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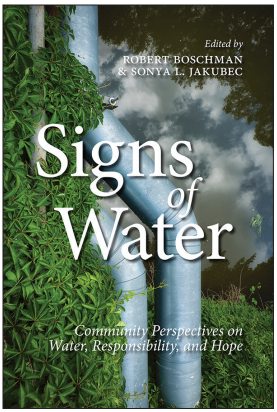

SIGNS OF WATER: COMMUNITY PERSPECTIVES ON WATER, RESPONSIBILITY, AND HOPE

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Unexpected Connections? Water Security, Law, Social Inequality, Disrespect for Cultural Diversity, and Environmental Degradation in the Upper Xingu Basin

Fernanda Viegas Reichardt, Andrea Garcia, and Maria Elisa de Paula Eduardo Garavello

The study presented in this chapter integrates the so-called "XINGU Project: Integrating land use planning and water governance in Amazonia: towards improved freshwater security in the agricultural frontier of Mato Grosso." Founded by the Belmont Forum, it consists of a group formed by some of the leading funding agencies for research projects on environmental change in the world, including the São Paulo Research Foundation (FAPESP), Brazil. The XINGU Project, initiated in 2013, proposes to address the interlinked main natural and human issues on water security at the agricultural frontier of the Mato Grosso State, Brazil.

Thus, this chapter looks to the Environmental Law and Sociology subarea of research of the XINGU Project. We explore the linkages between water security, social conflicts, and fragilities, and the challenges of responding in legal terms to water security risks in ways that avoid more

social violence in the Upper Xingu Basin, especially for the socio-environmental vulnerable communities.

The Upper Xingu Basin and the Environmental Law and Sociology Subarea of Research

The Xingu River Basin is among the main basins of the Amazon River Basin and the most extensive water network of the planet. In order to better plan the social and economic development of the Amazon region, the Brazilian government instituted the political concept of "Legal Amazon." With an area that corresponds to about 59% of the entire Brazilian territory, the "Legal Amazon" encompasses the states of Brazil that belong to the Amazon Basin, and among them the Mato Grosso State. According to the federal government, the nine states that are part of the "Legal Amazon" have similar economic, political, and social problems, and are inhabited by nearly 60% of the Brazilian Indigenous population (Ministry of National Integration [MI], n.d.).

According to the data of the Socio-Environmental Institute (ISA), the Xingu River Basin has a land area of about 51 million hectares, equivalent to approximately five-and-a-half times the size of Portugal. The headwaters region—the Upper Xingu Basin—is located in the northeast of the Mato Grosso State, Brazil, corresponding to 34% of the entire Xingu Basin. It is in a transition area between two different biomes: the Amazonian Biome, which represents 79.7%, and the "Cerrado Biome" (Brazilian savanna), which represents 20.3% (ISA, 2012). For a visual example of the Cerrado Biome in the Pimentel Barbosa Indigenous Reserve, one may refer to Figure 6.1.

The Evergreen Seasonal Forest, with peculiar physical and floristic characteristics and a high degree of endemism, is predominant in the Upper Xingu Region. Red and Yellow Latosols, flat topography, and a stable rainfall regime are attributes that stimulated the expansion of pastures and mainly soybean cultivation. The conversion of the pioneer economic activities (e.g., livestock) to soybeans transformed the Mato Grosso State into Brazil's largest soy producer, with 9.323 million hectares of planted area. According to the economic data of the Brazilian Agricultural Research Corporation (EMBRAPA), the production of 30.514 million tons of soybeans (2016–2017 crop) is considered fundamental for the

Figure 6.1. Cerrado [Brazilian Savannah], Pimentel Barbosa Indigenous Land. Photo by Fernanda Viegas Reichardt.

Brazilian agribusiness-based economy (Brazilian Agricultural Research Corporation [EMBRAPA], 2017).

The regional land profile is characterized by a high concentration of medium and large farms, which account for 70% of the Upper Xingu Basin. Around 24% of the territory corresponds to 16 Indigenous Lands that are inhabited by approximately 19 different ethnic groups. The Conservation Units are unrepresentative, accounting for 1% of the Upper Xingu territory. There are still 46 rural settlements arising from agrarian reform, which represents no more than 4% of the area of the Basin (ISA, 2012).

The region still faces severe problems related to deforestation, loss of biodiversity, changes in rainfall patterns (among other ecological issues) closely interlinked with social, cultural, and economic diversity. Different socio-cultural factors and their impacts played a leading role in the environmental degradation of the Basin (ISA, 2012). For example, most people who immigrated to the Upper Xingu coming from mid-west and northeast Brazil are cattle ranchers. Those people traditionally raise cattle based on low-input management such as building damns along the rivers

Figure 6.2. Amazon Basin, "Rio das Mortes." Photo by Fernanda Viegas Reichardt.

for the cattle and keeping livestock partially free by not fencing natural fragments.

In the field of social and legal research, we argue that the local water resources conservation must exceed the regulatory technical aspects, as the Brazilian Forest Code does. According to the premises of Democracy and Human Rights (as guarantees of cultural diversity), an equitable water management requires the inclusion of a range of socio-environmental diversity. Thus, a whole complex of dynamic rules—encompassing issues of the hydrological cycle, ecological aspects, and the respect of social diversity—is urgently required in legal interpretation to ensure the legal water protection of the of the rivers located in the Legal Amazon (see Figure 6.2 for a visual example of the of the "Das Mortes" River located in the Legal Amazon).

According to Heckenberger's (1996) archaeological research, the prehistory of the Upper Xingu begins around a thousand years ago. Radiocarbon dating indicates first occupations between 950 and 1050 A.D. At that time, the cultural pattern of the Upper Xingu tradition was established, recognizable archaeologically by a distinctive ceramics industry, settlement pattern, and circular villages with central squares. This pattern

remains intact to date. The Upper Xingu is the only area in the Brazilian Amazon where the continuity of Indigenous occupation can clearly be demonstrated from prehistoric times to the present. By 1400 A.D., the villages reached impressive proportions (20–50 hectares). These villages are among the largest villages in any area of lowland South America in prehistoric times. It is estimated that these villages sheltered about a thousand people and that in the western Culuene (or Kuluene) River lived probably more than ten thousand Indigenous people (Heckenberger, 1996).

It is important to highlight that archaeological records are notoriously difficult to obtain in the Amazon region due to the hot and humid climate and the considerable logistical difficulties that arise in the fieldwork. With respect to written documents, the first ethnographer who visited the Upper Xingu was Karl Von den Steinen (1855-1929). Through Von den Steinen's studies ("Unter den Naturvölkern Zentral-Brasiliens" or "Among the Aboriginals of Central Brazil"), we know that in the late nineteenth century more than 3,000 people lived in the Upper Xingu in 31 different villages. After Von den Steinen, other scientific and military expeditions entered the region and recorded the presence of its inhabitants. From the 1940s on, a new chapter in the history of the Xingu peoples began, blending with the history of the creation of the Xingu Indigenous National Park (ISA, 2002).

In the Upper Xingu, the non-Indigenous occupation process dates back to the 1940s, with the "Roncador Xingu Expedition." This expedition was an initiative of President Vargas' government to acquire and integrate the region into the country. In the formation of the "Aragarças" and "Xavantina" urban centres, the facilities of the Brazilian Aeronautic bases, with local Indigenous people's subsequent domination, have created the first conditions of the colonization process. However, the non-Indigenous occupation of the Upper Xingu was only intensified from the 1970s, 1980s, and 1990s onwards. Among the causes for this delay are the bad navigation conditions in the Xingu region. The colonization of the Upper Xingu was only possible after the construction of the BR-158 and BR-163 federal roads, which developed later into a network.

Indigenous peoples currently living in the southern portion of the Xingu Indigenous National Park are the Aweti, Kalapalo, Kamaiurá, Kuikuro, Matipu, Mehinako, Nahukuá, Naruvotu, Trumai, Wauja,

Figure 6.3. Etenhiritipá Village, Pimentel Barbosa Indigenous Land. Photo by Fernanda Viegas Reichardt.

Yawalapiti, Ikpeng, Kaiabi, Kisêdjê, Tapayuna, and Yudja peoples. The Xavante people currently live in nine different Indigenous lands, outside the Xingu Indigenous Park (ISA, 2002) (Figure 6.3).

In addition to the Indigenous peoples, fishermen and riparian communities also inhabit the Upper Xingu. Traditional populations, including fishermen and riparian peoples, were recognized by the Decree 6,040/2007. The Brazilian Federal Prosecution Service (*Ministério Público Federal Brasileiro - Procuradoria da República de Altamira*) recognized the Xingu Basin as a "Traditional Peoples Basin." In this sense, for data interpretation the Environmental Law and Sociology subarea of research must respect the regulatory framework below:

Universal Declaration on Cultural Diversity: The Universal Declaration on Cultural Diversity is a declaration adopted by the General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO) at its thirty-first session on November 2, 2001. This Declaration is comprised of twelve articles; Article 1, entitled "Cultural diversity, the common heritage of humanity," states that "As a source of exchange,

innovation and creativity, cultural diversity is as necessary for humankind as biodiversity is for the nature. In this sense, it is a common heritage of humanity and should be recognized and affirmed for the benefit of present and future generations" (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2001).

Convention 169 of Indigenous and Tribal Peoples Convention: The Indigenous and Tribal Peoples Convention, 1989 is the major binding international convention concerning Indigenous peoples, and a forerunner of the Declaration on the Rights of Indigenous Peoples. This Convention can be understood as a recalling of the terms of the Universal Declaration of Human Rights, the International Convention on Economic, Social and Cultural Rights, the International Covenant on Civil and Political Rights, and the many international instruments on the prevention of discrimination.

Pluralism Principle, as Fundament of the Federative Republic of Brazil: According to the Preamble of the Brazilian Federal Constitution, the democratic state must be "destined to ensure the exercise of social and individual rights, liberty, security, well-being, development, equality and justice as supreme values of a fraternal, pluralist and unprejudiced society, founded on social harmony and committed, in the domestic and international orders, to the peaceful solution of disputes …" (Brazil, Brazilian Federal Constitution, 1988).

Article 215 of the Brazilian Federal Constitution: The National Government shall guarantee to all full exercise of cultural rights and access to sources of national culture, and shall support and grant incentives for appreciation and diffusion of cultural expression (Brazil, Brazilian Federal Constitution, 1988).

Article 216, I and II of the Brazilian Federal Constitution: Brazilian cultural heritage includes material and immaterial goods, taken either individually or as a whole, that refer to the identity, action, and memory of the various groups that form Brazilian society, including: I. forms of

expression; II. modes of creating, making, and living (Brazil, Brazilian Federal Constitution, 1988).

Federal Law 9.985/2000: From this constitutional prerogative defined in article 225 of the Federal Constitution, Brazil has created the National System of Units of Conservation (*Sistema Nacional de Unidades de Conservação* [SNUC]), through the Federal Law No. 9.985/2000, to devise a plan for sustainable development and land conservation. Basically, SNUC divides protected areas into two groups: full protection and sustainable use areas, and full protection areas in order to have flexibility on land use policies. Brazil has created a dynamic system of regulations that promote and require sustainability practices to be implemented. These are innovative frameworks as they offer the community the possibility to participate in decision-making and to apply financial mechanisms that make the system viable, as well as encouraging the conservation of natural environments (Brazil, Federal Law 9.985/2000 2000).

Federal Decree 6.040/2007: Defines Traditional Peoples and Communities as "groups differentiated culturally that recognize themselves as such, who have their own forms of social organization, occupy and use territories and natural resources as a condition for their cultural, social, religious, ancestral and economic continuity, using knowledge, innovations and practices generated and transmitted by tradition." Two characteristics are strongly evident in these groups. The first concerns territory, which is considered as a necessary space for the cultural, social, and economic reproduction of these communities, whether used permanently or temporarily. It is in these areas that the memory and the material basis of cultural meanings that make up the identity of the group are symbolically printed. Another important factor is sustainable development: it is common to use natural resources in a balanced way, with concern in preserving the resources for future generations. Communities are marked by subsistence economies. Decree 6,040/2007 also established the National Policy for the Sustainable Development of Traditional Peoples and Communities (PNPCT). The main objective of this policy is to promote the sustainable development of traditional people and communities, with emphasis on the recognition, strengthening, and guarantee of their territorial, social, environmental,

economic, and cultural rights, with respect towards and appreciation of their identity, their organization, and their institutions (Brazil, Federal Decree 6.040/2007 2007).

Research Data

Our fieldwork started in 2016 with more than 24,000 kilometers of travelling in the Upper Xingu Basin and also in the municipalities of São Paulo and Cuiabá. In total, around 360 in-depth interviews through open-ended questioning with different social actors were made. Through these interviews, at least five different social groups were clearly identified for this research: (a) large and medium farmers[1]; (b) small farmers and agrarian reform settlers[2]; (c) fishermen and traditional riparian peoples; (d) rural workers; (e) and the Xavante people (traditional people of the Cerrado).

In addition to Cuiabá, the capital of the Mato Grosso state, the focus areas for the research include five municipalities of the south and east of the Xingu's headboard covering Campinápolis, Água Boa, Canarana, Ribeirão Cascalheira, and Querência, which are highly vulnerable to social-environmental conflicts. The municipalities of Água Boa and Campinápolis were selected for this study because they cover the Coluene River sub-basin. Along the river we can find a variety of human activity, use, and land occupation establishing the Coluene River sub-basin as having a cultural, social, and traditional importance for this study. Canarana, Querência, and Ribeirão Cascalheira are located in the headwaters of two major rivers, the Tanguro and the Suiá-Miçu, that also form the Xingu River. The municipalities still have a different social significance for this research owing to the colonization processes, which began in the 1970s but were actually intensified in the late 1990s. See Table 6.1-6.5 for information about the municipalities in the northeast of Mato Gosso state that are under more intense research processes.

Cuiabá, the capital of Mato Grosso, is a trading centre for an extensive cattle-raising and agricultural area. Cuiabá is among some of the fastest-growing cities in Brazil, followed by the growth of agribusiness in Mato Grosso, despite the economic recession that has in recent years affected Brazil as a whole. Two field trips to Cuiaba were made, respectively in March and April 2016. The interviews also focused on the agribusiness stakeholders and public agents.

Table 6.1: Characterization of the Municipality of Campinápolis/Mato Grosso state

Human Development Index - 2010 (IDHM 2010)	0.538
Territorial Area in km^2 - 2015	5,967,355
Resident Population - 2015	14,305
Indigenous Population - 2010	7,621
Literate Population	8,335
Health Facility Establishments - (SUS)	19
Total Employed Persons	879
Per Capita GDP R$ (Reais) - 2013	10,525.18

* Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.
** Unified Health System (SUS) is an administrative body responsible for the stewardship of both the public and private health systems, established in 1988 by the Brazilian federal government.
*** Per capita GDP is a measure of the total output of a region that takes gross domestic product (GDP) and divides it by the number of people in the region. Brazilian reais is the official currency of Brazil. Currently [06/2020], 1 real equals 0.24 Canadian dollars.

Table 6.2: Characterization of the Municipality of Água Boa/Mato Grosso state

Human Development Index - 2010 (IDHM 2010)	0.729
Territorial Area in km^2 - 2015	7,510,612
Resident Population - 2015	20,856
Indigenous Population - 2010	266
Literate Population	17,432
Health Facility Establishments – (SUS)	13
Total Employed Persons	5,085
Per Capita GDP R$ (Reais) - 2013	28,029.16

* Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.
** Unified Health System (SUS) is an administrative body responsible for the stewardship of both the public and private health systems, established in 1988 by the Brazilian federal government.
*** Per capita GDP is a measure of the total output of a region that takes gross domestic product (GDP) and divides it by the number of people in the region. Brazilian reais is the official currency of Brazil. Currently [06/2020], 1 real equals 0.24 Canadian dollars.

Table 6.3: Characterization of the Municipality of Canarana/Mato Grosso state

Human Development Index - 2010 (IDHM 2010)	0.693
Territorial Area in km^2 - 2015	10,882,402
Resident Population - 2015	18,784
Indigenous Population - 2010	1,349
Literate Population	14,851
Health Facility Establishments - SUS	16
Total Employed Persons	3,940
GDP per Capita R$ (Reais) - 2013	36,416.91

* Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.
** Unified Health System (SUS) is an administrative body responsible for the stewardship of both the public and private health systems, established in 1988 by the Brazilian federal government.
*** Per capita GDP is a measure of the total output of a region that takes gross domestic product (GDP) and divides it by the number of people in the region. Brazilian reais is the official currency of Brazil. Currently [06/2020], 1 real equals 0.24 Canadian dollars.

Table 6.4: Characterization of the municipality of Ribeirão Cascalheira/ Mato Grosso state

Human Development Index - 2010 (IDHM 2010)	0.670
Territorial Area in km^2 - 2015	11,354,805
Resident Population - 2015	8,881
Indigenous Population - 2010	794
Literate Population	7,097
Health Facility Establishments - SUS	6
Total Employed Persons	897
Per Capita GDP in R$ (Reais) - 2013	21,968.82

* Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.
** Unified Health System (SUS) is an administrative body responsible for the stewardship of both the public and private health systems, established in 1988 by the Brazilian federal government.
*** Per capita GDP is a measure of the total output of a region that takes gross domestic product (GDP) and divides it by the number of people in the region. Brazilian reais is the official currency of Brazil. Currently [06/2020], 1 real equals 0.24 Canadian dollars.

Table 6.5: Characterization of the municipality of Querência/Mato Grosso state

Human Development Index - 2010 (IDHM 2010)	0.692
Territorial Area in km^2 - 2015	17,786,195
Resident Population - 2015	13,033
Indigenous Population - 2010	1,349
Literate Population	10,544
Health Facility Establishments - SUS	14
Total Employed Persons	3,730
Per capita GDP R$ (Reais) - 2013	58,393.31

* Human Development Index (HDI) is a composite statistic of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development.
** Unified Health System (SUS) is an administrative body responsible for the stewardship of both the public and private health systems, established in 1988 by the Brazilian federal government.
*** Per capita GDP is a measure of the total output of a region that takes gross domestic product (GDP) and divides it by the number of people in the region. Brazilian reais is the official currency of Brazil. Currently [06/2020], 1 real equals 0.24 Canadian dollars.

São Paulo State and São Paulo city also encompass our fieldwork owing to their importance for the Brazilian economy and agribusiness trade. From early January 2016, we interviewed some stakeholders of the agribusiness sector, corporate executives of trading commodity companies operating in Brazil, public agents, academics from different areas of research, and social actors from the third sector. All interviewed persons are directly or indirectly related to the Upper Xingu's agricultural frontier.

From late February and early March 2016, we covered the municipalities of Água Boa, Campinápolis, Canarana, Querência, and Ribeirão Cascalheira. All these municipalities are located in a transition zone between the Cerrado biome, characteristic of the Brazilian Central Highlands, and the Amazon rainforest. The landscape is flat—with the exception of Campinápolis—with a predominance of forests interspersed by savannas and farmland. Disturbed landscapes composed of pastures and farmland were observed throughout most visited areas.

The five municipalities face problems related to deforestation and social, cultural, and economic diversity. In some of these, the social-environmental problems are more intense than in others. However, from

a socio-cultural point of view, the covered municipalities have some socio-environmental differences: biomes, soil types, vegetation, and relief; agricultural production models and technological support; colonization processes and socio-cultural and socio-economic issues. We emphasize that these differences could also be observed with high frequency within the same municipality. According to the Institute Brazilian Geography and Statistics data, among the visited municipalities the lowest human development index of the Mato Grosso State was registered in the municipality of Campinápolis, one of the communities with the highest concentration of Indigenous population in Brazil (Table 6.1). Among the 5,565 Brazilian municipalities, Campinápolis was ranked in the 5,339th place with human development indices comparable to the ones from Sub-Saharan Africa.

Social Groups Interviewed and the Main Results Obtained in the Upper Xingu

Large and Medium Farmers

- **visited municipalities**: Água Boa, Canarana, and Querência
- **origin of migration of this social group:** Brazilian South, Southeast, and Midwest

Intensive crop farming is a modern form of farming that refers to the industrialized production of crops. Intensive crop farming methods include innovation in agricultural machinery, farming methods, genetic engineering technology, techniques for achieving production in high scale, the creation of new markets for consumption, patent protection of genetic information, and global trade. These widespread methods in developed nations are also adopted in the Xingu region by large and medium farmers[3]. Soybean and corn producers of the municipalities of Água Boa, Canarana, and Querência have preference for medium and short-cycle crops, and the vast majority of the soybean and corn producers rely on trading companies to store the grain. The financing of the harvest is mostly done with owned resources or through partnerships with banks and

trading companies. The crops are planted in owned and leased properties. According to data released by the National Supply Company (CONAB), for five consecutive years the Mato Grosso State was considered the largest producer of grain and fiber of Brazil. The main crops of the Xingu region are soybeans and corn. The largest drop in the 2016 harvest was attributed to corn (second crop), with a reduction of almost 23% in the annual comparison. The reduction in the 2016 harvest was the result of bad weather, with no rain in the decisive moments for the development of the crops. The main problems reported by soybean and corn producers were poor infrastructure for transporting soybean harvests; energy supply; unequal relationship and dependence on trading companies; and changes in rain cycles (irrigation is starting to be considered an alternative).

Regarding Brazilian environmental legislation, in 1965 Brazil created and passed its first forest code. Laws such as the Forest Code do not exist in many places across the world. The Forest Code should be a stringent law that should ensure that our world's largest rainforest is protected. Unfortunately, the effectiveness of the Forest Code was not perceived and enforcing it has proved to be quite difficult over the years. Given federal and local governments with few resources, the Forest Code has been nearly impossible to implement and monitor. Brazil has a total area of approximately 8,516,000 km^2 and at least five different biomes, excluding the transitional areas of Biomes. The Amazon rainforest alone covers 6,900,000 km^2, the size of Mexico, Mongolia, Peru, and Egypt combined. Covering two million km^2, or 21% of the country's territory, the Cerrado is the second largest ecoregion in Brazil after the Amazon. The area is equivalent to the size of England, France, Germany, Italy, and Spain combined. According to the WWF recent data, only 20% of the Cerrado's original vegetation remains intact; less than 3% of the area is currently protected by law (see Figure 6.4 for a visual example of the frontier between the Cerrado and Amazon Forest biomes).

In 2012, a new Brazilian forest code was put into effect. The development of the new code was marked by social conflicts. On one hand, farmers pushed for an update which would allow them to harvest their land with less restriction from environmental laws. On the other, during the elaboration of the new code, environmentalists and civil society groups strongly reacted trying to reduce the proposed changes without success.

FIGURE 6.4. Canarana and Querência Border. According to the Brazilian forest legislation, the political border between the municipalities of Canarana and Querência is also the frontier between the Cerrado and Forest biomes. The Forest Code does not specifically protect biome transition areas. Photo by Fernanda Viegas Reichardt.

The code, published in May 2012 (Law 12.651/2012), mainly served agribusiness interests with measures such as extending amnesties to illegal deforestation carried out prior to 2008, and reducing areas that should be permanently maintained as forest (legal reserves) or where clearing vegetation was prohibited (area of permanent protection), such as on steep slopes and the margins of rivers and streams. In fact, deforestation in the Upper Xingu Region continues. According to the Research Institute

"Instituto do Homem e Meio Ambiente da Amazônia – Imazon" data, by February-March 2016 deforestation in Mato Grosso State had increased by 190%.

Through the in-depth interviews using open-ended questioning with large and medium farmers, there were absolutely no references to the soy moratorium, an agreement that ensures that companies do not trade, acquire, or finance soybean crops linked to deforestation in the Amazon. There were no significant reports of other kinds of public or private environmental conservation actions. The major health-related problem reported by this social group concerns pesticide contamination. All the producers interviewed complained about the increase in pesticide use. One hundred percent of the interviewees reported that they frequently smell agrochemicals everywhere during the application.

The interviewed farmers frequently insisted that the Xingu Basin does not belong to the Amazon region and this denial justifies the imbalanced relationship with the Indigenous people. These farmers believe that the area in question needs "development" and Indigenous people represent "socio-cultural backwardness." The total absence of the State (federal, state, and municipal governments) as a regulatory institution is one of the strongest data points obtained in this research. It was absolutely not uncommon to listen to the questioning about the Indigenous people's rights and territory demarcation and registration. In some interviews, the questioning about the human condition of Indigenous peoples appears, especially regarding the Xavante. From a sociological (and not legal) point of view, it is possible to make a clear parallel between the local reality and South Africa's apartheid. Some of these human rights violations are seen in the data within the previous tables and the discussion to follow.

In relation to the local non-Indigenous population, agricultural production does not seem to bring the expected development. For example, the only hospital in the region is located in Água Boa, with only a few medical specialties, and is in poor sanitary condition. Recently, a new hospital was built in the Querência municipality. Hospital intensive care units in the region exist only in Cuiaba, Goiânia, and Brasília, located about 1,000 km from the Upper Xingu. For these social groups, access to healthcare is normally obtained out of the Mato Grosso State. Water supply and

sanitation are still less than adequate, while some existing regulations are outdated (Tables 6.1-6.5).

Small Farmers: Agrarian Reform Settlers

- **visited municipalities:** Água Boa, Canarana, Querência
- **origin of migration of this social group:** Brazilian South and Southeast

In relation to Brazilian legislation, agrarian reform was initially conceptualized by the Federal Law 4504/64 called *Estatuto da Terra* or Land Statute. It is a set of measures that aim to promote the distribution of land in Brazil, through changes in ownership and use of rural properties, in order to address social justice and increase productivity. The possibility of implementing an agrarian reform in Brazil only occurred with the 1964 Constitutional Amendment No. 10 that inserted modifications in the Federal Constitution of 1946. Subsequently, the Brazilian Federal Constitution of 1988 presented the matter of agrarian reform in a progressive way, but still with conservative traits due to the country's private cultural heritage. The basic institutes of Brazilian agrarian law are currently oriented towards a fundamental right in the Federal Constitution. The law seeks to reconcile property with a social function of the land in order to better promote community justice.

However, the Brazilian agrarian reform has been severely criticized. The lack of infrastructure, limited policies geared to family farming, the financial difficulties of farmers, and low education are all factors that contribute to the limited success in the implementation of this law. Indeed, the law was beneficial to big producers and detrimental for small producers. The visited agrarian reform settlements highlighted the additional rural partnership agreements that supported soybean production, conforming with the family farming objectives, but demanding new layers of policy and work for smaller producers (see Figure 6.5 for a visual example of an interview carried out in a Rural Settlement in the municipality of Água Boa).

According to the interviews conducted in the rural settlements in the Xingu Region, one of the choices of soybean cultivation (instead of

FIGURE 6.5. Fieldwork, P.A. Jaraguá Settlement, Agua Boa municipality. Photo by Fernanda Viegas Reichardt.

producing food relating to family farming) in the settlements stems from the Sanitary Vigilance of Mato Grosso. The Sanitary Vigilance prohibits the marketing of any goods of animal origin produced in the settlements like milk, butter, cheese, lard, eggs, or meat. The prohibition complies with the law and with the health and hygiene standards adopted by the Mato Grosso State, which should ensure good health for its residents. However, these measures negatively impact the tradition and history of family farmers.

This decision was taken without any support and financial incentives for the small producers. As a consequence, milk and milk-derived products are declining. In the rural settlement, some handmade agriculture products for local subsistence are still available locally. The technical assistance provided in the settlements has not been enough to overcome

the serious cultivation problems the inhabitants face. All small producers interviewed complained about the increase in pesticide use, which even hinders the production of basic food (such as lettuce and cassava) for the community that lives in these rural settlements.

The State's efficiency in social and environmental conflicts resolution is very low, almost non-existent, leading to a very high rate of vulnerability for this population. Fundamental human rights such as basic sanitation, health, and education are absolutely precarious in the rural settlements visited. There are also not enough private or non-governmental organizations initiatives for local development. Access to drinking water is possible only by artesian wells, which represent a high cost for the poor local population. There are several reports of contamination of the wells by septic tanks. As a consequence, different health problems related to sanitary conditions were reported by the population. Among them was the growing number of cases of dengue fever in 2016.

Due to environmental legislation, the Federal Public Prosecutor's Office in Mato Grosso State initiated a public civil inquiry with the objective of investigating illegal deforestation in the Querência municipality. According to the Secretary of State for the Environment (Sema), around 60,000 hectares of native vegetation were burned in the rural settlement called "Brasil Novo." Unfortunately, this illegal deforestation has not been an isolated case in the region over the last decade. In the federal political discussions between the Brazilian Ministry of the Environment and the Brazilian Ministry of Agrarian Development regarding illegal deforestation, the consensus of the unsustainability of rural settlements in the state of Mato Grosso prevailed. There are also several reports of land abandonment caused by water issues in the region.

Fishermen and Riparian Peoples

- **visited municipalities:** Campinápolis, Canarana, and Querência
- **origin of migration of this social group:** unidentified

The main fishing arrangements observed along the Upper Xingu River basin were of artisanal and recreational fishing (fishing tourism). In the

São José do Couto District (Campinápolis municipality), the fishermen live near the rivers and practice artisanal fishing as their main activity. They also have, as complementary activities, subsistence farming and extractive activities.

The arrival of agriculture has promoted major changes to the natural environment, many of them related to water sources. All interviewed fishermen and riparian peoples complained about the increase in pesticides use. According to the statements of residents living in the São José do Couto District for at least twenty years, human occupation and deforestation growth have negatively affected fish stocks. These fishermen clearly perceive the decrease of some local fish species (especially large fish such as Pirarara and Jaú)[4] and report a great ecological imbalance in the Coluene (or Kuluene) River, which is one of the Xingu's main tributaries. However, predatory fishing and hunting tourism in the region are reported as a major problem for this social group. The high rate of homicides, child prostitution, and other forms of human rights violations also directly affect this population.

Regarding the Indigenous peoples, the Xingu Indigenous Park[5] lies across the agriculture frontiers in the historically highest-deforestation regions of the Amazon, as already reported in this chapter. In the 280,000 km² of the Park, most of the twenty-four Indigenous groups who inhabit the area depend on subsistence agriculture (cassava), hunting, and fishing. Indigenous peoples' historical management and use of these landscapes have enabled their long-term occupation and ultimately their protection. The different Indigenous peoples that inhabit the Park have a close interdependence relation with the natural resources, especially water: it is for this reason that they have a cosmological relationship with natural resources. Forest, water, and spirituality seem to go hand in hand. In fact, many of these peoples do not separate the concepts of environment, water, cosmology, and society.

However, according to the Indigenous groups' reports, dams, predatory fishing, road paving, logging, and mining have caused a large decrease in fish stocks. Added to these problems is the contamination of water resources by agrochemicals, untreated sewage, plastics, and other synthetic waste together with an increasing demand for agricultural commodities and the continued degradation of the upper headwaters outside the Xingu

Indigenous Park borders. Indigenous groups' reports on changing fire and rainfall regimes indicate that these facts may themselves also evidence climate change impacts, a new and serious threat. For example, in the year 2016–2017 the drought that hit the region drastically reduced cassava production. This root is the main source of food and raw material for the production of various products. During this period, there were numerous reports of famine in the Xingu Indigenous Park and, consequently, an increase in dependence on industrialized products.

It is important to highlight that Xingu headwaters are located outside the Xingu Indigenous Park, so that local Indigenous populations perceive the environmental impacts that occur in the surrounding area of the Park mainly through changes in water resources and climate. According to the testimony of the Cacique Yacuma Kamayurá (Indigenous chief of the Kamayurá people), "the stars are no longer telling us the right time to plant, nor do they announce the rainy season"; and "the water is becoming increasingly blurred, today the Xingu waters have a beer-like colour and is no longer crystal clear like before."

The high rate of human rights violations is also reported by this population. One of the most shocking examples of human rights violations reported by the Kuikuro Indigenous population of the Curumim Village relates to an accident suffered by a fifteen-year-old girl in 2002. Without going into the details of this accident, it is worth considering its consequences. Since 2002, the Indigenous woman suffers from paralysis in almost all her body, without any medical or legal assistance. We clarify that the term *paralysis* is not being applied in a technical way, because the family did not have access either to police or medical records reporting how the accident happened in addition to the girl's health condition. Lack of access to police or medical records formally prevented her family from securing justice or any kind of public legal support.

Human dignity is inviolable and it must be respected and protected by the Brazilian government. The dignity of the human person is not only a fundamental right in itself, but constitutes the basis of fundamental rights in the national and international law. Despite the law, the different kinds of human rights violations suffered by the local Indigenous population are usual and recurrent. Unfortunately, the above example, which clearly demonstrates the Brazilian State's (at the federal, state, and municipal

levels) inefficiency in conflict resolution, is only one case among many of the most basic rights violation reported by these peoples.

Rural Workers

- **visited region:** Canarana, Querência, and Ribeirão Cascalheira
- **origin of migration of this social group:** Brazilian North and Northeast

Poverty is historically considered the major cause of the migratory flow in Brazil. In consonance with the criteria adopted by the federal government, populations in poverty conditions receive up to 70.00 reais per month. Populations in extreme poverty conditions receive up to 140.00 reais. This respectively corresponds to approximately 28.00 and 56.00 Canadian dollars in September 2017.

A study carried out by the United Nations in partnership with the Brazilian federal government through the International Policy Center for Inclusive Growth, published in April 2016, concluded that between 2004 and 2013, poverty rates in Brazil have decreased from 20% to 9%. Extreme poverty rates have also been reduced from 7% to 4%. However, the main aspects or profiles of poverty remain the same: they are more present in the Brazilian North and Northeast rural areas.

Western Amazon and Maranhão State have very high levels of agricultural poverty verging on catastrophic dimension. Hunger, thirst, diseases, unemployment, illiteracy, low rural incomes, limited landownership, and variable climatic conditions historically drive migration from this region to the rest of Brazil in search of jobs and better living conditions. In the last decades, the migratory flow has intensified to the Amazon agricultural frontiers, including the Upper Xingu Basin.

Several of the rural workers interviewed in this survey (men under thirty-five years of age) are formally employed by the agribusiness sector that operates under very high technology. The labour relationship gives them legal benefits and protections in compliance with Brazilian legislation. However, the previous results of interviews still reveal a situation of socio-environmental vulnerability with negative repercussions on

production, health, and lifestyle. They also demonstrate human health issues, such as pesticide toxicity.

Informal work in the Upper Xingu was also reported, which is not covered by labour law provisions. Debilitating workdays, degrading working conditions, or restricting worker freedom were frequently reported. In some cases, interviewees cited child/underage labour and the use or threat of violence against workers. Some of the interviews describe true squalid working conditions, comparable to contemporary slavery. "Slave workers" are mainly used in the cleaning of the woods for the planting of seeds.

Other kinds of human rights violations were reported by this social group, including police violence, homicides, and child prostitution. In relation to public health, all the rural workers interviewed complained mostly about the increase in pesticide use. They reported problems such as headaches, eye and body itching, and an increase in cancer cases. Frequent use of pesticides of illegal origin, and clearly prohibited in Brazil, were also reported.

Xavante Indigenous People

- **visited region:** Água Boa, Campinápolis, Canarana, and Ribeirão Cascalheira
- **origin of migration of this social group:** Brazilian Midwest

According to data from the Demographic Census conducted by the Brazilian Institute of Geography and Statistics in 2010, the current Xavante Indigenous population of 19,259 individuals is distributed in twelve different territories.

Cacique Jurandir Siridiwe Xavante[6] (Figure 6.6) is the leader of the Etenhiritipá village, which is located in the Pimentel Barbosa Indigenous Territory between the municipalities of Canarana and Ribeirão Cascalheira, in the Brazilian central plateau between the Rio das Mortes and the Xingu River headwaters, where this research step was more deeply carried out. Cacique Jurandir reported that the first historical reference to the Xavante date from the eighteenth century, when they inhabited the northern and central regions of the state of Goiás. Mobility is a hallmark

Figure 6.6. Fieldwork, Cacique Jurandir Siridiwe Xavante, Etenhiritipá Village, Pimentel Barbosa Indigenous Land. Photo courtesy of Cacique Jurandir Siridiwe Xavante.

of this people, considered as nomadic or semi-nomadic, with long periods of dispersion in their territory. In the eighteenth century the discovery of gold began the expansion of the so-called Capitania de Goiás (later called Goiás State), which led to the policy of settlements, with reduction and pacification of the Indigenous peoples. During this period the Xavante became the target of military campaigns. Invasions of their lands, slavery, armed attacks, diseases, and resettlement projects were some of the factors that motivated them to move to the east, establishing themselves in the east of the River Xingu Basin and west of the Araguaia River. In the twentieth century, the contact of the Xavante groups with non-Indigenous society took place in different ways and at different times. Until the mid-1950s, some groups remained relatively isolated and independent. This isolation was interrupted by the occupation of their lands by the non-Indigenous population. At the end of the 1940s, the impossibility of other retreats and their very reduced territory forced the groups that currently

inhabit the Indigenous lands of Pimentel Barbosa to establish permanent contact with the surrounding society.

The strategy developed by the Xavante people in an attempt to preserve their territory and maintain their tradition with autonomy is called the "Xavante Strategy." Eight young Xavantes participated in a student exchange program. They were able to live with "white men" families of different social classes for several years and study in the Brazilian metropolitan regions. Some of them have graduated and have some knowledge of the English language, such as Cacique Paulo Cipassé Xavante. They acquired knowledge of the Portuguese language and non-Indigenous culture and became interlocutors of their people and nowadays are politically active, social agents of their people.

Regarding socio-environmental issues related to the Xavantes, human community and physical space are integrated concepts for them, which can never be separated. Places where people inhabit gain a symbolic meaning through social and cosmological experiences. This is the concept of "Ró," which is a literal translation of the Akwén language to English and means "place" or "territory." Since the meaning of place/territory can be offered in distinct contexts and employed in the service of different goals, it is useful to distinguish the definition in the context used by the Xavantes. Thus, "Ró" can be interpreted as a unifying concept that encompasses different terms as "Cerrado" (tropical savanna ecoregion), territoriality (with social and cosmological meanings), and "A'uwe" (Xavante people). According to Cacique Jurandir Siridiwe Xavante,

> Ró is not only the place from which we take our food. It is also the source of our spiritual strength. It is where we teach each new generation how to become great warriors, how to become great hunters. Our relationship with Ró is very deep; we have strong physical and spiritual bonds with it. We perform many ceremonies in Ró, like the 'Wai'a' spiritual initiation. In Ró we prepare the wapté, pre-initiate boys, for the ear-piercing ceremony that transforms them into adults, and then we take them for hunting (May 27, 2015).

In other words, Ró is the existence condition of the Xavantes as A'uwe (or people).

As the Xavantes are traditionally hunter-gatherer (gathering wild plants and hunting wild animals), game meat is a central component of their diet and social life. The cultivation of maize is the most outstanding crop for the Xavante people and plays a key role in the Xanantes' socio-cosmology. Squash, cassava, and beans are also cultivated by them.

However, wild animals are becoming scarce in their territory. In different interviews, the Xavantes pointed out, as main causes of wild animal scarcity, deforestation, reduction of biological diversity due to soybean cultivation, and intensive use of pesticides. The lack of animal protein (game meat) and the contamination of fish and "tracajás"[7] by pesticides are severe issues, especially for the children. According to UNICEF's widely publicized report in September 2014, one of the most serious problems faced by the Xavante people is the infant mortality rate, the second highest in Brazil, surpassing the indices of countries such as Kenya, Ghana, Namibia, and Zimbabwe. Malnutrition is among the leading causes of infant mortality.

Despite the Xavante people's effort to maintain their culture, they cannot sustain their traditional livelihoods anymore. They are becoming increasingly dependent on goods and industrialized products. In this scenario, alcoholism appears as a serious factor (or consequence) of negative socio-cultural impacts. Diseases, especially dengue fever, tuberculosis, and influenza are major public health problems.

The state's absence in the conflict resolution causes several violations in human rights and cultural diversity rights. The relations established between the surrounding community and the Xavante people can be compared to the South African apartheid, although not legally formalized. Apartheid was a segregationist regime that denied Black people their social, economic, and political rights. In a similar way, informal rules, social control systems, and "racial" segregation are imposed on the Xavante people. The informal ban on attending certain public places, police violence, and the prejudice suffered by Indigenous students in schools are some of the reported examples. The factors presented in this section of the chapter lead, among others, to a critical social and environmental state of vulnerability that can be comparable to a veiled ethnocide.

Concluding Remarks

Despite the fact that the Brazilian Federal Public Ministry recognized the Xingu Basin as a "Traditional Peoples Basin," the regulatory framework, which includes, among other laws, the Universal Declaration on Cultural Diversity, is only formally observed and with very low local effectiveness. As in the rest of the Legal Amazon, the Upper Xingu region faces severe problems related to deforestation, loss of biodiversity, and changes in rainfall patterns (among other ecological issues) closely interlinked with social, cultural, and economic diversity. Thus, the expansion of an agricultural frontier in the Amazon Basin represents an unresolved tension between the allocation of water for agriculture and for different sociocultural and ecological demands.

The revised Forest Code was approved in 2012 after more than a decade of efforts by Brazil's powerful agricultural lobby. The changes weakened restrictions for landowners, allowing them to clear land closer to riverbanks, and allowed those who had illegally felled land not to face penalties if they signed an agreement to replant trees, which is unlikely to be enforced.

As a result of the retrogression of environmental law, deforestation takes on unimaginable proportions. Data from the Monitoring System for Deforestation in the Legal Amazon of the Brazilian federal government of the Amazon show that the rate of forest destruction increased by about 30% from August 2015 to July 2016. There were almost 8,000 square kilometers deforested in one year—a destruction equivalent to 128 forest football fields per hour. Currently, different infrastructure projects in the Amazon region are also a cause of serious social-environmental damage.

Social rights are violated in even greater proportions. Brazil is experiencing severe restrictions with respect to different social rights. For example, Brazil's Lower House discussed the rural labour reform proposed to allow producers to replace workers' wages with crops or land. The proposed measure is seen as the legalization of "modern slavery" by various national and international human rights bodies.

All these are serious and urgent problems that directly affect the most vulnerable local populations, and which can also be considered as crimes against humanity.

NOTES

1 A medium rural property has an area of 320 to 1,200 hectares, while a large rural property has an area greater than 1,200 hectares.

2 A *minifundio* is a rural property of less than 80 hectares, and a small property is an area between 80 and 320 hectares.

3 See above, note 1.

4 The redtail catfish, *phractocephalus hemioliopterus*, is known in Brazil as *pirarara*. It is the only extant species of the genus *phractocephalus*. The pirarara can reach about 1.8 m in length and about 80 kg in weight. The gilded catfish, *zungaro zungaro*, or *jaú*, as it is known in Brazil, is a South American catfish (order *siluriformes*) of the family *pimelodidae*. It is the only species of the monotypic genus *zungaro*. The jaú can reach 140 cm in total length, weighing around 50 kg.

5 The Xingu Indigenous Park (in Portuguese, *Parque Indígena do Xingu*) is an Indigenous territory of Brazil, first created in 1961 as a national park. Its purposes are to protect the environment and the several Xingu Indigenous peoples in the area.

6 "Cacique" is the title given to the leader of an Indigenous group.

7 *Podocnemis unifilis* is a species of bluish-black turtle with yellow spots. Popularly called *tracajá*, it lives in many watersheds in northern South America.

REFERENCES

BRAZIL (Brazilian Federal Constitution). (1988). Official Press. Retrieved June 13, 2017, from https://www.imprensaoficial.com.br/downloads/pdf/Constituicoes_declaracao.pdf

BRAZIL (Federal Law 9.985/2000). (2000). Official Press. Retrieved June 13, 2017, from http://www.planalto.gov.br/ccivil_03/leis/L9985.htm

BRAZIL (Federal Decree 6.040/2007). (2007). Official Press. Retrieved June 13, 2017, from http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/decreto/d6040.htm

EMBRAPA (Brazilian Agricultural Research Corporation). (2017). *Embrapa Soy*. Retrieved June 8, 2017, from https://www.embrapa.br/soja/cultivos/soja1/dados-economicos

HECKENBERGER, M. (1996). *War and peace in the shadow of empire: sociopolitical change in the upper Xingu of Southeastern Amazonia, A.D. 1400-2000* [Doctoral dissertation, University of Pittsburgh]. Retrieved May 14, 2017, from http://booksali.net/diryy/war-and-peace-in-the-shadow-of-empire-by-michael-j-heckenberger.pdf

ILO (International Labour Organization). (1989). *Indigenous and Tribal Peoples Convention n. 169*. Retrieved June 13, 2017, from http://www.ilo.org/global/topics/Indigenous-tribal/lang--en/index.htm

ISA (Socioenvironmental Institute). (2002). " From the first expedition to the creation of the Park". Retrieved May 13, 2017, from https://pib.socioambiental.org/pt/povo/xingu/1541

ISA (Socioenvironmental Institute). (2012). “De Olho na Bacia do Xingu”. Retrieved June 8, 2017, from https://www.socioambiental.org/pt-br/o-isa/publicacoes/de-olho-na-bacia-do-xingu

MI (Ministry of National Integration / Superintendence of the Amazonian Economic Valuation Plan). (n.d.). “Legislation of the Amazon Region”. Retrieved June 8, 2017, from http://www.sudam.gov.br/index.php/plano-de-acao/58-acesso-a-informacao/86-legislacao-da-amazonia

UNESCO (United Nations Educational, Scientific and Cultural Organization). 2001. Universal Declaration on Cultural Diversity. Paris: UNESCO. Retrieved June 13, 2017, from http://portal.unesco.org/en/ev.php-URL_ID=13179&URL_DO=DO_TOPIC&URL_SECTION=201.html