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Performing Cassava: a material semiotic investigation of the cassava and quilombolas of Espírito Santo do Itá

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Abstract

This thesis explores the way the relation between the people and the cassava unfolds throughout the production and processing of this root in the quilombola community Espírito Santo do Itá, in Pará (Brazil). Based on ethnographic observations and interviews, this research follows a material semiotic approach, eschewing, thus, the nature/culture divide in an attempt to investigate the entities as they come into being through their relations. The discussion is divided into three chapters which examine distinct ethnographic moments, without the goal of producing a unified narrative. Firstly, the relation between traditional and scientific knowledge practices is explored in the planting task, identifying the creation of patterns of in/commensurability as comparisons between these practices are drawn. Secondly, the harvesting task is described with a focus on specific modes of ownership and measurement that inhabit the community and that need to be understood in relation to its position on the edge of capitalism. Finally, the different products the cassava becomes (flour, starch, and *tucupi*) are introduced as manifestations of the intimate relation between the community members and cassava, each one affecting this relation differently through their social-materiality.

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Introduction

> "Cassava is considered the most Brazilian of all economic crops, due to its connection to the historical, social, and economic development of our people, as well as subsistence culture, accompanying the homeland civilization since its discovery." (Conceição, 1979, p. 27, my translation)

Cassava (*Manihot esculenta*) is an important crop for food security worldwide. Besides having the biggest geographic expansion between 1980 and 2011 among the major food crops, its production has doubled during the same period (from 124 million to 252 million tons). Cassava is also an attractive crop to smallholder farmers since it is tolerant to acid soils, makes efficient use of water and soil nutrients, and the planting material is low-cost. Furthermore, it is a rich source of dietary energy, due to its high starch content, and is considered one of the world's hardiest and most reliable crops in the face of climate change (FAO, 2013).

Brazil harbors the center of origin for cassava as a crop (Ohlsen and Schal 1999) and it is still today among the biggest producers of cassava in the world (FAO, 2020). Moreover, this crop's importance in the country cannot be separated from its history and identity, as it can be inferred from this chapter's epigraph. It was, and still is, a central part of Brazilian indigenous agriculture and cuisine, being considered by many scholars as a crop that originated in the southern edge of the Brazilian Amazon (Conceição, 1979; Aguiar, 1982; FAO, 2013; Reifschneider et al., 2010). During the 3 centuries of Portuguese colonization, cassava continued to be vital for subsistence, mainly because it was not sustainable to import foodstuff from Europe. A Brazilian historian from the 19th century, João Brígido dos Santos, goes as far as to say that colonization would not have been possible had it not been for the cassava. (Amaral, 1958; Aguiar, 1982).

However, this crop did not only play a role in sustaining the status quo of the colonization, it was also part of the resistance to it, in runaway slave communities. Such communities existed in almost all the colonized regions in the Americas, receiving the name of quilombos or mocambos in Brazil (Reis & Gomes, 2012). Although quilombos seem to have varied in their structure and lifestyle, cassava cultivation and the processing of the root into cassava flour are said to be a common feature of the quilombola economy (Gomes, 2015).

After slavery was officially abolished in Brazil, in 1888, the members of these communities (called *quilombolas*) were stigmatized and made invisible legally, making it

difficult for this population to access basic social services and allowing for land grabbing. Notwithstanding, quilombos continued existing and disseminating, finally obtaining legal rights over their land in the 1988 Brazilian constitution, under the name of *Comunidades Remanescentes de Quilombo* (remnants of the Quilombos) (O'Dwyer, 2007; Arruti, 2009; Gomes, 2015). This was a far-reaching step for these communities to achieve recognition and rights, but since then only a few dozen communities received the ownership titles over their lands, and more than 5000 communities, according to the Quilombola Social Movement and the Black Movement of Brazil, are still fighting for recognition and land (Gomes, 2015). Among these, many communities have maintained agriculture and cassava flour production as their main economic activity (e.g. Costa 2010; 2012; O'Dwyer & Carvalho, 2002; Oliveira, 2002; Pedroso Junior et al., 2008; Vizolli, 2012)

For these reasons, cassava and quilombola communities have an important relation, not only for historical and economic reasons, but also due to their contemporary identity (Gomes, 2015). Before exploring this relation in the context of my fieldwork, however, I believe it is necessary to present a brief review of the history of quilombola communities in Brazil and how their relation to cassava production and processing has been explored in the literature.

1. Background and Review

1.1. Quilombola history and historiography

Slavery is an essential trait of the history of the colonization in the Americas, between the 16th and 19th century. Besides the indigenous population that was enslaved, mostly in the first decades of colonization, it is believed that the number of African slaves that arrived in the Americas was of around 15 million, of which a big amount came to Brazil. The slaves, however, should not be understood historically as passive, since there were everywhere multiple forms of slave resistance: negotiations, rebellions, violence, misbehavior, and escapes. A known form of resistance is the formation of runaway-slave communities, which received different names throughout the continent, such as: *cumbes* (in Venezuela); *palanques* (in Colombia); *maroons* (in Jamaica and the Caribbean); *bush negroes* (in Suriname); *grand marronage* (in French colonies), among others (Reis & Gomes, 2012; Gomes, 2015; Moura, 1981).

In Brazil, these communities were known as mocambos and quilombos[1]. Although these terms can be traced back to similar-sounding terms in different languages in Central Africa (in kimbundu and kicongo, for example), there is no unanimity as to the origins of the terms[2] and it is difficult to know how the people in these communities identified. The little that is known depends heavily on official documents from the Portuguese administration, a fact that attests to the enormous limitations of quilombola historiography[3] (Gomes, 2015).

The first official register of a mocambo formed in Brazil was in 1575, in the state of Bahia. By the end of the same century, more communities had been created and grown, becoming a known obstacle to colonization. Escaping became an attractive form of resistance, and happened both collectively and individually. An intensifier of this process were the moments of political dispute and military combat, such as rural rebellions[4]. The population of the communities also grew with the birth of new generations. (Gomes, 2015).

It is difficult to present a unified picture of the characteristics shared by the quilombos, since they were widely diverse in their economy, structure, and location. Although rural quilombos are more widely known, urban and suburban quilombos existed as well. Their size also varied: there were smaller communities that tended to be in constant movement, while the bigger ones would develop agriculture activities and become semi-fixed (Gomes, 2015). In order to tackle this diversity, I believe it is fruitful to present the main movements in quilombola historiography that tried to present a unified perspective (Reis & Gomes, 2012).

Quilombos started being systematically studied by Brazilian historians in the 1930s, in a tradition that can be called Culturalist, which remained influential in the following decades. Authors such as Arthur Ramos and Edison Carneiro[5] represent this movement. Drawing on the work of the 19th century theorist Raymundo Nina Rodrigues[6], they studied

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[1] Although both terms can arguably be used interchangeably, I opt for quilombos since it has become the preferred term in the literature due to contemporary processes resignification, as will be discussed in the next segment. (cf. Gomes, 2015).

[2] There are authors, such as Ney Lopes, argue that the word 'quilombo' has its origins in the Bantu language, and is still understood in Angola. David Birgham and Kabengele Munanga go even further and advocate that the origins of quilombos can be found in the Bantu region, and the Brazilian versions were copies of the African quilombo (Leite, 2000; Lara, 2016).

[3] In a fascinating essay, Richard Price (2012) illustrates this point by comparing the documents produced by Dutch colonizers with the oral tradition of the saramaka people in quilombo communities in Suriname. He, then, uses this evidence to speculate on the traits of the most famous Brazilian quilombo, called *Quilombo dos Palmares*.

[4] Some examples from the first half of the 19th century are the rural rebellions from the Regency period, such as Cabanada. Balaiada, and Farroupilha (Gomes, 2015).

[5] See, for example, Ramos, 1942 and Carneiro, 1958.

[6] See, for example, Rodrigues, 2010.

the quilombos as efforts to resist the process of acculturation (Reis & Gomes, 2012; Arruti, 2009). This mode of resistance was seen as an attempt to restore the African past, as can be inferred from the citation bellow:

> The escape movement was itself a denial of official society, which oppressed black slaves, eliminating their language, their religion, their lifestyle. The quilombo, in turn, was a reaffirmation of African culture and lifestyle. [...] The Quilombos, thus, were - to use the expression now common in ethnology - a counter-acculturative phenomenon, of rebellion against the standards of life imposed by official society and of restoration of ancient values. [7] (Carneiro, 1958, pp. 13-14, my translation)

Besides this romanticized and homogenous image of the African past, in this narrative the idea of isolation was central, since these authors believed the quilombolas wanted to create an alternative society with structures that resembled societies in the African continent (Schmitt et al., 2002; Reis & Gomes, 2012; Gomes, 2015). Furthermore, Arruti (2009) stresses that these authors were also heavily influenced by anthropological literature and ethnographies of Afro-Brazilian religions.

A second movement in quilombola historiography is the Marxist analyses that started to appear in the end of the 1950s. Through a socio-anthropological approach, authors such as Clóvis Moura and Décio Freitas[8] centered their analysis on the slave rebellions and political resistance (Leite, 2000). For these authors, and in agreement with the previous movement presented, the quilombos were seen as isolated units that aimed at building a free alternative society. However, in the Marxist reading, the quilombo is the basic unity of slave political resistance, thus locating the quilombola rebellions in a historical-materialist fieldwork, maintaining a somewhat evolutionist and teleological position (Reis & Gomes, 2012).

The political and intellectual context of Brazil in the second half of the 1960s were crucial for the development of this movement. On one hand there were social movements to resist the military coup in 1964 and the following dictatorship, on the other, there was an intellectual effort to oppose the theory of the racial democracy of the 1930s, represented by Gilberto Freyre, that portrayed slave-master relations as harmonious (Marques, 2009; Reis &

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[7] Original text: "O movimento de fuga era, em si mesmo, uma negação da sociedade oficial, que oprimia os negros escravos, eliminando a sua língua, a sua religião, os seus estilos de vida. O quilombo, por sua vez, era uma reafirmação da cultura e do estilo de vida africanos. [...] Os quilombos, dêste modo, foram - para usar a expressão agora corrente em etnologia - um fenômeno contra-aculturativo, de rebeldia contra os padrões de vida impostos pela sociedade oficial e de restauração dos valores antigos."

[8] See, for example, Moura 1981; and Freitas, 1973.

Gomes, 2012). There was also a rise in the left-leaning social movements and an increase in Marxist historiography. (Arruti, 2009).

Flávio Gomes and José Reis (2012) argue that quilombola studies in the 80s and 90s did not abandon the culturalist or Marxist angle. However, these more recent studies, influenced by new historiographic perspectives, moved on from the strict culturalist quest after African roots in the Brazilian culture and the naïve Marxist teleology. The authors further suggest that it is imperative to also consider the cultural exchange that happened among African slaves from multiple regions, as well as whites, natives and mestizos that also inhabited quilombos[9]. Contemporary quilombo historiography, thus, seems to advocate for the multiplicity and complexity of these communities (e.g. Almeida, 2002; Gomes, 2015; Souza, 2002).

Another noteworthy shift on more recent studies, is in the meaning of the term 'quilombo'. Most studies prior to the 70s were influenced by the official definition offered by the Conselho Ultramarino (Portuguese Overseas Council): "All housing of runaway blacks, which surpasses five, partly unpopulated, even though they have no ranches or pestle" [10] (as cited by Schmitt et al., 2002, p. 2, my translation). This definition can be decomposed in 5 main characteristics: 1. the escape, reducing the concept of quilombos to just runaway slaves; 2. the minimum quantity of 5; 3. the assumption of isolation; 4. the ranches, which refer to housing; and 5. the pestle, in this context, which symbolizes self-sufficiency (Almeida, 2002).

By relying on this conceptualization, these studies reproduced the idea of quilombo as a solely historical and isolated entity, characterized as a marginalized space of resistance. More recent authors argue that such a limited perspective does not do justice to the diverse quilombola experience and it needs to be relativized (Schmitt et al., 2002; e.g. Almeida 2002; Gomes, 2015; Reis & Gomes, 2012). Donald Ramos (2012), for example, in his study of small quilombos in Minas Gerais in the 18th century, presents this new perspective in analyzing the somewhat symbiotic relation between the small quilombos in that region and the colonial society. Another example is Gomes' (2012) study of quilombos in Rio de Janeiro in the 19th century, which strongly advocates against the isolationist view, showing how the

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[9] Funari (2012) presents an interesting on-going archeological investigation of the Quilombo dos Palmares, which seems to support the hypothesis that this quilombo had a denser population of indigenous people than it is commonly thought. Almeida (2002) also points out the existing reports regarding Palmares indicate the existence of deserters, criminals, runaway slaves, and natives. (See also Gomes, 2015; Souza, 2002; cf. O'Dwyer & Carvalho, 2002).

[10] Original text: "toda habitação de negros fugidos, que passem de cinco, em parte despovoada, ainda que não tenham ranchos levantados e nem se achem pilões nele".

quilombos he studied created an 'underground world' in which their interactions with freemen and slaves was vital[11].

In his 2015 book *Mocambos e Quilombos*, Flávio Gomes further elaborates on the importance of these relations around the quilombos for their survival:

> In Brazil - unlike other slave areas in the Americas - fugitive communities have proliferated like no other place, precisely because of their ability to articulate with the economic logics of the regions where they settled. Never isolated, they had economic exchanges with various sectors of the colonial population, including shopkeepers, farmers, miners, prospectors, fishermen, ranchers, peasants, peddlers, and grocers, both slaves and free men[12] (Gomes, 2015, p. 20, my translation).

Therefore, this new movement toward complexity and diversity seems to shift the traditional narrative presented by early quilombola studies.

I believe that these contemporary scholars contributed greatly to our understanding of quilombola history. Nevertheless, in opposing the unified narrative created by the culturalist and Marxist traditions, it becomes difficult to create a definition of quilombola that does not reduce the complexity of these communities. In the next segment, I will present the political struggle that persisted after the abolition, and briefly outline the contemporary legal definition of quilombos, heavily influenced by anthropology.

1.2. The contemporary quilombola political struggle

In 1850 the first Lei de Terras (Land Laws) were written, excluding freed slaves from property ownership, even when they received it as inheritance or it had been bought (Leite, 2000). Although the republican legislation stopped mentioning quilombos, since it was believed that they ceased to exist after the abolition in 1888, quilombos continued existing and spreading, even when faced with stigmatization and exclusion. The 20th century was

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[11] Almeida (2002) also presents a number of evidences from communities in the state of Maranhão. Based on military records, he underscores the fact that the harvest and structure of the quilombo Limoeiro was considered necessary by the colony during the wars in the middle of the 19th century. Furthermor, O'Dwyer & Carvalho (2002), in their study of the quilombo remnant community Jamary dos Pretos, in the state of Maranhão, point out that the collaboration of the slaves in the big farms with the escapees were vital for the survival of the quilombos. In a contemporary ethnographic analysis, O'Dwyer (2002b), in her study of the Quilombos do Trombetas and Erepecuru-Cuminá, in the state of Pará, argues that although their identity does not come from a social or geographical isolation, the community has been moving in the direction of what she calls 'conscious isolation', as response to the consequences of globalization.

[12] Original text: "No Brasil - ao contrário de outras áreas escravistas nas Américas -, as comunidades de fugitivos se proliferaram como em nenhum outro lugar, exatamente por sua capacidade de articulação com as lógicas econômicas das regiões onde se estabeleceram. Nunca isolados, mantinham trocas econômicas com variados setores da população colonial, que incluíam taberneiros, lavradores, garimpeiros, pescadores, roceiros, camponeses, mascates e quitandeiras, tanto escravos como livres."

marked by lack of rights and constant struggle over land. This process led to isolation of the rural communities, due to lack of land reforms and policies in the areas of communication, transportation, education, and health. (Gomes, 2015; Schmitt et al., 2002; Almeida, 2002).

Besides the resilience displayed by the peoples that became later known as *comunidades remanescentes de quilombo*, by the middle of the 20th century black social movements (such as the Unified Black Movement and, earlier, the Brazilian Black Front) incorporated the idea of quilombo in their activism. Quilombo, thus, became a more popularized and politicized term, leaving its solely historical meaning to get closer to the idea of 'black resistance' and anti-oppression activism. A salient scholar in this movement was the pan-Africanist writer Abdias do Nascimento, who developed the concept of *quilombismo*[13] (Gomes, 2015; Arruti, 2009; Leite, 2015).

In 1988 quilombola communities had their right to collective land ownership made legal in the new constitution (Article 68). The article reads: "the definitive property rights of "remanescentes", or "remnants" of quilombos that have been occupying the same lands over time are hereby recognized, and the state shall grant them title to such lands" (Consitution of the Federative Republic of Brazil n.d., as cited by Leite, 2015, p. 1228). This is the result of much discussion between the black social movements and politicians, as well as pressure by social movements, quilombola and black rural organizations formed in the 80s and 90s. (Gomes, 2015; Leite, 2000; Thorkildsen & Kaarhus, 2019).

The 1988 constitution also contains other legal devices to protect the Afro-Brazilian population, such as Article 125, that guarantees the legal right to express their African-Brazilian cultures, and Article 216, that considers traditional communities as immaterial Brazilian cultural heritage (Leite, 2015). Although the constitutional text allowed for an interpretation of these communities as 'residual', or 'leftovers' (see Almeida, 2002), it can also be read as something of the present, related to land ownership, but still connected to a historical past, with the notion of cultural heritage and a historical debt to the Afro-Brazilian population (Leite, 2000; O'Dwyer, 2007; Arruti, 2009). To have a clear and broad concept of what constitutes a quilombola community becomes, however, a pressing matter. This is highly challenging due to the fact that, as pointed out by contemporary historians, these

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[13] Pereira (2011) presents the following definition: "Quilombismo is a project of social and political organization that aims at the appreciating of the black population against the other groups that make up the national identity. It is the theoretical and practical resource that underlies the collective struggle in search of recognition of a social group, namely the Afro-Brazilian population." (p. 57).

communities present diverse origins: escapes, occupation of free land, heritage, donation, payment from the State, among others (Schmitt, 2002).

The *Associação Brasileira de Antropologia* (Brazilian Association of Anthropology - ABA) contributed to this discussion in a document published in 1994, which was a response to a rising demand for a legal and scientific definition of quilombola communities, as well as a critique towards the historical and archeological perspective. In the document, the authors argue that quilombo remnant communities are not defined by isolation, an origin in a rebellious movement, number of members, or individual land ownership. Instead, they define them as "[…] groups that developed everyday practices of resistance in order to maintain and reproduce their everyday ways of life, as well as to consolidate their own territory." (ABA, 1994 as cited by Leite, 2015, p. 1229). Building on the subjectivist concept of ethnic group by the social anthropologist Fredrik Barth, this document, thus, centers the definition on a common history, shared values, self-affirmation, and means of indicating affiliation and exclusion. (Leite, 2000; O'Dwyer, 2007, Arruti, 2009; Thorkildsen & Kaarhus, 2019).

In this perspective, then, the cultural contrast between 'insider' and 'outsider' does not depend on an external observer that takes account of 'objective' traits. Rather, it is the cultural traits and differences that are considered symbolically relevant by the social actors themselves that are taken into account. ABA, thus, had a key role in questioning the external and 'objective' criteria used by the specialized literature regarding quilombo remnant communities. This had political and legal effects, since this approach has oriented the drafting of anthropological "expert" reports for the legal inclusion of rural black communities as remnant of quilombos. (O'Dwyer, 2002; Almeida, 2002). Moreover, in 2003, the former President Luiz Inácio Lula da Silva signed the Presidential Decree 4887 of 2003, which regulates Article 68 and states that the self-definition of community, based on historical background, specific territoriality, and assumption of black ancestry, characterizes Quilombo communities[14] (Leite, 2012).

As mentioned above, cassava flour has been a typical product for contemporary quilombola communities. Together with other products such as the cassava starch and *tucupi* (liquid squeezed from cassava roots), the flour has a long history in Brazil, being strongly

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[14] Loloum and Lins (2012) summarize the legal process of recognition, as stated by the presidential decree: "The FCP [Fundação Cultural Palmares] recognizes Quilombola communities by delivering 'certificates of self-recognition'. The INCRA [Instituto Nacional de Colonização e Reforma Agrária] formalizes land restitution underthe monitoring of SEPPPIR [Secretaria Nacional de Políticas de Promoção da Igualdade Racial] and FCP. [..] [The anthropologists,] [r]ather than sanctioning 'marooness' through an 'expert report', their role is to formalise Quilombolas' claims through an 'anthropological report of historical, economic and socio-cultural characterisation of communities'." (p. 504).

related to native and quilombola communities (Gomes, 2015). In the next segment, I present a brief historical overview of this relation.

1.3. Cassava Processing and Quilombola Communities

The processing of cassava can be traced back to the indigenous populations that inhabited Brazil before the European explorations of the South-American continent in the 16th century. The famous German explorer, Hans Staden, for instance, during his visit to Brazil from 1548 to 1554, identified different products made from cassava in an indigenous community which inhabited the coast of São Paulo. Jean de Lery, a French Calvinist who stayed in Brazil from 1556 to 1558, also described the processing of the root, distinguishing between two types of flour: *farinha de guerra* [war flour] and *farinha puba* [fermented flour] (Aguiar, 1982; Modesto Júnior & Alves, 2015; see also Staden, 1955).

Descriptions of the different ways cassava was processed and lists of products made from the root were plentiful during colonial Brazil (Aguiar, 1982; Picanço, 2018). This root and its products have been considered as vital for the colonial project since they were the primary food source in the country, mainly for African and indigenous slaves[15] (Amaral, 1958, Aguiar, 1982, Picanço, 2018). The cassava flour has been by far the most popular cassava product, being often referred to as the 'Brazilian bread' (Aguiar, 1982). In its thicker, harder and, thus, more durable version (*farinha de Guerra* [war flour]), cassava flour also became the predominant food in slave ships and war ships (Cascudo, 2011; Modesto Júnior & Alves, 2015).

By the 19th century, cassava had reached its peak as the most important Brazilian food source, and slowly its popularity started to decline (Picanço, 2018). That is due mostly to the shift which started around 1820 of replacing subsistence crops by export crops, such as coffee. This process was also intensified with the 1850's Land Laws which strengthened the national coffee production and caused small farmers to migrate and work for big coffee farms (Silva & Murrieta, 2014). Picanço (2018) also states that the big flows of European immigrants, which arrived in Brazil in the first half of the 20th century, contributed to a shift in the Brazilian eating habits.

Nowadays, cassava continues to be widely produced in Brazil, but its economic importance has been vastly reduced in comparison to the prominence it had in the previous

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[15] It is important to mention that despite its characterization as a popular food among the poor, cassava flour has had its place in the daily diet of all social classes (Linhares & Santos, 2014).

centuries. Culturally, however, cassava products remain popular all over Brazil. (Cascudo, 2011; Picanço, 2018, Morais, 2003). This is even more evident in the North and Northeast, for instance in Pará, where cassava flour, starch, and *tucupi* are considered essential to the regional cuisine (Cascudo, 2011). Belém, the state capital, has the biggest consumption of cassava flour in the country, with an estimated annual per capita consumption of 34 kg, more than double the next city on the ranking (Salvador) (Cereda & Vilpoux, 2003 as cited by Chisté & Cohen, 2011). As explained by Picanço (2018): "[…] nowhere else in Brazil does the cassava complex remain as alive as in the lands and tables of Pará […]"[16] (pp. 85-86, my translation).

Cassava processing also has an interesting historical relation to quilombola communities. As already underscored, cassava flour was the main food for the slave population in the slave ships and colonial farms[17], but the importance of cassava crops did not decrease with escapes and the formation of quilombo communities. As explained by Bezerra Neto and Macêdo (2009), concerning eating practices among slaves in Pará in the 19th century:

> Cassava flour was so important that runaway slaves, in transit, or without a fixed location, or who could not grow their own cassava, had to use their cunning and their relations to others in order to obtain the flour. A different situation was that of fugitive slaves living in quilombos, who, in addition to hunting, fishing, and gathering forest fruits, had their own crops, including cassava for the production of not only the different types of flour, but also of the tucupi.[18] (pp. 4-5, my translation)

Cassava was, thus, a subsistence crop in the quilombos, and the root was usually consumed after being processed into flour.

The importance of cassava processing for quilombo communities is also highlighted by Gomes (2015): "A typical element of the quilombola economy was cassava flour. They planted and harvested cassava, transforming it - through grinding, sieve and oven - into flour

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[16] Original text: "[...] em nenhum outro lugar do Brasil o complexo da mandioca mantém-se tão vivo como nas terras e nas mesas dos paraenses, onde se come também a folha [...]."
[17] Surprisingly, rice also seems to have been an important subsistence crop for the slave and quilombola population, see Carney, 2004
[18] Original text: "A farinha de mandioca era tão importante que escravos fugidos, em trânsito ou sem pouso certo, ou que não tinham como fazer suas próprias roças de mandioca, tinham que se valer de sua astúcia e da cumplicidade com outros sujeitos a fim de obter a farinha. Situação distinta era a dos escravos fugitivos vivendo em quilombos, que além da caça, da pesca, da coleta dos frutos da floresta, tinham as suas próprias roças, entre elas a de mandioca para a produção não só dos diversos tipos de farinha, mas também do tucupi.".

and other derivatives."[19] (p. 21, my translation). The author also states that flour was not produced only for consumption inside the quilombo, but that the surplus was sold during moments of food shortage in the colony. Furthermore, some historians and archeologists, such as João Reis, have used the amount of cassava found in quilombos to estimate the community population, which also indicates the centrality of this crop and its products (Gomes, 2015).

This relation between cassava or cassava flour and contemporary quilombola communities has been explored by a few authors, most notably in the field of anthropology and human geography. In their study of the quilombola community Castainho (state of Pernambuco), for example, Silva et al. (2010) highlight the importance of the processing of cassava for the local economy and the preservation of a cultural heritage. The cultural aspect of this activity was further explored by Morais (2003), who observed that the space of the flour mill (*casa de farinha*) in the quilombola community do Pêga (state of Rio Grande do Norte) was inhabited by an intense sociality characterized by the transmission of values and beliefs (see also Santos, 2018). Carneiro (2017) also emphasize the cassava as important for the quilombola culture in the community Vão de Almas (state of Goiás), but identified ruptures in the transmission of this tradition to the newer generations.

2. Research Objectives and Content

These studies presented above exemplify the most popular way of addressing cassava production in quilombola communities: by considering it part of the local culture, tradition, or identity. These reflections are indeed relevant, and they have definitely contributed to my work, but I believe that by examining this issue as purely cultural, a lot is missed. In this thesis, I try to eschew the modern divide of nature/culture in my exploration of the relation between the quilombola community members and the cassava. Thus, the broad question that guides this research is: "How does the relation between the community members of Espírito Santo do Itá and the cassava and its products unfold during the many steps required to produce and process this root?". Many secondary interrogations stem from this first one: Does this relation change throughout the steps of the process? Did it change over time? How does this relation differ from the technical recommendations found in manuals? These are only a few examples.

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[19] Original text: "Um elemento típico da economia quilombola foi a farinha de mandioca. Plantavam e colhiam mandioca, transformando-a – através da moagem, peneira e forno – em farinha e outros derivados."

Nevertheless, although all of the chapters included in this thesis contribute to partially answering the main research question, they do not tell a unified story. They are inhabited mostly by shared entities, but new ones also take the stage and shift the analysis unexpectedly, precluding the conclusions that are drawn from adding up to a coherent whole. Therefore, I would like each chapter to be read as a somewhat independent attempt to tackle the relation between the cassava and the community members. This issue is complex, and to keep this complexity in the foreground, multiple answers were necessary, not merely a re-statement of the same argument in every chapter.

In the first chapter, I clarify the terms and theoretical concerns which have guided this work. This thesis is informed by a movement within the social sciences and humanities that can be referred to as 'material semiotics', which includes approaches such as actor-network theory (ANT), post-ANT, and feminist material semiotics. After briefly presenting some shared characteristics of this body of work, I experiment with Law's idea of 'method assemblages' (2004a) to identify some reflexive and methodological moves that are necessary to make certain entities visible in my narrative.

In the following chapter, I tackle the way cassava is planted in the community Espírito Santo do Itá. After analyzing the knowledge-practices observed, I contrast them with the recommendations from selected technical books and manuals. This technical knowledge is not only present in texts, but also co-exists with the traditional way of planting in the community, being introduced through government extension services, for example. I argue that the traditional and local practice resists impositions from the technical recommendations due to the control of the terms of the comparison by the community members: resisting abstract language, defining the relevant criteria, and making certain practices incommensurable. They seem, thus, to articulate a specific pattern of in/commensurability.

In the third chapter, I examine moments of material semiotic negotiation that are performed during the harvesting process. I suggest, following Anna Tsing (2015), that the community studied inhabits a 'pericapitalist' space, on the edge of capitalism. This requires, thus, specific negotiations between the capitalist logic, marked by private ownership and profit, and the traditional and collective practices of the community, marked by solidarity. I indicate, then, some different modes of ownership that elucidate the role of collectivity in limiting the reach of capitalism. Moreover, I examine the way cassava is measured and differentiated between its bitter and sweet varieties, highlighting their ambivalent and contingent characters and the importance of conversion practices in this contested space.

Finally, in the last chapter, I introduce the multiple tasks required to turn the cassava roots into flour, starch and *tucupi*. These products are considered here as distinct manifestations of the relation of 'companion species' (Haraway, 2008) between the community members and the cassava. The specificities of each product are also relevant, since these different manifestations shape not only the way the cassava is performed, but also the community members that come into being through this relation. Furthermore, I also stress the role of the *casa de farinha* as pivotal to the community's sense of collectivity and solidarity.

3. Field: Quilombola Community Espírito Santo do Itá

Thus far, I have presented a literature review of the study of quilombola communities and their relation to cassava, outlined the main goals of this research, and indicated what to expect in the following chapters. In this segment, I intend to introduce the community with which this work is concerned and, in the following one, clarify some methodological issues regarding data collection.

The quilombola community Espírito Santo do Itá is located in the northeast of the State of Pará (north Brazil), in the municipality of Santa Izabel. The biggest cities nearby are the city of Santa Izabel do Pará and the state capital, Belém, 20 and 45 kilometers from the community, respectively. The transportation to and from the community is most commonly done by a van, but it is also possible to do it by motorcycle, car, or bus. The city of Santa Izabel do Pará is the nearest one to access stores, go to the bank, and go to school (after elementary school). The road that connects this city to the community is paved, but it is not well conserved. On the way it is possible to observe large farms used for cattle breeding on one side of the road. A bit further down, there is also a Health Unit which marks the entrance to the unpaved road that leads to Espírito Santo do Itá.

Around 45 families live in the community. Besides the houses, there are also two churches (Catholic and Protestant), a shed for events (mainly the Cassava Festival), 9 flour houses, and 5 plots of land, somewhat collectively used, where crops can be planted (15 hectares each). Despite the somewhat difficult access and the lack of an internet connection, the community seems to have close contact with other cities in the municipality and state. Some reasons for that are the community members' participation in the open-air market in the city of Santa Izabel, where they sell their products; the close relationship of the community with the municipal Department of Agriculture; and, more recently, the Cassava Festival,

which takes place annually since 2012. Several members of the community also receive money from financial aid programs, such as *Bolsa Família*, as well as development programs, most importantly *Fomento Rural*, which consists of non-reimbursable transfers for productive purposes, used in the community for the construction of *casas de farinha* and purchase of equipment. In addition, there seems to be a partnership between the different communities formed alongside the Itá River (many of which are quilombola), marked by visits, bingo, parties, and football games.

It is important to highlight, however, that Espírito Santo do Itá is not officially a quilombo remnant community: the community has not obtained its certificate from the Palmares Cultural Foundation yet. Nevertheless, I characterize the community as quilombola in this work for two reasons: firstly, the legalization process is already underway; and secondly, the members of the community self-identify as quilombola, mainly as a political identity. This search for political rights also engendered a movement towards historical awareness in the recent years, through which the community members learned about their own heritage and formalized the stories from oral tradition. The legal and political aspects of this process will not be deepened in this thesis.

The main economic activity in the community is the sale of cassava products: flour, *tucupi*, and starch. The processing of cassava, despite having undergone some changes, is a historical activity in the community which depends largely on tradition and shared knowledge. Multiple steps need to be done to achieve the desired products, from planting the cuttings to toasting the flour and cooking the *tucupi*. These activities are carried out in the 9 flour houses, all of which are privately owned but used collectively. Notwithstanding, some community members prefer to work for private companies in nearby cities, such as factories. The products are usually sold to fixed customers, but on Saturdays many community members also sell their products at the open-air market in Santa Izabel do Pará. Moreover, in recent years the annual Cassava Festival has become an important source of collective income for the community.

4. Methods

The aims of this research, as well as its theoretical basis (further explained in chap. 1), require a qualitative approach. This is, then, an exploratory endeavor which carries a limited generalizability, but that could lead to a deeper understanding of the phenomenon studied, namely, the relation between the cassava and the community members in Espírito Santo do

Itá (Bryman, 2008). Thus, the possibility of the observations presented here being also valid in other spaces is not a central concern.

Two distinct qualitative methods were used in this exploration: ethnographic observations and semi-structured interviews. The ethnography was led for 4 weeks (from October 6th until November 3rd), during which multiple observations were done in *casas de farinha*, farms, and the open-air market. These pieces of data are presented in this thesis as edited ethnographic description (in italic), which are based on compiled field notes. Furthermore, in this final version of the texts, I have decided to refer to some community members by their nicknames, since nicknames seem to hold a special position in the community.

Six key informant interviews were conducted during the same period with specific community members. The aims of the interviews were very similar, but the questions were contingent upon the interest of the interviewee. This secondary method was used to add some information to the ethnographic description and, thus, is presented mostly in the form of direct quotes. It is important to highlight that both the field notes and the interviews were originally in Portuguese and had to be translated.

I believe, however, that these choices of method presented cannot be decoupled from my theoretical assumptions, heavily inspired by material semiotics. Indeed, they are all part of my 'method assemblage' (Law, 2004a). In the following chapter, I continue to clarify the methodological position taken here, but now contextualizing it within my broader ontological/epistemological understanding.

1. A few notes on Material Semiotics

1.1. Theories and Terms

In this work, I tackle how the cassava, its products, and its relations come to being in the quilombo remnant community Espírito Santo do Itá. In doing so, I consider the cassava, tools, people, and products as both physically and symbolically (discursively) meaningful; as entities which are performed through material-semiotic practices, hence the title. This approach is counterintuitive and, thus, clarifications are necessary before moving forward. In this first segment, I intend to present and discuss some theoretical and empirical concerns which have shaped the analysis and terms presented in the following chapters. In the second part, I will attend to some consequences of considering methods as performative, thus attempting to take account of my methodological choices.

Firstly, I would like to locate my work within what has been called material semiotics. As Law defines it:

> Material semiotics is not a school or a theory. Instead it is a movement in social science which cultivates a set of sensibilities to practice, to process, to the weaves of materiality and narrative, to the irredeemably situated character of those weaves (its own included), to difference, and to the idea that there is no single machinery at work behind the complexities of the social. (Law, 2019, p. 15)

Material semiotics can, thus, be used as an umbrella term to encompass a multiplicity of empirical and theoretical investigations within social sciences that have attempted to move beyond the nature/culture and material/discursive dualisms, including approaches such as Actor-Network Theory (ANT) (e.g. Latour, 2005; Callon, 1980; 1984; Law, 1986), Feminist Material Semiotics (e.g. Haraway, 1991a; 1997; Barad, 2007), and what has been referred to as Post-ANT (e.g. Mol, 2002; see also Law, 1999; Gad & Jensen, 2010). Although this body of work does not exhibit some strong internal coherence or clean-cut boundaries, mainly due to its empirical character[20], I will attempt to present some aspects I take to be central to the material semiotic project, and that I aim to retain in my own work.

As mentioned above, this approach attends to world-building practices, in which entities come into being as both semiotic (e.g. relational, discursive and meaningful) and material (e.g. physical) (Law, 2019). This means that objects are not taken to exist outside

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[20] Law (2008), however, identified a shift from the empirical, specific and contingent idiom of STS to a quest for generalizing claims and engagement with large-scale debate, mainly in Latour's recent work (see Latour, 2004). I must admit that I agree with his pessimistic and arguably prejudiced view: "[…] it may be that STS is shifting its intellectual character, or (depending on your point of view) displaying signs that it is starting to lose its soul. My own prejudices lead me to the latter view." (Law, 2008, p. 642)

practices (Mol, 2002; Haraway, 1988; Barad, 2003), or, in other words, to exist outside networks of humans and nonhumans (Latour, 1996b). There is, further, a rejection of essentialisms, mainly regarding *a priori* distinctions between nature and culture, or human and nonhuman, which is the reason such approach can be said to have a flat ontology (Latour, 1987; Law, 2019; Haraway, 1991a; Sismondo, 2010).

Such inquiries into practice as performative and generative can be arguably attributed to a recent movement in human sciences called the 'turn to ontology'. Most notably present in Anthropology (e.g. Holbraad & Pedersen, 2017; Kohn, 2007), Philosophy (e.g. Harman, 2018), and the interdisciplinary field of Science, Technology and Society (STS) (e.g. Law & Lien, 2013a; Mol, 2013), such shift is said to mark a move from epistemological concerns, to ontological ones[21]. Woolgar and Lezaun (2013) describe this turn as: "[…] an effort to circumvent epistemology and its attendant language of representation in favour of an approach that addresses itself more directly to the composition of the world." (p. 322). Ontological concerns, however, have never been very distinct from epistemological ones in STS studies, especially in Material Semiotics, even in its earlier formulations (e.g. Latour & Wolgar, 1986; Haraway, 1991b; Cussins, 1996; Star & Greisemer, 1989). Perhaps Woolgar and Lezaun are correct in stating that in a certain sense "[…] the turn to ontology would be a way of drawing out the full implications of many other turns: the materialist, performative, instrumental or experimental sensibilities developed by the field over the last two decades" (2013, p. 323). Despite its contested label[22], such explorations of 'the ontological' are cardinal to the reflections I attempt in this chapter.

In order to explore how realities are done in practice, these studies have introduced and reshaped several terms. The term 'construction', for example, was widely used in early ANT in spite of the adoption of this terminology by social-constructivist movements (e.g. Latour & Woolgar, 1986; Latour, 1983; 1986; 1987; cf. Aspers, 2015). Latour has put a lot of effort into trying to dissociate his use from that of this latter tradition[23] (e.g. Latour 1992; 1996a; 1996b; more explicitly in Latour, 2003), since for him construction does not refer to

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[21] Law & Lien 2013a have located this turn within a broader separation of ontological questions from cosmological ones, so that "[...] questions of ontology (the kind of objects or entities that exist) are detached from general assumptions about the character of the cosmos and become a matter for empirical investigation." (p. 364)

[22] For a discussion regarding the ontological turn in the field of Anthropology, see Holbraad & Pedersen, 2017; Holbraad, Pedersen & Viveiros de Castro, 2014. For this turn in STS, see Woolgar & Lezaun 2013; 2015; Van Heur et al., 2013; cf. Aspers, 2015).

[23] Including his and Woolgar's notable removal of the world 'social' from the title of their 1979 book *Laboratory Life: The Social Construction of Scientific Facts* in its 1986 edition.

the 'social stuff' of which things (scientific facts, for instance) are made, but the process through which these things are built. This process is 'social' not because it is solely done by humans, but because it is done relationally and collectively by humans and non-humans (Latour, 2003).[24] Furthermore, as Latour (2005) explains, recalling his ethnographic study in the Salk Insitute Laboratory: "Facts were facts— meaning exact—because they were fabricated—meaning that they emerged out of artificial situations. Every scientist we studied was proud of this connection between the quality of its construction and the quality of its data." (p. 90). Thus, construction (fabrication), for him, does not oppose 'truth'; it highlights the artificiality required in order to achieve objectivity (see also Latour & Woolgar, 1986).

> In summary, Latour uses construction to designate something which:
>
> […] a) has not always been around, b) which is of humble origin, c) which is composed of heterogeneous parts, d) which was never fully under the control of its makers, e) which could have failed to come into existence, f) which now provides occasions as well as obligations, g) which needs for this reason to be protected and maintained if it is to continue to exist (Latour, 2003, p. 43).

This term was very useful for the earlier formulation of ANT, which maintained the assumptions that "[…] the web that has been constructed is more or less coherent, more or less stabilized, rather obdurate" (Law, 2004b, p. 5). Such assumptions, as well as the notion of 'construction', have become less prominent in recent material-semiotic investigations, mainly among the scholarship considered part of the 'turn to ontology'. In her well-cited book *The Body Multiple*, Annemarie Mol presents an ethnography of a Dutch hospital, attending to the way atherosclerosis is done in practice. The author rejects the use of words such as 'make' or 'construct', she argues that "[t]hey suggest that material is assembled, put together, and turned into an object that subsequently goes out in the world all by itself." (p. 32). In her investigation, she is not interested in the way things were constructed in the past, but rather in the 'complex present' of things, in which they become and remain solid or durable due to constant practices and these may be done differently in other places or time (Mol, 2002; Law & Mol, 1995; Woolgar & Lezaun, 2013; see also Gad & Jensen, 2010).

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[24] Latour (2005) has named this positions 'constructivism', as opposed to 'social constructivism': "In other words, 'constructivism' should not be confused with 'social constructivism'. When we say that a fact is constructed, we simply mean that we account for the solid objective reality by mobilizing various entities whose assemblage could fail; 'social constructivism' means, on the other hand, that we replace what this reality is made of with some other stuff, the social in which it is 'really' built." (p. 91).

In order to avoid these connotations of the metaphor of 'construction', Mol opts for the fresh term of 'enactment' instead (Mol, 2002; see also Bertoni, 2012; Law, 2004b; 2004c). She also rejects the term of performance, due to the previous meanings attached to it in sociological literature (e.g. Goffman, 1971; Butler, 1990) which she aims to distance her use from (See Mol, 2002, p. 41). Although I agree that performance is a 'buzzword' in social sciences and it is a highly contested term, I believe that its commonsensical and academic connotations make a phrase such as 'performing cassava' at the same time familiar and odd. Furthermore, material semiotics literature has retained the use of this term (e.g. Law & Singleton 2003; Abram & Lien, 2011; Akrich & Pasveer, 2004; Law & Lien, 2013b see also Law & Singleton, 2000), mainly after the contributions of Karen Barad, who extended Butler's performativity beyond anthropocentrism (Barad, 2003; 2007).

Woolgar and Lezaun (2013) argue that such terms can be "[…] arranged along a rough continuum from weak to strong skepticism: social shaping, aggregating, affording, providing for, constructing, apprehending, performing, accomplishing, bringing into being, constituting and enacting." (p. 324). This can, indeed, be done, in abstract, but such attempt assumes these words have (roughly) fixed meanings, and I do not believe this is the case, especially if we are to take the material-semiotic project seriously. These words gain their meaning in relation to the empirical data, they are flexible, and although they are also obviously related to their previous uses, as they travel, they change. As Mol (2010) emphasizes, regarding ANT: "The strength of ANT is not in its coherence and predictability, but in what at first sight, or in the eyes of those who like their theories to be firm, might seem to be its weakness: its adaptability and sensitivity." (p. 262).

Keeping the flexibility of such terms in mind[25], in this work, I use 'enactment', 'performance', as well as 'choreography' (Cussins, 1996), as synonyms that designate the precarious, iterative, contingent, local and mundane material-semiotic practices, not solely done by humans, through which reality is brought into being. I further believe it is necessary to highlight that attending to practices of world-building does not mean that all performances are successful in bringing certain realities into being; or that enacting these realities are an easy accomplishment (Law & Singleton, 2003). Indeed, it requires iterative effort,

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[25] In a recent interview, Annemarie Mol foregrounds the difference between 'concept' and 'term': "A concept is a firmly defined term that the author outlines clearly and then tries to keep stable. I am not invested in stabilizing words in that way. Instead, I take it that terms shift and change – get adapted as they travel. Hence, the question you ask about journeys may be reflected back on the terms in which we get to talk about those journeys. Terms, like technologies and other things, do not necessarily stay stable as they travel. They are fluid. Here is the story" (Martin, Spink & Pereira, 2018, p. 299).

coordination, and network-building. This is perhaps not evident in the terms I have chosen to use, such as 'performance' or 'choreography'. This could be an argument for insisting on the 'construction' metaphor, but I believe that, following Law (1997), we should instead remember that dancing and performing are not easy, they are located accomplishments that depend on a number of entities (humans and non-humans) and may resist or fail.

By exploring the ethnographic data through these terms and metaphors, I hope to contribute to the body of empirical work that attempts to move beyond two central assumptions ingrained in Western philosophy, namely perspectivalism and representationalism. Perspectivalism is the idea that there is a singular reality that is perceived in different ways by different people, they have different standpoints (Mol, 1999). Consequently, the one seeing becomes plural but what is seen remains singular. Mol moves away from such conception by foregrounding practices: "Rather than being seen by a diversity of watching eyes while itself remaining untouched in the centre, reality is manipulated by means of various tools in the course of a diversity of practices." (1999, p. 77). There is, thus, no assumption of a singular reality which hangs together effortlessly: "[…] objects come into being – and disappear – with the practices in which they are manipulated. And since the objects of manipulation tends to differ from one practice to another, reality multiplies" (Mol, 2002, p. 5). Thus, if there is a singular object, it is not a given, but the result of several iterative coordination practices.

Representationalism, on the other hand, is a bit more complicated and difficult to break from. It consists of the metaphysical assumption of different and independent ontological categories of representations (words) and what is represented (matter) (Barad, 2003; see also Barad, 2007, p. 46). Karen Barad, in her 'agential realist' philosophy attempts to question representationalism, not unlike Mol, by attending to practices and the materialization of objects. She advocates for a posthumanist understanding of performativity, in which boundaries are constituted through material-discursive practices (Barad, 2003). Thus, the two ontological reigns of 'word and world' are not marked by a relation of representation, but by practices through which boundaries are drawn. Inspired by Barad, in my analysis I pay attention to material-discursive practices of boundary making (or boundary work), opting for a performative position as opposed to a representationalist one.

Barad's concepts and theory are indeed useful for thinking about the inseparability of meaning and matter in the context of my research. However, I do not intend to discuss her much broader metaphysical project here, and since my work is inherently empirical, I make

no such attempt of discussing how 'reality really is' the way she does, but how it came to be in my fieldwork observations, and in the texts I analyze.

In the following segment, I draw on Law's (2004a) understanding of 'method assemblages' as performative. How can I be accountable for the reality I perform in this thesis? How can I make such reflexive move without falling into endless 'naval-gazing'? (see Latour, 1996b) I attempt to bypass these challenges by discussing the patterns of presence and absence created by a flowchart of the processes the cassava goes through in the community studied. I then use this experiment as a way to foreground a few absent entities I want to make present in the chapter's analysis and introduce the ways I plan to do so.
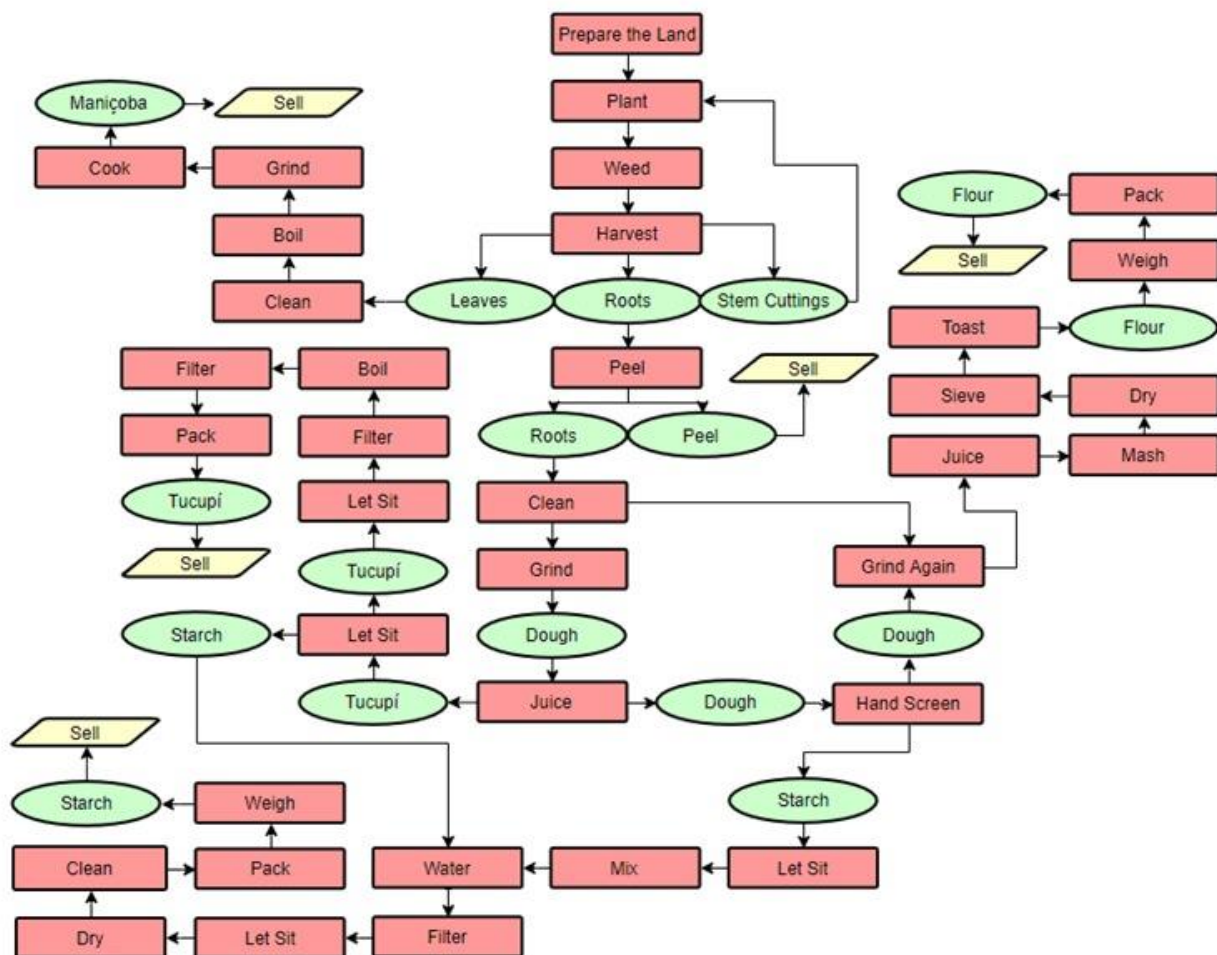

Figure 1. Cassava Flowchart

1.2. Method Assemblages and othering

In the book *After the Method: Mess in Social Science Research*, the author John Law extends the reflections of seminal work in the area of Science, Technology and Society (STS), such as Latour and Wolgar's *Laboratory Life* (1986), and Mol's *The Body Multiple* (2002), in order to destabilize some of the orthodoxies of the traditional way method is approached in social sciences. Instead of considering method in a purely procedural manner, Law invites us to think of methods as method assemblages, as he explains:

> Method assemblage is generative or performative, producing absence and presence. More specifically, it is the crafting or bundling of relations in three parts: (a) whatever is in-here or present (for instance a representation or an object); (b) whatever is absent but also manifest (that is, it can be seen, is described, is manifestly relevant to presence); and (c) whatever is absent but is Other because, while necessary to presence, it is also hidden, repressed or uninteresting. (Law, 2004a, p. 161)

Discussing such relations of absence, presence and otherness can perhaps allow for the flexibility and contestability of the boundaries I draw in this work to be made explicit. Moreover, by experimenting with the presence/absence pattern of a specific method assemblage, I intend to look for ways to make certain othered entities visible.

In figure 1 there is a flowchart of the processes that the cassava goes through in the community where I gathered my data. The fact that such process could have been presented in a chart in a great number of different ways is not surprising or interesting; the framing is always somewhat arbitrary. I argue, however, that, following Law (2004a), this flowchart[26] can be understood as a 'method assemblage' (or part of one) that performs cassava and its products a specific way, and not any other. Such performance, then, draws specific boundaries between what is present, manifestly absent, and Other.

The flowchart presents the data I observed as a recursive succession of processes and products. Everything moves one way, following the harmonious arrows and finally reaching the final stop of 'sale'. This process is fixed; there is no change, no detour, and no mistake. This image is a map; it tells the reader what route the cassava takes to become tucupi, flour, and starch. This mapping practice, which is central to what we may call Western culture, is very useful. It simplifies the observed reality in order to facilitate understanding, and this task is just achieved if a lot is made invisible.

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[26] When I talk about 'the flowchart', it is merely a necessary heuristic move for this experiment I attempt here; such boundary between the flowchart and my other conceptual and empirical apparatuses used to produce such chart are, following material semiotics, not independent.

There are two issues that I want to tackle before moving forward. Firstly, this flowchart is not untrue. The process I observed can indeed be presented this way, and when I showed the chart to the community members, they agreed with it. So, this discussion I am making is not about the 'truth' or the representation of a reality 'out there'. Or, in other words, I do not take this to be an epistemological problem, so that "[…] there is the possibility of an overall map. We just need to sort out our perspective – and try a little harder." (Law & Singleton, 2003, p. 12). The issue is tracing a specific enactment of this reality, through this method, and its consequences. Secondly, something will always be made invisible or, in Law's words: "[…] there will always be othering" (Law, 2004a, p. 85). That is the requirement to make something else present. When we attend to performance, there are never innocent stories (Law & Singleton, 2000). Nevertheless, I do not believe any method assemblage should be discarded due to its necessary othering, or else there would be no tools left. I am merely making explicit and articulating the patterns created by the method assemblages I have chosen to use.

What is absent from the chart? For starters, a chart can obviously not contain cassava, tucupi, or starch, or the community members whose skills are required to properly follow the path dictated. These entities are examples of things that are made manifest absent in this chart, they are relevant, they are represented or implied, but not there. However, there are many other things which are either considered irrelevant or impossible, and are thus made invisible in this method assemblage. In the remaining segments of this introduction, I further examine this pattern of absence/presence in order to discuss how and why to include certain entities, in my description in this chapter, which have been othered in the flowchart. Nonetheless, I do not aim to compare 'the flowchart' with other ways my data is presented (description or interview), since these are all part of my method assemblage. Rather, I use this specific product of my research practice (the flowchart) as a way to: exemplify the generative understanding of methods; play with the patterns of presence/absence in order to create connections I believe to be interesting; and explicitly embrace the partiality of my knowledge-practice.

1.2.1. Nonhuman Agency:

In the chart, many things are done to the cassava: it is planted, pealed, cleaned, and ground, just to name a few. It also becomes other products, but everything is done by the human handler. The cassava does not seem to be doing anything, at least nothing interesting.

Such othering of non-human agency is far from uncommon, and sometimes it can indeed be useful. However, in the narrative I present here, I expect that making such agency present can allow for a more interesting and perhaps more accountable story to be told. Therefore, my motivations for such inclusion are not grounded in strong metaphysical claims (e.g. Barad, 2007) or in a normative position (e.g. Latour, 1996b; 2005).

Although nonhuman agency is still a controversial topic[27], it has been increasingly made present in several studies in social sciences and related areas (e.g. Knappett & Malafouris, 2008; Maller & Strengers, 2019; Kirksey, 2014). Much of the literature, however, disagrees in their use of the term[28], and, thus, it becomes necessary that I summarize what I mean when I discuss nonhuman agency here. There are four important points I wish to make: first, agency is, here, detached from intentionality and language use (Callon & Law, 1995); second, it is perceived as an emergent property of the hybrid heterogeneous assemblages of actors and their relations (an effect of the network[29]), or, in other words, agency is *distributed* through and does not pre-exist practices: nothing acts or exists by themselves (Callon & Law, 1995); third, everything is only *potentially* an agent (Gad, Jensen & Winthereik, 2015), whether agency emerges is an empirical matter of *post hoc* attribution[30] (Law & Mol, 2008); and finally, since agency is relational, "[…] acting and being enacted go together" (Mol & Law, 2004, p.46): every actor is an 'actor-enacted' (Law & Mol, 2008).

In emphasizing these points, I wish to explicitly differentiate the use of nonhuman agency here from essentialist understandings of the term. I consider nonhuman agency as 'essentialist' when the agency attribution to a nonhuman entity is justified by the existence of some essential trait. This is not to say that every entity (e.g. objects, humans, plants, animals, ideas…) perform agency the same way, or that all entities should be considered as agents in an investigation, but that their agency should not be restricted before being empirically studied. This is, I believe, the case of Eduardo Kohn's 'Anthropology of Life' (Kohn, 2007). Although the author extends his anthropological analysis to the nonhuman, he does so by

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[27] For important critiques of attributing agency to nonhumans see: Bloor, 1999; Elder-Vass, 2008; Hornborg, 2014; 2017; Lave, 2015. See also Kohn, 2013 (cf. Latour, 2014).

[28] Tim Ingold (2008), who also extends agency to nonhumans in his analysis, challenges ANT notion of a distributed agency, and invites the use of another metaphor, that of 'meshwork'. This is a good example of unresolved tensions among scholars and their theories of nonhuman agency.

[29] In this chapter, I have avoided using the 'network' metaphor of early ANT, since I believe the lexicon provided by more recent 'post-ANT' literature can allow for a fresher analysis of my data. In the next chapter, however, I draw more explicitly on early-ANT literature and the metaphor of networks becomes more pertinent.

[30] For Law & Mol (2008), the interest of investigation is not in the traditional 'whodunit': "Anything is, or might be, or might be said to be, an actor. So, the point is not who has done it. Instead, what become more urgent are questions about what is happening." (p. 74).

separating living entities, who are unique due to their 'semiotic nature', and thus 'selves', from artifacts and objects, which are mere things[31] (Kohn, 2013).

I do not intend to criticize such use of the term; my position is not that non-human agency should be used in a strictly relational manner, and different uses can indeed provide engaging texts (see, for instance, Kohn, 2007). Moreover, although I would like to retain a strong tone of relationality (anti-essentialism) in my investigation, I do not assume that creating certain essentialist criteria for categorizing pre-existing entities entails a 'bad' or 'wrong' account of how 'reality really is' (e.g. relational). Something will always be othered (Law, 2004a), and although I try to make this as much an empirical matter rather than a theorical one, othering will still happen. Arguably unlike early-ANT, I believe there will always be 'missing masses' (see Latour, 1992): this is not a celebration of exclusions as much as an embrace of partiality (see Haraway, 1988).

After making clear my theoretical position, a practical matter remains: how can I present the cassava and its products as active entities that take part in their own performance? This is not a straightforward goal, mainly since most method assemblages in social sciences attend solely to the 'symbolic', leaving the 'material' to the reign of natural sciences. Following the ontological turn discussed previously, one move I make in order to make this material agency[32] visible is by foregrounding the practices, and how they unfolded in my observations:

> *In the **casa de farinha**, Jane was stirring her tucupi that had sat from the previous*
> *night in a basin. She said that her tucupi had a strange consistency, being thicker than*
> *Cacá's. Cristina said that this was due to the young cassava that the community had*

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[31] Kohn presents a thought-provoking critique of ANT (mainly Latour's) in his book (2013), which I cannot explore here. Regarding nonhuman agency, he argues that: "Nonhuman selves, then, have ontologically unique properties associated with their constitutively semiotic nature. And these are, to a certain extent, knowable to us. These properties differentiate selves from objects or artifacts. Treating nonhumans generically—indiscriminately lumping together things and beings—however, misses this. And this, to my mind, is the biggest shortcoming of STS, the dominant approach for expanding the social sciences to consider nonhumans" (p. 91).
[32] Barad (2007, p. 455) criticizes STS scholarship for often conflating `nonhuman agency` with `material agency`, saying that it is reinscribes the opposition of human and material agency. However, I have decided here to conflate such terms not because I believe human agency is not material, but because such categories of `nonhuman` as well as `material` are simply heuristic tools to investigate material-semiotic becomings, not as essentialist separations. Therefore, the same way I do not develop here an argument for the agency of every non-human (they are only *potentially* agential), I also eschew Barad`s broader metaphysical project that renders matter as (always) agentive. Both these positions, although they break from the common way matter and nonhuman are essentialized as passive, still define properties *a priori*, and do not necessarily ground these assumptions in specific and contingent material-semiotic investigations.

harvested and processed that week. Cacá agreed, but said that it could also have been their variety.

In this short conversation, the women in the *casa de farinha* assessed a difference (the thicker tucupi), and guessed what caused it (the variety or age of the cassava). An anthropocentric narrative would go further in the past events until finding a human to assign agency ("it is the farmer owner's fault! She let the community members harvest the cassava while it was too young! He planted a variety that did not provide good tucupi!"). I believe such story would leave an interesting part unexamined: the tucupi did something. The entity blamed by the women was the cassava, but what about the cassava was uncertain. This uncertainty is central to the way tucupi is performed there: it is hard to predict how much tucupi will come out when an amount of cassava is juiced; the colour and texture will change depending on the age and variety of the cassava; and the taste will change, from sweet to sour, according to the length you wait before cooking it. The properties of the tucupi refuse to sit still, and the women in the community are aware of that, this uncertainty shapes the way they talk about and handle the tucupi; they do not settle the debate, there is hardly certainty when it comes to tucupi.

In this brief comment, I tried to attest to the benefits, in this empirical study, to eschew the natural/cultural divide and opt for a relational ontology (the tucupi is both materially and symbolically uncertain in the way it is being enacted there). Consequently, I adopted a certain notion of agency, and tried to make it visible by foregrounding practices. In summary, then, the tucupi is perceived as an agent, despite its lack of intentionality and language; nevertheless, it solely becomes an agent through its relations with the cassava, the women, the *casa de farinha*, and other entities; this agency, in my empirical investigation, is manifested through the uncertainty and haziness of the way the tucupi is performed; and finally, in this performance the tucupi is not only acting, but being enacted: it takes active part in its performance by not sitting still, and, thus, it refuses certainty.

By focusing on the practices observed, I was able to make the agency of the tucupi visible. But there are many other things and agencies enacted throughout the process presented in the flowchart that I did not observe, for example, when the cassava was in the soil. Therefore, I believe it is useful to use technical literature to add to and contrast with my observations and interviews. Do such books make the material agency present? In what way does it differ from the flowchart?

Sprouting occurs 5–15 days after planting (DAP) the stem cutting. Five DAP, the first adventitious roots develop from the cut surface of the stem cutting and also from the buds, which are situated under the soil surface. After 10 DAP, the first sprouting occurs. One or more axillary buds form a bud, a palmate leaf blade, subtended by a long petiole and an internode. (Lebot, 2009, p. 39)

The cassava seems to do much more here than in the flowchart. It develops, sprouts, and forms buds and leaves. This is also a performance of material agency, perhaps it is very strict, not open enough to pertain to an ANT text (See Latour, 2005, p. 10), but by articulating this text with the flowchart, we are able to draw comparisons and perhaps find 'partial connections' (see Haraway, 1988).

Such inclusion of technical knowledge in the sociological scholarship has been a point of critique of early ANT by the Sociology of Scientific knowledge (Collins & Yearley, 1992a; 1992b; cf. Callon & Latour, 1992). According to this tradition, since the social scientists lack the technical knowledge of 'things', we need to naively believe what the experts tell us and thus preclude critique. This is a relevant consideration, but it only becomes a problem if we remain in the epistemological/representational realm of early ANT, in which the question asked is: 'is this expert a reliable spokesperson for the cassava?"[33] (e.g. Callon, 1984; Latour, 1983). If we move to the ontological/performative field and think of this text as enacting cassava a certain way[34], such narrative from a textbook can be contrasted with other enactments without making it as the ideal against which comparison is drawn, as Law and Lien (2013a) write: "There is no gold standard. There are just practices" (p. 374).

Therefore, in the following chapters, I attempt to articulate the data I gathered (observations and interviews), as well as technical and academic literature, to create a certain diffractive pattern[35] that allow for nonhuman agency to be present. Before that, however, there is another aspects othered in the flowchart discussed that I wish to make present.

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[33] For a critique of the 'spokesperson' concept of Latour, see Kirksey, Schuetze & Helmreich, 2014

[34] For material semiotic investigations that tackle texts as performative, see Nimmo, 2011; Woolgar & Lezaun, 2013; for an earlier version, see Latour, 1993.

[35] I use here Barad's appropriation of Haraway's notion of 'diffraction'. She uses this optical phenomenon as a metaphor to talk about her methodology of "reading insights through one another in attending to and responding to the details and specificities of relations of difference and how they matter" (Barad, 2007, p. 71; see also Haraway, 1997; Sehgal, 2014).

1.2.2. Situatedness

In this segment, I will make two points regarding reflexivity: firstly, I will attempt to incorporate Haraway's 'situated knowledges' in my knowledge-making practices, using language translation as an example; then, I will discuss Latour's critique of reflexivity, and how although his comments are important, they do not preclude reflexive accounts such as Haraway's. In this confusion, I hope to clarify my position as both convinced of the importance of partiality, accountability and reflexivity, and critical towards the inevitable academic 'naval gazing' this first move requires.

In her 1988 text *Situated Knowledges*, Donna Haraway puts forth her version of a feminist objectivity. She claims that: […] objectivity turns out to be about particular and specific embodiments, and definitely not about the false vision promising transcendence of all limits and responsibility. The moral is simple: only partial perspective promises objective vision." (pp. 582-583). In other words, objective knowledge practices are located, heterogeneous, fragile and never innocent or beyond scrutiny (see Haraway, 1997 pp. 137-138). Feminist objectivity, thus, can be opposed to what Haraway calls 'god-tricks', which promise '[…] vision from everywhere and nowhere equally and fully […]" (Haraway, 1988, p. 584), such as positivist and relativist epistemologies.

Although Haraways concept has been widely adopted by scholars, mainly in discussion of methods and epistemology, Barad notes that situatedness has often been conflated with notions such as 'social positioning'. For her, Haraway's concept is not about fixed location, but about 'specific connectivity' (see Barad, 2007, p. 471). I concur with this reading. She further explains that: "Situated knowledges are not merely about knowing/seeing from somewhere (as in having a perspective) but about taking account of how the specific prosthetic embodiment of the technologically enhanced visualizing apparatus matters to practices of knowing" (Barad, 2014, p. 238). In the discussion I present here, my visualizing apparatus is a flowchart, and without any reflexive comment, it can be said to be attempting a 'god-trick'.

In my narrative in this introduction I believe I have already made clear that my work is far from a universalist attempt, and even the flowchart I have used is inherently located in my specific empirical study, and not anywhere else. However, I believe thinking about Haraway's feminist objective allows me to situate aspects of my knowledge practice which are often considered disembodied, such as language translations. During my fieldwork, I used Portuguese to communicate with the community members and to conduct interviews, but here my findings must be presented in English. In such presentation, the English words

perform the double-move of 'traduction/trahision' (Law, 1997). Instead of looking for innocence, I will try to keep my word's unavoidable crimes and betrayals nearby by foregrounding my translation practices when I believe much is being missed; or by discussing the reason why I have decided to keep certain terms in their original language.

One example is the activity of 'weeding', which is presented in the chart. Weeding is the act of removing unwanted weeds from an area that is being cultivated, and the Quilombolas at the community I observed did do that. However, the verb they used to describe it was *capinar*, which although is often translated as 'to weed', it strongly implies the use of a hoe. How does 'weed' betray its original use? It sheds the hoe. In an interview, when asked about what parts of the process she liked and disliked, Maria said that: "*Planting is better than* **weeding** *[...] Because all that we do is planting and leaving it there; now,* **weeding** *is worse, because you need to be careful so you don't break the cassava stems. You can't break them.*". How can we understand this comparison, or the necessity of being careful when weeding if we remove the hoe from this activity? I believe, thus, that by not hiding these betrayals it becomes possible to both create interesting reflections and to emphasize the partiality of my knowledge-practice.

I have decided to leave words such as *Casa de Farinha* [flour mill], *encoivarar* [gather sticks to be burned], *terçado* [machete], when the words are from the regional dialect, and thus have a specific locality to its meaning, or because, as was the case of *capinar*, something I want to keep present gets lost in translation. This is, however, not an attempt to achieve transcendence, or bring my translations or my work closer to an innocent unaccountable position. It is, rather, about situating such translation practices, as well as other knowledge practices: they were done somewhere (here) by someone (me – including an assemblage of conceptual tools and apparatuses) (see Callon & Law, 1995).

Until this moment, I have tried to use this introduction to discuss what I believe to be important topics in the material semiotic project and which are necessary to develop the analyses presented in the following chapters and also to use a part of my method assemblage (the flowchart) as a way to bring certain reflexivity and accountability to the generative character of my work. Latour has been very vocal about his skepticism of reflexive moves (e.g. Latour 1988) and although his attacks are usually aimed at ethnomethodologists and deconstructionists, I believe the discussion is pertinent here. From a semiotic understanding, he claims that no matter how many reflexive loops a text attempts to make, it will always remain as reflexive as any other text: "[…] they are all texts or stories bearing on something

else. There is no way to order texts in layers because they are all equal. Texts, so to speak, live in a democracy, as far as semiotics is concerned." (Latour, 1988, p. 169).

This critique of reflexivity is connected to ANT's attempt to create an 'infra-language'[36] (see Latour, 2005, p. 30), rendering the researcher's vocabulary weaker than that of the actors, thus allowing them to formulate their own metaphysical and sociological assumptions (Latour, 1996b; 1999). I agree both with Latour's critique of reflexivity as an attempt to get the upper hand in order to produce explanation and of the sociologic meta-language that replaces the actors' rich vocabulary of the people we study. However, I believe two related problems remain: that of method and accountability.

If we are to take Latour's position seriously and pay attention to the metaphysical assumptions of the actor, I believe we require a reflexive move that attends to the patterns of absence/presence created by our method assemblages and visualizing apparatus: infra-language is not always enough to allow actors to take part in their metaphysical projects. This point can be illustrated by the chart I presented. This apparatus performs the processes the cassava goes through as fixed, harmonious, circular, and singular. There are no other ways to do so and it is always like this. As it will be clear from my discussion in this work, I argue that the community tends to reject such fixity: most things seem to be up for debate and change. How can we make such matter of concern present if we perform reality through this method?[37] Perhaps Latour's nonreflexive 'method of no method'[38] will not be useful here.

I believe, thus, that reflexivity does not have to be about arrogantly preventing the reader of believing in the text, or much less about making reflexive loops as to be a level 'above' to provide strong explanations (see Latour 1988). It can be, as I exemplified, about making patterns of presence/absence that are faithful to the actor's own metaphysical assumptions; or, following Haraway[39], it can be about creating consequential meanings from non-innocent positions:

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[36] For a critical discussion about ANT's notion of intra-language see Gad & Jensen, 2010.

[37] My position resonates with Strathern's (1996)

[38] This is a joke and also a betrayal of Haraway's concepts of 'nature of no nature' and 'culture of no culture' (Haraway, 1997); See also Winthereik, 2019 for an interesting reflexive take on ANT considering concepts as companions endowed with agency.

[39] Haraway, however, shifts the metaphor of reflexivity to diffraction: "My invented category of semantics, diffractions, takes advantage of the optical metaphors and instruments that are so common in Western philosophy and science. Reflexivity has been much recommended as a critical practice, but my suspicion is that reflexivity, like reflection, only displaces the same elsewhere, setting up the worries about copy and original and the search for the authentic and really real. Reflexivity is a bad trope for escaping the false choice between realism and relativism in thinking about strong objectivity and situated knowledges in technoscientific knowledge." (1997, p. 16).

"[t]he point is to make a difference in the world, to cast our lot for some ways of life and not other. To do that, one must be in the action, be finite and dirty, not transcendent and clean. Knowledge-making technologies, including crafting subject positions and way of inhabiting such positions, must be made relentlessly visible and open to critical intervention" (1997, p. 36)

Rendering my knowledge-making technology (method assemblage; visualizing apparatus) visible and open to critical intervention has guided the development of this chapter and of this project.

In summary, reflexivity is a dangerous game that can easily become academic navel-gazing, endless reflexive loops (Latour, 1988), and is perhaps a bad trope for thinking of knowledge practices (Haraway, 1997), but I believe that it is a game that still needs to be played, at least in the project I attempted here. In this introduction, thus, I have presented and discussed some material semiotic sensibilities and terms that will be used in my analysis of the way cassava and its products are performed in Espírito Santo do Itá and made some reflexive moves with regard to my method assemblage. I hope that in doing so I was able to clarify my translation and betrayal of the material semiotic project, and to embrace the partiality and accountability of the stories I tell.

2. Planting: making things in/commensurable

"I'm like the man here,

I was born on the earth and raised in it;

I'm like the man here,

I have my mother Earth's strength and skin color.

If you remove my skin,

My flesh is clear and strong.

Like the milk that sustains.

If you crunch me

Take my blood,

Yellow, and then you will have food;

I give you the flour, the starch and the tucupi.

I'm like the man here.

I'm part of nature

And live to give you life

I'm the cassava from the state of Pará."

- Sigla Regina (my translation, with the author's permission)

Figure 2. Maria making cuttings from stems using a machete and a make-shift support in Espírito Santo do Itá. October 30, 2019.

Figure 3. Ney burning the sticks he gathered to prepare the soil. Espírito Santo do Itá. October 30, 2019.

Cassava is popularly known as a crop which is fairly straightforward to plant, and due to its hardiness, it does not require much to achieve good yields. As described in the 2013 FAO report: "[…] cassava is well-known for its ability to produce reasonable yields on poor soils, in areas with low or erratic rainfall, and without agrochemicals and other external inputs […]. Those "hardy" traits have made cassava highly suitable for low-input, small-scale agriculture […]" (FAO, 2013, p. 37).

This is not a recent characterization of the crop. In 1918 the Brazilian writer Monteiro Lobato used the cassava in his negative characterization of the Brazilian country life and of the caboclo (Brazilian of indigenous and European heritage):

The soil only wants cassava, corn and sugarcane. The first one, because it is a bread that has already been kneaded by nature. Just pluck the root and pour it into the embers. It does not impose harvest, nor does it require a barn. The planting is done with a span of branch buried in any ground. It does not ask for care. The ant does not attack. Cassava is *shameless*.[40] (Lobato, 2014, p. 154, my translation and emphasis)[41]

I appropriate this literary 'shamelessness' of Lobato's cassava.[42] I believe it is a useful way of perceiving this crop, since it seems to allow for a positive and negative reconceptualization, and also, when diffracting[43] the contemporary literature this thesis draws on, it ironically queers the nature-culture divide.[44]

This shamelessness is a central part of the technical and popular identity of this crop. However, is this a necessity? Are there circumstances which may bring shame to this shameless crop? In Espírito Santo do Itá, the cassava is not always characterized by its 'hardy traits', but sometimes by low yields, lack of technical knowledge, and not enough land. This does not mean that cassava is not cultivated, but in the recent years there has been a shift towards buying the cassava from nearby (sometimes not that near) farms.

In this chapter, I present my observations regarding the way cassava is planted in Espírito Santo do Itá, drawing on data from my ethnographical work and interviews. I, then,

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[40] In Brazil, "sem vergonha" is also a popular term used to describe plants that grow easily.

[41] In the original: "Da terra só quer a mandioca, o milho e a cana. A primeira, por ser um pão já amassado pela natureza. Basta arrancar uma raiz e deitá-la nas brasas. Não impõe colheita, nem exige celeiro. O plantio se faz com um palmo de rama fincada em qualquer chão. Não pede cuidados. Não a ataca a formiga. A mandioca é sem-vergonha.". I have significantly changed the structure of the sentences so it fits the structure of the English language.

[42] Unfortunately, I am not able to present an analysis of his work or of the characterization of cassava in his critique of the *cablocos*. For a contemporary reading of racism in Lobato's work, see Rocha, 2015.

[43] Regarding the the material-semiotic notion of diffraction: see Barad, 2007; Haraway, 1997 and Sehgal, 2014.

[44] Here I am not arguing that these were the intentions of Lobato when the term was used, I am merely describing the meaning I believe it achieves when it is read through the academic literature used in this work.

articulate such findings with the way selected technical books perform the planting process, pointing out moments of disagreement. In doing so, I emphasize the ways in which the local knowledge practices regarding this stage of the crop production co-exist with the technical recommendations, even when there are disagreements and frictions. I argue that the local practice resists standardization and impositions from the technical and scientific practices through the creation of patterns of in/commensurability and the use of specific criteria when the comparisons are drawn. I consider especially the way community members resist talking about their knowledge-practices in abstract, consequently, precluding disembodied comparisons. Finally, I argue that Lobato's description of cassava as shameless can help us understand the relational agency the crop performs here, both in its hardy traits and in its flexibility that allows for enrollment in conflicting knowledge practices.

Nevertheless, my analysis in this chapter is based on fairly limited data, since there are only 5 plots of land (around 15 hectares each) that are owned by community members, and the crops cultivated there are not the main source of income. Due to this situation, and the fact that the people working in the *casa de farinha* where I did most of my observations did not cultivate land, I only briefly observed this part of the process, near the end of my fieldwork. I believe, however, that there are interesting reflections to be made. The ethnographic data presented here are based on field notes from October 30th, 2019, when I visited Maria's farm. I decided to retain the order in which I observed the events, interspersed with comments and interview excerpts.

> *I talked to Maria, the daughter of one of the owners, about the possibility of observing the routine at her cassava patch, and she agreed to let me. On the next day, her son, Ney, met me in front of the house where I was staying to walk with me to the farm. It took us around 15 minutes to get there. The reason that the cultivated land is not connected to the community land is because the community members who owned those first plots of land sold them.*

In an interview, Jane, the community treasurer, explained that most of the land surrounding the community was previously owned by community members, and it remained as a family inheritance across generations. However, many owners sold their land to outsiders such as Mrs. Telma, a land owner who became a close friend to the community. She hired community members to work at her farm and helped them get their land documents, since ownership was previously only assured by oral agreement and tradition. However, Mrs.

Telma sold her land, as Jane explains: "[…] *She sold it to a big farmer, Mr. Beto, who owns the brand "Tio Beto". He owns this land, and when he took over, he deforested everything. All the farm… And we were the ones who suffered, because of the increased heat it caused.*" The relation between the community and the owners of the surrounding land seems to be far from homogeneous, but unlike many other quilombola communities where there is explicit conflict, Espiríto Santo do Itá seems to be quite peaceful.

*When we arrived, Ney went to where his brother was working, and I went a different way to meet his mother, who was expecting me to show me how the planting works. She took me to one of the patches where the cassava plants were still small, and once asked she informed me they had been planted 2 months earlier. It was difficult to walk around, since the crops were still small and I was afraid of stepping on one. Using a hoe, she showed me how to **capinar** [remove the weed and clear the soil, using a hoe] in a way that it does not hurt the cassava stems. **capinar**, thus require a greater level of attention and care than planting, for example.*

*She grabbed her **terçado** [machete] and 3 pieces of wood that had been turned into a make-shift support. Then, she showed me about 10 cassava stems that she had cut from her crops previously, and that now would be planted. Using the **terçado** and the support, she quickly cut the stems into small cuttings, of around a span, each one with around 4 to 7 nodes (see figure 2). She also taught me how to properly do it, although I was not a very talented pupil.*

Using the hoe, she dug a few shallow holes on the ground. When I looked at them, I thought they were around 30 cm or less from each other, but I am not sure. She explained that she was replanting in the spots where the cuttings did not grow. I asked her why that had happened, and she said that sometimes it is because of the ground or the stem, but that there were animals that would eat the leaves and stems from the cassava, such as an Aracuã [Speckled chachalaca] which inhabited the woods. Maria had put an improvised scarecrow made of some sticks and a plastic bag, to see if it would help, but she said it did not.

Maria went on to explain how the crop grows: out of one end of the cutting the roots will come out, and out of the other one, the stems. I was informed that there are not many people that know this, or that are able to tell the ends apart. This knowledge is not merely a way to better understand the crop, it is important for the planting process, since they put 2 cuttings, in a horizontal position, in each hole, and they

should be put in opposite ways, so the roots will have more space to grow (see figure 4). *It is also useful when planting near tree roots, or big rocks, so the soil is occupied in the best way.*

In an interview with Maria's father, Mr. Aleontino, he explained the reason for planting 2 cuttings: "*If you do it this way, you will plant one tarefa[45] and harvest two*". Maria explained it differently: "*We do this because if one fails, the other one will grow. If one dies, the other one will be born.*"[46] However, the younger generation, even when planting two cuttings, does not care about these details. They either do not know this technique or do not pay attention to the placement of the cuttings.

After placing the cuttings in the shallow holes, Maria added a handful of fertilizers next to them. (see figure 5) *She explained that the soil is very old, and that many generations of her family have used this land, and therefore it was necessary to use fertilizers to achieve a good yield. I asked if they switch the places where they cultivate, and she affirmed they do it, but she explained that the first time this soil was cultivated, it was still a forest, and therefore the soil was very rich and did not require fertilizers to get a good harvest. Even if they allow some bushes to or thin trees to grow, it does not compare with the previous productivity.*
The holes were covered, either using the hoe or with the shoe sole, and then we were ready to find other crops that had not grown. Once we were done, Maria told me to observe her sons, Ney and Eré, who were gathering sticks to be burned in another patch of land. In our walk there, she showed me the divisions between her plot of land, and her brothers', her father's, and other members of the community's. They do not put up a fence, or any type of clear outline to enact this division. Instead, they use a few stakes, many meters apart.

Divisions such as fences or enclosures are not allowed in the community land, but they are allowed in these individually owned plots. In an interview with another community

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[45] *Tarefa* is a popular and informal unit used to measure land, traditionally the land used to plant sugar cane. It has somewhat different measurements in different states (e.g. in Ceará, it is 3360 m², but in Bahia, 4356 m²) (Onofre, 2018). I did not find any information regarding this measurement in Pará.

[46] In Portuguese, the expression 'to be born' is used symmetrically for plants, animals, and human beings. This sentence, thus, does not imply any attempt to anthropomorphize the cassava.

member, Adelson, I asked him how such divisions were materialized in these farms, since I had not been there at that point. He replied:

> "Here it is just the communitarian land, you can't even put up a fence […] There [in the individually owned plots] you can do it, but none of the farms there have a fence. There is only a division, there are only the stakes. […] There are only the demarcations, and each one knows their demarcation. And even when the grass is growing and it is getting ugly, we meet with the land owners and everyone cleans it. So we keep it always clean."

The fences are only used to demarcate the land owned by outsiders, which surrounds the community, such as Mr. Beto's. Maria cultivated in different patches inside her father's land, and such divisions were only demarcated by a few stakes. After re-planting in one patch, we met her children who were preparing the soil in another one:

> Ney and Eré were gathering sticks, a task she called **encoivarar.** This is done after the trees and vegetation have been already cut and burned, so the sticks that resisted the fire are piled up to be burned and some thicker logs are taken to be used as firewood for the oven. Ney and Eré managed to quickly create two impressive piles, both which were later set on fire (see figure 3).

This is a part of the process of soil preparation usually referred to as slash and burn, and it is a common practice in Brazil and worldwide, specially among the rural poor[47] (Fujisaka et al., 1996; Tschakert et al., 2007; Lebot, 2009; Pedroso-Junior et al., 2008). In Espírito Santo do Itá, it is not the only way to prepare the soil. Maria explained, in a later interview, that this technique is only used when they plant cassava "*in the middle of the tree stumps*":

> "That land they [her sons] were 'encoivarando' [gathering sticks] there isn't [any other treatment to the soil]. It is just in the middle of the tree stumps, really. But now, the one where we both were [replanting], that one, the soil was crushed. The tractor came and crushed it; we say it like this. It moves the soil back and forth and then it gets to that point where it is ready to be planted."

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[47] The use of slash-and-burn agriculture seems to be even more traditional when it comes to cassava cultivation. As Lebot (2009) argues: "Domesticated cassava probably evolved from a fire-adapted and fire-following ancestor. Cassava was therefore pre-adapted to slash-and-burn agriculture, which allowed the spread of this species into habitats wetter than those colonized by its wild ancestors" (p. 7).

Unfortunately, I did not observe this tillage process.

> *Maria and Ney, then, took me to another patch of their land where the crops had already been growing for a year in 'the middle of tree stumps', and they were slowly harvesting when the cassava they bought every week was not enough. Once the plucking was done* [which will be described in the next chapter]*, I asked how she selected the stems which would be then used as cuttings and planted. She explained that she likes to plant mixed varieties and that she selects for stems that are healthy, and not **maxiado*** [rotten].

This is what I observed regarding the way cassava is planted in Espírito Santo do Itá. This is a specific performance of the crop, and it does not require only the human farmer and the cuttings, but also the hoe, *terçado*, speckled chachalaca, make-shift scarecrow, fire, sticks, tractor, logs, and the knowledge embodied in the community members. Some parts of this performance are in accordance with the formalized way manuals and agricultural handbooks recommend that cassava should be planted, others differ in interesting ways. How is cassava planting performed in the technical books? Keeping in mind that the technical recommendations are far from stable or homogeneous, I will highlight a few differences when these performances are compared.[48]

Firstly, the way I observed the soil being prepared is not uncommon: "[i]n many areas, cassava is still cultivated in slash-and-burn traditional cropping systems where the plot is cleared from existing vegetation, exposing high organic matter soil content." (Lebot, 2009, p. 49). Such was also the case in studies done in Quilombola communities in Pará and other Brazilian states (Moraes et al., 2019; Santos & Mitja, 2012; Pedroso-Junior, 2008). This technique is far from problematic in the community I observed, since it is widely used there, mainly before they had access to tractors. However, part of the recent scientific literature seems to stress the environmental impacts of such traditional strategy for soil preparation, mainly due to the intensification of production and population growth (Pedroso-Junior et al., 2008). It is argued that slash-and-burn agriculture can lead to soil degradation (Pedroso-

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[48] I use a very restricted number of technical texts to draw my contrasts. My aim here is not to have a representative sample of the position of technical texts, merely to articulate a pattern of differences that helps me to further understand the cassava is performed in the community studied. Therefore, the texts used here should be read as case studies, without the intention of achieving generalizability.

Junior, 2008), deforestation (O'Brien, 2002), and excessive emission of greenhouse gasses (Malhi et al., 2008).

The need for replacing the unsuccessful stakes is also not fully supported by the technical literature, mainly much after 2 weeks (Maria was doing it after 2 months) (Lebot, 2009; Balagopalan et al., 1988). Furthermore, regarding the selection of cuttings, Brazilian texts seem to indicate that the length of the cuttings should be 20 cm, with 5-7 nodes, and approximately 2 cm thick (Mattos, Farias & Ferrreira Filho, 2006; Dantas et al, 1981) although the position in which the cuttings are planted (Viana et al, 2000) and the amount of tillage (Furlaneto et al., 2007) seem to influence its ideal size. Lebot (2009), however, highlights that internationally the length varies even more:

> Amerindians in Brazil use cuttings 50–60 cm long in non-mechanized cropping systems, but in the same country, modern and mechanized farms use 15–20 cm cuttings in mechanical planters. The most suitable length of cutting is found to be 15–20 cm in Thailand, 20–25 cm in Malaysia, 25–30 cm in India and short cuttings are recommended in the Philippines for horizontal planting and longer cuttings for vertical planting (p. 52)

As described above, Maria paid attention to the size of the cuttings, and she warned me to cut the stems in a right angle (which the literature also presents as relevant, e.g. Lebot, 2009; Mattos, Farias & Ferrreira Filho, 2006; Dantas et al, 1981). However, there is a very important difference from the way the cuttings are selected in the literature and in my observations: the cuttings Maria used were not 20 cm, 30 cm, or even 10 cm. The metric system was not present: she did not bring a ruler or a measuring tape to the farm so she could plant ideally sized cuttings, and this size does not exist there in a number of centimeters. As Haraway reminds us, following Barad: "[a]ll measurements depend on embodied choices of apparatus, conditions for defining and including some variables and excluding others, and historical practices of interpretation" (2007, p. 116). What I want to highlight here is that in order to plant a 20 cm cutting, a specific measurement apparatus[49] that converts into metric

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[49] I would like for my use of this term to resonate with Haraway's 'apparatus of bodily production', which is central to her feminist material-semiotic project that presents "[…] the object of knowledge as an active, meaning-generating part of apparatus of bodily production, without ever implying the immediate presence of such objects or, what is the same thing, their final or unique determination of what can count as objective knowledge at a particular historical juncture" (1988, p. 595). Barad's appropriation of the term is also informative here: "[…] apparatuses are not mere static arrangements in the world, but rather apparatuses are dynamic (re)configurings of the world, specific agential practices/intra-actions/performances through which specific exclusionary boundaries are enacted." (2003, p. 816).

system needs to be used, and when we focus on practice, a certain cutting cannot be said to be 20 cm without this apparatus.[50]

What, then, is the measuring apparatus used by Maria? It is her knowledge, body, and alternative length-measurements such as number of nodes (which is also present in scientific literature) and the measuring unit of spans. They allow her to differentiate between 'good enough' cuttings and the ones that should not be planted, for being either too short, too long, or not cut in a right angle (like the ones from my first attempts at cutting the stems). This leads to two initial reflections. Firstly, in the community, centimeters are not commonly used as a unit to determine the size of the cuttings, they do not usually exist either materialized in a measuring device or through conversion techniques. Secondly, and this is not a critique, the measuring apparatus is transparent and rendered irrelevant in the technical literature (how are the cuttings measured by the scientists?). This move is what allows me to call such measurements "abstract" or "disembodied", which points to a relation to the measuring apparatus. Measurements are always local, but some of them hide their conditions and materiality (apparatus – "body"), achieving "abstraction".[51] This relation will be further examined in the following chapters, but for now such words should be understood as effects of specific relations, not essential traits.

Another similar situation is the way the holes are spaced. In my fieldnote I wrote the holes were less than 30cm from each other, but as explained above, this is my imposition of a metric system, and it is not the way Maria described them. She did not say how far they needed to be, she refused to give me a number, she just exemplified it in practice. In the 2006 Embrapa (Brazilian Agricultural Research Corporation) short guide, however, it is recommended that when cassava is planted in simple rows, the best harvests seem to be obtained when the spacing is of 1 meter x 50/60 cm. (Mattos, Farias & Ferrreira Filho, 2000). Planting crops near each other is also not recommended due to possible intraspecific

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[50] In other words, for me to write here that a cutting is 20 cm, I would require two things: a measuring apparatus and the use of metric system in the community knowledge practice. For example, in a farm that follow the technical recommendations of Embrapa, I do not believe they use a ruler to determine the length of their cuttings, however, that does not mean they do not have a measuring apparatus: their hands, eyes, machete, embodied experience, and other cuttings can become measuring apparatus in their practice. The point is not the missing ruler in Maria's farm, but the absence of a measuring apparatus that converts into metric system. She measures the cuttings with her eyes, hands, and embodied knowledge, obtaining a correct-sized cutting, but she does not convert this size into metric system. Following Latour's (2005) resistance to impose our meta-concepts onto the actors, I believe Maria's cuttings should not be said to have a number of centimeters here. This position resonates with Barad's criticism of a measurement-independent property (see Barad, 2007, chap. 3), but unlike her, I take this to be an empirical issue, not a (meta)physical necessity.

[51] This point is inspired by Latour`s analysis of the construction of scientific facts. He argues that scientific facts get stabilized as their conditions of production (materiality) fade. (Latour, 1987, ch.1; see also Latour & Woolgar, 1986). Here, however, my point is not achieving stability, but disembodiment.

competition (Modesto Júnior et al., 2019). The community members sometimes attend government agriculture extension services which deal with cassava planting, so they are well aware of the way cassava is recommended to be planted:

> *I asked Maria why she planted the crops so near each other and if that was what was recommended. She grabbed the hoe, putting it in a horizontal position just above the ground, and said: "look, this is about 1 meter, look at the amount of space we would waste if we planted the way they recommend it".*

The way Maria expressed herself is extremely important for the point I wish to make. She used the metric unit when talking about the recommendation, even if prior to that she resisted putting a number to the spacing in her practice. Further, she used the hoe as a measuring apparatus, which although is far from exact, allows her to exemplify her point. In other words, she did not compare her spacing, with the recommended spacing in the traditionally disembodied quantified language (e.g. "I keep my crops 30cm apart, they keep theirs 1 meter apart"), but by keeping her measurements embodied and materializing the 'abstract' meter in her hoe. Maria used her body, knowledge, and the hoe as a measuring apparatus to convert the metric system used by the recommendation. Science studies has often said that commensurability is not a neutral affair (Stengers, 2011), and that measurements and standards are done locally (Star & Lamplard, 2009; Barad, 2007), but what is interesting here is Maria's resistance to perform this comparison in the disembodied metric system; she kept it close to the ground.

Maria further compared her way of planting with the formalized one when she told me about an episode when a woman visited the community to teach them about agriculture:

> *She came here and taught us a lot of things. But then I said that I had a question for her: in which end of the stem does the root grow? She said that I had got her, because she did not know* [laughs]. *I said: well, you taught us things, and now I will teach you something. Then, I explained it to her.*

A similar story was told by Mr. Aleontino (Maria's father) when I asked him why he continued to plant cassava (although now he also plants watermelons). He told me could not tell me why, but what he could tell me is that cassava is what he knows how to plant. Then, he went on to exemplify his knowledge by telling me that the younger generation did not

know how to plant cassava properly: *"you have to put two cuttings, **pé com ponta** ['feet with tip', in opposite ways]. The people do not know how to tell the ends apart."* He explained that he did that simply by looking at the direction of the nodes.

In the community, telling the cutting ends apart is relevant, not only symbolically, but practically, materialized in their planting techniques. That is not true for the textbooks. The sides of the cuttings do not appear as a relevant information for cassava planting, mainly since "[…] it is recommended that only one cutting be used at each planting hole. […] [plating more than one cutting] causes a waste of planting material and produces multistem plants, which are less efficient" (Lebot, 2009, pp. 53-4). In Espírito Santo do Itá, however, plating two stems, in opposite directions, was considered the most efficient way to plant it. This disagreement is informative, Maria and Mr. Aleontino are proud of their specific way of knowing the cassava: when the lecturer taught the community about agriculture, Maria did not argue that her way of planting was better or more productive (although I believe she would say it is, to a certain degree), that was not how the comparison was set up, she did, however, challenge the technician of knowing the plant as intimately as she does, again dragging the comparison back to the local and material reign.

I want to present a last example to clarify my point, which is related to the selection of planting materials. This step was only briefly mentioned in the above description, when Maria said that she got the cuttings from the crops that were not rotten, and that she opted to plant mixed varieties. The community prefers to plant different varieties together because each variety (which are classified as yellow, white, and cream) is ideal for producing some products, and not others. So, planting only one variety is not ideal in this setting, as will be further discussed in the fourth chapter. Nevertheless, the aspect of this task which is relevant here is the time which the farmers should wait before collecting the planting materials (cuttings) from their crops.

In the end of my visit, I spent many days just observing and talking with the community members in the *casa de farinha*, and whenever I thought they were not really busy and wanted to talk, I asked a few questions that could help my analysis. Conceição (Maria's sister) did not spend a lot of time in the *casa de farinha* where I did my observations, since she lived in the nearby community (São Francisco do Itá), and her husband had a job in the city and did not spend much time in the *casa*. When I had the chance, I asked her a few questions:

> *In the **casa de farinha**, Conceição was waiting by the sieve for the flour to be dried in the oven. She started a conversation about my work and I decided to ask her about the courses on food processing and cassava production that I had heard she had taken. I asked what she learned and how different it was from the way they did it. She said that those courses were aimed at industrial-level flour mills, and therefore much of the information given was not useful. She said: "But there was one thing that I didn't know. They said you have to get the cuttings from the crops 8 months after they have been planted". I was surprised she had gotten that information, since that was not done in the community (they got the planting material from the harvested crops, which were at least one-year old). I said then: "but, then how would you plant if you had land?". She replied: "I would plant the way we do here. We prefer it, it is how things are done here."*

For Conceição the disagreement is not solved by creating a comparison (the way Maria did regarding the spacing, for example), but by the opposite, a refusal to compare. In her dialogue, she rendered the community's practice and the one recommended in the course incommensurable. This is my main point in this chapter: the community members seem to articulate their activities with the 'scientific' agricultural recommendations by creating patterns of in/commensurability that allows them to resist the imposition of standards and limitations of their practices. I used three examples to illustrate different ways of dealing with the friction between these different knowledge practices: 1. The spacing among crops: the comparison was done using embodied measurements, not abstract ones; 2. Telling ends apart: the knowledge the community members traditionally have was presented as missing from the technical and newer way of planting; 3. Planting material: a comparison was not drawn and the knowledge practices become incommensurable.

Although these anecdotes do not allow for a clean-cut categorization, I believe they tell us about some of the ways the community's knowledge practice co-exists with the scientific standard, even after governmental programs and classes. The community members seem to try dictating the rules of comparison, and thus resisting quantifying their knowledge practices into abstract tropes, where science is at its strongest. I must, however, clarify that I do not take this to be the consequence of 'rational' planning (such as the homo economicus of liberal thinkers) or the effect of a single cause, such as attack from scientific practices or capitalism. My point is, rather, that these strategies contribute to the continuity of the community's traditional way of handling the cassava and its products.

Where, then, is the cassava in these anecdotes? I want, here, to think through Lobato's literary description of the cassava as shameless to put forth a relational and distributed analysis of nonhuman agency in this community. 'Shamelessness', in my appropriation of the term, should not be understood as an intrinsic or essential trait of the cassava, but an emergent property. When does the cassava become shameless and how is this quality characterized? As I observed in the community, the cassava does not always perform hardy traits, mainly when the soil is weak, animals eat the leaves, or there are floods. However, despite its recent lower yields, I want to argue that this crop remains shameless in another way: it is flexible the way it is planted so as to allow for multiple knowledge practices to co-exist. This, then, is a first way I want to foreground this agency in the community: the cassava is shameless both in its emergent hardy traits (which are mostly considered a thing of the past) and in its enrollment[52] in different uncoordinated and sometimes contradicting performances.

In this chapter, I presented the way cassava is planted in Espírito Santo do Itá, emphasizing the coexistence of the knowledge practices there and the technical recommendations. I framed this situation as a matter of in/commensurability, and measuring apparatus. Finally, I proposed a different understanding of the nonhuman agency the cassava performed in the situation observed. In the next chapter, I introduce the task of harvesting, shifting a bit the analysis. After presenting some ethnographical observations, I foreground and discuss specific material-semiotic practices that allows a further examination of the negotiability of the relations in which the cassava is enmeshed.

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[52] This term is inspired by early ANT research, in which "enrollment" is used for the recruitment of entities for a network (e.g. Callon, 1984; Latour, 1990). However, since I have avoided the network metaphor in this chapter, enrollment should be thought of as a contingent invitation to take part in a specific and local performance.

Figure 4. Maria showing how to put the cuttings in the right position, in Espírito Santo do Itá. October 30, 2019.

Figure 5. Maria adding fertilizer to her cassava crops. Espírito Santo do Itá. October 30, 2019.

Figure 6. Community members pulling the cassava crops, near Santa Izabel do Pará. October 28, 2019.

Figure 7. Cristina removing the cassava roots from the stem. Near Santa Izabel do Pará. October 28, 2019.

3. Harvesting: owning, measuring, and enacting cassava

In Espírito Santo do Itá, the harvesting usually occurs on Mondays. As mentioned in the previous chapter, most of the cassava processed in the community is bought, not grown. This means that the members of the community have agreements with small landowners in the region (from outside the community), who plant cassava and, once the cassavas are ready to be harvested, the community members go there, harvest them, and, after all the processing is done and they have sold their products, they pay the landowner. This system is not very old, since it was a consequence of the reduction on the community's land size and productivity, but the younger generation seems to appreciate its convenience. Cristina, the community president and the co-owner of the *casa de farinha* I observed, told me about this new situation in an interview:

> "*If I could I would do it* [planting] *more than buying, because it generates more profit.* […] [we do not do it] *because we got used to buying and we thought it was easier. And the soil also isn't good to do it… it isn't very productive.* […] *Sometimes it* [the cassava] *dies before it is ready to be harvested; sometimes it does not yield good potatoes* [cassava roots], […] *there is an area that we can't plant because of floods… the soil is weak…*"

Thus, although the shift from growing to buying is considered beneficial, it also reduces profitability and symbolizes the decline of the community's soil productivity.

Due to the large quantity of community members who work with cassava, there are 2 groups that go to different farms every week. I observed one of the groups, which consisted of about 15 people, although that number fluctuated. Before presenting a full description, I believe it is helpful to think of these people in two categories: *cassava owners*, and *workers*. The former are the people who will directly profit from the products made from the cassava harvested, that have the clients, that pay the landowners, and that hire workers to help him or her. The latter are family members who are helping, or other community members who work for a certain payment.

I will start the analysis here presenting some ethnographic observations from the first time I went with the community members to the farm to harvest cassava. Then, in the following segments, I will use different interview and description excerpts to discuss specific moments of material-semiotic negotiation, namely the way cassava is owned, measured and differentiated between its bitter and sweet varieties. I examine such episodes in order to describe the way the community's knowledge practices interact with a capitalist system,

which requires a specific profit-oriented logic. Following Anna Tsing (2015), I consider the community to inhabit a pericapitalist space, 'at the edge of capitalism': it is both inside and outside capitalism, and not fully under its control. I try to understand, then, what entities contribute to the community's condition in this contested space, and the moments of resistance that allows such positioning without having its knowledge practices co-opted by a capitalist logic.

My use of the words 'capitalist logic' and 'capitalism' deserve some attention. Such terms are very dangerous to be used in an ANT-inspired text, since they can be employed as explanatory macro-social forces that avoid the complexity and contingency material semiotics attends to. These words are used here as heuristic devices to draw comparisons, and thus, not as conceptual tools. However, I want to make explicit a few threads I want to pull as I weave these terms in my text: (1) I would like 'capitalism' to resonate with the formal, and now commonsensical, understanding of the term: "an economic system characterized by private or corporate ownership of capital goods, by investments that are determined by private decision, and by prices, production, and the distribution of goods that are determined mainly by competition in a free market" ("capitalism", n.d.); (2) I also want Wallerstein's (2011) concept of 'historical capitalism' to be a part of these terms: "Historical capitalism, is, […] that concrete, time-bounded, space-bounded integrated locus of productive activities within which the endless accumulation of capital has been the economic objective […]" (p. 18); (3) Finally, as an attempt to rescue an understanding of capitalism from the nature/society dualism, I am inspired by Moore's (2015) concept of capitalism as 'world-ecology' or as 'a way of organizing nature'. These distinct understandings form the background against which I use these terms, and also their derivatives (e.g. non-capitalist, capitalist logic, capitalist organization).

The following description is from a Monday (October 21st, 2019), when I finally got the chance to observe the harvesting process and visit the farm:

> I woke up at 5:30 am and went out to meet the others by the side of the road. The van picked us up at around 6 am. It was very full, since it was the main way to go from the community property to the nearby city, Santa Izabel do Pará. Therefore, people going to the farm and to the city had to share the van.
>
> We arrived at the farm after around 15 minutes; they had said this time the farm was going to be nearby, so I was not surprised. Each cassava owner brought with them a plastic crate full of sacks, tools, food, coffee, water, cups, among other instruments

required to spend half a day harvesting cassava. These crates and some other bags were carried to the proper field where we would start harvesting. Since the agreement the community had with the landowner was not new, they had already formed a working bond that allowed them to enter the land and start harvesting before he/she arrived.

In the farm, there were not clear divisions between where they were supposed to harvest, and where they were not. Therefore, the owner or one of the community members who knew about it had to inform the others and make these boundaries explicit. Once that was understood, the members spread around and started pulling[53] the cassava.

When the cassava was still in the ground, its ownership was undefined. Once the cassava had been pulled out of the ground, it became the property of the person who pulled it. This means that it would be considered wrong, for example, to take the cassava someone else pulled from the ground, but when they are underground, anyone can claim ownership by pulling it. Once the crops were removed from the soil, they were gathered in piles, and each pile was, then, individually owned by a cassava owner.

I helped and observed different people in the farm, and all of them tried to teach me how to properly **arrancar** *[pull] the cassava. It was not easy. It required strength, care, and skill, mainly since the aim was to remove all of the roots without breaking them and leaving pieces on the ground. Depending on the size of the plants, the depth and size of the roots, and the condition of the soil, there were different strategies involved. Sometimes the stems were cut with the* **terçado** *[machete] before the cassava was pulled. When the plants were younger (probably less than a year), the soil was soft, and there were not a lot of weeds, it was more common to just pull the whole plant and cut it afterwards.*

The first instruction I received was to watch out for **tiririca** *[Paspalum virgatum L.], which is a type of grass with long leaves that can cut when they rub against the skin. The solution was to either wear gloves and long sleeves, or to be careful when pulling*

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[53] In Portuguese, the usual word to describe the act of removing the cassava from the ground is '*arrancar*', which could be translated as 'to pull out', 'to rip out' or 'to pluck', among others. I decided not to translate this word as 'harvest', in this case, since '*arrancar*' emphasizes that there is the use of strength, which I do not believe 'harvest' implies. Therefore, when I refer to the whole process of getting the cassava from the soil to the *casa de farinha*, I will use 'harvest' (*colher*), and when I refer to the specific action of pulling the cassava out of the ground, I will use 'pull' (*arrancar*).

the cassava. Once I started having a hard time pulling the first plant out of the ground without breaking the stems, Ney gave me further instructions and explained what I was doing wrong: "You can't pull it all at once". He showed me that I needed to pull the stem gradually, and feel where the bigger roots are, in order to pull from the right directions. After some practice, I was able to pull some plants without breaking the root, but I found it very difficult to feel the root's positions.

*The heat was not very easy to bear once it started getting at around 10 am, and I was very tired. Thankfully they had a break at around 10:30 am, which they called **almoço*** [lunch], *even it being much earlier than the usual Brazilian lunch. Someone grabbed a big metal basin and put it over a plastic crate that had been turned upside-down. The cassava owners started filling it up with a lot of rice, which was brought by different people, some portions of beans, and some meat or fish* [see figure 8]. *Everything was then mixed in the basin, and cassava flour was added. After it was done, everyone got a spoon and started eating from the same basin. They explained to me that the food was shared in order to make sure there was enough for everyone, but they also seemed to enjoy it, since they had previously told me the food at the farm was good.*

*The 'lunch' lasted for around 15 minutes, and after that the harvesting continued. I decided to help Cacá do the next step after **arrancar** [pulling]: **destocar*** [to remove the individual tubers/roots from the stem; see figure 7]. *This was definitely easier. We walked to one of Cacá's piles and using our hands or a **terçado** [machete], we separated the individual tubers. Once this was done, we moved to the next pile. They could tell which pile belonged to whom since they memorized their locations.*

*Once the cassava roots were removed from the stem, they had to be measured. The community and the landowners agreed on buying/selling per **basqueta** [crate], so first the crates were filled up, then, the cassava was poured inside the sacks (1 crate per sack). When they were full, the workers or cassava owners who were done helped the ones who were not. This usually lasted until the tractor or truck arrived to bring the people and cassava back to the community. When the ride arrived, the sacks had to be carried and loaded in the truck, which was difficult. The sacks were carried individually, but another person was required to help lifting it and fitting it in the other person's shoulders or back. This was done very quickly, and they had a lot of coordination. This task was done collectively, so the sacks were carried by everyone despite who owned it. They were placed in the truck in a certain order so they could*

remember who owned each sack, and a few of them used pieces of ribbon to make sure they were not mixed.

*On the way back, we sat on the cassava sacks on the truck. The driver would stop in the different **casas de farinha**, so the sacks could be unloaded.*

This episode is far from a complete description of what happens most Mondays at Espírito Santo do Itá, however I believe that it can be used to identify a few aspects of the relation between the community and the cassava that I wish to further discuss. As explained above, I want to examine moments of negotiation and resistance in the way the community's knowledge practices incorporate or reject certain aspects of the capitalist profit-oriented practices. In order to do so, I focus on two types of material-semiotic operations: modes of ownership and measurements. Therefore, the remainder of this chapter will be divided in two segments.

Figure 8. Community members eating their shared lunch. Near Santa Izabel do Pará. October 28, 2019.

3.1. Enacting cassava through ownership

Cassava ownership is a specific relation between the crop and the community members, and it is very important for the people's identities and working system in Espírito

Santo do Itá. In this segment I aim to better understand how such a material-semiotic relation is enacted and negotiated. In doing so, I hope to briefly examine the community's working system and the types of ownership performed, focusing on the oscillation between collective and individual property. Here, such relations are analyzed as inherently embedded in the community's material and social organization.

Ownership is not a new topic in the material-semiotic tradition (e.g. Verran, 1998; Cowan et al., 2018; see also Strathern, 1999). Lien and Law (2011), for instance, in their investigation of the different enactments of the domesticated Atlantic salmon, briefly observe the way ownership is performed in a salmon farming industry:

> The notion of an industrial company, an economic enterprise replete with a head office, a director, budgets, profits, investments, workers, equipment, as well as legal rights and responsibilities, introduces a principle of ownership into the lively assemblage below our feet. What is owned is a license to raise salmon in this particular location. The logic of ownership further implies that the netting which holds the salmon in place simultaneously enacts a boundary between what belongs to the company (the salmon inside) and what belongs to no one in particular (everything that swims outside). Ownership also includes non-animate entities such as the platform and its metal railings, the house, the boats, and all the other equipment that is involved in raising salmon to a standard size for slaughter. (pp. 70-71)

Ownership requires, thus, heterogeneous entities (material and symbolic), as well as an iterative performance. It is done in practice (Law, 2010).

I discuss here mainly cassava and *casa-de-farinha* ownership relations. This choice leaves unfortunately other relations unexamined. The relation between the community and the land owner also requires materiality and performance, and so does the ownership over houses and land. I argue, however, that cassava ownership takes precedence due to its centrality in the working and symbolic system in the community, as hopefully will be clear by the end of this segment.

Firstly, as explained above, once the community agrees to buy the cassava from a certain landowner, the crops stop being his/her property, and become potentially anyone's. The situation changes, however, when the cassava is harvested, becoming individually owned[54]. This seems like a somewhat clean-cut agreement of ownership and exchange; but

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[54] There are, however, cassava co-owners, who harvest and process together splitting the profits but such relations are not common.

once we pay closer attention, we observe the coordination necessary to maintain this choreography stable.

In the farm, the location of the piles of harvested roots are important to separate each member's harvests. The sacks also enact boundary work, and so do the colorful strand attached to them. These boundaries do not always fulfill their role, and sometimes people ask '*Is this my pile*?'. Other times, they are made flexible, for example when a certain community member has some cassava left in their last pile, after filling up their sacks, so they give the remaining roots to someone else. In these examples, however, the cassava continues to be individually owned, but is this the only mode of ownership performed? I have argued that the cassava goes from the landowner, to a moment of indeterminacy (potentially anyone's), and then becomes owned by a community member once it is pulled from the ground. However, there is also a type of collective ownership which manifests itself.

Most community members tend not to harvest the small crops, since their roots are probably small as well. These roots are not desirable due to the difficulties of peeling them during the first step of the processing stage (see Chap. 4). This means that once most members have harvested an agreed-upon area, there would still remain a few small crops. The landowners dislike this habit, since for them it is profitable if all the cassava planted in a certain area is harvested and sold, so the soil can, then, be prepared to be planted again. Therefore, when we were at the second farm I visited, the community president Cristina had to remind people to also harvest the small crops, so there would not be any problems with the landowner. The community members, then, have to ideally share the burden of harvesting and processing small roots to maintain a good relation, even if this behavior is not explicitly required by the agreed-upon cassava ownership relations.

These are material-semiotic negotiations through which cassava-ownership is performed. I argue, then, that four modes of ownership can be identified: 1. Individual ownership by the landowner (before the deal was struck); 2. Individua ownership by a community member (once the cassava is harvested); 3. Indefinite ownership (when the crop may or may not be harvested by the community, after the deal was struck); and 4. Collective ownership by the community members (the small roots that must be harvested). These categories are not intended to be exhaustive, but merely tools to explore these relations. This first argument highlights that although cassava is mostly individually owned, there is also a type of collective ownership which contributes to this choreography.

Secondly, when the cassava is pulled, it becomes individually owned, but not necessarily by the person who pulled it. As explained in the beginning of the chapter, the

people who work with cassava in the community can be separated into two groups: workers and cassava owners; and only the latter can enact cassava ownership. These categories are pretty much clean cut, but the relations between them are not that clear. The workers do not necessarily work for the same person every week. Sometimes they may help a family member (of whom they are or are not dependent) and other times another cassava owner may hire them to work. A few of them have a more fixed position working for a certain cassava owner, others only help family members (usually their parents). The common question I had to ask at the farm was "*Who are you pulling for?*", and the answer would be "*Today, I'm pulling for…*".

One of the workers, Xaboca, works permanently for his sister's husband, Tolete, who is a cassava owner. When I asked him how much he got paid for harvesting and processing the cassava, he told me "*I don't know, Tolete sees every week how much he can pay me*". I believe this type of working relation, which is not rare in the community, does not allow for a clear separation between working and helping, or paid and unpaid. All the workers benefit from their work, it is just not always by receiving a previously agreed daily wage.

There are, however, important distinctions in what is expected from workers and cassava owners. The latter have specific duties: they have to bring food and water for their workers; they have to decide how many sacks of cassava should be harvested; they are the ones that contact the clients, and, usually, they have to pay their workers a daily wage. This does not mean that cassava owners are a fixed group. During the time I was there, Cacá, who previously worked for her husband, a co-cassava owner, had decided to become an owner. Hence, she shifted from a working position, and started harvesting separately, by herself.

I want to argue, however, that these categories are not mere analytical resources that I impose on the community through my description. They are, rather, material-semiotic relations which are enacted throughout many of the cassava-processing steps, although differently. Which means that I do not take these categories to be merely practical or symbolic, they are both material and meaningful. The following excerpt is a dialogue I observed while some people were working in the *casa de farinha*:

Cristina: "*I will go to the party, and you have to buy beer for me* [laughs]*.*"

Debora: "[laughs] *Don't kill me!*[55] *I will not buy beer. You have to buy beer for me, you own cassava, I do not.*"

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[55] This is a common expression in the community. It is used to indicate disagreement in response to a joke.

This dialogue can be read in a few different ways. It could be a purely economic matter: cassava owners have more money, and thus should pay; it could be a symbolic matter: the issue is not the money, but the identity of the cassava owner as a provider; or it could be a trivial joke. In my reading, I believe it is all of the above. What interests me is how boundaries are drawn and differences matter, sometimes through trivial jokes.

Being a cassava owner, however, has to do both with the cassava itself and with the relations to the customers. If you decide to 'pull cassava for yourself', and thus become a cassava owner, you are expected to have people to sell to. It is possible, although rare, to be a cassava owner and only take part in the selling part of the process, which was sometimes what Tolete had to do, since he worked at a factory in the city and had to hire workers to do the harvesting and processing for him. It can be said that money is perceived as stemming from the client (cassava ownership), not from the farm/*casa de farinha* (work). This position is further supported by the fact that, in the dialogue above, Debora highlights Cristina's cassava ownership, but not, for example the fact that she owns the *casa de farinha* where they all work. Owning a *casa de farinha* does not seem to be as important as owning cassava. In an interview with Adelson, the co-owner of a *casa de farinha*, I asked whether they charged other cassava owners for using his space, machines and instruments. He replied:

> *"No, they do not pay anything to use it. We just alert them to preserve the space since it is used by everybody, right?* […] *they try to work in the days that we are not working, so it is better for them and for us."*

This is an intriguing part of the working relations in Espírito Santo do Itá: although there is indeed private ownership of what we could call the 'means of production', they do not provide profit or exploitation. Cassava provides profit, but the *casa de farinha* does not (cf. Barbosa et al., 2015). That is the reason for considering cassava ownership as the core relation that organizes the working and social life in the community.

An important question remains: why do *casas de farinha* not provide profit/exploitation? I want to propose a tentative answer by locating the *casa de farinha* in the community's history of collective ownership and solidarity. Before the *casas de farinha* were built in the last few decades, there used to be solely one for the whole community. The elders, André and Aleontino, told me about how they sometimes used to have to work through the night, since the *casa* had to be shared by all the families in the community at the time. Even now, when there are 9 individually-owned *casas de farinha,* which are usually only shared by direct relatives and close friends, the collectivity and solidarity lingers. In my interview with

Adelson, I asked whether he would let anyone in the community use his *casa*, even if they were not his friends or relatives. He replied:

> *They can definitely come and do it. Because one thing that we know is that* […] *people that work with cassava flour… only a few of them have another income. They survive from this… it would be bad for us if we have it here* [the *casa de farinha*] *and didn't let them come and do it.*

I believe Adelson's position highlights the collective responsibility and solidarity which remains above individual ownership when it comes to the *casa de farinha*.[56] Or, to put it differently, a strong sense of collectivity is a central part of the way the ownership of *casas de farinha* is enacted. This means that the structure of the cassava, building, instrument, ownership documents, people, and their relations of solidarity and kinship are all entities that take part in this choreography. The social and material importance of the *casa de farinha* for cassava processing will be further explored in the following chapter.

Collectivity and solidarity are also manifested in other practices in the community. In the long excerpt from my observations presented above I described the collective lunch they had, brought by the cassava owners, but share by everyone alike. The same was true for some steps of the harvesting work, such as filling up the sacks and carrying them to the truck, which were done collectively or shared among the people that had already finished their work. These are just a few examples, and when we observe cassava production in the community as a whole, the somewhat idealized and modern working relations get polluted in a dance of individuality, collectivity, exploitation, and solidarity.

This specific system does not imply that such relations of production are benevolent to the workers or that the exploitation is restricted. Indeed, the cassava owners are able to make much more money than the workers. This distinction is even more explicit when we look at the division of wealth and work inside families. In my observations, there seemed to be a very clear conception of who the cassava owner was and, consequently, who earned the money, even if everyone in the family worked with cassava[57]. There remains, nevertheless, important ways in which the community's working practices differ from a capitalist mode of production.

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[56] Silva & Silva (2015) also highlight the non-capitalist characteristic of the familiar and communitarian production in *casas de farinha* in Pará.
[57] This led to moments of conflict, mainly when the economic power was centered in the hands of the husband/father.

Allow me to summarize the arguments presented so far: 1. Cassava is mostly individually owned but, among the different types of ownership, the root can also have an indefinite ownership or be collectively owned by the community (e.g. the small roots); 2. Cassava-ownership dictates the working relations since it is this relation that generates profit; 3. *Casas de farinha* are privately owned but used collectively, and so owning them does not seem to have a strong impact in the working or social life. Finally, I wish to add a fourth argument: 4. I believe this choreography of individual ownership and collectivity is a characteristic of the community's location on the 'edge of capitalism' (Tsing, 2015).

In her 2015 book *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, the anthropologist Anna Tsing elucidates a distinct understanding of capitalism as: "[…] a translation machine for producing capital from all kinds of livelihoods, human and nonhuman." (p. 133). The author argues that capitalism converts knowledge, goods, and services that are produced without capitalist control into profit and capitalist returns (a straightforward example would be indigenous and family farming knowledge-practices). It is against this backdrop that she coins the term 'pericapitalists' to describe these sites which are simultaneously outside and inside the capitalist system. As she explains: "[…] goods and services produced by pericapitalist activities, human and nonhuman, are salvaged for capitalist accumulation. If a peasant family produces a crop that enters capitalist food chains, capital accumulation is possible through salvaging the value created in peasant farming." (p. 63).

These pericapitalist spaces are important sites to better understand the interactions between capitalist and non-capitalist economies and can provide a fruitful ground for investigation. They are, however, not safe spaces where the grips of capitalism cannot reach, but they can perhaps be sites for "[…] rethinking the unquestioned authority of capitalism in our lives" (p. 65). Unlike the Matsutake mushrooms studied by Tsing, the cassava flour, starch, and tucupi that the people at Espírito Santo do Itá produce do not enter the global economy, but they do provide accumulation as they are bought by supermarkets, grocery stores, and restaurants. The community can, then, be located in this space the author characterizes as the edge of capitalism.

Building on Tsing's analysis, I believe the community I observed performs both capitalists and non-capitalist traits in their cassava processing tasks. They cannot be said to fully incorporate a capitalist logic due to their core solidary and collective organization, but neither can they be considered an example of an anti-systemic resistance movement. I argue, rather, that the ownership-relations examined are part of material-semiotic moments of

negotiation where specific capitalists and non-capitalist practices are rejected or embraced. This is done locally, but it affects and is affected by the connection of the community with the broader market system.

Studying these negotiations on the edge of capitalism does not provide a generalizable understanding of the effects of this system on other pericapitalist spaces. It does, however, allows us to examine specific elements which resist incorporation into a capitalist logic, and highlights the possibility of alternative combinations of non-capitalist and capitalist organizations. Moreover, I wish to reject a simplified reading of the community practices in which the economical organization is considered a single cause of the 'social' aspects of solidarity; or one in which the solidarity is seen as the reason for their current material organization. Following ANT (e.g. Latour, 2005), I try to present here a story in which both the social aspects and material ones are effects of the relations among heterogeneous (human and non-human) actants, and even the actants themselves are understood as constituted through their relations (or intra-actions, see Barad, 2007).

Figure 9. Maria filling up the crate before pouring in the sack. Near Santa Izabel do Pará. October 28, 2019.

3.2. Enacting cassava through measurements

So far in this chapter I have explored some different modes of ownership, highlighting them as part of specific material-semiotic negotiations that have not fully incorporated (or rejected) a capitalist logic. In the cassava and *casa de farinha* ownership examined, collectivity and solidarity seem to be important non-capitalist traits embraced by the community. Extending this analysis, I attend, in this segment, to another entity made present in my account that I believe contributes to the community's negotiations in this pericapitalist space, namely, measurements and their units.

Measurements, as already introduced in the previous chapter, are material-semiotic operations and also effects of the assemblage in which they unfold. This means that I consider unit/measurement as analytically inseparable from their production and materiality. In this segment I aim to elicit the material-semiotic arrangements through which important measurements emerge in the harvesting process and speculate on the consequence of such practices for the pericapitalist space the community inhabits. I will use two moments of negotiation to present my argument: 1. The measurement of *basquetas* [plastic crates], which is the unit used to buy cassava from landowners; and 2. The definition of a distinction between *macaxeira* [sweet varieties] and *mandioca* [bitter varieties].

3.2.1 Basquetas: measuring cassava.

As described in the description presented, cassava is bought from the landowners per crate. This means that after the roots are removed from the stem, they need to be measured. The following excerpt describes how this was done at the farm:

> *The measurement was done by filling the plastic crate with cassava; but the borders of the crate were not used as the limit, and more cassava was added until there was around 10 cm of cassava above the boarder. Cacá would tell me when it was enough, and we should stop filling it up. She explained that the agreed-upon unit they used to measure cassava was* **'basqueta'** [crate; see figure 9]*, but it did not refer either to 'as much cassava as you can carry' or 'a full crate, without exceeding the boarders'.* **'Basqueta'** [crate] *meant a specific quantity of cassava that is measured in the crate, but that included an expected extra amount to be added after it was 'full' (the cassava reached the boarders).*
> *This crate was not always necessary. When I helped Ney with the cassava he was harvesting for his mother, he did not always measure them in the crate. He told me*

that when the landowner trusted them, it would be acceptable to fill the sack with the right amount just by looking at it. However, most community members used the plastic crates.

From this description, we can conclude that there is an agreed-upon unit (*basqueta*) used to buy and sell the cassava, but that the crate by itself is not enough to perform this measuring operation. The boundaries drawn between each quantity of cassava is enacted, then, by a number of heterogeneous entities: crates, cassava, community members, vision, plastic sacks, the relation to the landowners, tradition, tacit knowledge, among others. This is an explicitly material-semiotic unit, it does not try to hide behind a pretentious 'objectivity', and it is not less material because of it.

How was this convention established? As described in the previous chapter, buying cassava from landowners is a fairly recent system, and so, the need for developing an appropriate standardized unit is also new. I was told by the elders, André and Aleontino, that they used to buy per sack (flour sacks of 60 kg), which made sense, since they use the sacks to carry the cassava. They explained, however, that the convention was that the unit 'sack' meant 'as much cassava as you can fit inside the sack'. This was not ideal for the buyers, since the sacks became extremely heavy and a few times more than 4 people were required to carry them. This problem remained when they started buying per *basqueta,* since the convention initially allowed for as much cassava as you can pile up on the crate, leading to very heavy sacks as well. It was only when the community members decided that it was not practical to carry such heavy loads that the unit of *basqueta* obtained its current meaning. In an informal conversation, Adelson told me that he always informed the landowners what they meant by *basqueta,* so there would not be any confusion. He also told me the *basqueta*-amount of cassava weighted around 40 kg, which means that this amount could be carried inside a sack by one person.

Kilogram, however, is not a common unit for buying/selling cassava. There was only one episode mentioned in which this was done: when a Danish company decided to buy some cassava from a nearby land (due to the chemical composition of the crops there, which was ideal for distilling an alcoholic beverage), and some community members were hired to harvest the crops for them. Thus, the fact that the community does not use kilogram cannot be easily explained away solely by a supposed lack of knowledge or lack of the appropriate apparatus.

The characteristic which sets the *basqueta* unit apart from other units commonly used in market production (e.g. kilogram) is that it can be what I wish to name 'dysmetric', that is, it sometimes does not entail equality between the same units. In other words, a certain person's *basqueta* could not always be exchanged by someone else's[58]. Furthermore, this inequality is not evidenced in comparison with a different unit (kg, for instance), but within its own measuring system (e.g. *basquetas* that weigh the same, or have the same volume, would not necessarily be considered quantitatively equivalent if they belonged to different cassava owners).

This dysmetric system emerges in a specific assemblage, and I believe a few relevant entities need to be highlighted. In an interview, I asked Adelson why they made sure that each person's sacks were separated and did not get mixed, which did not make sense to me since they were all bought for the same price and were talked about as equivalent units. He explained that:

> […] *it's because some people have a lot more patience. I don't know if you paid attention to how Maria fills the crate… she fills it up with only very few roots at first, organizing them at the bottom* […] *but I do it differently. I don't have that much patience* […] *that is why it takes her a lot of time. I throw the cassava there and just then organize it* […]. *Her crate has more cassava than mine [...] and that does not matter to me.*

Interestingly, patience and the way the crates were organized seem to influence the inequality between crates, even if Adelson believes it does not really matter and does not have a significant impact in the amount of flour, tucupi, or starch produced. This excerpt also brings into the foreground the individualized character of the unit: it is not that the same units are always non-equivalent, but that equivalence only exists, in the farm, within the cassava owner's *basquetas* (internally)*,* not between *basquetas* from different cassava owners (externally).

Adelson also explained that the specific plastic crates used by each cassava owner[59] affected the amount of cassava that could fit, contributing to this dysmetric character. He explained that: "*The black crate is broken up here, you start throwing cassava into it and it opens up. It fits more roots than the red crate which is whole. [...] It* [the red crate] *is more*

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[58] I use 'external dysmetric/isometric' to refer to relations between *basquetas* belonging to different cassava owners, and 'internal dysmetric/isometric' when it comes to units owned by the same person.

[59] Each cassava owner used only one plastic crate. It which was both used to carry things from and to the farm and to measure *basqueta* amount.

resistant than the black one." This underscores two aspects of this performance: the quantitative character of the inequality between the same units (it is not so much that certain cassava roots are better-selected, but that some cassava owner's crates contain more, or less, of it); and the fact that the non-equivalence is not solely a consequence of the cassava-owners' (and their workers') work or skill. It is, rather, a result of what we may call the cassava-owner-assemblage, which includes all the network of humans and non-humans that produce an internally-isometric-but-externally-dysmetric unit.

This is, nevertheless, not always the case. There is a further level of ambiguity to this unit: it has moments of external equivalence as well. This is most evident when the cassava is bought, and thus there is a conversion into money. Other moments of conversion also hide the dysmetric trait of the unit, for example when the community members say that '*one basqueta weights around 40 kg*' or '*with one basqueta we can produce around 15 kg of flour*'. There is also the fact that this unit acts as an agreed-upon standard, and, as mentioned in the description at the beginning of the chapter, when the landowners and the community members have a relation of trust, the crate is not even necessary to measure the *basqueta.* The non/equivalences coexist and the ambivalences do not get solved.

What does this unit have to do with the pericapitalist space the community inhabits? The *basqueta* unit emerged in a specific social-materiality: it was not used when they had enough land to plant the crops themselves and only became necessary when the community started buying cassava from other farms. It solved the local needs and it is dependent upon a number of human and non-human entities in order to be successfully performed. In this performance, the unit becomes individualized, precluding an (external) equivalence between *basquetas* belonging to the different cassava owners. There are, then, two points I wish to make: 1. The rare external equivalence among units emerges in specific moments of intersection between the community's and a capitalist knowledge-practices, which requires conversions; 2. Such conversions can be understood as punctualizations, which simplify the network into an actant which can then be displaced in other networks.

By paying attention to the specific moments in which *basqueta'*s external equivalences are brought into being (e.g. when cassava is bought, or when it is converted into kilograms to assess the community's productivity), it becomes clear that such operations are not fully incorporated in the community's practices. When I asked about the productivity of a *basqueta*, some cassava owners were not really sure of the answer, and the numbers that were given to me (40kg = 1 *basqueta* = 15 kg of flour) were imported from an industrial cassava producer from the nearby city, who did the math and then told the community members (and

they were not fully accepted by all the cassava owners). The community had been planting, harvesting, and processing cassava for decades without enacting these equivalences. They became necessary only in the moments of interaction between the community's traditional knowledge-practices and a capitalist logic (both outside and inside the community) and, thus, equivalences and non-equivalences had to co-exist, leading to the ambivalences observed. In this sense, then, the ambivalent character of the *basqueta* unit can be understood as consequence of pericapitalist negotiations.

Before exploring the second point, I wish to bring to the foreground a concept from early ANT that I believe can assist this analysis: punctualization. This is a process in which a network is simplified and becomes a single point in another network, we can also use the ANT term 'black box' to refer to punctualized networks (Law, 1992; Callon, 1991; Cressman, 2009). This process is common, since it allows for actors to organized social-materiality without dealing with 'endless complexity' (Law, 1992). Therefore, building black-boxes becomes even more important in wider networks and, as Law explains, "network patterns that are widely performed are often those that can be punctualized" (Law, 1992, p. 385). The black boxes are, however, never fully sealed, and they may become 'leaky' when the precarious process of punctualization fails (Callon & Latour, 1981; Law, 1992).

Appropriating this term, and this is my second point, I want to examine once more the moments of measurement and conversion. When the cassava is measured and becomes a *basqueta,* the complex network of the cassava is punctualized into a certain unit, and when it gets converted into kilograms or money it goes through this process again. I argue, however, that there is a big difference between the two endeavors: the *basqueta* black box is extremely 'leaky'; it does not fully become a homogenized and simplified point in a network due to its social-materiality and, most importantly, its dysmetric character. The conversion into money and kilogram is, I argue here, the act of placing a leaky black box inside a second one which is still precarious, but much less leaky.

I believe the episode when the Danish entrepreneur visited the community and bought cassava from a nearby farm is telling. He bought in kilogram, not in the local unit (*basqueta* or sack), but why? Following the argument presented, using a unit that is a more stable black box is what allows for the cassava to travel and to be included in wider networks. This does not mean that kilograms, for example, have no materiality or complexity. Indeed, the measurement operation of weighing cassava has its own amount of complexity and it is also an effect of heterogeneous entities, but such units allow for their networks to disappear almost completely, unlike *basqueta.*

Expanding networks, building black boxes, displacing entities, and building isometric units are all required for building wide networks and, thus, also central to a capitalist system. In such an organization, I argue that performing entities which resist black-boxing and punctualization can be considered moments of resistance. In short, by developing and using specific units and conversion schemes, Espírito Santo do Itá has been able to retain aspects of their traditional knowledge-practices and still guarantee their partial incorporation into a capitalist system.

Figure 10. A *macaxeira* (sweet variety) crop to the left and a *mandioca* (bitter variety) to the right. Near Santa Izabel do Pará. October 28, 2019.

3.2.2 *Mandioca / Macaxeira*: the multiple ontologies of cassava

In this segment, I present a second example of a measurement that I believe affects the pericapitalist negotiations performed in the community. In the previous discussion, I used the *basquetas* as an example due to their dysmetric and, thus, ambivalent character. Adding to this analysis, I wish to explore here the distinction between the bitter and sweet variety of the cassava to highlight another aspect of some measuring operations performed in the community: their contingency and revisability. In order to do so, I draw on a number of different episodes from my fieldwork as well as technical literature.

I started this chapter with a long description of a Monday morning in Espírito Santo do Itá, when the harvest for that week was done. In the farm described, the community members were informed where they could and could not harvest, and such distinction was marked by the location of the crops. Nevertheless, perceived location is not the only technology used for boundary making, as I observed in the second farm I went to, one week later:

> *That day, the agreement was to harvest the cassava first from one landowner, and then from another one, some meters away. Before we started, however, the owner of the first one warned us to only harvest the* **mandioca** [bitter variety], *not the* **macaxeira** [sweet variety]. *They were mostly planted in different patches, but there were some exceptions. He went to the patch where the* **macaxeira** *was planted and started looking for* **mandioca** *crops, so that the community members could harvest and buy them from him. I asked some community members how to tell the crops apart, but many of them did not know how to do it, or could not explain it. They told me Maria was the one who knew how to properly do it. When I talked to her, she told me to notice the differences by looking at the leaves, at the lower part of the stems, and at the bark markings. It was not easy, a few times I would ask her "So this one is a* **macaxeira***, right? The leaves are longer and thinner as you explained", and she would say "No, it isn't. That is because that one is a* [name of a bitter variety], *that is a type of* **mandioca** *which has leaves like that".*

Drawing on the analysis from the previous chapter we can observe that Maria and her embodied knowledge are part of an apparatus doing boundary work not only between macaxeira and mandioca, but between the cassava that should and should not be harvested. That is how such boundaries are enacted in the farm, but is it done the same way elsewhere?

Through what other performances does the *macaxeira* and *mandioca* emerge as distinct entities? I now explore the different ontologies of the cassava.

In some parts of Brazil, sweet and bitter cassava are considered to be different crops (e.g. Costa, 2010). *Macaxeira*, *aipim* and *mandioca de mesa*, are names for the sweet varieties of cassava, which have low levels of cyanogenic glucosides and can, thus, be eaten without being processed (Henry & Hershey, 2002). *Mandioca amarga* or *mandioca brava* are used to describe bitter varieties, which are poisonous if consumed before being processed. In Pará, qualifiers were not used, and this second crop and its roots were simply referred to as *mandioca*. Alves (2002) explains that: "[a]ll cassava organs, except seeds, contain cyanogenic glucoside (CG). Cultivars with < 100 mg kg−1 fresh weight (FW) are called 'sweet' while cultivars with 100–500 mg kg−1 are 'bitter' cassava" (p. 78). However, CG levels are not solely determined by cultivar; environmental conditions, cultural practices and plant age are also relevant for the production of CG. (Alves, 2002).

Since the cassava harvested in Espírito Santo do Itá is processed, there is no need to differentiate between the varieties. Processing makes the CG-rich varieties edible (Mattos, Farias & Ferrreira Filho, 2006), and although the community prefers to process *mandioca*, since it allows for the extraction of *tucupi* (see chap. 4), processing a few *macaxeira* roots does not change the end products. However, sometimes this difference between the crops matters and it becomes part of the discussion, as in the episode in the farm described above. How is, then, such difference drawn? In the technical literature, the most important criterion to separate bitter varieties from sweet ones is the CG level, but that is not true for the farm. As explained above, at the farm the perception of the morphology of the plant are used to enact this difference: longer and slimmer leaves, as well as vertical bark markings indicate that the crop is of the sweet variety, if I remember Maria's instructions correctly.

What is happening here? I believe these different material-discursive practices[60] (the lab and farm operations) constitute different versions, or ontologies, of the *mandioca/macaxeira* (see Mol, 1999; 2002). Each of these boundaries are drawn through a specific assemblage of heterogeneous entities (at the farm: tacit knowledge, vision, touch, experience, community members…; at the lab: machines, conventions, samples, scientists…), and they do not necessarily coincide. This divergence, however, is not a problem, since these

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[60] I use this term in Barad's agential-realist sense: "Material-discursive practices are specific iterative enactments—agential intra-actions—through which matter is differentially engaged and articulated (in the emergence of boundaries and meanings), reconfiguring the material-discursive field of possibilities in the iterative dynamics of intra-activity that is agency" (Barad, 2003, pp. 822-823).

different versions inhabit different sites: the lab version of *mandioca/macaxeira* does not reach the farm. Following Mol (2002), it is a matter of coordination: the multiple cassava versions do not need to challenge each other if they do not meet. It is, then, possible to maintain the assumption that there is only a singular *mandioca/macaxeira* distinction.

In the community, however, there are also incompatible versions of the *mandioca/macaxeira* that do meet, and thus require a different form of coordination. This is what happened in the following episode:

> In the **casa de farinha**, a group of 6 women were peeling the cassava. Cacá's daughter stopped peeling and started observing a cassava root she was about to peel. She said: "Mom, isn't this one a **macaxeira**?". Cacá replied: "I don't think so. Taste it!". The daughter used the knife to peel part of the root and then took a small bite. She immediately said "Yes, it is a **macaxeira**!".

In the *casa de farinha,* vision is usually not enough to perform the *mandioca/macaxeira* boundary. The heterogeneous assemblage in which this material-discursive boundary is enacted changes: taste becomes the most important evidence. Similar episodes happened throughout my visit in the community, and even if by looking at the root a certain community member thought it was a *macaxeira,* if the taste was bitter, their suspicions were collectively denied. Here, then, unlike the farm, the distinct versions of the cassava inhabit the same site, but they remain coherent due to the establishment of a 'hierarchy between diverging measurements' (see Mol, 2002, p. 63): taste is considered as a more accurate measurement than vision.

So far, in the two examples presented, the *mandioca/macaxeira* boundary managed to retain its coherence: in the first one, the divergences were distributed across different sites, so there were no conflicts; in the second one, the contradiction was settled by an agreed-upon hierarchy of measurements. There are, nevertheless, moments when incoherence cannot be avoided. After the harvest was done in the second farm I visited, Maria told me she had harvested a *macaxeira* crop in order to cook it and make some sweets for me to taste it. The following ethnographic observation describe the following day, when I went to her house to interview her:

> It was almost dark when I arrived at her house. She was waiting for me at the outdoor kitchen. We sat down and started talking. Before starting the interview, we discussed

*informally about the previous harvest and my impressions about the community. A few minutes later her husband arrived and I met him for the first time. He sat down and we continued the conversation. Maria wanted to apologize to me because she was unable to make the sweets she had offered, since the **macaxeira** did not cook the way it was supposed to. She also added: "I tasted it, but it had a bitter aftertaste". Her husband commented: "If it had any bitter aftertaste, it was not a **macaxeira**!". Maria did not seem to be convinced, but she said: "Maybe, it could be that it was a **mandioca**, I don't know. For me, by looking at the plant, it was a **macaxeira**". After some seconds of disagreement, they just changed the topic, and I started the interview.*

Here there is again contradiction, but this time these different boundaries inhabit the same site and do not have an agreed upon hierarchy: the incoherence does not go away. For Maria, the crop morphology was a stronger evidence than the bitter aftertaste the cooked root had, but for her husband it was not. What is further interesting here is that what until then, for Maria, was a *macaxeira,* suddenly changed its status to become 'maybe a *mandioca*'. This disagreement highlights the contingent and revisable character of this boundary: the cassava can shift from *macaxeira* to *mandioca* without much work, and the community members do not seem to be worried about reaching consensus.

I believe this revisability and contingency[61] is also present in the previous examples, although less explicitly since at the end coherence was achieved. The assumption of a single and coherent ontology requires the two sides which disagree to be separated into a correct and an incorrect one (e.g. when I thought a certain crop was a *macaxeira* and Maria said it was not, I was incorrect and the crop was 'in reality' a *mandioca;* when Cacá's daughter thought the root was a *macaxeira,* she was correct since its taste proved that it was 'in reality' a *macaxeira*). In this last example, there were no incorrect or correct sides, no version of the cassava was thought to lie underneath the other. Thus, my argument here is two-fold: 1. In the community, the *macaxeira/mandioca* boundary can be performed in different ways, but it always remains revisable and it may be somewhat easily challenged; 2. When there is

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[61] Contingency has perhaps become a buzzword in post-ANT literature. I use this term in as a strictly empirical matter: I reject the position that 'everything' is in essence contingent or, in other words, that things are contingent in the same way. The point I wish to make here is not solely the existence of certain contingency in the measurements analyzed, but the way this trait is contrasted to other knowledge practices and how it affects the space the community inhabits. I, thus, do not take this analysis to be a consequence of an a priori ontological assumption about the 'contingent character of reality', even if I draw on literature that makes similar metaphysical claims (e.g. Barad, 2003).

disagreement in the same site, it may be solved through an agreed-upon hierarchy of measurements, or it may just remain incoherent, without a consensus being reached.

In Latour's complex analysis of the construction of scientific facts, he argues that the stability of a fact depends on the invisibility of the context and conditions through which such statements were produced[62] (Latour & Woolgar, 1986) and that when there is controversy, scientists and engineers try building stronger networks by enrolling new allies (humans and non-humans) of which they become the spokesperson of (Latour, 1987; see also Latour, 1989). The rules are clearly different in the community. The claims examined do not attempt to go beyond their moment of production, they accept their contingency, and building stronger networks also does not seem to take the claims far, since in the community they will still retain a level of revisability. Latour's warlike metaphors do not seem to be of much use here.[63]

Building on the analysis previously presented in this chapter, I argue that the contingency, revisability and incoherence, which I believe are important in the way the *mandioca/macaxeira* boundary is performed, contribute to the community's attempts to remain only partially incorporated into capitalism. The boundary-work analyzed and the claims through which it is enacted can be compared to the *basqueta* unit from the previous segment: they resist punctualization and, thus, cannot be easily displaced and enrolled in broader networks. Both measurements are also individualized and sometimes dysmetric: a person's *basqueta* cannot be replaced by another person's, the same way a person's boundary claims cannot always be reduced to someone else's.

Furthermore, I hold that it is possible to carefully extend the contingency and revisability identified to other measuring practices and knowledge claims performed in the community. Although this is beyond the scope of this chapter, it is interesting to mention that there were other measurements and claims that were enacted in a revisable and contingent manner (e.g. time at the farm was sometimes measured by comparing the positions of the clouds; when asked about the duration of certain tasks, community members resisted giving abstract numbers, opting for contingent words like 'soon', 'it is almost ready', 'you can see it when I do it'; and before answering questions about their way of producing, they would very often start with 'this is how I do it...', 'for me…', or even add information about how other

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[62] As the authors summarize: "It is characteristic of the process of fact construction that stabilization entails the escape of a statement from all reference to the process of construction." (Latour & Woolgar, 1986, p. 176). For a critique of this position, see Amsterdamska, 1990; Shapin, 1988.

[63] See Haraway, 1997 for a feminist critique of ANT's combative lexicon.

people do it differently). This also resonates with some of the patterns of in/commensurability analyzed in the second chapter.

Similar to the units examined, conversions are also essential for knowledge claims in the community's efforts to navigate the edge of capitalism. However, unlike the creation of an equivalence between units, the knowledge claims produced in the community seem to get converted into a technical knowledge by being imposed a certain hierarchy of measurements which is different from the ones the community holds. From brief conversations with community members regarding the extension services offered by the government, this seems to be what happens, but I believe a proper empirical observation of such interactions could perhaps uncover other modes of conversion.

These observations can allow for speculations regarding the somewhat uncomfortable relation between the community's and the technical knowledge practices (as briefly discussed in chap. 2). The rules are different, and when the community is presented with stabilized 'facts' from outside (e.g. a crate can produce 15 kg of flour; the oven should be cleaned twice a day; the space between the crops should be of 1 meter… see chap. 2) they tend to take it as contingent and revisable, in a similar way they deal with their own claims. Therefore, although in many interviews the 'need for more technical knowledge' was stressed as something the community members wished to gain in order to improve their livelihoods, importing 'technical' knowledge perhaps requires a conversion to fit the community's own knowledge practices, instead of merely imposing a new hierarchy of measurements (or evidence in general) which is not fully accepted by the community members.

3.3. Conclusion

In this chapter, I have attempted to examine what I believe are moments of negotiation in the pericapitalist space inhabited by the community. In the first part, I highlighted the different modes of ownership which make explicit the role solidarity and collectivity play in limiting the capitalist incorporation in the community. In the second part, I focused on certain measuring operations to bring to the foreground the dysmetric, ambivalent, contingent, and revisable characters which come into being through the choreographies examined. When it comes to the *basqueta* unit, I further underscored the importance of the conversions which create an external commensurability, necessary for capitalist practices.

Throughout this chapter, I have used the term 'capitalism' following a few distinct meanings, and not fixing it as a conceptual tool. This remains dangerous, mainly since I have

made some claims which can be read as the use of abstract social forces as explanatory tools, something ANT has explicitly criticized (see Latour, 2005). I want, however, to reject that the differences between the community knowledge practices and one that fits a 'capitalist logic' can be explained away by social forces, identity, or tradition as a single cause; I have brought too many entities to the surface to be able to neatly organize them into a coherent causal claim. Indeed, there are multiple (not purely social) reasons why contingency, ambivalence and incoherence are enacted in the community's harvesting performance and, I hope I have managed to keep this mess in the foreground in my description and analysis.

Figure 11. Starch and cassava flour being sold at the open-air market in Santa Izabel do Pará. October 19, 2019.

Figure 12. Cassava flour (on the back) and cassava dough (on the front), sitting in *coxos* in the *casa de farinha.* Espírito Santo do Itá. October 23, 2019.

4.   Processing and Selling: from cassava to flour, starch, and tucupi

So far in this work, I have attempted to present some different ways in which the cassava grown in Espírito Santo do Itá interacts (and intra-acts, Barad, 2007) with the community members, their practices, artifacts, and knowledge. In this chapter, the main focus of my analysis is no longer solely the cassava as a plant, but also the cassava as the products which are made from it: the flour, starch, and *tucupi*. Through the description of the complex choreographies that inhabit the *casas de farinha* of Espírito Santo do Ita presented here, I hope the reader is able to better understand how the *tucupi*, starch and flour, and their companion community members, are brought into being, materially and symbolically.

These products can be studied as different manifestations of the cassava in the community. Each product interacts with the members differently, and thus, they shape the relation between the people and the crop in a specific way. Following Haraway (2003; 2008), the main argument in this chapter is that the cassava and the community members can be considered as 'companion species'. That is, the crop and the people in the community intra-act (Barad, 2007) and come into being relationally: "The partners do not precede the meeting; species of all kinds, living and not, are consequent on a subject- and object-shaping dance of encounters." (Haraway, 2008, p. 4). It is against this backdrop that the following segments should be read. They have been divided according to the products the cassava is transformed into, exploring the many steps required to enact such transformations, and how they engage with the community members and their customers.

As already presented in this work, quilombola communities have an important historical relation to cassava and its products. In contemporary remnant quilombo communities, cassava processing continues to be a traditional and popular activity. When compared to the descriptions of the processing techniques from colonial Brazil, the current artisanal process does not usually present drastic changes (Morais, 2003). The *locus* of this activity has also remained the same: the *casa de farinha*. Beyond its historical importance, the contemporary social role of this space of production and interaction has been explored by a number of authors (e.g. Silva & Silva, 2015; Morais, 2003; Alves et al., 2011; Silva et al., 2019). In many communities, the *casa de farinha* is also called *retiro* [retreat], which bespeaks the social importance of this space (Silva & Silva, 2015). As Coutinho (2015) indicates: "*Casa de Farinha* is a space for sociability, exchange of information on techniques and is the ideal place for carrying out any analysis that deals with reciprocity, solidarity and

eating habits of peasant or traditional communities in Northeast Brazil."[64] (p. 228, my translation).

Observations of the social role of the *casas de farinha* are indeed relevant, but I believe many anthropological studies that focus on solidarity and tradition reinforce the nature/culture divide and leave the materiality solely in the background of the analysis. There are, however, some important exceptions (e.g. Picanço, 2018; Velthem, 2015). Jacques' (2013) description of the material culture in the *casa de farinha* in a quilombola community in the state of Amapá stands out:

> The dynamics of the flour house involve the circulation of bodies and things, as if it were a dance where the bodies move without touching each other, the children come and go, helping in some processes, the women peeling, washing the cassava and boiling the tucupi , and the men peeling, toasting, grating and carrying the bags of grated cassava dough in a harmonious process.[65] (p. 13, my translation)

I wish to also explore the *casa de farinha* as a space where this harmonious dance of bodies and knowledge can be observed.

In Espírito Santo do Itá, cassava processing has historically been the main source of income, it is what people know how to do and what they have been learning from their parents and grandparents for many generations. I did most of my observations in one *casa de farinha*, which is owned by Cristina and Adelson, and is used by around 5 cassava owners and 10 workers, mostly family members. I also observed some specific steps which were only done in other *casas*, as well as the open-air market where the community members sell their products.

In the remainder of this chapter, I aim to present my observations of the interactions between humans and non-humans in the *casa de farinha* and the open-air market and, thus, explore how the cassava, *tucupi*, starch, and flour are performed in their relations to the community members and customers. Firstly, I will present the steps which are done before the flour, starch and tucupi are separated, the specific steps done to obtain each product, and the different ways they are sold. I will also include some comparisons to other ethnographies done in quilombos and other rural communities.

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[64] Original text: "A Casa de Farinha trata-se de um espaço de sociabilidade, troca de informações sobre técnicas e se configura como o lócus ideal para a realização de qualquer análise que trate de reciprocidade, solidariedade e hábitos alimentares de comunidades camponesas ou tradicionais do Nordeste do Brasil."

[65] Original text: "A dinâmica da casa de farinha envolve a circulação de corpos e coisas, como se fosse uma dança onde os corpos se movem sem se tocar, as crianças vêm e vão, ajudando em alguns processos, as mulheres descascando, lavando a mandioca e fervendo o tucupi, e os homens descascando, torrando, ralando e carregando as sacas de massa da mandioca ralada em um processo harmonioso."

Figure 13. Two different groups of women peeling cassava in the *casa de farinha.* Espírito Santo do Itá. October 23, 2019.

4.1. Cassava Roots

4.1.1. Peeling[66]:

As already explained, in Espírito Santo do Itá the harvest is usually done on Mondays. That happens during the morning and, in the afternoon, some cassava owners already start peeling their roots. In the *casa de farinha* where I was doing my observations, Cristina liked to start as soon as she arrived from the farm, whereas Adelson, her brother and co-owner of the *casa,* usually started in the following morning. This activity was the first task I observed and learned how to do, so I spent many hours peeling cassava in a circle with the women, children, elders, and some cassava owners. The following short excerpt is a compilation of some observations done throughout the month of October.

The peeling usually starts on Monday afternoon and continues up to Wednesday, when all the cassava owners have already peeled their roots. The men, women, and children who peel the cassava would sit in a circle, on some tree stump stools or plastic chairs, and in the middle of the circle they would pour the sacks of cassava. When they had a lot of cassava to peel, the roots of more than one cassava owners were peeled at the same time, but in different circles, so they would not mix [see figure 13].

Since there are multiple steps to be done simultaneously in the **casa de farinha***, the cassava owners cannot devote their time exclusively to peeling, which is one of the most time-consuming tasks. Therefore, they usually hire one or two* **raspadeiras** [women who got hired by a cassava owner to peel his/her cassava] *and also have help from family members, usually children and elders. Although by observing the peeling process it would not be completely clear who works for which cassava-owner, since there seems to be a constant exchange of favors, the* **raspadeiras** *are hired per day by a specific cassava owner, and they are supposed to peel solely their cassava.*

There are two main artifacts used to peel the cassava: the knife and the **raspador** [peeler]. *The knife is more popular among the community members, since it can be used to remove both ends of the cassava, the* **cabeça** [head] *and the* **ponta** [tip][67]. *The*

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[66] Interestingly, the verb 'to peel' in Portuguese would translate to '*descascar*', and '*raspar'*, which is used for the act of peeling cassava in the community, translates to 'to scrape/scratch'. I decided to use here the verb 'to peel' since it indicates the removal of the peel, which is the reason for this task, but I still want the reader to keep in mind the movements of scratching and scraping that are central to the meaning in the Portuguese word.

[67] Velthem (2015) indicated a different way of characterizing the parts of cassava, as '*cabeça*' [head], '*rabo*' [tail], '*carne'* [meat], and '*pele*' [skin]. With the exception of '*rabo*', these words were also used in Espírito Santo do Itá.

*raspador, on the other hand, cannot be used to remove the ends, but is more effective than the knife when it comes to big roots. Most **raspadeiras** bring their own tools to the **casa de farinha**, which are usually one knife and one **raspador**, but as more people enter the circle, the tools are shared.*

*During the peeling process, the conversations are almost constant. Topics such as the soap opera, news, stories and gossips are frequent, usually on a humorous tone. When people arrive at the **casa de farinha**, they usually gather around the pile of cassava and peel to join in the conversation, even if they do not take part in the activity. The children always join their parents once they come from school and help in the peeling process, mostly working on the small roots. They were not usually asked to do it, and if there were not enough places to sit or tools, they would stop and let an adult peel instead of them. For them peeling seemed to be a fun activity, not work.*

I learned to peel at an average speed, not being the slowest one after some days of practice. With some more time I learned to perfect some secondary movements: flipping the position of the root by throwing it in the air, and using the knife to reach the cassavas from the pile. My hands would always get very sticky from the viscous milk that cassava expels once its skin is cut, and the smell on my hands and clothes would linger for a few days.

Many entities were made present in this description: the cassava, *raspador*, knife, chairs, community members, gossip, stories, humor and laughter. When compared to other tasks, peeling is considered the most 'social' one by the members. Cacá, for instance, informed me that peeling is her favorite task due to conversations and laughter. As Vizolli et al. (2012) described in their study of a Quilombola community in the state of Tocantins: "During the peeling task, people tell stories and remember old times, which creates a pleasant environment and a moment of relaxation." [68] (p. 600, my translation). I believe this to be the case for Espírito Santo do Itá as well.

Linhares & Santos (2014), who also investigate the sociality in the *casa de farinha*, further highlight the importance of the interaction between generations which happens as the cassava is peeled:"[…] this reunion is marked by the socialization process itself, which even

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[68] Original text: "Normalmente, pessoas de outras famílias auxiliam no processo de raspagem. Enquanto se efetua a raspagem, as pessoas contam causos, relembram velhos tempos, contam histórias, o que cria um ambiente agradável e um momento de descontração."

in the face of the transformations experienced in this space is still one of the main characteristics of the *Casa de Farinha* that remains alive."[69] (p. 62, my translation). Indeed, this is the only task which includes children, adults and elders. This gathering of multiple generations could perhaps contribute to the blurred boundaries between helping, working, and playing that this task enacts.

Furthermore, the community members engage with the cassava in multiple ways in this choreography. Jacques' (2013), for instance, emphasizes the role of human vision and touch in the human-nonhuman interactions during the peeling process. This is also true for my observations, but I would add that the cassava and humans connect in other ways as well, namely, through smell and taste. The smell of the cassava takes over the *raspadeira*'s clothes and hands, it marks their intimate relation. The taste, on the other hand, is only sometimes made present, for example when Cacá's daughter ate a piece of cassava to find out if it was a *mandioca* or *macaxeira,* as presented in the previous chapter. Vizolli et al. (2012) argue that the interactions that happen while the cassava is being peeled "[…] strengthen the bonds of friendship between people" (p. 600), but perhaps we should also consider the bond between the members who peel and the root, the fact that the children learn to know the best way to handle the cassava, to remove the peel, to look at the cassavas '*pele*' [skin] and identify if it is rotten. People who peel get marked by this relation of companionship, in their smell, their sticky hands, their dirty clothes, and their intimate knowledge of the root.

After the roots have been peeled, they are put in one of the plastic crates, and then, once the crate is full, it is moved a few meters to a basin full of water. The cassava is poured inside and cleaned in the water. The roots are left there for some time, and the basin is also stirred for a few minutes to make sure the pieces of peel and dirt that got stuck on the root's skin get removed. This short step is called 'cleaning', and it is the last step before the cassava is transformed into dough. The peel which is left behind in this first step is gathered and sold to farms who feed it to their pigs.

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[69] Original text: "Essa reunião é marcada pelo próprio processo de sociabilização, que mesmo em frente as transformações vividas nesse espaço ainda é uma das principais características da Casa de Farinha que permanece viva."

Figure 14. Tolete preparing the cassava to be ground. Espírito Santo do Itá. October 23, 2019.

4.1.2. Grinding:

After the cassava has been cleaned, it needs to be ground to become a dough. Unlike peeling, which has remained pretty much the same for the last decades, this step has gone through many changes. In Espírito Santo do Itá, none of the *casas de farinha* hand grind the cassava, they all do it on an electric grinder. I asked the elders about it, and they told me that they used to use a make-shift grater made from a can of paint. Aleontino and André, the community elders, told me about how they would always have scars on their palms since it was difficult to use the grater for hours without getting hurt. This memory of the grating process as a harmful and difficult one was also brought up by the rural community in Tocatins studied by Linhares and Santos (2014).

Before the electric grinder, however, the workers from Espírito Santo do Itá developed a way to grind it using a pedal-system built from bicycle parts, which made the process much easier and less hurtful. In the last decade, all *casas de farinha* were able to obtain an electric grinder. In some *casas*, this is the only change made from the traditional way of processing the cassava, which is coherent with the stories about this being the most difficult and painful part of the process.

I believe that this inclusion of an electric artifact in the *casa de farinha* changed the relations that unfold in this space. The process now requires electricity, and when there are blackouts it has to be stopped. Thankfully, that is not very frequent, but when it does occur, the members cannot continue this activity. Further, the electric grinder is a very loud machine; when it is turned on, most conversations stop and people just focus on the task at hand. In the previous section I stated that conversations, gossip and laughter are all important to this choreography, and this somewhat newly introduced noise requires some moments of silence, changing a bit the dynamic of the peeling circles. This does not mean that the introduction of new artifacts in the *casa de farinha* is bad, but that they can change how other entities, humans and non-humans, are enacted through these interactions. In the following short excerpt, I present a description of how the electric grinder and community members turn the cassava into dough.

> *The electric grinder consists of a long wooden board surrounded by around 1 palm of wood, so that the cassava does not fall from the sides* [see figure 14]. *It is slightly declined, and on its lower side there is a cylinder which crushes the cassava that is pressed against it. Once crushed, the cassava becomes a yellow and mushy dough that pours down a big plastic recipient which is positioned under the machine. The*

operators must first fill the board with cassava, turn on the machine by connecting two wires that hang from the ceiling, and then push the cassava so it is crushed. This is not a very simple task, the cassava needs to be positioned correctly so as to get properly ground, and if you press them using your hand, you can end up hurting your finger on the cylinder. When I was taught to operate the machine, I was told to use some big roots as extensions of my hands, in order to press the other roots without getting dangerously close.

Figure 15. Hand-operated press. Espírito Santo do Itá. October 23, 2019.

4.1.3. Juicing

The product that comes out of the electric grinder is called '*massa*' [dough]. It looks like a yellow mush and has a strong smell. In this step, the aim is to remove the tucupi from the dough (starch and flour). In the *casa de farinha* where I did my observations, this was done using a hand-operated press, as described below.

The dough that comes out of the grinder is not ready to be juiced. First, water needs to be added, and the very wet mixture is stirred using a hoe. Using a bucket, this mixture is taken to the hand-operated press, which is located next to the grinder. On the press, the liquid is then poured in a sack which is held in place by a wooden frame. Once the sack is full, the wooden frame is removed and a plank is set over the recently-filled-up sack. Then, the same process is done again, but this time, the second sack is supposed to sit over the first sack, with the plank separating them. This process is repeated until there are 3 sacks piled up on the press [see figure 15]. *At this point, then, the top part of the press is lowered manually, using a long metal bar. As the sacks get squeezed, a yellow liquid is released and pours into a bucket. When the bucket gets full, it is switched for another bucket or basin.*

*By touching the sacks and looking at the flow of the liquid that is being released, the community members can decide if the press should be further lowered, or if the task is completed. When they decide to stop with the juicing task, they raise the top of the machine and remove the sacks. The recently-juiced dough is put in plastic recipients to be taken to the next step; and the buckets of liquid, which is now called **tucupi**, are left on the side to sit for a few hours.*

The process of removing the *tucupi* from the cassava dough has been discussed since the first observations of cassava processing by Europeans in the 16th century. Hans Staden (1955, originally published in 1556), for instance, highlights the use of the *tipiti*, made of *guarumã* vines (*Ischnosiphon arouma*), in this process. The *tipiti* is an indigenous instrument used to juice cassava, and it was, until recently, the most popular way to perform this task. In Espírito Santo do Itá, only a few *casas de farinha* have obtained a press, and many families still use the *tipití*. On October 29th, I had the opportunity to visit a different *casa de farinha* and observe this instrument being used. The following ethnographic description is based on my field notes from that day.

*I arrived at Joel's **casa de farinha** at around 11 am. Joel and his young son were toasting the flour and his wife was operating the **tipiti**. She would grab the dough which had just been ground and stuff it inside the instrument. It looked like a very long cylinder, made of plaited plastic fiber, in a way that it was very elastic. She would fill the cylinder, and then hold the instrument up and hit the bottom of it with her knee, almost as if she were dancing* [see figure 16]. *This was done so to fit the*

*biggest amount of dough in the **tipiti**. After that, she would fix the instrument in a wooden structure. This structure used lever power to stretch the **tipiti** as much as possible, and so the **tucupi** was juiced. After some minutes, she would change the position of the instrument, to increase the force stretching the **tipiti**. Then, she would just check to see if there was much juice left, and finally remove the tool from the structure and take out the dough to be sieved.*

This process of removing the *tucupi* also to be done at Adelson and Cristina's *casa de farinha* before the hand-operated press was obtained. This new entity seems to have shifted a bit this choreography. When I asked the community members why they had changed tools, they usually mentioned two things: 1. The press is faster and makes it possible to juice more *tucupi*; 2. The *tipiti* juicing was very hard on the women. Regarding this second point, the older members would often mention how the women would have bruises on their legs and thighs from using the instrument, since they would have to work many hours. The press, then, seems to be considered as a replacement for a female activity, a situation which was also observed by Silva et al., 2019.

The gendered character of the *tipiti* does not mean exclusivity. When I asked if it was a female tool, the community members would strongly deny it: '*anyone can operate the **tipiti***'; but then they would add: '*but women do have a better way with it*'[70]. The same way '*raspadeira*' is a gendered role in the community (see Morais, 2003), before the press, mostly women were hired to operate the *tipiti*. Interestingly, this categorization did not seem to be justified by a difference in physical strength between men and women (cf. Barbosa et al., 2015), but on a specific female skill which allowed for them to better handle the *tipiti*. I further argue that operating the *tipiti* was an important way of performing womanhood. Outside the domestic field, peeling and juicing seem to be traditionally the way womanhood was enacted in the *casa de farinha*, both activities which were sometimes presented in the discourse of community members as peripheral tasks, or as 'helping out'.

With the inclusion of the hand-operated press, the juicing task stopped being considered a female duty, and women lost a specific attribute they had: the ability to handle the *tipiti*. Thus, the introduction of an entity, in this case a nonhuman artifact, changed the iterative practice of gender-in-the-making (see Haraway, 1997). The relation between *tipiti* and women performs a different type of womanhood from the relation between press and

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[70] In Portuguese the expression used was: "[…] *as mulheres têm um jeitinho* […]"

women. Another important gendered task in the *casa de farinha* is the *tucupi* processing, which I turn to now.

Figure 16. Tipiti being operated by a Community member. Espírito Santo do Itá. October 30, 2019.

4.2. Tucupi

The community of Espírito Santo do Itá has historically sold flour and starch, but only in recent decades they've started selling *tucupi*. This has to do with shifts of demand in the market, and with knowledge that the community has acquired. This yellow liquid, which was previously wasted, became one of the main products sold by the community. Once it has been juiced from the dough, however, this liquid is poisonous, and if humans or animals drink it, they can become intoxicated. Therefore, the process done before it can be consumed is extremely important.

*Firstly, the **tucupi** needs to sit for a few hours for the starch to decant. The women would often put their hand in the buckets to verify if the starch had already gathered in the bottom. Once that is done, the tucupi is separated from the starch and poured on another recipient. It is very important that this is done at the right moment, because after some time the two substances mix again and the starch does not decant anymore, so both products need to be wasted. After the tucupi is separated, it needs to sits for a day so it can thicken. The amount of time the it is left to sit affects its final taste. Thus, it is decided according to the flavor the clients and producers prefer, which varies from sour to sweet. Once that is done, the liquid is filtered using a cloth, so the few insects who fell and got stuck in the tucupi get removed. The liquid is now much thicker and has a more vibrant color. It is, then, taken to the back of the **casa de farinha**, where there is a type of simple firewood oven. The **tucupi** is poured in a big pan, and it is added salt and 3 types of seasoning: **cipó alho** [garlic vine], **alfavaca** [basil], and **chicória** [chicory]. It needs to be boiled for around 30 minutes [see figure 17]. The women decide that this process is done after it has achieved their desired taste. The liquid is filtered using a cloth once again, and then it just needs to be bottled.*

This process has a few interesting points that I wish to highlight. Firstly, this is the only activity in the *casa de farinha* which is done solely by women. I have no intentions of guessing a reason for this division, and I do not believe any type of neat structuralist gender division would fit (cf. Velthem, 2015). Instead, I want to explore the *tucupi* as part of the way womanhood is performed in this community. Therefore, the argument I wish to make is that the tucupi is a manifestation of the relation of companion species between the cassava and the community members, especially for the women.

In the last decade, Donna Haraway has explored the ways humans and non-human animals, mainly dogs, become with each other in situated naturecultures:

> […] all the actors become who they are in the *dance of relating*, not from scratch, not ex nihilo, but full of the patterns of their sometimes-joined, sometimes-separated heritages both before and lateral to *this* encounter. All the dancers are redone through the patterns they enact. (Haraway, 2008, p. 25)

In Espírito Santo do Itá, I believe the women and the tucupi become with each other, they are redone in their dance of relating. These women have an intimate relation to this liquid, which is not only epistemological, but material-semiotic. They relate to the tucupi through their touch, smell, and taste, and by doing so, they learn and they care. Although most women make *tucupi,* their products are not the same: the way it is made and the taste changes. There is, then, a subjectivity which emerges in these encounters.

The tucupi is sold in 2-liter plastic bottles. These bottles are reused, since most customers are fixed, so they return the bottles to be filled up again. The products are usually sold to specific clients who order a certain amount every week, but there are sometimes a few new clients at the open-air market. At the market, it is interesting to observe the way clients engage with the tucupi. The following excerpt is from a moment I observed on October 26th, at the market:

> *An older man approached Cristina to ask about her products. He wanted to buy a sour **tucupi**, not a sweet one. He asked her how her product tasted. She replied: "For me, it is sour, but you should try it to see how it is for you". She then opened one of the bottles, and put his hand on the top of the bottle neck, allowing for some of the liquid to get stuck on the palm of his hand. He licked it and then said: "yes, that is fine. I will take one bottle.".*

Cristina is aware of the relationality and contingency of her product. She likes her *tucupi* to be sour and she dislikes the sweet one, but she also knows this liquid well enough to allow for it to become different things as it relates to other people.

To say that the *tucupi* is a manifestation of the companionship between the women and the cassava is not to say the other products are not. Nevertheless, the *tucupi* holds a specific position as a solely-female contribution to the community. As I argue, inside the *casa de farinha,* women perform their womanhood through their material-semiotic relation to this liquid.

Figure 17. Boiling *tucupi* in the *casa de farinha.* Espírito Santo do Itá. October 23, 2019.

Figure 18. Community members '*lavando*' [washing] the dough to separate the starch from it. Espírito Santo do Itá. October 23, 2019.

4.3. Starch

Once the dough is removed from the hand-operated press, it needs to be hand screened or, as they call it in the community, they need to '*lavar a massa*' [wash the dough]. It is in this step that the dough which will be used to make the flour is separated from the starch, as explained below:

> *This process is done manually, using a stretch cloth which is fastened to the top of a big tank. The dough is put on the cloth, and it is rinsed with water. As the water pours down the cloth, it fills the tank. The person doing this process needs to rub the dough against the cloth, back and forth, so that a slightly white liquid is released. This liquid contains some **tucupi** which remained I the dough after the juicing process. This process requires a lot of strength and coordination, mainly since you have to move the dough and also use a bucket to pour down water constantly [see figure 18]. After*

*some time, the liquid from the tank, the leftover **tucupi** and water, is used instead of pure water.*

It was not clear to me how the community members know when to stop this process. They explained that the liquid released from the dough needs to be transparent, but that was not obvious to my untrained eyes. Then, the dough needs to be pressed and rubbed so that most of the liquid is removed, it is supposed to look a bit dry and powdery when it is removed from the cloth.

After this process, the dough does not contain a lot of starch anymore. This substance is now in the tank, mixed with *tucupi* and water. The same way the women let the *tucupi* sit so that the starch gathers in the bottom of the bucket or basin, as explained in the segment above, the liquid in the tank sit so that the starch decants. When this happens, the *tucupi* (which is very diluted and, thus, is wasted) is removed from the tank, and the solid starch in the bottom is broken into pieces, water is added, and the mixture stirred. The starch which had remained in the recipients after the *tucupi* was taken to be boiled is also mixed together in the tank. This latter step is called '*agoar*' [to water], and it consists of mixing the starch with water until it becomes an opaque white liquid, and the it is removed from the tank and put in basins to sit.

Once the starch has sat, it needs to be dried, cleaned, and packed:

*After the leftover **tucupi** is removed from the basins, the white starch left almost looks like pieces of cast. In order to dry the starch, three layers of cloth are used to cover the basin, the first one being a white and thin fabric, followed by thicker and colorful rugs. After the starch is fully covered, ash and sand are poured over the basin. The cloth, then, is supposed to keep the starch clean while the sand and ash absorb the humidity of the starch. In order to speed up the process, the members would step on the basin, in order to add pressure* [see figure 19]. *But most of the time, it would just be set aside until it was dry enough.*

*After that, the pieces of fabric are removed and the starch needs to be cleaned. This means: to remove the '**burra**'* [the few yellow spots on the starch] *using a knife. This is done usually at the same time the process of packing starts. Usually one person removes the **burra**, and then puts the pieces of starch in a transparent plastic bag, someone else gets the bags and weights them, on an electronic scale, removing or adding more starch to achieve 1 kg, and, if there is someone else, this person closes*

the bag. Usually this work is done by two people. Most people seem to allow for the bags to contain up to 5 grams of extra starch, but not less than 1 kg.

This is the process done to achieve the starch. This product is used in many different dishes in Pará, but its most common use to make the '*tapioquinha*', a type of pancake that is eaten for breakfast. It is, thus, a very common item for people in Pará to have at home. There is something, however, that stands out about this product: its whiteness.

Unlike the other products: flour and *tucupi*, the starch cannot be tasted in the open-air market, and people only judge its quality from its appearance. The same way the *tucupi* and flour need to look yellow to be considered good, the starch needs to look white. This is very important and it is considered by the community from the very first steps of cultivation and harvesting. I was told my Maria that there the different varieties of cassava can be classified in 3 types: yellow, white, and cream, which is a middle term. She explains that:

> The **Jurará Amarelo** [a yellow variety] *is better to make flour, to toast, to eat. Its starch is not very good, it turns yellow and people don't like it. But the **Duquinha**, the **Bujarú**, the **Brandão**, they are white cassava, they are very good for removing the starch [...] it is good for flour too [...]. The **tucupi** is not very good, it does not turn yellow, but if we mix it with **Jurará Amarelo**, it will produce a good starch, a good tucupi, and the flour will also be good.*

Adelson made a similar point in his interview, when I asked him why different varieties were used:

> *That is because there are some colors that are better for the **tucupi**. […] [For example] the **Pratinha** is better for the starch than the **Jurará**, but it is white, so the farinha will be different. The **Jurará** has a cream color, so it produces a much more beautiful flour. […] If we used only one variety, for example the **Pratinha**, I would only use the starch; the flour would be ugly and the **tucupi** would be spoiled.*

There seems to be a negotiation of colors, in the cassava used and the products produced. Interestingly, the community members seem to be aware that a yellow starch is just the same as a white starch when it comes to its taste or consistency. But they say that people do not like or buy it. The colors of the products are important for the way they relate to clients.

The whiteness of the starch cannot be achieved solely by selecting the appropriate varieties. It also needs to be packed in individual plastic bags of 1 kg to be sold, unlike the flour, which is brought to the market in bulk, and then measured there according to the amount the client wants (see figure 11). As Adelson explained in an interview:

The starch… it is difficult for us to take 30 kg, in bulk, like the flour. We have to weigh it before. […] *That is because, even if we were to open it there* [at the market]*, it would get dirty, and the starch is tricky to work with, any little thing makes it dirty. And, since everyone knows that it is white, any dirt can be seen from far away. That is why we need to pack it.*

The members know the varieties to use and the entities to enroll so that the starch remains white, despite its delicate quality. It is tricky to work with, as Adelson puts it, but their intimate knowledge, materialized in their practices, allows them to keep the starch white and clean. This is essential since it is the only product with which the clients only engage visually, and thus, the quality of a good starch is marked by its whiteness and cleanliness.

In the next segment, this distant relation between starch and the clients in the market can, then, be contrasted with the importance of the touch and taste when engaging with the flour. Firstly, however, I will present the steps required to achieve this product and the specificities of this performance.

Figure 19. To speed up the process of drying the starch, the basin can be stepped on. Espírito Santo do Itá. October 23, 2019.

Figure 20. Cristina *escaldando* [heating] the dough in the *casa de farinha.* Espírito Santo do Itá. October 23, 2019.

 4.4. Flour

Cassava flour is perhaps the most complex product I encountered during my fieldwork. This is due to the multiple ways it can be produced and the different types of flour that are consumed. The two most common types in Pará are: *farinha de mandioca d'água* and *farinha de mandioca seca.* The former requires an extra step before the cassava is peeled, in which it is left in water to ferment for a few days. The latter, which is the one most often produced in Adelson and Cristina's *casa de farinha*, does not require this fermentation, and is usually further categorized according to its grain size (thin, medium, or thick) (Modesto Júniro & Alves, 2015).

In the practices I observed, these categories did not fit so perfectly. In the different *casas de farinha*, even if the *farinha seca* was more popular*,* the process and tools used changed, and the flour which was produced was not considered equal to someone else's. Sometimes they would mix the types of *farinha*, or try to make a special flour for a certain occasion. They had, nevertheless, their preferences as to the grain size of their product, and so did their customers. If someone at the open-air market asked for a 'thin flour', for example, they would recommend the flour from a certain community member who liked to produce it that way. These observations resonate with the study produced by Denardin et al. (2015) about the flour production in the coast of the state of Paraná: […] [E]ach farmer has their recipe, their logic, their rationality. The farmers have the ability to produce flour that is thinner, thicker, more or less toasted. This identity knowledge is often shared, whether between family members or in neighborly relationships.[71] (p. 209, my translation).

In this segment, I will solely present the flour-processing steps observed in Cristina and Adelson's *casa de farinha*, which differs from the way it is done elsewhere. Therefore, the following narrative should not stand as a summary of how cassava flour is made in rural communities in Pará, or in Espírito Santo do Itá, but as an attempt to explore a specific and localized choreography that inhabits this community.

In the previous segment, I explained how the starch is removed from the dough in the process of *lavar a massa*. After that has been done, the dough goes through the electric grinder again, mixed with new cassava roots which have just been peeled and cleaned. Or, as the community members say, the "*dura*" [hard], the cassava roots, is mixed with the "*mole*" [soft], the dough which has had its starch removed. If the '*dura*' cassava is not added, the

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[71] Original text: "[...] cada agricultor tem sua receita, sua lógica, sua racionalidade. Os agricultores têm a capacidade de produzir uma farinha mais fina, mais grossa, mais ou menos torrada. Estes saberes identitários são, com frequência, compartilhados, seja entre familiares ou nas relações de vizinhança."

flour ends up being very thin, since there is very little starch. The proportion between the "*dura*" and "*mole*", thus, affects the density of the flour that is produced.

After this mixture is ground, it is juiced in the hand-operated press again. This time, however, the tucupi cannot be used. After that it is ground one more time, but in a different electric grinder. Since the mechanism is very similar, I will not describe these two repeated steps. After they are completed, the dough needs to be '*escaldada*'[72] [heated], which is the first time it is heated in the oven in order to become dry and powdery.

*After the dough has been ground in the specific electric grinder, it looks like a thick yellow powder, but it is still wet. Using a dish, the dough is thrown in the oven. The oven consists of a large round metal plate, supported by a round structure made of clay. The dough is spread over the top of the oven using a tool called **vassoura*** ['broom']*, which looks like a wooden broom made of wood and a type of thick husk. This instrument is used to mix the dough around, with circular movements, while more dough is being added. Once the quantity has increased, the instrument changes, and the **rodo*** ['squeegee'] *is used instead. This second tool consists of a long wooden rod with a piece of wood at its end, resembling a wooden squeegee* [see figure 20]. *Unlike the **vassoura**, it requires strength and precision, since the dough needs to be pushed and pulled on the metal plate. The movement also changes, remaining circular but adding some back-and-forth motion as well.*

*The end result desired is a much thinner powdery substance, which, then, starts being called 'flour'. As the **rodo** moves the dough around, the person operating the oven also uses their hand to remove some **bagos*** [clumps of thick dough]. *This task lasts for many hours, but it depends on the amount of dough that needs to be **escaldada*** [heated]. *By seeing and touching the dough, the oven operator is able to tell if the batch is done. Using the **vassoura**, the newly heated flour is put in a big metal tin and then poured in the **cocho*** [large wooden recipient traditionally made of a hollowed-out tree trunk; see figure 12]

This process of heating and drying the flour requires a lot of attention. The fire needs to be controlled so that the product does not stick together in big chunks (*bagos*), which is a

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[72] This verb is difficult to translate since it has multiple meanings in Portuguese. The closest official meaning to the one the community uses is 'to burn by contact', but there it is used more often to refer to this step in the flour processing.

result of a very hot oven. The wetness of the dough also influences the chances of the flour thickening too much, but when I talked to different community members, there did not seem to be a consensus: some people liked to work with a wet dough and some others preferred it when it was drier. Making a mistake and, thus, allowing the flour to become thick, was considered a laughing matter, and the people in the *casa de farinha* would make fun of this lack of skill.

After the whole batch has been *escaldado*, it needs to be sieved. That happens while it is poured in the *cocho*, since a squared metal sieve with a wooden frame is put over this recipient. As the flour is poured by one person, another person needs to shake the sieve back and forth in order for the smaller grains of flour to go through. This is a very quick step, and it can be done by anyone, even young teens are asked to help out sometimes. After the whole batch has been poured, someone presses the leftover chunks against the metal mesh, in order to allow for some of it to go through. The ones that remain in the sieve are then separated in a sack and are later sold to a farmer who uses it to feed his animals.

The flour usually sits for some time before going through the next step, which is the most popularly recognized task of *torrar* [toasting]. Some cassava owners use both ovens in the *casa de farinha* at the same time, one for *escaldar* and the other one for *torrar*, but one person is required for each task. Both *torrar* and *escaldar* require the full attention of a community member, and if they want to take a break, they need to ask someone else to continue their work in the meanwhile.

*Using the can, the recently **escaldado** [heated] flour is poured back on the oven. This time, the flour is much thinner and it moves more around the plate as the **rodo** pushes and pulls it. The technique is similar to the one used in the previous task, but this time a common trick is added: the flour is sometimes thrown in the air. Although some community members explained that this is done to keep the flour from getting burned, most people seemed to consider it just a habit. A few people, mainly the younger ones, would not do it because they were not confident in their skills, and it is not a requirement to produce a good flour.*

*With the flour going up in the air, and the **rodo** going back and forth, sometimes in a circular motion, this task strongly resembles a dance. This seemed to me like the hardest task: although **escaldar** requires more strength, **torrar** requires more attention to avoid the flour from slipping out of the oven. The fire also needs to be controlled to keep the flour from getting burned or, as the people would say, **podada**.*

*If the fire is too weak and the flour ends up being clumpy and soft, they call it **bigbig**, which is the brand of a popular chewing gum in the region. The ideal flour, which is crunchy and yellow is called **biscoito*** [cookie]

*After being toasted, the flour is again removed using the **vassoura** [broom] and the metal tin. The product is poured in the **cocho** using the metal tin to cool down before being packed* [see figure 21]. *The flour spends a lot of time in the **cocho**, and during that time it is being constantly eaten by the people working in the **casa de farinha**. They use their hands to grab the flour, and the act of eating it is sometimes followed by a compliment regarding its quality. Visitors would also do that, usually while they join the conversation circles.*

A number of things stand out in this description. Firstly, as mentioned in the previous segment, the way the community members relate to the flour requires a very close connection, of touch, vision, and smell. This becomes very explicit when the producer needs to identify the moment the flour has been toasted and is ready to be removed from the oven. As Vizolli et al. (2012) points out: "[t]he flour toasting time (02 and/or 03 hours) is consolidated when, with the naked eye and/or the taste of the flour, the producers consider it to be good. [...] it consists of a practical knowledge in which time (duration in hours), appearance (color, texture), and taste are combined."[73] (p. 604, my translation). I would also add that the sound the flour makes is sometimes made present in this performance: I was told by Erê, one of Maria's sons, that a few people identify the moment the toasting is done by the sound the flour grains make when they rubbed against each other, but this required a very advanced expertise. Thus, in order to develop the skill to toast the flour properly, the community members "[…] orchestrate a multisensorial perception" (Velthem, 2015, p. 94).

As argued for the other products, flour is also considered here a manifestation of companionship between the community members and the cassava. The act of producing flour needs to be understood not only as an enactment of a historical (quilombola) heritage, but also as the formation of specific subjectivities and a collective identity. The subjectivity which comes into being through this practice, I argue, involves the specific ways in which each community member produces their own flour, creating entities that are not interchangeable. Cacá, for example, does not produce the flour the same way as Maria, her

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[73] Original text: "O tempo de torração da farinha (02 e/ou 03 horas) se consolida quando, a olho nu e/ou pelo gosto da farinha, os produtores a consideram de qualidade. [...] trata-se de conhecimentos práticos em que se combinam tempo (duração em horas), aspecto (cor, textura) e sabor"

sister, who removes the *tucupi* using a cloth, before using the hand-operated press; or her brother, Vadeco, who, makes a thinner flour. Each one has their own preferences, choreographies, and, thus, perform flours that are not equivalent.

There is also a layer of collectivity to this entity, which can be observed in two distinct moments. Firstly, the collectivity of flour is enacted as it is produced, through the shared knowledge, skills and interests, which connects the community members, despite the heterogeneity in their practices. Secondly, the cassava flour performs a type of agency that reinforces the collective identity of the community: it invites[74] people to snack on it while they sit, interact and work in the *casa de farinha*.

The flour sits in the *cocho* for a few hours before being packed, and while it is there, most people grab a handful of flour and snack on it. I had not noticed the importance the community members gave to it, until I did it while I was in a conversation circle. The people who saw it were surprised: they laughed and remarked how I was almost becoming "one of them". Eating the flour is, I argue, important for the material-semiotic performance of their collective identity, it binds them together. The flour does something here, it has agency, it invites people to snack on it and thus, to take part in this collective choreography. This invitation the flour puts forth cannot, however, be abstracted from the other entities that take part in this performance as well: the *cocho*, the tree stumps where people sit, the *casa de farinha*, the community members, among others. This material agency that can be identified is contingent, localized, and a consequence of this specific heterogeneous assemblage; but it is not less relevant for the community because of that.

Here, touch is central to this relation. People use their hands to grab the flour, they feel its consistency and they assess its warmth. This is also true for the way people engage with the flour in the open-air market. There, every cassava owner leaves the flour sack open and people who walk by take a handful of it to get to know its taste, texture and smell (see figure 11). They also assess its color, which needs to be bright yellow, as other authors have also pointed out (e.g. Velthem, 2015; Guerrero, 2015). As already mentioned, in order to achieved the desired color, the "yellow" or "cream" colored cassava need to be used; if flour is made solely of the "white" variety, it ends up looking too white, which is considered ugly by the producers and consumers.

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[74] I use this term inspired by Van de Port & Mol, 2015. The authors study how different fruits *invite* people to engage with them a certain way in Bahia, Brazil.

Figure 21. The flour, once it was ready, being removed from the oven to sit in the *cocho*. Espírito Santo do Itá. October 23, 2019.

4.5. Conclusion

In this chapter I have tried to present some specific material-semiotic relations that unfold as the community members in Espírito Santo do Itá and their customers engage with the flour, starch and *tucupi*. I have also described the multiple tasks necessary to achieve each product and considered them as manifestation so the relation of 'companion species' the cassava and community members have. In their performance of the different tasks, people get together in the *casa de farinha* to work, talk, and taste the cassava. I have thus argued that this *locus* is central to the sociality of the community members, and it reinforces both a sense of collectivity and solidarity.

These products are strongly related, they are all made from cassava: they are all 'cassava offspring', as characterized by Picanço (2018). Although they take part in distinct contingent performances and through those, different community members and clients come into being, I believe they need to be understood as manifestations of the relation between cassava and community members. Indeed, through the steps presented, the community members often consider the three products as a whole: one clear example is the cultivation of multiple cassava varieties (yellow, cream and white) to benefit the products. Becoming with the cassava means, in the community, knowing how to engage with it, differently, in all its forms: as a crop, root and products.

The *tucupi*, I further argued, holds a very important position in the community as a female contribution, although there were changes in this relation with the introduction of the hand-operated press. The close relationship between this liquid and the women who worked in the *casa de farinha* is marked by knowledge, materiality, and care. The starch, unlike the other products, requires a distant relation to the community members, it needs to remain white and 'clean': it demands a specific heterogeneous arrangement to guarantee its whiteness, which includes not only artifacts (plastic bags, scales, knife) but also a refrain from touch from the community members and customers. Finally, I presented the way the flour is produced in Cristina and Adelson's *casa de farinha*, emphasizing the importance of the multisensorial engagement the members have with this product (taste, touch, smell, and even sound). I also argued that the flour needs to be understood as both an entity through which subjectivities emerge (in the specific and individual types of flour produced), and as part of an important performance of collectivity. Regarding its collectivity, I suggested that a type of agency can be identified in the way this product invites people to snack on it as it sits in the *cocho*.

Concluding Remarks

In this study, I have tried to explore the way the relation between cassava and the community members of Espírito Santo do Itá unfolds during their activities of production and processing. Following a material semiotic approach, I attempted to empirically eschew the nature/culture divide and attend to the way the multiple entities observed come into being through their relations. Since the entities that inhabit each chapter change, distinct arguments, although partially related, were made for each moment investigated.

The first chapter set the scene for the following ones, introducing some central terms that were used throughout this work, such as enactment, performance, choreography, and agency. This vocabulary inherited from ANT and post-ANT literature proved to be useful, even if their meanings may have changed as they related to the empirical fieldwork. In the second part of the chapter I introduced the notion of situated knowledges, following feminist material semiotics (Haraway, 1988). This term allowed me to bring to the foreground the effects my 'method assemblage' (Law, 2004a) had on this research practice.

In the second chapter, I followed Maria and her sons as they showed me how cassava is planted in the community. I focused on the relation between the traditional knowledge practices and the technical recommendations found on manuals and taught in extension services. I argued that community members articulate specific patterns of in/commensurability when they relate to the technical knowledge: they control the criteria for the comparison of the practices and, sometimes, make them incommensurable, precluding comparison. Furthermore, there seemed to be a resistance in performing comparisons in an abstract language: the community members preferred to engage with the comparisons in a material and contextualized way.

In the following chapter, which focused on the harvest processing, I brought to the analysis the concept of 'pericapitalist' spaces (Tsing, 2015) in order to characterize the position of the community on the edge of capitalism. I argued that there are multiple negotiations in the community thorough which specific traditional traits resist or are appropriated as they relate to the capitalist logic. I explored these negotiations by examining the way ownership and measurements are performed in the community during the harvesting task and, thus, suggested that the ambivalent, revisable and contingent characters of these practices can be said to contribute to this contested space the community inhabits.

In the last chapter, I used Haraway's concept of 'companion species' (2008) to characterize the way the community members engage with the cassava. The products were

understood, then, as specific manifestations of this relation of companionship, and, through the different tasks performed, different entities and community members come into being. Moreover, I highlighted the importance of the *casa de farinha* for the sense of collectivity and solidarity in the community.

Through this empirical investigation, I attempted to understand human-plant relations without presenting the cassava and its products as merely cultural/social representations, but engaging with them in their materiality. Furthermore, regarding the examination of traditional knowledge, I tried to move beyond a purely epistemological understanding, unfolding the importance of specific embodied knowledge-practices such as measuring. These insights could perhaps be further tested in other contexts and be incorporated in different method assemblages.

That said, I believe the biggest weakness of this research is its tricky mixture of ANT with unexamined social categories such as 'capitalism'. During the fieldwork, I did not have the chance to attend extension services, and I could not identify enough connections in order to explore the effect of wider market economic forces in the community empirically. A longer fieldwork would perhaps have allowed for a better understanding of the negotiations between the traditional and scientific knowledge-practices and the solidary and capitalist logic, as well as how these relations interconnect. Furthermore, due to the diversity in the way cassava is processed in the community, I believe a deeper exploration of different *casas de farinha* would also be beneficial.

Finally, I hope this thesis illustrates the possibility of incorporating the sensibilities of material semiotics in an empirical research of human-nonhuman relations. The relation of the cassava with the community members in Espírito Santo do Itá was complex, and this approach allowed me to present it without making this complexity invisible. Following this movement, I believe further research that examines this topic could try to incorporate such perspective to more actively engage with these spaces of conflict between traditional and scientific knowledge, as well as the way these conflicts relate to the contemporary capitalist system.

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