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Jute cultivation in the Lower Amazon, 1940–1990: an ethnographic account from Santarém, Pará, Brazil

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Abstract

The Amazon region has long been a place of economic booms and busts. Much attention in the historical literature on Amazonia has focused on the largest and most famous regional economic boom, the Rubber Boom, a period of sustained economic prosperity for some from 1860 to 1920. Other ‘booms’ have occurred in the region as well and this paper describes and discusses one of those others. The paper demonstrates how an export economy in a global periphery (coffee in Brazil) affected economic development in a periphery of that same country and makes a methodological contribution by demonstrating how ethnographic research can contribute to an understanding of a historical period when the paper trail is weak.

Jute, a fiber crop, dominated agricultural production along the Amazon River floodplain in the reach between Manaus and Santarém, Brazil, from the late 1930s until the early 1990s. The crop was introduced to the region by Japanese immigrants in order to supply the demand for jute sacking in the south of Brazil where such sacks were used to package commodities, especially coffee. Local smallholder cultivators grew and processed jute, production being mediated initially through Japanese middlemen, later by Brazilians. Poor fiber quality, several external shocks, including the removal of tariffs on imported jute, and especially changes in commodity packaging such as bulk handling and the use of synthetic sacks instead of jute sacks for the transport of coffee beans, the Amazonian jute market collapsed in the early 1990s. Despite its collapse, the legacy of the boom is still evident in the physical and social landscapes in the region.

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Introduction

The Amazon region has a long history of economic booms and busts. Rubber, cacao, turtles and their eggs, manatee, caiman, capybara skins, and fish have all waxed and waned in importance over the centuries.¹ Some natural products have resulted in particularly strong and prosperous booms for some people, the Rubber Boom being particularly noteworthy.² Much attention in the historical literature on Amazonia has focused on this period of sustained economic prosperity that existed between 1860 and 1920. More localized ‘booms’ have also occurred in the region, although with a smaller regional impact and with negligible coverage in the literature on the region. This paper explores the historical geography of one of the region’s other ‘booms’, the Jute Boom, which lasted from the late 1930s until the early 1990s along the Amazon River floodplain.³

Jute is a fiber crop (*Corchorus capsularis*) that was cultivated along both the whitewater and blackwater floodplains⁴ of the Amazon River Basin. Although also important to smallholder agriculture in the Upper (mostly Peruvian) Amazon, this article discusses jute cultivation along the main-stem Lower Amazon River between just upstream of Manaus and Santarém (Fig. 1).⁵ Jute was introduced to this region by Japanese immigrants in order to supply the demand for jute sacking in the south of Brazil where such sacks were used primarily in the coffee industry. Smallholder cultivators grew and processed jute, production being mediated initially through Japanese middlemen, later by Brazilians. Due to a combination of declining quality, the increased use of synthetic sacking, containerization, and the removal of tariffs on imported jute in 1991, the demand for Amazonian jute collapsed in the early 1990s. Despite its collapse the legacy of the boom is still evident in the landscape and in the social relations of production in the region. The history of jute cultivation in the Amazon has a complex and fascinating geography. Places as disparate as Bengal,⁶ Japan, the State of São Paulo, and the Amazon region are all woven together by exchanges of people, germplasm, technology, and capital. The increasing global importance of the coffee industry of southern Brazil prompted attention to the cultivation of a commodity, jute, in a periphery of the Brazil, the Amazon region. Ironically, just as the British were ‘stealing’⁷ rubber from the Amazon to create the large rubber estates of South-East Asia, so the Japanese were moving South Asian jute from English colonies to the Amazon. The loss of propriety over germplasm was probably greater for Brazil.⁸

Much of the history of Amazonian jute cultivation exists only in the minds of those who participated in it, a few Brazilian academic publications and technical reports, newspaper articles, and the footnotes of a broader literature on jute. The inaccessibility of the literature and information on the Amazonian Jute Boom has meant its relegation to the illegible and the unknown. My research on the topic thus far has centered on an ethnographic component and illustrates how historical research can benefit from ethnographic investigations when the paper trail is thin, as it is with the topic of jute cultivation in the Amazon. By integrating empirical research in one of the jute producing regions (the Lower Amazon centered on Santarém), including ethnographic interviews and participatory methodologies with smallholder farmers, with an analysis of obscure secondary sources, I bring to light a previously unknown resource economy that was critical to local populations, and one that demonstrates that profound global interactions that made up the jute trade. Further archival research (such as those exist) awaits future investigation.⁹

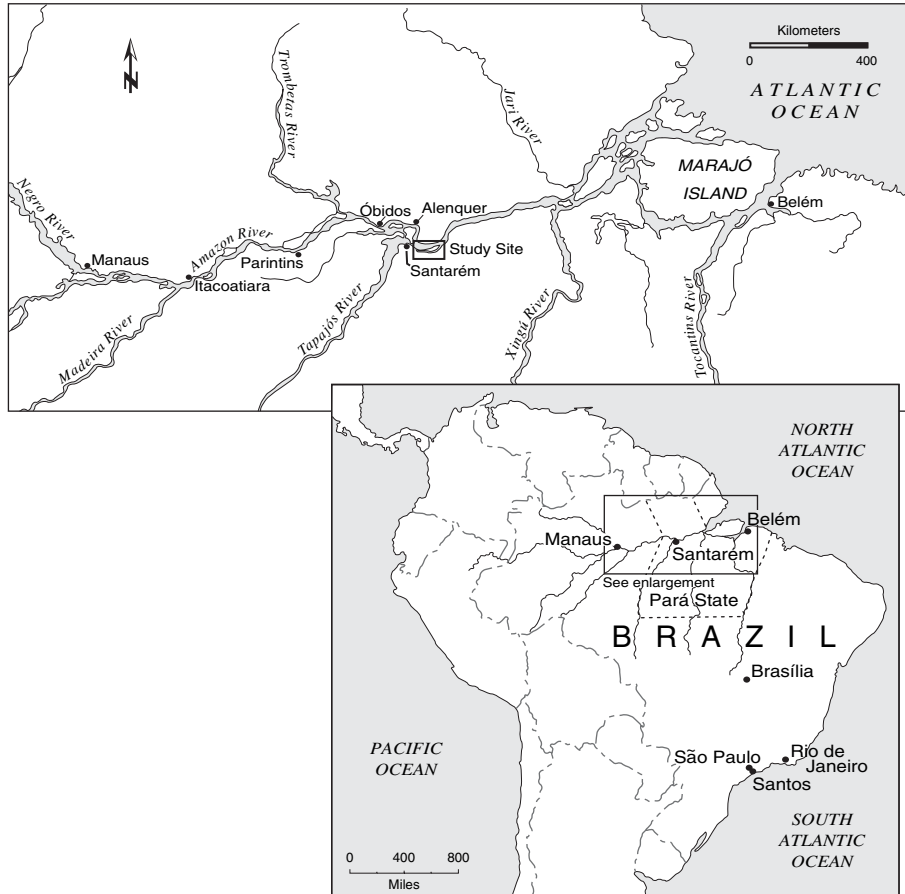


Fig. 1. Map of locations referenced in the text; University of Wisconsin-Madison Cartography Laboratory and Ellen White.

The physical landscape of the Lower Amazon River

Jute can only be cultivated in certain ecological settings. In its homeland of Bengal, the Ganges and Brahmaputra River floodplains provide that ideal setting. The Lower Amazon River floodplain, the setting of the present study, provides a similar environment (Fig. 1). The physical landscape of the Lower Amazon is characterized by the annual flood of the Amazon River and highly seasonal rainfall. The flood season stretches from February to July, with much of the land in the floodplain under several meters of water during the peak of the annual flood (March–May). This flood period overlaps with the rainy season (January–June) and the combination rainy/flood season is locally referred to as *inverno* (winter). The non-flooded dry season is locally referred to as *verão* (summer).

Although the Lower Amazon River floodplain is part of the tropical rainforest biome, the climate of the jute zone region is much drier than that to the east and west of the Amazon Basin.¹⁰ The region experiences a tropical monsoon climate (Köppen's Amw) with a distinct dry season. Only 20% of the average annual 1973 mm precipitation in the Santarém region falls during the

cropping season.¹¹ ‘True’ tropical rainforest found in the western Amazon (Af) receives more than 2200 mm of rain per year, and exhibits much less seasonality.¹² This local seasonality has important implications for jute cultivation as shall be explained below.

There are many relatively stable floodplain islands in the Lower Amazon River. Most of these consist of a ‘ring’ of higher land (levees) around overlapping basins of lower lying and therefore periodically inundated land. These basins are seasonal lakes. Habitation and agriculture occur on the levee ring, with communities located along the river, sometimes for several kilometers. Almost all households have access to land and resources across the levee. Agriculture is practiced on privately controlled (by household) land on the levee, while fishing occurs in communally controlled river access in the ‘front’ as well as communally controlled lake access in the ‘back’ of the levee. During the dry season cattle is run on the communally controlled dry lakebeds in the ‘back’.¹³ Soils found on the levees are alluvial, having formed in nutrient-rich (Andean-derived) fluviially deposited sediments.¹⁴

The vegetation of the Lower Amazon floodplain is a highly humanized mixture of floodplain forest, natural grasslands, fruit trees, and crops. The vegetation on the islands has been extensively manipulated by humans for centuries and has few areas of ‘natural’ forest. Amerindians used the floodplains extensively long before Europeans arrived in the area, and were also quickly removed from the region through disease and slavery.¹⁵ During the 1800s forests were felled to make way for cacao plantations. Deforestation on the floodplain continued, and perhaps peaked, while jute was cultivated in the region. With the jute market collapse around 1990 forest are currently re-growing.¹⁶ In the early part of the twenty-first century extensive largeholder cattle and water buffalo ranching is limiting forest regrowth, however, as large areas are kept in natural and artificial pasture.¹⁷

The inhabitants of the Amazon floodplain

The Lower Amazon floodplain is inhabited by Caboclos,¹⁸ a Portuguese-speaking mestizo people thought of as a ‘quasi-ethnic’ group¹⁹ and recognized as the historical peasantry of the Amazon.²⁰ The Caboclo cultural group can be traced back about 300 years, originating as disenfranchised Amerindian populations also known as *tapuios*.²¹ This group occupied the depopulated floodplains after the ravages of disease brought on by arrival of Europeans. The *tapuios* mixed with European settlers, primarily Portuguese, and adopted a form of social organization that reflected their Amerindian and European antecedents.²² During the late nineteenth century large numbers of migrants arrived in the region from the northeast of Brazil (*nordestinos*) to participate in the Rubber Boom as rubber tappers. Many of these migrants were former slaves, or descendants of slaves originally from Africa and were rapidly incorporated into the Caboclo cultural fabric. Locally, floodplain Caboclos are referred to as *ribeirinhos* (river-side dwellers) and self-reference as *varzeiros* (river-side dwellers of white-water rivers). *Varzeiros* see themselves as the ‘legitimate Amazon Caboclo’²³ in contrast to the recently arrived *colonos* (colonists) who are occupying the *terra firme* (upland areas) government sponsored agricultural colonies since the 1970s.²⁴

Caboclos live a varied life rooted in the environment they occupy. They are ‘the inheritors of a rich realm of knowledge about the physical environments of Amazonia’²⁵ and are linked

biologically, culturally and historically to Amerindians whom they replaced as floodplain farmers. It is, however, difficult to

generalise about Amazonian *caboclos*. They tend to be quite mobile, with migration facilitated by kinship ties which give residential rights to affines; they hunt, fish, and practise extractivism as well as agriculture; they spend periods in towns and cities; they engage in wage labour as well as in *aviamento* debt-credit relationships, and move seamlessly between monetised and non- or partly monetised spheres of the regional economy.²⁶

Smallholder *varzeiros* farmers live in nuclear family units in houses situated along the river in a linear fashion. They are loosely grouped into communities for activities such as schooling, church and *futebol* (soccer) clubs. The independent living style is in part an outcome of a history of extractivist economy of the region, which encouraged isolated household units.²⁷ This autonomy is reflected in *varzeiro* definition of where they live. Rather than state the name of the community they live in, *varzeiros* are more inclined to refer to physical features of the land than to their community name.²⁸ For example, a particular point, beach, high levee, or even on old tree can mark where a person lives. The Catholic Church has long been active in forming communities, a process that has continued to this day with various other institutional organizations (rural workers unions, fishermen's union, etc.).²⁹

The majority of *varzeiros* in the region today engage in a combination of fishing, agriculture and ranching with both subsistence and commercial ends. Fishing has intensified since jute's decline³⁰ as has commercial agriculture and ranching. Manioc is grown where the levees are flood free for at least six months, as are maize, beans and cucurbits.³¹ Agriculture is a privately controlled activity practiced on land and with usufruct rights respected among *varzeiros*. Communal natural grasslands are used for ranching, with cattle moved off the floodplain during the flood season.³² Overall, there is little community regulation of land or resource use and to date there has been little pressure on land or other resources. This is changing, however, with intensification of the fishery, by both local and extra-local fishers. Local forms of control of fishing areas, mediated by a fisherman's union and an NGO, are being consolidated.³³

The families that currently occupy Ituqui Island, the study area, probably arrived several generations ago during the cacao era. There is evidence that Portuguese settlers occupied the floodplain near Santarém since the 1840s, when they planted cacao trees on the levees and grazed cattle on the natural grasslands.³⁴ None of my elderly informants (in their 70s, 80s, and 90s)³⁵ could remember specifically where their parents' parents came from, but they are most likely descendants of Amerindian and Portuguese unions formed during the Directorate Period (1757–1799) of Amazonian history.³⁶

Prior to jute: the cacao and rubber eras

During the late colonial period and into recent (living) history, cacao (*Theobroma cacao*) was an important commodity extracted from wild groves as well as cultivated on the Amazon floodplain from the river's mouth to Óbidos (Fig. 1).³⁷ In the Santarém region wild cacao was found extensively along the banks of the river, especially on the higher levees, and was extracted by collection throughout the late seventeenth and eighteenth centuries.³⁸ With wild sources dwindling in

the early nineteenth century, cacao was planted along the Amazon River floodplain levees to increase Portuguese Amazon's market share of the product.³⁹ By the mid-eighteenth century cacao was planted in the 'cacao corridor... between the cities of Santarém and Óbidos'⁴⁰ and continued to be planted until the Rubber Boom siphoned off the labor required to manage the groves, periodic higher floods devastated the groves, and later jute cultivation leveled the remainder.

Cacao plantations were planted on the highest levees so as to avoid all but the highest floods. Land was cleared of forest and seeds were planted in rows at the end of the rainy season when the soil was easy to work.⁴¹ Thereafter, the plantation was kept free of secondary growth by hand weeding. Once the canopy was established (in three to five years) the dense shade limited undesired plant growth. Trees yielded fruit in the fifth year, and were harvested annually during July and August. The seed ('bean') was extracted from the pulp and dried before being sold and then exported.⁴²

The large flood of 1855 destroyed most cacao groves around Santarém. Cattle grazing increased following that devastating flood. Groves were replanted, though, and the cultivation of the crop has persisted on a small scale in scattered locations even into living memory of those elderly still alive in the region today. Cacao as the dominant economic activity on the floodplain was, however, eclipsed by jute cultivation that began in the late 1930s.

In the Amazon River floodplain region around Santarém rubber was never a dominant economic activity. On neighboring upland regions, especially those to the south (along the Tapajós River) were the center of large-scale rubber plantation experimentation by the Ford Foundation. The ex-Confederate Riker family was active in planting rubber trees on a smaller scale just south-east of the urban center of Santarém, and some of the trees are still tapped today.⁴³ Rubber was, of course, a critical extracted resource during the time before jute elsewhere in the Amazon Basin and the activity encouraged extensive local labor out-migration.⁴⁴ This labor, once freed from working in rubber, helped the Jute Boom expand in the late 1930s.⁴⁵

The Jute Boom

'A introdução da juta provocou grandes transformações nos cenários econômico, social, e política da região e foi também por ela influenciada, de maneira endógena e exógena, fora do controle do produtor' (The introduction of jute provoked great transformations in the regional economic, social and political scenes but it was also transformed by the region by both endogenous and exogenous means that were beyond the control of the producer.⁴⁶

The Jute Boom is a reference point in regional memory and has taken on great importance in the minds of locals as they search for another dominant activity and income source since its demise. During my initial visits to the Lower Amazon floodplain during the mid 1990s, many residents commented immediately that 'the jute era, now that was a time...'. Most *varzeiros* hearkened back to that time when most of them were able to afford goods that had been unavailable before the Jute Boom. Men, in particular, look back to that period as 'golden' because it is when there was significant credit or disposable income available. This enabled families to upgrade their houses from mud to wood planks, and purchase such valuable assets as canoes and radios. Women were less enthusiastic about the era because, although they recall the great benefits of a relatively higher income, they also remember the backbreaking work that jute cultivation

involved and the inherent dangers of working in the river water (which the processing of jute requires).

Origins of jute and its introduction to the Amazon

Since the early part of the twentieth century Brazilian agronomists were experimenting with the cultivation of a fiber crop to supply sacking material for the booming export commodities such as coffee.⁴⁷ A local fiber plant, *malva* (also known as *aramina* or *guaxina*) (*Urena lobata*) was extracted from naturally occurring stands in various parts of Brazil, including the south. Sacks were made from the fiber of this plant, as well as from *caroa* (*Neoglaziovia varieagata-Mez*) to supply the coffee packaging demand. Supplies were never adequate though, since the plant was extracted and not cultivated, resulting in production inefficiencies.⁴⁸ The coffee economy relied heavily on imported jute from British India, which was cheaper than local production of *malva*. In this early jute era, 1900–1910, imported jute cost £15–17 per ton, whereas local *malva* cost £60 per ton,⁴⁹ a difference that was a disincentive to develop *malva* production.⁵⁰ In fact, the *malva* industry was not furthered until jute had begun to be commercially successful in the Amazon.

During the 1920s agronomists in various Brazilian states experimented with jute including southern states such as São Paulo, Espírito Santo, and Rio de Janeiro. Attempts were made in northern states later on, including Amapá, Pará and Amazonas,⁵¹ with the first successful harvest occurring in Parintins, Amazonas State in 1937. Seed was obtained from British India for this purpose through government agreement.⁵² Most of these experiments were unsuccessful due to a variety of reasons including poor quality seed, lack of appropriate environmental conditions, and lack of adequate labor. The most successful experiments were those in the Amazon region where environmental conditions are very similar to those found in the jute regions of South Asia. It was not until the efforts of Japanese colonists, however, that jute was successfully introduced to the region.

Japanese colonization efforts in the Amazon were part of Japanese migration to Brazil in the early 1900s and especially following World War I. During the post-World War I economic depression in Japan, the Japanese government sponsored Japanese colonization to Brazil, including the Amazon, in part to rid itself of ‘excess agricultural labor’.⁵³ Land pressure and inheritance laws in Japan were such that non-inheritors were forced to migrate to Japanese cities or out of Japan. Many of those wishing to remain in agriculture chose to come to Brazil, which welcomed them with relatively inexpensive agricultural land and many opportunities, especially in cotton and coffee production. A total of 247,312 Japanese immigrated into Brazil between 1900 and 1970, primarily to the states of São Paulo and Paraná (Fig. 1).⁵⁴ Of those only about 2% colonized the Amazon.⁵⁵ Agricultural colonists were trained and given startup capital by the Japanese government in very deliberate attempts to successfully settle Japanese nationals on Brazilian soil. For the development of agriculture in the Amazon, two crops were chosen as appropriate for introduction to the region, jute and black pepper. Cultivation of black pepper in Tomé-Açu has become synonymous with the Japanese in the Amazon.⁵⁶ But the Japanese role in the development of jute cultivation was key and instrumental for both the Japanese presence in Amazonia and the development of the jute industry.

Japanese–Brazilians were greatly involved at both ends of the jute–coffee association. Although initially quite active in cotton production, many Japanese turned their attention to the production, processing and shipping of coffee in São Paulo state. During the early 1930s, Brazil was entirely dependent on imported jute from Bengal. Realizing the risk that dependency entailed to their coffee industry, the Brazilians, together with the Japanese, decided to create Brazil's own jute industry. This incentive linked the Japanese and their jute cultivation to the Amazon, an activity directly sponsored by the Japanese government, especially in the area around Parintins.⁵⁷ It was Japanese research and development that experimented and ultimately developed a number of jute varieties that were the right 'fit' for the Amazon. In 1934, Ryota Oyama, a Japanese agronomist, developed the 'Oyama' variety of jute that became very successful in the region.⁵⁸ It was also the Japanese who invested in the incipient agricultural extension services in the Amazon region. An agronomist was sent to British India to observe how to best grow jute. Upon his return to Brazil he shared what he had learned in such a way that he set up a service that eventually led to the state extension service in Pará state.⁵⁹

Soon after its introduction in the late 1930s, most smallholder subsistence farmers in the floodplain region near Santarém switched from subsistence farming to jute production. Environmental as well as economic reasons are given by locals to account for the rapid acceptance of the new crop. Some argue that jute became an attractive alternative as the perceived increase in flood height made perennial crops such as cacao difficult to cultivate. Others relate the switch simply to economic reasons, i.e. higher returns to labor and capita, than other options. It demonstrates that local people will quickly accept new crops and technology when decent price and market conditions present themselves, providing the introduced crop does not compete with existing labor, land, or capital demands.⁶⁰

The destination for jute was primarily the south of Brazil, especially the state of São Paulo, where it was used for sacking to package coffee, castor beans, cacao, and other agricultural commodities.⁶¹ Jute cultivation was intimately linked with the commodity export activities of southern Brazil and marked a clear articulation of a link between the north of Brazil (the Amazon region) and the south of Brazil and started industrialization in the Amazon.⁶² Until this time the Amazon was more closely linked to Portugal than it was to the south of Brazil. There were no roads at all between the regions, air-traffic was nascent, and due to wind and current patterns, ships sailed easier between the Amazon and Europe than southern Brazil.

With the rise in the production of the various commodities there was also an increase in the demand for jute, which was met by both increasing domestic production and importation of jute from Bengal. A key event in terms of the development of jute production in the Amazon was World War II. During this time the jute plantations of South Asia were functionally shut down. This resulted in an increased demand for Amazonian jute all over the world since at that time most of the world's jute was produced in South Asia.⁶³ This gave a great boost to the Brazilian producers.

World War II was also a time when most Japanese in Brazil were encamped, resulting in the partial transfer of jute management to Brazilian middlemen. Initial production of jute had been managed by Japanese 'patrons' (see below), underwritten by Japanese capital through the medium of a jute company, the Companhia Industrial Amazonense S/A (CIA). Brazil sided with the Allies during World War II, encamping Japanese nationals and their descendants, and confiscating their properties, including the jute company.⁶⁴ The company was transformed into

a Brazilian entity, and renamed to Companhia Brasileira de Fibras S/A. This was a period of the formation of the local *pequeno produtor*, the small producer, people who formed an emerging class of local middlemen with modest assets.⁶⁵

Given the boost that World War II had given Brazil as a world producer of jute and the decolonization of South Asia after the War, the peak of the jute production in Brazil occurred after World War II, from the 1950s until the 1970s, with its zenith in the 1960s (Fig. 2). In 1953, 25,000 metric tons of jute was produced, making Brazil self-sufficient in the product for the first time.⁶⁶ During the 1960s and 1970s production was relatively steady, with annual variation due to variable environmental conditions and fluctuating world oil prices. The latter had an effect on jute production because of the increasing competition of synthetic sacks.⁶⁷ Ironically, just as Brazil was reaching its maximum jute production, world demand for the product started declining since alternatives to jute sacks were becoming increasingly popular for the transport of agricultural commodities.⁶⁸

Jute cultivation and processing

The success of Brazil's jute industry came about because of ideal environmental conditions along the Amazon River floodplain. Several features are key. Jute needs silty-clay soils,⁶⁹ hot (at least 26 °C during the growing season) and humid conditions, and adequate sun and rain, the latter especially after germination. The crop does best when growing under inundated conditions after the plant has germinated. All of these conditions were found on the Amazon River floodplain. The annual plant cycle coincided perfectly with the extended rainy/flood period of the region.⁷⁰ Additionally, much of the processing of jute requires access to large volumes of

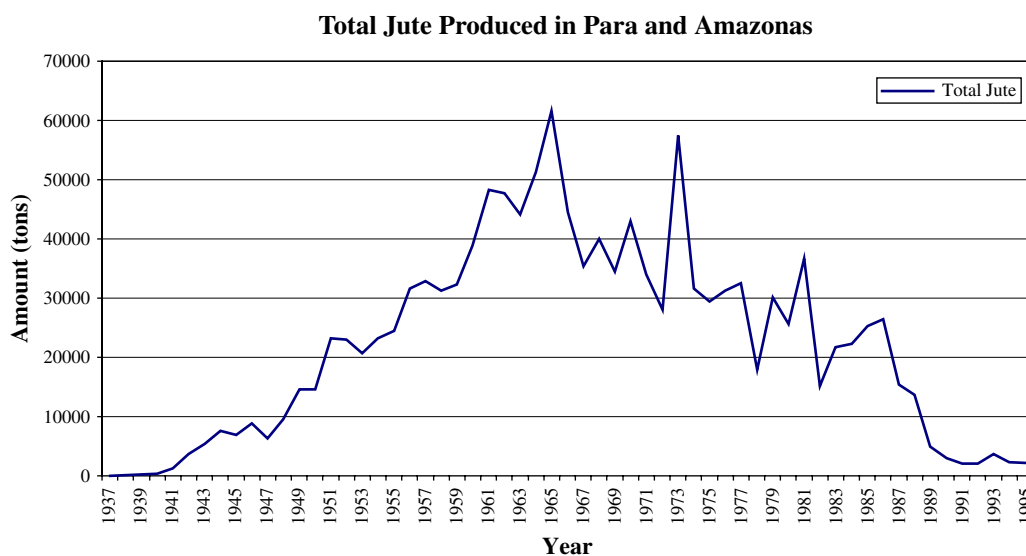


Fig. 2. Jute production in Pará and Amazonas states, 1937–1995. Source: A.K.O. Homma, *A civilização da juta na Amazônia: Expansão e declínio*, in: A.K.O. Homma (Ed.), *Amazônia: Meio Ambiente e Desenvolvimento Agrícola*, Brasília, 1998, 38–39.

warm water, also available on the floodplain. The latter had been a problem with jute experiments in southern Brazil.⁷¹

Land was prepared for seeding during the dry period, usually during October and November.⁷² Extensive areas of former cacao groves and floodplain forest were cut down, left to dry, then piled into *coivaras* (piles of slash) and burned. Only large tree trunks were maintained, as they were useful during the processing phase of jute cultivation and for other household purposes.

Higher levee areas were primarily chosen for jute cultivation, but lower lying areas were also used. Little regard to local soil qualities was considered. Jute was cultivated on a specific plot of land for two to three years, then left fallow for the equivalent length of time before being put into jute again.⁷³ The specific impact jute cultivation had on the soil resource is not entirely clear at this time, but certainly the associated deforestation probably had a negative impact. Less organic material was available for incorporation into the soil, and with less permanent vegetation localized erosion was likely also a problem.

Jute was planted using a '*tico-tico*', a small locally manufactured instrument that distributed the seeds evenly. Four varieties of jute were grown on the Brazilian floodplain *várzea*,⁷⁴ all of them maturing in six months or less. Jute seeds were slightly smaller than a peppercorn, making them difficult to handle and hand broadcast. Seed had to be procured from an intermediary (the patron, discussed below), home gathering and storage being impossible because for fiber the plant had to be cut prior to fruiting and the setting of seed. This led to heavy control and a monopoly over jute seed, all of it being produced by dedicated smallholder farmers under contract with the government in the Municipality of Alenquer, located between Santarém and Manaus (Fig. 1). 'Seed' jute was grown specifically for that purpose on the uplands in Alenquer, the plant left to cycle through its flowering and fruiting phases and harvested only for its seeds.⁷⁵ The limited availability of jute seed made it easy for patrons to control its distribution since most *varzeiros* could not purchase it themselves. The situation is described as 'autarkical' and the various jute production 'crises', the high variability in its output, are ascribed to constraints imposed by the limited source of seed.⁷⁶

Seeds obtained from patrons were planted on the prepared land at the very end of the dry period, usually in December, after the fall of the first rains. Seed germination needed moisture,⁷⁷ and if the onset of the rainy season was delayed, planting of jute was delayed with possible problems at harvest time. Excessive moisture (i.e. too much rain at planting), however, was detrimental to plant germination, so the timing of the planting step was tricky.

Once germinated, however, the plant needed moisture and the arrival of the rains was a requirement. For the next few months the plants would grow rapidly, needing little attention. Although in South Asia there are several jute pests,⁷⁸ in the Amazon there were few jute-specific diseases or pests. Thinning, to assure an even stand, and weeding, to decrease nutrient competition, were the only attention the crop needed until harvest time. Plants typically attained a height of about 2–4 m.

To assure some level of marketable fiber quality, jute needed to be harvested at the critical moment between the plants' flowering and fruiting (which are separated by only 1–2 weeks). Typically, this 'moment' came while the flood was just beyond its peak, in June or July. Harvesting involved arduous physical labor as the plant had to be cut (using a scythe) while laborers stood up to their waists in water. This exposed workers to stingrays, piranhas, and other dangerous river fauna. It has also led to a legacy of arthritis in the knees, limiting the mobility of aged jute cultivators.

After cutting, the plant needed to be immediately submerged in water to be ‘retted’ in bundles for several days (4–7). Retting is ‘the process of separating the embedded fiber from the stem through partial rotting by immersion in water; this rotting is brought on by a complex enzyme action of microbes naturally present in retting water’.⁷⁹ Retting ideally occurs in clear, slow moving water because the clearer the water the higher the quality of the fiber. Bundles were typically submerged in river water near where the plant had grown. The use of sediment-rich river water compromised the quality of the fiber since the retting process was key to the production of high quality jute fiber. However, distance to clear water in the Middle and Lower Amazon precluded the use of clear water, and the use of sediment-rich water was an accepted compromise situation.⁸⁰ Chemical retting, a process that reduced the time to remove the jute fiber from the stem from several days to 3–4 h, had been experimented with but has not been satisfactory and was never adopted.⁸¹

After the fiber had loosened from the stem, the strands were washed and then dried in the sun before they were processed into bundles to be sold or exchanged. There existed a constant tension between producers, who wanted quantity of fiber, and purchasers, who wanted high quality of jute fiber. The more mature the plant the quantity of fiber increased, while quality of the fiber decreased.⁸² Bundles of jute would usually be ‘bought’ by the same patron who had provisioned the jute producer with seeds and other necessities (see below). These bundles of raw jute would then be processed into sacking material in factories located in cities such as Santarém, Belém, and Parintins before being shipped to São Paulo to be used in commodity packaging.

Since all of the steps in jute processing needed to occur at critical moments, there was a labor bottleneck at harvesting and processing times. Long hours were spent at least knee deep in water struggling with large and unwieldy water-logged plants. All available family labor (men, women and children of varying ages) was recruited. Schools followed a ‘jute’ calendar, closing just when children were needed in the jute fields.⁸³ The kin network was engaged to recruit and press into service any *parentes* (relatives) who lived in nearby upland or urban areas.

Two types of labor exchanges (work parties) were used to ensure the right number of people at the correct time. A *troca de dia*, a ‘day trade’, was commonly used.⁸⁴ Entire families would trade a day worth of labor in each other’s jute fields. Agreements were made ahead of time between individual workers. The host family would provide coffee, lunch, and snacks. Exact days of planting jute were usually different between producers, especially if they did not necessarily live within the same community, and therefore not every family was needed to harvest on exactly the same day, making ‘day trades’ possible.

A *puxirum* was another type of labor exchange. This type of labor exchange usually involved 4–15 men from one community working together to benefit that community. Sometimes it was used in jute cultivation, but the *troca de dia* was much more common.⁸⁵

At the end of the annual jute cycle, after the crop was harvested, agricultural fields were clear of weeds and generally free of pests. These fields could then be planted with subsistence crops such as manioc, corn and cucurbits. Most jute fields were used for two to three years and then fallowed for at least as many years. Farmers preferred to reuse fields that had been fallowed because the secondary succession was easier to clear than native floodplain forest. However, sometimes there was a need to clear new areas of native floodplain forest, either because of excessive weed invasion of fields or simply as an expansion of land under jute cultivation.

The financing of jute

The production of jute involved a complex network of relationships centered around the availability of informal credit. Because of the lack of secure land tenure for *varzeiros*, the only method for obtaining credit to produce jute was through an informal source. All floodplain land in Brazil is owned by the Brazilian Navy, ‘for defense of the country’, making it impossible for smallholders to ever claim full land tenure.⁸⁶ Usufruct rights are honored among fellow smallholders (through receipts of purchase or inheritance), but these rights are often not recognized by formal institutions such as banks.

The use of informal credit has a long history in the Amazon.⁸⁷ The extraction-oriented focus of much of the colonial period and the cacao era produced incipient patron–client (*patrão–fregûes*) relations, known as *aviamento*. This was a vertical exchange system wherein the extracted good moved from the remotely located producer via a series of intermediaries to a ‘trading house’ that simultaneously was the exporter of the good. Moving in the opposite direction from the trading house to producers, consumable and durable goods supplied producers’ needs and were ‘traded’ for the extracted goods. It was during the Rubber Boom (1860–1920) that this type of production relations was consolidated in upland areas of Amazonia and became a pervasive means of extracting commodities from remote areas of the region. In the Central and Lower Amazon floodplain regions, however, consolidation of the *aviamento* system occurred during the Jute Boom.⁸⁸ In general, the *aviamento* system terms of trade always favored those higher in the exchange hierarchy, frequently keeping those on the lowest rungs in perpetual debt. The closer to established urban centers the producer was located, the better terms of trade existed since there were fewer intermediaries and less distance.⁸⁹ This situation was much less severe in the jute patron–client system than it had been during the Rubber Boom, however, smallholder did remain indebted to their patron.

Capital-endowed Japanese colonists, using the patron–client system, primarily delivered informal credit for the production of jute to smallholders. This capital was available initially through the Japanese government⁹⁰ and later through individual’s own accumulated capital.⁹¹ Patrons would come to producers’ homes with their boats and supply jute cultivators with necessities for the household (durable goods, foodstuffs) and for jute cultivation (seeds, tools). Jute cultivators usually needed cash or credit and supplies up front in order to obtain jute seed and household supplies heading into the ‘winter’ season. Many middlemen refrained from providing all at the beginning of the growing season, instead provisioning household in thirds. The first third would be provided between September and December (dry season, just before planting), a second third would be provided between January to March (jute growing season), and a third between April and June (harvest).⁹² In return for these provisions the same patron would then ‘buy’ the bundles of jute directly from the producers at the end of the harvest period. Arrangements between ‘patron’ and ‘client’ were typically verbal, given the low levels of literacy of both producers and the Japanese middleman.⁹³

During World War II many Japanese ‘patrons’ were encamped and some Brazilian ‘patrons’ took their place. These were frequently former producers who had accumulated enough capital to provision themselves and to become a patron to neighboring families. The most management-savvy of these new ‘patrons’ specialized in trading and eventually stopped producing their own jute.

Interestingly, many locals are nostalgic about the patron–client era because the patron ‘provided for them’ and ‘took care of them’. The patron knew them personally and helped in times of need (e.g. major illness, births, deaths, etc.). This personal relationship was very different from the often quite impersonal and unfriendly service locals now confront in the city to purchase supplies and seek credit.

This longing for the patron–client era perhaps indicated that the system of patronage that existed in the Lower Amazon region appears to have been less exploitative than in other parts of the Amazon and at different times.⁹⁴ Jute cultivators were aware that the prices the patron charged for household goods and supplies were typically higher than those in the city. Producers were also aware that the patron paid less for jute than could be gotten if they marketed jute themselves. Most accepted these terms of production since it was extremely convenient and to most a very safe and comfortable situation. Gentil, in her study of jute cultivation on the Lower Amazon, suspects that families would have been unable to afford to cultivate jute without the system of support that was offered by the patron.⁹⁵ Although fluvial, the cost of transporting the bundles of raw jute was high, and without appropriate connections in the city a good market price was not always assured for the product. The patron–client system of production has been associated with exploitative practices. In very remote areas it can be highly exploitative since producers are totally dependent on those who arrive with supplies and those who take products to market. But it is an effective and relatively efficient system that works well in large regions of low population density and with poor communication and transportation infrastructures, such as the Amazon.⁹⁶ This type of a ‘friendly’ patron–client relationship is acknowledged to have existed in some parts of the Amazon region during the Rubber Boom as well. This appears to be a very effective way of producing a commodity under conditions of little information, high risk, but with the possibility of high rates of return as well.⁹⁷

The decline of jute

‘For jute to be useful [it] must be cheap’⁹⁸

Jute was cultivated on the floodplain islands in the Lower Amazon River Basin from the mid-1930s until around 1990 when the last of the processing plants in the region closed.⁹⁹ In some localities jute is still grown for a very highly localized small artisanal market, accounting for the continued small output (Fig. 2).¹⁰⁰ The processing plants closed due to a variety of concurrent events and circumstances, changes in commodity handling and transportation, the opening of the Brazilian market to cheaper jute imports from South Asia with the elimination of jute tariffs in 1991,¹⁰¹ and continued decline in fiber quality.¹⁰²

Ever since the 1960s there have been changes in the way commodities are packaged and transported. These changes in packaging and handling were fundamental to Amazonian jute’s demise. Many industrially produced commodities (including coffee) are now bulk handled and poured directly into standard containers, by-passing the need for individual sacks. Given that the coffee produced in Brazil is primarily for mass consumption (i.e. not for the specialty coffee market), the beans are shipped in bulk from Santos, São Paulo’s port, to their destination, mostly in North America and Europe. Other commodities such as cacao and soybean are handled in a similar way.

In Brazil, where sacking is still used and needed, industrially produced synthetic sacks made out of polypropylene are now used. These sacks are stronger, are cheaper to produce by a third to a half,¹⁰³ and their production is less subject to the vagaries of the physical environment. 'In general [users] are impatient of the brokerage aspects of jute.'¹⁰⁴ Synthetic sacks can be produced closer to the site where they are needed, reducing transportation costs. Being an industrial product, they are also more responsive to demand and economies of scale can be realized.¹⁰⁵ However, synthetic sacks are subject to the price of oil, and this is noticeable in Fig. 2. Jute production did well during years of oil crisis. For some products jute is still seen as a superior product since it is breathable and is biodegradable, but this market is increasingly limited.¹⁰⁶

Second, the lack of an adequate labor supply is seen by some as contributing significantly to production decline.¹⁰⁷ The annual labor bottleneck at harvest time was reported by locals as a source of continual tension, and a reason for the inability to maximize production. Given the need to process jute in a particular chronology, the mobilization of an appropriate crew at just the right time was critical. However, the lack of labor supply per se, may not have the issue as much as the relative cost of that labor. In Bangladesh, because of much higher population densities, there is a vast surplus of labor that can produce jute at a lower cost than can the *varzeiros* in the Amazon. Due to its low population density, lack of adequate labor has been a perennial issue with any type of production in the Amazon, and jute is not an exception.¹⁰⁸

A third reason for the decline in jute was Amazonian jute was its inferior quality compared with Bangladeshi jute. This too was related to the inadequate labor supplies at harvest time as fiber quality depended on timing of the processing. The producers on the floodplain around Santarém were paid on a quantity basis with the quality not being rewarded.¹⁰⁹ Also, quality was always compromised by retting in muddy water, which does not produce as high a quality of fiber as does retting in clear water. These factors contributed to a downward spiral in terms of the quality of fiber, which, combined with the production and selection of seed emphasizing quantity, led to the demise of the factories in Santarém. Poor fiber is woven into weak sacks that eventually are no longer bought. With a limited market for jute sacks (e.g. for specialty coffees), those still demanded need to be of high quality in order to compete.

The *coup de grâce* for Amazonian jute production came in 1991. Since 1943 Brazil's jute industry was supported by a tariff on imported jute.¹¹⁰ Brazil's economic strategy throughout much of the period between World War II and the period of neo-liberal reforms was one of import substitution, and supporting an inefficient jute industry was part of that strategy. As part of its increased economic liberalization, the Brazilian government ended all tariffs on imported jute in 1991. Economics and quality opened up a protected industry by allowing the Bangladeshi product to fill the remaining need for jute sacking in the Brazilian economy.¹¹¹

The post-Jute Boom era

'The jute based system of resource management provided *varzeiros* with a balanced annual subsistence system ... which substantially improved the quality of life on the *várzea*.'¹¹²

How have *varzeiros* dealt with the collapse of the jute trade? Fig. 3 is a seasonal calendar for the floodplain region in the Lower Amazon. It combines precipitation, flood, and resource-use

information diagrammatically to demonstrate how well jute fit into the annual agricultural cycle. Jute grew during the agriculturally ‘down’ period when the river is high, and yielded income just as ‘winter’ ended. Thus, jute provided income just as food stocks were low. The emerging harvested jute fields then allowed *varzeiros* to cultivate subsistence crops easily during the ensuing dry season. With the elimination of jute from the annual agricultural calendar this ‘balanced system’ has ended and people are seeking alternative means of income generation. Several alternative income sources are (re)emerging from the *varzeiro* repertoire, including commercialization of fishing, increased livestock holding, the increased seasonal migration to nearby upland bluffs that offer agricultural opportunities during the rainy/flood season,¹¹³ and increasing urban migration where sparse wage and service jobs lure the now grown children of former jute producers.¹¹⁴ Fundamentally, the space of the floodplain is aging and emptying, as the younger generations move on to other lifeways.¹¹⁵

Jute revitalization has been rumored for many years because of its biodegradable properties. Synthetic sacking lingers in the environment, whereas jute sacks break down and disintegrate.¹¹⁶ Jute is also being considered in the manufacture of car-seat covers in tropical areas because it is very cool to sit on. Consequently, there is some hope for this product to be reintroduced, especially if sustainable and environmentally friendly development policies are encouraged. Jute is a crop very suited to the floodplain environment, and as long as deforestation is contained, could be

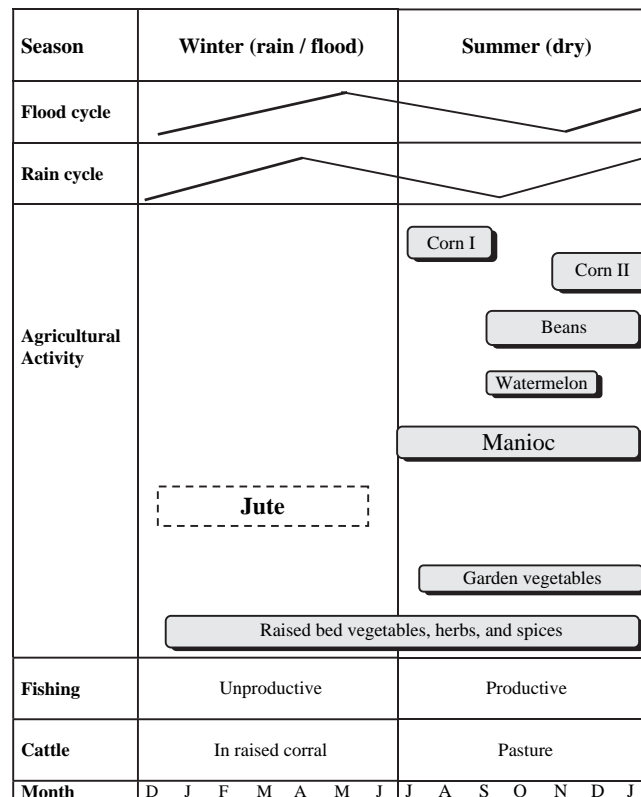


Fig. 3. Seasonal calendar for floodplain area. Source: Fieldnotes, 1995–1996.

environmentally sustainable and an excellent land-use for the region. Without technological improvements to overcome the production labor bottlenecks and trade protection, however, this is not an economically viable option at present.

The more years that pass without jute also means that socially the jute era has passed. The human resources and knowledge systems associated with jute cultivation are slowly disappearing, as is, sadly, the germplasm that the Japanese agronomists so carefully adapted to the Amazon.¹¹⁷ No seed banks of jute exist in Brazil, so both in-situ and ex-situ germplasm conservation opportunities are being lost. As new and different opportunities present themselves, few children of jute producers are attracted to its long hours in the water and associated backbreaking labor.

Conclusion

The historical geography of jute in the Amazon is a tale of the interweaving of a crop and people from places far apart, yet bound together in a world economy. It illustrates the interconnectedness of places and processes cannot be separated. It demonstrates that how an export economy in the global periphery, coffee in Brazil, affected economic development, state inspired and supported jute cultivation in the Amazon region in a periphery within that same country.

But the legacy of the Jute Boom (and even the cacao era that preceded it) has left social and environmental imprints on the region in which it flourished. On the positive side, the relative prosperity of the jute era allowed many families to upgrade their homes and purchase durable goods such as radios and canoes. Many purchased cattle as a form of investment.¹¹⁸ Those benefits are still visible in the communities today, and are also reflected by the ease in which many families today are multi-local, having the resources to occupy residences on the floodplain, the uplands, and the urban area (or some combination). Those men who became patrons were able to better themselves and their families, and contribute to regional society. Some are experimenting with intensive agriculture, others have invested in boats and provide services to the region.

On the negative side, the legacy of patron–client relations is evident in the pervasiveness of the ‘need’ for the patron–client structure and support. With the collapse of informal credit systems, *varzeiros* are experiencing difficulties in obtaining credit. Some are hesitant to engage the more formal urban-based institutions such as banks, especially since without official tenure rights to their floodplain land this is indeed difficult. Many have created new patron–client structures in the urban zones, doing business only with those who will engage in systems of informal credit and services.¹¹⁹ Others are engaging the formal economy by participating in government colonization programs available to smallholders. These programs provide tenure to upland plots that can be cultivated and otherwise used year-round. Still others continue to struggle as they adjust to the new situation. As time passes, and the younger generations are urbanized and educated, these issues will diminish and change and jute will truly be in the past.

Environmentally, the planting of cacao trees followed by extensive jute cultivation initiated a cycle of floodplain forest deforestation. Ironically, the current ‘emptying’ of the floodplain of people and their land-based activities, areas of floodplain forest are re-growing.¹²⁰ Those locals remaining on the floodplain report a slow but significant return of floodplain forest since the demise of jute cultivation, especially in areas not used by cattle ranchers. And therein lies a hope that in a region such as Amazonia, known for its headlines about deforestation, the opposite can also occur.

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Notes

1. R. Santos, *História Econômica da Amazônia – 1800–1920*, São Paulo, 1980.
2. B. Weinstein, *The Amazon Rubber Boom – 1850–1920*, Palo Alto, 1983; W. Dean, *Brazil and the Struggle for Rubber*, Cambridge, 1987; B.L. Barham and O.T. Coomes, *Prosperity's Promise: The Amazon Rubber Boom and Distorted Economic Development*, Syracuse, 1996.
3. The jute era is poorly delimited in terms of time. Jute cultivation started roughly in the late 1930s, and ended during the early 1990s. I have picked the specific dates of 1940–1990 in the title of this paper as those are the critical dates specific to the Santarém region in which ethnographic research was conducted.
4. Although contested by some researchers, the Amazon Basin is often roughly divided into three 'water' classifications. Whitewater rivers carry a heavy sediment load from the young Andes, blackwater rivers and clearwater rivers drain the highly weathered Guiana and Brazilian Shield regions (H. Sioli, *The Amazon and its main affluents: hydrography, morphology of the river course and types*, in: H. Sioli (Ed.), *The Amazon: Limnology and Landscape Ecology of a Mighty Tropical River and its Basin*, Dordrecht, 1984).
5. A general map showing the Brazilian 'jute zone' is Map 102, P.E. James, *Latin America*, New York, 1959, 529. There was also limited cultivation of jute in parts of the Peruvian Amazon (M. Pinedo-Vasquez, *Changes in soil formation and vegetation on silt bars and backslopes of levees following intensive production of rice and jute*, in: C. Padoch, J.M. Ayres, M. Pinedo-Vasquez and A. Henderson (Eds), *Várzea: Diversity, Development, and Conservation of Amazonia's Whitewater Floodplains*, New York, 1999, 301–312; also M.J. Dourojeanni, *Amazonia Que Hacer?*, Iquitos, 1990).
6. During the initial phases (1920s–1930s) of the Boom, jute seed was imported from what was then British India, specifically Bengal, G. Stewart, *Jute and Empire*, Manchester, 1998. This part of the world is now the country of Bangladesh and the Indian state of West Bengal.
7. The deliberate removal of rubber seedlings from the Amazon by Henry Wickham in 1876 is considered to have been a form of germplasm 'theft' by the Brazilians (Weinstein, 1983, 219). The same cannot be said of jute as there was cooperation between agronomists from Japan, India and Bangladesh, and Brazil.
8. A.K.O. Homma, *A civilização da juta na Amazônia: Expansão e declínio*, in: A.K.O. Homma (Ed.), *Amazônia: Meio Ambiente e Desenvolvimento Agrícola*, Brasília, 1998, 55; also W.D. da Fonseca, *Santarém: Momentos Históricos*, Santarém, 1996, 180.
9. According to Alfredo Homma, a scholar on the subject, the archival materials about the jute era are thin, scattered and much in inaccessible private hands of relatives of the Japanese jute company owners (A.K.O. Homma, personal communication, Belém, August 2003). The most comprehensive treatment of the subject in Portuguese is Homma, *A civilização da juta na Amazônia*.
10. W. Sombroek, *Spatial and temporal patterns of Amazon rainfall*, *Ambio* 30 (2001) 388–396.
11. A.M.G.A. WinklerPrins, *Between the floods: soils and agriculture on the Lower Amazon, Brazil*, unpublished Ph.D. thesis, University of Wisconsin-Madison, 1999, 40.

12. Sombroek, Spatial and temporal patterns of Amazon rainfall.
13. D.G. McGrath, et al., Community management of floodplain lakes and the sustainable development of Amazonian fisheries, in: Padoch, Ayres, Pinedo-Vasquez and Henderson (Eds), *Várzea*, 59–82.
14. Soils on the levees are classified as Coarse-silty Typic Tropofluvents and on the back-slopes they are Fine-silty Typic Tropofluvents in the USDA classification system. They are known as Eutric Fluvisols in the FAO system, and Neossolos Flúvicos (Ta) Eutróficos Típicos in the Brazilian soil classification system (WinklerPrins, *Between the floods*, 157–158).
15. W.M. Denevan, A bluff model of riverine settlement in prehistoric Amazonia, *Annals of the Association of American Geographers* 86 (1996) 654–681; also A.C. Roosevelt, The Lower Amazon: a dynamic human habitat, in: D.L. Lentz (Ed.), *Imperfect Balance: Landscape Transformations in the Precolumbian Americas*, New York, 2000, 455–491.
16. M. Worbes, The forest ecosystem of the floodplains, in: W.J. Junk (Ed.), *The Central Amazon Floodplain*, Berlin, 1997, 223–265.
17. N.J.H. Smith, *The Amazon River Forest*, Oxford, 1999; P. Sheikh, *Effects of livestock activity on structure and composition of floodplain forests in the Lower Amazon Basin*, unpublished Ph.D. thesis, The Pennsylvania State University, 2002.
18. I use the term ‘Caboclo’ as a proper noun and capitalize it since it has now become commonplace in Amazonian and other literatures. For a discussion see M. Harris, ‘What it means to be Caboclo:’ some critical notes on the construction of Amazonian caboclo society as an anthropological object, *Critique of Anthropology* 18 (1998) 83–95; R.S.S. Murrieta, *The dilemma of the ‘Chibé’-eater: food choices, ecology, and everyday life among peasant communities in the Lower Amazon, Brazil*, unpublished Ph.D. thesis, University of Colorado, 2000.
19. M. Chibnik, Quasi-ethnic groups in Amazonia, *Ethnology* 30 (1991) 167–182.
20. The group known as peasants is defined in a variety of ways and in the Brazilian Amazon ‘peasants and peasantry are inherently problematic terms’ (D. Cleary, After the frontier: problems with political economy in the modern Brazilian Amazon, *Journal of Latin American Studies* 25 (1993) 331–349). I use Ellis’s definition of peasants as ‘household agricultural producers characterized by partial engagement in incomplete markets’ (F. Ellis, *Peasant Economics: Farm Households and Agrarian Development*, Cambridge, 1993, 276–277); see also S. Nugent, *Amazon Caboclo Society: An Essay on Invisibility and Peasant Economy*, Oxford, 1993, 5.
21. E.P. Parker, *The Amazon Caboclo: Historical and Contemporary Perspectives*, Williamsburg, 1985; also M. Schmink and C.H. Wood, *Contested Frontiers in Amazonia*, New York, 1992.
22. R.S.S. Murrieta, *Diet and subsistence: changes in three Caboclo communities on Marajó Island, Amazonia, Brazil*, unpublished master’s thesis, University of Colorado, 1994; also Nugent, *Amazon Caboclo Society*.
23. Author’s translation, 153; J.M.L. Gentil, A juta na agricultura de várzea na área de Santarém-Médio Amazonas, *Boletim do Museu Paraense Emílio Goeldi-Antropologia* 4 (1988) 118–199.
24. Schmink and Wood, *Contested Frontiers in Amazonia*; S.G. Bunker, *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*, Chicago, 1985.
25. See E.P. Parker, A neglected human resource in Amazonia: the Amazon caboclo, *Advances in Economic Botany* 7 (1989) 249–259, 255.
26. Cleary, After the frontier, 335. A debt-credit, or *aviamento*, relationship is one in which there is a hierarchical systems of provisions and payment.
27. Murrieta, *The dilemma of the ‘Chibé’-eater*.
28. Gentil, A juta na agricultura, 52.
29. At present there is also a counter force of the evangelical movements. Although the latter are providing the region with health and education services, their movements are also splintering weak communities into ‘catholic’ and ‘evangelical’ sections.
30. O.T. Almeida, et al., The commercial fisheries of the lower Amazon: an economic analysis, *Fisheries Management and Ecology* 8 (2001) 253–269.
31. A cucurbit is any plant from the gourd family (Cucurbitaceae) such as melons, cucumbers, pumpkin, and squash.
32. A.M.G.A. WinklerPrins, Recent seasonal floodplain–upland migration along the Lower Amazon River, *The Geographical Review* 92, 3 (2002) 415–431.
33. McGrath, et al., Community management of floodplain lakes.

34. Gentil, A juta na agricultura, 134–135; also M. Goulding, et al., *Floods of Fortune: Ecology and Economy along the Amazon*, New York, 1996, 30.
35. Methods specific to the gathering of information of the jute era consisted of ethnographic interviews and the creation of historical time lines (WinklerPrins, *Between the floods*).
36. C. MacLachlan, The Indian Directorate: forced acculturation in Portuguese America, *The Americas* 28 (1972) 357–387.
37. H.H. Smith, *Brazil, the Amazons and the Coast*, New York, 1879; also D. Alden, The significance of cacao production in the Amazon region during the late colonial period: an essay in comparative economic history, *Proceedings of the American Philosophical Society* 120 (1976).
38. Alden, The significance of cacao production.
39. Alden, The significance of cacao production, 113.
40. Alden, The significance of cacao production, 126.
41. Smith, *Brazil, the Amazons and the Coast*, 110–111.
42. Interestingly, some observers discuss the region as being as ‘abandoned’ and a ‘demographic void’ during the cacao era. See M. Ono and N. Miyazaki, O aviamento na Amazônia: Estudo sócio-econômico sobre a produção de juta, *Sociologia* 20 (1958) 366–396, 371; J. Henshall, Japanese pioneers in Brazil, *Geographical Magazine* 40 (1968) 1366–1373. It is not until jute is cultivated that the region is ‘put into production.’ This reflects the tendency to categorize extraction and agroforestry as non-agricultural and therefore not ‘productive.’
43. da Fonseca, *Santarém*, 175–179; also A.T. dos Santos Amorim, *Santarém: Uma Síntese Histórica*, Canoas, 2000, 179.
44. Weinstein, *The Amazon Rubber Boom*; Dean, *Brazil and the Struggle for Rubber*; Barham and Coomes, *Prosperity’s Promise*.
45. A.K.O. Homma, Do extrativismo à domesticação – 60 anos de história, in: A. Dias Mendes (Ed.), *A Amazônia e o seu Banco*, Manaus, 2002, 142.
46. Homma, A civilização da juta na Amazônia, 33.
47. Homma, A civilização da juta na Amazônia, 34; also J. Poetzsch, *A Juta: No Brasil e no Mercado Mundial*, Rio de Janeiro, 1940; L.D. Martins, *Aspects of the Textile Industry in Brazil: Liberian Fibers and Coarse Textiles*, New York, 1944, 39.
48. Poetzsch, *A Juta*, 59.
49. A pound in that era was worth \$4.86, O. Newman and A. Foster, *The Value of a Pound: Prices and Incomes in Britain 1900–1993*, New York, 1995, 23.
50. Poetzsch, *A Juta*, 59–60.
51. Poetzsch, *A Juta*, 60–61; Homma, A civilização da juta na Amazônia.
52. Martins, *Aspects of the Textile Industry in Brazil*; also P. Sengupta, *The Indian Jute Belt*, Bombay, 1959.
53. P. Staniford, *Pioneers in the Tropics: The Political Organization of Japanese in an Immigrant Community in Brazil*, London, 1973; S. Lone, *The Japanese Community in Brazil, 1908–1940: Between Samurai and Carnival*, Basingstoke, 2001.
54. J. Lesser, *Negotiating National Identity: Immigrants, Minorities, and the Struggle for Ethnicity in Brazil*, Durham, 1999, 8.
55. Henshall, Japanese pioneers in Brazil; T. Suzuki, *The Japanese Immigrant in Brazil: Narrative Part*, Tokyo, 1969, 22; A.K.O. Homma, A imigração japonesa na Amazônia (1915–1945), in: Homma (Ed.), *Amazônia*.
56. The Japanese signed a contract with the Brazilian government to obtain land in Pará state for the Japanese colony. See M.T. Katzman, Paradoxes of Amazonian development in a ‘resource-starved’ world, *The Journal of Developing Areas* 10 (1976) 445–460, 449; also Staniford, *Pioneers in the Tropics*; S. Subler and C. Uhl, Japanese agroforestry in Amazonia: a case study in Tomé-Açu, in: A.B. Anderson (Ed.), *Alternatives to Deforestation: Steps Toward Sustainable Use of the Amazon Rain Forest*, New York, 1990, 152–166; Henshall, Japanese pioneers in Brazil.
57. K. Tanaka, Japanese immigrants in Amazonia and their future, *Kobe University Economic Review* 3 (1957) 1–23; also Suzuki, *The Japanese Immigrant in Brazil*.
58. Homma, A civilização da juta na Amazônia, 41; also Martins, *Aspects of the Textile Industry in Brazil*, 10.
59. Poetzsch, *A Juta*, 67; also da Fonseca, *Santarém*, 182–185.

60. Homma, A civilização da juta na Amazônia, 35.
61. Brazil at this time produced 70% of the world's coffee, R. Ahmed, *The Progress of the Jute Industry and Trade (1855–1966)*, Dacca, 1966, 223; also Ono and Miyazaki, O aviamento na Amazônia.
62. Homma, A civilização da juta na Amazônia.
63. FAO, *Jute, a Survey of Markets, Manufacturing and Production*, Rome, 1957, 14.
64. Homma, A civilização da juta na Amazônia.
65. Ono and Miyazaki, O aviamento na Amazônia, 380–381. The emerging class was ethnically 'Caboclo,' Amazonia's historical peasantry.
66. Exact figures are inconsistent between publications. Gentil and Homma's 20,000 (Homma, A civilização da juta na Amazônia, 39; Gentil, A juta na agricultura, 190) is lower than the 25,000 cited by others (Goulding, et al., *Floods of Fortune*, 38). This is probably due to the inconsistent inclusion or non-inclusion of the production figures of the other fibers that were often mixed with jute (malva, caroa, etc.). Either way, 1953 marks the moment in which Brazil became self-sufficient in the production of sacking material.
67. FAO, *Impact of Synthetics on Jute and Allied Fibres*, Rome, 1969.
68. FAO, *Impact of Synthetics on Jute and Allied Fibres*, Rome, 1959 and 1969.
69. Sengupta, *The Indian Jute Belt*, 38.
70. Gentil, A juta na agricultura.
71. Poetzscher, *A Juta*, 60–65.
72. This description of jute cultivation and processing is based on the methods used in the region between Manaus and Santarém.
73. See L. Pinto Soares and V.F. Libonati, Problemas atuais da jiticultura Amazônica, *Pesquisa Agropecuária Brasileira* 1 (1966) 1–6, 3.
74. The four varieties grown along whitewater rivers in the Brazilian Amazon are: Solimões (Bambu), Branca (Oyama or Verde), Roxa, and Lisa (Gentil, A juta na agricultura, 157; also Pinto Soares and Libonati, Problemas atuais da jiticultura Amazônica, 2).
75. Poetzscher, *A Juta*, 34; also L.F. Monteiro, A.K.O. Homma and N.A. de Souza, Considerações sobre a produção de sementes da juta, seu centro produtor na amazônia, EMBRAPA Circular #7, Manaus, 1973.
76. This point was strongly emphasized to me by Alfredo Homma during a lengthy interview about jute in the Amazon. Homma, personal communication.
77. T. Ghosh, *Handbook on Jute*, Rome, 1983.
78. Ghosh, *Handbook on Jute*.
79. Ghosh, *Handbook on Jute*, 95.
80. The closest fresh water would be upland bluff streams and also the Tapajós River about 20–50 kilometers away. These sources are simply too far away to be used.
81. Poetzscher, *A Juta*, 36; Martins, *Aspects of the Textile Industry in Brazil*, 14.
82. Ghosh, *Handbook on Jute*, 68.
83. Gentil, A juta na agricultura, 152.
84. Sometimes this labor exchange is known as a *mutirão*.
85. For a discussion of both types of labor arrangements see Ono and Miyazaki, O aviamento na Amazônia, 394–395. Both types of labor parties have practically disappeared from the region since the demise of jute. Most observers ascribe their disappearance to the increased use of wage labor since the end of jute. Work parties do still occur periodically for the maintenance of communal canoe channels.
86. R. de Santos Vieira, *Várzeas Amazônicas e a Legislação Ambiental Brasileira*, Manaus, 1992.
87. Bunker, *Underdeveloping the Amazon*.
88. Ono and Miyazaki, O aviamento na Amazônia; also Pinto Soares and Libonati, Problemas atuais da jiticultura Amazônica, 4.
89. Bunker, *Underdeveloping the Amazon*, 68.
90. Tanaka, Japanese immigrants in Amazonia and their future.
91. Gentil, A juta na agricultura.
92. Ono and Miyazaki, O aviamento na Amazônia, 533.
93. Ono and Miyazaki, O aviamento na Amazônia, 532.

94. Cf. M.T. Taussig, *The Devil and Commodity Fetishism in South America*, Chapel Hill, 1980.
95. Gentil, A juta na agricultura.
96. Bunker, *Underdeveloping the Amazon*.
97. Barham and Coomes, *Prosperity's Promise*; Bunker, *Underdeveloping the Amazon*, 68.
98. FAO, *Impact of Synthetics on Jute and Allied Fibres*, 102.
99. D.G. McGrath, et al., Fisheries and the evolution of resource management on the Lower Amazon floodplain, *Human Ecology* 21 (1993) 167–195.
100. D.G. McGrath, *Population, Resource Management, and Environmental Change on the Amazon Várzea: Final Report to the Santarém Sub-Cluster to Population, Land-Use and Environmental Change (PLEC)*, Belém, 2002.
101. N.J.H. Smith, et al., *Amazonia: Resiliency and Dynamism of the Land and its People*, Tokyo, 1995, 189.
102. There continues to be a world demand for jute to be used as sacks for specialty coffee and as carpet backing, especially in the U.S. M.E. Thigpen and T. Akiyama, *Prospects for the World Jute Industry*, Washington, 1986; FAO, *Impact of Synthetics on Jute and Allied Fibres*. This demand is currently being met by South Asian production.
103. Smith, et al., *Amazonia*.
104. FAO, *Impact of Synthetics on Jute and Allied Fibres*, 99. The frustrations referred to are price fluctuations and periodic shortages.
105. FAO, *Impact of Synthetics on Jute and Allied Fibres*.
106. Small-scale experimentation to mechanize jute continues as a way of promoting a return to jute, see I.P. Motta, Pesquisa abre caminho para o aproveitamento de várzeas, *Gazeta Mercantil* (February 12, 2003); Interestingly, the Brazilian government has recently instituted a law requiring the recycling of synthetic sacks (C. Brannstrom, personal communication, 2003).
107. J.M. Pinto, *Aspectos Econômicos da Juta na Amazônia*, Manaus, 1966, 8.
108. Several commentators on jute underline the limitations imposed on jute production by the relative lack of labor in the Amazon region, see Homma, A civilização da juta na Amazônia, 47; also Sengupta, *The Indian Jute Belt*, 74; Ahmed, *The Progress of the Jute Industry and Trade*, 229.
109. C.J. Barrow, The development of várzeas (floodlands) of Brazilian Amazonia, in: J. Hemming (Ed.), *Change in the Amazon Basin: Man's Impact on Forests and Rivers*, Manchester, 1985, 108–128; also Gentil, A juta na agricultura; Homma, A civilização da juta na Amazônia.
110. Tanaka, Japanese immigrants in Amazonia and their future, 12; also Smith, et al., *Amazonia*.
111. Goulding, et al., *Floods of Fortune*.
112. McGrath, et al., Fisheries and the evolution of resource management, 175.
113. WinklerPrins, Recent seasonal floodplain.
114. J.O. Browder and B.J. Godfrey, *Rainforest Cities: Urbanization, Development, and Globalization of the Brazilian Amazon*, New York, 1997.
115. Survey data demonstrates that some communities on the floodplain now gain most of their income from government pensions. This is a clear indication of the 'aging' situation (WinklerPrins, *Between the floods*, 237).
116. Homma, A civilização da juta na Amazônia; Motta, Pesquisa abre caminho para o aproveitamento de várzeas.
117. This loss of genetic material is distressing and very unfortunate, Homma, A civilização da juta na Amazônia, 44.
118. Cattle numbers have been increasing since during the heyday of the Jute Boom (Sheikh, *Effects of livestock activity on structure and composition of floodplain forests*).
119. For ethnographic treatment of this phenomenon see Murrieta, *The dilemma of the 'Chibé'-eater*; also A.M.G.A. WinklerPrins, House-lot gardens in Santarém, Pará, Brazil: linking rural with urban, *Urban Ecosystems* 6 (2002) 43–65.
120. Worbes, The forest ecosystem of the floodplains.