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Who Owns Guaraná? Legal Strategies, Development Policies and Agricultural Practices in Brazilian Amazonia

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This paper offers a historical perspective on the interactions between legal standards and agricultural practices relating to guaraná, an energy-inducing Amazonian plant that is in increasing demand. Guaraná is managed in a number of socio-technical contexts, ranging from the fizzy drink industry to alternative agro-ecological farming systems, and is subject to a great many legal rules that determine the conditions for its use and appropriation. The paper shows how, in guaraná's native region of Maués, Brazilian Amazonia, various stakeholders including the indigenous population, associations of smallholdings and multinationals use legal standards in order to gain prerogatives over the plant and/or win a share of a growing market. In spite of the fact that the plant has been domesticated by the Sateré-Mawé and that traditional knowledge has been recognized in Brazil, to a certain extent history has dispossessed them of their rights to guaraná. New political and economic circumstances have favoured those actors committed to strategies of agricultural modernization and industrial processing. On the other hand, the ecologization of agriculture and the increasing numbers of instruments for differentiating production (such as fair trade, organic farming and geographical indications) seem to be favouring diversification in the methods of managing guaraná, as well as a certain re-appropriation of the plant by local communities.

Keywords: agrobiodiversity, agro-ecology, traditional knowledge, seeds, intellectual property

INTRODUCTION

Guaraná (*Paullinia cupana* var. *sorbilis*, Sapindaceae) is an agroforest plant from Amazonia with strong links to a group of indigenous people: the Sateré-Mawé, who have been claiming rights to the plant since the 1980s. The plant is in increasing demand and has gained a national and international reputation for its stimulant properties, widely promoted by agribusiness. Its seeds come in clusters and contain high levels of caffeine, trace elements and vitamins. Thanks to the combined action of these various components, guaraná has the reputation of being an elixir of eternal youth and of stimulating cognitive functions and

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memory (Smith and Atroch 2010). When dried and roasted, the seeds are sold on the national and international markets for the preparation of fizzy drinks, as a source of caffeine for industry and, more recently, as a food supplement in the parapharmaceutical industry.

In the state of Amazonas in Brazil, different socio-technical systems now coexist for the production of guaraná.[1] The Sateré-Mawé people claim to be the custodians of the genetic diversity of the plant, having been linked to its original location. They also claim to collect seedlings from wild forest seeds to be grown in their fields (Henman 1982). This 'native guaraná' has a fair trade label (Raynolds 2012) and has drawn the attention of the international Slow Food network, which has chosen it as a sentinel project. The multinational Ambev, a beer company that is a partner of Pepsi, industrially manufactures an extremely popular soda (*Guaraná Antarctica*) from guaraná extract produced by small farmers (*agricultores familiares*). These small farmers, who are often referred to as *caboclos*[2] and settled in the region after the extractivism decline (Clüsener-Godt and Sachs 1993), are being pushed into adopting modern agricultural practices, but with varying degrees of success.[3] Not far away, Embrapa,[4] a state-run agricultural research body, has been working on improved varieties for over 20 years, in accordance with agricultural policies aiming at modernizing agriculture and setting up a productivist model.[5] It distributes these to the farming communities of *caboclos*, whose practices for managing the plant are still poorly known and recognized by its agricultural researchers and technicians who – as is often the case in Brazilian Amazonia – fail to take local knowledge into account.

After several decades during which such a productivist model has dominated, externalizing social and ecological costs, the increasing numbers of economic outlets and the commercial success of guaraná derivatives have been favourable factors for the diversification of the ways in which the plant is managed in its native region. Another decisive factor has been the inclusion of environmental considerations in production activities, with the emergence of the concept of sustainable development and the promotion of agro-ecology at the Rio Summit in 1992.[6] The standards and criteria for agricultural performance have been reviewed, controversy is arising as to the effectiveness of the respective models, and the importance of local practices in biodiversity conservation has gained prominence (Agrawal 1995; Dahan and Pinton 2008). As markets for biodiversity are being built (Aubertin et al. 2007), the juxtaposition of different socio-economic models within a geographical area (agribusiness, cooperatives, small-scale farming, ethnodevelopment), as well as the use of different labels (fair trade, organic farming, geographical indications) tend to create tensions and confusion between production chains. Embrapa, Ambev and local communities (both indigenous and *caboclos*) are

[1] By 'socio-technical' system is meant a system in which social and technical aspects are of the same order of reality, with a high level of interaction between them (Akrich 1989).

[2] Even if the category is in itself controversial (i.e. pejorative for some) or too loose (i.e. covering a vast array of social organizations), we will use the term *caboclo* to denominate the smallholders of Maués and Urucará who are not indigenous peoples. The term *caboclo* refers to the riverine and interfluvial rural populations of the Amazon. *Caboclos* have inherited the agricultural knowledge of pre-Colombian populations related to floodplain agriculture; however, this knowledge has been shaped by historical factors, land tenure and available market opportunities (Brondizio 2004).

[3] On the new issues faced by 'family agriculture' in Brazil, see Oliveira et al. (2011).

[4] *Empresa Brasileira de Pesquisa Agropecuária*.

[5] Productivism can be conceptualized as a commitment to an intensive and industrially driven agriculture with state support, based on output and increased productivity (Wilson 2001).

[6] Agro-ecology may be thought of as a new discipline (the study of the interactions between agriculture and ecosystems), but also as a practice seeking to develop food production in a sustainable manner. At the same time, it is a broader social movement integrating politically the social actors who promote institutional and social changes towards sustainable agriculture (Wezel et al. 2009; Altieri and Toledo 2011; González 2012).

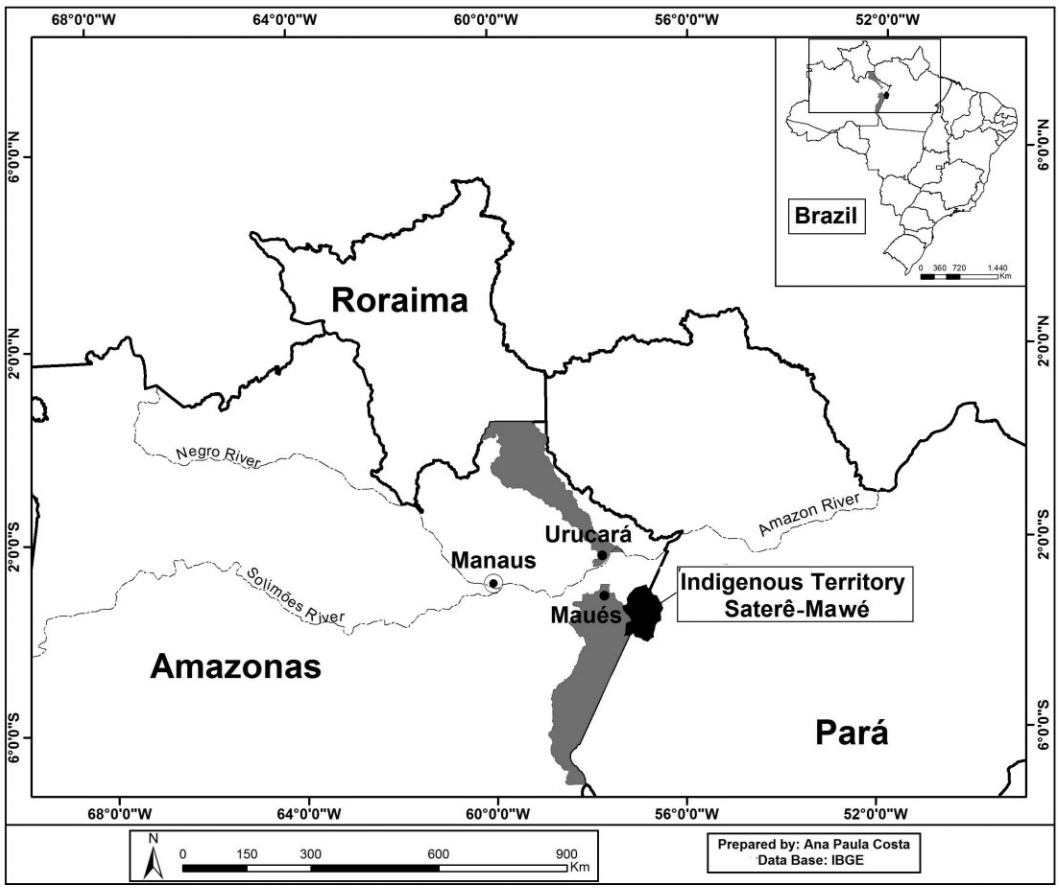
claiming rights concerning the intrinsic properties of guaraná and the specific aspects of how it is grown and processed, while state agencies and social movements define sometimes conflicting rural development policies.

This paper reviews, with a diachronic approach, the different directions taken by guaraná production in its native region over the past 30 years, examining the underlying socio-technical systems in conjunction with the legal systems governing them or giving rise to them. The approach adopted in this paper is both formalist (law as a system of norms that can be interpreted and contested) and critical (law as a means of domination or emancipation). Our objective is to demonstrate the sociological meaning of the details of law, the latter being conceptualized both as a system aiming at organizing society (by creating institutions and distributing rights and obligations) and as a tool used by actors in order to secure their position or to gain opportunities (Filoche 2013). As such, law is, beyond what is written in a legal document and what is interpreted by public administration or judges, made by the set of agents who, while being determined by interests and constraints associated with their position in different fields (legal, but also political or religious), elaborate private revendications and confer to them a 'social problem' status (Bourdieu 1986). This paper focuses on the relations between the four categories of stakeholders (Sateré-Mawé, *caboclos*, Ambev and Embrapa), who, according to their social position and strategies, draw on certain rights from among the tangle of coexisting standards. When it comes to define what type of guaraná they want, how to produce it and for what type of use or market, these relations range from opposition to cooperation, even if the objectives pursued are not always the same when partnerships are implemented. Because of these equivocal relations, actor network theory (ANT) has provided some useful elements during our research (Latour 1999). ANT postulates that the *actant* – any agent, collective or individual, human or non-human – can associate or disassociate with other agents, creating networked associations, which define them. Among other things, 'ANT is interested in the ways in which networks organize and gain coherence and consistence (stabilize); . . . how they enlist others to invest in or follow the program (enroll); . . . and how they become functionally indispensable (as obligatory points of passage)' (Crawford 2005).

We draw on field research conducted in 1999, and between 2007 and 2011, in Manaus, Urucará and Maués, where the indigenous territory of the Sateré-Mawé people is located (Figure 1). We carried out individual interviews with institutional actors (public research, political leaders, individuals or entities involved in the creation of production chains). At the same time, because of the diverse networks they are involved in, we targeted three groups of producers who accepted to share with us their daily activities: the indigenous Sateré-Mawé community in Maués, *caboclos* groups in Maués and a *caboclo* cooperative with a strong cohesion history in Urucará. We were thus able to rely on participant observation and semi-structured interviews relating to their agricultural and social practices. Lastly, we made extensive use of bibliographical data on the Maués region (history, anthropology, public policies), while collecting legal texts and statements from the institutions in charge of the political management of biodiversity issues.

The first task is to analyse the standardization of guaraná at a time when it is moving towards becoming a plant grown for industry. This will show how the rationale of agricultural productivism and the standardization of varieties have favoured a certain type of agrobiodiversity management, and made it possible to assign rights to varieties to the advantage of certain parties. Next, we will show how the emergence of new alternative agri-food sectors has led to (or resulted from) the diversification of agricultural management models that involve environmental and social concerns, while enabling guaraná to be re-appropriated by local communities to a certain extent.

Figure 1 The study areas in Central Amazonia, Brazil



FROM LEGENDARY PLANT TO RAW MATERIAL FOR INDUSTRY: THE SOCIO-TECHNICAL AND LEGAL STANDARDIZATION OF GUARANÁ

The Maués region (state of Amazonas) is recognized as being the native land of guaraná. Over time, guaraná production has spread to the point of becoming the economic hub of the region (Pinton 2010). While the Rio Summit in 1992 and national laws have had the effect of creating an (albeit fragmentary) status for the knowledge of indigenous peoples, the overall situation still bears witness to an inability to establish a legal link between the Sateré-Mawé and the plant. At the same time, the model of agricultural productivism supported by the state is transforming the agricultural practices of the *caboclos*, conferring on them the role of operators in a standardized production chain.

The Spread of Guaraná and the Dispossession of the Sateré-Mawé People

Native guaraná is a liana that grows spontaneously to a height of 12 metres and reproduces in the wild in the Amazon forest. Its epicentre is the land occupied by the Sateré-Mawé people,

between the Tapajós and Madeira rivers. The plant, and the importance conferred to it by the Sateré-Mawé, were first described in 1669 by *padre* João Felipe Betendorf. In 1819, the plant was collected and described as *Paullinia sorbilis* by C.V. Martius, who showed the existence of an important commercial network with neighbouring regions (Mato Grosso) and even Bolivia. The indigenous people would go in the forest to collect seedlings, which they would grow in their fields. With the benefit of light, the liana is transformed into a shrub and bears fruit. In the strict sense of the term, there does not seem to have been any breeding work on the varieties grown but, rather, continuous domestication through systematic use of these so-called 'wild' strains to regenerate the guaraná plants when the latter cease to produce fruit. The Sateré-Mawé people claim that this non-selection of seeds is an original practice, which they refer to as 'semi-domestication'.[7] Guaraná forms a major part of their symbolism and is a central theme in their mythology.[8]

The process of demarcating Sateré-Mawé land began in 1978, during the military dictatorship, but it was not until the adoption of the 1988 Constitution that the Brazilian Union was obliged to recognize their land and ensure that their property was respected.[9] In the meantime, their territory suffered several attempted invasions (plans to build a road, prospection work by Elf Aquitaine and the presence of gold prospectors). Even if guaraná has been commercialized by the Sateré-Mawé since the nineteenth century, it is said that this long period of combat was almost fatal to the actual growing of guaraná, as – unlike in the past – the Sateré-Mawé became dependent on a captive economy controlled by *atravesadores* (intermediaries) and leading extractivism barons. The aim of the political struggle by the Sateré-Mawé people, which is part of the indigenous social movement, is to regain their economic independence, as well as their identity.

Guaraná growing and the processing techniques developed over time by the Sateré-Mawé are the basis of the know-how that gives this product its particular properties.[10] However, the fact that this people claim to have domesticated the plant and contributed to perpetuating significant genetic diversity is not taken into account in current law. Guaraná growing has spread throughout the region and well beyond. Traditions other than those of the Sateré-Mawé people have been created over time. Like them, the *caboclos* in Maués and in the region have been renovating their guaraná plants with supplies of seedlings collected in the forest or grown from seeds from their own spent plants. Like the Sateré-Mawé people, they have been designated as extractivist producers (Lescure and de Castro 1992; Homma 2012). The municipality of Maués is counting on the development of guaraná growing to ensure its prosperity. On a more symbolic level, the municipality highlights its relationship with the plant by organizing the guaraná festival, which attracts a large number of tourists: while Maués is indeed the 'land of the Sateré-Mawé people', as claimed in a media campaign, there is no doubt that the guaraná in question belongs to the town and its entire population. Similarly, every year since 1998, Ambev has been organizing a 'guaraná day' to promote its production model to local people. More broadly, with the popular enthusiasm for *Guaraná Antarctica*, which is now one of the most-consumed drinks in Brazil, guaraná has become an iconic

[7] See the *'Sons of Warana'* portal, available at http://www.nusoken.com

[8] The forest liana is said to come from the eyes of a child, killed deliberately during the course of a dramatic incident. The Sateré-Mawé people believe that they originated from this child's body. When ripe, the fruit resembles a human eye (Figueroa 1997).

[9] The indigenous land of the Sateré-Mawé, called Andirá-Marau, covers an area of 780,000 hectares.

[10] The guaraná powder produced by roasting the seeds is agglomerated and rolled into the form of a stick (*bastão*); this is subsequently grated according to requirements.

plant, one that forms part of the national heritage, while large-scale farmers grow it in other Brazilian regions (Mato Grosso and Bahia).

The legal status of guaraná has acknowledged the fact that, sociologically, it can be seen as a common heritage; at the same time, it has contributed to protect it from any real appropriation by means of intellectual property rights (IPRs). Yet, the 1990s could have seen the emergence of formal rights to guaraná for the Sateré-Mawé people. Indeed, the adoption of the Convention on Biological Diversity (CBD) in Rio de Janeiro in 1992 allowed the role of traditional agro-ecological practices for the preservation of genetic resources to be highlighted (Filoche 2009), while it established a system of Access to genetic resources and related traditional knowledge and Benefit Sharing regarding the outcomes of their use (ABS) (Correa 1995; Bosselmann 1996; Helfer 2004). In Brazil, this system resulted in the implementation of Provisional Measure no. 2186-16 in 2001, according to which access to genetic resources must henceforth receive authorization from the state, from communities and from landowners, and the benefits must be shared with the suppliers of the resource or traditional knowledge (Belas et al. 2009; Machado and Godinho 2011; Saccaro 2011). However, guaraná was considered to be a freely available raw material for agribusiness long before the CBD was drawn up. Similarly, Brazil has managed to contain the influence of IPRs (Filoche 2012). Since the Rio Summit in 1992, the trend has been a gradual extension of the field of the patentability of life-forms, as evidenced by the 1994 TRIPS agreement (Trade-Related Aspects of Intellectual Property Rights), which has been adopted by the WTO. The 1996 law on industrial property (LPI) was adopted amid considerable mobilization shortly after the Rio Summit. Biopiracy opponents held that life-forms are not patentable, because nature is not a commodity, or at least so that the foreign stakeholders can be prevented from patenting the properties of national resources. According to the LPI, genes and proteins that have been isolated from natural life-forms are not patentable; neither are extracts, molecules, substances or mixtures obtained from animals, plants or micro-organisms that exist in the natural state. The successive reforms conducted since then by CGEN[11] confirm this tendency to consider guaraná as being freely available. No access authorization is now required to extract essential oil, or use a natural extract to make drinks.[12] The closer the end product is to the original resource, the more it is covered by the ordinary regime for the use of natural resources, without recourse to the principle of access to the gene, even if the legal texts can still be interpreted in different ways.[13]

If the legal system makes it impossible for a company to own guaraná with IPRs – which explains the proliferation of guaraná-based sodas, produced either by national or foreign companies (e.g. Kuat, a Coca-Cola group brand) – guaraná has by the same token moved beyond the control of the Sateré-Mawé people, becoming available to all. Some rights can,

[11] The *Conselho de Gestão do Patrimônio Genético* (Genetic Heritage Management Council) is an interministerial body in charge of granting access authorization, but which also has the power to change access standards.

[12] CGEN Resolution no. 29 (2007).

[13] During the course of an operation dubbed 'Novos Rumos', the Brazilian environment and renewable natural resources institute (IBAMA) imposed sanctions on 35 companies in 2012, amounting to 88 million reais, because they had used native resources (açaí, guaraná, cupuaçú, *castanha do Brasil* etc.) without sharing the revenues from their use fairly with the localities from which they were taken. Action was not taken against Ambev for traditional guaraná soda, but was for its use of guaraná in the preparation of a new Red Bull type energy drink. In spite of the fact that CGEN has refined the field of application of ABS, IBAMA appears to be unaware of these changes – against which the companies in question appealed in vain. This state of affairs in which a number of different standards coexist leads to a great deal of confusion, exacerbated by IBAMA not specifying who holds the rights.

however, be acquired in relation to guaraná. Being a party to the UPOV Convention,[14] Brazil provides for the granting of rights to cultivars, which are plant varieties used in agriculture (Blakeney 2002; Fowler and Hodgkin 2004; Raustiala and Victor 2004; Santilli 2009). Plant breeder's right, as commonly termed, is a form of intellectual property granted to a breeder (i.e. someone who obtains a new plant variety), which is not as exclusive as a patent. This protection confers an exclusive right to produce and sell material for the propagation of this variety. But the breeder's authorization is not required for use to be made of a protected variety in order to create and market a new variety (breeder's exception). A farmer may use part of his or her harvest to plant his or her fields (farmer's privilege). Although there is no need for authorization (either from the state or from the indigenous people) to make soda, ABS rules must be adhered to when engaging in plant breeding. By virtue of the combination of CDB and UPOV, the genetic resources are established as public heritage and their use regulated by the state; this is the prelude to granting private rights to varieties. However, the presence of the Sateré-Mawé people is also obscured in this scenario, in two ways. First, the holders of potential rights to varieties are only the 'scientific' improvers of guaraná (i.e. Embrapa, and not indigenous peoples or *caboclos*). Second, traditional knowledge is not taken into account in this specific context. Embrapa is not obliged to pay any duties resulting from the contribution of the Sateré-Mawé people to domestication of the plant or knowledge about its properties. Embrapa is only required to request authorization for access to genetic heritage from CGEN or CNPq,[15] and it must obtain the agreement of the owners of the land from which the plants are taken. But in practice engineers no longer collect varieties *in situ*. They work on cultivars that were initially collected long ago and now form their germplasm bank.[16] The Sateré-Mawé people cannot establish their role as guardians of the genetic pool or claim an actual link with the many different cultivars obtained.

To sum up, guaraná is not the subject of a great deal of appropriation by IPRs from public, private or community interests: no patent may be lodged, and no effective right on traditional knowledge can affect the granting of breeder's rights – which, in turn, are not completely exclusive. At the same time, the free access configuration that governs the use of guaraná favours those whose economic position (i.e. Ambev in our case) is strongest. Anyway, law does not have an incidence only regarding the plant's appropriation (who owns what). It also influences the management modalities of the plant (who can do what), as it may favour the use of certain cultivars and regulate the farmers' choices regarding the methods of production.

The Slow Progress of a Productivist Model

The average productivity of the traditional, extractivist growing system in the Maués region is estimated by agronomists to be 100 kg/ha (400 plants per hectare, or 250 grams of dry

[14] International Union for the Protection of New Varieties of Plants. UPOV was established by the International Convention for the Protection of New Varieties of Plants. The Convention was adopted in Paris in 1961 and has been revised in 1972, 1978 and 1991.

[15] National Scientific and Technological Development Council. CNPq is an agency of the Ministry of Science and Technology.

[16] The guaraná germplasm bank managed by Embrapa in Manaus is a collection of shrubs planted and organized into plots. It is the fruit of 30 years of experiments and breeding from varieties taken from smallholdings or growing wild. Three hundred varieties are represented and 15 genotypes are used to minimize the risks of contamination.

seeds/plant). At the same time, there is a local pool of seeds with broad genetic diversity. The local material is recognized as having a high caffeine content (4 per cent), and the artisanal roasting carried out produces a better result in terms of quality compared to the agro-industrial system adopted in the states of Bahia[17] and Mato Grosso in the 1990s. Nevertheless, from the 1970s onwards, during the military dictatorship, a long history of conversion to a productivist model began in Maués. Unlike indigenous peoples, *caboclos* have been targeted by agricultural modernization policies implemented by Embrapa, aiming at improving its productivity and turning local farmers into suppliers of raw materials for industrial use.

Guaraná was marketed in the form of soda for the first time in 1921. The seeds were collected in Amazonia and processed in São Paulo. Very soon, large industrial firms such as Antarctica became interested in this regional product, the production of which did not live up to its reputation. In 1942, Antarctica opened a plant in Maués to manufacture guaraná extract on site. In 1971, the firm acquired the Fazenda Santa Helena, a 1,000-hectare estate; this was used as an experimental laboratory for conducting the first agronomic research. The *guaranazeiro* improvement programme was launched by Embrapa in 1976. The aim of the agronomists was to obtain 400 kg/ha in field conditions, or 1 kilogram of dry seeds per plant instead of the 250 grams produced by small farmers. Action to intensify production was based essentially on selecting varieties that had been improved through crossbreeding and then disseminating these varieties. The work began with the phenotypic selection of 'superior plants'[18] taken from material collected in the 1950s in the Maués region (Atroch et al. 2009). The researcher assigned to Embrapa in Maués achieved an outstanding technological feat by developing a vegetative propagation system, which involves misting and hormone treatment of the plants. The stability of the selected varieties, as opposed to plants obtained through germination (which could be very different from the original plant), now makes it possible to produce highly productive clones. The researcher was later hired by Antarctica, where he facilitated the establishment of a partnership between the two institutions and organized the transfer of technological and biological equipment (organization of nurseries) to the company's *fazenda*.

Subsequently, the small farmers underwent a number of cycles of agricultural modernization projects (Fraxe et al. 2008). In the early 1990s, they were encouraged by farm technicians with state subsidy funds[19] to get rid of their old guaraná plants in favour of improved varieties, in conjunction with the use of pesticides, herbicides and fertilizers, in order to make the production chain more effective. However, the conception of the spread of innovation, which was prevalent at that time, along with poor knowledge of traditional agricultural systems, led to massive rejection of technology transfer (Emperaire and Pinton 1999).[20] Nevertheless, Embrapa pursued its genetic improvement programme, having studied over 1,000 varieties of guaraná. Twelve clones were put into circulation in the region between 1999 and

[17] In 2001, following research by Embrapa, 24 clones were selected to be planted in the state of Bahia by large-scale farmers. This north-eastern region is now the main guaraná producer in Brazil, accounting for 58 per cent of national production.

[18] A guaraná liana with particularly interesting characteristics from which a selection of seeds or cuttings are taken is known as a matrix or mother plant.

[19] The PRONAF ('National programme for strengthening family farming') has been giving small farmers access to bank loans since 1995. PRONAF was the first agricultural policy to recognize the specific characteristics of family farming as a social form of work and production. Until then, credit policies, technical assistance and other related policies did not take into account the significant differences in scale between small-scale and large-scale producers, and were highly biased towards the latter (Schneider et al. 2010).

[20] On the effects of agricultural policies in Brazil, see for example Tonneau and Sabourin (2007).

2000.[21] However, the research/action partnership between private and public stakeholders deteriorated for unclear reasons,[22] depriving state research of a major source of funding. In the meantime, Ambev bought out Antarctica (1998). In spite of disappointing results in Maués, it pursued its production recovery policy (renovation of guaraná plants and intensification of crops). In 2003, the election of the new governor of the state of Amazonas encouraged Ambev to support the '*Zona Franca Verde*' programme.[23] A 10-year contract, managed by the municipality, allowed the distribution of *mudas* (young plants) from Fazenda Santa Helena to small farmers.[24] In exchange, Ambev undertook to purchase the entire crop of the *municipio* of Maués, with the price set at 7 reais per kilogram at that time. Despite all these attempts, results still did not measure up to expectations and there was even a downward trend in regional production. According to our interviews, 15 years after the first initiatives, agricultural technicians were still displaying the same weaknesses, as well as the same criticisms towards farmers, who were accused of being resistant to change and technology.

This modernization project was accompanied by a process for standardization and traceability of varieties. The 2003 seed law regime derived from an essentially technical concern: that of being familiar with the properties of a cultivar (for agronomical reasons and continuity of the resource). The issue is one of producing more 'stabilized', supervised agrobiodiversity: the desire is to achieve a transition from what is indistinct to what is recognizable and therefore controllable. The law has established an extremely formal system, in which the circulation of seeds is allowed through the production of scientific and administrative data. The aim of this regime, designed for cash crop, is to ensure that farmers can now plant or sow only registered, formatted cultivars, and that they will only be able to purchase these from an accredited supplier (a nursery – *viveiro*).[25] Ambev's Fazenda Santa Helena has thus now been obliged to obtain the accreditation in order to continue supplying farms with the cultivars it deems to be of interest – or else find itself outside the law. These rules are not, however, absolute. For instance, family farmers and indigenous communities are not required to register with Renasem to produce seeds and *mudas*, provided that they exchange them only between themselves and plant them in their fields. They are also exempt from the obligation to register their 'local, traditional and *crioulos* cultivars' (landraces) with the RNC; however, they must prove that these landraces are different from the commercial cultivar – something that is difficult to achieve in practice. They may also choose to register their local cultivars with the RNC, although the authorities are responsible for determining the criteria for this

[21] Certain local NGOs accuse Embrapa of distributing genetically modified guaraná, which according to our sources is inaccurate. The term 'clone' is no longer used by Embrapa, having noted that activists assimilate the concept to that of genetically modified organism (GMO). A GMO is an organism whose genetic material has been altered using genetic engineering techniques. Genetic modification involves the insertion or deletion of genes, in order to enhance desired traits, such as increased resistance to herbicides or improved nutritional content.

[22] After the researcher who initiated this cooperation left, the trust that existed between the two organizations began to decrease.

[23] The PZFV is a showcase government programme that defines itself as working for sustainable development with the ambition of reconquering 'inner' areas of the state of Amazonas by building relations with local cultures.

[24] Every year, 60,000 young guaraná plants leave the Ambev nursery to be distributed to growers.

[25] The production, processing and marketing of seeds and *mudas* may be undertaken only after registration of the cultivar with the National Register of Cultivars (RNC), managed by the Ministry of Agriculture, MAPA. There is an obligation to register with the Renasem (*Registro nacional de sementes e mudas*) for any person who produces, processes, packages, stores, analyses, markets, imports or exports seeds or *mudas*. The controls relating to the origin and quality of cultivars are performed by certifying bodies; these are also registered with Renasem. In the case of guaraná from Amazonas, Embrapa has the status of certifying body.

registration. In any case, registration does not entail creation of a right to the landrace that would be binding on any party wishing to use it (a plant breeder, for example).

The modernization network is yet far from being stabilized, for determining the precise identity of cultivars is not a simple task. The consequences of 20 years' worth of selection and dissemination of improved varieties by industry, research centres and public institutions in the region have not been properly measured. There are still many different suppliers of *mudas* and farmers can obtain them from different sources. Alongside the official circuits, growers exchange seeds and *mudas* and germinate seeds that produce plants that may prove to be genetically very different from the original plant. Furthermore, it would appear that the owners of *viveiros* are not always very discerning about the cultivars that they market. This difficulty has a repercussion on the implementation of IPRs in the Maués region, for the system of traceability and standardization is also meant to ensure that the allocation of rights to specific varieties allows plant breeders to receive the commercial benefits of their work.

Redistribution of Rights to Cultivars – Competition or Cooperation?

In the Brazilian system, it is variety improvers that have the most extensive rights with respect to the plants grown – UPOV-type rights.[26] Embrapa finds itself in a dominant position: only cultivars obtained in a scientific manner can be protected by IPRs, and Embrapa is the only organization in the region with the technical capacity to carry out plant improvement work on guaraná.[27] Nevertheless, this matter of fact is being challenged.

The competition between Ambev and Embrapa has been apparent since the end of the scientific partnership, and is exacerbated by the fact that Ambev can no longer distribute the *mudas* produced by its *fazenda* as it wishes. This competition has now entered the realm of intellectual property rights. According to interviews with its research staff, Ambev claims to have legitimate rights to the cultivars for two reasons. First, it argues that the improved varieties obtained by Embrapa come from varieties collected at the *fazenda* during the course of their partnership; this is denied by Embrapa. Second, the multinational claims to have done the improvement work itself. However, to obtain these rights from the SNPC, it is vital for it to be able to prove its contribution to the production of the new varieties; this implies major work on monitoring, as well as presenting applications in a scientific format. Ambev must prove that it has conducted a *melhoramento* programme, and that the ABS rules were adhered to: so far, it has been unable to do so. The Embrapa researchers say they are eager to check whether Ambev meets all the requirements relating to the protection of cultivars, and to ensure the company is not seeking to appropriate material from the public institution. Furthermore, Ambev is considered by some interviewees to be irresponsible, due to the lack of rigour in the way it distributes cultivars. Nobody can guarantee the identity of the variety distributed; some are even of the opinion that Ambev disseminates a mix of varieties rather than pure clones, as asserted by the company. In the meantime, Ambev is making much of the fact that its *fazenda* is – allegedly – home to the largest guaraná germplasm bank.

[26] The 1997 law (on the protection of cultivars) is the Brazilian expression of the UPOV system. This allows the plant breeder to protect varieties by registering them with the *Serviço Nacional de Proteção de Cultivares* (SNPC), managed by MAPA (as is the RNC). To be registered, the cultivar must be distinct, homogenous and stable (these criteria being known as 'DHS'). The plant breeder receives payment of a tax, paid by the owner of the *viveiro*, when the seeds or *mudas* are multiplied and sold by the latter.

[27] According to the information available on the MAPA website (last accessed 6 September 2012), 18 varieties are already registered with the RNC, four of which are protected by the SNPC: BRS Andirá, BRS Cereçaporanga, BRS Luzéia and BRS Mundurucânia. A number of cultivars have names of indigenous origin, chosen by Embrapa researchers in a token recognition of the Sateré-Mawé people. Meanwhile, the latter must content themselves with this symbol instead of actual rights.

The *caboclos* and the Sateré-Mawé have been excluded from the allocation of rights. Contrary to the wishes expressed by a large number of authors (Eyzaguirre and Dennis 2007; Salazar et al. 2007), traditional varieties (landraces) cannot be protected by UPOV-type rights: they are too unpredictable and too variable from a genetic point of view. However, a partnership between farmers and plant breeders could eventually result in them being protected. Our interviews with the managers of a *caboclo* cooperative in Urucará in 2011 revealed the desire of local farmers and certain Embrapa researchers to engage in an initiative of this type. With the support of farmers, who would give them access to local varieties from their selection practices, and the benefit of local '*terroir*' attributes, the Embrapa researchers would work on producing a type of guaraná tailored to the ecological conditions in the microregion. One outcome could be co-ownership of rights to the cultivars, shared by Embrapa and the cooperative.

In any case, the stakeholders often work around the system, or use existing legal standards to achieve ends other than those originally intended by the law in question. As a result, not all the cultivars used by farmers are protected – far from it – and the practices of stakeholders can in fact be more akin to cooperation than competition. Local Embrapa does not necessarily behave like a seed 'owner' seeking a return on investment. Its goal is to make its material available to growers and disseminate its innovations, creating technical progress in order to achieve social progress. In certain cases, Embrapa gives farmers new *mudas*, so that they can try them out experimentally on their land. In other cases, Embrapa's *mudas* are produced by accredited nurseries, irrespective of whether they are protected by rights. Similarly, for as long as it was permitted to do so, Ambev distributed *mudas* free of charge as part of its social programme, in exchange for an obligation on the part of the farmers to sell their crop exclusively at an established price.

Even if the seeds law still allows the indigenous peoples and family farmers to choose what variety they want to grow, the system sees this choice as an exception. The network made of the conjunction of the seed law and the cultivar law constitutes a strong tendency in Brazil aiming at modernizing agriculture and at creating a single model for both agribusiness and small-scale farming. Both Ambev and Embrapa enlist the *caboclos* to use certain varieties. For the latter, the goal is to implement agriculture modernization policies; for the former, the objective is to perpetuate exclusive relations with the farmers in order to make them produce raw material for the soda industry. However, other networks come into play. Since 1995 and the creation of PRONAF, Brazil has recognized family farming as a category inscribed in social and environmental policies, and credit is provided for nature conservation. Similarly, certain *caboclos* communities and indigenous peoples are trying to connect to alternative networks and to pull legal strings to prove to the world the specific, long-term properties of 'their' guaraná.

THE NEW RIGHTS IN CONTEXT – INNOVATIVE MODELS FOR THE RE-APPROPRIATION OF GUARANÁ BY LOCAL COMMUNITIES

There has now been considerable diversification in the outlets for guaraná. It is sold and consumed nationally and internationally. It is now circulating (in the form of powder, tablets etc.) through various networks to Europeans or Americans seeking a combination of health, exoticism and fair trade (Andersen 2011). Increasingly demanding consumers are seeking products whose specific features can now be recognized and protected by geographical indications (GIs), a tool that was generalized by the WTO's TRIPS agreement in 1994 (Evans and Blakeney 2006; Raustiala and Munzer 2007; Bowen 2010). Instruments that have been dis-

cussed in international settings as varied as the CBD (traditional knowledge, organic certifications) and the WTO converge on the ground, where they constitute opportunities (Schneider and Niederle 2010; Emperaire et al. 2012). For a significant proportion of growers, the productivist model has been shunned in favour of models relying on promoting the benefits of local experience and the typical features of products marketed. This sometimes involves adopting new techniques, but above all consists in highlighting practices whose value had long been downplayed or overlooked by agricultural technicians and development policies: sometimes it even involves reinventing a tradition (Pinton 2002).

The Development of Participatory Agro-Industry in Urucará

On the left bank of the Amazon, across from Maués, the region of Urucará is extremely active in guaraná growing. It has a long-standing reputation, although its annual yield (90 tonnes)[28] cannot compare with that of Maués (ten times greater). Initially, the *caboclo* population in Urucará eked out a living from hunting and fishing, gathering *jutas*, seasonal farming (in the dry season) and gathering the famous *drogas do Sertão* as part of the extractivist captive market. They were helped in their emancipation by monks,[29] who set up the first 'base communities' on dry land. A training centre – CETRU (*Centro de treinamento rural de Urucará*) – was established in 1972. Thirty-seven agricultural colonies were set up, in which individuals worked their own land but all the tasks were pooled (the *mutirão* principle). Procedures were undertaken with the public authorities to obtain title deeds for land. Later on, the monks sought to establish cash crops. Guaraná seeds were taken from Maués in 1974, and the first seedlings obtained by germination were transferred to the different colonies. The plant was adopted without any difficulty by the small farmers and the first harvests were carried out 4 years later.

Over the years, CETRU has become weaker due to a marketing system that was not very attractive for growers, in spite of the creation of a local technical training facility that took the form of a school, the NTI (*Núcleo de treinamento intensivo*). In 1998, a group of young people from this school began to work on the idea of a cooperative that could take care of the processing and marketing of guaraná, in order to allow growers to free themselves from their dependency on intermediaries. The Organization of Brazilian Cooperatives (OCB) provided them with supervision and training, thus allowing activists to be trained, take part in seminars and broaden their support base. The cooperative was created on 15 January 2001. It began with 29 members and now has 50. It also works with 100 non-affiliated growers. For a while, the growers benefitted from the technical support of IDAM[30] (at that time known as Emater), but, as many other farmers, they quickly became resistant to its methods and rejected massively technical packages (*pacotes técnicos*) and chemical fertilizers. This has made it became necessary to rethink how things are done and adjust the farmers practices to the technicians' theories. Conceptions of agricultural development gradually changed within IDAM and were transformed by the promotion within the institution of a technical assistance model based on participation and voluntary agreement. With the support of FUCAPI (the Foundation Center for Analysis, Research and Technological Innovation), a private organization working mostly in partnership with public agencies or funds, the militants of the cooperative backed an

[28] In 2009, approximately 268 growers were listed.
[29] These militant activities in Brazil have links to liberation theology.
[30] *Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Estado do Amazonas*. A public agency linked to the state secretary for rural production (SEPROR), IDAM aims at assisting farmers in their activities.

educational project based on 'organic farming' certification; for some three years, they worked to convince growers and local institutions, acting as pioneers in the field, since this avenue was not at that time being promoted by the Brazilian government.

Organic farming[31] is now booming in Brazil, sustained by the calling into question of the production systems that have grown out of the technological revolution and supported by environmental movements (Blanc and Kledal 2012). It is also a manifestation of the emergence of private initiatives that are in competition with the public institutions (Mutersbaugh 2005; Bartley 2007), even if the Brazilian state seeks to retain some control, as proved by Decree no. 7794 establishing a 'national policy for agroecology and organic farming' in August 2012. Nevertheless, organic farming is not very extensively developed in Amazonia: the conditions for exercising it are more complex than elsewhere (farmers have received little training and there is little organization, as well as poorly developed agricultural infrastructure etc.) and difficult marketing conditions.

In Urucará, the organizational capabilities of the local leaders, who are highly committed to the economic development of their region, combined with the social capital of the community, may be put forward as one factor of success. The guaraná produced in Urucará is specific, both from the point of view of growing techniques and in terms of the commercial strategies used. The cooperative has been exporting guaraná to Europe since it was first set up and has obtained the organic certification issued by Ecocert, as well as the fair trade label for 70 farmers. The procedure is funded by a French company and by Sebrae.[32] The cooperative, which has already filed in 2003 the brand *Guaraná Urucará* with the National Institute of Industrial Property (INPI), commenced operations the next year with 19 tonnes of certified production. The switch to organic farming did not cause any problems in that the production systems were already 'organic'. The only change was the use of organic fertilizer. After 40 years of production, the renewal of guaraná plants is currently causing certain farmers to adopt new practices, with the dissemination of cloned varieties developed by Embrapa as part of an agreement with the municipal council. Others have apparently renewed their plants gradually, by breeding their own seeds. The origin of guaraná plants (i.e. which specific variety is used) does not interfere with the principle of organic certification. However, to comply with customers' demands and support, the idea of product differentiation, batches of different origins and ages have been organized. The documented origin does not relate to the precise genetic origin, but to the history of each plot of land (environment, state, crops).[33]

An organic-type production network has emerged and stabilized. In this context, what counts is not so much the quality of the cultivars (as 'proven' by the traceability system) as the quality of the final product, which depends on the practices, know-how and forms of socio-economic cooperation. Basing themselves on the values of cooperativism, the growers have succeeded in freeing themselves from the domination of agro-industry and are the first to have enshrined their practices in the organic farming system of reference. They have succeeded in 'enrolling' diverse actors to follow the programme, and benefited from both public rural development policies (training and technical support) and alternative networks.

[31] It can be defined as a production system that seeks to have a low ecological impact by excluding agrotoxins, soluble fertilizers and chemicals. In 2007, IFOAM (International Federation of Organic Agriculture Movements) noted the growth in certified surface areas worldwide; Brazil's growth in this field varied between 50 and 60 per cent per year, with a certified area of 6 million hectares.

[32] The Brazilian Service of Support for Micro and Small Enterprises is a private entity of public interest mainly funded by the financial contributions collected from firms.

[33] The different plots of land are mapped out in a database: this makes it possible to monitor changes to each batch using the computer. Ecocert launched this idea of mapping crops.

Yet the Urucará example shows that the conventional dichotomy between standardized and alternative food does not thoroughly reflect the present reality of the food sector (Sonnino and Marsden 2006). Just as the law faces difficulties in achieving a true standardization and traceability of cultivars – meaning that *Guaraná Antarctica* is most likely made of guaraná of unknown agronomic origin – the fact of growing organic guaraná does not imply that improved varieties will not be used.

Rooting Guaraná – A Geographical Indication for Maués

Alternative food networks place an emphasis on attributes of 'quality', which does not refer exclusively to the properties of the food itself. Quality is a multidimensional concept that can involve different legitimacies: an identifiable place of origin, traceability, and ecological or cultural attributes. The Maués example shows two processes of construction of this quality, the first emphasizing the organic quality of the product, and the second emphasizing the origin of the plant.

The Maués *caboclos*[34] have understood, somewhat late in the day, the interest of differentiated production, the Sateré-Mawé people and the *caboclos* from Urucará having opened up this avenue for them. A number of them decided to embark on organic certification, following the seminar on organic guaraná growing that took place in Maués in 2007 and that was the result of an agreement concluded between FUCAPI, Sebrae and the municipality in 2005, at the request of 80 rural families. The work of FUCAPI to prepare farmers for organic certification (setting up an association, adherence to hygiene rules, waste treatment, production of organic fertilizer etc.) has been well accepted, and technology transfers have been more efficient than those previously attempted by IDAM. The working method is based on building 'sustainable development networks' (*redes de desenvolvimento sustentável*), beginning with a comparison of growers' basic knowledge. The benchmark is that of participatory methods. Certification is more than just a market differentiation tool: this strategy enables *caboclos* to be the driving force in their own social organization, as they themselves argue. In 2008, 15 growers were able to claim certification from IMO Brasil. Although, in 2011, prohibitive certification costs and a lack of organization forced *caboclos* to abandon this path temporarily, the perception of organic farming is changing. Growers are no longer the targets of bitter criticism on the part of professional organizations – the rural workers union (STR) no longer believes in the advantages of productivism, and wants to join forces with an industry that values the local know-how, in order to withdraw from the regional market. This does not, however, rule out the need for technical improvements to meet market health standards. Furthermore, as in Urucará, organic farming does not require farmers to use any particular variety, be it native, improved or selected, although their own selection processes are subject to a high degree of pressure. Embrapa encourages (with publicly financed programmes of cultivar donation and technical training) farmers to use the improved varieties registered with the RNC, whereas Ambev continues to distribute plants from its *fazenda* and adjusts its purchase price to the local market.[35]

Even if not entirely stabilized, another programme of differentiation has emerged. The city council of Maués – with the support of Sebrae, IDAM and Embrapa Manaus – seeks to enlist

[34] In 2010, there were 2,700 growers all told (in associations, farming communities and independent growers) in Maués, producing a total of 911 tonnes.

[35] The original price set by Ambev has not been immune to the reality on the ground. It rose from 15 reais in 2008 to 25 reais in 2011.

the *caboclos* in a new programme: the creation of a GI.[36] The Indication of Source (*Indicação de Procedência* – IP) for 'Maués Guaraná' is taking form as a political project for the region, as it would be the first GI implemented in the north of Brazil. For the *municipio*, the stated aim is to avoid 'biopiracy' in the face of growing trade. The superiority of Maués guaraná is emphasized by the city officers, who decry the widespread wrongful use of the Maués name, the reputation of which is firmly established. Normally, any GI helps to protect producers against unfair competition and counterfeiting, products with guaranteed origin typically having a higher price in the market. But in order for the *municipio* to enrol producers as well as other actors, IP's objectives have been extended, stretching from economic motivations to political considerations. First, the IP may be seen as a way to promote collective sense: using the discourse of community-based projects, it posits itself as a means of collective defence and management of IPRs. Producers need to organize themselves and create a legal entity that is 'representative of the legitimate body claiming exclusive use of the geographical name, operating in that area'.[37] The establishment of an IP also involves demarcating the area concerned and setting up a production cooperative (Ramos et al. 2012). Second, through the elaboration of 'rules of use and control structure', the IP may be portrayed both as a tool enhancing agricultural practices that respect the environment and as a means of guaranteeing determined qualities of the product.[38] Nevertheless, the *municipio* would rule out part of the production as it now stands by defining rigorous specifications, which would contradict the stated objective of building a large network covering most of the municipality's territory and increasing the visibility of the Maués name. Specifications will probably allow hybrid and recomposed practices as a result of years of technical transfer, and introduction of improved varieties will most likely have no adverse effect on this new network.

For the Maués municipality itself, the objectives of the IP network are diverse: according to the situations, the IP is seen as a means of fostering rural development, to link the plant with a territory and even to attract tourists. The municipality seeks to enrol the *caboclos*, while for them other issues are at stake too: to sell at a good price, to be free from the relation with Ambev or to promote their culture. Whatever the case, this as yet embryonic IP project is putting to the test the organizational capabilities of the Maués *caboclos*, who are less inclined to cooperativism than their neighbours in Urucará. While still under discussion, its geographical area does not include the Sateré-Mawé territory, since they pursue their own initiative and connect to another network.

The Sateré-Mawé People; in Search of an 'Even More Distinctive' Mark

The Sateré-Mawé people have put together a project based on the history of their relationship with the plant, known as the 'Waraná project'. At the same time, they have regained

[36] A Geographical Indication (GI) is an intellectual property asset that consists of a sign used on goods that have a specific geographical origin and possess qualities, reputation or characteristics that are essentially attributable to that place of origin. The 1996 industrial property bill establishes two types of GI: Indication of Source (*Indicação de Procedência* – IP) and Denomination of Origin (*Denominação de Origem* – DO). The IP is related to the geographical name of country, city, region or locality of its territory, which has become known as a centre of extraction, production or manufacture of a specific product. On the other hand, the DO refers to the geographical name of country, city, region or locality of its territory, which designates a product whose qualities or characteristics are exclusively or essentially related to the geographical environment, including natural and human factors.

[37] Article 5 of INPI Resolution no. 75 (2000).

[38] A few Brazilian IPs include quality criteria: analysis of the aroma, colour and texture for 'Cerrado coffee'; determination of animal breeds for 'Pampa Gaúcho' beef.

political and economic autonomy by being freed from a local network (local intermediaries) and by reconnecting to a transnational one. This project has been interpreted by the Sateré-Mawé people as the fulfilment of a legendary prophecy, while its promoters attribute its success to the combination of original sociocultural and ecological characteristics.

The project arose from the need to maintain the political structure of the General Council of the Sateré-Mawé tribe (CGTSM), which was at risk of breaking up, and from the more or less fortuitous meeting with fair trade and ecology activists. Highly committed individuals drafted the articles of the Council, working on the basis of the right, granted by the 1988 Constitution, to the recognition of their cultural and ecological heritage. Meanwhile, a French company specializing in the plant trade, which is a member of the PFCE Fair Trade Platform, was involved, with a view to establishing an export industry to Europe. Its motivation was focused on the desire to get back to the place of origin of guaraná, which until now had been marketed from the region of Mato Grosso. A fair trade label was granted to products from 80 villages in the region on the condition that their production must adhere to the specifications. The guaraná had to be be grown traditionally, without chemicals. The Forest Garden Products (FGP) label is the final aspect of the system, emphasizing the organic dimension of the product.[39] The Sateré-Mawé has also benefited from the support of a large number of activists, and succeeded in enrolling transnational alternative networks (Slow Food, International Federation for Alternative Trade) to meet their objectives.

These arrangements have allowed the community to valorize its practices and resources since 1994, without having to wait for a specific legal framework that was eventually not destined to come (Pinton 2007). The agricultural system ensures that the genetic diversity of the plant is maintained, along with land management. Through the Waraná project, the Sateré-Mawé people have recovered their self-esteem by assigning value to their culture. The project allows their elders' knowledge of guaraná to be recovered by making it meaningful. In 1999, their territory was named the 'Sateré-Mawé Waraná cultural and ecological sanctuary' by three traditional chiefs (*tuxáuas*). They have also adapted their decision-making structure, following a number of internal conflicts: in 2008, the growers set up an organization, the Sateré-Mawé Producers Consortium (CPSM), which oversees the use of agroforest products from the indigenous territories.

The desire of the Sateré-Mawé people not to take part in the IP project put forward by the municipal council is based on an affirmation by them of their ecological and cultural distinctiveness. They are defining their own Denomination of Origin (DO) project, named 'Sateré-Mawé Guaraná', which would be an even more distinctive mark than the Maués IP. In the case of an application for a DO, and unlike an IP, extensive proof of its specific nature must be supplied, not based solely on the reputation of its geographical name: the product's properties must be scientifically proven and related to a local area of land and determined practices (Wilkinson and Cerdan 2011). This raises the question of the extent to which the DO could also enshrine the status, long claimed by the Sateré-Mawé people, of custodians of an *in situ* bank of genetic resources, which would be an argument for enlisting partners in the network. A DO guarantees a specific quality or a particular manufacturing process by defining the technical process applied to the plant down to the final product (planting, harvest, processing) and by making this process a norm that must be enforced. In spite of the network's programme to preserve the guaraná's identity, DO implementation could lead to standardization at the expense of diversity, as is the case when specific cultivars are imposed

[39] This is the equivalent of the Forest Stewardship Council (FSC) certification, more widely known in America. On the FSC, see for example Tozzi et al. (2011).

(Boisvert and Caron 2010). However, a DO could help to highlight the Sateré-Mawé's specific management practices if the specifications were to state that the guaraná sold was the product of a large varietal diversity, and that the indigenous practices (renewing the plants grown in their gardens at regular intervals with wild seedlings found in the forest) maintained continuous gene flows between wild varieties and semi-domesticated varieties. It could also highlight the ecosystemic growing procedure, in addition to the know-how relating to the seed transformation, which distinguishes the Sateré-Mawé production chain from other production chains.

Since these 'guaraná territories' do not overlap, and if the different groups win their respective battles, the Sateré-Mawé DO could coexist alongside the Maués IP which, according to the Sateré-Mawé, could play the role of a buffer zone against productivism in the region. The Sateré-Mawé and the *caboclos* communities connect to networks advocating alternative agriculture, but these networks are different: the Waraná project marks a distinction between the indigenous group and other local small farming, despite the latter facing similar problems. Since the markets in which their products will be sold are very similar, each IG may seek to be the obligatory point of passage of the consumer, even it is far from certain that consumers will be able to tell the difference between the Maués IP and the Sateré-Mawé DO. The coexistence could exacerbate some tensions if cultivars or production methods spread beyond the boundaries of the respective IGs.

CONCLUSION

We have conducted an analysis of the legal standards that are being implemented in the light of the different socio-technical guaraná growing systems found in Amazonia, and described how each group constitutes itself around a specific actor network. Three basic findings have been outlined, which can be summarized as follows. First, the status of guaraná depends on the way in which it is apprehended – as an 'industrial raw material' that has been delocalized and 'disembedded' (as defined by Karl Polanyi) or as a 'typical product' with a recognized link to a specific place and practices; as a 'genetic resource' with 'related traditional knowledge' as defined by the ABS system rules, or as a 'plant variety' with UPOV-type rights. Second, an evolution of guaraná's production modalities can be observed: based on the standardization of cultivars (with the concern for the mass supply of markets and agronomical stability uppermost), agricultural productivism exists side by side with social and environmental challenges that may run counter to this mode of organization. Third, the participatory trend that has emerged during the course of the past two decades has resulted in increasing attention being paid to the preservation of genetic resources 'on farm', as a large part of genetic diversity is owned by growers who keep their own 'collection' and exchange their varieties through sociocultural networks on the fringes of research institutions (Emperaire et al. 1998). These three findings have considerable consequences in relation to the strategies of the various stakeholders.

Although exchanges of material in the form of *mudas* or seeds were freely carried out for many years, the legal system now tends to require the origin and characteristics of cultivars to be known. This is in line with the practices of Embrapa, which favours standardization and encourages growers to procure cultivars from the official suppliers, even though the institution simultaneously and recently promotes agro-ecology. However, although the law is now attempting to put some order into the tangle surrounding guaraná, the historical period from the domestication of the plant by the Sateré-Mawé people down to its transformation into raw material for industry is characterized by a marked lack of clarity. There is no precise,

documented knowledge about the process by which the plant was domesticated, growing practices or seed management methods,[40] or indeed about the availability of phytogenetic resources or the varieties used today. Similarly, the legal rules have not prevented plants being exchanged between small farmers, just as they have not prevent the latter from renewing their guaraná plants as they wish. There is also some doubt as to the ability of the law to standardize such volatile items as guaraná cultivars in the Maués region, especially when these are associated with a range of socio-technical systems that themselves are often hybridized.

The coexistence of different types of production (productivist and alternative) is indicative of contradictory values, and this is reflected in the law. There are those who defend a low-cost product, with no differentiation in terms of quality, and those who ascribe value to distinctiveness and typical characteristics; there are those who believe in the superiority of technical methods and those who are in favour of tradition. Although productivism has often been called into question, the rules applying to this model may still slow down innovations in other production chains. Be that as it may, there is nothing legally obliging *caboclos* and indigenous peoples to adopt scientifically obtained varieties, even if policy incentives remain strong. In practice, the *caboclos* may actually be interested in Embrapa's varieties, but this does not prevent them from selling their produce in alternative supply chains. Similarly, the rights to cultivars owned by Embrapa do not constitute economic income and do not have any major impact on the availability of the plant. Ambev does not need rights to guaraná varieties to generate large revenues, although the multinational's desire to put down roots in the Maués region is related to the fact that this is where the plant comes from.

The possibilities open to the *caboclos* and Sateré-Mawé for re-appropriating guaraná do not relate to the area of rights to the resource in and of itself (guaraná as a genetic resource or cultivar). Rather, these possibilities result from rights regarding practices relating to the resource. Organic certifications, fair trade and geographical indications may be used to support the strategies of these stakeholders. The desire of the *caboclos* from Urucará is to build upon their social cohesion to defend their autonomy and to occupy a commercial niche that enables them to sell at a better price. For the Maués *caboclos*, the desire to value their local knowledge while embarking on another agricultural model is combined with the will of some to change their relations with Ambev and Embrapa. Although the concern of the Sateré-Mawé people is also to differentiate their own production chain, their stated aim is first and foremost to regain their cultural and economic independence by positioning themselves as the sole guarantors of the sustainability of guaraná agrobiodiversity.

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[40] S. Tricaud's dissertation (2011) constitutes an initial investigation in this direction.

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