

CHALLENGES OF THE ENVIRONMENTAL LICENSING OF  
HYDROELECTRIC PLANTS IN BRAZIL: THE CASE OF THE ITAPEBI PLANT<sup>1</sup>

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## Abstract

Environmental licensing is an instrument of the Brazilian Environmental National Policy that enables the State to match socioeconomic development with environmental quality preservation and ecological balance. In Brazil, the literature indicates that, in several cases, there were failures in the environmental licensing of hydropower dams causing unforeseen negative impacts and unsatisfactorily mitigated impacts. The aim of this research was to discuss the reasons why certain environmental impacts in the socioeconomic arising of hydropower dams are not predicted in the environmental licensing process. The licensing process of the Itapebi hydropower dam (1999-2002) was selected as case study. This process was characterized by conflicts among the enterprising and the population of one of the affected municipalities (Salto da Divisa, State of Minas Gerais) and suffered intervention of the Brazilian Prosecution Service. The research was realized through the analysis of public documents related to the licensing process and interviews with representatives of the social groups affected by the project and local policymakers. The results demonstrate that failures in the environmental licensing were consequence of errors in the Environmental Impact Assessment, failures in the diagnostic of socioeconomic and natural environment, failures in the conception and execution of the mitigation plans, and failures in the concession of licenses. Similarities were observed with other negative experiences reported in the World Commission Dams and the Brazilian Prosecution Service. The conclusion is that improving of environmental licensing is necessary because its execution has not been assured the reach of rights constitutionally established.

**Key words;** Public policies; Environmental Licensing; Hydropower dam; Environmental Protection.

## 1 - Introduction

During the course of the 20th century, a range of economic activities have caused negative externalities on society, the State and productive sectors because of environmental impacts resulting from the use of natural resources or the emission of pollutants. Environmental Impact Studies<sup>3</sup> (EIS) and environmental impact assessments are two examples of public policies that have been implemented in a number of countries to monitor the installation and operation of economic activities that are potentially harmful to the environment.

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<sup>3</sup> The Environmental Impact Study is done in the beginning of the Environment Licensing process in Brazil. Its objective is to describe the project, the environment and socioeconomic aspects of the affected area and to predict environmental impacts.

According to the World Commission on Dams - WCD (2000) - on the one hand, dams make an important contribution to development, on the other hand, they have also resulted in significant negative consequences, in social and environmental terms, as in general, efforts to mitigate them have been unsatisfactory.

The Brazilian Prosecution Service - MPF (2004) and the World Bank (Banco Mundial, 2008) demonstrated failures in environmental impact studies and pointed out that the licensing process for hydroelectric plants had negative consequences. The results of these failures were unexpected environmental impacts and unsatisfactory mitigation measures, which consequently caused negative externalities to the population and regions in question, to productive sectors and to municipal and state governments.

Gavião (2006) shows failures in the licensing of the hydroelectric plant Itapebi (UHE Itapebi)<sup>4</sup> that are similar to the ones that were pointed out by the Brazilian Prosecution Service (MPF, 2004) and the World Bank (Banco Mundial, 2008) and by various other case studies (Almeida, 2007; Prochnom *et al*, 2005; Silva Junior, 2005; Manyari, 2007; Kolln, 2008; Zitzke, 2003).

## 1.1 - Objective

The general objective of this study is to discuss the reasons why certain environmental impacts on the socio-economic environment of hydroelectric enterprises are not predicted in the licensing process. The Itapebi Hydroelectric Plant (UHE Itapebi) (the licensing process occurred between 1997 and 2002) was chosen as case study. Its licensing process was marked by conflicts

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<sup>4</sup> UHE means hydroelectric plant.

between parts of the population in the city of Salto da Divisa and the enterprising.

The specific objectives are:

- 1) To determine and analyze the environmental impacts on the socio-economic environment in the municipalities of the area that was directly affected by UHE Itapebi that had not been foreseen by the EIS or throughout the licensing process.
- 2) To analyze the effectiveness of the mitigation and compensatory measures implemented by the enterprising in regards to the damages suffered by the different affected social groups.

## 1.2 - Description of the case study

The environmental licensing of the UHE Itapebi took place between 1997 and 2002 and was marked by conflicts between the enterprising and parts of the population of the city of Salto da Divisa in the state Minas Gerais due to failures in the EIS. After preparation of the EIS, and the start of the licensing process, it was discovered that the area that was supposed to be flooded was larger than originally expected. As a result, the waterfall Tombo da Fumaça, the main tourist attraction and leisure destination for the residents of Salto da Divisa, would be flooded.

Furthermore, during a public hearing<sup>5</sup> realized in the municipality of Salto da Divisa, to present the Environmental Impact Report (EIR), local residents discovered that the document had neglected the existence of social groups that worked in economic activities associated with the Jequitinhonha

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<sup>5</sup> In Brazil, public audiences are realized to present the Environmental Impact Report to the population of the affected area. This document, is a summary of the Environmental Impact Study (EIS).

River. In the light of these failures, parts of the local population organized themselves and pressured the Chamber of Councilors to prevent the implementation of the project.

The strategy of the municipal government to prevent the implementation of the project was to create a Protected Area<sup>6</sup>. This took place in 1998 and the strategy was used again by the government of the State of Minas Gerais in 1999. In that same year, the Tombo da Fumaça waterfall was officially recognized as a historic heritage site of the state of Minas Gerais. These three actions of public authorities involved laws that blocked the construction of the plant.

According to Gavião (2006), from an institutional point of view, the conflict involved the participation of thirteen entities: two municipal, three state and eight federal entities. The solution was found in the participation of the Federal Public Prosecutor and the signing of the Term of Adjustment of Conduct<sup>7</sup> (TAC) that determined the social groups affected and the respective indemnities.

### 1.3 - Description of the study area and the UHE Itapebi

The UHE Itapebi has the capacity to generate 450 megawatts and is located in the valley of the Jequitinhonha River<sup>8</sup>. The study was carried out in the municipalities that were defined by the EIS as an Area of Direct Influence (ADI) of the UHE Itapebi.

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<sup>6</sup> It was created an Environmental Protection Area which is one of the categories of the Brazilian protected areas system. 9985/2000 Act.

<sup>7</sup> The Term of Adjustment of Conduct (TAC) is a document produced by the Brazilian Prosecution Service and other public bodies. The TAC determines to the enterprise, actions and changes in the project, to face negative impacts. This document is usually produced in cases which the enterprise has environmental passives or public bodies points out changes in the enterprise that must be done according to guidelines of environmental laws and policies.

<sup>8</sup> One of the most poorest regions in Brazil.

Chart 1 - Socio-economic profile of the municipalities of the ADI of the UHE Itapebi. By the author. Source: IBGE (Brazilian Institute of Geography and Statistics)

Municipality	Population in 2000	Urbanization rate in 2000	Population variation 1991-2000	Poverty rate 2003	HDI in 2000
Itapebi	11,126	77%	0.43%	67%	0.636
Itagimirim	7,728	77%	-2%	58%	0.633
Salto da Divisa	6,779	82%	-13%	60%	0.642

## 2 - Data collection and analysis

Public documents (produced by IBAMA<sup>9</sup> and the Brazilian Prosecution Service) on the licensing of UHE Itapebi were analyzed and interviews were conducted with public officers of municipalities in the study area and representatives of the impacted social groups.

The documents are the EIS (Engevix,1995) , the EIR (Engevix, 1997a), the Supplementary Report to the EIS (Engevix, 1997b), the Preliminary License (LP) (IBAMA, 1997), the Installation License (IL) (IBAMA,1999), the Operational License (OL)<sup>10</sup> (IBAMA, 2002), the Basic Environmental Projects<sup>11</sup> (BEP) (Engevix,1999a; Engevix,1999b; Engevix,1999c) the Term of Adjustment of Conduct (TAC) (MPEMG,2002) and its additives.

The analysis of EIS and EIR permitted the identification of the environmental impacts and social groups that would be affected according to the initial studies. To identify the impacts that were not foreseen by the EIS, the public documents produced in the following phases of the licensing were analyzed. These documents are the Preliminary, Installation and Operational

<sup>9</sup> IBAMA - Brazilian Institute of the Environment and Natural Renewable Resources. A government body (federal) responsible by environmental licensing of projects that affect more than one state.

<sup>10</sup> In Brazil, the federal environmental licensing process has three phases. In each phase, a license is granted by the IBAMA and determines the actions that the enterprise has to do to obtain the next license.

<sup>11</sup> This document shows the mitigation measures proposed by the enterprise to face the negative impacts foreseen by EIS or other studies done in the licensing process. In the case of UHE Itapebi the BEP was done according to determinations of IBAMA that imposed to the enterprise, to do the diagnosis of the social groups used to work in activities related to the natural resources of the Jequitinhonha river.

Licenses and the Basic Environmental Projects. With these, were identified, the social groups that were included in the licensing process, after the interference of the Environment Foundation of Minas Gerais State<sup>12</sup> (FEAM, in Portuguese) and the Movimento dos Atingidos por Barragens (MAB, Movement of People Affected by Dams)<sup>13</sup>.

The analysis of the TAC showed the decisions by the Brazilian Prosecution Service on the conflict, the mitigating measures that the enterprising would have to undertake, it ratified the inclusion of social groups that the EIS had neglected and demonstrated the development of the licensing process of the UHE Itapebi.

To identify the unforeseen impacts of the licensing process as a whole, and to analyze the effectiveness of the mitigating measures and compensatory measures that were implemented by the enterprising, those documents that were produced by IBAMA at the end of the licensing process and at the start of the commercial operation, were analyzed. These documents are the Survey Report (SR)<sup>14</sup> (IBAMA, 2005a; 2005b), Expert Opinion<sup>15</sup> (EO) (IBAMA, 2006a), Public Records (PR) and Compliance Reports of the Term of Adjustment of Conduct (CRTAC).

The interviews with municipal public officers and representatives of the affected social groups were conducted during two field trips. The first one was in 2009, to inspect the site, establish contact with the leaders from the affected social groups and municipal public officers, test the questionnaire and identify

<sup>12</sup> A government body.

<sup>13</sup> Social Movement created in the end 1970 to face social and environmental impacts related to dams. Is the main organization in Brazil related to this issue and its presence in Salto da Divisa was fundamental to organize sectors of civil society and to Brazilian Prosecution Service intervene in the licensing process.

<sup>14</sup> Relatório de Vistoria in Portuguese. Document available for public consult.

<sup>15</sup> Parecer Técnico in Portuguese. Document available for public consult.

new questions based on the interviews. During the second trip, in 2010, all questionnaires were applied.

Quantitative and qualitative questions were used. According to Goldenberg (1997, p. 62), "it's the set of different points of view and different ways to collect and analyze the data (in a qualitative and quantitative way) that allows a broader and more intelligible understanding of the complexity of a problem. The prepared questions were based on the analyzed documents and described questions by the proper respondents. The Master dissertation of Gavião (2006), which examined the licensing of the UHE Itapebi, also served as a base for understanding the case and preparing the questions.

### 3 - Results

#### 3.1 Miscalculation in the prediction of the flooded area and the volume of the displaced population

There was a miscalculation in sizing the area that was going to be flooded by the reservoir of the UHE Itapebi. The EIS (Engevix, 1995) determined a flooding of 5,780 hectares (57.8 km<sup>2</sup>), but according to Gavião (2006) 6,248 ha (62.48 km<sup>2</sup>) was flooded, displacing more families than expected. Similar experiences are pointed out by (Almeida, 2007; MPF, 2004; World Bank, 2008; Prochnom *et al*, 2005; IPPUR, 2005; MPF, 2004; Silva Júnior, 2005; CDDPH, 2010).

The EIS (Engevix, 1995) predicted the displacement of 54 families (50 in the urban area and 4 in the rural area) in Salto da Divisa, but according to Gavião (2006) 120 families have been displaced (109 in the urban area and 11 in the rural area), practically twice as many as expected. Regarding the number

of persons resettled in Salto da Divisa, the total, according to Gavião (2006), was 324 persons instead of the prediction of 245 from the EIS.

### 3.2 - Mistakes in the socioeconomic diagnosis

The EIS (Engevix, 1995) made no reference to the social groups of Salto da Divisa who depended on the natural resources of the Jequitinhonha River for their survival, which consequently made it impossible to predict any negative environmental impacts that were observed in the analyzed documents and interviews.

These groups had been included in the licensing process by the FEAM<sup>16</sup>, which required new socioeconomic diagnoses (Engevix, 1997b). Even so, the Brazilian Prosecution Service in the state of Minas Gerais (PRMG, 2010) states that members of these categories were neither acknowledged nor indemnified. Similar cases are presented by IPPUR (2005) in the UHE Cambuci and according to CDDPH (2010), in the UHE Canabrava, more than 800 affected families have not been acknowledged.

In the municipality Salto da Divisa, the directly affected social groups are fishermen, stone and sand extractors, farmers, former farm employees, rural population, washerwomen, masons and residents of the urban area that was flooded. General parts of the population also suffered a loss of quality of life.

The World Commission on Dams (WCD, 2000) the World Bank (Banco Mundial, 2008) the Brazilian Prosecution Service (MPF, 2004) the Attorney General's Office (Cureau, 2009), Manyari (2007) and CDDPH (2010) also pointed out that the socioeconomic diagnostic failures, failures in the

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<sup>16</sup> State Foundation of the Environment.

preparation of the EIS and other environmental studies that were conducted during the licensing process of hydroelectric plants, caused a series of unforeseen negative impacts in several regions affected by hydroelectric power plants.

According to CDDPH (2010), the Prosecution Service (MPF, 2004) and Cureau (2009), a too strict and limited definition of the concept of affected people is a problem that compromises the identification of the damages and of those who would be affected by the planning, implementation and operation of the dams in Brazil. They also pointed out that the non-acknowledgment of the affected social groups is a consequence of recurring failures in the socioeconomic diagnosis performed by EISs and other environmental studies related to dams.

The observation that there were flaws in identifying the people who were affected by the dams resulted in the Ministry of National Integration creating the Operating Manual for Resettlement due to Expropriation Processes for the Construction of Public Reservoirs (MIN, 2006).

According to Morel (2008) the concession of the PL<sup>17</sup> of the UHE Itapebi was given contrary to constitutional prerogatives and specific laws, which require a prior study of all environmental impacts at the initial stage of the environmental license process, and he confirms that the PL was granted on the basis of an EIS that did not reflect the venture that was carried out.

According to the World Bank (Banco Mundial, 2008), the difficulties in the licensing process for hydroelectric plants in Brazil involve insufficient human

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<sup>17</sup> Preliminary License. This license is granted

resources and professionals with training in social sciences in the coordination of the hydroelectric plant in the IBAMA.

The conflict between the enterprising and the population of Salto da Divisa during the licensing process was the first major impact of UHE Itapebi (Gavião, 2006). According to Honorato (2008), conflicts of this nature are one of the characteristics that were observed during the licensing of hydroelectric plants in Brazil. Conflicts in the licensing process of hydroelectric plants were also observed by (World Bank, 2008; Almeida, 2007).

Negative environmental impacts, resulting from hydroelectric plants, are characterized by loss of resources, loss of access to the same, loss of income sources or ways of sustenance and involuntary displacements. These negative impacts were also observed during the phases of installation and operation of the UHE Itapebi. Similar experiences are pointed out by (World Bank, *apud*, CDDPH, 2010; Honorato, 2008; Cureau; 2009; Almeida, 2007). The dependence on natural resources and their importance for economic activities and livelihood around the world is demonstrated in UN studies (TEEB, 2008; SCBD, 2008, 2011).

According to Kolln (2008), all economic ownership of water and environmental resources, for the installation of hydroelectric enterprises, involves a process of expropriation of natural resources and changing the social base of the region where it is installed. According to Manyari (2007), experiences in Brazil have shown that economic dynamism brought about by deploying a hydroelectric enterprise does not necessarily result in social development and this shows similarities with the observed impacts when deploying the UHE Itapebi.

Article 170 of the Federal Constitution establishes that one of the economic order principles is environmental protection, which is not being fulfilled in several cases of hydroelectric plants (Cureau, 2009). According to CDDPH (2010) the prevailing pattern in the deployment of dams in Brazil has often involved human rights violations, the consequences of which ultimately accentuate the already severe social inequalities, translated into situations of poverty and the disruption of social, family and individual structures.

Next are presented and analyzed the unforeseen impacts and the effectiveness of the mitigating measures according to each social group.

### 3.3.1 - Fishermen

Professional fishing in the Jequitinhonha River was affected, according to Gavião (2006), PRMG (2010). Testimonials point to an overall loss in profit, financial losses on certain days and destitution of one's diet because of fish scarcity. These facts have not been proven by documents, there are only testimonials. According to PRMG (2010) and the testimonials, there are fishermen who have not been acknowledged and have not been indemnified.

The EIS of UHE Itapebi (Engevix, 1995) did not carry out an inventory of the ichthyofauna of the Jequitinhonha River and the socio-economic importance of fishing was characterized after the concession of the PL., this represents a flaw in the EIS's preparation. Similarities are shown by IPPUR (2005) in the UHE Cambuci and Barra do Pombal and by Brazilian Prosecution Service (MPF, 2004) in the UHE Estreito. MPF (2004) and the World Bank (Banco Mundial, 2008) state that mistakes in the methodologies that were used in the EISs and insufficient sampling efforts are common in the licensing process of hydroelectric plants in Brazil.

The reduction of fish stock is an unforeseen impact by the licensing process and it is mentioned by technicians from IBAMA in the documents of TAC (MPEMG, 2002), by Gavião (2006), by PRMG (2010) and it was supported by monitoring campaigns, carried out by the contractor to fulfill requirements of Brazilian Prosecution Service. In 2002, after the reservoir had been filled, fish stock was 42 tons (MPEMG 2004) and in 2007, almost 340 kg (Itapebi, 2007).

Silva Junior (2005), Manyari (2007) and CDDPH (2010) mention that in the UHEs Itaparica, Tucuruí and Chapecó, respectively, also saw a loss of fish stock, a collapse of fisheries, a disruption of fishing structures, destitution of fishermen and negative economic impacts in the regions of the ventures. According to WCD (2000), the reduction of fish stock is a commonly observed impact of dams.

According to testimonials, fishing was a reliable food source to which the population of Salto da Divisa had free access to and the high percentage of poor people suggests that there was a great dependence on this food source. According to MDS (2011), the Organic Law on Food and Nutritional Safety determines that adequate nutrition is a basic right of any human being and that public authorities need to ensure this, which did not happen in Salto da Divisa.

The mitigating measures carried out by the entrepreneur consisted of a donation of motor boats and fishing equipment. These measures were ineffective because, according to the testimonials, the profit of the activity dropped in comparison to the past. There was an increase in expenses to go fishing (fuel and maintenance of the boat), which reduces the profit on the days when fishing delivers few kilos. Another problem is the financial damage with the loss of fishing nets that get stuck in the trees that have been submerged.

Faced with a reducing fish stock, the fishermen filed a motion at the Brazilian Prosecution Service office and the 2nd Additive to TAC (MPEMG, 2004) determined a compensation payment for the production loss. The amount of 42,300/kg, available at the time of the filling of the reservoir, was established as a reference point in order to calculate the values to be paid to each of the 42 registered fishermen. Despite the indemnities, testimonials point out that the category suffered economic losses.

### 3.3.2 - Washerwomen

The group of washerwomen has not been acknowledged in the EIS, the Supplementary Report to the EIS, the Licenses, Preliminary and Installation, however it was included in the BEP 8 (Engevix, 1999a), because the GADHH pressured the enterprising. According to PRMG (2010) and testimonials, they are unemployed and have lost clientele, which was an unexpected impact.

The contractor built a public laundry room for the group even though he did not acknowledge the legitimacy of the claims because the category was not included by IBAMA in the licensing process (Gavião, 2006). The laundry room has insufficient capacity for the group and has an inadequate infrastructure according to Survey Report (IBAMA, 2005a).

The BEP 8 (Engevix, 1999a) only acknowledged those washerwomen (six) that had declared that washing clothes was their main activity. This shows a wrong identification methodology, because it excluded dozens of women who complemented the household income with the activity (PRMG 2010).

Currently the group claims indemnities from Prosecution Service while an Expert Opinion (IBAMA, 2006a) did not recommend the compensation

payments and denied the right to compensation for the losses. It was suggested to readjust the laundry room, even with the knowledge that the groups consists of dozens of women. On the other hand, in a Suvey Report (IBAMA, 2006b), IBAMA officials established that the laundry room is abandoned, that there is no adequate infrastructure to execute the activity.

### 3.3.3 - Extractors

The category was not recognized by the EIS and was inserted in the Preliminary License, upon request of the FEAM (State Foundation of the Environment). They are cited in the EIS Supplementary Report (Engevix, 1997b), and under the conditions of the Preliminary License (IBAMA, 1997). The end of operations is an impact that was not anticipated by the licensing and currently, according to testimony, members of the category are unemployed.

Silva Junior (2005) and Manyari (2007) show that in the Itaparica and Tucuruí hydro-electric power plants, there was also a disruption of the mineral extraction economy, because of submergence of mineral resources. According to the MPEMG – Prosecutor of the State of Minas Gerais, (2010) the number of extractors is greater than the amount that was compensated with the signing of the TAC (MPEMG, 2002) and forms another flaw in the licensing of the Itapebi hydro-electric plant.

The mitigating factors imposed by the TAC (Op. Cit) were the legalization of new deposits and donation of the tools necessary for the operation. These measures were ineffective because the deposits were not sold by the owners, making them unviable. The group decided to receive and divide the value of the

tools that were purchased, representing eighty-six minimum salaries according to the values at the time (MPEMG, 2002).

The formation of sandbanks was predicted in the river Jequitinhonha regarding the extraction of sand, (Engevix, 1997b; Engevix 1999) which would allow for the continuation of the operation. According to Gavião (2006) and testimonials, the sandbanks were not formed, which shows just one more error of the environmental studies carried out. Group members were compensated by seventy-five minimum salaries (Itapebi, 2002).

Even with the possession of this capital, the rock and sand extractors were not able to invest in new economic activities that might have maintained employees. The group is characterized by the low education people, and the city of Salto da Divisa is characterized by low economic dynamism, factors that contributed to the unemployment.

### 3.3.4 - Stonemasons

The category was not recognized at any time of the licensing process and has been hampered because, with the end of stone and sand mining, and their raising of prices, the volume of works (renovation and construction) in the city of Salto da Divisa was much reduced. According to the PRMG (2010) and testimonies, the members of the category, one hundred and seventy four in all, are unemployed. Testimonials show that the general population was also affected because it has done less renovation and construction work of new homes.

The claims of the stonemasons are found in the Inspection Reports (IBAMA, 2005a; IBAMA, 2005b). IBAMA points out that, in the licensing period, it recommended the maintenance of mining activity, but that the extractors

chose compensation in cash (IBAMA, 2006a). In 2010 prosecutors held a public hearing in Salto da Divisa, in which representatives of this class were present and claimed damages (PRMG, 2010).

### 3.3.5 - Farmers

The impact not foreseen in the licensing was the worsening in access to farms and increased spending in time and fuel, because of longer distances (up to 100km in some cases) that must be travelled from the city of Salto da Divisa to the farms on the opposite bank of the river Jequitinhonha. Testimonials pointed out greater difficulty in managing the farm. Other segments of the population were also jeopardized because agricultural operations were carried out across the river and it is more difficult to visit friends and relatives.

The BEP 11(Basic Environmental Plan) provided for the establishment of a ferry across the river Jequitinhonha, but this measure was not carried out according to an Expert Opinion (IBAMA, 2006a). The IBAMA also determines that the ferry be donated by the enterprising to the former one in charge of the service.

### 3.3.6 - Employees of farms

According to the statements of public officials and representatives of social groups affected, this group is currently dispersed, and it is not clear who these people are, so it was not possible to obtain results. On the other hand, reports of loss of livelihoods and sources of livelihood and employment were obtained from many of these people.

### 3.4 - Unforeseen impact on the population of Salto da Divisa

#### 3.4.1 - Cracked Houses

According to the PRMG (2010) the problem of the cracked houses was brought out by several residents at a public hearing realized in Salto da Divisa to address the impact of the UHE Itapebi and several respondents mentioned the problem. The 2nd Report of Compliance of the TAC (Itapebi, 2003a) mentions this problem and in a Survey Report (IBAMA, 2005b) it states that the residents demanded repairs. In an Expert Opinion (IBAMA, 2006a) IBAMA confirms the damage in some of the houses.

#### 3.4.2 - Bad smell in the city

Another unforeseen impact is the stench produced by the sewage treatment plant, which is not working according to PRMG (2010). Silva Junior (2005) cites that in the Luis Eduardo Magalhães Hydroelectric Plant, problems were also observed with the quality of material used by the enterprising in work carried out in the city. In the Survey Report (IBAMA, 2005a), IBAMA confirmed the release of untreated sewage into the river Jequitinhonha.

The Supplement Report to the EIS (Engevix, 1997b) points out that there would be a complete basic sanitation of the affected area. In an Expert Opinion (IBAMA, 2006a) IBAMA claims the document that describes the infrastructure that would be done by the enterprising is very confuse and is difficult to solve this problem.

#### 3.4.3 - Displaced Population

In the city of Salto da Divisa about seventy houses were built to resettle families relocated with the filling up of the reservoir. Some respondents

mentioned that the measure was effective, enabling improvements in the housing standard for many families.

The flaws in this measure are outlined in the TAC (MPEMG, 2002) and involve complaints from residents about construction defects in the homes. The 9<sup>th</sup> Compliance Reports of the Term of Adjustment of Conduct (CRTAC) (Itapebi, 2003) and the 10<sup>th</sup> CRTAC (Itapebi, 2004) point out problems in homes, such as cracks in the walls, gutters, structural problems, warped doors and windows and cracked or fallen walls.

The loss of quality of life was noted in interviews as a problem due to the loss of the small farm areas and greater distance from the river. Greater difficulties were reported in maintaining subsistence agricultural activities that were carried out in ancient dwellings. Currently, the displaced spend money on water for irrigation (formerly free) and electric power for the pumps that fill the water tanks of homes.

For many families, the difficulty for farming and raising livestock is a significant problem because part of their subsistence was produced in their own backyards of the older homes. There are reports of impoverishment of some families who used to trade agricultural surpluses. According to Gavião (2006) some people before being relocated were resistant to giving up the areas, mainly due to reduction in their small farms.

### 3.5 - Unforeseen impact on the municipalities of Itapebi and Itagimirim

#### 3.5.1 - Children of construction workers

According to public managers of Itapebi and Itagimirim, dozens of adolescents and adult women became pregnant from workers from the jobs,

causing a significant social impact and overloading the public health service with pregnant women and women in childbirth. Many women were not able to find care, and had to search it out in other cities. According to Honoré (2008) and ASMIP (2010) prostitution and early pregnancy are usually observed with the implementation of hydropower projects in Brazil. According to testimony, many children do not know their father.

In the municipalities of Itapebi and Itagimirim, the burden of public health and education services was predicted by EIA (Engevix, 1995). The measures taken by the entrepreneur were insufficient according to testimony of public managers, and quality of services fell sharply at the time of the dam construction. Similar cases were demonstrated by Zitzke (2003) in the Lajeado power plant and by the CDDPH – Human Rights Defence Council (2010) in the Aimorés power plant. According to Zitzke (2003) during the construction of plants, the needs increase significantly of the communities directly and indirectly affected and of the municipalities surrounding the reservoirs of the hydroelectric plants.

### 3.6 - Impacts on the city of Belmonte (at the mouth of the river Jequitinhonha)

The municipality of Belmonte (BA), located downstream from the dam, makes up a part of the Jequitinhonha river basin but was not included in the licensing of the Itapebi hydroelectric plant contrary to Article 5 of CONAMA<sup>18</sup> Resolution 1/86 which states that the watershed is considered as the unit of analysis for preparation of the EIS. According to the Brazilian Prosecution Service (MPF,2004) this failure is common in EISs of hydroelectric plants. Local

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<sup>18</sup> Environmental National Council.

fishermen claim that fish stocks were reduced after the implementation of the Itapebi power plant and questioned IBAMA at a public hearing on the possible relationship of this impact with the project (IBAMA, 2005b).

The information is contained in a Survey Report, developed after the meeting of IBAMA with representatives of the community of fishermen and the Fisheries Association of Belmonte. Manyari (2007) points out that the impact downstream of dams is often cited in the literature, and according to the World Commission on Dams (WCD, 2000), the loss of nutrients and sediment in rivers contributes to the loss of biodiversity in ecosystems downstream of dams.

In the same Survey Report (IBAMA, 2005b), losses are reported of boats because of waves, formed with the release of water from the dam. According to testimonies, the loss of boats causes losses because of the interruption of fishing and economic losses with repairs of vessels. Finally two deaths due to drowning were cited because of these waves.

#### 4 - Conclusion

Based on the obtained results and consulted literature, one may conclude that certain socio-economic environmental impacts of hydroelectric plants had not been foreseen in the licensing process, due to recurring failures in the elaboration of Environmental Impact Study and other environmental studies conducted during the licensing process. Other issues include the failures of licensing bodies that fail to carry out the determinations of the CONAMA Resolutions 01/86 and 237/97, fail to comply with the goals of the National Environmental Policy (PNMA) and disregard the basic guidelines of the National Water Resources Policy. It was concluded that some rights as

established under the Federal Constitution of 1988 were not ensured for some sectors of society in the municipalities affected by the UHE Itapebi.

Despite the intervention by the Brazilian Prosecution Service in the licensing process of UHE Itapebi, unforeseen impacts on social groups and on the municipalities affected by this endeavor are still observed. These results demonstrate that the Brazilian Prosecution Service also failed to identify the shortcomings of the environmental studies, did not demand compliance with the CONAMA resolutions, did not demand measures to ensure that the goals of the National Environmental Policy were met and failed to notice omissions of guidelines for the National Water Resources Policy. Consequently, the body managed to bring an end to the conflict between the enterprising and the affected social groups, and enabled the concession of the Operating License, but still left several issues unresolved. These issues are now being reviewed by IBAMA and the Brazilian Prosecution Service in the state of Minas Gerais, who reopened the case six years after the Operating License was awarded, upon the request of affected social groups.

The differences between the impacts foreseen by the Environmental Impact Study and other environmental studies, and those impacts observed after concession of the Operating License, led to the conclusion that the continuity in the production of information throughout the licensing process is a key factor in foreseeing socio-economic impacts and developing mitigating measures. Failures observed in the Environmental Impact Study also demonstrate that the Operating License was granted on the basis of information that incorrectly described the enterprising, the physical and biotic environments,

the socioeconomic aspects and the interdependent relationship between the local population and the natural environment.

Furthermore, some mitigating measures, which were called for during the licensing process, were not implemented by the enterprising, demonstrating that IBAMA did not correctly monitor compliance with the signed agreements. It also demonstrates that the municipal government of Salto da Divisa was not prepared to deal with the implementation of major investments, which may be a common characteristic of other municipal governments throughout Brazil.

Deficiencies in the socio-economic diagnosis of the affected social groups throughout the development of mitigating measures demonstrate that in the same licensing process IBAMA failed a second time by accepting environmental studies that contained methodological flaws and excluded members of the affected social groups.

It is also necessary to improve the public hearings that are held for the purpose of presenting the Environmental Impact Reports<sup>19</sup> in Brazil. The public hearing that was held in Salto da Divisa did not allow for the inclusion of certain impacts and social groups in the licensing process, despite requests by members of these groups. This issue proves that the presence of IBAMA representatives did not result in the correction of failures in the socio-economic diagnosis of the population affected by the UHE Itapebi.

Promulgation of Decree 7.342/2010, which implemented a socio-economic register for the identification, qualification and public registry of populations affected by hydro-electric energy generation, demonstrates the progress that has been made in public policies for the licensing of hydro-electric

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<sup>19</sup> Environmental Impact Reports is a document that summarizes the main conclusions of the Environmental Impact Study, and is the document that is commonly shown to society.

plants and the Federal Government's acknowledgement of problems in the methodologies used until that time.

The first goal of the National Environment Policy has not been achieved in various ways, as the implementation and operation of the UHE Itapebi does not allow for economic and social development that is compatible with the preservation of the environment and environmental balance. Rights established by article 225 of the Federal Constitution were also not achieved as currently not all the residents of Salto da Divisa enjoy an ecologically balanced environment.

Various sectors of the Brazilian population depend on natural resources and the construction and operation of hydro-electric plants has resulted in an increase in poverty. The main challenge in the environmental licensing process of hydro-electric plants in Brazil is to ensure that the licensing bodies, the Brazilian Prosecution Service and the enterprising comply with the guidelines of Brazilian environmental policies.

#### 4.1 - Recommendations

The results indicate the need for a review of the calculation method, applied by ANEEL<sup>20</sup>, for dividing the revenue of electricity production among the municipalities and states whose territories have been flooded. ANEEL takes into account the percentage of land flooded by the reservoir, proportionate to the size of the municipality. As a result, the municipality of Salto da Divisa, which encounters far greater negative externalities than other municipalities affected

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<sup>20</sup> National Agency of Electric Energy

by the UHE Itapebi, receives an amount that is ten times less than what is received by Itapebi.

It's recommend the inclusion of new variables to compose the calculation for the division of the revenue of energy production. These variables may include the size of the affected population, the value of environmental damage and the value of the production that will be sacrificed by the affected activities.

## References

- ASMIP. Associação dos Servidores do Ministério Público do Distrito Federal e Territórios. 2010.  **Prostituição e pedofilia do jeito que o diabo gosta.** Available in <http://www.asmip.org.br/noticias.php?num=326>. Último acesso em 13/03/2011
- BANCO MUNDIAL. 2008. **Licenciamento Ambiental de Empreendimentos Hidrelétricos no Brasil: Uma Contribuição para o Debate.** Relatório síntese.
- CDDPH Conselho de Defesa dos Direitos da Pessoa Humana. Comissão Especial. 2008. **Atingidos por Barragens.** Brasília. DF.
- ENGEVIX. 1995. **UHE Itapebi. Estudo de Impacto Ambiental.** Empresas Petroquímicas do Brasil S.A. CP-ITA. 0112.
- ENGEVIX. 1997a. **Relatório de Impacto ao Meio Ambiente.**
- ENGEVIX. 1997b. **Relatório de Complemento ao EIA da UHE Itapebi.**
- ENGEVIX. 1999a. **Projeto Básico Ambiental 8. Projeto de Remanejamento e Monitoramento da População Diretamente Atingida.**
- ENGEVIX. 1999b. **Projeto Básico Ambiental 9. Projeto de Remanejamento e Monitoramento da População Diretamente Atingida.**
- ENGEVIX. 1999c. **Projeto Básico Ambiental 11. Projeto de Redimensionamento e Realocação da Infra-Estrutura (PBA 11).**
- GAVIAO, A. B. 2006. **Gestão de conflitos ambientais frente à implantação de hidrelétricas: estudo de caso do aproveitamento hidrelétrico de Itapebi/BA.** Dissertação de Mestrado em Regulação da Indústria de Energia. Universidade Salvador – UNIFACS. 2006.
- GOLDENBERG, M. 1997. **Integração entre análise quantitativa e qualitativa. Métodos de Pesquisa em Ciências Sociais.** In. A arte de pesquisar. p. 61-67. Ed Record.

IBAMA - Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis. 1997. **Licença Prévia nº 20/97.** Available in <http://www.ibama.gov.br/licenciamento/> Last access in 20/5/2011.

\_\_\_\_\_ 1999. **Licença de Instalação nº 78/99.** Available in <http://www.ibama.gov.br/licenciamento/> Last access in 20/5/2011.

\_\_\_\_\_ 2002. **Licença de Operação nº 291/02.** Available in <http://www.ibama.gov.br/licenciamento/> Last access in 20/5/2011.

\_\_\_\_\_ 2005a. **Relatório de Vistoria ao município de Salto da Divisa/MG com vistas a mediar a apresentação do projeto tanque-rede à Associação dos Pescadores, afetada pela implantação da UHE Itapebi, e vistoria ao tratamento de esgoto citado no Ofício nº 197/2005 – Gabinete do Prefeito de 14 de dezembro de 2005 (Prefeitura de Salto da Divisa/MG).** Período: 18 a 20 de janeiro de 2005. Available in <http://www.IBAMA.gov.br/licenciamento/>. Last access in 20/5/2011.

\_\_\_\_\_ 2005b. **Relatório de Vistoria Assunto: Relatório de Vistoria à UHE Itapebi instalada no rio Jequitinhonha/BA e suas áreas de influência, para atender demandas junto às comunidades afetadas pela implantação do empreendimento.** Período: 19 a 22 de julho de 2005. Available in <http://www.IBAMA.gov.br/licenciamento/>. Last access in 20/5/2011.

\_\_\_\_\_ 2006a. **Parecer Técnico nº 028/2006 – COEND / CGENE / DILIC / IBAMA** Brasília, 25 de julho de 2006. Available in <http://www.IBAMA.gov.br/licenciamento/>. Last access in 20/5/2011.

\_\_\_\_\_ 2006b. **Relatório de Vistoria ao município de Salto da Divisa/MG Assunto: Relatório das reuniões realizadas com as categorias de pescadores e lavadeiras do município de Salto da Divisa/MG.** Período: 25 a 28 de julho de 2006. Available in <http://www.IBAMA.gov.br/licenciamento/>. Last access in 20/5/2011.

\_\_\_\_\_ 2007. **OFÍCIO Nº 160 / 2007 - DILIC / IBAMA. Assunto: Processo de Licenciamento Ambiental da UHE Itapebi.** Available in <http://www.IBAMA.gov.br/licenciamento/>. Last access in 20/5/2011.

IPPUR. Instituto de Pesquisa e Planejamento Urbano. 2005. **Parecer sobre os processos de Licenciamento Ambiental das Usinas Hidrelétricas Barra do Pomba e Cambuci trechos médio-inferior e baixo Paraíba do Sul/RJ.** Rio de Janeiro.

ITAPEBI Geração de Energia S. A. 2003a. **2º Relatório de Cumprimento do Termo de Ajustamento de Conduta firmado com o Ministério Público do Estado de Minas Gerais.**

**2003b. 9º Relatório de Cumprimento do Termo de Ajustamento de Conduta firmado com o Ministério Público do Estado de Minas Gerais.**

**2004. 10º Relatório de Cumprimento do Termo de Ajustamento de Conduta firmado com o Ministério Público do Estado de Minas Gerais.**

MANYARI, W. V. 2007. **Impactos ambientais a jusante de hidrelétricas: O caso da usina de Tucuruí, PA.** Tese do Programa de Planejamento Energético e Ambiental. COPPE/UFRJ.

MEDAUAR, O. (Org). **Coletânea de legislação de direito ambiental.** 5<sup>a</sup> ed. Ed. Revista dos Tribunais. São Paulo. 2006.

MIN. Ministério da Integração Nacional. 2006. **Manual operativo para reassentamento em decorrência de processos de desapropriação para construção de reservatórios públicos.** Brasília.

MOREL, Q da C. R. 2008. **O licenciamento ambiental de Aproveitamentos hidrelétricos. O espaço da adequação.** Dissertação de Mestrado. UFMG.

MPEMG. Ministério Público do Estado de Minas Gerais. 2002. **Termo de Ajustamento de Conduta firmado perante o Ministério Público do Estado de Minas Gerais, pela Itapebi Geração de Energia S. A. com anuênciia do Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA e do Grupo de Defesa dos Direitos Humanos – GADDH, de Salto da Divisa/MG definindo algumas medidas compensatórias para as questões sócio-ambientais da comunidade de Salto da Divisa/MG atingida pelo Aproveitamento Hidrelétrico de Itapebi.**

MPEMG. Ministério Público do Estado de Minas Gerais. 2003. **Aditivo nº 01/2003 ao Termo de Ajustamento de Conduta firmado entre Itapebi, GADDH, Ministério Público Estadual e IBAMA em 25 de novembro de 2002.**

MPEMG. Ministério Público do Estado de Minas Gerais. 2004. **Aditivo nº 02/2003 ao Termo de Ajustamento de Conduta firmado perante o Ministério Público Estadual de Minas Gerais, pela Itapebi S. A. com anuênciia do Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis – IBAMA e do Grupo de Defesa dos Direitos Humanos – GADDH, de Salto da Divisa/MG datado de 25/11/2002.**

MPEMG. Ministério Público do Estado de Minas Gerais. 2007. **Aditivo nº 0312007. Aditivo ao Termo de Ajustamento de Conduta firmado pela Itapebi Geração de Energia S. A. em 2511/2002 perante o Ministério Público Estadual de Minas Gerais, com anuênciia do Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - IBAMA e do Grupo de Apoio e Defesa dos Direitos Humanos - GADDH.**

MPEMG. 2003. Ministério Público do Estado de Minas Gerais. **Relatório de Cumprimento ao Termo de Ajustamento de Conduta.**

MPF. 2004. **Deficiência em estudo de impacto ambiental. Síntese de uma experiência.** Ministério Público Federal. 4<sup>a</sup> Câmara de Supervisão e Coordenação: Escola Superior do Ministério Público da União. Brasília.

PRMG - Procuradoria Republica em Minas Gerais. 2010. **Audiência pública discute impactos ambientais da Usina de Itapebi.** Available in <http://www.prmg.mpf.gov.br/imprensa/noticias/meio-ambiente/audiencia-publica-discute-impactos-ambientais-da-usina-de-itapebi>. Último acesso em 7/10/2010. Last access in 20/5/2011.

PROCHNOM, M. et al. 2005. **Barra Grande, a Hidrelétrica que não Viu a Floresta**, Rio Grande do Sul - SC.

REZENDE, L.P. 2007. **Avanços e contradições do licenciamento ambiental de barragens hidrelétricas.** Belo Horizonte.

SILVA JUNIOR, J. M da. 2005. **Reassentamentos rurais da usina hidrelétrica Luís Eduardo Magalhães – Tocantins: A efetividade do programa de remanejamento populacional quanto a sua sustentabilidade sócio-ambiental.** Dissertação de Pós- Graduação em Ciências do Ambiente. Fundação Universidade Federal do Tocantins - UFT.

ZITZKE, V. A. 2003. **Deslocamento Involuntário e Novos Territórios no Tocantins: o caso da UHE do Lajeado.** Tese de Doutorado Interdisciplinar em Ciências Humanas da Universidade Federal de Santa Catarina – UFSC.