HYDROELECTRIC POWER PLANT IN THE AMAZON AND SOCIOECONOMIC IMPACTS ON FISHERMEN IN FERREIRA GOMES COUNTY — AMAPÁ STATE[1]

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Introduction

The great unexplored Brazilian hydroelectric potential, the excessive damming of rivers in the Southern and Southeastern regions, and the increasing energy demand by industries located in São Paulo and Rio de Janeiro states and by electro-intensive industries (production of aluminum and other metals) located in Pará State drive the energy-exploration expansion encouraged by federal and transnational governments in Amazonian rivers (FEARNSIDE, 1999; 2015; BERMANN, 2007; MORETTO et al., 2012).

According to Bermann (2007), the installed capacity of Brazilian Hydroelectric Power Plants (HPPs) is approximately 74 thousand MW, which represents 28.4% subutilization of the total hydroelectric potential (approximately 260.1 thousand MW). The aforementioned author states that the expansion of this energy modality faces several issues, since 50.2% of its potential rely on rivers such as Araguaia, Tapajós, Tocantins and Xingu (Amazon region), which are surrounded by several indigenous, riverine and traditional populations.

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Despite the advancements in the Brazilian environmental legislation, the construction of HPPs in the country remains contradictory due to impacts from them. Discussions about the impact caused by HPPs were essentially focused on the physical effects deriving from planning and implementation processes, although they have recently turned towards often overlooked social issues, since these impacts led to deep changes in the socioeconomic and environmental conditions of local populations (CERNEA, 1997; CUNHA, 1999; RICHTER et al., 2010; CAVALCANTE; SANTOS, 2012).

The HPPs around the world are responsible for permanent negative impacts on populations, because of the noticing and continuous noncompliance with national and international legal standards, unbalanced socio-cultural relations and disrespect to human rights. Consequently, it makes the socioeconomic reproduction of the affected ones difficult and/or infeasible, in space and time (GEGENSTRÖMUNG, 2011). An example of it is the historical need of developing "social impact assessment" mechanisms focused on more efficient HPPs in order to allow measuring, mitigating, compensating and/or repairing their negative externalities as an attempt to effectively restructure the socio-environmental conditions of the affected ones (TAJZIEHCHI; MONAVARI; KARBASSI, 2012). Therefore, the magnitude of impacts caused by HPPs has been underestimated, fact that suggests serious flaws in the environmental impact evaluation instruments applied to watersheds, as well as in instruments used to assess the exact number of affected individuals and the effective mitigating/compensatory measures (BARAN; MYSCHOWODA, 2009; GEGENSTRÖMUNG, 2011).

Although entrepreneurs and governments deny the serious impacts caused by HPPs, the scientific literature confirms the social, cultural, historical, environmental, economic, health and leisure-related consequences they have on different populations (RICHTER et al., 2010; WANG et al., 2012; KIRCHHERR; CHARLLES, 2016). On the other hand, since these social phenomena are complex, their dimensions, intensities and temporalities require constant monitoring, as well as the development of methodologies capable of integrating macro and micro socioeconomic levels (e.g., take into consideration the variables related to degree of equality and to its local specificities).

The report of the *World Commission on Dams* (WCD) from 2000 was a milestone that put the impacts caused by HPPs in the mainstream. It addressed how these ventures are planned and implemented, as well as how social impacts are addressed in EIAs/RIMAs (environmental impact assessment studies/environmental impact reports) (WCD, 2000). In recent past, social impacts were not even seen as relevant in these studies; consequently, they did not require fair reparation measures (KIRCHHERR; CHARLLES, 2016).

Hydroelectric projects need to associate the interests of the state, entrepreneurs and affected populations. The reversed premise undermines the sustainable development, food sovereignty, culture and livelihoods of the affected ones (CERNEA, 1997; LEKWOT et al., 2016).

The HPPs have considerably affected the regulation of aquatic ecosystems in the Amazon, since they affect its fauna, mainly fish (ALHO; REIS; AQUINO, 2015; SILVANO; JURAS; BEGOSSI, 2009). On the other hand, the region is the core of HPP's expansion in Brazil. Thirty (30) new HPPs were launched in the country since 2011, and

the Amazon region holds 18 of them. Special focus shines light on the complex comprising the Madeira, Jirau, Santo Antônio (Rondônia State) and Belo Monte rivers (Pará State) (MORETTO et al., 2012; FEARNSIDE, 2015), which can affect thousands of fishermen.

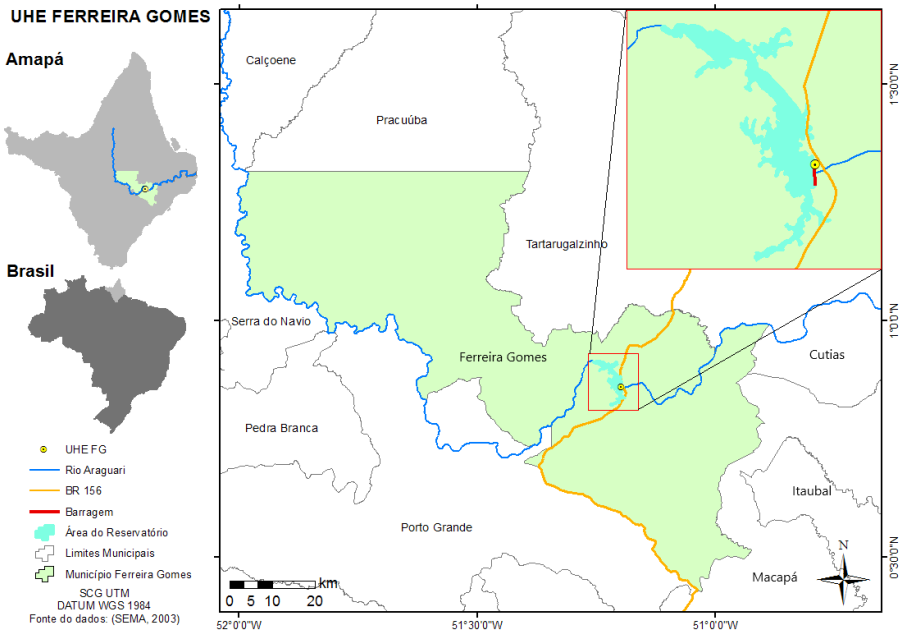
The aim of the current study was to assess the socioeconomic impacts mostly influencing the lifestyle of fishermen living in Ferreira Gomes County - Amapá State, before and after Ferreira Gomes HPP (UHEFG) reservoir was filled. This power plant has the capacity to generate 252 MW and holds 17.7 km^2 of flooded area (ECOTUMUCUMAQUE, 2009). Two hypotheses were herein taken into consideration: a) the UHEFG impacts represented significant changes in fishermen's lives because it affected their income and well-being; and (b) impact-repair measures have been underestimated and are insufficient to restore fishermen's socioeconomic conditions.

Material and methods

Study Site

The UHEFG is located in Ferreira Gomes County (Figure 1), central region of Amapá State (Brazil), Northeastern Amazon. Its main geographic boundaries comprise Pracuúba and Tartarugalzinho counties, to the North; Cutias and Macapá counties, to the East; and Porto Grande County, to the Southwest.

FIGURE 1. LOCATION OF FERREIRA GOMES HYDROELECTRIC POWER PLANT (UHEFG) -AP.



Source: SEMA, 2003.

The territorial area in Ferreira Gomes County covers 4,973.85 km^2; the county has 7,087 inhabitants, and population density 1.29 inhabitants/km^2. Its GDP per capita at nominal values in 2014 was US$ 9,104.98, whereas the Human Development Index (HDI 2010) in 2010 was 0.656 (IBGE, 2017).

Data collection and analysis methodology

The current research was carried out in 2014 and 2015 and was based on the application of forms filled by 48 fishermen living in the Z-7 colony ($n_{1\ (before)} = n_{2\ (after)} =$ 48 samples). The forms contained open and closed questions covering socioeconomic, infrastructural and environmental aspects.

The following questions were asked to the fishermen:

a) What was/is the monthly income derived from the sales of fish before and after the UHEFG reservoir was filled? The income was measured in Minimum Wage (MW) - US$ 232.05. The conversion to US$ was based on the dollar price (R$ 3.12 - monthly average) in June 2015, according to the US Treasury Department;

b) How many boat trips per month did/do you do before and after the UHEFG reservoir was filled? The number of trips/month was added;

c) What were/are the fish commercialization issues before and after the UHEFG was built? The options were: 1. road; 2. transportation; 3. price; 4. product loss; 5. electric power; 6. storage; 7. people who did not want to buy; 8. no problem;

d) Was it difficult to fish before the UHFG was built? What about after it was built? If so, what are the difficulties? The options were: 0. no; and 1. yes;

e) How do you classify the environmental conditions of the Araguari River before and after the UHEFG was built? The options were: 0. terrible; 1. Bad; 2. regular; 3. good; 4. very good; 5. excellent;

f) What benefits did the UHEFG bring to fishermen living in Ferreira Gomes County before and after it was built? The options were: 0. job generation; 1. economy; 2. leisure; 3. tourism; 4. did not bring benefits; 5. other;

g) What were the main socioeconomic and environmental impacts caused by UHEFG before it was built? What about after it was built? The options were: 0. increased deforestation, 1. declined fish sales, 2. increased violence and drugs.

The EIA, issued licenses and basic environmental projects linked to the HPP that supported the data analysis process were herein analyzed. All the information provided by the aforementioned documents was also considered relevant in similar studies (CERNEA, 1997; WCD, 2000; VAINER, 2003; ZOURI; OLIVEIRA, 2007).

The sampling methodology applied to form application followed the randomization criterion, whose goal is to discriminate elements through sequential evaluations. The sample size was estimated through equations 1-5 to assure the significance level of the survey, as well as the use of reliable and representative information (GIL, 2002).

$$(1) \quad U = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1;$$

$$(2) \quad \mu_U = \frac{n_1 n_2}{2};$$

$$(3) \quad \sigma_U = \sqrt{\frac{(n_1)(n_2)(n_1+n_2+1)}{12}};$$

$$(4) \quad z = \frac{U - \mu_U}{\sigma_U};$$

$$(5) \quad p(value) = 2 \times [1 - \phi(z)]$$

Wherein:
n_1 = size of the first sample (before damming); n_2 = size of the second sample (after damming); R_1 = sum of the stations of the first sample; μ_U = mean; σ_U = standard deviation; $\Phi(z)$ = Z function; p(value) = bilateral value.

The socioeconomic and environmental conditions lived by the fishermen "before" the UHEFG reservoir was filled were analyzed in the present study according to answers in the forms (from 2010 on). The period "before" the reservoir was filled comprised the settlement of workers hired by the company "Ferreira Gomes Energia" in Ferreira Gomes County, the number of people who moved to the county in pursuit of job positions, the possible changes in the local socioeconomic dynamics, as well as the construction of the UHEFG. The time "after" the reservoir was filled (between 2014 and 2015) refers to the period comprising the HPP construction completion.

Data analysis

The Mann-Whitney test (non-normal distribution of variables) was applied to assess the temporal significance of the analyzed variables (before and after the reservoir was filled) in the BioEstat 5.0 software (AYRES et al., 2005).

The effectiveness of the recovery measures was analyzed through the comparative evaluation applied to the impacts anticipated before the Preliminary License was issued (CERNEA, 1997; WCD, 2000; VAINER, 2003; ZUCARELLI, 2006; QUEIROZ, 2011). Thus, the goal was to assess whether the conditions of the issued licenses were fulfilled and sufficient to restore and/or to improve the living conditions of the affected fishermen, according to their point of view.

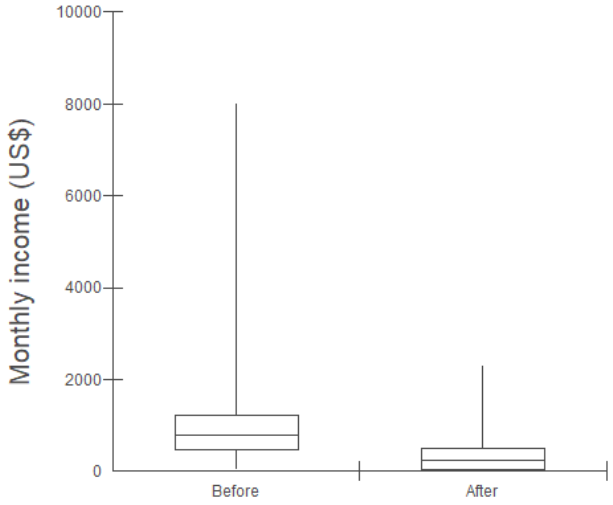
Results and discussion

Monthly income

The HPP implementation resulted in sharp decrease in the income of the local fishermen. The mean monthly per capita income was US$ 464.10 before the HPP was built; however, this value decrease to US$ 268.30 after its implementation (42.18% income reduction).

The mean income of fishermen earning between 2 and 3 MWs decreased by approximately 77.27%. The number of fishermen who earned up to 1 MW increased by 86.95%. Fishermen who earned 4 and above 10 MWs ended up earning 2 to 3 MWs (Figure 2).

FIGURE 2 MONTHLY INCOME (US$) IN MW EARNED THROUGH FISH TRADING BEFORE AND AFTER THE UHEFG WAS BUILT.



Source: Authors

These periods ("before" and "after") presented significant variation, which resulted in the following parameters: p-value (unilateral) = 0.001; and p-value (bilateral) = 0.001 (AYRES et al., 2005).

Similar economic losses were also recorded after the HPP located in Lajeado County (Tocantins State) was built; 53% of the interviewed fishermen reported monthly income up to 2 MWs, 40% presented monthly income up to 1 MW, and 7% earned up to 3 MWs/month (FOSCHIERA; PEREIRA, 2014).

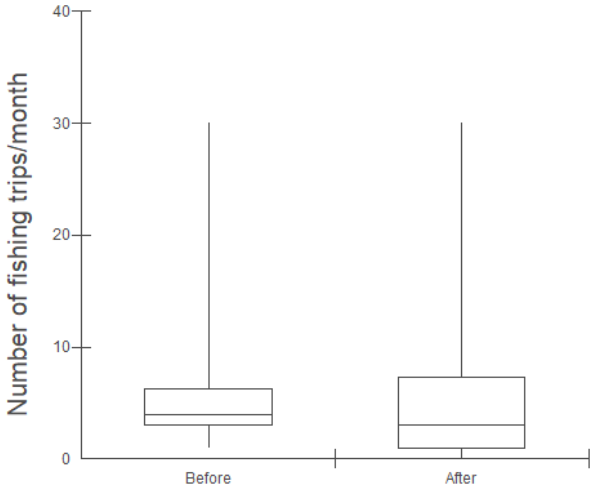
A similar study reported 75% reduction in the income of local fishermen, as well as in the quality and quantity of captured fish, after the Kainji HPP (Nigeria) was built (ADENIYI, 1970). However, opposing situations may take place; for example, the number of fishermen and their incomes gradually increased after the Diama HPP (Mauritania) was

built - from 1992 to 1999 (DUVAIL; HAMERLYNCK, 2003). Key points concerning the increase or decrease in the post-HPP fishermen's income lie on the broad social participation in the HPP construction plan and on its long-term strategic management, which helped controlling variables such as the flood flow in the reservoir, fishing sites and the amount of captured fish, in order to favor the multiple use of water and fishing resources.

Number of fishing trips

Before the HPP was built, 67% of the fishermen made 1 to 5 fishing trips per month; however, this number reduced to 63% after it was built (4% decrease). On the other hand, 15% of the fishermen made 6 to 10 trips/month before the HPP was built; however, this number increased to 21% after it was built (6% variation). It happened due to the need of keeping the amount of fish equivalent or close to what they used to fish, although with greater logistical effort and increased number of trips (Figure 3).

FIGURE 3 NUMBER OF FISHING TRIPS PER MONTH BEFORE AND AFTER THE UHEFG WAS BUILT.



Source: Authors

The increased number of trips resulted in higher costs with fuel, ice and food (≈ 10.35%). These items are essential to the viability of the herein investigated economic activity, mainly fuel, as it was reported by 70% of the fishermen. In addition, there were proportional losses in the amount of captured fish (reduced fishing efficiency), probably due to the environmental impacts on the ecosystems in that watershed section.

The variation in the number of trips per month was significant ($p < 0.05$) and resulted in the following parameters: p-value (unilateral) = 0.0057 and p-value (bilateral) = 0.0115 (AYRES et al. 2005).

Similar to the fishing dynamics response recorded in the Araguari River, the literature shows that fishing is one of the economic activities most often negatively influenced by the HPP constructions around the world (FENILLI, 2002; BERMANN, 2007; AGOSTINHO; PELICICE; GOMES, 2008; BHAT et al., 2012; SHAKIR et al., 2014). Changes in the physicochemical and biological conditions of the river and of its ichthyofauna, restrictions and difficulties in fishermen adaptation, changes in the usual fishing location from upstream to downstream due to the power plant, and changes in the monthly frequency of fishing, among others, stand out among the main factors causing such impacts.

Studies about impacts caused by Shiroro (Nigeria), Tucuruí (Brazil) and North Carolina (USA) HPPs showed that the fishing activity was, in fact, strongly affected. One of the most commonly mentioned problems concerns fishing prohibition at several productive sites, fact that led to reduced amount of captured fish (by approximately 82%) in two years (ODINETZ-COLLART, 1987; FEARNSIDE, 2001; RICHTER; THOMAS, 2007; RICHTER et al., 2010; ABDULLATEEF; IFABIYI, 2012).

Fish trading

Fifty-eight percent (58%) of the fishermen reported to have no difficulty or obstacle to trade fish before the HPP was built, whereas 42% reported that such difficulty or obstacles were real. In addition, 21% of the fishermen reported to have no problem in selling fish after the HPP was built, whereas 79% said that this problem always existed. This hard time selling fish mainly emerged when consumers started rejecting the local fish due to frequent fish mortality rates reported upstream and downstream the UHEFG in 2014. It is relevant to observe that such fish mortality suggested possible water contamination after the reservoir was filled and started operating.

The variable "trading issues" presented the following results: p-value (unilateral) = 0.0279 and p-value (bilateral) = 0.0558 (AYRES et al., 2005). Thus, the impact caused by the construction of Ferreira Gomes HPP can be considered significant, although the aforementioned variable is statistically at the limit of significance ($p = 0.0558$).

Thus, fishermen reported the following issues resulting from consumers' elusive behavior towards the "quality" of the local fish: depreciation of fish prices, precarious availability of electricity for fish conservation purposes, and lack of ice factory and of a pier for the boats.

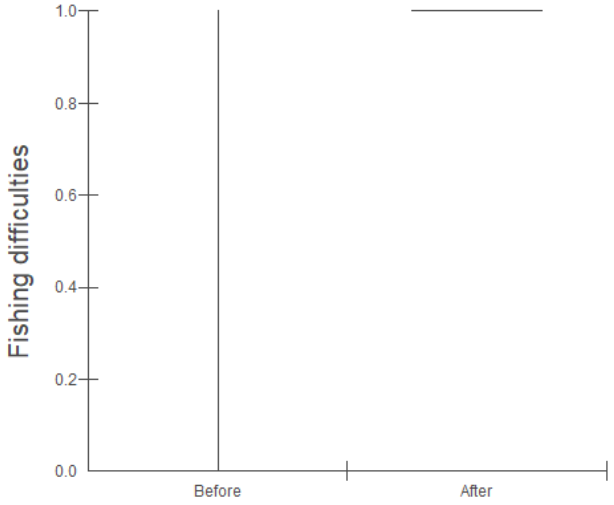
In addition, the non-counterpart of the HPP construction company (for example: a fish market) may have contributed to the economic losses. Assumingly, fishermen were not able to sell their product, which had to be eaten by them, donated or thrown away due to such dynamics and to the inadequate economic infrastructure for fishing. One of the main economic barriers lied on the use of precarious thermal vats; fish conditioning often showed little thermal efficiency for conservation purposes, since the product is highly perishable, mainly if one takes into consideration the elevated temperatures imposed by the local climate. In fact, the "excessively" prolonged travel time needed after the damming process was concluded also required longer storage, although the critical and precarious

conditions remained the same. Besides the increased expenses, fishermen did not have economic security (the local market was frightened by the possible product "poisoning").

Fishing difficulties

Eighty-one percent (81%) of the fishermen reported to have no difficulty fishing before the HPP was built; however, 100% of them reported to have a hard time doing so after it was built. According to 27% of the fishermen, the post-damming difficulties lied on the "dirty water" of the Araguari River, whereas 20.8% blamed the emergence of dead fish, and 16.7% referred to consumers' refusal to buy the fish (Figure 4). These economic and social barriers made the production outflow *in loco* difficult.

FIGURE 4 DIFFICULTY FISHING BEFORE AND AFTER UHEFG CONSTRUCTION.



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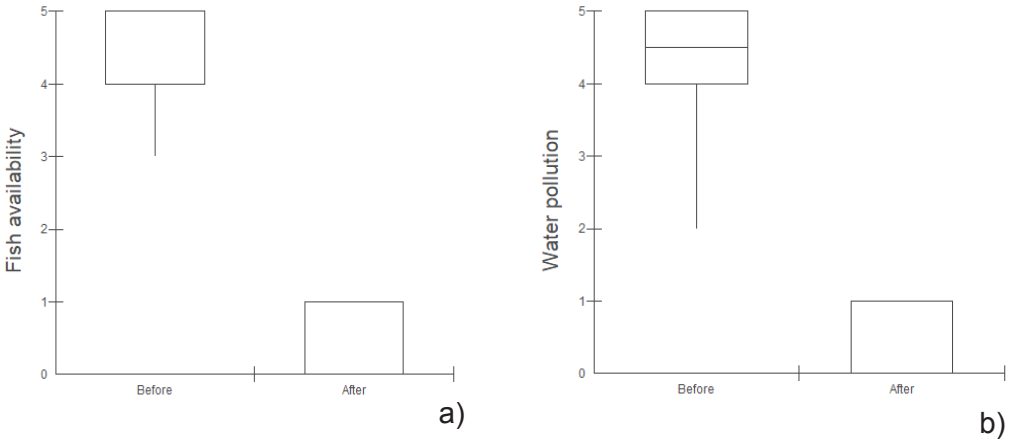
The parameters analyzed between the two periods for the variable "difficulty fishing", showed the following results: p-value (unilateral) = 0.0001 and p-value (bilateral) = 0.0001 (AYRES et al. 2005).

These results corroborate the studies by Richter et al. (2010) and Zemba, Adebayo and Ba (2016), who stated that HPPs mainly tend to affect the subsistence and maintenance of populations, such as fishermen, who depend on natural resources. It happens because hydroelectric ventures prioritize energy generation, agriculture, and flood control, to the detriment of other multiple water uses such as fishing. On the other hand, Zhang (1999) stated that, paradoxically, the construction of HPPs in China is positively related to farmers' food security, to tourism and to recreation.

Environmental conditions

The analysis applied to the environmental conditions in Araguari River showed that 92% of the fishermen considered fish availability "excellent" or "very good" before the construction of the HPP, whereas 100% considered it "terrible" or "bad" after it was built. In addition, 50% of the fishermen considered the quality of the water in the river "excellent" and 27% considered it "very good" before the construction of the HPP. However, 65% of them considered the quality of the water "terrible" and 35% considered it "bad" after the HPP was built (Figure 5).

FIGURE 5 ENVIRONMENTAL CONDITIONS IN ARAGUARI RIVER BEFORE AND AFTER UHEFG CONSTRUCTION (A) FISH AVAILABILITY AND B) WATER POLLUTION.



Source: Authors

There was significant variation in variable "environmental conditions" ($p < 0.05$), which presented the following values: p-value (unilateral) = 0.0001 and p-value (bilateral) = 0.0001 (AYRES et al., 2005).

The construction of the HPP had significant impact on the perception about water pollution and fish availability in the Araguari River.

Data collected in the current research meet those recorded by Silva (2015), who observed that the UHEFG reservoir filling process changed key parameters in the water of the Araguari River, such as hydraulic (speed, depth, hydrodynamics) and limnological (nutrients, in-suspension material and microorganisms - algae, total and fecal coliforms) features. All these changes in the physical environment may have effectively influenced fish mortality, quantity and quality.

These problems were uncommon or punctual, as well as did not affect most fishermen before the construction of the HPP. However, all the herein interviewed fishermen (100%) believe that the river was affected by the HPP construction.

The main issue concerning the impacts of HPPs on fishermen communities lies on their extensive and permanent effects; they not only affect the reservoir area, but also change the quality of the water and decrease its normal flow, mainly in rivers fractionated by several dams, such as the Paraná (Paraná State) and Araguari rivers (Amapá State) (AGOSTINHO; PELICICE; GOMES, 2008; SILVA, 2014).

If one takes into consideration the impacts of two sequential HPPs in Southeastern India, it is possible saying that the construction of both HPPs led to 50% reduction in the total fish taxa in the Sharavathi estuary. It happened due to decreased salinity level in the estuary, since the freshwater inflow was changed by the HPPs' waterflow control, which unbalanced the local ecosystem (BHAT et al., 2012).

The intensity and the continuity of post-damming impacts caused by HPPS on watersheds vary and depend on biotic and abiotic factors, which present different interaction levels. Thus, it corroborates the fact that the construction of HPPs requires better systemic and strategic planning quality. In addition, such planning cannot be dissociated or fragmented at individual levels for each variable involved in the licensing process (CERNEA, 2004; CHEN et al., 2011). However, there seems to be a "new world order" in energy planning, mainly because large HPPs have increasing centrality on and power over the way water and land will be used (PAHL-WOSTL et al., 2013).

Benefits from UHEFG construction

Fifty-four percent (54%) of the fishermen stated that there was no benefit from the HPP construction, whereas 42% said the HPPs generated jobs just before the construction process started. On the other hand, 85% said the HPP did not generate permanent benefits after it was built. On the contrary, the fishing sector ended up in crisis, according to indicators previously analyzed in the current study.

There was significant variation in variable "benefits" ($p < 0.05$), which resulted in the following values: p-value (unilateral) = 0.0012 and p-value (bilateral) = 0.0023 (AYRES et al., 2005). The impact caused by the HPP construction led to significant reduction in the benefits provided to the fishermen.

The current results meet those recorded in similar international, national and regional studies that addressed the relation between HPP constructions and poor populations that depend on water resources. Undoubtedly, fishermen were the most affected ones, since the resulting environmental changes mainly affected the source of aquatic ecosystems and increased food security (CERNEA, 1997; RICHTER et al., 2010). Therefore, prioritizing the subsistence of local populations may be a solid argument to help removing HPPs, mainly those presenting high environmental risk (LEJON; RENÖFÄLT; NILSSON, 2009; JORGENSEN; RENÖFÄLT, 2012).

Main socioeconomic impacts

There have been significant changes in the lifestyle of fishermen. Increased violence and drug use in the region before the construction of the HPP were the main impacts

pointed out by 46% of the fishermen. On the other hand, 38% of the respondents reported decreased fish sales and deforestation as the main impacts observed after it was built.

The variable "impacts" presented significant variation and resulted in the following values: p-value (unilateral) = 0.0047 and p-value (bilateral) = 0.0095 (AYRES et al., 2005). The UHEFG construction had significant impacts on the social and economic life of fishermen and on their families.

Results in the present study corroborate many other cases recorded in the literature, which describe the explicit and inseparable features of HPPs as the trigger of severe socioeconomic, environmental, cultural, individual and collective impacts; among them: family disruption; decreased arable lands; increased violence; difficult subsistence and food security; changes in the aquatic ecosystem; overload in local public services, mainly in sanitation and health services (due to the proximity of the UHEFG reservoir to Ferreira Gomes County), among others (CERNEA, 1997; BRISMAR, 2004; KUDLAVICZ, 2005; WYRICK et al., 2009; ABDULLATEEF; IFABIYI, 2012; CAVALCANTE; SANTOS, 2012; CHANDY et al., 2012; RICHTER et al., 2010; TAJZIEHCHI et al., 2013; FEARNSIDE, 2015).

According to 98% of the interviewed fishermen, the UHEFG construction company did not comply with most or with all the mitigating, compensatory or reparatory measures proposed in the EIA. In addition, they complained about their incipient participation in the decision-making process, mainly in the environmental licensing stage. According to Cernea (1997), the social participation must happen since the HPP planning and implementation stages. This is the only way to allow collectively discussing and mitigating the consequences derived from these ventures.

Conclusion

The present study confirmed the hypothesis that UHEFG had significant socioeconomic and environmental impacts on fishermen living in Ferreira Gomes County. These impacts resulted in serious issues such as increased social vulnerability in the fishing process as sustainable economic activity, because there was no counterpart and/or monitoring by the State and by the construction company in face of the new challenges. Consequently, there was a severe and forced socioeconomic adjustment, which was translated in drastic monthly income decrease, in fishery production cost increase, as well as in fish sale losses, since fish were often related to potentially contaminated environments resulting from changes in the characteristics of the water in Araguari River. Fish mortality became a common phenomenon, even after the end of the current research; thus, there was also decreased amount of fish per trip and changes in places showing abundant fish.

The UHEFG environmental licensing process presented several similarities to national and international cases. It indicates that the corrective measures taken by UHEFG socioenvironmental programs and applied to fishermen were underestimated and unable to change the paradigm, and that it would be possible reestablishing the socioeconomic conditions lived before the HPP construction.

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HYDROELECTRIC POWER PLANT IN THE AMAZON AND SOCIOECONOMIC IMPACTS ON FISHERMEN IN FERREIRA GOMES COUNTY — AMAPÁ STATE

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Abstract: Socioeconomic impacts of the construction of the Ferreira Gomes Hydroelectric Power Plant (UHEFG) were analyzed in communities of fishermen affected before and after the filling of the reservoir. The study occurred between 2014 and 2015, in the municipality of Ferreira Gomes-AP. Data were collected using forms ($N_{sample}=48$) and a comparative analysis was performed to evaluate their significance (Mann-Whitney, $p<0.05$). The results showed that the Environmental Impact Assessment (EIA) did not adequately predict impacts in the fisheries sector. The comparative tests confirmed a) six variables with significant variation ($p<0.05$): monthly income, number of trips to fish, fishing difficulties, environmental conditions of the Araguari River, socioeconomic and environmental impacts; and b) a variable at the limit of significance ($p\approx0,056$): fish trade. We concluded that the reparatory measures did not reestablish the socioenvironmental conditions, generating conflicts not foreseen.

Keywords: UHEs, socioenvironmental impacts, fishermen, Amazon.

Resumo: Impactos socioeconômicos da construção da Usina Hidrelétrica Ferreira Gomes (UHEFG) foram analisados em comunidades de pescadores atingidas antes e após o enchimento do reservatório. O estudo ocorreu entre 2014 e 2015, no município de Ferreira Gomes-AP. Dados foram coletados mediante aplicação de formulários ($N_{amostral}=48$) e uma análise comparativa foi feita para avaliar sua significância (Mann-Whitney, $p<0,05$). Os resultados mostraram que o Estudo de Impacto Ambiental (EIA) não previu adequadamente os impactos no setor da pesca. Os testes comparativos confirmaram a) seis variáveis com variação significativa ($p<0,05$): renda mensal, número de viagens para pescar, dificuldades para pescar, condições ambientais do Rio Araguari, benefícios e impactos socioeconômicos e ambientais; e b) uma variável no limite da significância ($p\approx0,056$): comércio do pescado.

Concluímos que as medidas reparatórias não restabeleceram as condições socioambientais, gerando conflitos não previstos.

Palavras-chave: UHEs, impactos socioambientais, pescadores, Amazônia.

Resumen: Impactos socioeconómicos de la construcción de la Hidroeléctrica Ferreira Gomes (HFG) fueron analizados en las comunidades de pescadores afectadas antes y después del llenado del embalse. El estudio ocurrió entre 2014 y 2015, en el Municipio Ferreira Gomes-AP. Los datos fueron colectados por medio de la aplicación de formularios ($N_{amostral}=48$) y análisis comparativo fue realizado para la validación de la significancia (Mann-Whitney, $p<0,05$). Los resultados arrojan que el Estudio de Impacto Ambiental (EIA) no predice adecuadamente los impactos en el sector de la pesca. Las pruebas comparativas confirmaron: a) seis variables con variación significativa ($p<0,05$): ingreso mensual, número de viajes realizados para pescar, dificultades presentadas para pescar, condiciones ambientales del Río Araguari, benefícios, impactos socioeconómicos y ambientales; y b) Una variable en el límite de la significancia ($p\approx0,056$): comercio del pescado. Concluimos que las medidas reparadoras no restablecerán las condiciones socioambientales, generando conflictos no previstos.

Palabras clave: impactos socioambientales, pescadores, Amazonia.