeiraCaldeirão plants, implemented respectively in 2011 and 2013. Although they are run-of-river projects, i.e., the reservoir does not cover large areas, it presents less accumulation of water volume, especially when compared to the projects installed in the Amazon during the 1970s, 1980s and 1990s. Even though the published discourse seeks to minimize the negative impacts arising from

the construction of these works, the literature on the subject at both regional and national levels continues to highlight its effects on the environment and local populations. Marinho (2018) in a study with non-industrial fishermen in the municipality of Ferreira Gomes points out that the hydroelectric stations Ferreira Gomes and CachoeiraCaldeirão have been singled out by local fishermen as the ones impacting on the environment and, consequently, the artisanal fishing developed in the area of Araguari. According to the author, since the beginning of the construction work, there have been changes in the natural dynamics of the river, changes in geology and geomorphology, loss of vegetation that provide fruits consumed by different species of fish, as well as numerous cases of their deaths, reflecting in the decrease of the capture of fishing resources, directly compromising the social reproduction of those who depend on their consumption and marketing. Hence, it is clear that development projects for the Amazon, such as mineral and electricity generation projects continue to generate or intensify social tensions, environmental degradation and often act in the degradation of lifestyles and territorial reconfiguration of localities where these large projects are being implemented.

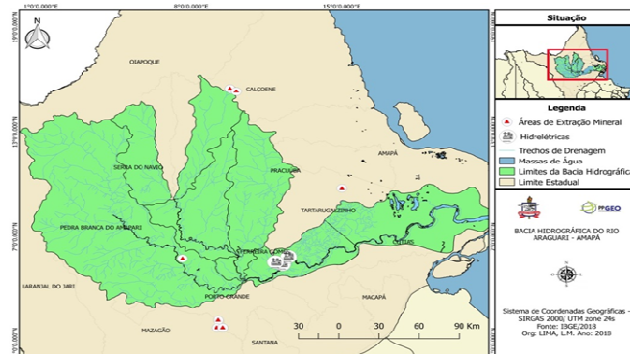
Territorialities and resistance of fishing in the Araguari river basin: As we have already mentioned, the invisibility of the Amazonian populations is the first act provided by the big capital, disregarding existing territories and territorialities, and with them the whole relationship developed by generations is ignored, such as the production and reproduction of the territory and the possibilities of survival, extracting or promoting conditions to supply basic needs. Therefore, the inversions of capital end up becoming hegemonic in emerging countries, causing serious social and environmental problems. The Amazon region of Amapá has been very representative in this discourse, presenting the first experience in hydroelectric stations in the Amazon to Coaracy Nunes, and in recent years new enterprises have been installed in Araguari. This has led to transformations in the landscape elements, in addition to negative impacts on the territorialities of fishermen and fisherwomen of the Araguari River. These changes in topography, vegetation and hydrography are essential components of the landscape (Diegues, 1999) and their transformations are crucial to the understanding of the impacts on territory and territorialities. By analyzing the use of territory based on the fishermen's perception (SILVA, 2012), they use strategies based on fixed or portable gear³ for the demarcations of fishing in rivers of the Amazon commonly found in areas of boreholes. Therefore, it can be said that the practice, the knowledge passed on for generations are elements of the territoriality of fishermen and fisherwomen. In addition to the manufacture of gear and boats, the knowledge about the season when there is more fish in the rivers (Begossi, 2004; Maldonado, 1993), add elements to understand that these have a territoriality. Due to the use and the practice, the knowledge of these fishermen and fisherwomen is built to comprehend the aquatic ecosystems, knowing that they are placed in stains, points and fishing grounds. So, strategies such as agreements or demarcations are employed, with the objective of avoiding the incidence of conflicts that can be common in these activities. Although the most common are characterized by subjects of the same group such as fishermen and fisherwomen, the addition of other activities has been the

3 Also known as fishing gear these can be fixed or mobile: net, hook, fence, longline among others used in artisanal fishing.

cause of other forms of conflict. Furthermore, we understand the installation of hydroelectric projects as areas of conflict in artisanal fishing, since they present conditions that imply in effects: such as interference in the aquatic environment, impact on the resource, economic impact and social impact, which affects mainly the river's fishing areas. Therefore, it becomes a scenario that is prone to conflicts. The researched area includes the middle stretch of the Araguari (Picture 2), where the hydroelectric projects CachoeiraCaldeirão, Ferreira Gomes and Coaracy Nunes are placed. In addition to the problems that are brought up during the construction period, such as the increase in the population and the increase in criminality, in which the scenario of countless large projects established in the Amazon is configured, are the environmental problems arising from the installation of dams along the river, as they now affect the daily lives of small Amazonian cities, mainly afflicting communities that survive from artisanal fishing in the middle section of Araguari, as they are linked to Porto Grande.

The fishing colony Z- 16⁴ has about 120 registered fishermen, of whom we were able to interview 30 f who add up to a total of 146 dependents of this type of fishing, according to a survey conducted in the field by counting the members per family. The Araguari basin crosses Amapá from east to west and since the 1970s it has been the stage for mineral activities, and more recently, due to the morphological conditions in the middle stretch of the Araguari, the installation of hydroelectric dams have been identified as being the cause of several changes in its natural conditions, such as the overflow of the bed and the flooding of closed areas of the cities of Ferreira Gomes and Porto Grande, directly influenced by these projects. Such alterations contribute to the disappearance of species that, in addition to the impacts already caused by the mineral activity, cause serious impacts on the local economy, in parallel with the loss of fishing spots or areas. Marinho (2018), when studying the Ferreira Gomes and CachoeiraCaldeirão hydroelectric stations, points out that there are two moments for fishermen in the municipality of Ferreira Gomes: the first of which developed the activity without major concerns and the second is filled with uncertainties caused by the strong transformations that occurred in this stretch of land. The city of Porto Grande, also placed in the middle stretch of the Araguari, is another area of influence of the energy enterprises installed in the region. The presence of hydroelectric dams has impacted the fishing activity, making it difficult to access areas that were previously possible to fish, the so-called fishing territories, according to the municipality's fishing population. These are limited to a cartography of the perception in which they establish norms of use based on their knowledge of the activity (Silva, 2012). The arrival of these companies in the region aimed to strengthen the energy supply that until then held back the economic performance of the mineral industry. In 2010, according to the Mineral Sector Diagnosis of the State of Amapá, the energy companies installed and being studied consisted of infrastructures to support the mineral production. As shown in Picture 1, it is possible to see that along the Araguari basin there are several mining extractions points, including in the areas of influence of energy companies, Porto Grande is one of the extraction centers for the aggregates

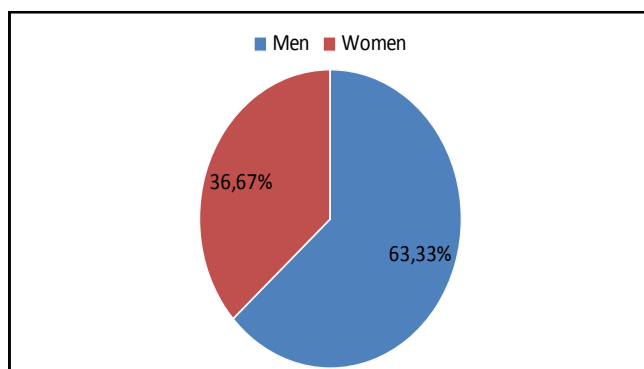
linked to civil construction, such as: pebbles, sand and gravel. One of those is placed at many places on the bed of the Araguari: the washed pebble that is dredged from the bottom of the Araguari. On the environmental aspect, the report mentions that this activity may expose the area to environmental impact such as: the silting of the river bed, water turbidity and the leaking of the ichthyofauna, among many other things.



Source: IBGE data base (2018).

Picture 1. Activities throughout the Araguari basin: mining and hydroelectric dams

Along the Araguari River one can encounter a number of economic activities that 777also have some kind of effect on fishing, however, as these are modifications that cause changes in the fishing environment, this one stands out among other activities that may have an equal or greater effect on fish stocks. In spite of the harshness that can arise in other activities, it is the impacts caused by hydroelectric enterprises that highlight the problem of environmental issues in fishing activities, since such activities are the main occupation practiced by residents of the areas of influence of these enterprises. The field research was carried out in two moments in the area of direct influence of the dams; During these two moments it was possible to meet the leaderships of 25% of the fishermen registered in colony Z-16 in the municipality of Porto Grande. About thirty people were interviewed, among men and women. Through the data we were able to elaborate some graphics with the purpose of better visualizing the characteristics of artisanal fishing in Porto Grande. Table 1 shows the percentage of respondents who answered fifteen to twenty questions related to the enterprise and fishing in the municipality of Porto Grande. Among them, the percentage of women in the fishing activity is noteworthy, as they generally share this activity with household chores and the common farm in the area surveyed.

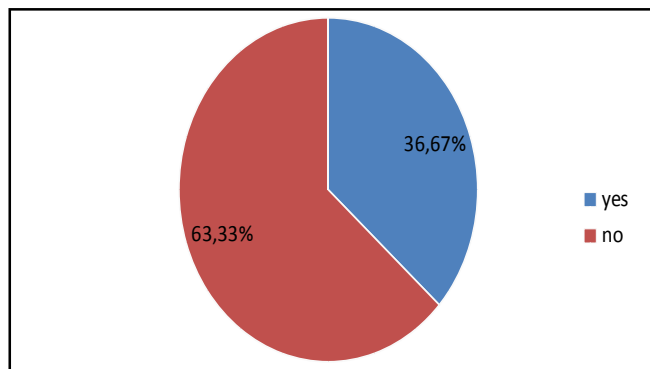


Source: Elaborated based on field data (LIMA, 2018).

Table 1. Percentage of respondents by gender

⁴Fisheries colonies are groups of fishermen that were created by the Brazilian Navy to provide services and assistance to fishing populations. Currently, they have undergone several transformations, and work as if they were labor unions in the category of artisanal fishermen. They are usually divided by municipality and always have an acronym preceded by the letter Z, following a numbering.

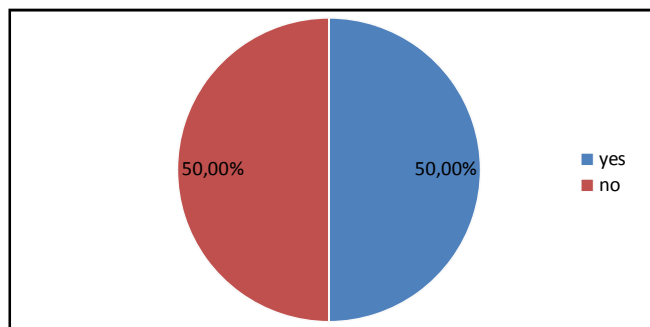
As an important activity in the life of this community, since it represents a major portion of family subsistence, we can see the discontent of the fishing population with the arrival of the Hydroelectric power stations in the region. When asked if there were changes in the time of fishing (Graph 2) 37% answered that yes, although these were not the majority in this survey. Such an assertion can be explained because the 63% are part of the portion seeking other activities, as reported in field, whether in public, commercial or informal market.



Source: Elaborated based on field data (LIMA, 2018).

Table 2: Increase in fishing time

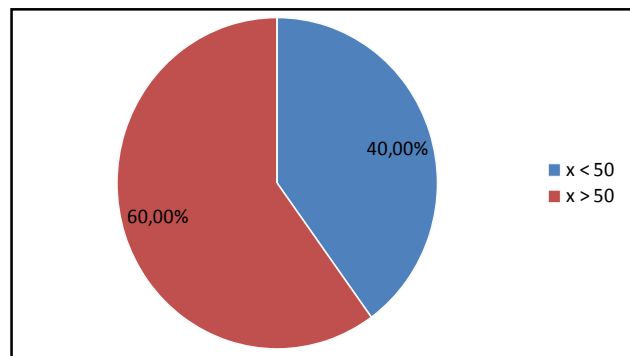
During the interview, 37% of them reported an increase in fishing time, due to the absence of common species in this stretch of the Araguari. On the causes of the time delay, and in accordance with the following question, we asked whether there was a disappearance of species? Among those interviewed, there was a balance in the answers: 50% answered yes, there was the disappearance of species. The other 50% said no. On the other hand, added to the data collected during the fieldwork, the reports indicate that the 50% corresponding to the group of those who gave the negative answer are from the group of the fishermen who insist on continuing the activity, although in conditions of reduced quality of fish. Even when they find fish to be of a lower quality or with a different flavor, which implies in the suspicion of alteration of the resource, that may be altered due to transformations occurred in the river, resulting from remains of dead vegetation or other components of fauna. Some respondents addressed some questions such as: "Are we not eating contaminated food?" We may be sick and we don't even know". These questions demonstrate the population's concern about the suspicion of fish contamination, although there are few subsistence alternatives in the region, the population persists in the activity, while another part believes in the disappearance of species, corresponding to a portion of fishermen already convinced of the environmental impacts and that add to those who are seeking other alternatives to survive. Table 3 shows this decrease in the fishing stock, loss of quality and disappearance of common species in the region.



Source: Elaborated based on field data (LIMA, 2018).

Table 3: The disappearance of species according to the perspective of fishermen

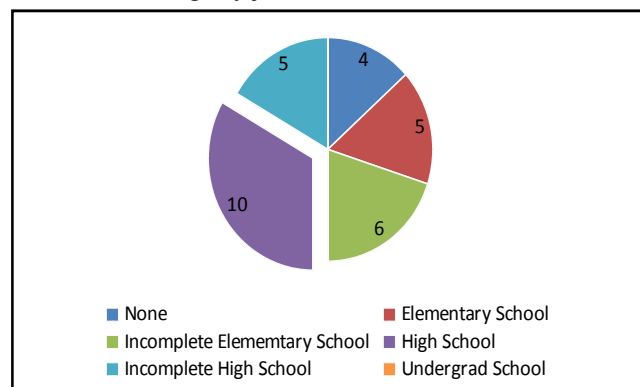
The population of fishermen and fisherwomen interviewed in its majority are about 60% people over 50 years of age and the other 40% correspond to people under 50 years of age, as shown in Table 4. This shows that only 40% of those interviewed should or should belong to the so-called productive age group, and another should belong to the elderly group. We believe that these are statements that should be verified at another time. However, they suggest that we draw a profile regarding their age.



Source: Elaborated based on field data (LIMA, 2018).

Table 4: Age between men and women

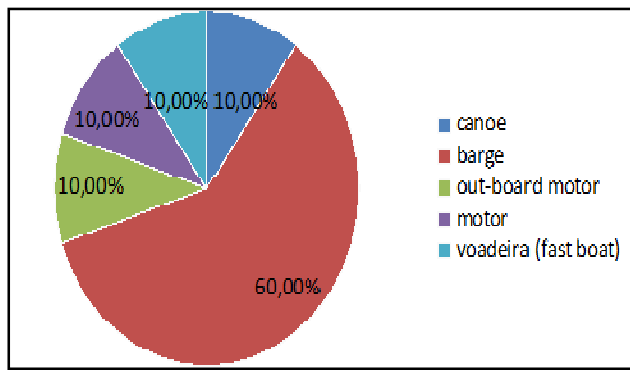
As for their education, according to table 5, about 33% of the respondents have the high school level, followed by 20% incomplete elementary, 17% complete elementary, 0% incomplete high school and 13% illiterate. With these data it is possible to affirm that the possibilities for this population to be absorbed by other activities is almost minimal, because even if 33% of the people interviewed have the high school level, the population with lower education or none is even higher, at 54%. It is also known that the data in the previous table shows that 60% of the population is over 50 years old, who have little chance of assuming any job in the labor market.



Source: Elaborated based on field data (LIMA, 2018).

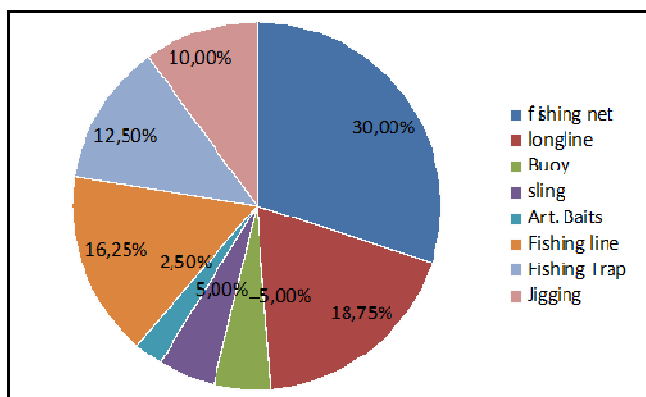
Table 5: Education of the fishermen

With limited alternatives for survival, the fishermen of Porto Grande take risks in small boats known as motorboats, barges, out-board motors, canoes and fast boats. As stated in Table 6, the use of the barge is common, and it is with it that a large part of the population practices the activity and mainly travels through the most dangerous areas of the Araguari. In addition to transport, the most common gear used for the practice are: the fishing net followed by the longline and fishing line. The boat and the handling of the gear characterize and differentiate artisanal fishing from other capture practices, and it is possible to observe the types of tools in table 7 pointing to the insertion of other instruments, disregarding the practice and others that were mentioned in interviews, such as pistol. The use of these other instruments indicates the prospecting of future conflicts among fishermen.



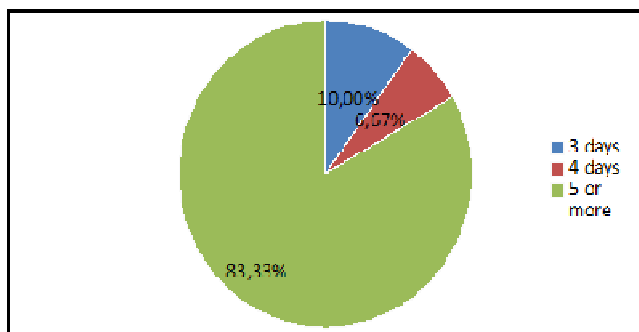
Source: Elaborated based on field data (LIMA, 2018).

Table 6: Boats used in the fisheries



Source: Elaborated based on field data (LIMA, 2018).

Table 7. Most commonly fishing gear used in Porto Grande



Source: Elaborated based on field data (LIMA, 2018).

Table 8: How long do you spend fishing?

The use of certain utensils further aggravates the crisis in fishing in Porto Grande, because it highlights other problems arising from the absence of a fishing system that exposes the population even more, added to the difficulties experienced with pressure on resources such as dams. All these factors contribute to the environmental damage, causing the disappearance of species according to their perception, such as: tucunará (*Cichlaocellaris*), traíra (*Hopliasaimara*), curupeté (*Myleus*), branquinha (*Curimatainornata* Vari, 1989), mandubé (*Ageneiosusbrevifilis*), piaba (*Leporinusobtusidens*), acará (*Geophagusbrasiliensis*), marfurá (*Myleustiet*) and piranha (*Pygocentrus nattereri*), they have had their stock reduced in certain parts and in some cases they are no longer possible to be found. They also reported that in order to continue surviving from fishing, they end up extending their journey to areas near Macapá, and may spend more time searching for fish, as shown in Table 8, moving in many situations to more distant stretches in order to catch the fish; others risk being near the dam; in these

fisheries, some accidents have already happened near the turbines. Another problem found refers to the non-viability of moving boats in some stretches of the Araguari, in which we can observe extensive areas of devastation (Picture 2) of the fauna and flora. In some stretches of the river it is possible to see the immense amount of dead forest, with dry trunks along the way. This is a dangerous situation for those who risk facing the river in small boats, mainly because they are submerged in a state of decomposition and may fall at any moment. The proliferation of mosquitoes is also one of their complaints: "the flooding of the land, loss of the field, water pollution, the epidemic of mosquitoes and the reduction of fish". With a large flooded area, whose biological damage is irreparable, some owners on the edge of the Araguari were compensated, but others had to be replaced or even abandoned their properties. According to the fishermen, the agencies that are acting effectively through projects are the ICMBIO- appointed as very active in this area through work with the cooperative and due to the proximity to the FLONA. that also becomes very assiduous; Some fishermen are split in the manufacture of forest items as artisan soaps and fishing, complementing their incomes by this works.

In an attempt to draw a profile we have used the typology and classification developed by Diegues (1995) and Furtado (1993), regarding the characteristics in the artisanal fishing activity; The first categorizes it as small commercial production and the second classifies it as: monovalent or polyvalent, in which the first is dedicated exclusively to artisanal fishing and the second one alternates with other activities. So, according to the information gathered, the fishermen of Porto Grande are part of the small commercial production, which may be monovalent and polyvalent, since they only and exclusively depend on fishing and on those that alternate with other activities. With the data gathered and analyzed we can visualize and trace a profile of the fishing and fishermen in Porto Grande, in short, the fishermen depend on the river for production and social reproduction, as well as for the acquisition of goods and consumption. It is a very diverse grouping of men and women who divide themselves between domestic tasks, fishing and farming. Most of them are over 50 years old, owning their own boats or working in partnership, although these are limited to the characteristics expected from small-scale fishing communities, framing themselves in the perspective of small commercial production. Therefore, fishing in Porto Grande goes through profound changes, and strives for the rights of its territories and their territorialities.

RESULTS

Artisanal fishing in the Amazonian region in Amapá is defined in a historical geographical process that constitutes itself in the process of territorial political transition of the State of Amapá, in which it is inserted in the core of the processes of the constant development of the Amazonian space, which constitutes contradictory scenarios. Mining and hydroelectric stations are two activities that expose the traditional communities of the Amazon to the loss of territories, compulsory displacement, loss of land and fields, in addition to the recurring environmental damage of these businesses. Along the Araguari it is possible to identify several points of mineral exploration, in some points dredging and removal of the riparian forest to explore some minerals contribute to changes in the riverbed, in addition to these other products can be identified through specific studies.



Source: Field Research (LIMA, 2018).

Picture 2: A stretch of the Araguari River near Porto Grande and areas impacted by the CachoeiraCaldeirão HPP

The strengthening of energy sources, in line with mining activities and the increase in population, which occurred in the capital, is today one of the main activities affecting small-scale fishing according to the perception of fishermen in the municipality of Porto Grande, causing losses in fishing grounds, species, increase in the time for capturing. It may have other impacts, those of greater amplitude such as in the economy of the municipality. In addition to these there are other impacts, such as accidents occurring near turbines, fishing near vegetation in a decomposing state. Exploitation of natural resources requires automation, the insertion of technologies that arrive as packages in the Amazonian space, without socio-environmental commitment. Therefore, the losses are environmental and also social and cultural, causing an imbalance in the environment, affecting not only the flora and fauna, but also the communities that build a whole cultural knowledge. There is, therefore the destruction of the Amazonian space. The dispute based on the insertion of HPP in the Amazon and specifically in the State of Amapá highlights the indispensable approach to social and environmental issues, arising from the overlapping and territorial restructuring caused by the attacks of the globalized capital. With the loosening of the relations with the arrival of this capital in the Amazon, it encouraged through the dispensation and also the reduction of tax incentives, the attraction of this capital that includes in many situations foreign companies that arrive in the region, with the only purpose of exploring the resource, without giving any return.

The region is one of the last frontiers of capital expansion, causing the establishment of a large production chain, having as its primary base the generation of electric power, because without such an apparatus it is impossible to install steel mills, mining companies and others, and before all this, the ethical principles must also be respected, dealing primarily with local communities and the environment in which they are installed, where symbiotic and identity relationships are maintained. It is imperative that these actors and their territorialities are respected and not neglected and made invisible. Within this framework, a new perspective is essential to address the needs of small farmers, riparian farmers and other segregated actors, by identifying their rights and assessing the risks of installing the hydroelectric power stations.

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DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

INFORMED CONSENT

The interviewees of this research were informed that they were providing data for a master's thesis, which results from this article, and the authors of this research committed themselves not to divulge personal data, limiting themselves to the quantitative aspect.

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REFERENCES

- Becker, B. K. 2009. Os eixos de integração e desenvolvimento da Amazônia. *Território*, 46: 29-42.
- Begossi, A. 2004. Áreas, pontos de pesca, pesqueiros e territórios na pesca artesanal. In: Begossi, A. Ed.. *Ecologia de pescadores da Mata Atlântica e da Amazônia*. São Paulo: Hucitec, pp 223-255.
- Diegues, A. C. 2002. *Povos e águas: inventário de áreas úmidas brasileiras*. São Paulo: EDUSP.
- Fonseca, W.; Bitar, O. Y. 2012. Critérios para delimitação de áreas de influência em Estudos de Impacto Ambiental. *I Congresso Brasileiro de Avaliação de Impacto*, 1-14. São Paulo: ABAI.
- Gonçalves, C. W. P. 2001. *Amazônia, Amazônias*. São Paulo: Contexto.
- Kohlhepp, G. 2002. Conflitos de interesse no ordenamento territorial da Amazônia brasileira. *Estudos Avançados*, 1645: 37-61.
- Loureiro, V. R. 1985. *Os parceiros do mar: natureza e conflito social na pesca da Amazônia*. Belém: MPEG.
- Maldonado, S.C. 1993. *Mestre e Mares: espaço e indivisão na pesca marítima*. São Paulo: Annablume.
- Marinho, V.N. M. Impactos de Hidroelétricas na Atividade pesqueira: estudo de Caso a partir dos pescadores Artesanais do Municípios de Ferreira Gomes, Amapá-Brasil. Master Degree dissertation in Geography, Federal University of Pará, Belém PA, Brazil.
- Monteiro, M. A. 2003. A ICOMI no Amapá: meio século de exploração mineral. *Novos Cadernos NAEA*, 62: 90-141.
- Raffestin, C. 1993. *Por uma Geografia do Poder*. São Paulo: Ática.
- Silva, C. N.; Lima, R. A. P.; Marinho, V. N. M. 2018. Desestruturação territorial na atividade pesqueira: a instalação de usinas hidroelétricas na bacia do Araguari Ferreira Gomes – Amazônia – Brasil. *NERA*, 4221: 186-201.
- Silva, C. N. 2012. *Geografia e representação espacial da pesca na Amazônia paraense*. Belém: GAPTA/UFPA.
- Sombra, D.; Mota, G. S.; Leite, A. S.; Castro, C. J. N. 2018. A reterritorialização pesqueira no estado do Pará: reprodução

- contraditória de relações capitalistas. *Revista de Geografia Recife*, 352: 243-267.
- Vainer, C. B.; Araujo, F. G. B. 1992. *Grande Projetos Hidrelétricos e desenvolvimento regional*. Rio de Janeiro: CEDI.
- Viana, I. A. F. 2017. *Estudos sobre o Setor Energético no Estado no Amapá e sua Influência no Desenvolvimento Local, entre 1943 a 2015*. Master degree dissertation in Regional Development, Federal University of Amapá, Macapá AP, Brazil.
