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Brazil's São Luiz do Tapajós Dam: The Art of Cosmetic Environmental Impact Assessments

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ABSTRACT: Brazil's planned São Luiz do Tapajós dam is a key part of a massive plan for hydropower and navigable waterways in the Tapajós basin and on other Amazon River tributaries. The dam's Environmental Impact Study (EIA) illustrates the fragility of protections. EIAs are supposed to provide input to decisions on development projects, but in practice these studies tend to become formalities in legalizing prior decisions made in the absence of information on or consideration of project impacts. The EIA has a tendency to minimize or ignore significant impacts. Loss of fisheries resources is likely to be critical for Munduruku indigenous people and for traditional riverside dwellers (*ribeirinhos*), but the EIA claims that there is "low expectation that natural conditions of aquatic environments will be significantly altered". The destruction of Munduruku sacred sites is simply ignored. The Brazilian government's priority for the dam has resulted in blocking creation of the Munduruku's Sawré Muybu indigenous land and other indigenous lands throughout Brazilian Amazonia. With the exception of one legally recognized community (Montanha e Mangabal), non-indigenous *ribeirinhos* are considered as not 'traditional people'. Even the one recognized community is not considered to require free, prior and informed consent. The São Luiz do Tapajós case illustrates problems in decision making in Brazil and in many other countries.

KEYWORDS: Hydropower, Indigenous people, EIA, Hydroelectric dams, Amazon, Brazil

INTRODUCTION

The Tapajós river Basin is Brazil's most recent and most active 'hydroelectric frontier' (*fronteira hidrelétrica*). The wild-west implication of this Brazilian term is not undeserved. In addition to the São Luiz do Tapajós dam, two other large dams are planned on the Tapajós River itself (the Jatobá and Chacorão dams), plus 40 more on Tapajós tributaries: four on the Janximim River, six on the Teles Pires and 30 on the Juruena and its tributaries (see Fearnside, 2014c, 2015).

Hydroelectric dams are notorious for inflicting heavy social and economic impacts (see WCD, 2000). These are generally much greater than for other forms of energy supply or equivalent energy conservation. The attraction of dams comes from their supposed lower costs; however, virtually universal cost overruns and project delays make these savings illusory, as shown by a recent worldwide review (Ansar et al., 2014). In addition, only monetary costs are considered; dams would be even less attractive if social and environmental impacts had proper weight in the initial decisions. Were the EIA to include a thorough review of the socioeconomic impacts it would be an important potential contribution to more rational decision making on energy development. Unfortunately, the pattern with EIAs is to minimise, overlook or deny socioeconomic impacts, and the São Luiz do Tapajós EIA is no exception, as will be shown in this paper.

The licensing process in Brazil proceeds through a series of steps, of which the environmental impact study (EIA) is one. The federal environmental agency (IBAMA: Brazilian Institute for the Environment and Renewable Natural Resources) is brought into the process by a 'notification of intent' submitted by a project proponent. IBAMA then prepares terms of reference (ToR) specifying the requirements for the

EIA. The National Foundation for the Indian (FUNAI) produces a ToR for the indigenous component of the EIA. The EIA, including the indigenous component, is then prepared; normally this is done by a consulting firm, which hires biologists, anthropologists and others as consultants to gather the data that the firm uses to draft the report. A shorter non-technical version called the RIMA (Report on Impacts on the Environment) is also prepared for wider public distribution and discussion. A series of public hearings (*audiências públicas*) is then held in the affected areas. Theoretically, if 'consultations' are held such as those specified by International Labour Organization (ILO) Convention 169 for Free, Prior and Informed Consent (FPIC), these would also occur at this point in the process. IBAMA and FUNAI then request any necessary changes in the EIA and RIMA, and, when satisfied, IBAMA issues the prior license (*licença prévia*). The prior license can be issued with a list of conditions, all of which are supposed to be satisfied before the installation license (LI) is issued. After the prior license, a basic environmental plan (PBA) is prepared by the consulting firm. This document proposes mitigation measures and includes input from the affected communities. FUNAI and IBAMA can request revisions of the PBA. When satisfied with the revised PBA and with compliance with the conditions established in the prior license, IBAMA issues the installation license (LI), allowing construction to begin. While construction is underway, the proponent implements the mitigation measures specified in the PBA. IBAMA then determines whether these measures have all been implemented, and issues an operating license (LO). The recent example of Brazil's Belo Monte dam illustrates a pattern of dam builders ignoring such 'conditions' without suffering any significant consequences (FGV, 2014; ISA, 2014). The operating license allows the reservoir to be filled. Unfortunately, steps in this legally required sequence can be abbreviated by regulators under political pressure, and violations of legal protections can be allowed to stand unaltered through court rulings invoking 'security suspension' provisions decreed during Brazil's 1964-1985 military dictatorship but still present in the country's legislation (Fearnside, 2015). 'Security suspensions' have already been used 12 times to overturn injunctions against the Tapajós River dams, surpassing the eight usages for the Belo Monte dam (Palmquist, 2014).

EIAs in Brazil have evolved steadily over the years since they became mandatory in 1986, with regulatory agency demands resulting in reports with greater detail, added topics and standardized organization (Landim and Sánchez, 2012). However, the more fundamental problems that affect objectivity remain unchanged: the reports are prepared by consulting firms hired by the project proponents, and, before the reports are submitted to the licensing authority, their content is subject to both explicit vetting by the proponents and to the more subtle effect of self-censorship by the individual authors and editors hired by the consulting firm. Producing EIAs is a business activity where rapid and assured project approval is the key to advancement and to future contracts.

Another key feature that has not evolved is the timing of the EIA within the overall planning and decision-making process. In practice (as opposed to in legal terms), decisions on major infrastructure projects are made by a handful of high-level authorities before any study is made of environmental and social impacts and before any input is sought from local peoples. The subsequent processes of producing the EIA, holding public hearings, etc., serve to legalize the initial decision, subject only to adjustments in the details of execution and mitigation, but not subject to questioning the wisdom of the overall project (see examples in Fearnside, 2007, 2013, 2014a, 2014b; Fearnside and Graça, 2009).

Human rights is an area that has had an increasing presence in EIAs in Brazil (Hanna and Varclay, 2013; Hanna et al., 2014) and throughout the world (Boele and Crispin, 2013). Most important is interpretation of Free, Prior and Informed Consent (FPIC), a concept that has been the subject of debate among different agencies and experts (Kemp and Vanclay, 2013). The existence of disagreement provides a handy excuse for actors such as the Brazilian government and Brazil's EIA industry to essentially ignore FPIC on the basis of waiting for 'controversies' to be settled. Historical parallels with supposed controversies on issues such as tobacco smoke, ozone depletion and global warming (Oreskes and Conway, 2010) are evident.

All of the problems mentioned above are illustrated by the EIA for Brazil's São Luiz do Tapajós dam. Lack of objectivity in EIAs for Brazilian dams is evident from previous cases, such as Belo Monte (Santos and Hernandez, 2009) and the Madeira River dams (Fearnside, 2013, 2014a). Each dam has different aspects that stand out. In the São Luiz do Tapajós EIA a key area is the treatment of socioeconomic impacts, particularly those affecting indigenous peoples and traditional riverside residents (*ribeirinhos*). In this case, impacts on indigenous peoples include population displacement, blocking of creation of indigenous areas throughout Brazil, loss of fish and other river resources, and loss of sacred sites. Lessons that can be learned from the São Luiz do Tapajós case have value for improving decision-making procedures both in Brazil and in other countries where similar challenges apply.

INDIGENOUS PEOPLES

Population displacement

Among the impacts of the São Luiz do Tapajós dam is displacement of Munduruku indigenous people who traditionally inhabit the banks of the Tapajós River. The EIA (CNEC Worley Parsons Engenharia, S.A., 2014a, henceforward cited simply as 'EIA') emphasises a law from Brazil's military dictatorship:

> It is appropriate to emphasise that the Union may intervene in indigenous areas to carry out public works that are of interest for national development (EIA, Vol. 2, p. 85, citing Federal Law No. 6001/1973, Article 20, Paragraph 1, Sub-clause 'd').

Instead of this, the EIA might have emphasised the various legal protections of indigenous and other groups, such as the provision in Brazil's 1988 Constitution that reads:

> Removal of indigenous groups from their lands is prohibited, except (….) in cases of catastrophe or epidemic that put the population at risk, or in the interest of the sovereignty of the country (….), [but,] in any event, an immediate return is guaranteed as soon as the risk ceases (*Federal Constitution*, Article 231, Paragraph 5).

It is precisely such a 'removal' of indigenous groups that is in question to allow filling the São Luiz do Tapajós reservoir. Three Munduruku villages would have to be removed: Karo Muybu, Sawré Muybu and Dace Watpu (Figures 1 & 2). These villages are in the proposed Sawré Muybu indigenous land (*terra indígena*, or TI). Destroying the stretch of the Tapajós River that flows past the proposed indigenous land will remove the source life of the Munduruku, which is almost entirely based on the river. All villages are near the river.

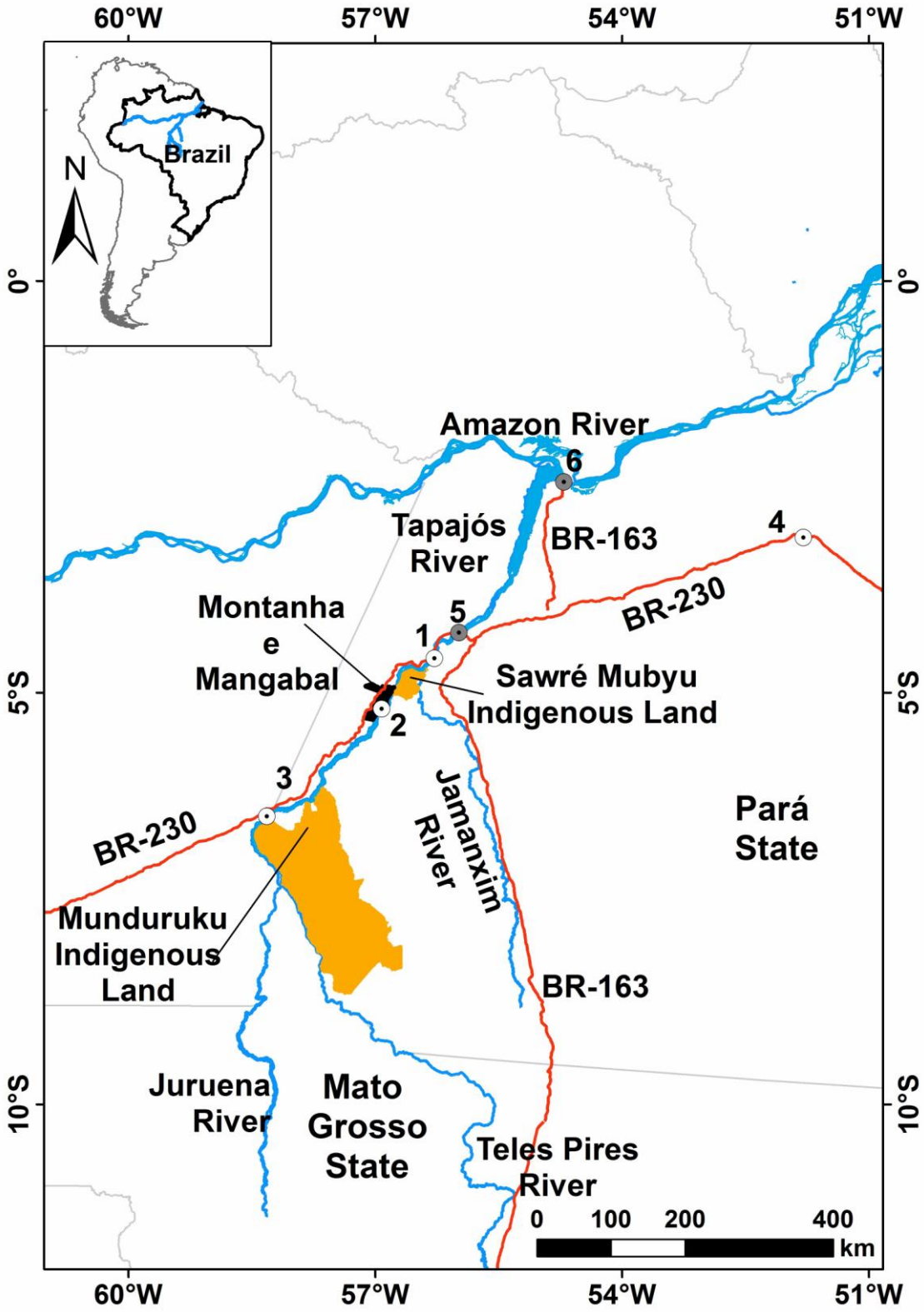
Affected indigenous and traditional peoples have a right to 'consultation'. Brazil is a signatory to Convention 169 of the International Labour Organization (ILO, 1989). 'Consultation' is very different from a public hearing, as it means that the people consulted have a say in the actual decision, i.e. whether to build the dam or not, as opposed to making suggestions about mitigation or compensation for a project that has already been decided upon (see: ILO, 2005). The convention states:

> (....) they shall participate in the formulation, implementation of plans and programmes for national and regional development which may affect them directly (*ILO Convention 169*, Article 7.1).

The ILO has clarified that this does not give indigenous peoples veto power over development projects, but it does require a real voice in the initial decisions:

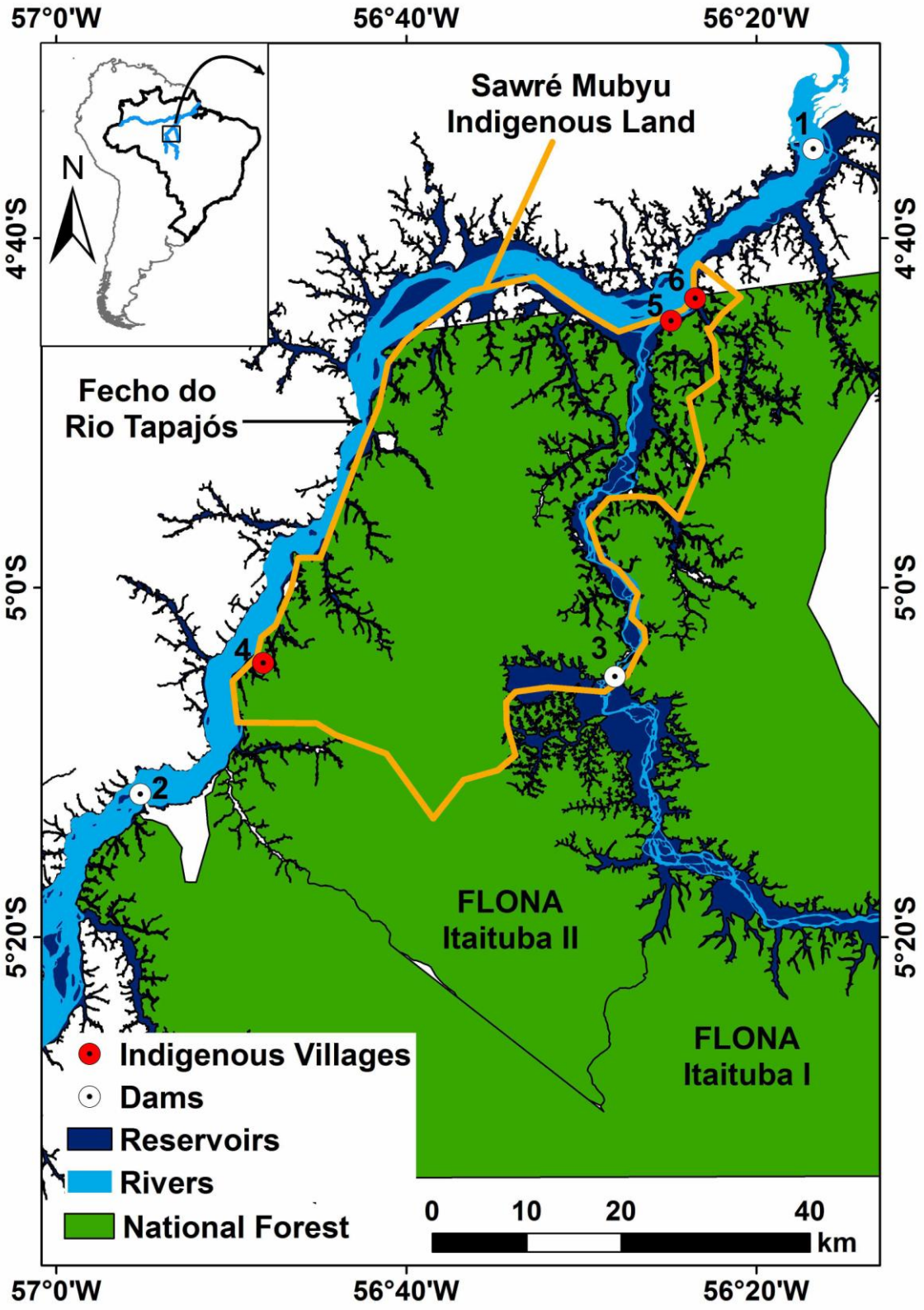
> The Convention requires that procedures be in place whereby indigenous and tribal peoples have a realistic chance of affecting the outcome – it does not require that their consent to the proposed measures is necessary (ILO, 2005).

Figure 1. Map with locations mentioned in the text.



Note: 1) proposed São Luiz do Tapajós dam, 2) proposed Jatobá dam, 3) proposed Chacorão dam, 4), Altamira, 5), Itaituba, 6) Santarém.

Figure 2. Map of the proposed Sawré Muybu Indigenous Land.



Note: 1) proposed São Luiz do Tapajós dam, 2) proposed Jatobá dam, 3) proposed Cachoeira do Caí dam, 4) Karo Bamamaybu village, 5) Sawré Muybu village, 6) Dace Watpu village.

However, others question how 'consent' could mean anything other than the right to say 'no' (e.g. Esteves et al., 2012).

The main text of the EIA mentions ILO 169 in passing (EIA, Vol. 2, p. 86), but fails to affirm the need for consultation in these terms. The annex on the 'indigenous component', which was added to the EIA several months after the remainder of the report was completed, reproduces the text of ILO 169 (EIA, Vol. 22, General Annex, pp. 28-31). However, the discussion in the text focuses only on the need for culturally appropriate means of holding the consultation, with no indication that the outcome might be a deciding factor in allowing the dam project to proceed. The provisions of ILO Convention 169 were transformed into Brazilian law through Decree no 5051 of 19 April 2004 (Brazil, PR, 2004). The Munduruku have not been consulted about the dam projects.

The dam as a motive for blocking recognition of indigenous land

Brazil's 1988 Constitution specifies that indigenous peoples have the right to the land that they 'traditionally occupy' (*Constituição Federal*, Article 231, Paragraph 1). The area of the proposed Sawré Muybu indigenous land has been inhabited by Munduruku for thousands of years, as shown by archaeological sites, including one inside the Sawré Muybu village. Ceramics approximately 1000 years old have designs that match those on tatoos of today's Munduruku, according to Bruna Cigaran da Rocha, *an* archaeologist at the Federal University of Western Pará (UFOPA) who specialises in the study of these ceramics. Munduruku legends featuring sacred sites in the proposed Sawré Muybu indigenous land also point to very long-term presence in the area.

The Munduruku move their residences frequently, and many have lived in more than one place. Reasons for moving include feuds with neighbouring families or other events, such as the death of a seven-year-old boy from Malaria in the case of one of the villages in the proposed Sawré Muybu indigenous land. Escaping the effect of witchcraft has also been a reason for movement (EIA, Vol. 22, General Annex, p. 30). Moves can be either short distances or over hundreds of kilometres, but always along the Tapajós River. The present population of the proposed reserve has moved from other places along the river in recent decades.

Sawré Muybu is not yet officially recognised as an 'indigenous land'. The proposed indigenous land would be 178,173 ha in area, 7% of which would be flooded by the reservoir, this being precisely the location of the villages (Seixas et al., 2013, p. 189). The dam project has hindered the creation of indigenous lands, including the proposed Sawré Muybu indigenous land. Lack of a recognised indigenous land makes discouraging invasion of the area by loggers and miners more difficult, and these incursions have been increasingly bold. Classification as an indigenous land both discourages invaders who realize that their illegal activities are less likely to have a positive result and also increases the chances that calling on police or other authorities will have an effect. At present, the Mundurku in an unrecognized area like Sawre Mubyu cannot call upon authorities to expel invaders.

Despite the vulnerability of the area, the indigenous presence does have some inhibitory effect. This is evident from the huge burst of gold and diamond mining activity (Gonzaga, 2012) in the portions that were disaffected from the Itaituba I and II National Forests (FLONAs) by President Dilma Rousseff through a provisional measure (MP No. 558 of 5 January 2012), subsequently converted into law (No. 12 678/2012). These areas are also part of the proposed Sawré Muybu indigenous land, which overlaps the two national forests. The national forests had been created in 1998 without consulting the indigenous residents.

The priority the government has placed on preventing the National Foundation of the Indian (FUNAI) from creating the Sawré Muybu indigenous land has repercussions far beyond this portion of the Tapajós River. It has weakened and demoralised FUNAI, and apparently been a key contributor to paralyzing creation of indigenous lands throughout Brazil. Therefore, the socioeconomic impacts caused

by São Luiz do Tapajós extend to locations thousands of kilometres from this dam, affecting other indigenous groups that have not had their territories recognised and demarcated as indigenous lands.

In September 2014 the Munduruku leaders travelled to Brasília to meet with Maria Augusta Assirati, then the interim 'president' of FUNAI (a position appointed by the Minister of Justice). The video of the meeting made by the Munduruku (MDK, 2014) shows her tearfully explaining that the paperwork for creating the Sawré Muybu indigenous land was complete and had been on her desk ready to sign for over a year, but that 'other agencies' had become involved.

The subjugation of FUNAI revealed at the September 2014 meeting was not only shown by the words of FUNAI's 'president'. The key fact was the presence of three high officials of the Ministry of Mines and Energy (MME). The Munduruku had expected to be meeting alone with the 'president' of FUNAI in an attempt to convince her to sign the papers for creating the reserve, as she had promised over a year before, and was within her power to do. The Munduruku believe the MME officials come to these meetings to guarantee that no agreement is made regarding the indigenous land. They have also appeared at meetings with the Ministry of Health and the Ministry of Education. The fact that the president of the FUNAI cannot meet with indigenous leaders without supervision from MME implies that the agency charged with protecting indigenous interests is, effectively, nonexistent when important political interests such as hydroelectric dams are involved. Note that FUNAI is hierarchically subordinate to the Ministry of Justice, not the Ministry of Mines and Energy.

Only nine days after the September 2014 meeting, Maria Augusta Assirati was removed from her post as 'president' of FUNAI with the papers for creating the indigenous land still unsigned. Four months later, in January 2015, she made an emotional statement to the press, confirming interference with FUNAI by MME and the Civil House and stating that "FUNAI is being devalued and its autonomy totally disregarded" (Aranha, 2015). The Minister of Justice was standing beside her when she made these public comments. São Luiz do Tapajós has effectively destroyed the government agency responsible for protecting indigenous peoples throughout Brazil. The socioeconomic impact of the dam therefore extends far beyond the area around the proposed dam and reservoir.

When the Munduruku met with the replacement interim 'president' (Flávio Chiarelli Vicente de Azevedo) they invited him to come to their upcoming assembly, and he agreed to come. However, he sent a substitute instead of coming himself, which was seen as breaking his first promise. The Munduruku refused to speak with the substitute, stating that they will only deal with someone who has the power to make decisions. The Munduruku then decided not to wait for the government to create and demarcate their indigenous land, and in October 2014 they began a 'self-demarcation' project that is cutting a boundary trail and placing signs around the perimeter of the area. Note that Munduruku decision making is broadly democratic, with all community members (including women and adolescents) participating in long discussions, followed by a consensus among the leaders from each village. This contrasts with indigenous groups with a top-down hierarchy, such as the Kayapó. Once the Munduruku make a decision it is less likely to be reversed than for other groups.

It is relevant that the Munduruku emphasise their warlike past, when they were feared by neighbouring tribes for their custom of cutting off their enemies' heads and displaying them on poles. A depiction of such a head is featured on the signs placed around the Sawré Muybu indigenous land as part of the self-demarcation. The Munduruku have been among the most assertive of Brazil`s indigenous peoples in directly confronting government authorities. In March 2013 'Operation Tapajós' began with 80 biologists and support staff accompanied by the National Force (*Força Nacional de Segurança*) (Fonseca, 2014). In June 2013 the Munduruku captured three biologists who were collecting data for the EIA and who had entered their area without permission from the Munduruku (Carvalho, 2013). This resulted in an order from President Dilma Rousseff for armed soldiers from the National Force to accompany all researchers working on the EIA, thereby greatly increasing tension and mistrust among both indigenous and non-indigenous residents of the Tapajós area. In June 2013, the

Munduruku expelled 25 EIA researchers from the Munduruku indigenous land, freeing them after a planeload of National Force troops arrived (Sposati, 2013). In order to bring attention to the Tapajós plans, a party of Munduruku warriors travelled almost 1000 km to Altamira, on the Xingu River, where they were the most forceful group in invading the construction site of the Belo Monte dam and occupying the site for 17 days in May and June 2013 (e.g. *Xingu Vivo*, 2013). In November 2014 the Munduruku occupied the FUNAI offices in Itaituba and prevented the staff from leaving until a high-level delegation was brought from Brasília to discuss the proposed Sawré Muybu indigenous land (Aranha and Mota, 2014a).

The FUNAI document proposing the Sawré Muybu indigenous land concludes:

> The completion of the procedure for the Sawré Muybu indigenous land would constitute a fundamental guarantee of survival for the indigenous peoples who live there and of their maintenance as differentiated cultures in the region of the Tapajós River. Considering that the survival and continuity of the indigenous population depend on the preservation and the sustainability of use of the natural resources that exist there, the Sawré Muybu indigenous land encompasses the factors mentioned in the environmental study as indispensable so that the culture and productive activities of the indigenous people may be developed over the years without threats to their integrity. The indigenous land, as a whole, is essential to environmental preservation, since it covers the main resource niches used by the indigenous people to provide their sustainability and it enables the indigenous people to have exclusive use of these resources, which are often threatened by the actions of non-Indians (Sandhu et al., 2013, pp. 189-190).

The contrast with the EIA is evident. However, it is not FUNAI, or even the Ministry of the Environment, that decides the course of events in practice. Rather it is the Ministry of Mines and Energy. A series of reports by Ana Aranha and Jessica Mota make this clear (Aranha and Mota, 2014b, 2014c, 2015).

Loss of fisheries

The EIA assumes that the river and its resources, such as fish, will remain essentially unchanged, implying that both the Munduruku and non-indigenous riverside fishermen have no reason to worry that their livelihoods will be affected. The EIA assures us:

> It is considered that (....) [there is] low expectation that the natural conditions of aquatic environments will be significantly altered (EIA, Vol. 3, p. 170).

Note that the EIA also assumes that terrestrial ecosystems will not be affected by the dam and that, implicitly, there is no need for measures to prevent losses of these ecosystems and consequent socioeconomic impacts. The EIA states:

> Physical environment: the conditions diagnosed indicate great stability in the current scenario with reduction of the rate of deforestation (....) (EIA, Vol. 3, p. 170).
>
> Reduction of the rates of opening deforested areas is expected (EIA, Vol. 3, p. 171).
>
> No projects for opening new highways were reported on the scale of the hydrographic basin (EIA, Vol. 3, p. 171).

The planned reconstruction of the BR-163 is apparently being defined away as not a 'new' highway. Among the impacts of greater deforestation would be degradation of aquatic ecosystems. However, the EIA assures us that no such degradation is likely as a result of deforestation:

> Impacts on the physical environment: alteration of the aquatic community has the potential to interact and influence other impacts (intensifying them in most cases), such as: altering the aquatic community and alteration of fish stocks (biotic). However, at present, current conditions allow one to estimate that conditions will remain stable as a function of the low pressure exerted by human occupation (EIA, Vol. 3, p. 172).

The area along Highway BR-163 has been one of the hotspots of deforestation in Amazonia over the past several years (e.g. Victor et al., 2014). This area abuts the eastern side of the proposed Sawré Muybu indigenous land. A study by the Institute for Man and the Environment in Amazonia (IMAZON) projects substantial deforestation associated with all of the Tapajós dams (Barreto et al., 2014).

Loss of sacred sites

Loss of livelihood by destroying the fisheries resource that is the main food source for the Munduruku is, logically, a major concern for the villages now threatened by the dam. However, loss of the river is also the loss of the sacred centrepiece of Munduruku culture, and this symbolic role receives even more emphasis when Munduruku leaders recount their concerns. Among the sacred sites to be lost is the place where Karosakaybu (a revered Munduruku ancestor who was endowed with supernatural powers) created the Tapajós River at a narrow place (the '*fecho do rio Tapajós*') known to the Munduruku as the 'crossing of the pigs'. The significance of the site is explained as follows by chief Juarez Saw Munduruku of the Sawré Muybu village.

Karosakaybu had his son taken by a band of peccaries (the '*queixada*' or white-lipped peccary: *Tayassu pecari*), which were really Munduruku who had been transformed into pigs. The pigs have pierced ears, showing that they had been Munduruku. Karosakaybu heard the screams of his son as he was being kidnapped by the pigs. Karosakaybu ran after his son, but the pigs were getting away with the child. As a means of blocking the pigs' path, Karosakaybu made steep hills rise up that can be seen near the sacred site today, but the pigs, which also had supernatural powers, were able to get past these hills. Then Karosakaybu threw four tucumã (*Astrocaryum aculeatum*) seeds on the ground and created the Tapajós River to serve as a barrier blocking the pigs. The tucumã seeds explain why the water of the Tapajós tastes sweet today. But the pigs threw a cord with a giant hook to the other side of the river and pulled it to create the narrows. The pigs swam across the river at the narrows, taking Karosakaybu's son with them, and never returned.

Another sacred site is the 'Devil's Throat' (*Garganta do Diabo*) at the rapids where the proposed São Luiz do Tapajós dam would be built. This is sacred because of the abundance of fish that can be caught there during the *piracema* (the yearly mass migration of fish ascending Amazon tributaries). The Munduruku believe that disrespect for the site is the cause of the many boat wrecks that have occurred there. According to Chief Juarez, "The whites don't know the site is sacred".

Concern for loss of sacred sites in the area to be flooded by the São Luiz do Tapajós reservoir extends to Munduruku outside of this area, and the Munduruku in the area to be flooded by this dam are likewise concerned about sites to be flooded by the other planned Tapajós dams. The Sete Quedas holy site that was flooded by the Teles Pires dam at the end of 2014 is of special concern (e.g. Palmquist, 2014). This site is sacred because the spirits of old people who know the legends and who sing traditional songs and play Munduruku musical instruments go there after they die. Only the spirits of these respected elders go to Sete Quedas, not the spirits of deceased young people.

In the case of fisheries, the EIA essentially denies that there will be any loss by claiming that aquatic ecosystems will remain unharmed. In the case of spiritual losses, the EIA simply ignores this as a problem.

'Indirectly' affected indigenous areas

In addition to the proposed Sawré Muybu indigenous land, which is 'directly' impacted through flooding, the EIA lists four indigenous areas that are in the 'Area of Indirect Impact' (AII):

1. Praia do Índio indigenous land. This Munduruku area, located near Itaituba, is listed in the EIA as having 31.74 ha and 39 self-declared indigenous people; it is 100% in the Area of Indirect Impact (AII) (EIA, Vol. 7, p. 118).

2. Praia do Mangue indigenous land. This is 32-ha Munduruku area and is 100% in the AII, with 152 self-declared indigenous people (EIA, Vol. 7, p. 119). The indigenous land is very near Itaituba, and the growth of the city has resulted in it becoming a periurban area. The Munduruku express concern over problems that are already apparent from the proximity of the city, such as alcohol and crime.
3. Munduruku indigenous land. This would have part of its area flooded by the Chacorão dam (Fearnside, 2015) and also has 2.3% of its 2,415,382-ha area in the AII of the São Luiz do Tapajós dam (EIA, Vol. 7, p. 118) [also given as 2.03%: EIA, Vol. 7, p. 116].
4. André Miran indigenous land. This is a 798,481 ha area for the Sataré-Mawe people in the state of Amazonas; 25.3% of the indigenous land overlaps the western edge of the AII.

The EIA (Vol. 7, p. 116) also lists areas "under study by FUNAI". These are 'Km-43 Area of the BR-230', which is designated by FUNAI by its Munduruku name 'Sawré Apompu' (Seixas et al., 2013), 'Pimental Area', 'São Luiz do Tapajós' (designated by FUNAI and the Munduruku as 'Sawré Jaybu'), and 'Boa Fé', which refers to part of the proposed Sawré Muybu indigenous land.

In addition to indigenous areas in the Area of Indirect Impact, there is also one 'isolated' or uncontacted group. Uncontacted Indians are shown at 'point No. 9' on the map of isolated groups (FUNAI, 2006) that is reproduced in the EIA (Vol. 7, p. 119). The EIA points out that this point is inside the indirect area of influence of the São Luiz do Tapajós dam (EIA, Vol. 7, p. 119). However, nothing is said about what should be done to protect these people.

The EIA appears to pick information with a view to minimizing the indigenous presence in the area. For example, it 'highlights' with respect to Praia do Índio indigenous land:

> The fact is highlighted that in Itaituba [municipality] census tract 076, in spite of encompassing all of the Praia do Indio indigenous land, which represents 95% of the territory of this census tract, only 38% of the residents declared themselves as indigenous (EIA, Vol. 7, p. 117).

This appears to be presented to imply that 62% of the population is really non-indigenous. However, since this indigenous land is practically adjacent to the city of Itaituba the 5% of the area of the census tract outside of the indigenous land may not be negligible, among other potential problems with the census data.

The EIA was first prepared and circulated by IBAMA (Brazilian Institute of the Environment and Renewable Natural Resources) without the indigenous component; FUNAI objected on 15 August 2014. A version of the EIA with the indigenous component added was delivered to FUNAI by IBAMA on 12 September 2014. An internal FUNAI opinion (*parecer*) dated 25 September 2014 (FUNAI, 2014) later leaked to the press. The document makes clear the inadequacy of the indigenous component, which, among other irregularities, had been done without any fieldwork in the affected indigenous areas as required by the terms of reference for the study. Most importantly, although the indigenous component pointed out the severe losses of resources that the dam project would inflict on the Munduruku, there were no changes made to the remainder of the EIA to reflect these implications, particularly the portion on the viability of the project. The leaked document shows that the administration is not homogenous.

The indigenous component was added to the EIA as an annex, which explains that:

> The present study did not completely follow the methodological processes that were announced in the plan. The team did not receive authorization from FUNAI-DF and from the Munduruku for entry into indigenous lands (EIA, Vol. 22, General Annex, p. 34).

The Indigenous Component Study (ECI) annex asserts that "It is important to make clear that fieldwork does not consist exclusively of being at the *locus* where the social subject and their ways of life are

concentrated, [that is, in] their lands", and goes on to explain that the EIA authors had spoken with some Munduruku (apparently teachers from village primary schools) while staying in the city of Itaituba (EIA, Vol. 22, General Annex, p. 34). It then cites a passage from the 1988 Brazilian constitution (*Constituição Federal*, Article 7, Item 3) to claim that FUNAI, as a government agency, was obliged to have permitted them to enter the indigenous areas:

> Governments [even though it is redundant, it should be emphasised that the indigenist agency is part of the government] should ensure that, whenever possible, *studies should be carried out* [our emphasis] among the interested peoples in order to assess the social, spiritual, cultural and environmental impact that the planned development activities may have on these peoples. The results of these studies should be considered as fundamental criteria for the implementation of the activities mentioned (EIA, Vol. 22, General Annex, p. 36).

Rather than the passages that the EIA authors highlighted, they might have highlighted instead the last sentence in the passage.

The Indigenous Component Study does present a summary list of impacts on the indigenous people:

> In any case, during the period when the team was in the field it was possible, through the accounts of indigenous [individuals] who were contacted, as previously reported, to list some impacts, such as:
>
> - The generation of expectations regarding the future of the indigenous population in the region;
> - Increased visibility of indigenous people at the local, regional, national and international levels;
> - Increased migratory flow;
> - Alteration of cultural elements of the traditional peoples;
> - Alteration of the existing social organization;
> - Possibility of increased incidence of diseases (sexually transmitted diseases, malaria, yellow fever, leishmaniasis, diarrheal diseases, respiratory diseases, leprosy and tuberculosis) in indigenous lands and indigenous areas (EIA, Vol. 22, General Annex, p. 115).

With the exception of the first two, these impacts are all serious and highly damaging.

The Indigenous Component Study concludes that taking land from indigenous people is a historical process that is not the fault of the dam-building consortium, and that the only question is how to take proper care to mitigate and compensate the indigenous groups that lose land with this undertaking:

> Finally, another decision element is the understanding of the gradual reduction of indigenous territory in the study area motivated by a historical process of occupation that today results in reduced territories that are under ever-increasing pressure, and every effort should be made to ensure that these refuges are maintained, thereby assuring the physical and sociocultural reproduction of the group. This historical process cannot be attributed to the entrepreneur [Consorcio Tapajós], but it [the entrepreneur] should understand and take the necessary care so as not to augment this liability, establishing the necessary mitigatory and compensatory measures that are specific to the enterprise (EIA, Vol. 22, General Annex, p. 116).

Clearly, this is very far from the ILO-169 concept of the indigenous people having a voice in the overall decision on the development project.

Impacts on indigenous people, and the measures taken to avoid or alleviate these impacts, represent, or should represent, a central part of the approval process of the dam project. Prior to bidding on the construction project, the Basic Environmental Plan (PBA) must be prepared and approved, including its indigenous component. FUNAI is also supposed to issue an official opinion (*parecer*) approving the indigenous component of the PBA prior to the Ministry of Environment's authorizing the Ministry of Mines and Energy (MME) to hold the bidding. Instead, on 12 September

2014 MME published an official notice (*Portaria* MME No. 485) that the bidding would be held on 15 December 2014. At the time of the notice the Indigenous Component Study had not yet been submitted to FUNAI, let alone approved. After this irregularity was denounced in a major newspaper in Rio de Janeiro (Fariello, 2014) the bidding was suspended (Fonseca, 2014). It is now expected to take place in 2015, and the expected completion date or the dam has receded from January 2019 to August 2020 (Borges, 2014).

It is important to note that the waterway plan means that all dams along the route would have to be built to achieve this priority of the 'transportation axis' of the Programme for the Acceleration of Growth (PAC) (Brazil, MT, 2010). The São Luiz do Tapajós dam therefore has a role in bringing to completion the Chacorão dam, with major impact on the Munduruku indigenous land (Fearnside, 2015). The Chacorão dam is included in the viability study for São Luiz do Tapajós (CNEC Worley Parsons Engenharia S.A., 2014b). The São Luiz do Tapajós EIA mentions the waterway only in passing, with no indication of how this consequence of the dam will affect the Munduruku in the São Luiz do Tapajós area and throughout the Tapajós basin (EIA, Vol. 3, p. 171).

Indigenous leaders like Juarez Saw Munduruku are always very clear in their message: their people have been living here for thousands of years and they have a right to continue having their land and their river with clean water that gives them fish and life. They see the dam builders as only giving them false promises that are later broken.

TRADITIONAL RIVERSIDE DWELLERS (RIBEIRINHOS)

The EIA appears to be laying the ground for stripping riverside dwellers (known as '*ribeirinhos*') of their rights. *Ribeirinhos* are 'traditional populations' and, as such, have rights to consultation under ILO 169. However, the EIA asserts:

> However, one cannot state that these are traditional peoples under the terms of law No. 111,284 (Law for the Management of Public Forests) (....) nor as set out in Decree No. 6040, Article 3, Subparagraph 1, Traditional Peoples and Communities (….) (EIA, Vol. 7, p. 120).

Nevertheless, the EIA authors were forced to admit that one of the *ribeirinho* communities had been legally recognised as a 'traditional population': Montanha e Mangabal (EIA, Vol. 7, p. 121). This group was recognised in 2006 by a civil public suit [*ação civil pública*] (ACP No. 2006.39.02.000512-0; DOU No. 30654 of 3 April 2006). The area is described in a report by Maurício Torres and Wilsea Figueiredo (2006) [cited in the EIA, Vol. 7, p. 121]. These authors even found some of the same families that Henri Coudreau reported having visited at this location in 1895 (Coudreau, 1977 [1896]). The fact that this is the only *ribeirinho* community that has been studied and resulted in a citable report is the apparent explanation of why this is the only one that is officially recognised as 'traditional'.

The EIA mentions that the Ministry of Agrarian Development (MDA) "published, in the second half of 2011, a call for proposals for a diagnosis of traditional communities located on Federal Public land areas in Legal Amazonia, [which has] not [been] completed as of the closing of the present document" (EIA, Vol. 7, p. 124). But, elsewhere (Vol. 2, p. 80) the EIA states:

> (....) *ribeirinho* communities can be included [as traditional peoples], composed of a traditional non-indigenous resident population, the majority of whom inhabit the edges of watercourses, lakes and floodplains, and who are widely dependent on these water bodies as their source of water for domestic use, food and transportation.
>
> In this way, *ribeirinhos* potentially affected by the implantation of the São Luiz do Tapajós dam, if they are included [*enquadrados*] under the concept of traditional peoples and communities, should be resettled preferentially in areas that are appropriate for maintaining the protection of their cultural identity, organizational structure and access to the resources they traditionally use (EIA, Vol. 2, pp. 80-81).

The key term is 'if they are included' [*caso enquadrados*]. It is clear that, with the exception of Montanha e Mangabal, where a legal decision makes denial impossible, the EIA is indicating that *ribeirinhos* are not traditional and therefore have no right to consultation. Even for the one officially recognised 'traditional' population, no suggestion is made of a right to consultation, but only to having a more sensitive form of resettlement, and this only 'preferentially' [*preferencialmente*], that is, if this can be done conveniently, but without any form of obligation.

With reference to ILO 169, the EIA alleges that:

> Disagreement exists on the subject of the right to consultation, there being [an interpretation in] defence of a consultation directed only to indigenous communities and [there also being] a broader [interpretation] that includes *ribeirinhos* and traditional communities (EIA, Vol. 22, General Annex, p. 78).

Evidently this is being interpreted as meaning that there is no need to consult *ribeirinhos*, even if recognised as 'traditional communities'.

The EIA does a major disservice to the *ribeirinho* population by implicitly endorsing one of Amazonia's most notorious schemes for land theft [*grilagem*]. The history of the 1,138,000 hectares usurped by *Indústria e Comercio de Madeiras L.B. Marochi, Ltda.* (known as 'Indussolo') has been exhaustively documented by Maurício Torres (e.g. Torres, 2008, 2012). A public civil suit (MPF-PA, 2006) brought by the Federal Public Ministry was decided in favour of the *ribeirinhos* on 16 June 2006, indicating the invalidity of the Indussolo claims.

The EIA presents a map of the Montanha e Mangabal area showing the Indussolo land claims as if they were legitimate (Figure 3), thereby giving implied endorsement to them (EIA, Vol. 23, Tome II, p. 39). The text even emphasises the predominance of the large properties in the Indussolo land claims as an advantage, minimizing the number of entire properties being flooded and thereby averting the need to relocate the occupants:

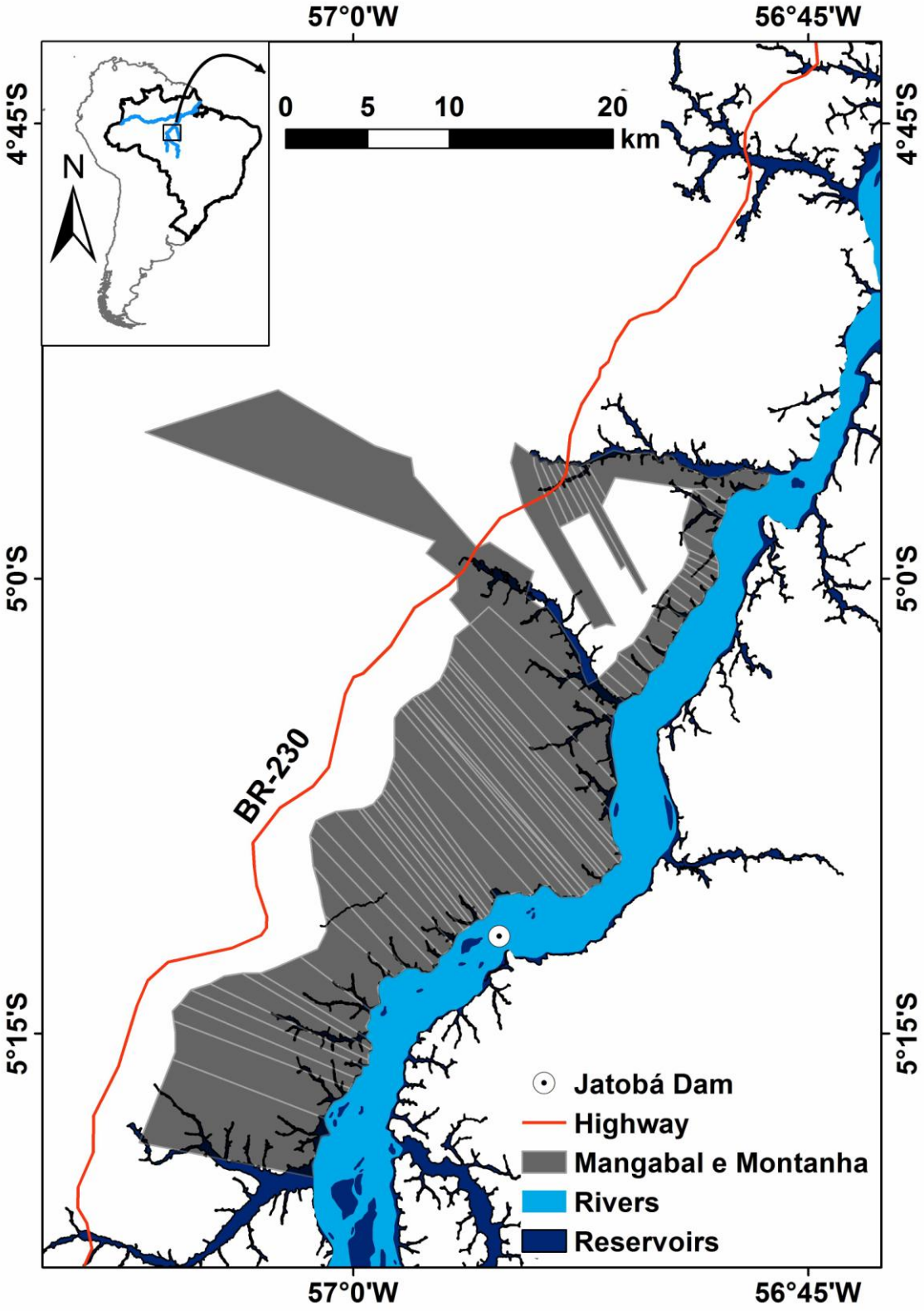
> In the portion of the river further upstream, the properties are of great size (....) constituting the portion [of the flooded area] with the best conditions for restructuring of productive activities and the permanence of the users [of the productive activities] (EIA, Vol. 23, Tome II, pp. 38-39).

In parallel with the role of São Luiz do Tapajós in motivating blockage of proposals to create new indigenous areas, the dam is also causing blockage of new extractive reserves. The Federal Public Ministry states:

> In 2006, based on studies carried out by Maurício Torres and Wilsea Figueiredo with the objective of documenting the antiquity of occupation by the riverside dwellers, the Federal Public Ministry obtained from the Federal Courts, by means of Public Civil Suit ACP nº 2006.39.02.000512-0, preliminary approval [*deferimento liminar*] of the complete interdiction of the area to any person who is not a member of the families of Montanha-Mangabal. In the same year, IBAMA carried out a public consultation to discuss the proposed creation of an extractive reserve (Resex), which was unanimously approved by the *ribeirinhos*. However, the proposal did not materialise, having been paralyzed by the Civil House of the Presidency of the Republic. This, it should be noted, occurred only because of the interest in the occupied area for a government hydroelectric project (MPF-PA, 2013).

Note that at the time in question the head of the Civil House was Dilma Rousseff, currently president of Brazil. Since then the National Institute for Colonization and Agrarian Reform (INCRA) has established a directed settlement project (PAD) approximately 50 km away and given colonist lots to many of the families that were expelled from their traditional riverside homes by Indussolo.

Figure 3. Map of the Montanha e Mangabal area presented in the EIA showing areas that were illegally appropriated (*griladas*) as legitimate properties.



Source: Redrawn from EIA, Vol. 23, Tome II, p. 39.

An estimated 2500 *ribeirinhos* are to be uprooted by the São Luiz do Tapajós and Jatobá dams (Aranha and Mota, 2015). Repeated demonstrations of the power of the dam-building consortium have led a sizeable fraction of them to give up their initial resistance to the dams and accept whatever resettlement arrangement is offered (Aranha and Mota, 2015).

COLONISTS

The EIA includes a voluminous accounting of the precarious state of public and private services in the area today. The idea that the dam will bring better schools, health care and employment opportunities was promoted among the non-indigenous population by the 'Tapajós Dialogue' programme (financed by the dam consortium), leading some of them to support the hydroelectric project. Temporary employment in jobs such as boatmen ferrying the scientists who were collecting data for the EIA were also important inducements. The poor state of services is a fact, but the supposed improvement is often illusory for poor rural people, and especially for indigenous people (see example of the Tucuruí dam: Fearnside, 1999).

Colonists have less legal rights than do indigenous and 'traditional' peoples: there is no question of consulting them about the project itself. For those that would be removed, their options are explained as:

> (....) the affected people [*atingidos*] have the following options: (i) total compensation in cash, (ii) partial compensation in cash, (iii) exchange of land, (iv) self-resettlement, and (v) exchange of house (EIA, Vol. 2, p. 78).

The destructive effect of cash compensation has been seen repeatedly in the past (e.g. Cernea, 1988, 2000; Oliver-Smith, 2009, 2010; Scudder, 2006). The people usually are penniless within a short while. Cash compensation is often preferred by dam construction projects because it provides better assurance that the project developers will be protected from possible future complaints by the affected people or their supporters.

URBAN RESIDENTS

No cities are to be flooded by the reservoir, but small towns [*povoados*] and villages [*aldeias*] are. The normal social impacts of large construction projects, such as prostitution, alcohol and crime, are essentially not discussed in the EIA. They are hinted at by quoting a statement by one of the Munduruku representatives at a meeting in Brasília:

> Roseni Saw [Munduruku] brought to the discussion facts involving hydroelectric dams that are already in operation and cited the negative effects brought about by enterprises of this size, fearing that the same could happen in the region: the projects that were executed did not have positive results. (....) Many people who had land before are beggars today. There was an increase in theft and prostitution (....) IBAMA is worried about fining the logging companies, but the greatest crimes are the hydroelectric dams. The government has its proposals, but we also have ours, which is the demarcation and final approval [*homologação*] of our lands (EIA, Vol. 22, p. 180).

In 1973 this author stayed in the small town (*povoado*) of São Luiz do Tapajós, near the site that has now been chosen for constructing the dam that bears the town's name. This was at the time of another massive development project: the Transamazon Highway (BR-230) (e.g. Fearnside, 1986). São Luiz do Tapajós was the nearest town to the camp of Queiroz Galvão, the firm building this stretch of the highway. This was the construction 'front' of the highway at that moment in history, and the force of impacts such as those alluded to by Roseni Saw was evident.

THE POLITICS OF DAM DECISIONS

The actors

The initial decision to build a dam in Brazil, such as São Luiz do Tapajós, is made by high-level officials in the Civil House (*Casa Civil*) in the presidential office (www.casacivil.gov.br) and its priority is set in conjunction with the Programme for Acceleration of Growth (Programa de Aceleração do Crescimento: PAC) (www.pac.gov.br) under the Ministry of Planning (Ministério do Planejamento, Orçamento e Gestão: MP) (www.planejamento.gov.br). Technical information comes from the Enterprise for Energy Research (*Empresa de Pesquisa Energética*: EPE) (www.epe.gov.br), which is under Brazilian Electrical Centres (*Centrais Elétricas Brasileiras S/A*: ELETROBRÁS) (www.eletrobras.com) in the Ministry of Mines and Energy (*Ministério de Minas e Energia*: MME) (www.mme.gov.br). The consortium formed to build and operate the dam (*Consórcio Tapajós*) is made up of CEMIG Geração e Transmissão S.A., Construções e Comércio Camargo Corrêa S/A, COPEL-GT - Copel Geração e Transmissão S.A., Électricité de France (EDF), ELETROBRÁS, ELETRONORTE, Endesa Brasil S.A. and GDF Suez Energy Latin America Participações Ltda. The consortium's interface with the local populations is through the 'Tapajós Study Group' (*Grupo de Estudos Tapajós*) made up of the companies in the consortium and led by ELETROBRÁS (www.grupodeestudostapajos.com.br).

This powerful group of government and industry actors is pitted against an assortment of non-governmental organizations (NGOs) and others who question the project. These include four local grassroots NGOs representing the Munduruku: the Da'uk Indigenous Association (Associação *Indígena Da'uk*, formerly '*Pusuru'), the Pahyhyp* Association (Associação *Pahyhyp), the* Ipereg Agu Munduruku Movement *(Movimento* Munduruku *Ipereg Agu) and the* Munduruku *Indigenous Council of the Upper Tapajós (Conselho Indígena Munduruku do Alto Tapajós: CIMAT).* National indigenist groups include the Coordination of Indigenous Organizations of Brazilian Amazonia *(Coordenação das Organizações Indígenas da Amazônia Brasileira*: COIAB) (www.coiab.com.br), the Eastern Amazonia Forum (*Fórum da Amazônia Oriental*: FAOR) (www.faor.org.br) and the Indigenist Missionary Council (*Conselho Indigenista Missionário*: CIMI) (www.cimi.org.br).

Other Brazilian NGOs engaged in the struggle against the dam include the Living Tapajós Movement (*Movimento Tapajós Vivo*) (http://movimentotapajosvivo.blogspot.com.br), the Socio-Environmental Institute (*Instituto Socioambiental*: ISA) (www.socioambiental.org), the Movement of Dam-Affected People (*Movimento dos Atingidos por Barragens*: MAB) (www.mabnacional.org.br/) and the Movement for the Living Xingu Forever (*Movimento Xingu Vivo para Sempre*: MXVPS) (www.xinguvivo.org.br). International NGOs include International Rivers (www.internationalrivers.org), Amazon Watch (http://amazonwatch.org) and Greenpeace (www.greenpeace.org/brasil).

Some portions of the press have been active in investigating and reporting on events on the Tapajós, particularly the social impacts of the dam preparations. These include the Agency for Reporting and Investigative Journalism (*Agência de Reportagem e Jornalismo Investigativo*: APublica) (http://apublica.org), Telma Monteiro (http://telmadmonteiro.blogspot.com), and Mongabay (www.mongabay.com). Mongabay is an international environmental website that, in addition to its own reporting, has supported Brazilian investigative journalists following these events.

Brazil's academic community has also contributed information that raises questions about the dam, especially researchers from the Federal University of Western Pará (*Universidade Federal do Oeste do Pará*: UFOPa) (www.ufopa.edu.br/), the Nucleus for High-Level Amazonian Studies (*Núcleo de Altos Estudos Amazônicos:* NAEA*)* at the Federal University of Pará *(Universidade Federal do Pará:* UFPA*)* (www.naea.ufpa.br) and the National Institute for Research in Amazonia (*Instituto Nacional de Pesquisas da Amazônia*: INPA) (www.inpa.gov.br). Groups of academics have been brought together by International Rivers and by Greenpeace to examine dam impacts, but, unlike the case of the Belo

Monte dam, no 'panel of experts' has been formed like the 40-member panel that accompanied Belo Monte's licensing process (e.g. Hernandez and Santos, 2011).

A key actor in the events on the Tapajós River has been the Federal Public Ministry (*Ministério Público Federal*: MPF) (www.prpa.mpf.mp.br), particularly the branch in Santarém. The Federal Public Ministry is a public prosecutor's office created by Brazil's 1988 constitution to defend the people against infringement of their constitutional and legislative protections. In this case, multiple violations of protections of indigenous peoples have led the Federal Public Ministry to obtain a series of injunctions against the dam. Most recently, on 15 June 2015 the Regional Federal Court in Itaituba ruled in favour of a public civil suit brought by the Federal Public Ministry ordering IBAMA to carry out consultations in accord with ILO-169 before licensing the dam (Presser, 2015). However, as will be explained, these injunctions are usually quickly reversed by means of 'security suspensions'.

Barriers to considering socioeconomic impacts in dam decisions

A series of barriers acts to impede consideration of socioeconomic impacts in decision making on dams and in the associated licensing process. One is the political influence of the construction companies that profit from building dams. In January 2013 Brazil's Supreme Electoral Court (*Tribunal Superior Eleitoral*: TSE) released information on campaign donations. The four largest donors to political campaigns over the preceding ten years were large construction companies that build dams and other infrastructure projects in Amazonia (Gama, 2013). These contributions are extraordinarily profitable for the companies, yielding over eight times the amount invested in political donations (Scofield Jr., 2011). In addition to these legal contributions, the existence of widespread illegal payments has recently come within the public domain. In March 2015 the chief executive officer of Camargo Corrêa (Brazil's second-largest construction firm) formally confessed to having paid R$100 million in '*propinas*' (bribes) to obtain 16% of the contracts for Belo Monte (*Amazonas em Tempo*, 2015). This amount was worth approximately US$50 million at the time of the contracts in 2010; if the other companies paid in similar proportions, the total would come to US$300 million for the Belo Monte contracts.

The financial flows (both legal and illegal) from business interests (e.g. contractors) to politicians and government bureaucrats illustrate the 'iron triangle', as this configuration is known in political science (e.g. Adams, 1981) (not to be confused with the homologous term in the field of project management). The benefits from the perspective of actors in each of the groups making up the triangle lead to decisions where the costs (both monetary and non-monetary) fall on others outside of the triangle, namely taxpayers and/or the residents of the affected area. Iron triangles have been identified as a feature of water resource development in locations ranging from California (Zetland, 2009) to the Mekong region of Southeast Asia (Molle et al., 2009a).

A biased system of environmental impact assessment constitutes another barrier, as illustrated by the São Luiz do Tapajós dam. The arrangement whereby the reports are contracted and paid directly by the project proponents represents an inherent structural bias that guarantees reports favourable to project approval (e.g. Fearnside and Barbosa, 1996).

A further barrier is executive interference with the environmental licensing agency (IBAMA). Documented cases include the Santo Antônio and Jirau dams on the Madeira River, where the technical staff of IBAMA produced formal opinions (*pareceres*) opposing approval of the prior license and the installation license, but were overruled by replacing the head of the licensing department and later the 'president' of IBAMA as a whole (Fearnside, 2014b). In the case of Belo Monte, the technical staff formally opposed approval of the installation license but were overruled by replacing IBAMA's 'president' (Fearnside, 2012a). These events illustrate the contradictions between alleged objectives from different administrations within the government - some components being more powerful than others. These events also indicate that the licensing is a contested process, which is clearly a general pattern.

An important barrier to elimination of biases in Brazil's environmental impact assessment system through legislation is *de facto* control of the National Congress by the 'ruralist' voting block that represents large landholders. The extent of this influence was dramatically revealed in May 2011 with the first vote in the House of Deputies on revising (gutting) Brazil's 'Forest Code'. The House of Deputies voted in a ratio of seven to one against the environment and against the interests of the overwhelming majority of the electorate. Representation in the House of Deputies is proportional to population, and 85% of Brazil's population is urban – with no financial stake in being permitted to deforest, for example, along watercourses and on steep hillsides. Opinion polls taken immediately after the vote indicated 80% of the population opposed to any change in the Forest Code (Lopes, 2011). The apparent explanation for the outcome lies in the financial power of soy planters and other agribusiness and ranching interests. The 'ruralist' block has consistently used its influence to weaken environmental regulations of all kinds, meaning that any proposed legislation to tighten EIA requirements would be likely to receive amendments giving the final legislation the opposite effect (Fearnside and Laurance, 2012).

A final barrier is the security-suspension legislation mentioned earlier. These laws serve as sort of 'safety net' for developers of dams and other projects, allowing courts to permit projects to proceed to completion no matter how many laws, constitutional guarantees or international agreements have been violated, since the only criterion needed is that the project be important for the 'public economy' – an argument that can be made for virtually all hydroelectric dams (see Fearnside, 2015). These laws were created by Brazil's 1964-1985 military dictatorship (Law No. 4348 of 26 June 1964; replaced by Law 12 016 of 7 August 2009), and after Brazil's 1988 constitution created the Public Ministry to defend the interests of the people, security suspensions were clarified to include overruling any actions of this new public prosecutor's office (Article 4 of Law 8437 of 30 June 1992).

Brazil's 'security suspensions' are a form of 'securitization', as such practices are known in the fields of political science and international relations (not to be confused with the homologous term in economics). 'Securitization' refers to classifying any given subject as a matter of national security, and thereby gaining both official sanction and popular support for overcoming any legal or other barriers that would hinder dealing with the alleged security issue (e.g. Molle et al., 2009b). Of course, this can also provide a handy tool for bypassing restraints on development projects that are planned for reasons unrelated to security, such as Amazonian dams. Securitization is a tactic that extends beyond invocating the 'security suspension' provisions in Brazilian laws: a recent case for another type of Amazonian development project is the BR-319 (Manaus-Porto Velho) Highway, where 'national security' was invoked to justify proceeding without the economic viability study that is required of all major infrastructure projects, despite the road not being a priority for security according to military authorities (Fearnside, 2012b).

The existence of 'security suspensions' is not widely known in Brazil, even among academics and other professionals outside of the legal area. This results in little impetus to change these laws. Added to this is the age-old shibboleth in Brazil that "the law is to be obeyed, not to be questioned". While violation of laws is commonplace in Brazil, popular action directed at inducing legislators to change laws is not. The tradition in Brazil, dating from colonial times, is instead to circumvent inconvenient restrictions at all levels through informal subterfuges: the '*jeitinho brasileiro*' (Rosenn, 1971). Repeal of 'security suspension' clauses (e.g. Article 4 of Law 8437 of 30 June 1992 and Article 15 of Law 12 016 of 7 August 2009), is an evident prerequisite for avoiding endless repetition of the problems illustrated by the São Luiz do Tapajós dam.

These barriers have allowed other dam projects to proceed regardless of impacts and licensing irregularities. Belo Monte, described as 'totally illegal' by the Federal Public Ministry (Miotto, 2011), offers a recent example. In the case of São Luiz do Tapajós the main counterweight to the dam proponents is the government's awareness of the political consequences if tensions lead to bloodshed. This is a real possibility given the Munduruku's determination to 'fight to the end' (Sandy, 2015).

CONCLUSIONS

The environmental impact assessment study (EIA) of the São Luiz do Tapajós dam ignores many serious socioeconomic impacts and minimises others. This treatment fits into a pattern of such reports being drafted to favour project approval by environmental authorities no matter how severe the impacts, rather than serving as an input to rational decision making and as a tool for protecting local residents. This needs to be changed to separate the proponents from the EIA process, for example, by having money for preparing the EIA placed in an independent fund and the selection and payment of consulting firms and others being done without participation of the proponents.

Environmental and social impacts catalogued in the EIA have essentially no influence on the overall decision to proceed with a project such as a hydroelectric dam, the decision having been made before information is gathered on impacts, based on perceived financial attractiveness. This system needs to be changed so that information gathering and public discussion occur before the decision.

The decision-making and licensing process provide an example of the 'iron triangle', where the interplay of corporations, politicians and government bureaucrats results in infrastructure projects going forward regardless of their monetary and non-monetary costs.

Licensing of the São Luiz do Tapajós dam also illustrates a contested process and shows that the government is not monolithic, but rather contains actors with diverse views. The much greater political power of pro-dam actors is evident.

The São Luiz do Tapajós example serves as a warning of the weakness of protections against serious impacts from the dozens of other large dams planned in Brazilian Amazonia, as well as in other countries with similar decision-making systems.

In addition to reform of the decision-making and licensing processes, including the EIA, legislative changes are needed to remove the ultimate weapon of dam-building interests, namely laws granting 'security suspensions' to override any legal or constitutional protections that impede a project that is important for the 'public economy'.

All of the needs for legal changes are currently constrained by the domination of Brazil's National Congress by the 'ruralist block' that represents large landholders who oppose environmental restrictions of all kinds.

The outcome of the rapidly advancing drama on the Tapajós River, as well as at other planned dam sites throughout Brazilian Amazonia, hinges on the contest taking place on the ground in the affected areas, particularly the struggle between indigenous peoples like the Munduruku and the three vertices of the 'iron triangle'.

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