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South-South Cooperation Across the Atlantic:
Emerging Interfaces in International Development and Technology Transfer in Agriculture

By

Letícia Maria Costa da Nóbrega Cesarino

A dissertation submitted in partial satisfaction of

the requirements for the degree of

Doctor of Philosophy

in

Anthropology

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Corinne Hayden, chair
Professor James Holston
Professor Alastair Iles

Fall, 2013

Abstract

South-South Cooperation Across the Atlantic:
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Letícia Maria Costa da Nóbrega Cesarino

Doctor of Philosophy in Anthropology

University of California, Berkeley

Professor Corinne Hayden, Chair

This is a study about South-South cooperation, or the recent (re)intensification of cooperation initiatives between countries from the so-called global South. It contributes to the effort of documenting and understanding this emerging phenomenon by dwelling on the case of technical cooperation in tropical agriculture between Brazil and the African continent. Drawing on ethnographic and other kinds of data collected in Brazil, Mali, Burkina Faso and Ghana, it looks at some of the modalities of cooperation – in particular, capacity-building trainings and technology adaptation and transfer – that have been offered by Brazil's national agricultural research institute, Embrapa, to its counterparts in Africa during the last half-decade. Fundamentally inspired by Marilyn Strathern's analytics of relationality, this dissertation looks at South-South cooperation between Brazil and Africa as the formation of new socio-technical assemblages across the Southern Atlantic, regarded as a process characterized by an intensive work of context-making. I describe this as an ethnographic experiment in looking at emerging interfaces that bring together various domains, most notably in development cooperation and technology transfer.

The first interface approached by this dissertation is the one that constitutes South-South cooperation as such, by means of its claims to difference vis-à-vis Northern development aid. These claims are assessed in Chapter 1 in terms of two domains historically privileged by the anthropological literature on international development: global politics, and organizations. Inspired by postcolonial perspectives that complicate simplistic renditions of the North-South divide, I chart a possible genealogy of South-South cooperation from the situated standpoint of Brazil, focusing on its discursive principles on the one hand, and on its hemispheric and domestic politics on the other; and describe Brazilian cooperation in terms of its emerging organizational architecture and dynamics. The chapter concludes by foregrounding South-South cooperation's ambivalent historical constitution within a global apparatus built under Northern hegemony, suggesting that the practical enactment of some of its principles stems less from a coherent, alternative policy apparatus than from its very organizational "fragility" relatively to Northern aid.

I then move on to Brazil-Africa relations, to look in Chapter 2 at Brazilian cooperation's official discourse on Africa, uniquely based on claims to similarity and sharedness that are particularly

emphatic when it comes to the domain of culture. A look at history indicates that this discursive emphasis has, for at least fifty years, eclipsed other vital dimensions of Brazil-Africa relations. Based on my ethnographic experience, I argue that this discourse does not find an easy counterpart in the practice of contemporary cooperation initiatives either. The chapter traces the origins of this special interest in culture to Gilberto Freyre's racial harmony ideology (itself a postcolonial rendition of Franz Boas' culturalism), and proposes the notion of nation-building Orientalism to characterize a view on Africa that, even though not inaugurated by Freyre, was taken by him to new heights. Inspired by classic and contemporary postcolonial literature, I argue that this view is fundamentally characterized by an interplay between domestic concerns (in this case, with the place of African descendants in Brazilian nationhood) and Brazil's own historical sense of subalternity vis-à-vis European and U.S. hegemony.

As one zooms in further on the scale of technical cooperation in agriculture, this concern with culture recedes to the background, giving way to considerations centered on shared natural environments and (peripheral) agricultural development. Chapter 3 focuses on one of Embrapa's technical cooperation modalities, capacity-building, to suggest how Brazilian *cooperantes*' reach to their African counterparts can be best characterized as being based on demonstration rather than intervention. More than actually transferring technology or knowledge, I argue that this mode of engagement aims at making a context for relations between Brazil(ians) and Africa(ns) where these were largely unprecedented, and where organizational and financial resources are limited relatively to those available to Northern donors.

The two final chapters take a closer look at one of the emerging assemblages conjured up by the recent South-South cooperation wave: Embrapa's Cotton-4 Project with Mali, Burkina Faso, Benin, and Chad. They tell story of the project's early beginnings in Brazil's cotton dispute with the U.S. at the World Trade Organization during the mid-2000's, map out the new organizational assemblage that formed around the project, and describe how the project framed, and proposed to address, the problem of low cotton productivities in West Africa by adapting and transferring a package of Embrapa technologies made up of three components: no-till, integrated pest management, and plant breeding. Here, I draw on STS works on technology transfer based on Bruno Latour's actor-network theory to provide an account of technology transfer as the co-production between technology and context. I elaborate however on avenues little explored by the literature: in particular, the actors' scaling operations and the socio-technical controls they exercise differentially across contexts that are perceived less in terms of difference than in terms of an asymmetry between capacities. Based on my observations of this project's ongoing technology adaptation and transfer efforts, I conclude with a situated discussion about Brazilian South-South cooperation's potential for robustness.

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To acknowledge is to render networks explicit and, in a sense, to share authorship (or, as the common admonition goes, only the good part of it). Indeed, this dissertation is quite explicitly a composition of multiple academic and non-academic voices, orchestrated by my own. But a project like this is made not only of ideas. For it to happen at all, it required basic material conditions. These have been largely provided by the Brazilian Ministry of Education – which is to say, the Brazilian people – along with its U.S. partner, the Fulbright Foundation. I thank them for supporting my family and I financially and logistically during most of my time in Berkeley and in the field. Equally important, I thank the people of California for subsidizing my son's childcare and education, as well as my daughter's healthcare. Besides CAPES/Fulbright, my field research benefited from financial support from the UC Berkeley's Center for Latin American Studies (CLAS), Center for African Studies (CAS), Center for Science, Technology, Medicine and Society (CSTMS), and Institute of International Studies (IIS).

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Introduction

The second time I landed in Bamako, it was (unknowingly) on the eve of a big festivity. It was time to celebrate the 51st anniversary of Mali's independence, consolidated in September 22, 1960. The main event was going to be the inauguration, by President Amadou Toumani Touré, of the capital city's mile-long *troisième pont* (third bridge) over the Niger River, the country's largest construction works in recent years. Its official name was Bridge of Sino-Malian Friendship: it was, the press happily announced, a 70 million dollar "gift" entirely paid for by China. I had a glance of it for the first time as I entered the gates of the Sotuba research station of Mali's national agricultural research institute, the Institute d'Economie Rurale (IER). The new bridge stood less than a mile from where Brazil had, two years earlier, set up the grounds for one of its flagship cooperation projects in Africa, which involved transferring cotton technologies to Mali and three other countries in the region. The project's experimental fields were established right next to that of CIRAD, France's research institute for tropical agriculture, which had been present in Mali, in changed forms, since colonial times. The imposing Chinese bridge, on its turn, was constructed literally on top of an older one built by the French in the 1920's – in reality, a narrow, intermittent causeway amidst the rocks on the bottom of the river, only crossable during the dry season.

This vignette, it would turn out, encapsulates well broader processes going on in Africa and across the so-called global South at large during the time I did my fieldwork. The Chinese had been investing heavily in infrastructure works demanded by African governments, in straightforward bargaining agreements usually involving access to natural resources. The Brazilians were extensively expanding their portfolio of technical cooperation projects in the African continent to countries beyond their historical areas of influence in former Portuguese colonies. And they were not alone: Indians, Australians, Russians, South Koreans, South Africans, Turkish, and many others – new and not-so-new presences adding to the already populated development landscape in Sub-Saharan Africa, for decades dominated by former European colonizers and other Western players such as the U.S., the Bretton-Woods institutions, the various United Nations agencies, and an infinity of NGOs.

This dissertation is about the recent efforts entertained by one of the world's so-called emerging countries to establish closer ties with other nations in the global South by offering them an alternative modality of international cooperation for development. This country is Brazil, and this dissertation will look at its reach across the Southern Atlantic to the African continent by means of discourses, technologies, capacity-building, and other objects and practices defined as technical cooperation. Brazil's efforts are part of a larger wave that has been variously referred to as South-South cooperation, emerging donors, non-DAC donors,[1] technical cooperation between developing countries (TCDC) – to mention a few of the rubrics available in the international development community and the academic literature. Here I chose to speak of South-South cooperation, as this was the preferred label among my field interlocutors, both on the Brazilian and on the African sides.

In spite of being discursively defined in contrast to Northern aid, South-South cooperation does not describe a monolithic, stable, or even coherent phenomenon – in fact, as

[1] The Development Assistance Committee (DAC) of the Organization for Economic Cooperation and Development (OECD) aggregates Northern donors and others who choose to follow their rules; it regulates the aid they provide according to well-defined accounting standards for Official Development Aid (ODA).

much as a conceptual tool in academic inquiry, the notion of South-South cooperation is itself one of the stakes in this empirical field. Different emerging donors may have quite distinct modus operandi and motivations for stepping up cooperation with others in the global South. In the last few years, much has been said about them – what I take to be a predictable effect of the development industry pipeline itself.[2] Most of this writing belongs however to the report genre; very little has been based on careful academic, empirically grounded research on both provider and recipient sides. Even fewer publications offer contributions in terms of theory.[3] This dissertation aims to help fill this gap by looking at the case of Brazil-Africa cooperation through the lenses of ethnographic fieldwork and theory in anthropology and allied fields.

But I chose that vignette to open this dissertation for yet another reason. It conveys a basic problematic permeating both my fieldwork and writing: that of scaling. Shifting back-and-forth between scales occurred from the most micro level of what anthropologists call practice to the most macro scale of global organizations, political economic structures, or geopolitics – that is, from what is immediately accessible through observation during fieldwork (the bridge, the plot) to the intangible objects they are supposed to stand for. As anthropology itself, both development and techno-science are fundamentally characterized by such "tricks of perspective and scale" (Maurer 2008, 2). South-South cooperation also shares other traits Bill Maurer (2008) has identified as characterizing the empirical fields for which he claims an analytics of ethnographic "emergence": "bleeding across the frame, hybridity, autodocumentation or reflexivity, and the continual shift in perspective between general and particular to generate knowledge" (2) – all this according to a temporality that is "coincident" with that of ethnographic writing.

Indeed, I came across Maurer's Strathernian proposal after having reached the conclusion that what I was looking at could be best conceived of as an emerging phenomenon. This notion first came up during fieldwork in the form of a self-awareness, by many of those involved in Brazilian cooperation, about their country's emergence in the world stage – in 2011, for instance, Brazil for the first time overtook the UK as the world's sixth largest economy. For Brazil and others, this primarily economic emergence from the developing to the developed world has entailed taking up a more prominent role in world affairs, including their self-assertion as donors: in other words, as providers instead of recipients of development cooperation (Gray 2011, Mawdsley 2012).

The notion of emergence I will deploy in this dissertation is not however a teleological one. What I wish to indicate most centrally with it is an assemblage whose arrangement is at this point unstable, and its direction, unclear. At a micro scale, this has translated into inadvertent

[2] Reports on emerging donors have mushroomed in the past few years: e.g., UNCTAD (2010), Walz and Ramachandran (2011), World Bank and IPEA (2011), Scoones et al. (2013), to mention just the ones I will reference here.

[3] The limited body of work published thus far by anthropologists or other scholars inspired by the discipline's sensibilities (not all of which based on ethnography, and some funded by development agencies) includes Silva (2008, 2013), Alden et al (2008), Langwick (2010), Muhr (2010), Gray (2011), Mawdsley (2011), Drazkiewicz (2011), Eyben and Savage (2012), DeHart (2012). Emma Mawdsley (2012) has recently provided a welcome synthesis of the overarching questions surrounding emerging donors. Other works have not yet reached the publication stage; cf. panels on emerging donors in recent anthropology conferences (e.g., 2012 American Anthropological Association meetings, and 2012 conference of the European Association of Social Anthropologists.) Interestingly, most studies I have found so far on emerging donors other than China have come either from Europe or the global South itself; this "too strong" (Mawdsley 2012, 107) – I would even say, almost obsessive – a focus on the Asian giant seems to be especially salient among U.S. academics and development experts.

accommodations, anxiety and sometimes contradiction, but also learning and openness to experimentation and creativity. This is, I suggest, what seems to be going on with Brazil's (and probably others') recent South-South cooperation efforts, as projects and other cooperation activities take shape on the ground and begin to produce their first, more or less sustained effects – both on the side of receivers *and* providers.

Even though this dissertation will make many claims about South-South cooperation at large, and will deploy a wide array of methods and primary and secondary sources, its ultimate anchoring is ethnographic. Fieldwork focused on a forefront Brazilian institution among the many that have been delivering technical cooperation to other parts of the global South in the last decade or so: Brazil's national agricultural research institute, best known by the acronym Embrapa. This is not however an institutional ethnography about Embrapa, as others have done for Northern development agencies (e.g., Rottenburg 2009, Valente 2010, Goldman 2005), but an account of the institute's and its employees' interfaces with other organizations and individual actors in Brazil, in Africa, and elsewhere. These organizations include most centrally the Brazilian Cooperation Agency (itself part of Brazil's diplomatic body, the Itamaraty), and the African research institutes with which Embrapa has been partnering up for implementing its cooperation initiatives. Along with the notion of emergence, therefore, interface is another methodological-conceptual pillar of this study.

Previous ethnographies of international development have also tackled interfaces, such as Ferguson's classic account of a project by the Canadian development agency (CIDA) and the World Bank in a village in Lesotho (Ferguson 1994), or Mosse's extensive description of a decade-long project run by the British Department for International Development (DFID) in tribal India (Mosse 2005). But these and other studies have been usually circumscribed to the beaten path whereby Northern developers meet their clients in developing countries, usually tribal or poor communities (Long 2001). In the case in point here, not only is the current interface between Embrapa and its African counterparts largely unprecedented; also fairly new is its close work with the Brazilian Cooperation Agency – which is itself undergoing a transformation from receiver to provider of cooperation. Embrapa employees are *not* development workers like those implementing projects for CIDA, the World Bank or DFID; their regular work concerns agricultural research, and to a lesser extent, technology transfer to Brazilian farmers.

Based on this fundamental way of framing the subject of this dissertation, I sought to marshal, drawing on (meta)theoretical works in anthropology and adjacent fields, an analytics of relationality that would help make sense of such emerging interfaces without reducing them to one final explanation(s). My focus is therefore not on the terms but on the hyphen in South-South cooperation. There is, as especially Chapter 1 will suggest, a whole (geo)politics behind this hyphen. Mine would have to be therefore a take on relationality that did not fail to attend to the play of power relations, more specifically those of a postcolonial kind, since South-South engagements grew directly out of another, more familiar power relation that is at the core of anthropology itself: between "North" and "South".

A first conceptual tool that came out of this exercise in crafting an analytics of relationality enriched by postcolonial insights refers to the scales of context at which such relations unfold, and which they simultaneously create. Typically, these have ranged from global politics, to organizational relations, to interactions between (human and non-human) actors at the micro scale of practice. Moreover, following Strathern (1991), scale will indicate not only levels of context, but also the comparative scales according to which these levels are evinced and

assembled. To enter into relation, especially at a new interface, always entails a comparison with something that is already known – and indeed, as will be seen, Brazilian cooperation's discursive and practical engagements with Africa and the global North has proceeded largely through the proposition of analogies. In the same sense, contexts are not to be understood as a preexisting background to relations observed during fieldwork, like an archaeological puzzle waiting to be unearthed as soon as its right theoretical match in the literature is found. They are live participants in contemporary assemblages, constituting and being constituted by relations entertained between human and non-human actants. In my narrative, therefore, scaling, context-making and related operations such as domaining or analogy-making will play a central role.

These knowledge-making operations are also present in academia, and reflexively describe the work this dissertation does when bringing together my field interlocutors, other kinds of primary sources such as policy, PR and technical documents, and the academic literature itself. My ultimate grounding is however on field relations; it was always from there that I pulled, as it were, all the other threads, and from where I stood (or better said, was situated) as I delineated a picture of how these scales were articulated to form an assemblage fit for the frame of an academic dissertation. My understanding of emerging assemblages resonates with other uses of the term in anthropology, such as those compiled by Ong and Collier (2005).[4] In his latest theoretical book, Bruno Latour also deployed a notion of (re)assembling based on his long-term reflections on the nature of socio-technical associations. The assemblage I have in mind does not however coincide fully with Latour's network.

The description I will provide here is neither an un-situated account of the actors' immanent interactions in the field (what I suspect to be the aim of Latour's "myopic" ethnographer), nor a detached representation produced by an authoritative voice claiming to speak on behalf of society, culture, history, or whatever other transcendent explanatory tool brought ready-made from academia (a procedure which Latour frontally criticizes). It is, rather, a combination of both academic *and* field efforts at scaling and context-making: an analytics that "does not take for granted that 'global' and 'local' indicate orders of magnitude or scales of importance", but looks at "techniques by which people shift the contexts of their knowledge and thus endow phenomena with local or global significance" (Strathern 1995, i). In Maurer's terms, this dissertation will venture into the muddled ground of using anthropology's "tricks of perspective and scale to document a field that is similarly involved in such tricks of perspective and scale in documenting itself and its own objects" (2008, 4).[5]

This analytical preference for emerging interfaces at multiple scales of context stems as much from preexisting theoretical affinities as from my fieldwork experience – or, in the terms put forth by David Mosse (2006) which I will extensively deploy here, from both my social relations in the "field" and my academic ones at the "desk".[6] I have chosen it in part because it

[4] For instance: "An assemblage is the product of multiple determinations that are not reducible to a single logic. The temporality of an assemblage is emergent. It does not always involve new forms, but forms that are shifting, in formation, or at stake. … [A]ssemblage implies heterogeneous, contingent, unstable, partial, and situated" (Ong and Collier 2005, 12).

[5] Commentaries on context-making, scaling and reductionism can be found in Huen (2009), Holbraad and Pedersen (2009), and Hayden (2012).

[6] Through these metaphors, Mosse (2006) aimed to shed light on a characteristic of knowledge production in anthropology since at least Malinowski: the work involved in constructing an analytical object amenable to appreciation by academic peers during the process of writing (the desk) involves partly or totally severing the social relations established with one's informants during the research process (the field). Although far from a novelty, this way of putting the question of ethnographic authority seems especially relevant for anthropologists of development

allows me to make as explicitly as possible the situated character of this account, and how it is ultimately a unique composition of many voices: those of my various field interlocutors, the literature, and my own, which orchestrated all the others. In this sense, the narrative offered here could not, I believe, have been written by someone else; indeed, it looks quite unlike other available accounts of Brazilian South-South cooperation,[7] and it does not aim at objectivity. While this may be by now commonsense for anthropologists and other scholars, it has to be made explicit from the start for other potential readers of this dissertation.

Finally, this analytics allows for bringing different bodies of literature into articulation with the two core ones, based on Strathern and Latour. The remainder of this Introduction will be dedicated to discussing where and how these and other writings – most centrally, in the anthropology of development, postcolonial critique, and science and technology studies – have been brought into the assemblage articulated by this dissertation.

Anthropology of development and the question of difference

One of the first analytical challenges this dissertation faced was how to approach the question of *difference* between Northern development aid and South-South cooperation. On the one hand, Brazilian actors themselves would frequently, and sometimes quite incisively, mark this difference by emphasizing not only their distinctiveness but superiority in relation to traditional aid. This appeared especially poignantly in diplomatic discourse, but also, and somewhat differently, at the frontline practice of projects and other cooperation activities. My job as an anthropologist was to *not* take such claims to difference for granted; but on the other hand, I did have to take them seriously. Moreover, difference was indeed what came out of the exercise of looking at my fieldwork data in light of the anthropological literature on international development.[8] Given that ethnographically based works on South-South cooperation are few and still in process of theoretical maturation,[9] publications based on the study of Northern aid imposed themselves as my primary theoretical yardstick when it came to the domain of international cooperation. I therefore felt that my engagement with this literature called for an exercise in provincialization (Chakrabarty 2000), which I began to entertain in previous occasions (Cesarino 2012a,b).

The first danger to avoid was to slip into a lack-based analysis: after all, when compared to accounts in the mainstream literature on development, Brazilian cooperation will most often appear as lacking bureaucratization, governmentality, and other angles from which especially critical anthropologists have commonly looked at development aid (Cesarino 2012a,b). I wished to come up instead with a perspective on Brazil-Africa cooperation that would do more to

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and others who study up (Nader 1972). Differently from Malinowski, who never had to see a Trobriander again after returning to London, for many reasons the latter might not be able to perform such a trick – at least, not with impunity (cf. also Cesarino 2012a).

[7] Sá e Silva (2009), Cabral and Weinstock (2010), Leite (2012), Cabral and Shankland (2012, 2013), Cabral et al. (2013), Pierri (2013), Nogueira and Ollinaho (2013).

[8] Here as elsewhere (Cesarino 2012a) I have limited my exploration of the literature to so-called anthropologists *of* development, thus excluding the more applied field of development anthropology (on the ambivalent relationship between anthropology and development, cf. Escobar 1991, Ferguson 1997).

[9] In a recent AAA panel, for instance, Patty Gray (2012) called for a phenomenology of emerging donors, as individuals and institutions turn from receivers to providers of cooperation; she has not however developed this proposal in writing yet. Gray (2011) and others have experimented with thinking about international cooperation through Mauss's notion of the gift (Silva 2008, Mawdsley 2011, 2012).

respect its own terms. But then the opposite challenge immediately emerged: how to write a dissertation that would not be the mere description of a particularity?

This dilemma becomes more or less sharp depending on the theoretical perspective. Actor-centered perspectives on development (e.g., Long 2001, Bierschenk et al. 2000, Olivier de Sardan 1995, Mosse 2005, Lewis and Mosse 2006, Rottenburg 2009), for instance, seem more readily generalizable, even to a point where differences between South-South cooperation and its Northern counterpart would vanish. This kind of analytics is about sticking as closely as possible to the "immanence" of ethnographic materials, describing the various actors' interests and backgrounds, and how they interact in the case of a particular assemblage (most typically, one development project). From this perspective, at bottom Brazilian cooperation is not fundamentally different from any other, Northern or Southern: it is also a network-like arrangement between various interest-bearing individual and institutional actors that come into a composition of relations the ultimate outcome of which will depend on the articulation and equilibrium achieved (or not) between them.

Besides the richness in ethnographic description, an advantage of this approach over other perspectives in the anthropology of development such as those based on Foucault, is to anchor empirically the issue of power and political accountability – who gains what with development cooperation initiatives, even those that fail. In Foucauldian approaches, on the other hand, this question is usually rendered mute or downplayed by a view of power as lying in a systemic bureaucratic-discursive apparatus (Ferguson 1994, Sachs 1992, Escobar, 1995, Crush 1997), or in a "will to improve" (Li 2007) that is so generally defined that it could fit virtually any phenomenon involving the state or the market in the contemporary world. These works do however have their own appeal: most notably from this dissertation's perspective, to approach discourse as a key part of the field where power relations are played (see following section). Moreover, the focus on systemic dynamics showed some relevance for South-South cooperation, albeit not exactly in the same way as for its Northern counterparts. In the case of Brazil-Africa cooperation, power relations that can be empirically traced and historicized cannot be reduced to the ones mapped out by the anthropological literature on development through generalizing notions such as governmentality or discourse.

Nonetheless, the anthropological literature on development was particularly instrumental in drawing my attention to institutions, or how organizational arrangements shape practical encounters on the ground while remaining separate from them, with their own self-referential drives, logics, and socialities.[10] This led me to begin this dissertation in Chapter 1 with an effort at delineating the organizational architecture and dynamics of Brazilian cooperation. Unfortunately, I have not found such work ready-made anywhere in the academic or policy literature, at least not with the scope I deemed necessary for making sense of what I saw in the field. The picture I provide was based on materials drawn from heterogeneous sources: reports, academic publications, government documents, and interviews, which were systematized according to the most recurrent way relations seemed to unfold as they were observed during fieldwork.

This exercise yielded a three-leveled picture: official discourse (the locus of diplomats and politicians); policy and management (managers and bureaucrats); and implementation (in the case of Embrapa, "frontliners" – to borrow a term common in the aid literature [e.g., Long 2001) – were typically agronomists and other research scientists). This was evinced through a

[10] The issue of organizational inertia and self-referentiality has been approached by actor-centered ethnographies such as Mosse (2005) or Rottenburg (2009).

comparison with the ethnographic literature on development aid, and turned out to be a major touchstone for ascertaining the differences between Brazilian cooperation and its Northern counterparts, in terms of organizational architecture (how institutions are organized within and between each other) and dynamics (how the three levels relate to each other). As I had argued previously (Cesarino 2012a,b) and will reassert in Chapter 1, the chief contrast ended up being that, while in Northern development aid the mid-level of policy and management tends to over-determine the other two, in Brazilian South-South cooperation the opposite relation is obtained, with a policy level atrophied relatively to diplomacy on one side, and frontline practice on the other.

The anthropological literature on development aid also usefully drew my attention to the pervasive *gap* between discourse and frontline practice. I concur with other analysts that this "disjuncture between rhetorics and rituals … and the complex and messy realities of engagement" (Mawdsley 2012, 163) can also be found in South-South cooperation. But the character of this gap in this case remains largely unexplored. Here I will suggest that in Brazilian cooperation the dynamics between the two sides of the gap plays out differently than in the highly bureaucratized relationship found in Northern aid, whereby the messiness of practice is systematically purified back into development policy (Moore 2001, Mosse 2005, Rottenburg 2009), or even parasitized by it (Long 2001, Li 2007). But this is not because in South-South cooperation the path between principles and frontline practice is mediated by a bureaucratic apparatus oriented by an alternative kind of policy. In fact, as Chapter 1 will suggest, it is precisely the lack of robustness at the level of policy and available resources that has prompted the practical enactment of South-South principles such as non-interference, non-conditionality, demand-drivenness, horizontality, or tailoring projects according to each context.

In the anthropological literature, a common corollary to the bureaucratization argument has been that aid de-politicizes developmental issues by submitting local realities to a kind of expert knowledge that renders them technical and diagnoses problems according to pre-conceived solutions (Ferguson 1994, Li 2007). Chapter 1 will also pose this question for Brazilian cooperation, and will suggest a paradox of sorts: while emerging South-South relations are indeed marked by politicization effects at the international level, it may lead to de-politicization effects domestically. These effects however are not the same that have been underscored by the literature on development aid, and play out differently among recipients of cooperation on the one hand, and providers on the other.

Finally, the literature on development aid points to a dilemma that is also shared by South-South cooperation: that of – to use the development jargon – ownership, or the continuity of the projects after the donor leaves. Like other emerging donors, Brazil follows the global standard of providing cooperation in the project format. As I will argue in Chapter 3, however, it does so through a mode of engagement that is more hands-off and based on demonstration, in contrast with traditional aid, based on more bureaucratized and large scale kinds of intervention. Here I will approach this question through an idiom closer to my relational analytics, that of *robustness* (Strathern 2005, Nowotny et al. 2002) (see below).

Postcolonial critique: discourse and the double directionality of coloniality

At least since Ferguson's insightful chapter on the politics of knowledge in World Bank reports in *The Anti-Politics Machine*, discourse lingered for a long while as a prevailing analytical angle in the anthropology of development (Sachs 1992, Escobar, 1995, Crush 1997,

Apthrope 1997, Grillo and Stirrat 1997, Anders 2005), remaining important even after potent critiques during the late nineties (Moore 1999) that continue to resonate today (Venkatesan and Yarrow 2012). To refuse discursive determinism is not however to deny the importance of discourse, but to pay close, empirically grounded attention to its relations with history and practice. The first three chapters will begin by approaching South-South cooperation discourse in three domains: Chapter 1, South-South / North-South politics; Chapter 2, culture and history in Brazil-Africa relations; and Chapter 3, nature and agricultural development in the tropics. Each will seek to show how official discourse participated in context-making efforts, and then move on to look at its relations with frontline practice. In this dissertation, however I will refer to discourse in two senses, which I try to differentiate.

Most of the time, discourse will refer to a working tool consciously deployed by certain groups of actors in the field – most notably that of the diplomats, but also those in politics, academia and other intellectual circles. I tried to mark this specificity by qualifying it as official discourse rather than discourse in general. Official discourse in this sense is mostly concerned with a self-account of Brazilian cooperation. But one of my most forceful observations during fieldwork was how distant it could be from the practice of frontliners. The various chapters will suggest how, rather than describing the latter accurately or even shaping it directly, official discourse is more often than not disconnected from it: it follows a logic and productivity of its own that is largely circumscribed, by organizational and sociality lines, to diplomatic and more political and intellectual kinds of circles. Not that there are no relations between diplomats and frontliners (and managers); they not only exist as may play a significant part in cooperation activities. But as will be seen, they unfold in ways that do not follow a linear, coherent referential bridge between discourse and practice.

The other way in which I talk about discourse here draws on the Saidian-Gramscian-Foucauldian analytics found in much of the U.S. literature in the anthropology of development (Ferguson 1994, Escobar 1995, Moore 2005, Li, 2007). In it, the Foucauldian view on knowledge production as part of the apparatus of power is refracted by Said's postcolonial inflection and/or by Gramsci's deeply historical approach to hegemony and special attention to political economy. Here, I will largely follow these refractions. Some of the discursive elements I will approach are long lasting and do seem to provide a common grammar that is shared by virtually everyone on the Brazilian side. I traced discourse in this sense to certain historical processes, in special those involved in shaping Brazil's postcolonial condition. This discussion, which I have also started to entertain elsewhere (Cesarino 2012c), will be made explicit in Chapter 2. There I draw, besides on Said himself (Said 1978), on works on the question of postcoloniality and modernity in Latin America in general, and Brazil in particular (e.g., Mignolo 2000, Escobar 2007, Holston 2008, Moraña et al 2008). In particular, some notions put forth by Portuguese sociologist Boaventura de Sousa Santos such as double colonialism, internal coloniality, and situated postcolonalisms were highly productive for making sense of Brazil's postcolonial condition as well as of its past and contemporary relations with Africa (Sousa 2002; see also Cesarino 2012c).

Here, I have coalesced these and other insights into an attention to how coloniality[11] operates in two, interrelated directions: both externally *and* internally to postcolonial nation-

[11] My understanding of the term coloniality follows the common usage by scholars such as Mignolo (2000) and Santos (2002) (cf. also Quijano 2000). More than the notion of the postcolonial itself, whose prefix (post) implies in one way or another a possibility of overcoming the colonial condition and its enduring effects, coloniality

states. What is framed as the postcolonial condition in general usually focuses on the international dimension. Some Latin American authors, on the other hand, have sought to specify its domestic dimension through the term internal colonialism (Stavenhagen 1965, Cardoso de Oliveira 1972, Ramos 1998). Few however have made a sustained, empirical and theoretical, investment in looking at the relations between these two (an exception is, again, Santos 2002). While this dissertation will focus on how this double directionality has played out on the Brazilian side, this perspective could also be useful for looking at equivalent processes on the African side.[12] I will introduce it in Chapter 2, through a discussion about a kind of hegemonic discourse on Africa that I term Brazil's nation-building Orientalism. But like coloniality itself, this double directionality can be found in dimensions beyond discourse, from political economy to culture, from agricultural development to geopolitics. Some of these will be brought in the other chapters, albeit not as explicitly as in Chapter 2.

Finally, the postcolonial inflection will reappear in Chapters 4 and 5, which will provide an account of an ongoing technical cooperation project between Brazil and four countries in West Africa. In these final chapters, I will try to bring these insights to bear on questions raised by science and technology studies and vice-versa – not unlike those who have been working at the scholarly interface some have been calling postcolonial science and technology studies.[13] This discussion will bring us back full circle to the question of North-South difference raised in the first chapter, but now hopefully enriched by the analytics of relationality deployed more broadly here.

Relationality: Strathern, STS, and other intersections

This Introduction has already drawn on various analytical idioms of relationality found in anthropology and science and technology studies (STS): interfaces, emergence, scaling, assemblages, context-making, socio-technical networks, situatedness, or robustness. These and others evoke works from (or around) science studies, such as those by Marilyn Strathern (1987, 1990, 1991, 1995, 1996, 2005), Bruno Latour (1987, 1988, 1993, 2005) and Donna Haraway (1988). To these I add insights from works that tread the path opened up by these authors, but introduce important new twists such as De Laet and Mol (2000), Hayden (2003, 2005, 2007, 2012), Da Costa Marques (2005), or the Deleuzian approach put forth by Jensen and Rödje (2010). Less frequently, a similar perspective has been brought to bear on discussions on development, although rarely incorporating the techno-scientific dimension of projects (Riles 2001, Mosse 2005, 2006, Green 2009, Venkatesan and Yarrow 2012).

We do not need to delve too deep into micro-practice to realize the centrality of relations to the phenomenon approached in this dissertation: it is in the very hyphen in South-South. As Chapter 1 will suggest, the duplication of the term(s) brought into relation, "South", is meant to evoke horizontality: a leveling opposition to the asymmetry explicit in the North-South configuration. As the hyphen in African- or Native-American, however, the one in South-South denotes less hybridism than an interface – which, I have been arguing here, is characterized by being in emergence. The character of this relation(s) is therefore largely underdetermined; it is a

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foregrounds precisely the resilience of some of those effects – which, after 500 years of Latin American colonial and post-colonial history, became a constitutive part of these countries' self-consciousness (and political economies).

[12] Classic works in Africanist scholarship such as those by Bayart (2000, 2009) and Mamdani (1996) tread precisely this terrain, where internal colonization processes meet Africa's postcolonial condition.

[13] Reviews of this field have been done by Anderson (2002), Harding (2008) and Seth (2009).

work in progress being actively, and in some cases reflexively, performed by those involved in practicing and thinking it (myself included).

As was already indicated, the ways in which this interface is being (re)worked will be approached here most frequently through an analytics of context-making, scaling and domaining, after some of Strathern's discussions on gender, kinship and audit cultures. This emphasis on the production of context came out of the empirical observation that interactions between actors from both sides of the Southern Atlantic have unfolded through relational channels which are much less consolidated than the ones underlying relations between, say, Mali and France. Correspondingly, given the largely unprecedented character of these relations, much of my field interlocutors' efforts have been directed towards making a context for them, in a more intensive, less bureaucratized, and reflexive way than its Northern counterparts.

In Strathern's prolific oeuvre, context-making has appeared alongside related operations such as analogy-making, scaling, and domaining, all of which were also salient in the discourses and practices observed during fieldwork. As Brazilians and Africans are brought together into South-South cooperation's emerging interfaces, their relational effort proceeds largely through analogies based on their respective experiences. In this process, some contextual elements are differentially (and strategically) assigned to preexisting domains and scales; some are brought to the fore, while others are left to evanesce in the background or are altogether eclipsed. Although these operations strive to coherence, quite often they lead to contradiction and ambivalence, especially as they straddle different interfaces and the lag between official discourse and cooperation practice.

Indeed, when there is an overinvestment in certain analogies at a discursive level – most notably, between Brazil's and Africa's peripheral conditions, cultural outlooks, natural environments, developmental paths –, they not always correspond to practical relations. But as I will argue in Chapter 2, this does not mean, as those who have remarked some of these mismatches before me suggested (Saraiva 1996, Sá e Silva 2009), that official discourse is false, deluding, or naïve. There is, rather, certain diffuse functionality to it, including as an effort to open up a path for turning – to use a classic organizing duality in anthropology –[14] metaphor into metonym: that is, to incite the establishment of mutually transformative, exchange-intensive interactions between Brazilians and their African counterparts.

However, those who come up with the most explicit discursive analogies are not necessarily the ones who will work the hardest in practice to entice and nourish metonymic relations. Chapters 3 and 4 will focus on the work of the latter – the cooperation frontliners – as they strove to make a productive context for their relations with their African counterparts during capacity-building trainings and technology transfer efforts. In these activities, as Chapter 3 will suggest, *demonstration* has been the prevalent mode of engagement. Here, demonstration is evinced from a contrast with the notion of intervention, which denotes conventional views on the global North's prevalent mode of engagement with Africa (epitomized most forcefully by aid conditionalities and the IMF/World Bank neoliberal "blackmailing" during the eighties and nineties, as Jerry Rawlings once put it in an angry interview).[15] They show how capacity-

[14] Begun in Frazer's distinction between sympathetic and homeopathic magic, this duality was made famous by Lévi-Strauss's rendition of totemism, defined in contrast with its metonymical counterpart, sacrifice (which Viveiros de Castro would subsequently claim for his perspectivism) (Frazer 2002, Lévi-Strauss 1966, Viveiros de Castro 2002).

[15] Rawlings headed Ghana's government during much of the eighties and nineties, and was one of the many African leaders who begrudgingly implemented neoliberal reforms during that period.

building has been performed less as the imposition of abstract, authoritative techno-scientific knowledge than as the demonstration of a particular kind of experience in agricultural development and research, making explicit its socio-technical entanglements and enticing the audience to participate in context-making.

Notions of context and demonstration have their own purchase in the field of technology adaptation and transfer. Demonstration is the basis of key modalities of TT in agriculture in Brazil, African countries, and elsewhere. Context (and related notions such as environment or milieu) describes the site to which technologies will be transferred, which, in common policy views, denotes an inert background for a bounded object. Chapter 4 will draw on part of the STS literature, especially Latour's actor-network theory and works on technology transfer inspired by it (Akrich 1992, 1993, Mol and De Laet 2000, De Laet 2002), to recast the process of technology transfer as a *co-production* between contexts and technologies. Vital to this end will be to bring more emphatically to the fore the question of power, which is not readily evident in Latour himself (nor, for that matter, in Strathern). For this, I will recruit in Chapter 5 the notion of socio-technical controls.

"Socio-technical" draws on an epistemological-methodological assumption that has by now become part of STS's commonsense: that there is nothing essential about nature or society, the task being to trace how this ontological boundary is empirically made by scientists and those (humans and non-humans) with whom they interact. Controls, on the other hand, are part of an idiom that came to the fore during fieldwork, especially during my time in Mali. It was enticed by a perception that what Brazilian and African researchers and technicians were doing in their experimental activities was less about constructing scientific facts than about deploying, or trying to deploy, practical controls – experimental controls, most obviously, but also socio-political controls. In fact, I came to see one type of control as inextricably linked to the other, and both as linked to the question of power at large: it matters where and when techno-science is being carried out, after all. Latour's Salk Institute (Latour and Woolgar 1986) is *not* the same as Mali's Institut d'Economie Rurale and even Embrapa research units – and yet these *are* part of a common global techno-scientific assemblage, but unequally so. The last chapter will foreground this paradoxical aspect of the cotton project, intimately tied especially to Sub-Saharan Africa's postcolonial predicament, by proposing to view techno-science as being about controlling the flow of vitalities in both nature and society, in a multi-scalar network ranging from subterranean mineral molecules to the global rules of the World Trade Organization.

The last chapter will conclude by foregrounding certain trends in the project's emerging technology adaptation and transfer strategy, as I came to see it: relatively hands-off, fluid, and open to inputs by actors on the recipient side. This has meant greater potential for horizontality, but also vulnerability to all sorts of noises in the translation chain (in the sense of Latour 2005). It could even be argued that this mode of engagement marks many of the relational interfaces in the Brazil-Africa cooperation assemblage: between nation-states, between research institutes, and between researchers, technicians, and farmers. Whether this is better than what happens in Northern aid, depends on the perspective; but it is certainly more open-ended. It comes however at a risk: that of the denying of, or disinterest in, the relation by the African partners – in which case it will inevitably die out.

To address this last issue, instead of the technical jargon of ownership or an emphasis on the self-referential character of development cooperation (Cesarino 2012a,b), I will deploy the more relational and open-ended idiom of robustness. In their account of the rise of Mode 2 science in the contemporary "age of uncertainty" (cf. also Latour 2004), Helga Nowotny and

colleagues argued that robust scientific knowledge is that which, rather than shielding itself from society in a position of expert authority (Mode 1), actively seeks to be strongly contextualized in it (Nowotny et al 2002, 167). When discussing an ethnographic example of such a configuration amidst the "rise of management audit", Strathern (2005, 465) complicated the abstract, preemptive notion of society that is being conjured up in some of these schemes. But by acknowledging the inherent open-endedness of social transactions, she points to the possibility of the same schemes activating new relations, producing "in real time, on [their] own scale, un-looked-for effects" (475). Similarly to Mode-2 science, technology transfer has always been about not just avoiding isolation from society, but finding ways to actively produce strong contextualization in it; if the travelling technology's relations with its new environment are not robust enough, it will neither thrive nor disseminate.

In the case of Brazil-Africa cooperation, robustness seems to be an open question, both theoretically and practically. Theoretically, one may say that, precisely because the hold of policy and bureaucracy over frontline practice is, as Chapter 1 will argue, less firm than in development aid organizations, the possibility should be acknowledged of its effects being different than the ones described in the ethnographic literature. And since, as Chapter 1 will also argue, one of the effects of this loose grip of policy is heterogeneity in the implementation of projects, it is likely that if robustness is achieved, it will be more so in some cases than in others.

But robustness was a question that imposed itself less through my readings of the literature than through my relations with some of the *cooperantes*. Having had little experience with international development before the recent surge in Brazil's South-South cooperation, many of these people – who are research scientists, rather than development workers – seemed to have a sense of possibility that I did not envisage in the ethnographies of aid. I suspect that experienced and professionalized development workers in a way already know, and probably expect, that particular development initiatives will be short-lived, even if the overall system will certainly keep on going. By and large, however, this was not the case of Brazilian frontliners. I would not equate this with naiveté, though; this sense of possibility seemed indeed real, precisely because of the emerging character of Brazil-Africa cooperation. In other words, at this point, future directions are open-ended, and, given the gloomy picture provided by the anthropological literature on development aid, that is a good thing.

Finally, this leads to another reason why I have chosen the analytics outlined here over all-encompassing notions common in the anthropology of development such as governmentality.[16] In a discussion with fellow anthropologists in Brazil (Cesarino 2012b), I pondered whether, at least if deployed in a totalizing manner, these kinds of approaches would not run the risk of congealing virtualities that are today in full effervescence in this moment of emergence of Brazilian South-South cooperation – a moment marked by vitalities and internal tensions that seem to be no longer present in the cold landscape of Northern development aid. I therefore preferred, I affirmed, to instigate these vitalities and their multiple potentialities – to

[16] I do not think however that the notion of governmentality is incompatible with the relational analytics presented here. After all, it points to that which strives to control, standardize, separate, domesticate (to use a Deleuzian vocabulary, molarize) flows of relations that would be otherwise tending to mixture and differentiation (the molecular, rhizomatic, nomad). But in Foucault's work and the Weberian lineage from which it stems, this drive towards governing the "conduct of conduct" has historically come about along with modernity's major institutions, especially the nation-state and the capitalist market. I am not sure, then, how useful would it be to think in terms of "alternative" forms of governmentality (e.g., Bayart 2009); but it definitely makes sense, as Moore (2005) among others has suggested, to provincialize it (Cesarino 2012a,b).

evoke a Deleuzian-Guatarrian idiom, the lines of flight flowing from their smooth (as opposed to striated) spaces – than to incarcerate them in one single analytics that, albeit perhaps acceptable to, or even expected by, my relations at the desk, would not be productive, or even fair, in terms of my relations in the field. If, as may as well happen, Brazilian cooperation eventually goes on to be engulfed by development's self-referential machine and these lines of flight fade away, this dissertation will nonetheless remain as the register of a moment – of a window that may be already closing – when things could have been different. This leads to the last cluster of general questions to be tackled in this Introduction, that of knowledge production and reflexivity in anthropology.

Ethnography and writing as situated knowledge practices

The analytics proposed here has its own challenges. Strathern once discussed one of them in the following terms:

> Social science research, and especially anthropological research, is often justified by the need to 'put things into context' … Contexts are regarded as piling on layers of understanding, which should thus become deeper, richer; one tool of this deepening process is research through ethnography … Instead of allowing one to specify (garner more knowledge about) relational contexts, the more ethnographically local studies became, the more new contexts (and new areas of ignorance) were opened up; every new perspective meant loss of others … In so far as [ethnographies] produce fresh (exogenous) data, they simultaneous point to yet more possibilities of contextualization. There is seemingly no stopping to this 'fractal unfolding of complexity' (2002, 303).

How and when to pull the breaks on this "fractal unfolding of complexity" – or, in Akrich's terms, the "propagation of causal chains in all directions" (1993, 9) – inevitably brought about by ethnography? Akrich was a student of technology transfer, a phenomenon that is particularly conducive to the evocation of scales of context beyond micro-practice. She once responded to this question much along the lines of how her supervisor Latour probably would have: "On what grounds would the analyst stop [to extend the network] – apart from the arbitrary one of lassitude? Quite apart from the indefinite amount of time such a study would take, there is also the question as to whether it would be interesting" (1992, 223).

I find Akrich's response highly unsatisfying, and the reasons why point precisely to a broader problem with Latour's version of actor-network theory and its "myopic" method (Latour 2005, 171): the "flatness" of the network, which in my view stems from Latour's poor investment in reflexivity, as opposed for instance to the work of Strathern or Haraway. His perspective assumes that the analyst is as an observer whose task is to witness and register immanent relations in a flat network until some "arbitrary point of lassitude". She supposedly operates at the same scale of the actors in the network, but is not *situated* in it, in the Harawayan sense (Haraway 1988); what she must do is to describe what she sees and hears. From this point of view, indeed, to reach for scales beyond the immediate scope of micro-practice would seem not just "uninteresting", but illegitimate.

Broader scales are however something that might interest the actors themselves deeply (Maurer 2008). Scaling and context-making are a major part of what they do, and they do it

asymmetrically; as many have noted before me (e.g., Strathern 1996, Redfield 2002, Hayden 2003, 2005, Da Costa Marques 2005), actor-networks are never flat. Far from being arbitrary, these moves have a direction – at times, a very clear one – driven by the actors' interests and the politics in which they are enmeshed. To access these moves and later on provide an account of them necessarily entail, therefore, that the analyst situates herself in her field relations. Ethnographers are never free of the risk of being called upon, by her field interlocutors, to make this explicit, especially as the products of research (like dissertations such as this one) go back to circulate in the field – among the examples that come to mind are Latour's involvement in the nineties' "science wars", and the controversy that prompted David Mosse's reflections on relations between "field" and "desk" (Mosse 2006).

Any ethnography is therefore a compromise between at least two relational networks: one in the field, and one in academia (be these relations more immediate like professors, colleagues, committees, peer-reviewers, funding agencies, or more distant, through the literature). At the "desk", when to pull the breaks on the unfolding of complexity unleashed by fieldwork is hardly arbitrary either. Often, however, the ways by which this happens are eclipsed by recourse to the supposedly disembedded domain of theory. Take, for instance, the debates about technification-depoliticization in the literature on development. To argue that development discourse and practice are about rendering technical (Li 2007) or depoliticizing (Ferguson 1994) problems that find their roots elsewhere assumes that the analyst *knows* what is the actual cause of poverty, underdevelopment, and so forth: namely, politics, usually conceived in terms of historical and political economic processes. This assumption that it is historical and political economic processes that matter – that are the *real* ones – may have been embraced by the analyst even before she went to the field, during seminars or in preparation for qualifying exams. In the writing stage, theory is brought back in to select and weave field data together – Gramsci, Foucault, or some other European philosopher of choice. This kind of operation follows knowledge practices that are prevalent in academia, rather than in the field.

I do not have qualms with the depoliticization-technification claim as such; in fact, it is an assumption that I do share with the literature. What I try to do differently is to make explicit how my account is anchored both on debates in academia and on my field relations. This kind of movement can be found, for instance, in De Laet and Mol's (2000) explicitation of their "love" for the Zimbabwe bush pump and its creator as "what moves [their] writing" (225). As a Brazilian citizen who has been personally interested in the politics of agriculture since long before this PhD, I have my own, non-academic stakes on the topic this dissertation is addressing; these have shaped my relationship with informants as well as the way I looked at their claims about South-South cooperation. This oriented, for instance, my choice of what elements eclipsed by the actors to bring to the fore here – not an abstract "political economy" or "history", but concrete political processes that have been central to Brazil-Africa relations, or to Brazilian domestic politics. Moreover, the fact that the empirical processes that I describe here are unfolding, as Maurer (2008) put it, "coincidently" with writing, led me to provide feedback to my field interlocutors not separately, but *in* this dissertation. Parts of my account, especially in Chapters 3 and 4, are responding to demands and debates coming less from academia than from the field.

In a similar vein, assumptions of flatness and transparency that underlie actor-network theory's formulations are rendered problematic when one acknowledges that the ethnographer's view on the network is itself also directed by the actors' interests. In other words, rarely is she given access to any and all actors and interactions in the field, and when and where she does, this

happens through an often implicit "contract" with interlocutors that further constraints what can or cannot be made explicit in writing. Indeed, questions of access have been common in the anthropology of development, especially for those wishing to study up: that is, the developers rather than the poor communities or peasant farmers to be developed – normally more accessible to, because more vulnerable than, the ethnographer (Cesarino 2012a). Quite often, ethnographers of developers have had to "pa[y] their way [into the policy world] with knowledge products" (Mosse and Lewis 2006, 3) by working for these institutions as consultants or volunteers, and that is how they get direct access to their internal operations: what Rottenburg (2009, 60) described as "the main rule of access – 'No admittance except on business!'"[17] Alternatively, access can be granted through connections of a non-academic type, and this has been the case of some of the Brazilian literature on which I drew here. Many students of institutions such as Itamaraty, Embrapa or the WTO have either personal (often kin) ties to their officials,[18] or worked at (or collaborated professionally with) them.[19] Indeed, in occasions when I recounted my fieldwork experience to Brazilians from academia or from Embrapa who were not directly within my research scope, their first assumption normally would be that I worked at Embrapa, or was providing consultancy for the Brazilian Cooperation Agency.

This was not the case, however. I had neither personal nor professional networks whatsoever in any of these institutions before I started this project. This often made things slow and sometimes oscillating for me during fieldwork, and, coupled with the rapidly (and sometimes abruptly) changing character of Brazilian cooperation in its early moments, resulted in a fragmented fieldwork experience in institutional, geographic, and temporal terms. Thus, my field ended up including multiple institutions (especially Embrapa and its partner institutes in Africa, but also the Brazilian Cooperation Agency); multiple countries (Brazil, Ghana, Mali, Burkina Faso); multiple cities within countries (Brasília, Campina Grande, Goiânia, Sete Lagoas in Brazil; Bamako and Sikasso in Mali; Bobo-Dioulasso and Ouagadougou in Burkina Faso; Accra and Kumasi in Ghana); three fieldwork languages (Portuguese, French, and English); and multiple fieldwork periods (a longer one of twelve months in Brazil, in 2010-2011, trips to West Africa totaling five months, and another month in Brazil as I was already writing in 2012) – not to mention long-distance interactions through email, skype, or facebook.

This fieldwork experience has shaped writing (and consequently, knowledge production) in at least two ways. On the one hand, this dissertation does not reproduce the development version of Malinowskian fieldwork: it is not an in-depth experience of one particular cooperation initiative as it was observed locally. The last two chapters will focus on one project (for which it took me one year of networking, and some luck, to get high-level official authorization by two different institutions), and the other three will provide a broader account of Brazilian South-South cooperation. Here, what is lost in terms of depth is hopefully gained in terms of breadth.

[17] Besides Rottenburg himself, this was also the case of Li (2007), Mosse (2005), Goldman (2005) and Green (2009).

[18] Often high-ranking ones: for instance, Moura (2007) and Patriota (2011) are related to Brazil's current Ministry of Foreign Affairs; Pereira (2012) to Embrapa's CEO at the time; and Azevedo (2006) to the WTO's current director-general.

[19] Dereti (2009), Lobo (2010) and Silva et al. (2002) are or were employed at Embrapa, and Cabral (2005) was its CEO during the seventies; Saraiva has been collaborating with Itamaraty's Africa policy (Coelho and Saraiva 2004, World Bank and IPEA 2011), and Sá e Silva (2009) became head international advisor at the federal government's human rights secretariat; Menezes (2013) is a diplomat, and soon-to-be ambassador, at Itamaraty; Cabral and Weinstock (2010), Leite (2012), Cabral and Shankland (2012, 2013) are in the South-South cooperation consultancy business.

Had I focused only on the cotton project, for instance, I probably would not have had a real notion of the heterogeneity and shifting character of this phenomenon called "Brazilian South-South cooperation", and might have generalized an experience that turned out to be in fact quite particular, even within Embrapa itself.

The particular configuration of field-desk relations underlying this dissertation has also shaped its narrative style. This is due not only to the way I entered the field, but to the way I left it. In other words, it has to do with the highly politically charged character of the phenomena that I am proposing to describe here (both Brazilian cooperation in general and the sector-specific experience of agriculture). As with other ethnographies of developers, many things – important things – had to be either addressed indirectly or left out of writing altogether for ethical reasons. As Rottenburg (2009) remarked, differential access to information is itself part of the game in development networks, so there will always be a potential for interference and even harm by the ethnographer's "external" gaze.[20]

My transit from field to desk – a step that, when completed, would normally mean the conclusion of the PhD project cycle – has been therefore shaped by a prospect: the reverse path, from desk back to field. In fact, I have had a previous experience with an academic publication going back to the field in a way that was, from my perspective, "unfaithful" to it.[21] I know already of a couple of field interlocutors who have quoted some of my writings about Brazilian South-South cooperation. This dissertation is therefore not a detached account, but, to use Jensen and Rödje's Deleuzian-Strathernian idiom, a "specific exploratio[n] of multiple *concrete interfaces* at which … experimentation with the real takes place" (2010, 9; emphasis in the original). This way, it can be brought into generative connections with other academic works on similar phenomena,[22] and hopefully also with the field: as these authors have further suggested, "if the relation between the explanation and explained is destabilized and rendered flexible, then one's ambition cannot be to achieve a more or less adequate 'matching' of the two. Instead the aspiration must be to create associations that mutually enrich and reciprocally transform each part of the material" (8). By thus nurturing this dissertation's relational potentials vis-à-vis both academia and the field in a direction that I see as productive for both domains, I hope it can be a step towards a more robust representation of / intervention on the emerging practical and discursive interfaces of South-South cooperation.

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[20] Different authors have come up with different strategies for minimizing these ethical risks. So, Kaufmann (1997) chose to let her informants read and rewrite the passages in which they were quoted prior to publication. Mosse (2005, 2005) had to revise and rewrite several versions of his manuscript against his informants' objections, and ultimately was able to uphold a final version through the mediation of external agencies such as his university and professional association. Rottenburg chose to fictionalize his account in order to be able to compose "an ethnographically thick and vibrant account" of a development project in which he worked as a consultant (2009, xix).

[21] In 2007, I published an article in a Brazilian anthropology journal that brought a discussion I had made in my M.A. thesis about the legislative process that led to the approval, in 2005, of a Biosafety Bill regulating research and commercialization of GMOs, as well as the use of spare in-vitro embryos in stem cell research. As soon as it was passed, this Law was contested by religious groups in the Brazilian Supreme Court, which issued a decision upholding the Law in May 2008. In her 5-page opinion about this matter, the then President of the Supreme Court drew extensively on my article, something which surprised me as I did not see my argument as supporting any of the sides of the debate; my aim had been, rather, to make a Latourian/Strathernian analysis precisely of the controversy as such. This episode taught me, among other things, about the ultimate impossibility of sustaining a "neutral" account: if the ethnographer does not position herself *in* the text, she may be sooner or later called to render this stance explicit *outside* of it.

[22] Particularly fruitful, in my view, would be to bring it into conversation with ethnographic works on other emerging donors.

Chapter 1

South-South Cooperation:
A Difference in Development

This chapter looks at South-South cooperation as an emergent trend within the international development landscape. What was described in the vignette with which I opened the Introduction is not something one would encounter as frequently, say, even ten years ago. Both Brazil and China have been entertaining cooperative relations with various parts of the African continent since decolonization and even before that, but not with the same extension, purposefulness, systematicity, or visibility of today. And even though many of the processes, institutions, and individual actors engaged in contemporary South-South cooperation did exist previously, I suggest that the *interfaces* into which they are being brought together since the last decade or so are, indeed, *emergent*. This claim is based on Brazil's recent rise as a provider of cooperation, but the growing body of works on other (re)emerging donors indicate that some of the trends I observed may be more generally shared among them.

As virtually all commentators, academic and not, of these proliferating global interfaces remarked, the agents and processes that have been brought together under the rubric of South-South cooperation are multiple, shifting, ambiguous, and sometimes contradictory. South-South cooperation is itself a contested term, not only in academia but in the field: various actors and institutions currently struggle with or against each other to codify it and stabilize their own account of what South-South cooperation is or should be. But in spite of the complexity of stakes and narratives, a claim that has been widely shared by those purporting to speak about, or in behalf of, it in Brazil and elsewhere is that it is something *different* than the development aid provided by Northern donors and multilateral institutions during the last half-century or so.

This claim to difference is found both in self-accounts by emerging donors and in views on them by Northern donors and the recipients of cooperation. Difference may have opposite signals: competition or complementarity, positivity or negativity. Thus, one of the common framings of South-South cooperation has been neoimperialism; in this view, emerging donors would be merely reproducing the rapacious intentions and behaviors of their Northern counterparts, and even more perniciously because couched in a cloak of Third World solidarity. Another option is a negative assessment of emerging donors by those who stand by development aid: that through their heterodox and unaccountable practices, new donors would be jeopardizing the good work achieved by traditional aid thus far. A third perspective, which shares the latter's sympathy towards traditional aid, views South-South cooperation as an embryonic, incomplete phenomenon, that has yet to catch up with the more mature form of development cooperation found in the global North and in multilateral institutions such as the World Bank or UNDP. Finally, and closing the circle of this four-legged matrix, critics of Northern development aid may see in emerging donors a hope out of the latter's neocolonial grasp over the global South.

Between these poles, in practice there are multiple hybrids and combinations. During fieldwork, the most prevalent views involved the latter two; rarely did I come across manifestations of the first two among Brazil's African partners. In Brazil and elsewhere in the emerging global South (Mawdsley 2012), even official self-accounts do not always fit squarely in one such options. In its multiple manifestations in the various governmental and non-governmental arms involved in the provision of South-South cooperation, emerging donors'

views on themselves may also span polar ends: ranging from an oppositional, Third-Worldist discourse that they should remain independent from the North and frame their practices *against* those of traditional development aid (for instance, by not imposing conditionalities on recipient countries), to a conciliatory, North-friendly narrative that South-South cooperation is here to complement, rather than to replace or oppose, aid delivered by traditional donors. Although my interlocutors in Brasília used to be much more explicit about these kinds of self-accounts than those implementing cooperation activities on the ground, I found more or less coherent versions of these two views among all of them – not rarely, ambivalently combined in the same person.

The question of *difference* between South-South cooperation and its North-South counterpart found in the field also characterizes this dissertation's engagement with the available literature. In the absence of an ethnographically and theoretically robust body of ethnographic works on emerging donors, this chapter's privileged academic interlocutors will be studies based on development initiatives led by Northern donors or multilateral agencies. Two mainstream currents will be privileged here: works inspired by Foucault's notions of discourse and governmentality (e.g, Sachs 1992, Ferguson 1994, Escobar 1995, Moore 2005, Li 2007), and actor-based approaches (e.g., Olivier de Sardan 1995, Bierschenk et al. 2000, Long 2001, Mosse 2005, Lewis and Mosse 2006, Rottenburg 2009).[23].

The debates prevalent in this literature drew attention to three inter-related analytical domains, which this chapter will approach: historical genealogies of development cooperation; organizational architecture and dynamics; and discourse and de-politicization. Section 1 will sketch a brief historical account of South-South cooperation based on its relations with traditional development aid, going back and forth between global scales and Brazil's more situated standpoint. Against the backdrop of this situated genealogy, Sections 2 will set the terms for a discussion, to be pursued further in this dissertation, about whether, and in which sense, would South-South cooperation imply a re-politicization of a phenomenon marked, according to much of the anthropological literature on development aid, by de-politicization. Section 3 will provide an account of the organizational architecture and dynamics of Brazilian South-South cooperation, based on data collected during fieldwork and on secondary sources. The chapter will conclude by claiming that this emerging phenomenon calls for an analytics capable of attending to open-endedness, ambivalences and contradiction, as well as to the historical density of particular South-South relations. I suggest that generative insights in this direction may be found in discussions on the postcolonial question in Latin America and elsewhere; the next chapter will put some of these to work with respect to Brazil-Africa relations.

1.1 South-South cooperation in international development: a situated genealogy

Brazil and other emerging donors are hardly newcomers to the international development scene. From its early beginnings, the Western development apparatus has included them, but mostly in the condition of beneficiaries of aid. This experience as recipients is relevant for their current transition to providers of cooperation, but this relation is not a simple one to track empirically (Mawdsley 2012, 76). Moreover, South-South cooperation provided by individual countries is never an isolated, unidirectional effort, but part of a broader historical tide that has also included other emerging donors. This is a story about a changing world order, about an

[23] Here I will resume and elaborate on some of the points I had raised previously in a broader literature review (Cesarino 2012a).

emerging multi-polar world that would have outgrown the regulatory shoes crafted by the hegemonic geopolitics that spanned much of the twentieth-century. It is a story told by many narrators, including – and claims to North-South opposition notwithstanding – the international development community itself.

How would the story of international development, told by so many in the academic literature (e.g., Cowen and Shenton 1995, Escobar 1995, Rist 2000, Cooper and Packard 1998), look like from the *other* side of the North-South hemispheric divide? In historical approaches to South-South cooperation, a common way to begin has been with the emergence of the global development apparatus at large and the "making of the Third World" (Escobar 1995) that ensued (Rist 2002, 198, Sá e Silva 2009, Leite 2012, Mawdsley 2012). From this perspective, South-South cooperation shares Northern development's two chief, interrelated historical vectors: the emergence of the global multilateral system in the aftermath of the World Wars, within which developing countries participated initially as subaltern parties and recipients of aid; and decolonization in Africa and Asia, which led to the formation of what would become the Third World. It was not until then that broad-based alignments across what is now best known as the global South could emerge as a formal engagement between independent nation-states.

Against this broader historical canvass, Mawdsley (2012) singled out more particular "drivers or contexts" in her comprehensive work on emerging donors: "socialism(s), the Non-Aligned Movement, the United Nations South-South cooperation initiatives, the oil price rises in the 1970s, and European Union expansion" (15). The last two have little relevance for the case of Brazil, and in the others, it has participated quite differently than other (re)emerging donors such as China, India, or Russia. A loyal, though at times ambivalent, member of the Western block along with most of Latin America, Brazil has been less permeable to the Cold War juggling for allegiances that marked decolonization in much of Asia and Africa.[24] Cold War geopolitics was, on the other hand, key for understanding the early engagements within and between Asia and Africa during decolonization. Besides the former Soviet Union and China, smaller socialist countries such as Cuba, Vietnam and those in Eastern Europe participated in pioneer experiences of South-South collaboration in various domains, from financial to military, from technical to diplomatic (Mawdsley 2012).

The non-aligned movement was also a direct outgrowth of Cold War politics, but emerging around a commitment not to align with either of the two blocs. If Harry Truman's iconic 1949 Point Four program is widely referenced in both the academic and the development literature as marking the birth of international development,[25] the 1955 Bandung Conference is often raised as a key historical landmark for horizontal cooperation between Third World nations.[26] Even if the Conference's original twenty-nine members – all from Asia, Africa, and the Middle East – were not equally committed to neutralism, they closed ranks firmly around the

[24] Like in much of Latin America in the 60's and 70's, Brazil suffered the 1964 anti-communist coup d'état. But comparatively to the unstable allegiances and direct military interventions in many parts of Asia and Africa, this was one, relatively clear-cut event that came to secure a pro-Western, pro-capitalist bent that was already hegemonic in that country.

[25] Escobar (1995), Sachs (1992), Valente (2010), Santana (2011), Leite (2012). Others have questioned this landmark to trace the origins of development farther back, to colonial development policies put in place by European metropolises in Africa well before the first official aid programs in the forties, ultimately even receding to the civilizational imperative of the "white man's burden" (Cowen and Shenton 1995, Moore 1999).

[26] Rist (2009), Leite (2012), Mawdsley (2012).

question of decolonization.[27] Both in Bandung and in its sequel, the Non-Aligned Movement, Brazil and most of Latin America participated only as observers.[28] As independences were gradually achieved and most of the original Bandung and non-alignment leaders eventually left power, the politico-ideological character of early alignments across the nascent Third World gradually gave way to pragmatic drives of a geopolitical and economic order (Leite 2012, Mawdsley 2012). As will be seen, even if foreign aid was not a major theme in the Non-Aligned Movement, the purchase of the latter's political language in contemporary South-South cooperation, including in Brazil, is remarkable.

These processes took place in tandem with the erection of an overarching global apparatus, in particular the United Nations system and the Bretton-Wood institutions (i.e., the World Bank and the International Monetary Fund). Early rapprochements between the dozens of newly independent nation-states unfolded largely under the auspices of – and were in a sense enabled by – this multilateral governance system. In particular, the United Nation's "one nation, one vote" rule quickly became an appealing invitation for the multitude of new nations, large and small, to band together around issues of common concern, or to make strategic alliances in the pursuit of their interests. In the mid-sixties, the Group of 77 (G-77) emerged as the most prominent face of the Southern bloc, in the ambit of the UN Conference on Trade and Development (UNCTAD). This time, Asian, Middle-Eastern and African countries were joined by most of their Latin American counterparts (Brazil included), and commercial interests came to the fore as a common thread in negotiations with the developed world. Indeed, the G-77 – which is still in place and, despite the maintenance of its original name, assembles today over 130 developing countries – is one of the fora where shared principles of South-South cooperation are being currently put forward (see Box below).[29]

The multilateral system is however far from a neutral space; it carries the imprint of the post-war geopolitical weight of Western and Eastern powers, most notably in the asymmetry between the United Nation's General Assembly and its highest decision-making body, the Security Council. The U.S. and Europe further entrenched their hegemony through the Bretton Woods institutions, where voting power is weighted according to each country's financial contributions (Leite 2012). Two decades ago, the fall of the Eastern bloc provoked a seismic geopolitical shift in this post-war configuration, whereby the West collapsed into the North, and the Second and the Third Worlds were aggregated under the umbrella category of the "global South". The international governance structure crystallized in the aftermath of the World Wars remained nonetheless fundamentally unaltered, thus becoming a fundamental battleground for contemporary North-South disputes, according to which South-South alliances are being currently revitalized and rearranged. According to both the literature and my field interlocutors, this is the single strongest drive behind Brazil's recent South-South cooperation spur, which was triggered and is largely driven by foreign policy.

[27] Leading players included countries like India, Indonesia, Egypt and Yugoslavia, but also others like Pakistan, Saudi Arabia and Ghana. China, whose relations with the Soviet Union were getting increasingly tense in the years leading to their split in the early sixties, also attended Bandung as a firm advocate of decolonization and horizontal relations across the developing world.

[28] The common historical landmark for the Non-Aligned Movement was a conference of heads of state called for in 1961 by Yugoslavia's President Josip Tito. The only Latin American country to participate as full member was Cuba (Leite 2012).

[29] The seventy-seven original members met for the first time in Algiers in 1967. Although China is not part of the group, it often acts in concert with them. The "G-77 plus China" put forth a joint position paper for the first time during the preparatory meetings for the 1992 UN Conference on Environment and Development in Rio de Janeiro.

Brazil's standpoint as an emerging donor also brings to the fore other, more recent global battlegrounds. After a period of general retraction in South-South relations during the eighties and nineties (Sá e Silva 2009, Leite 2012, Mawdsley 2012),[30] as the twentieth century came to a close they gained new impetus and complexity with the emergence of global regulatory apparatuses in sectors such as trade, environment, finance, and intellectual property. In particular, negotiation rounds on trade and the environment[31] have been marked by successive standoffs credited to seemingly intractable divergences across the North-South divide, for instance over opening up developed countries' markets to agricultural exports from the developing world. Although far from new, these struggles came to occupy center stage in recent World Trade Organization (WTO) negotiations, causing a stalemate in the Doha Round that began in 2001 and remains in place. Some have even singled out the 2003 WTO meetings in Cancun as a landmark for the revamping of South-South engagements in the last decade (Sá e Silva 2009). Indeed, this has been a major battleground for Brazil, which recently succeeded in having its ambassador to the WTO, Roberto Azevedo, elected as the organization's director-general. Several of my interlocutors attributed to Brazil's South-South cooperation efforts the support many African countries and others granted to Azevedo's bid, as well as to José Graziano in the Food and Agriculture Organization (FAO) before him.

Like its predecessors in Bandung and the Non-Aligned Movement, however, concerted action across the global South in these arenas has worked only up to a point. This ensemble of countries is far from homogeneous, and they have collaborated as much as competed with each other (Mawdsley 2012) – the case of Brazil and Africa will be dealt with in the next two chapters. The global South, therefore, can only be a provisional assemblage established in relation to an equally constructed global North. Yet, Southern countries have sought to sustain some appearance of unity at least at the level of discursive principles. It is in the context of the "G-77 plus China" group that we find what is probably the most explicit statement on common guiding principles for South-South cooperation, in a joint declaration released by their foreign ministers in 2009 (Box 1):

[30] These were times of economic crisis and structural adjustment policies in much of Latin America, Africa, and Asia, with the rise of neoliberal globalization and its emphasis on the liberalization of global trade and market integration. The neoliberal program has had different forms and effects in Asia, Africa and Latin America, but in all of them the opening of national economies to global markets has translated into a focus on comparative trade advantages and efforts to attract foreign private investment (Mkandawire and Soludo 1999). The latter not rarely took the form of a competition between developing countries, further contributing to the demobilization of previous South-South alliances (Leite 2012, 18).

[31] While negotiations on the former have been largely codified by the global apparatus of the World Trade Organization (WTO) and its infamous acronymic add-ons like the TRIPS (Trade-Related Aspects of Intellectual Property (TRIPS), which included the requirement of intellectual property protection laws into international trade regulations, the latter has been discussed mostly in the ambit of the United Nations' Framework Convention on Climate Change and its associated Convention of Parties (COPs).

Box 1. G-77 and China Guiding Principles of South-South Cooperation (UNCTAD 2010: 8; emphases added)

1. South–South cooperation is a common endeavour of peoples and countries of the South and must be pursued as an expression of South–South solidarity and a strategy for *economic independence and self-reliance of the South* based on their common objectives and solidarity;

2. South–South cooperation and its *agenda must be driven by the countries of the South*;

3. South–South cooperation must *not be seen as a replacement for North–South cooperation*. Strengthening South–South cooperation must not be a measure of coping with the receding interest of the developed world in assisting developing countries;

4. Cooperation between countries of the South must *not be analysed and evaluated using the same standards* as those used for North–South relations;

5. Financial contributions from other developing countries should *not be seen as official development assistance* (ODA) from these countries to other countries of the South. These are merely expressions of solidarity and cooperation borne out of *shared experiences and sympathies*;

6. South–South cooperation is a development agenda based on premises, conditions and objectives that are *specific to the historic and political context* of developing countries and to their needs and expectations. South–South cooperation deserves its own *separate and independent* promotion;

7. South–South cooperation is based on a *strong, genuine, broad-based partnership and solidarity*;

8. South–South cooperation is based on *complete equality, mutual respect* and *mutual benefit*;

9. South–South cooperation *respects national sovereignty* in the context of shared responsibility;

10. South–South cooperation strives for strengthened multilateralism in the promotion of an *action-oriented approach* to development challenges;

11. South–South cooperation promotes the *exchange of best practices* and support among developing countries in the common pursuit of their broad development objectives (encompassing *all aspects of international relations* and not just in the traditional economic and technical areas);

12. South–South cooperation is based on the *collective self-reliance of developing countries*;

13. South–South cooperation seeks to *enable developing countries to play a more active role in international policy and decision-making processes*, in support of their efforts to achieve sustainable development;

14. The modalities and mechanisms for promoting South–South cooperation are based on bilateral, subregional, regional and interregional cooperation and integration as well as multilateral cooperation.

Many passages in this document are remarkably reminiscent of the Bandung language of solidarity, collective self-reliance, and mutual respect for each other's sovereignty – which was, on its turn, inspired by earlier bilateral relations.[32] Its emissary is a monolithic and homogeneous South addressing an equally monolithic North, and although there is talk of complementarities between South-South cooperation and North-South development, the relationship is largely constructed in terms of difference. The main difference is in character: South-South cooperation is supposed to be based on "expressions of solidarity and cooperation borne out of shared

[32] Before Bandung, much of this language appeared in the "five principles of peaceful coexistence" first enunciated in the early 1950's in a pact of non-aggression between India and China: mutual respect for each other's territorial integrity and sovereignty; mutual non-aggression; mutual non-interference in each other's internal affairs; equality and mutual benefit; and peaceful co-existence (Mawdsley 2012, 55). These remain a central part of China's rhetoric as an emerging donor (Strauss 2012).

experiences and sympathies" that, one is led to infer, are not shared by the North. But this supposed difference in character has an important procedural side: South-South cooperation should have its own agenda and be evaluated according to its own standards; in particular, it "should not be seen as official development assistance (ODA)". This is as much a matter of principles as of strategy: by not being considered ODA, cooperation provided by emerging donors remains out of the reach of their Northern counterparts' regulatory agency, the OECD-DAC.[33]

Part of the literature indeed points to growing concern by Western powers about losing their regulatory and even geopolitical grip over the international development apparatus (Walz and Ramachandran 2011, Mawdsley 2012). Emerging donors' claims to difference and autonomy are at the root of much of the anxiety that, through their heterodox practices, emerging donors will "support 'rogue states', increase levels of indebtedness, ignore environmental protections, focus on extracting resources, and undermine the improvements that have been made over the past several decades" (Walz and Ramachandran 2011, 1). The non-interference principle in particular has been considered as a threat to achievements in democratic governance and responsible budget management among aid recipients arguably brought about by the conditionalities enforced by Northern donors. These and other accusations are however as strategic as the move they are attacking: even when directed to non-DAC donors at large, its preferential targets are not Brazil or India but countries like Venezuela, Iran, and China. The latter in particular has been consistently accused of using this principle as an excuse for closing its eyes to corruption in its dealings with some African countries – the usual retort being that double standards are far from a privilege of Southern donors (Strauss 2012).

The OECD-DAC is not the only agency in the international development community that has been striving to attract emerging donors to its bureaucratic and regulatory orbit: the World Bank has created its own apparatus to this end,[34] and multilateral and bilateral donors have been increasingly engaging in South-North-South triangulation schemes.[35] Emerging donors have shown mixed responses to these efforts, not only between themselves but within each of them; thus far, most have preferred to remain at arms' length from the OECD-DAC, and to engage selectively with Northern actors and apparatuses (Mawdsley 2012).

This ambivalence seems to be especially sharp in the case of Brazil, which has trodden a historical path that is somewhat unique amidst the major emerging donors. Differently from China and Russia and like India, it is a constitutional democracy and a former full-fledged European colony; but in contrast with the latter, Brazil has remained consistently within the

[33] The Development Assistance Committee (DAC) is the forum that oversees official aid flows by selected members of the Organization for Economic Cooperation and Development (OECD), the "rich nations' club" whose institutional origins stretch back to the reconstruction of Europe by the Marshall Plan. Since then, the OECD has come to include countries from the global South, such as South Korea, New Zealand, Mexico and Chile, as well as a growing number of Eastern and Central European countries acceding to the European Union (Mawdsley 2012, 68, 79).

[34] In 1999, the Global Development Network was created in order to foster transfers, between Southern nations, of policies and programs considered successful by the Bank's standards. In this case, South-South initiatives such as Brazil's conditional cash transfer program *Bolsa Família* are re-framed as the sharing of "best practices" according to umbrella benchmarks such as the United Nation's Millennium Development Goals (Sá e Silva 2009, 48).

[35] Triangulation involves one Northern donor that typically participates with funds and managerial capacity, and two Southern countries, one of which will act as provider of technical expertise to the other. Japan has been a pioneer in promoting this kind of aid architecture, in the wake of domestic pressures to reduce the country's ODA (Mochizuki 2009): Embrapa's largest agricultural project in Africa involves precisely a triangulation between Brazil, Japan, and Mozambique.

geopolitical orbit of the West during its much longer history as an independent nation-state, including during the Cold War. This belonging is manifested in quotidian language: while most Brazilians feel comfortable to talk about "Occidental" in the first person, in Africa and Asia "Westerner" is usually a reference to a third person. Like most other Latin American countries, Brazil participated only as an observer in the Bandung Conference, and was not a full member of the Non-Aligned Movement either – indeed, as the next chapter will illustrate, its stances on both neutralism and decolonization were at points ambiguous. In spite of some Brazilian politicians and diplomats' whims about assuming leadership of the emerging Third World,[36] no Brazilian ruler has ever attained the international status of notable leaders of the non-aligned movement such as India's Nehru, Egypt's Nasser, Ghana's Nkrumah, Yugoslavia's Tito, Indonesia's Sukarno, or Tanzania's Nyerere. Indeed, during my fieldwork in West Africa the only Latin American figure I saw referenced and stamped in vans, motorcycles and walls (if soccer players are excepted) was Ernesto "Che" Guevara. And one would assume that Che gained such lasting popularity due not to his Argentinean nationality, but to his participation in revolutionary Cuba's efforts (quite exceptional within Latin America) to support liberation and anti-apartheid struggles in Sub-Saharan Africa.

Not surprisingly, then, other than Bandung a common landmark in historical accounts of South-South cooperation from the point of view of Brazil has been the Buenos Aires Action Plan.[37] It instituted a regulatory framework for Technical Cooperation Among Developing Countries (TCDC), in a meeting sponsored by the United Nations in Argentina in 1978.[38] One can fathom the reasons why this event would find special purchase in Brazil: it was held in Latin America, was a more recent event than Bandung, and was fully codified by the UN's framework. Different from China and Arab states, for instance, Brazil has relied significantly on the UN apparatus: the Brazilian Cooperation Agency was itself created with the aid of the United Nations Development Program (UNDP), and continues to entertain key operational relations with it as the country turns from receiver to provider of cooperation. Another global development frequently mentioned by Brazilians has been the rise of a group of countries which are regarded as emerging out of a condition of underdevelopment, codified in the acronym BRIC (Brazil, Russia, India, China) – coined by a Goldman Sachs executive in 2001 and eventually appropriated by these countries themselves.[39]

As the appropriation of the BRIC acronym shows, Brazil's rise as an emerging donor has been as much an internal as an external formulation. On the one hand, there was a strong foreign policy drive: much of the recent spike in demand for Brazilian cooperation coming from Africa and elsewhere has been attributed to the enhanced visibility of Brazil's newfound status as a donor promoted by what has been referred to, in the media and reports, as the "presidential diplomacy" of the Lula years (2003-2010). This notion refers to the special attention former

[36] A delegate to Bandung and key advocate for a specific policy for Africa during the 50's, Brazilian diplomat Bezerra de Menezes proposed that the country would use its "main politico-diplomatic weapon – the almost perfect social and racial equality that exists in Brazil" in order to seduce and attract the "African and Asian masses" (Saraiva 1996, 64; D'Ávila 2010, 9). More on this in the next chapter.

[37] For instance, in Vaz and Inoue (2007), Cabral and Weinstock (2010), Santana (2011), Leite (2012).

[38] The Special Unit for TCDC established then was renamed Special Unit for South-South Cooperation in 2003 (Leite 2012).

[39] The group, which holds their own periodic summits, came to include South Africa in 2010, thus becoming BRICS. Within the BRICS itself, narrower alliances have been established more recently, most prominently the IBAS trilateral forum that excluded the two former socialist powers (China and Russia) to bring together the South's "largest democracies" (India, Brazil and South Africa).

President Lula dedicated while in (and now out of)[40] office to the global South and to Sub-Saharan Africa in particular, manifested in a personal commitment with spreading the word about Brazil's new status as an emerging donor.[41] Others have disputed the centrality of his figure, claiming that demand for cooperation would have augmented anyway along with Brazil's rise to global prominence, which is not only political but, perhaps most fundamentally, economic: "it wasn't Lula who put Brazil in the BRIC group", one of my interlocutors in Brasília insisted. Indeed, Brazil has long been given a prominent place in the shifting typologies found in global bureaucracies.[42] From the point of view of Northern donors, Brazil lies at the "good" end of a broad spectrum of countries the impressions on which range from a welcome and "valuable complement to North-South cooperation" (OECD quoted in Mawdsley 2012, 65) to a fear that they might end up "underwriting a world that is more corrupt, chaotic, and authoritarian" (Naim quoted in Walz and Ramachandran 2011, 1).

In the case of Brazil's rise as an emerging donor, we therefore find a dovetailing of a *horizontal, Third-Worldist and a vertical, Occidentalist axis* that, at different points in history (as the next chapter will illustrate), has been manifested as inconsistency, ambivalence or contradiction, but also flexibility and strategic leverage. Thus, even while remaining friendly to the West and its institutions, like many of its peers in the emerging South (Mawdsley 2012) Brazil strongly rejects the donor label, and the characterization of its activities as aid. This stance secures the country's autonomy for crafting, implementing and evaluating its cooperation policies according to its own standards – a claim raised by government and cooperation officials, including some of my interlocutors, in response to international pressures for transparency and accountability. This stance also allows for greater flexibility and pragmatism in the translation of cooperation principles into practice. Finally, to align with Northern models and accountability standards would imply adding a bureaucratic and expertise burden to Brazilian cooperation's already strained institutional apparatus (see below) that the country does not seem ready to afford.

This indicates how ambivalent, multi-dimensional and politicized may be the relations between emerging donors and the broader apparatus of international development. The contrast between Northern development and Southern cooperation does not fixate the terms according to which such relations unfold, but *is itself a stake* in this global battleground. Even though the self-representations of South-South cooperation draw heavily on oppositional claims vis-à-vis Northern development aid, they cannot avoid unfolding in the ambit of the global apparatus consolidated under Northern hegemony: especially the United Nations, but also the Bretton-Woods institutions and, more recently, other fora like the World Trade Organization. Since decolonization of the world's peripheries invariably took the nation-state form and immediately ushered into an era of gradually increasing and liberalized global trade, the South could never have emerged as an external entity standing in symmetrical opposition to the North. Ultimately, then, the North-South divide is itself over-codified by Northern hegemonic forms; talks of South-

[40] After leaving office in 2011, the former president created the Lula Institute, a "nonpartisan, not-for-profit" organization "whose principal focus will be on Brazil's cooperation with Africa and Latin America" (www.institutolula.org).

[41] Lula holds the record of official Brazilian presidential visits to African countries. Indeed, many new South-South initiatives have originated during his trips or those of his Foreign Affairs Minister Celso Amorim (Cabral and Weinstock 2010, 10).

[42] In 1995, for instance, the United Nations labeled it a "pivotal country", that is, a catalyst for South-South technical cooperation at large. More recently, this notion has mutated into the more restrictive one of "prime movers" (Mochizuki 2009), and typologies keep changing.

South cooperation being "hijacked" by Northern institutions (Sá e Silva 2009, 50) are therefore idle in a sense. To what extent, then, would the recent rise of South-South cooperation imply a re-politicization of global development?

1.2 South-South cooperation and the emerging multi-polar order: Re-politicizing development?

In a spring afternoon in 2012, during a forum on Africa in Stanford, I posed a question for a policy professor and former advisor to the White House who had just discussed the difficulties involved in convincing BRIC countries to comply with Northern development aid standards, whether the opposite has not been the case: that is, whether traditional donors would not be changing *their* ways of doing things in view of the growing importance of emerging donors in the international development scene. After acknowledging that institutions, especially government bureaucracies, cannot change but very slowly, he concluded by firmly asserting that the OECD-DAC parameters are "not Western, but evidence-based".

The latter is a kind of claim I would not expect to hear from my Brazilian interlocutors, or even from the institutions to which they belong. The principles of South-South cooperation are framed as stemming from their historical and geopolitical experience *as* Third World countries. In this sense, South-South cooperation is always and already explicitly politicized in a way Northern development is not. In other words, the very historical constitution of nation-states and their subjects in the global South does not allow them the "god trick" – the position of viewing everything from nowhere (Haraway 1988) – so frequently denounced by critical anthropologists with respect to Northern development institutions such as the World Bank (Sachs 1992, Ferguson 1994, Escobar 1995). Most often than not, emerging donors make quite clear the – to stick to the Harawayan lexicon – situatedness of their stances towards development, global trade, and the like, a stance which may be accompanied by academic and non-academic critiques of the "development establishment" (Cooper and Packard 1997, 14).[43]

Beginning with Ferguson's pioneer Foucauldian ethnography, in much of the anthropological literature on international development a fundamental corollary to the argument on bureaucratization (to be further discussed below) has been precisely de-politicization. From this perspective, development's bureaucratic apparatus implies conceiving as technical problems the roots of which are, at bottom, political.[44] How far do emerging donors go in challenging the de-politicization apparatus put in place by traditional development aid? Would South-South cooperation also imply some kind of de-politicization, and if so, how?

A first point to note when talking about emerging donors re-politicizing development is that, as Sá e Silva (2009, 50) put it, "South-South cooperation is no longer a flag hoisted only by developing countries". Indeed, some of the discursive elements that stood out so saliently during

[43] In India and Latin America, the influence of neo-Marxist approaches such as dependency theory has contributed in fundamental ways for this "politicization of development in the South at both grassroots and state levels" (Gardner and Lewis 1996, 18; also Ferguson 1997).

[44] Even though this argument is particularly central to anthropological approaches inspired by Foucault and/or Gramsci (Ferguson 1994, Escobar 1995, Li 2007), the claim that, in the practice and discourse of development, politics is generally put under the rug is hardly limited to these, or even to the academic literature (Cesarino 2012a). As Kaufmann (1997) noted, developers themselves sometimes will often recognize the "institutional and political constraints on development, the close interactions, the importance of a political economy rather than just economics, of bureaucracy and the way it operates" (123).

fieldwork, and which appeared to be so particular to Brazil, eventually turned out to be more broadly shared not only by other emergent donors, but also by Northern-led multilateral agencies. Today, South-South Cooperation has a bureaucratized version partly "owned – and some critics would say hijacked – by international agencies" (Sá e Silva 2009, 50; Mawdsley 2012). Indeed, it is where South-South cooperation meets the latter that its oppositional elements are most visibly watered down or translated as complementarity, for instance in terms of technical expertise better suited to problems supposedly shared by the global South. Similarly, when Brazil's South-South cooperation discourse is uttered within the orbit of the World Bank or U.N. agencies, or in triangulations with Northern donors, claims that throughout its decades as a recipient of foreign aid Brazil would have learned how *not* to provide it (that is, by not tying in conditionalities and not interfering in the recipient country's domestic affairs) tend to be diluted or altogether cut off.

Re-politicization also operates unevenly across the global development and governance apparatus. More than the Bretton Wood institutions or the WTO, for instance, the United Nations has been perceived as a receptive forum for advancing the interests of non-hegemonic nations. Indeed, much of Brazil's recent impulse towards South-South alignments has to do with gathering allies to strengthen its own position within that institution. As remarked, a first test has been recently passed: José Graziano da Silva's election as director-general of the U.N.'s FAO in June 2011. Many of the cooperation agents and institutions I interacted with during fieldwork were engaged in his campaign, and some have singled out his victory as an effect of Brazil's renewed cooperation efforts.

But even the U.N.'s legitimacy as a neutral and equitable forum is tainted by the power asymmetry crystallized in the Security Council.[45] The Council's architecture has been for long criticized by Brazil and other non-permanent member countries for its arguably outdated structure: the world order has changed since World War II, they claim, and so must the Security Council. This was a common view among my field interlocutors, and the most frequently remarked foreign policy agenda behind Brazil's South-South cooperation has been precisely the country's bid for a permanent seat in the Council – one of the priorities of President Lula's Foreign Minister, Celso Amorim. Brazil is not alone in this quest,[46] and neither is it a new one. During the 1920's, it pursued a permanent seat in the Council of the League of Nations, and when the creation of the UN Security Council was being negotiated between Eastern and Western powers, Brazil also (unsuccessfully) pressed for inclusion.

This search for international recognition can be regarded as part of a longstanding expectation, widespread in the consciousness of many Brazilians and perhaps even more of its diplomats, that the country will one day play a prominent part in the concert of nations. The almost mythical motto "Brazil, the country of the future"[47] encapsulates the "excess of future"

[45] Three permanent seats in the Security Council have been occupied since the its inception in 1946 by the Western powers that came out victorious from World War II (United States, United Kingdom, and France), and the other two by their allies in the war effort, the Soviet Union (today's Russia) and China (in fact, Taiwan until 1971).

[46] Most remarkable is the absence of two contemporary Northern powers that were on the defeated side when the U.N. was created: Germany and Japan. Besides them, other emerging global players, most prominently India, have pressed for reform and permanent inclusion in the Council. Together with these three, Brazil has presented in 2005 a proposal for enlarging the Security Council by adding six new permanent seats and four non-permanent ones. This proposal, as well as an alternative one put forth by the African Union, has never succeeded in securing enough votes in the UN's General Assembly.

[47] Pervasive in Brazil's commonsense, the idea, originally drawn from the title of a 1940's book by Swiss writer Stefan Zweig, has even been exported elsewhere, notably to Angola.

that, Santos (2002) suggests, stems from Brazil's unique history of double colonization first by a subaltern colonizer, and then by Western imperialist powers (Cesarino 2012b). It is indeed remarkable how, historically, this expectation to recognized global prominence has held sway even in the absence of a strong economic and military foundation comparable to that of the U.S.. Brazil's recent foreign policy shift towards the global South may be also regarded as part of this age-old expectation: by becoming a provider of international cooperation, Brazil is addressing as much its Southern counterparts as Northern powers, from whom it seeks recognition as a major global player.

Brazil's quest for recognition has therefore never implied a break with its historical alignment with the West. In the post-Cold War world, it has engaged in North-South oppositional politics only up to a point – for instance, in negotiations on trade and intellectual property rights. Brazil's cotton dispute with the U.S. at the WTO (the background for Embrapa's C-4 Project) and its struggle to defend compulsory licensing of antiretroviral pharmaceutics became famous examples of such global "activism".[48] In these and other disputes, Brazil is indeed challenging powerful players, but within rules and norms that have been largely crafted by them.

Similarly, much of oppositional politics by Brazil and others has aimed at enhancing their position *within* these multilateral fora, more than providing alternatives to them. Along with others in the global South (albeit not necessarily as one cohesive bloc), emerging donors have brought about the standoffs in agricultural trade and climate talks throughout the 2000's. They have been gradually enhancing their financial contributions to the Bretton Woods institutions, and in 2012 for the first time all candidates to the presidency of the World Bank had come from the global South.[49] In response to Europe and the U.S.'s resistances to open up these institutions, the BRICS have ventilated proposals to create their own version of the World Bank, or to replace the dollar-based global trade system with a multi-currency system.

At this point, we can only guess about the ways and the extent to which the emerging multi-polarity of which Brazil and other new donors are a major expression would be de-stabilizing the global balance of forces that prevailed during the last century. In February 2011, I attended a lecture at the University of Legon in Accra where the speaker – a Ghanaian Law professor based in the U.S. – challenged the link between the TRIPS and the WTO, that is, between the requirement to enforce intellectual property rights and the right of African countries to trade freely. After a few minutes of debate, the host put a question everyone seemed to be waiting for: "that is all very well, but, if China does not care [about enforcing intellectual property rights], why should we?" This encapsulates a couple of key questions that may be raised a propos the growing importance of emerging donors especially in Sub-Saharan Africa: what kind of leverage are these new powers providing to those in countries highly dependent on foreign aid, in their dealings with Northern donors? Or, conversely, how are emerging donors accommodating on a historical layer sedimented during decades of hegemony by former colonizers and Cold War geopolitics – or, in the case of Africa, on long-standing extraversion processes (Bayart 2000, 2009)?[50]

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[48] I allude here to João Biehl's notion of Brazil as an "activist state" (Biehl 2004). In the case of pharmaceutics, Brazil advanced a case for breaking patents in the name of public health; in the case of cotton, it proved that U.S. subsidies breached WTO's free trade rules and thus gained the right to retaliate.

[49] Considering that the eventually successful candidate, backed by the U.S., was a South-Korean naturalized American.

[50] Bayart's pan-African notion of extraversion seeks to trouble vertical analytics of imposition by emphasizing African agency in harnessing foreign resources and networks to their own ends.

Just as Brazilian commercial missions to Africa in the sixties and seventies landed somewhat inadvertently amidst an oligopolistic environment dominated by former European metropolises and later newcomers such as the U.S., Japan and countries from the Soviet bloc (Saraiva 1996, 114-5), so is contemporary Brazilian cooperation making its way into a terrain shaped by decades of development aid and, in the last years, by an "extraordinary explosion in the number of aid actors and programmes" (Mawdsley 2012, 44). This includes not just newcomers from the global South, but new, public and private, organizations from the global North, from tiny "backyard" NGOs to massive private foundations such as the Bill and Melinda Gates Foundation: a process of "NGO-ization" which some have associated with the effects of neoliberal reforms in Africa (Ferguson 2006, Rottenburg 2009).

At a local scale, this is a highly populated environment that may translate at times into cooperation and complementarities, at times into jealousies and competition. While some bilateral and multilateral donors have actively sought triangulation with Brazilian cooperation, pioneer frontliners have told me about the resistances they encountered when trying to network their way into the local development environment in Africa, especially by established Northern agencies and agents. Conversely, it is not evident that Brazilians will always be willing to share credit for cooperation initiatives with other donors either. On the ground, simultaneous and sometimes overlapping cooperation projects from various agencies, North and South, not rarely dispute the interest and commitment of individual actors – who, in the case of Embrapa's partners to be focused on here, come in limited numbers.

Indeed, even though development cooperation is generally approached as an inter-national affair, politics at national and sub-national scales are key to understanding it. The next section will suggest some of the ways in which the hemispheric politics of emerging donors discussed in this section may relate to domestic processes among providers and recipients of South-South cooperation.

1.3 Sub-national politics of South-South cooperation

My field observations generally concur with Mawdsley's remark that, by and large, the politicization emerging donors bring to the global scale is not reflected in their "sub-national politics of development" (2012, 159). On the one hand, emerging donors usually have little to say about domestic politics in recipient countries; on the other, their own domestic cooperation politics has, at least for the moment, little robustness and visibility.

In the first case, as Mawdsley (2012, 102) argued for emerging donors at large, by working through established political and bureaucratic elites in recipient countries, they don't do much to help local publics hold the latter accountable. In the case of Brazil, domestic politics indeed seems to be, even if by default, something left for its local partners to deal with. This has been the stance, for instance, in more controversial cooperation initiatives such as the Pro-Savannah in Mozambique (cf. Chapter 3), which allowed Brazilians to sidestep concerns raised by civil society groups such as peasant organizations.

In this, emerging donors are reproducing the double standard historically deployed by their Northern counterparts, who have selectively engaged with, and sometimes plainly ignored, principles and rules of their own creation. If, for instance, the South-South principle of mutual non-interference came into being as a reaction against a past history of having been intervened upon (be it in terms of formal colonialism or soft imperialism), on the other it serves as a convenient smokescreen for unpopular stances that make, nonetheless, geopolitical or

commercial sense. This principle was repeatedly deployed, for instance, to justify Brazil's indirect backing of the South African apartheid government in U.N. votes during the seventies (Saraiva 1996, 34; cf. Chapter 2).

Something similar could be said of the emerging donors' reluctance to fully commit to principles of the Aid Effectiveness Agenda, whose agreed principles include ownership, harmonization, mutual accountability, use of recipient country's own systems, and untying aid.[51] While Brazilian cooperation encourages recipient countries' ownership and refuses conditionalities, as almost everyone else it is less willing to harmonize its projects with other donors, and some of its cooperation programs have involved something like tied aid.[52]

This ambivalence has also allowed emerging donors to avoid difficult, and resource-demanding, issues like accountability and transparency in the provision of cooperation. A country like China, in many ways an exception in this already highly heterogeneous group, might afford to disregard such demands more than others – although even it has been more forthcoming in making its cooperation data public. But even in constitutional democracies more vulnerable to international opinion like Brazil, unless domestic constituencies decide to push governments in these directions, this kind of pressure from the development community is likely to fall on deaf years.

Indeed, low awareness and involvement by domestic publics in South-South cooperation seem to be a general trend among emerging donors (Mawdsley 2012, 105-8). Indeed, and contrastively to the growing interest in them shown by the international media and the development community at large,[53] Brazil's and others' rising profile as providers of cooperation has been either ignored or taken for granted by the domestic public. This has a few consequences, which I will outline here based on the case of Brazil.

Firstly, in contrast with their Northern counterparts who have to continually justify and account for the expenditure of part of their national budget in foreign aid, most governments in the South do not (yet) face a significant domestic constituency interested in this question. In the Brazilian public sphere, there hasn't been much debate on its growing status as a provider of cooperation – even if, as one of my interlocutors in diplomacy claimed, there is always a press that will "pick on whatever the government does". Indeed, in the national media, Congressional debates and in informal conversations with ordinary Brazilians, there seems to be no consensus about whether the country's international relations should be following this path. Different from former European colonizers, for instance, not many in Brazil recognize a historical indebtedness towards Africa and other parts of the global South that could justify the deployment of scarce public resources in foreign aid. Some claim that the country has its own "Africas" to take care of,

[51] This Agenda emerged in the development community at the turn of the century to "confront long-standing criticisms of dominant foreign aid", including that it is "top-down, poorly coordinated between donors, tied to donor interests, places excessive transaction costs on recipients, and insufficiently monitors what is successful or not" (Mawdsley 2012, 41). Countries in the global South have participated in the discussions, mostly in the role of recipients of aid.

[52] Harmonization is an element of the aid-effectiveness agenda that has found resistances in most countries, including Northern donors, as it potentially dilutes the political capital and visibility of individual donors. Tied aid has also been common among emerging donors; Brazil's "More Food Africa" program, for instance, provides credit lines for the purchase agricultural machinery from Brazilian companies (cf. Chapter 2).

[53] As remarked in the Introduction, in the last few years, there has been an avalanche of reports on South-South cooperation in the international development community. Although not matched by the exceptional interest in China, Brazil's rise as an emerging donor has deserved its own reports (Vaz and Inoue 2007, Cabral and Weinstock 2010, World Bank and IPEA 2011, Cabral and Shankland 2013, Scoones et al. 2013) and international press coverage.

or that in today's globalized, competitive world to help other countries would be "to shoot one's own foot". Yet others oppose the *terceiromundista* drive of the Lula administration, reckoning that Brazil would be better off privileging its historical alignment with the United States and the rest of the global North (indeed, foreign policy under the Rousseff administration has tilted slightly in this direction).

The visibility of South-South cooperation initiatives is still dim even at the state level; as a senior ABC official once told me in late 2010, pointing to the National Congress' modernist building standing just across the windows of the Agency's headquarters in Brasília, "we are not yet on their radar. But when we are, we must be ready to show the impacts we have had on recipient countries". Indeed, this state of affairs has the effect of sparing Brazilian institutions of the need for a bureaucratic pipeline for producing "ritual evaluations" (Rottenburg 2009, 71) of their cooperation activities.

Secondly, in the absence of an interested public, the domestic politics of South-South cooperation has been largely confined to intra-governmental relations. Thus, even though, like most other emerging donors,[54] Brazil currently has the hybrid status of being a provider of cooperation while still being a recipient, its legal framework is not in line with this emerging status. Although at least one proposal for institutional reform of the Brazilian Cooperation Agency has already been drafted, as far as I could gather its appreciation by the National Congress is not yet on the horizon. Extensive reform has faced opposition, for instance, by sectors of Itamaraty itself, as greater institutional autonomy for the agency would mean loosening the Ministry's grip over an important foreign relations instrument. When I was in the field, Embrapa itself was involved in Congressional debates on a Bill changing its original mandate for acting only within Brazil's territory, so it would gain added flexibility for operating in other countries, for instance by being able to open bank accounts abroad.

As the case of Embrapa flashes out, sector-specific domestic interfaces may be tensioned by Itamaraty's growing demands on national institutions to carry out South-South projects. In the case of agriculture, this took the form for instance of a concern that by helping African countries Brazil would be "feeding tiger cubs that will one day grow and eat us up", as one of my interlocutors at Embrapa put it. As will be detailed in the next chapter, this is not a new fear; it has been most visibly expressed by part of the Ruralist Caucus in the National Congress, a version of the American farm lobby that has been around virtually as long as the Brazilian state itself, and that has gained even more muscle during the Lula and Rousseff administrations.

My interlocutors at Embrapa and the Brazilian Cooperation Agency dismissed such claims on several grounds: that there will always be more than enough demand in the world for food (and now biofuel) crops; that, just as Embrapa itself has benefited in the past from technologies brought from the U.S. and other parts of the North, so would productivity-enhancing technologies eventually find their way into Africa anyway; or that, more than a threat, Brazilian agribusiness should see such rapprochement as a commercial opportunity for opening up new markets, for instance for seeds or machinery adapted to tropical conditions. I was even told about how Africa's preferential access to European markets could be harnessed as a potential indirect avenue around trade barriers against Brazilian products.

These and other scenarios are certainly being discussed backstage among Brazilian (and perhaps African) policymakers and the many stakeholders involved in agribusiness, but in my

[54] This has also been the case of some Northern donors, such as Japan and Germany during the decades that followed World War II. Today, cooperation received by Brazil has a selective character, being restricted to sectors such as environmental protection and indigenous rights (Valente 2010).

experience these sector-specific strategies have not, or not yet, translated into clear impacts on the intensity and direction of technical cooperation. Official technical cooperation in agriculture remains fundamentally driven (and funded) by Itamaraty. And even there, directions are not entirely clear yet; as one of my interlocutors in Brasília put it, "some in diplomacy ask, but what does Brazil stand to gain? China knows what it wants from Africa; we don't."

Contradictions between development cooperation and other sectors such as agriculture, trade or intellectual property enforcement seem to be a common issue in development aid at large, and a particularly difficult one to tackle (Rottenburg 2009, 66; Mawdsley 2012, 46). During fieldwork, I heard about a growing will to accommodate cooperation activities to Embrapa's own strategic interests and those of other stakeholders in the agricultural sector, and one would assume this is also true of sectors other than agriculture. To establish such relationships would indicate the extent to which strategies and interests that lay outside of the organizational scope of the cooperation apparatus are shaping South-South cooperation. Unfortunately, however, this interface remained largely obscured. This may be due to the incipient character of these processes, but ethnographic access also proved remarkably difficult, since they refer to a high level of domestic politics that I could not access but indirectly, mostly through rumors or confidential statements that I cannot reproduce here. This heightened political sensitivity is not surprising, given that, according to official discourse, South-South cooperation is supposed to be solidarity-based, and therefore free of commercial and other non-diplomatic kinds of interests.

1.4 South-South cooperation's organizational outlook

International development as a self-referential system

One of the most puzzling paradoxes of international development, voiced over and again in both academia and the development community, is the fact that, after over five decades and trillions of dollars, "no country in the world has ever developed itself through projects" (Nyoni quoted in Edwards 1989, 120). It is generally acknowledged, even by agents of the development community, that many if not most projects fail in meeting their development objectives in a sustainable manner. One cannot but be baffled by such a striking distance between discourse and reality. How is it, then, that development aid organizations still get away with claims that their projects and programs will reduce poverty, enhance food security, raise income – in one word, develop – beneficiary countries?

Responses to this paradox in the literature have been various. A prevalent, somewhat functionalist reasoning thread is that, if international development aid does not really deliver development, then it must be about something else. In his rewriting of a review made for USAID on *The Political Economy of West African Agriculture*, anthropologist Keith Hart (1982) linked the real "function" of agricultural development to processes of internal colonialism, or to concrete interests by African political and bureaucratic elites in expanding the state's presence in rural areas. But probably the best-know argument of this kind in anthropology has been put forth a few years later, in James Ferguson's *The Anti-Politics Machine*. Ferguson's account traces the primary effects of development less to concrete interests by local elites than to an impersonal "anti-politics machine" operating according to broader systemic logics of "expanding bureaucratic state power" and "depoliticizing both poverty and the state" (1994, 256).

Alternatively, development can be approached in terms of geopolitical and commercial interests undergirding especially bilateral aid, like in much of the international relations literature.[55] Even though these are usually eclipsed by a discourse based on notions of uninterested solidarity (both in South-South *and* development aid), most actors would not shy away from acknowledging that development cooperation is a legitimate tool in a country's foreign relations. Indeed, this was a view explicitly held by many of my field interlocutors. But such acknowledgement is usually put forth within a win-win frame: by engaging in cooperation, one helps oneself while helping others. The claim that development aid *really* helps recipient countries is however far from settled. In particular, the question whether aid helps or harms structural development in Sub-Saharan Africa has been the subject of ample debate by African and Western academics and think-tanks.[56]

It is not evident however that rejecting foreign aid is an option for the world's poorest countries. Although in particular cases individual countries and actors may and eventually do turn down aid, this seems structurally unlikely given Sub-Saharan Africa's historical insertion at the most peripheral, dependent end of the world-system. The literature indicates, furthermore, that vested interests in the perpetuation of the development apparatus are not limited to the donor side; recipients of aid, too, are not only part of it, as they contribute in fundamental ways to its systemic inertia.[57] Resistances encountered in contemporary attempts at implementing the Aid Effectiveness Agenda (see above) during the past decade or so, for instance, make evident the resilience of the development apparatus' organizational inertia on *both* sides of the development divide.

One could look at development agencies, then, as being primarily neither about commercial or geopolitical interests, nor about extending bureaucratic power beyond its organizational boundaries, but, in a more mundane way, as "actual institutions, which … spend billions of dollars a year" and employ a significant contingent of permanent and temporary, specialized and non-specialized, office and field workers (Gardner and Lewis 1996, 2). In this sense, they are not different from other organizations that operate according to self-referential bureaucratic logics and reward systems. Moreover, their goal is to stay in business. From this perspective, far from being a win-win situation, those who make their (life-long or occasional) careers in the development industry and bureaucracy would only lose if the poor countries to whom they provide aid would *actually* develop – or, more realistically, if the provision of aid is reduced or altogether cut off.

All these views on development as a self-referential system assume a professionalized, well-oiled, billion-dollar bureaucratic apparatus, coupled with a vibrant industry of expert consultants and NGOs, where the scale of managerial policy prevails over both discursive principles put forth by diplomats, and the practice of development workers at the frontline of projects. Even though not based on fieldwork at this scale, Ferguson's notion of the anti-politics machine aims to reflect precisely the systemic and colonizing character of this bureaucratic

[55] Mawdsley (2012) brings a useful introduction of chief paradigms to those outside of this disciplinary field.

[56] The chief claim against aid relates to the encouragement of foreign dependency and reproduction of rent-seeking elites. In the development community, arguments of this kind have been put forth by think-tanks and specialized journalists such as Dambisa Moyo (2009) and John Glennie (2008).

[57] Local elites, government officials, and the remainder of the chain of brokers that connects providers of aid all the way down to ultimate project clients are also in the business of development (Bierschenk et al. 2000, Lewis and Mosse 2006). They also play a part in the representational work involved in managing the gap between policy and practice that inevitably arises during development projects (Moore 2001), further contributing to the "incontestability of Western models" (Rottenburg 2009, xxxvi).

apparatus.[58] Policy is also the locus where other authors would later on find some kind of (neoliberal) governmentality to be operating (Ferguson 1994, Mosse and Lewis 2006, Li 2007). Even works that do not share the Foucauldian perspective assume such prevalence of policy. In his Latourian ethnography, David Mosse saw the work of developers as a "purification" (Latour 1993) of sorts, that is, a constant effort to bridge the gap that arises between the bureaucratic demands of policy and the messier level of frontline practice – or between "what is attempted and what is accomplished" (Li 2007, 1). Rottenburg (2009, 68-9) described strategies deployed by developers in order to defuse contradictions between official narratives and actual practice as "the only way such organizations can survive".[59]

But one of the sharpest contrasts between Brazilian South-South cooperation – and, according to Mawdsley's (2012) account, also other emerging donors – and development aid is to be found precisely at this scale of managerial policy. From the latter's point of view, the former would be still at an embryonic stage, lacking sufficient and specialized personnel, an efficient and comprehensive apparatus for producing and managing standardized, evidence-based knowledge about projects and programs, central coordination and a clear, institutionalized strategy. From another point of view, this could mean that South-South cooperation is more flexible, adaptable, and open to innovation and creativity – in other words, not (yet) congealed by bureaucratic inertia. Here I will avoid taking either of these positions for granted to look at organizational arrangements as part of the assemblage in which the practice of technical cooperation is enmeshed.

Brazil's technical cooperation

The ethnographic scope of this dissertation concerns activities officially defined as technical cooperation by Embrapa and its main policy partner, the Brazilian Cooperation Agency (Agência Brasileira de Cooperação, from now on ABC). Technical cooperation is generally considered to be the "emblematic modality" (Mawdsley 2012, 124) of South-South cooperation. Even if, in practice, it may overlap at points with adjacent types such as scientific, academic or technological cooperation,[60] it is typically associated with capacity-building and transfer of knowledge and technology in technical or policy fields such as public health, agriculture, or social policies. The first official account of Brazil's South-South cooperation, published in 2010 by the Brazilian Cooperation Agency and the Institute for Economic and Applied Research (IPEA), defines technical cooperation in terms of federal resources spent on "training and

[58] The abstractness of Ferguson's notion of the anti-politics machine stems, it seems, from a lack of ethnographic grounding on the practice of developers, especially at the level of policy. Yet, Ferguson's *is*, ultimately, a claim about policy. A downside of Foucauldian approaches of this kind is that to assume that some actors are subduing others without necessarily being aware of it makes political accountability difficult, if not impossible.

[59] These include "loose coupling" between policy and practice, establishing "ceremonial facades", "an aura of unquestionable competence and trustworthiness", and "ritualizing evaluation mechanisms" (Rottenburg 2009, 82)

[60] A technical cooperation project with Ghana I followed up during its initial stages, for instance, had elements of scientific cooperation since one of its original goals was to publish a collaborative scientific article – therefore, producing new scientific knowledge. On the other hand, in conversations with ABC or Embrapa staff, cooperation with South Africa was most often defined as scientific rather than technical irrespective of its particular "content". As I understood it, this was due to South Africa's perceived status as being at a similar level of development as Brazil. In other cases, this association between perceived equality of status and the categorization of cooperation as scientific is clearly marked, as in Embrapa's cooperation with South Korea and China, which is carried out along the same lines of cooperation with Europe and the United States (that is, by means of the Labex model; see below).

capacity-building activities, related administrative costs, and expenses with various materials and equipment" (ABC and IPEA 2010, 35).[61]

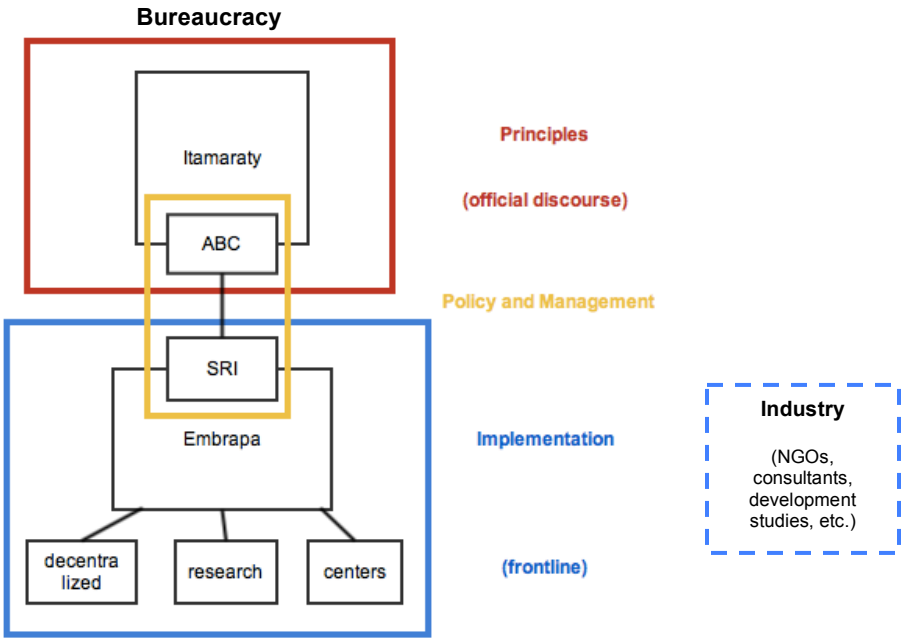
Behind the apparent straightforwardness of the phrase South-South technical cooperation lies a sea of ambiguities and controversies for each term, not all of which will be discussed here.[62] Among emerging donors, the preference for terms like cooperation or partnership over development or aid is a strategic marker of the claims to difference discussed above (Mawdsley 2012). But at least in Brazil, *cooperação* became the preferred word for what is better known in the North as development or *développement* because *desenvolvimento* is most promptly associated with a national endeavor. Sometimes, *cooperação para o desenvolvimento* (development cooperation) is a term of choice that merges the two ideas. For aid, there is the Portuguese term *ajuda*, but in the field I never heard this term designating the cooperation provided by Brazil.

In contrast with Africa, then, where development most often refers to a blurred interface between national states and foreign agencies (the *partenaires*, as they say in Francophone Africa) (Ferguson 1994, Olivier de Sardan 1995), the notion of development in Brazil has been more thoroughly "nationalized". The Green Revolution is a good example of how the Brazilian actors "nationalized" a model of agricultural development originally crafted at the level of the international development system. A similar process is taking place today in the construction of Brazil's South-South cooperation apparatus, which has involved on the one hand borrowing models and procedures from the international development community (chiefly, the United Nations Development Program, UNDP), and on the other drawing on the sector-specific work Brazilian institutions have carried out domestically.

The apparatus of Brazil's technical cooperation can be schematically outlined in terms of three organizational levels (in red, yellow and blue), which run along institutional borders but also demarcate different logics and networks of sociality:

[61] Based on interactions with ABC officials, Cabral and Weinstock have defined it along similar lines, as the "transfer, adaptation or facilitation of ideas, knowledge, technologies and skills to foster development. It is normally executed through the provision of expertise, education and training, consultancies and, occasionally, the donation of equipment" (2010, 10).

[62] Useful definitional exercises can be found in Leite (2012) and Mawdsley (2012).



Picture 1. Schematic representation of Brazilian South-South cooperation's organizational architecture.

The first level (in red) is that of foreign policy, from where demands for stepping up South-South cooperation efforts have come, and where the general *principles* for delivering it are crafted as official discourse. The core institution here is Brazil's Ministry of Foreign Relations, commonly known by the name of its headquarters in Brasília, the Itamaraty Palace. Individual actors include diplomats and officials linked to diplomacy or other parts of the federal government. The second, intermediary level (in yellow) is that of *policy and management*, concentrated in a small cooperation bureaucracy centralized in the Brazilian Cooperation Agency (ABC), itself institutionally submitted to the Ministry of Foreign Relations. The third level (in blue) is that of *implementation*, or frontline practice, where one finds a wide range of (mostly state) institutions in charge of carrying out projects and other cooperation initiatives on African or Brazilian grounds. This dissertation will focus on the work of one such institutions, the Brazilian Agricultural Research Corporation (Embrapa) – like the ABC, also submitted to a federal ministry, that of Agriculture, Livestock and Food Supply.

As the diagram seeks to show, Brazil's South-South cooperation presents a singular kind of architecture where the mid-level of managerial policy (in yellow) is less prominent than the other two.[63] In Northern development aid, on the other hand, even if in practice projects follow less "high modern" grand planning designs than "are pulled together from an existing repertoire, a matter of habit, accretion, and bricolage" (Li 2007, 6), the level of policy is generally regarded

[63] My understanding of policy follows that of David Mosse in his ethnographic study of "aid policy and practice" (Mosse 2005). Policy here has to do both with a well-defined institutional milieu (the development bureaucracy) and with a technical, "evidence-based" mode of planning, managing and evaluating projects, and "bringing institutional reality into line with policy prescription" (3). Project cycle management methodologies and its variations are probably the best manifestation of this aspect of policy as a technology that over-determines the level of frontline practice precisely by ensuring the separation between planners and implementers (Mosse 2005, Biggs and Smith 2003). Mosse and others (Mosse 2005, Mosse and Lewis 2006) have further associated the recent intensification of such "managerialism" to neoliberalism.

as over-determining both frontline practice and principles.[64] It is in this sense, for instance, that Li (2007) and others will claim that the development apparatus depoliticizes relations by rendering technical historically constituted power asymmetries at the scale of both local politics and global political economy. On the other hand, after half-century of Western development aid, its principles have been largely rationalized into technical policy guidelines. Even a controversial mechanism such as aid conditionalities has been justified based on technical claims (Anders 2005): while many recipients of aid see it as a humiliating assault on their sovereignty, donors brand it as an evidence-based tool for promoting good governance and ownership among them.

Finally, besides bureaucratic organization, significant differences are to be found in the other arm of the transnational development apparatus (Li 2007, 16):[65] the private *industry* of NGOs, academics, think-tanks, consultants and other development workers in charge of drafting, delivering and assessing projects, whose pipeline is fed by professionals trained in specialized development studies programs. Although it does exist at a small scale in Brazil and seems to be growing, this industry is not significant in the delivery of official technical cooperation. Different from Northern aid and similar to other emerging donors (Mawdsley 2012), in the provision of Brazilian cooperation there has been a prevalence of (mostly federal) state institutions at *all* organizational levels, from principles and policy to implementation. Let us turn to the ones within the scope of my fieldwork.

A central but loose node: the Brazilian Cooperation Agency (ABC)

The fact that Brazilian cooperation is essentially foreign policy-driven means that, by and large, the demand for enhancing technical cooperation with African countries and others in the global South has come from Itamaraty.[66] The institutions in charge of project implementation are however many – according to the 2010 IPEA/ABC Report, they can be counted by the dozens, and the vast majority are state institutions (mostly federal but also state or municipal).[67] The system is therefore highly decentralized at the implementation level, and the Brazilian Cooperation Agency (ABC) is supposed to provide a core policy and managerial node to this otherwise widely dispersed network. The ABC is Embrapa's main institutional partner in most if not all its technical cooperation activities in the global South; indeed, its agents were a continual presence within my ethnographic scope.

The Brazilian Cooperation Agency came into being in the mid-eighties as a rearrangement of preexisting federal bodies involved in managing development aid *received* by

[64] In Long's words, "Although the interpretive strategies developed by agency personnel for carrying out their tasks will vary in accordance with their own individual interests and cultural understandings, their repertoires will be broadly similar since the way in which they allocate resources or explain and legitimize plans will reflect the images and priorities of development promoted by the particular institution for which they work" (2001, 36).

[65] Typically, this apparatus includes "departments and bureaucracies in colonial and post-colonial states throughout the world, Western aid agencies, multilateral organizations, the sprawling global network of NGOs, experts and private consultants, private sector organizations such as banks and companies that marshall the rhetoric of development, and the plethora of development studies programs in institutes of learning worldwide" (Crush 1997, 6).

[66] As Cabral and Weinstock (2010) put it, foreign policy is "the major driver of development cooperation and, as such, it has shaped the focus and geographical location of technical cooperation initiatives" (vi).

[67] A main exception to the public character of executing institutions is in technical cooperation on vocational training, mostly provided by SENAI, a network of professional schools maintained by the National Industry Confederation. But even SENAI has been a longstanding partner of the public sector domestically, and it was itself created during the 40's within the frame of import-substitution policies (World Bank and IPEA 2011).

Brazil. Since the recent spike in South-South cooperation, it has increasingly accumulated the function of coordinating of the full cycle of technical cooperation that is both received and provided. The agency is supposed to receive and negotiate demands for cooperation coming from countries in Africa and elsewhere, and channel Itamaraty's funds for implementing them. The ABC is not a full-fledged, autonomous agency like the ones providing Northern aid; like many of their counterparts in the global South (Mawdsley 2012), it is a department and operational arm of the Ministry of Foreign Relations. High-level strategic planning is not, according to a recent report (Cabral and Weinstock 2010), part of the agency's purview.

The life of the ABC changed considerably during the Lula administration (2003-2010), when demands for South-South cooperation skyrocketed. The agency's budget tripled accordingly, from a meager 19 million in 2006 to 52 million reais in 2010.[68] Although a historic record high, this is almost negligible compared to the budgets of Northern agencies like USAID, which are counted by the billions. One of the ABC's claims is that every dollar allocated to projects can be further multiplied if indirect costs are factored in. The most significant of these are salaries paid to frontline staff.[69] Since state institutions implement the bulk of technical cooperation, and it involves mostly capacity-building with only limited transfer of materials and equipment,[70] most of this kind of expense would have already been covered by the Brazilian state. This is the case of Embrapa, whose staff includes highly qualified personnel, often research scientists holding PhDs and other advanced degrees.

ABC personnel are in charge of negotiating, approving, managing and monitoring technical cooperation projects.[71] Staff has increased in the last few years along with the agency's budget, albeit not at the same rate.[72] But since it is not an autonomous agency, none of its personnel in fact "belongs" to it; they come, rather, from two main sources: Itamaraty and UNDP. The former's appointees are career diplomats, chancellery officials or assistants, whom, in my experience, tended to occupy higher rank positions. Most of the agency's staff was hired through UNDP as project consultants to carry out functions of project management, or operational tasks like translation. A practical effect of this configuration is that the ABC has exceptionally high staff turnover.[73] Itamaraty appointees may be – and indeed, eventually are – relocated elsewhere, to diplomatic representations and embassies abroad. And most UNDP employees are hired on short-term contracts, normally of one year with limited renewal

[68] The number of new projects has risen steeply from 23 in 2003 to 413 in 2009 (Cabral and Weinstock 2010, 4). The geographical area covered has also expanded, with the African continent receiving half of the ABC budget in 2009. Despite Brazil's recent efforts to reach out to the continent at large, projects in Portuguese-speaking countries still account for most technical cooperation resources spent in Africa. By 2010, around half of the ABC budget was spent in agriculture, health and education projects (in that order).

[69] Other indirect expenses include use of equipment and materials from implementing institutions, or scholarships in the case of academic cooperation (Cabral and Weinstock 2010, 21).

[70] Much of project budgets are typically spent on travel expenses and maintenance of Brazilian experts abroad, as well as of foreign participants when they come for trainings and study visits in Brazil.

[71] In development aid, quantifiable outcomes are an expected part of public accountability, but the ABC does not have a comprehensive, fully functioning bureaucratic apparatus for monitoring and evaluating projects. Cabral and Weinstock (2010) stressed this "expertise gap" at the level of monitoring, evaluation and "analytical documenting of experiences". This means there is no process in place from which to systematically learn with ongoing experiences. Some of my interlocutors at the ABC have recognized as much; but only a policy-centered approach would surmise from this that there is no learning going on.

[72] In 2010, ABC had around 160 employees, of which approximately 100 were in charge of managing over 400 projects in 58 countries (Cabral and Weinstock 2010, 9).

[73] Cabral and Weinstock (2010, 9) estimated that the average maximum period an employee stays in the BCA is 2 to 2.5 years.

possibilities. The rest of the staff – *cargos de comissão* appointed by the Agency's Director, himself a diplomat – usually lasts only as long as the latter's management cycle. It is at this level that strategic functions such as planning and coordination tend to be concentrated (Cabral and Weinstock 2010, 12).

For carrying out its mandate, the Brazilian Cooperation Agency has to rely heavily on other organizations: national institutions like Embrapa at the implementation level, but also international agencies at the level of policy and management. As of the writing of this dissertation, there was no specific legislation regulating the *provision* of cooperation by Brazilian institutions. In practice, this means that those implementing projects in Africa and elsewhere are not legally allowed to perform basic tasks such as buying and contracting abroad for the benefit of non-Brazilian institutions and citizens (Cabral and Weinstock 2010, 11). A chief way by which the ABC has been getting around this is by partnering up with the UNDP or other international organization, which then acts as the implementing agency.[74]

Moreover, different from many Northern agencies and like most other emerging donors (Mawdsley 2012), the ABC does not maintain permanent offices abroad. Instead, the agency makes ample use of UNDP's extensive worldwide network, present in almost every country, in order to procure goods and services as well as hire staff to work in Brazil's projects. While some have remarked that this partnership allows to overcome "legal and bureaucratic obstacles [facing] Brazilian government agencies working overseas" (Cabral et al. 2013, 56), fieldwork indicated that, from the perspective of those working at the frontline of projects, this may appear as itself an obstacle to practical engagements (cf. Chapter 5). Besides the red tape implied in this scheme – resources have to flow from the ABC to the UNDP office in Brazil, and then to UNDP's counterpart in the recipient country before it gets to project frontliners –, there are supplemental financial costs, as the United Nation's agency charges a non-negligible fee for performing such bureaucratic mediation.[75]

The UNDP has been also providing support to the ABC for mapping and strengthening a network of South-South cooperation stakeholders, including a pool of volunteers and specialists as well as staff of the Brazilian embassies abroad.[76] This and other emerging networks make up a nascent cooperation industry in Brazil formed by professional experts in managing and delivering cooperation.[77] As already remarked, the implementation of official cooperation has been mostly a job for staff from national state institutions, rather than consultants and NGO workers trained in development studies and related academic fields, and experienced in the international development industry. Today, thus, Brazilian cooperation frontliners' professional affiliation and commitment lie not in the development industry but in their home institutions; for

[74] The UNDP is the world's largest multilateral development assistance organization and, as part of the United Nations, it has a reputation for being geopolitically neutral. Other partner organizations have included the International Labor Organization or the IICA. A formal statement on UNDP's operations in Brazil can be found at http://www.pnud.org.br/pnud/. Last accessed, 12 April 2012.

[75] The unconfirmed figure I heard from one of my interlocutors was of 11%. In one occasion, I was told that this payment was made only to the UNDP office in Brazil, which could cause procrastination by UNDP employees in recipient countries.

[76] http://www.pnud.org.br/recrutamento/arquivos/201111251930.pdf. Last accessed, 12 April 2012.

[77] Brazilian universities and research institutes have very few interdisciplinary programs specialized in international development and cooperation. My interlocutors working with South-South cooperation had either done their studies abroad, or in Brazil in kin disciplines such as international relations, with occasional specialization provided by Northern development agencies that maintain offices in Brazil.

the most part, they do not rely on the provision of cooperation neither for a living nor for their career advancement.

This is not a trivial fact in light of the literature's claims about international development as a self-referential, inertial organizational apparatus. At a micro scale of cooperation practice, however, there seems to be no fixed correlation: while the work in South-South projects may bring personal or professional benefits to particular individuals, in other instances the opposite might as well be the case, like in the not uncommon situation when participation in a project implies removing individuals from their regular work activities back in Brazil. Not all technical personnel is willing to commit to cooperation projects abroad, and this acceptance seems to be always the outcome of situated negotiations between individuals and their home institutions.

Moreover, if the Brazilian Cooperation Agency is taken as an organizational equivalent to, say, USAID or the World Bank, it would suggest the misleading conclusion that Brazil's cooperation is fragile in all aspects of the project cycle, from strategy and design to execution and evaluation. Indeed, according to Mawdsley (2012, 94), with the exception of the main Arab donors, emerging donors' cooperation institutions tend to be bureaucratically feeble: most Southern counterparts to the ABC also have "insufficient numbers of trained personnel", are "constrained by path dependency", and "lack power relative to other parts of government".

But if we look from a different scale, the relative institutional flimsiness of the ABC is "compensated" by the preponderance, upstream, of Itamaraty as a (foreign) policy guide, and, downstream, of implementing institutions like Embrapa. This is salient especially in the case of the latter, which enjoys an institutional robustness and national prestige that the ABC can hardly dream of ever matching.[78] Moreover, some implementing institutions are building up their own expertise for managing their South-South activities, including by establishing or strengthening of international relations units whose operational functions may even overlap with those of the ABC. This is the case of Embrapa, to which we now turn.

South-South cooperation at Embrapa

Embrapa is currently Brazil's chief provider of technical cooperation in agriculture to Africa and elsewhere, and even of Brazilian South-South cooperation at large. It is a publicly-owned national research institute, created during Brazil's military rule in the early 1970's as part of a broader governmental effort to enhance domestic food supply and open up new agricultural frontiers in the country's hinterlands. This historical background is itself key to understand Embrapa's cooperation, and it will be discussed in Chapter 3.

According to its own self-account, Embrapa engages in two main types of international cooperation: scientific cooperation with Northern research institutions and other emerging economies in the global South; and "technology transfer to developing countries", or South-South cooperation.[79] The first type follows the so-called Labex model, where Embrapa researchers spend time doing cutting-edge research in the facilities of partner institutions abroad, in the United States, France, England, and more recently South Korea and China. The second type involves transferring technologies and building capacity in countries considered as being at

[78] In 2011, Embrapa had almost 10,000 employees (around 2,400 of which are researchers) in 47 decentralized units scattered across almost all Brazilian states, with an annual budget of almost two billion reais (around 1.2 billion dollars).

[79] http://www.embrapa.br/a_embrapa/missao_e_atuacao. Last accessed, 30 March 2012. According to 2011 data, it had 78 bilateral agreements with 53 countries and 89 foreign institutions.

a lower level of development than Brazil. The Secretariat of International Relations (or SRI, Secretaria de Relações Internacionais; cf. Picture 1), a centralized units linked to Embrapa's Presidency located at the institute's headquarters in Brasília, is in charge of articulating and managing these activities, and many of Embrapa's decentralized research units also have their own international relations personnel.

When I did fieldwork, Embrapa offered four modalities of technical cooperation to African countries. The first were small-scale, short-term projects normally involving small teams of researchers from both sides (that is, one or more research units at Embrapa and an African research institute). Embrapa researchers would eventually engage in this kind of cooperation even before the recent South-South cooperation wave. It typically involves study visits, technical training, and occasional transfer of small pieces of equipment and materials, and may also involve the production of new knowledge. I have followed up one such projects, with Ghana's Center for Scientific and Industrial Research (CSIR), which was not carried up to its conclusion. These smaller projects are supposed to be gradually phased-out in favor of more robust forms of engagement,[80] the so-called structuring projects – this is a second modality, which will be described later on in this dissertation.

A third modality of cooperation consisted in capacity-building trainings offered to trainees from Africa and elsewhere in a new center built for that purpose at Embrapa's headquarters in Brasília, named Strategic Studies and Training (Estudos Estratégicos e Capacitação, CECAT). I participated in the first two trainings the center offered to Africans, in October 2010 (45 participants from 20 African countries) and April 2011 (49 participants from 28 African countries). CECAT was literally built from scratch within a few months as part of the "PAC-Embrapa," [81] a generous supplement to the institute's budget provided by Lula's administration. Its small but hard-working team was recruited from other Embrapa units or hired anew, and a learning process was taking place as they accumulated experience with each new training cycle (more on the CECAT trainings in Chapter 3).[82]

Finally, there was the Africa-Brazil Agricultural Innovation Marketplace, a triangulation between Embrapa, the Forum for Agricultural Research in Africa (FARA), and several Northern agencies. This virtual platform provided relatively small (U$80,000) research grants for bilateral teams made up of researchers from Embrapa and partner research institutes in Africa.[83] Its format seems to be the closest to established models in the international development community, notably the World Bank's Development Marketplace. This is certainly due to the involvement of one major donor (Britain's Department for International Development, DFID) and major multilateral institutions such as the World Bank, the UN's International Fund for Agricultural Development (IFAD), the FAO and the Inter-American Development Bank. I attended the forum of the first round of applications held in Brasília in October 2010, the only time when all 125 applicants (from Brazil and 15 African countries) gathered face-to-face. Due to the virtual and widely scattered nature of this platform, the Marketplace remained a secondary field site.

[80] The World Bank/IPEA Report (2011, 53) in fact refers to only three "instruments" of cooperation: structuring projects, technical training, and the Innovation Marketplace.
[81] The "PAC", Programa de Aceleração do Crescimento (Program for Accelerating Growth), was a sort of "stimulus plan" focused on infrastructure implemented by the federal government towards the end of the Lula administration.
[82] After holding the first two trainings dedicated to the African continent, CECAT ventured into Central Asia and other parts of the global South.
[83] Details on the Marketplace mechanics can be found in Pereira (2012).

To complement the ethnographic effort – and access to field sites was always negotiated ad hoc with the various actors, sometimes with success, sometimes not –, I conducted semi-structured interviews with African and Brazilian participants in all these four modalities, as well as with ABC personnel working with Embrapa. Excluding the CECAT and Marketplace participants, to whom I had access mostly through informal conversations during the cooperation activities or after them through the internet, the remaining poll of more permanent actors in my research scope was no larger than twenty people. While this reflects the circumscribed nature of Brazilian cooperation teams even in its largest initiatives, it has posed some challenges to writing and anonymizing research subjects. My narrative strategy is therefore a mixed one, combining omission of names and institutional or national affiliations, occasionally changing gender, expertise or other personal information, and, in some cases, slightly fictionalizing the narrative or making partial claims based on pieces of information that I assessed could be safely made available to other field interlocutors or the public at large. Here I will draw on my experience with all four modalities of cooperation, but the focus will be on the CECAT trainings and on a structuring project with four West African countries, the Cotton-4.

Principles, policy and frontline practice in Brazil's South-South cooperation

In her ethnographic work on development as the "will to improve", Tania Li described the aid apparatus in terms of a double process: what she called problematization (the framing of problems according to pre-established solutions rather than the other way round) and rendering technical (a technical view on "political-economic questions – questions about control over the means of production, and the structures of law and force that support systemic inequalities" [Li 2007, 11]). As was suggested earlier in this chapter, Brazilian South-South cooperation lacks a robust bureaucratic apparatus comparable to those of Northern agencies; neither does it have effectively centralized, standardized, across-the-board protocols for the design and execution of projects. Cabral and Shankland (2013) have recently characterized this as a "policy of no policy". But as remarked earlier, here I am avoiding looking at it from a perspective of lack; indeed, more prominent during fieldwork were the ways in which what would be seen, from the perspective of "mature" development agencies, as lack may be turned into a positive asset for South-South cooperation.

As both the historical and the organizational accounts above suggest, to look empirically at South-South cooperation in its own terms does not yield a coherent, alternative model to Northern development aid. It evinces, rather, a set of emerging interfaces loosely assembled around key nodes at the three organizational levels outlined here: principles, policy, and frontline practice. Different from development aid as described by the literature, relations between these levels are not over-determined by a bureaucratized path that continuously recycles the messiness of practice back into the technicalities of policy; most often, these paths are loose, heterogeneous and intermittent. Principles are only partly translated into policy, and their deployment in frontline practice has to do less with policy prescriptions than with the practical conditions under which cooperation is implemented. This section will bring some examples of the forms such relations may take, and suggest some of its differential effects vis-à-vis Northern aid.

In their claims about South-South cooperation's comparative advantages over Northern aid, which always implies a somewhat caricatured picture of it,[84] emerging donors often argue

[84] For instance, by contrastively reducing Northern development aid to a one-size-fits-all approach, or "standardized package solutions to problems" (Grillo 1997, 20). Rottenburg (2009) notes however that even though in practice

that it would be better suited to other countries in the global South not only because of the supposedly similar experiences shared by provider and recipient, but because it would be tailored to each particular case. As an ABC representative put it to a group of African trainees in Brasília in a quite typical statement,

> An element of Brazil's success in adapting its experiences to other countries in the South is that it sends experts to get in touch with the realities on the ground in order come up with the best project design. In the case of African countries, it also relates to elements like a common cultural heritage in the arts, sports, music; ethnic and historical resemblances due to the immigration of Africans; similar challenges in development, agriculture, energy; and similarities in climate and the environment.

Indeed, due to its organizational architecture, Brazilian South-South cooperation is necessarily heterogeneous. Each initiative is to some extent tailored, because its technical content and implementation process are not over-codified by ABC's policy and management apparatus, but are the task of the multiple institutions operating at the frontline. Each of these has its own experience in domestic development and/or in cooperating with foreign agencies, and for the most part they have no contact with each other. Projects will therefore vary widely, sometimes even within the same institution, as is to some extent the case of Embrapa.

Besides heterogeneity, another differential effect of South-South cooperation's organizational outlook relates to flexibility and autonomy in implementation. Mawdsley (2012, 110) suggested that one of the differences between emerging and traditional donors has been greater "dynamism", "speed" and flexibility (while also pointing to downsides regarding monitoring, transparency and efficiency). In the case of Brazil, the absence of a pre-determined, standardized portfolio of expert solutions seems to allow not only for greater flexibility in translating principles and policy into practice, but also greater autonomy and some degree of experimentation at the lower end of the policy-frontline spectrum. The limited amount of resources available especially for bilateral projects, for instance, may mean that their implementation takes the form less of an ambitious intervention over a broad slice of local reality guided by predefined technical prescriptions, than an initially circumscribed and somewhat open-ended enterprise that gradually expands along with its learning curve. Different than what was suggested by Mawdsley (2012), however, this does not necessarily mean that project execution will proceed at a faster and smoother pace. In fact, the mediation apparatus that needs to be put in place for transferring resources abroad, normally through UNDP, adds an intricate layer of red taping that may weight heavily down on project activities on the ground, as will be further discussed in Chapter 4.

Another set of effects resonates with the South-South principles of non-intervention, non-conditionality and demand-drivenness. In some iterations of Brazil's discourse, these principles appear as a negation of the country's historical experience as a recipient of aid from the North, marked by impositions of various kinds, conditionalities in particular. South-South cooperation therefore makes a principled point of not imposing itself on recipient countries, but responding to their demands. The first cooperation model tried by Embrapa in Africa – a regional office located

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projects are multiple, standardization must be maintained at the level of policy because without "objectives of intervention that have been determined beforehand, it would be impossible to provide an account of achieved success rates, and without accountability the legitimacy of development cooperation would be called into question" (73).

in Accra (Ghana) centralizing cooperation all over the continent – sought to apply the demand-drivenness principle quite literally. It involved an "over-the-counter" mode of operation whereby African agents (with no discrimination between the state and private sectors) would come to them with their demands. This model was eventually changed with the (re)centralization of cooperation in Brazil in 2010, for reasons that are both operational and political. Now most demands get to Embrapa through its international relations unit in Brasília, mediated by the Brazilian Cooperation Agency (directly, or via diplomatic representations in Brazil or in Africa).

In practice, projects may be, and occasionally are, offered to African counterparts. But one of the points to which the discussion in this chapter leads is that, from an organizational point of view, like most of its Southern counterparts Brazilian cooperation would not have the capability to impose itself on recipient countries anyway. The institutional presence of Brazilian cooperation in Africa is minimal, and it would not have the financial or organizational capacity to monitor, for instance, the implementation of conditionalities. This spares recipients from the bureaucratic burden that development aid usually adds to their already fragile institutional apparatuses and may make them even more dependent on foreign expertise and funds (Mawdsley 2012). But on the other hand, this non-interventionist approach brings other kinds of challenges, as it requires more extensive engagement by recipients in all stages of project design and implementation.

This requirement evokes a prominent issue in the development aid scene at large, that of ownership (or *apropriação*, in Portuguese), or how to make local actors carry the projects forward after the donor leaves. This is an element of the Aid Effectiveness Agenda that has been addressed by Northern donors in bureaucratic terms – for instance, by incorporating aid projects into the recipient countries' own policy systems. Even if ownership has not been explicitly incorporated in Brazilian cooperation's official policy as such (in fact, as we saw, some have claimed that it does not have one), it is something that individual actors, especially at the frontline, care about deeply. Lack of ownership was among the reason why, for instance, the project between Embrapa and Ghana's CSIR that I was following up in 2010 was eventually abandoned – the latter was not able, or willing, to invest in its last stage, which would demand a significant apportion of local funds for the trainings that were planned to take place next.[85]

But in other cases (and the C-4 Project may be one of them), the organizational configuration of Brazil's cooperation could end up promoting ownership in the sense that, by requiring that recipient countries, institutions and individual actors invest their own, scarce resources in order to carry South-South projects forward, they would be encouraged to own them. Even if, as we shall see in later chapters, on the ground things are not as straight-forward, the point to retain from this chapter's perspective is that to promote ownership by making African counterparts share some of the project costs (be it financial, or in terms of time and commitment by individual actors) is, again, as much a matter of principles as an effect of Brazil's limited cooperation resources and particular organizational architecture.

Finally, an analogous point could be made with respect to the provider vs. recipient dimension. In my experience with Brazilian initiatives, even if there was an asymmetry in terms of resources and capabilities between Embrapa and the African research institutes, the difference

[85] In fact, a high rank administrator at CSIR told me how a problem he saw with Brazilian cooperation was that it did not provide direct transfer of financial resources to local institutes. Brazilian Cooperation Agency personnel have also recognized this as a qualm often raised by its African partners.

between providers and recipients did not appear as a "trustee-subject" boundary (Li 2007).[86] In the C-4 Project, for instance, African partners were required to play a leading role in the production of diagnoses about the local situation and in the technology adaptation process. If this concurs to fulfilling South-South principles of horizontality and mutual exchange, it seems to be, again, less a matter of applying principles through a clear policy path than an effect of the capabilities available to Brazilian *cooperantes* as they come to (learn how to) engage with local actors without a specialized apparatus for producing development-related knowledge.

This may be the case even with more elusive assumptions about Brazilians' supposedly higher socio-cultural capabilities for functioning in other Southern contexts (more on that in Chapter 2). In Brazil's cooperation for institution-building in East Timor, for instance, Brazilians' presumed greater cultural openness for socializing with the locals was eventually made real by their poor fluency in central languages like English or French, which made socialization with other expatriates difficult.[87] As I observed during fieldwork, the language barrier may also encourage the deployment of more practical and tacit idioms, such as joking relations, hands-on work, and communicative mediation of technological artifacts and other non-humans. In this case and the others, what I wish to suggest is how assumptions about Brazilian South-South cooperation as being different than Northern aid may end up becoming true not because of an alternative, "Southern" bureaucratized path systematically linking principles to frontline practice through policy, but due to characteristics at the level of organizations and resources that, from the point of view of established aid institutions, would be regarded as lacking.

Finally, another effect of South-South cooperation's organizational outlook is that those implementing it do not have the same mechanisms as their Northern counterparts for "recycling" failure back into the project pipeline (Long 2001, Mosse 2005, Rottenburg 2009).[88] Especially now that smaller projects are being phased out in favor of structuring projects such as the Cotton-4, Embrapa is likely to have fewer initiatives in Africa, and each of them will become more visible. Since, as remarked, domestic support for South-South cooperation is far from consensual, and implementing institutions are porous to pressures and influences by governmental sectors other than diplomacy, project failure could become a big issue for the institutions and individuals implementing them. As Leite (2012) also noted, many in Embrapa are indeed concerned about the potential for inefficiency that increased demand for South-South cooperation coming from Itamaraty could entail.

Moreover, in contrast with scientific cooperation with Northern institutes, in technical cooperation with Southern countries there are no evident immediate returns from the point of view of the institution's own interests – let us not forget, neither Embrapa nor most other implementing institutions are development agencies. The institute certainly benefited from the generous resources provided especially during the last years of the Lula administration. CECAT's infrastructure, for instance, has been useful to other ends like internal trainings, and it is hoped that some benefits may eventually accrue from technology transfer projects, such as access to new markets for Embrapa's technologies. These and other dilemmas are being

[86] Li (2007, 7) described how, in traditional aid, the "practice of rendering technical confirms expertise and constitutes the boundary between those who are positioned as trustees, with the capacity to diagnose deficiencies in others, and those who are subject to expert direction".

[87] Silva (2013). East Timor's first language is Tétum, but the language of the former colonizer, Portuguese, is also widely spoken.

[88] The main such mechanisms are evaluations, which "play a useful role in confirming the self-fulfilling prophecy that intervention policies are indeed viable and ideologically sound" (Long 2001, 37).

confronted as I write, and point to yet another effect of the emerging assemblage outlined here: its open-endedness. These aspects are not fully captured by the established approaches in the anthropology of development discussed here.

1.5 Concluding remarks

This chapter argued that, like other emerging donors, Brazilian South-South cooperation is in a process of emergence, characterized by the formation of a unique assemblage made up of new interfaces that bring together, under the aegis of foreign policy, preexisting institutions, discourses, individuals, practices, and politics. It is difficult to fathom how Brazilian South-South cooperation will look like even in the near future. What is certain is that it is changing and will continue to change, and if the forward drive unleashed during the Lula administration is not reversed (as will be seen in the next chapter, intensification of South-South relations has been historically linked with moments of economic bonanza), it could be that the current picture will eventually give way to a more stable and policy-oriented assemblage.

However, it is unlikely that, even in this case, Brazilian cooperation will ever look like the picture described in ethnographies of Northern aid; but neither will it ever constitute an entirely alternative model to it. The historical genealogy proposed in this chapter indicates that South-South cooperation, even if discursively constituted in terms of an opposition to Northern aid, emerged from within a global apparatus built under Northern hegemony. As a result, Brazil's process of emergence as a donor has been highly ambivalent and even contradictory, both internationally and domestically. While South-South cooperation involves a quest for recognition at a global scale, it has also been shaped by the domestic politics of foreign policy and its relations with other governmental and economic sectors such as agriculture. This double-directionality is key for making sense of Brazilian cooperation at various levels, as the following chapters will continue to show.

A similar point can be made regarding the organizational aspect, which was described here in light of a double claim commonly found in the anthropology of development literature: about development aid's self-referential character, and its bureaucratization and de-politicization effects. A look at the organizational assemblage of Brazil's South-South cooperation against this backdrop yielded a three-leveled architecture that is in a sense an inversion of Northern aid's: instead of prevailing over discursive principles and implementation practice, the level of managerial policy is weak relatively to them. Rather than constituting a specialized, bureaucratized model alternative to its Northern counterpart, Brazilian cooperation has relied significantly on global bureaucracies such as UNDP on the one hand, and on the sector-specific experience of national institutions like Embrapa on the other.

This state of affairs has an interesting effect. While South-South cooperation upholds principles that are largely crafted in opposition to Northern aid, it has no coherent bureaucratic apparatus to systematically translate them into practice. Yet, as I have argued in the last section, some of the effects of Brazilian cooperation do go in the direction of some of these principles, such as demand-drivenness, non-conditionality, mutual exchange, tailored projects, and even more elusive assumptions about Brazilians' higher socio-cultural capabilities for operating in Third World contexts. Rather than being the outcome of planned policy, this seems to be an effect of the practical conditions under which cooperation operates – conditions that, when looked at from the point of view of established aid organizations, would be regarded as immature or lacking.

This somewhat paradoxical situation calls for a kind of analytics that is less totalizing and more open to ambivalence, contradiction, and the historical density of particular South-South relations than the Foucauldian and actor-based approaches in the anthropology of development literature reviewed here. As I have suggested in the Introduction, part of this analytics can be found in certain strands of postcolonial critique. The following chapter will put some of these to work, by zooming in from the scale of the hemispheric relations privileged in this chapter on that of Brazil-Africa relations.

Chapter 2

Culture in Context-Making:
Nation-Building Orientalism and Brazil-Africa Relations

By zooming in from the previous chapter's hemispheric scale on relations between Brazil and Africa I am inverting my actual research path. The fieldwork on which this dissertation is based started in Africa, more specifically in Ghana, before it got to Brazil and its broader South-South cooperation enterprise. Only then did I start to pay attention to the account Brazilian cooperation provided of itself, which was largely crafted by its diplomatic arm rather than by the frontliners themselves. One of the things that stood out since then was a certain mismatch between the concerns shown by those pioneering Brazilian cooperation on African grounds, and what was said about it in official discourse back in Brazil. While cooperation discourse was centered on confident expectations borne out by cultural and natural affinities supposedly shared by the two sides of the Southern Atlantic, those operating at the frontline of cooperation showed a much more diverse range of concerns, addressing the multiple domains they encountered while making their way into Africa's intricate development landscape.

As it turned out, the idiom prevalent in the Brazilian diplomats' discourse could also be found among most other emerging donors, and was just as often conveyed through presumed historical connections or analogies. Thus, in their cooperation efforts, Indians have evoked ties with Africa from pre-history – the landmass where India stands today broke off from the Southeastern part of Africa before it bumped into Asia to form the Himalayas – to the common struggle against colonization, where that continent would have figured as "the land of awakening of the Father of the Nation, Mahatma Gandhi"[89] –, to language, food and Bollywood songs and films (Bose and Hassen 2011). The Chinese have made extensive use of a "rhetoric of commonality, analogous underdevelopment, suffering at the hands of colonialism and encouragement of self reliance" (Strauss 2012, 142). Age-old sea trade and the imaginary of the millenarian Silk Road linking Asia to East Africa have been lavishly deployed by both Asian giants. Emerging donors from the African continent– South Africa and some Maghreb countries – have drawn on their alleged natural vocation to act as mediators between Sub-Saharan Africa and Northern and Southern donors. Even those who do not enjoy significant historical ties with Sub-Saharan Africa, like the Japanese, are finding their way around this handicap by partnering up with those who do, like Brazil.

When one looks closer at the historical record, however, a series of strategic "occlusions and associations" (Mawdsley 2012, 126) quickly emerges. Based on several case studies, some of them by anthropologists, Emma Mawdsley remarked for instance how China's South-South rhetoric draws extensively on the Maoist era's close engagement with Africa while in contemporary China itself, that period is a subject to be avoided (155); how India's "sanitized historical referents" have excluded "troublesome realities" like the expulsion or hostility against Indians in some East African countries, or their participation as lower-level officials in British colonization in Africa (156-7); or how, in today's reemergence of Poland as a donor, it is as if cooperation experiences during its socialist past "had never existed" (166). Therefore, all emerging donors have a "symbolic politics" (145) of re-writing their joint history towards a naturalized narrative of affinities and commonalities.

[89] India's Prime Minister Manmohan Singh at the 2008 India-Africa Forum Summit; in Chand (2011, 6).

This chapter will discuss this symbolic politics in the case of Brazil-Africa relations. Although in this case the rhetoric of affinities and commonalities is equally prevalent, it has addressed with particular poignancy and tenacity a domain in which anthropologists have also made much investment over the decades: culture. The first section will probe into the historical roots of Brazilian diplomacy's exceptional interest in culture, and discuss some of the contradictions to which this has led. I then go on to suggest some of the ways in which culture appeared (or not) at the frontline practice of contemporary cooperation, as it was observed during fieldwork. The last section takes up the claim that Brazilians' views on Africa have been historically imbued with a persistent "culturalist grammar", originally popularized by the work of sociologist Gilberto Freyre from the 1930's onwards in Brazil, and later on in Portugal. Looking at Freyre's ideas and their vulgarized version through the lenses of Said's *Orientalism*, I elaborate the notion of *nation-building Orientalism* to suggest how Brazilians' views on Africa have been shaped by the double directionality of coloniality discussed in the Introduction: on the one hand an internal colonialist concern with the incorporation of African descendants into the national polity, and on the other, Brazil's sense of subalternity and quest for recognition vis-à-vis European and U.S. hegemony.

2.1 The cultural grammar of Brazil's discourse on Africa

In October 18th 2010, Embrapa's brand new training center in Brasília opened its doors to its first cohort of African trainees, from 27 countries in both Sub-Saharan Africa and the Maghreb. In the opening ceremony, government officials and Embrapa managers received them with a warm welcome, urging them to feel at home, "brothers and sisters" of Brazilians as they are. A representative of the Brazilian Cooperation Agency opened the speaker series by presenting Brazil's model of South-South cooperation along the lines described in Chapter 1: demand-driven, non-conditional, based on solidarity and free of commercial interests, tailored to particular conditions of recipient countries. In the case of Africa, he argued, success in adapting Brazilian experiences would be further linked to a series of enabling elements: ethnic and historical resemblances produced by past migratory flows; a common cultural heritage expressed in the arts, sports, food, music; natural and climatic similarities; and comparable challenges in developmental fields like agriculture or energy. In his afternoon presentation, he addressed Brazilian culture: the country is highly mixed racially, he explained, with an "open, dynamic and versatile culture" marked by religious and racial tolerance. Both plural and original, it is diverse across the country's different regions, while being capable of producing modern world-class "jewels" like Brasília.

The assumption of "indissoluble cultural ties"[90] between Brazil and Africa, and that Brazil's unique cultural outlook owes much to African contributions in domains like food, language, music and other arts, sports and other bodily techniques, is one of the most recurrent threads in written and spoken official discourse on Africa-Brazil cooperation.[91] A secondary one is the ample deployment of an idiom of kinship, especially that of siblinghood, where Brazil occasionally appears as a more mature brother. President Lula was one of its most enthusiastic users, and even his temperate successor Rousseff has maintained it; in their statements during trips to Africa or when receiving Africans in Brazil, *irmãos e irmãs africanos* (African brothers

[90] http://www.agroanalysis.com.br/especiais_detalhe.php?idEspecial=79. Last Accessed, 20 April 2011.

[91] Cabral and Shankland (2012, 2013) have recently referred to this as the "affinities discourse", and associated it closely with the rhetoric of President Lula.

and sisters) or *vizinhos próximos* (close neighbors) were a sure reference. A third theme speaks of Brazil and African countries in terms of a common historical experience of having been subjected to colonization or imperialism, and the almost automatic ties of solidarity that would ensue from it. Different from Europe's racialized rule that "relied on assertions of fundamental cultural differences between Europeans and Africans to legitimate imperial projects of civilizing improvements" (Moore 2005, 11), relations between Brazilians and Africans would be characterized by cultural familiarity and spontaneous affinities. The recurrence of these claims led me to ask the obvious questions: is this indeed the case? If not, what role is this discourse playing in contemporary rapprochements between Brazilians and Africans? How is it able to sustain itself in spite of its potential for contradiction vis-à-vis both frontline practice and the historical record?

One of the first things my research effort unveiled is that none of this is new; in fact, if it weren't for some recent inflections, one would be tempted to suggest that contemporary discourse on Brazil-Africa cooperation is at least half-a-century old. In his reference book on Brazil's international relations with the African continent, Brazilian historian José Flávio Sombra Saraiva (1996) remarked an "intriguing continuity" (129) throughout the decades, despite oscillations in virtually all other domains: what he called, in a formulation that I will take up here, the *culturalist grammar* of Brazil's discourse on Africa. This rhetoric is not only long-lasting but in many ways unique; according to Saraiva (1993, 233), it stands out sharply for its "emotional" elements, in contrast with the tone dedicated to other regions historically privileged by Brazil, such as Latin America, the U.S., and Europe.

This grammar can be found with particular salience in the two other moments when Brazilian diplomats, policymakers and businessmen sought a closer approximation with their African counterparts. One harks back to the first wave of independences in the African continent beginning in the late 1950's, when Brazilian President Jânio Quadros inaugurated in 1961 an official foreign policy for the African continent which was carried forward by his successor João Goulart until his overthrow by a military coup in 1964. The first three years of military rule swung back to Brazil's traditional Occidentalist alignment with Europe and the U.S., downplaying relations with African countries and other decolonizing nations. But this did not last long: in another shift around 1967, begun what Saraiva (1996) called the "golden years" of Brazil-Africa relations, which this time would last over a decade.

Both Quadros and Goulart used to refer to Africa in today's tropes of familiarity, a common cultural identity and history, and a natural bridge across the Southern Atlantic. Correspondingly, it was often taken for granted that Africans would be "naturally" receptive to Brazil's gestures of political and cultural solidarity (Saraiva 1996, 90), and that the nascent African nations would be eager to learn from Brazil's more mature post-colonial nation-state, including as an "example of complete absence of racial prejudice" (Quadros quoted in D'Ávila 2010, 35). Brazil's constitutive "Africanness" and its marginal position within the Western sphere were cast by Brazilian diplomats as a positive vocation for mediating between former European colonizers and the new "tropical civilizations" in Africa, or between the First and the Third Worlds at large – even to "lead the bloc of Afro-Asian nations" in its relations with the West (Saraiva 1996, 52, 92; cf. Chapter 1).

But if metaphors of approximation have framed the Southern Atlantic as Brazil's "Eastern border" (Penha 2011, 11), an "inner sea" (Saraiva 1996, 205), or "no more than a 'river' between two continents" (World Bank/IPEA 2011, 39), the 1,600 miles that separate continental Brazil's Easternmost portion from the Senegalese capital of Dakar have also been regarded as a

line of key geopolitical importance for protecting the West from the communist threat (Saraiva 1996). The Southern Atlantic has been for centuries a battleground for struggles for commercial hegemony (Penha 2011). In spite of the discursive emphasis on spontaneous solidarity, geopolitics, global trade, and imperatives of national development played from the start a key part in shaping Brazil-Africa relations.

In fact, this kind of rhetoric showed to be highly flexible to different uses; its basic logic would persist even when Brazil's orientation towards Africa followed a very different direction than Quadros' and Goulart's distinctive Third-Worldism. In those moments when an engagement with decolonizing Africa was downplayed in favor of a realignment with the West, the culturalist grammar undergirded the confidence placed on the supposedly higher civilizing capabilities of Portuguese colonialism – of which Brazil itself would be the most finished exemplar. Supporters of Portugal would often deploy kinship or sentimental terms to describe its relations with former and current colonies, going to such lengths as to declare that "Our policy with Portugal is not really a policy. It is a family affair"[92] (D'Ávila 2010, 27), or that "I have no policy. I came here to love Portugal" (32).

A common starting point in narratives about Brazil-Africa relations, including in South-South cooperation discourse, is the arrival, in the 1550's, of the first African slaves to the shores of recently "discovered" Portuguese possessions in South America. Most of them were shipped from slave trade outposts established by the Portuguese in what is today Angola, and in the Gulf of Benin in West Africa. By the late seventeenth century, Portugal had become a subaltern Empire politically and economically dependent on the British, and from the late 1700's, Brazilians themselves had surpassed the Portuguese in direct trade with Africa (Penha 2011, 34-5). The nineteenth century, which saw a gradual receding of legal and then illegal slave trade across the Atlantic, is generally regarded as a moment of relative silence between Brazil and the African continent (Saraiva 1996, Penna Filho and Lessa 2007). During this period, the rising British Empire succeeded not only in significantly curbing the transatlantic traffic in slaves, but in consolidating its hegemony over South Atlantic trade routes (Penha 2011). The encroachment of European powers on the African continent, which would culminate in the late nineteenth century "scramble" and from there in the effective colonial occupation of the African hinterlands, finished closing off the continent's channels of exchange with Brazil. And this included Angola as well as all other Portuguese colonies – as part of its independence deal with Portugal in 1822, Brazil had renounced any attempt to gain control over its former colonizer's possessions in the African continent.

But the reasons for Brazil's retreat did not refer solely to changing international arrangements: the first decades of independence (the so-called Imperial Period, from 1822-1888) were a key moment for internal colonialism and territorial integration, marked by multiple

[92] Brazil's relations with its former colonizer are indeed unique even within Latin America, and they started off quite literally as a family affair. Brazil became an independent nation in 1822 under the son of the King of Portugal, after the Portuguese Royal family itself had lived in Rio de Janeiro for over a decade. King João VI of Portugal and his Court fled to the South American colony in 1808 escorted by the British Royal Navy, while the Napoleonic army marched into Portugal. Portugal's subaltern Empire (Santos 2002), that had been since long financially dependent on England, now became so politically. During the time King João remained in Brazil, this colony had the paradoxical status of being the seat of the Empire. After restoration, the King returned to Portugal in 1921 leaving behind his oldest son, Pedro. When the Portuguese Courts demanded Pedro's return in 1822, he decided to declare Brazil's independence instead. Luso-Brazilian elites were then left with the challenge of building "a neo-European nation in the Americas – a white construct that had the 'burdensome legacy' of a huge black and slave population" (Vale de Almeida 2008, 4).

internal rebellions and upheavals as well as by an outflow of *retornados* (African returnees) especially to the Bight of Benin. Such returnees would become a central element in the twentieth-century reinvention of a shared tradition between Brazil and Africa (D'Ávila 2010, Alberto 2011). Today's South-South cooperation has also included projects for restoring their material and immaterial culture in countries like Ghana or Benin. In Accra, I visited the Brazil House, a small museum dedicated to the Tabom returnees which was, according to the ambassador there, one of President Lula's "pet projects". When he inaugurated the museum in 2008, Lula praised the returnees as "a true example for us", for "never giving up the dream" of overcoming their condition as slaves.[93] Not all Africans returned to their continent of origin by choice, however. A significant contingent was deported by the Brazilian state in the aftermath of slave revolts, most notably that of the muslim Malês in Bahia during the 1830's (Reis 1993). Many returnees took advantage of their Brazilian connections to become themselves traders in slaves.

In the mid-twentieth century, the resumption of more intensive contacts was marked by excitement and hope by sectors of Itamaraty and Brazilian intelligentsia imbued with ideas about Africa's affinities with Brazil (D'Ávila 2010). Multiple missions crossed the Southern Atlantic back and forth carrying diplomats, intellectuals, returnees, artists, and athletes. Even if all Brazilian diplomats were white, the culturalist grammar allowed them to claim some degree of Africanness. When President Quadros decided to appoint a black ambassador to Brazil's first embassy in Sub-Saharan Africa, he had to choose someone from outside of Itamaraty's regular ranks: Raimundo Sousa Dantas, a journalist. (Exactly fifty years would pass before Itamaraty would appoint for the first time a black career diplomat as an ambassador, in 2011.) This initial enthusiasm occasionally ran into its own inflated expectations and Brazilians' poor knowledge of on-the-ground realities in Africa. A particularly evocative story tells of how, when Dantas arrived in Accra to take up the Brazilian embassy, Ghana's iconic independence leader Kwame Nkrumah would have replied that a true demonstration of racial integration in Brazil would have been to appoint a black ambassador to Sweden rather than to Africa.

This anecdote points to the sharp potential for contradiction between Africa's place in Brazil's nation-building imaginary and Africans' views on race, colonialism and their own processes of internal colonialism. In the aftermath of decolonization, for instance, not all Africans saw their supposed legacies to Brazilian culture in a positive light, connected as they were with a tradition that those eager to modernize wished only to leave behind. Another telling anecdote recounted by D'Ávila (2010, 61) speaks of a Nigerian student in Salvador who went crazy of fear of the Orishas (*candomblé* gods),[94] associated as they are by many urban, Christianized Africans with the dangers of the bush.

But the potential for disjuncture between the affinities discourse and the historical record is not limited to culture and race relations. One of them had to do precisely with the historically peripheral position shared by Brazil and the African continent in the domain of trade and finance. If, at certain moments, horizontal relations across the South appeared as a cooperative move stemming from some inherent Third World solidarity with the potential to reduce economic dependence on the hegemonic West, at others they have translated into fears about competition for foreign investment and for consumer markets for tropical commodities. During the Kubitschek administration (1950-60), which boiled its interest in Africa down to economic

[93] http://www.africaresource.com/index.php?option=com_content&view=article&id=720:brazilian-president- pays-tribute-to-ex-slaves-in-ghana&catid=140:newsworthy&Itemid=330. Last accessed, 5 Oct 2013.
[94] *Candomblé* is a modality of Afro-Brazilian religion akin to the Haitian *Vodou* or the Cuban *Santería*.

relations, a major concern shown by Brazilian diplomats and policymakers related to Africa's privileged commercial ties with Europe, which remained in place even after independence. In the view of some, this was an "unfair" advantage (Saraiva 1996, 38), given African countries' cheaper labor force and their preferential access to European markets for agricultural products also exported by Brazil such as coffee, cocoa and cotton. This concern existed even during the Quadros and Goulart administrations (Saraiva 1996).

When looked at with contemporary eyes accustomed to Brazil's undisputable prominence as a top world exporter of agricultural commodities – a stark contrast with many African countries' struggle with their own food security —, such concerns with competition may seem at best overrated, at worst morally questionable. It should be kept in mind however that it was during the 1960's and 70's that many African countries knew their best economic moment, including in the agricultural sector. Yet, even after Brazil's "agricultural revolution" in the 1970's and the simultaneous stagnation of productivities in much of Sub-Saharan Africa, concerns with real or potential commercial competition have not entirely subsided. On the contrary, this was an uncanny undercurrent to many conversations I had in the field that rarely came to the fore forthrightly. Some of the few occasions where such concerns were publicly aired and even defended were during debates in the National Congress on South-South cooperation with Africa and in the press coverage that accompanied them. In these debates, such positions were generally associated with members of the powerful farm lobby and their associates in government and society at large (cf. Chapter 1).

These and other domestic concerns with national development have been an important drive behind Brazil's policies for Africa, but they were not always aligned with diplomacy. This tension has been perhaps nowhere more pointed than during the early years of the golden period of Brazil-Africa relations, when two major African issues interpellated Brazil directly: South African apartheid and Portuguese colonization. Both were issues against which virtually the entire African continent and much of the Third World had firmly closed ranks. And in both cases, Brazilian diplomacy failed to take a clear oppositional stance, acting with hesitancy and ambiguity in the United Nations. Although these two issues are central to the academic literature on Brazil-Africa relations,[95] in commonsense they are almost totally eclipsed. Most if not all my Brazilian informants (including myself, before I started this research project) were utterly unaware of this historical fact. This may also be true of many of those working at the policy and perhaps even diplomacy level, given that even today we come across statements by Itamaraty personnel such as that what unites Brazil and Africa are "emblematic facts, such as Brazil's support to political emancipation of African countries, joint efforts in overcoming underdevelopment, Brazil's condemnation of the apartheid regime in South Africa".[96] Yet, it hasn't been forty years since Portugal's African colonies became independent, and even less since the apartheid regime collapsed.

The historical literature tells us that, like most other nations South and North, successive Brazilian governments did condemn the apartheid regime in principle. However, even in the period of independent foreign policy, commercial and strategic interests would prompt silence when it came to supporting concrete measures against South Africa in the United Nations (Saraiva 1996, 73-6). Faithful to their Occidentalist alignment, the Brazilian military considered

[95] E.g., Saraiva (1996), Penna e Filho and Lessa (2007), D'Ávila (2010).
[96] http://www.ipea.gov.br/portal/index.php?option=com_content&view=article&id=12643. Last accessed, 5 Oct 2013.

this African country an important and reliable ally of the West in a continent otherwise marked by fluid coalitions and leaders prone to strategically playing the communist vs. capitalist card.

The easy story behind Brazil's hesitancy in supporting the independence of Portugal's African colonies, on its turn, is that of the "sentimentality" towards its "friendly colonizer" (Penna Filho and Lessa 2007). Indeed, Portugal's stubborn attachment to its colonies even while independences were being rapidly achieved all around them seemed beyond comprehension by those in more "rational" societies such as the U.S. (D'Ávila 2010, 17). Caution should be taken however not to take the facile road of accounting for Portugal's (and at points, Brazil's) moves as merely irrational or emotional, nor to overestimate the significance of these affective drives (as I suspect sometimes D'Ávila does). Portugal's stubbornness was in part a matter of missed timing. As Vale de Almeida (2008) pointed out, "African colonies became 'real', important factors for the economy and self-representation of the country [Portugal] precisely at the moment when anticolonial protest started" (6).

As for Brazil, the eventual shift in attitude towards these two issues indicates that there is more to the story than sentimental attachments or even geopolitics. The Geisel period (1974-79) in particular was marked not only by the heyday of Brazil's so-called economic miracle, but by what some scholars have called a renegotiation of dependence: that is, efforts at diversifying Brazil's pool of trade partners away from the United States towards not just Africa, but also Japan, Western and Eastern Europe and the Middle East (Saraiva 1996, 141). Another major drive related to the 1970's oil shocks: at a moment when Brazil's energetic vulnerability was much higher than it is today, exporting manufactured products to Africa was a way of offsetting growing oil imports especially from Nigeria, which by the late seventies had displaced South Africa as Brazil's main commercial partner in the continent (Saraiva 1996, D'Ávila 2010). Brazil's pragmatic shift was, moreover, hastened by an immediate constraint: a geopolitical alliance between Sub-Saharan Africa and Arab countries that threatened Brazil with an oil embargo due to its "recalcitrant stances" on South-African apartheid and Portuguese colonization in Africa (Saraiva 1996, 159).

In Geisel's foreign policy, this shift was rationalized in terms of the doctrine of "responsible pragmatism", and allowed for moves that would be otherwise incomprehensible from a strictly ideological point of view. Thus, in November 1975, during the harshest period of Brazil's anti-communist military regime, it was the first Western country to recognize the independence of Angola – under a Marxist guerilla government, Agostinho Neto's People's Movement for the Liberation of Angola (MPLA). According to D'Ávila (2010), this was a belated attempt at redemption from the lack of firm commitment to decolonization in other parts of Lusophone Africa, which had bred acrimonious resentment from independence leaders from Guinea-Bissau and Mozambique to the point where the Brazilian government was not even invited to the latter's independence celebrations in June 1975. Even if Brazil's long-awaited gesture was made obsolete by the Carnation Revolution that happened months earlier, in April 1974,[97] the recognition of Angola's independence would, it was hoped, demonstrate to African leaders, to their Arab allies and ultimately the rest of the Third World that Brazil was not a "toy in the hands of U.S. interests in Africa" (Saraiva 1996, 160). A legacy of this moment was Brazil's special relationship with Angola, which persists to this day even with China's huge strides in that country during the past decade or so.

[97] This popular movement overthrew the Salazarist regime in Portugal and made untenable the continuation of colonization in Africa.

By the end of the eighties, however, the commercial ties achieved during the golden years of Brazil-Africa relations had come mostly undone. As it turned out, Brazil's 1970's economic miracle was short-lived, eventually collapsing under the weight of a severe and long-lasting debt crisis. Relations with Africa suffered accordingly, as economic recession sweeping both sides of the Southern Atlantic "cooled down Brazil's dreams of becoming a world power and crushed Africa's expectations of economic autonomy" (Saraiva 1996, 185). Relations would not re-intensify until Lula's presidency beginning in 2003. Like in the 1970's economic miracle, Brazil sees itself in a moment of economic and geopolitical emergence. But this time, in a changing international context where the North is arguably losing ground to so-called emerging powers, most notably China, it is hoped that such emergence will be for good – and so will the country's commitment with Africa.

In his latest book, Saraiva (2012, 110) even made a case for a rupture with Brazilian diplomacy's decades-old discourse on Africa. In his view, during the Lula administration there would have been a shift away from the fanciful culturalist idiom of affinities to a more realistic idiom of indebtedness. Rather than clinging to Africans' imagined contributions to Brazilian civilization, this new discourse would recognize "slavery, rather than the official cordiality of culturalist discourse" (111) as Brazil's fundamental historical link with Africa, as well as the unequal socio-economic inclusion of African descendants that unfolded from it. Indeed, during the last decade or so, the hegemony of the racial harmony ideology has been visibly shaken by the rise of race-based movements in Brazil. Affirmative action claims have gradually gained ground especially during the FHC and Lula administrations (1994-2010), most visibly in the form of quota policies in public universities and civil service. Yet, just as Brazil's diplomatic body has been, historically, a fertile ground for the proliferation of the culturalist grammar, it seems to be less permeable to these and other challenges to it. So how far have these recent discursive displacements gone in constituting a real shift?

My fieldwork experience indicated that Saraiva's recent celebration of a change in Brazil's discourse on Africa should be taken with a grain of salt. As himself one of the crafters and champions of this new discourse in policymaking circles,[98] this celebration is possibly better understood as an attempted self-fulfilling prophecy. As such, it tends to gloss over some of the ambiguities and contradictions that characterize what could perhaps be a transition to a different rhetoric. Although the displacements underscored by Saraiva are indeed perceptible, they do not seem to be sufficiently robust, widespread or concerted to constitute a shift. Sometimes what I heard in informal situations would even go in a direction other than indebtedness: claims about Africans' own responsibility in the trans-Atlantic slave trade, that Africans had (and in some cases, still have) their own slaves, and so forth. These and other fieldwork interactions indicate that it would be an overstatement to talk about the consolidation of a new discourse on Africa in Brazil's diplomatic and policymaking circles.

Different views on Africa coexist today, and, as all discourse in a Foucauldian sense, they will turn out to be right or wrong on account not of its referentiality and presumed historical accuracy, but of the particular balance of knowledge and power that eventually comes to prevail. It remains to be seen whether, in Brazil, such balance is really tipping or not, and in which direction. What is most likely however is that oscillations and ambivalences will continue to coexist for some time. After all, historically these have been the mark of Brazil's Africa policy,

[98] Saraiva was, for instance, part of the team that wrote up the IPEA and World Bank's *Bridging the Atlantic* report (World Bank and IPEA 2011). His latest book (Saraiva 2012) is part of a government-sponsored series on "Brazil's Strategic Partnerships", and is a hybrid of academic and policy work (cf. Cesarino 2013).

and there seems to be no clear evidence that, as I remarked in a review of Saraiva's latest book (Cesarino 2013), they would be coming to a Hegelian "end of history" of sorts during the Lula-Rousseff administrations.

Moreover, even if stripped of much of its racial harmony guise, the grammatical privileging of affinities and culture remains in place. In the case of South-South cooperation, part of this "inertia" – as Kabengele Munanga recently put it in a radio show on affirmative action in Brazil broadcasted to Francophone Africa[99] – might have to do with the selective and closed character of Brazil's diplomatic body (Moura 2007, D'Ávila 2010). This is largely true of diplomacy in general, but in Brazil it has come to a point where the Lula administration decided to take proactive measures for opening up Itamaraty to a more diverse pool of social segments.[100] In this sense, then, just as in the global North the narrative of progress "remains largely untouched" in aid organizations even while "tarnished in its native environs" (Rottenburg 2009, 80), in Brazil the culturalist grammar seems to have a certain sociological and institutional inertia linked to the self-reproduction of its diplomatic body.

Furthermore, in the contemporary re-intensification of Brazil-Africa relations under the rubric of South-South cooperation, certain elements of this discursive grammar might have found a renewed functionality. Assumptions about a shared history and culture come to occupy the not always confortable space of Brazil's actual historical engagement with Africa, marked by the ambivalences and contradictions described above. Just as the general principles of South-South cooperation provide some glue to an otherwise highly heterogeneous pool of emerging donors (cf. Chapter 1), Brazil's diplomatic discourse unites diverse cooperation initiatives in the absence of a common cooperation policy. Secondly, Brazil's contemporary rapprochement with Africa involves an unprecedented reach to regions that lie beyond its traditional relational scope, such as the Sahelian band, East and Central Africa, or the Maghreb. The idiom of historical ties and cultural affinities allows Brazilian diplomats and officials to talk about Africa at large based on the country's more restricted historical experience with certain parts of the African continent, most notably former Portuguese colonies and parts of West Africa. In this sense, it also seeks to lay a fertile ground for the flourishing of a relationship where before there was little of concrete to stand on.

Finally, Saraiva (1996, 93) hinted at how the ease with which policymakers' and diplomats' views were infused with the culturalist grammar might have been allowed by the vacuum of empirically-based knowledge about Africa. Even in Brazilian academia, much of African studies in fact refer to African-Brazilians, while knowledge about Africa has been gained second-hand from Northern literature. Many such knowledge gaps have been addressed to the extent that, in Saraiva's words written in the mid-nineties, "knowledge about Africa in Brazil is no longer on a par with that of nineteenth century British anthropology" (1996, 241). But the implementation of policies in this direction has been slow, and their reach, limited.[101] As will be seen in later chapters, in cooperation activities much of the knowledge about African realities has in fact come from the African partners themselves.

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[99] *Mémoir d'un Continent*, Radio France Internacionale, 1 Septembre 2012.

[100] These included changes in Itamaraty's entrance exams to make it more accessible to less privileged groups, such as racial quotas and lower foreign language requirements.

[101] The Brazilian government funded for instance the Portuguese translation of UNESCO's 8-volume General History of Africa, and is sponsoring the writing of a ninth volume. This oeuvre is supposed to subsidize the teaching of African history in Brazil's public schools – a mandate since a Bill to this end was passed during the first Lula administration. The new Law has not been fully enacted however, as adaptation of content to curricula and training of teachers have proceeded at a very slow pace.

Indeed, according to my field experience, unfamiliarity with contemporary and historical Africa remains the rule to a large extent; correspondingly, presumed knowledge about imagined Africa remains important. It must be remarked however that the significance and pervasiveness of official discourse is *organizationally and socially fragmented*: while the culturalist grammar has significant hold in political, intellectual and diplomatic circles, it tends to fade away as one approaches the frontline practice of cooperation. In other words, the purification of culture, which is possible and even functional at the level of official discourse, becomes problematic in on-the-ground circumstances where "cultural" elements cannot be easily separated from other domains in which relations between Brazil and Africa have historically played out, as shown in this section. The next will outline some others, based on my field interactions.

2.2 The double mirror in practice: culture/race in cooperation

As remarkable as the frequency of statements on culture (and its underbelly, race) during ritual moments performed by diplomatic and other officials was their paucity among those implementing projects and trainings on the ground. During fieldwork, this was rarely a generative topic of conversation with frontliners; cultural affinities (or differences) were not among their top concerns. For the most part, Brazilians were concerned with working with Africans rather than saving Africa or paying back a debt for their cultural contributions to "Brazilian civilization"; in them, I saw very little of the two extremes of romanticizing and racism. Similarly, African partners seemed far more interested in the technical knowledge and material resources that could be imparted by their Brazilian colleagues, or in networking with them for future opportunities, than to learn that capoeira was invented by African slaves, or that in parts of Brazil palm oil is a common ingredient in the regional cuisine – although they would no doubt appreciate trying it. In other words, if I wanted to find "culture" at the cooperation frontline, I had to literally squeeze it out of my field materials.

Like mostly everyone else, before going to Africa most Brazilians have very stereotypical images of the continent and its inhabitants. As I was told by a Brazilian running a farm in Ghana, as we met for lunch one day in the Accra Mall, "When we were looking for people to come work for us, whenever we said Africa, they would laugh. You know, most people in Brazil think they're going to come here and find only lions, zebras; never that you could be in a restaurant like this, eating a nice salad". Once there, the *cooperantes* would carry out their own, informal comparative exercises. Expressions of familiarity were common especially as they travelled around rural areas in West Africa; but these addressed certain contextual elements only, never the entire picture. Thus, while women carrying loads on the head are definitely a common view in rural (and even parts of urban) Brazil, there the child tied on to the back is missing from the picture. Mud houses can be found in many parts of the Brazilian hinterlands, but rarely do they have a round architecture like the ones most often found in the villages in Mali or Burkina Faso. Roadside vendors selling produce, handicrafts and manufactured products under fragile wood-and-straw shelters can be found along many stretches of road in Brazil, but their sheer quantity and the intensity of their displacement back and forth in Africa are unmatched.

As one moved from rural to urban areas, remarks about difference came more often to the fore: traffic, religious practices, or bodily techniques were favorite topics in informal comparisons. Nothing in Brazilian cities, for instance, like the *tro-tros* and *sotramas* (public transportation vans) that pack the streets of Accra and Bamako (which, in my experience, no Brazilian *cooperante* has ever made use of), or the profusion of motorcycles in Bamako and

Ouagadougou, the lack of protection helmets, and the quantity and quality of cargo they would sometimes carry. While Christian (Evangelical or Catholic) churches were more of a familiar view, Islamic prayer in Mali or Burkina Faso, especially collective outdoor sessions by the street side, would provoke surprise and curiosity. Women would cause amusement in their way of leaning down without bending the knees (in Brazil, people will most often squat or knee down), of walking swiftly around as if they did not have a load on the head and a baby tied to the back, or in their elaborate way of doing the hair and dressing quite elegantly for daily situations most Brazilians would find unnecessary.

For their part, African partners' impressions on things discourse assigns to the domain of culture did not seem to manifest a previously held, essentialized view on how a Brazilian culture or even a Brazilian race (phenotypically speaking) should look like. Partners working in the cotton project, for instance, seemed to have very vague images or conceptions about Brazil prior to their engagement with the project. Many of them had never heard of the kind of work Embrapa did, neither of the existence of the institution itself. When asked about it, those coming from the only C-4 country on the coast, Benin, mentioned some of the Brazilian names from returnees that could still be found in their country, and told me about the Brazilian soap operas showing on Beninese TV. Indeed, in West Africa Brazilian *feuilletons* shown in Mali, Benin, Burkina Faso or the Ivory Coast were quite popular. In Bamako, people would tell me about actors and actresses whose names I had never heard before, being four years away from Brazil. Whenever I had the chance to get hold of a TV, I would amuse myself watching Brazilian actors speaking French with each other for an African audience.

But by far, the single element that appeared most readily associated with Brazil in all countries I visited was soccer. In Ghana, posters showing Brazilian players were common views in the Accra landscape. In Bamako, rarely a day would go by without me spotting someone wearing the Brazilian team's yellow jersey. During fieldwork, this was the first topic of conversation with people on the streets and in public transportation as soon as they learned that I was Brazilian, and I lost track of how many times I was asked, "Why didn't your coach call Ronaldinho Gaúcho to the [2010] World Cup? That man is crazy!" (with which I would solemnly agree). The image of this player in particular could be easily found on walls, motorcycles and vans all over Bamako.

One could wonder why soccer and soap operas would matter in a study about cooperation in agriculture. But in a sought-for relationship that has little precedent, these and other elements that circulate in the global mediascape do gain some significance. Moreover, this is neither incidental nor new. Once, a taxi driver in Bamako was thrilled to tell me of the day he saw soccer star Garrincha perform when Botafogo played the Mali team in 1972. Indeed, during the golden years of Brazil-Africa relations, excursions of Brazilian clubs to Africa were a common strategy for diffusing a good image of the country in the African continent. Pelé was a poster boy for Brazilian manufacturers advertising in Nigeria in the seventies (D'Ávila 2010), and even today, this player stands as a champion of views on the absence of racial prejudice in Brazil. More recently, elite players from the Brazilian national team went to Haiti as part of Brazil's PR campaign as it assumed for the first time leadership of a United Nations peacekeeping force in 2004.

It is not a small thing to be the top title-holder of the world's most popular sport, and soccer is a language that is readily understandable all across the global South. I heard this idiom being deployed a number of times in cooperation activities. A *cooperante* in Brasília once explained to a group of African trainees that he liked "to measure hectares in terms of soccer

fields, because it's a language that everyone knows". Embrapa itself produced an institutional video, played to African trainees in CECAT and in other cooperation settings,[102] whose narrative thread was an analogy between soccer and agricultural development. Narrated in English, it begins with vintage footage of Pelé and Garrincha's wonders with the ball, which suddenly mutates into a researcher examining a plant in a green field: "It wasn't of yesterday that we began to do wonders in the fields. In order to improve our agriculture, we used our creativity to dribble our way around our adversaries: setbacks posed by climate and soil". While showing an animated world map of all countries, North and South, with which Embrapa had scientific or technical cooperation initiatives at the time, it continued with statements like "Embrapa is a great success abroad; it is even greater when playing at home", or "much to the joy of Brazilian fans, it is playing its part in ensuring the supply of staple foods, energy production and job creation." As the video comes to a close and one hears increasingly loud background music playing the Brazilian national anthem in samba rhythm, the narrator concludes during a shot of Embrapa employees wearing white coats with hands on their hearts: "And it is for this country, a star and master player in tropical agriculture, that we lay our hands in our chests and sing out with pride: Embrapa, scoring goals for years in Brazil and in other courts of the world". The video as a whole is remarkable for its *ufanista*[103] combination of elements typically deployed as tokens of national pride: soccer, samba, the national anthem (itself associated with soccer matches) – and now, tropical agriculture.

The fact however that Africans will most readily associate Brazil with elements that circulate in the global mediascape such as sports or television shows draws our attention to the contemporaneity of such connections, rather than any essentialist notion of centuries-old cultural affinities between Brazil and Africa. And even in the case of such a typically Brazilian "cultural specialty" as soccer, there is some triangulation with the North: all contemporary Brazilian footballers referenced by Africans played in European clubs. In fact, during fieldwork I ran into some clues as to how Africans' views on their Latin American partners seem to be equally refracted by the historical density of Brazil-Africa relations discussed in the previous section, which has always included the mediation of some hegemonic pole: first Portugal, then England, then the U.S. or the "West" at large.

This was first brought to my attention by a remark made by a Ghanaian researcher receiving training in Brasília in 2010. He had been there for a few days and was very excited about what he saw, especially in terms of Embrapa's research infrastructure. While telling me about his good impressions he mentioned how "here in Brazil, people are very free. It's not like other Europeans". "Free" was an adjective I heard a number of times while in Accra, used by Ghanaians to positively qualify themselves for foreigners ("Here in Ghana people are very free, you can be free, there is no problem"). Spontaneous expressions of mutual sympathy like that were not uncommon during the cooperation activities in which I participated; what surprised me in this case was his qualification of Brazilians as "other Europeans". Being a Brazilian myself, that was not something I expected to hear – aren't we a Southern country after all? What about our Africannness?

A couple of years later, as I travelled to West Africa for the last time, I asked one of the local researchers who was involved in the cotton project how was it like to work with the Brazilians. Other than issues with resource transfer and bureaucracy, he replied,

[102] It is available for instance in the Brazil-Africa Innovation Marketplace website: www.africa-brazil.org.
[103] *Ufanismo* is a genre of over-enthusiastic nationalistic discourse made popular during the First Republic (1889-1930), celebrating Brazil's unique potentials as a nation, its natural wealth in particular.

- It's great, they are really friendly and nice to deal with.
- That much?
- Oh yes, it's already legendary! You know, here in Africa when we see the white skin, we immediately think: colonizer.
- But in Brazil they were also colonized.
- I know, but it doesn't matter. It's white skin nonetheless. So, it still surprises us.

In one of the rare scholarly works about Africans' perceptions on Brazil, Anani Dzidzienyo (2002) argued that Africans tend to see Brazilians through a Euro-American mirror. This stems, he suggests, from the fact that few of the individuals who represent Brazil in past and present interactions with Africans – diplomats, businessmen, civil servants of all kinds – are in fact dark-skinned (also D'Ávila 2010). Indeed, this was the case not of most, but *all*, Brazilian *cooperantes* I met from Embrapa and the Brazilian Cooperation Agency. I would disagree however that this identification with Europe has to do solely with perceived racial characteristics; after all, albeit the chief one, whiteness is not the only sign of "Europeanness". From the perspective of practice, what this identification indicates is the fact that in these and other official initiatives of rapprochement, neither Africans nor Brazilians have a "wholesale" experience of Brazil and African countries; it is always a very partial view, perhaps even more than in the case of other travellers such as students or tourists.

Researchers and technicians from various African countries who came to Brazil for capacity-building trainings were ideally accompanied at all times by Brazilian staff during their working hours; even in the evenings or weekends they would check on them. Special transportation was provided at all times, and the choice of accommodation was made on their behalf. Even though choices (such as moving to a less expensive hotel in order to save on daily allowances) were not prohibited, they were highly discouraged. Besides the long working hours at Embrapa facilities or experimental fields, the circulation of trainees in Brasília and other cities was generally restricted to good hotels, restaurants, shopping malls, or touristic sites indicated by the Brazilian staff. Such controls on the African trainees' environment were not deliberately meant to hide economic, racial, and other kinds of domestic inequalities from them; they are part of the modus operandi of international cooperation more generally. Given the official status of such activities, there is a level of diplomatic responsibility for the safety and well-being of these foreigners (most of which did not speak Portuguese, and for many it was the first time outside of the African continent) that is manifested in the care and concern cooperation agents showed for them.

These conditions lend further sense to the abovementioned remark made by the Ghanaian researcher: while in Brazil, African partners circulated mostly in high to middle-class environments, where material infrastructure is notably superior to that found in lower-class urban peripheries or in much of the Brazilian countryside, and where the presence of blacks or dark-skinned *mestiços* is significantly reduced. Therefore, from this double point of view of perceived phenotypic characteristics and quality of material infra-structure – coupled with previous perceptions sedimented during African countries' much longer and intensive history of engagement with Europe –, it would make perfect sense that *those* Brazilians would appear as an odd kind of "European". If such classification as European concurs with the self-recognition of many Brazilians, on the other it runs counter the contrastive North vs. South rhetoric privileged by official discourse.

The can be said of Brazilian frontliners working in projects in African countries, especially those who travelled on short-term missions. Besides the local research institutes and occasional trips to selected farm areas, their environment included hotels, restaurants, souvenir shops, exchange bureaus and occasionally touristic sites and leisure places attended by other white expatriates. They also made exclusive use of hired transportation in order to circulate in town, and generally did not stray from prescribed circuits and guidelines. When I went on a mission as a translator for a Brazilian researcher in Burkina Faso, the schedule was all pre-established in terms of where to stay, where to eat, who talk to. This limited circulation had to do with language to some extent, since not all Brazilians spoke fluent English, and even fewer spoke French; outside of project activities, translation was not always available. Most had never been to Africa before, and occasionally it was even their first time outside of Brazil. These controls, that kept them separated from the daily routine of most Africans, were also ultimately related to health and safety concerns: Brazilian *cooperantes* go to Africa on official government duty, and indeed they have partly diplomatic status.[104] Therefore, like their African counterparts travelling to Brazil, most Brazilian frontliners also end up having a very partial view on the African countries where they work.

This is less the case of frontliners who had a longer-term engagement in cooperation activities. But neither would these, at least in my experience, bring racial-cultural considerations to the fore, unless requested to do so by the anthropologist. And even then, a more diverse mix of attitudes and imaginations could be found: from a loose reproduction of the spontaneous affinities argument ("yes, we get along pretty well with them") to perspectives that ran frontally counter assumptions of bounded cultural difference (or sharedness) in favor of a more universalistic, practical-oriented view that Africans "are just men like in anywhere else". Such diverse attitudes are evinced by the very concreteness and coevalness of the on-the-ground encounter between Brazilians and Africans – an encounter for which official discourse seems to lend little practical support.

In a piece problematizing some of the assumptions found in official discourse, Sá e Silva (2009) suggested that cooperation between countries from the global South might be facilitated not by shared cultural traits broadly conceived, but by closer "working cultures":

> Government officials or consultants from developing country A working in developing country B will be less upset about having to deal with reduced Internet connectivity, energy shortages, unpaved roads, reduced working hours, and, very important, a different timing (57).

This passage is remarkably reminiscent of commentaries about other emerging donors in Africa: for instance, "sometimes, the majority of these [frontline] experts come from China's grassroots level and are familiar with harsh conditions, and thus are able to adapt quickly to different environments in Africa" (Xiaoyun et al. 2012, 238). This kind of assumption is relatively widespread, and draws on a loose notion of "Third World culture" that would supposedly translate, in practice, into greater adaptability of emerging donors' frontliners to the "harsh environments" arguably found in Sub-Saharan Africa.

My fieldwork experience did indicate that most Brazilian *cooperantes*, especially agronomists, felt quite at ease in their working environments in African countries. But to

[104] Each is granted an official passport, which waives a visa in most cases.

seriously ascertain and generalize this presumed relative advantage of Southern developers beyond (informed or not) guesswork would entail comparative ethnographic research between South-South and North-South initiatives. Otherwise, to take claims like this at face value could mean sharing the self-romanticization of South-South cooperation discourse. I saw all kinds of individual reactions to bumpy roads, power outages, extreme heat, delays, lack and incompatibility of appropriate equipment, safety or health concerns, or bad traffic. But in all African countries I have been to, I also experienced good roads, great food, pleasant weather, very safe streets; quite commonly cooperation activities would unfold with no major problem of energy, equipment, or punctuality. The same is true for Brazil; working conditions vary according to the institution, the region, the epoch; but most importantly, there does not seem to be a pattern of responses to these and other practical conditions *based simply on one's nationality*.

If there is a difference – and even that is not a universal – it is to be found between project frontliners on the one hand, and management and diplomacy personnel on the other; or, as some of the Malians would have it, between *terrain* (field) and *bureau* (office) people. Brazilian *cooperantes* trained in field sciences such as agronomy or conventional breeding, who regularly engage with farmers as part of their work at Embrapa, and/or who have a personal background in rural areas in Brazil, seemed to be particularly at ease in their work environment in Africa. But Northern developers must be pretty aware of what they are getting into when they go to rural Africa to implement a project, and – differently from most Brazilian frontliners – they often have done it many times before. Even though assessments about the Brazilians' performance were usually positive, assertive views that they fared significantly better than their Northern counterparts were not a rule.

In sum, my fieldwork experience indicated, perhaps unsurprisingly, that more than the officials and intellectuals who indulge on discursive comforts, cooperation frontliners were the ones closest to having a "real confrontation with the time of the Other" (Fabian 1983, 153). Rather than being guided by predetermined notions about how relations between Africans and Brazilians were supposed to look like, this confrontation was partial to their own personal and professional backgrounds in Brazil and in African countries, as well as to the practical conditions in which their encounter happened.

Therefore, the gap between official discourse (with its affinities idiom focused on the domain of culture) and the heterogeneity of actual relations between Brazilians and Africans observed historically in the previous section also appears in contemporary South-South cooperation. One of this chapter's suggestions is that this stems from the fact that official discourse about Africa is never "about" Africa: on the one hand, it projects outwardly, on Brazil's international relations with Africa, a discursive emphasis that grew out of domestic concerns with internal colonialism; on the other, it stems from a broader relational configuration organized through the mediation of Northern hegemonic terms (and increasingly today, other emerging powers), from which Brazilians seek recognition.

The last section will lend further theoretical substance to this claim by looking at how this movement can be found at the very root of Brazilian diplomacy's deep and long-lasting interest in culture. This interest, traced to the ideas of the most influential ideologue of the Brazilian national character, Gilberto Freyre, are chief lenses through which Brazilians have looked at Africa since at least the 1930's (Saraiva 1993, Dziedzienyo 2002, D'Ávila 2010). In the remainder of this chapter, I will revisit this connection from a postcolonial angle, to shed another kind of light on the question of discourse, this time inspired by Edward Said's *Orientalism*. The

culturalist grammar popularized by Freyre will be taken as a model for the notion of nation-building Orientalism that I will advance here – a manifestation, at a discursive level, of the double directionality of (post)coloniality discussed in the Introduction.

2.3 Culture and nation-building Orientalism

It is hard to overestimate the influence of Gilberto Freyre's ideas on Brazil's self-image as a nation. Since Freyre published his inaugural masterpiece *Casa Grande & Senzala* (translated as *The Masters and the Slaves*), thousands of pages in several languages have been dedicated to praising or criticizing his legacy not only for intellectual but political and social life in Brazil.[105] In its relentless search for a positive self-representation of the country to be displayed abroad, Brazilian diplomacy has been particularly instrumental in raising Freyre's intellectual musings to official state ideology (Saraiva 1993, 1996, Dzidzienyo 2002, D'Ávila 2010). Elsewhere (Cesarino 2012c,d) I have suggested how both Freyre's original oeuvre and its subsequent popularization have been tied to postcolonial concerns stemming from Brazil's historical experience of double colonization (Santos 2002; cf. Introduction). Here I will retrace how the interest in culture Freyre bequeathed to Brazilian diplomacy has been shaped by a similarly multi-layered postcolonial topography, directed both inwards and outwards to the Brazilian nation-state.

In a well-known passage in the Preface to the first edition of *The Masters and the Slaves*, Freyre expressively conveyed the connection between the two aspects I would like to highlight: his borrowing of the notion of culture to counteract that of race, and his own personal awareness of subalternity as a Brazilian in the United States. I quote it at length:

> The scholarly figure of professor Franz Boas is the one that to this day makes the deepest impression upon me…. I do not believe that any Russian student among the romantics of the nineteenth century was more intensely preoccupied with the destiny of Russia than was I with that of Brazil at the time that I knew Boas. It was as if everything was dependent upon me and those of my generation, upon the manner in which we succeeded in solving age-old questions. Of all of the problems confronting Brazil there was none that gave me so much anxiety as that of miscegenation. Once upon a time, after three straight years of absence from my country, I caught sight of a group of Brazilian seamen – mulattoes and *cafusos*[106]– crossing Brooklyn Bridge. I no longer remember whether they were disembarking from the São Paulo or the Minas, but I know that they impressed me as being the caricatures of men, and there came to mind a phrase from a book on Brazil written by an American traveler: 'the fearfully mongrel aspect of the population'. That was the sort of thing to which miscegenation led. I ought to have someone to tell me then … that these individuals whom I looked upon as representatives of Brazil were not simply mulattoes and *cafusos*, but sickly ones. It were my studies in anthropology under the direction of professor Boas that first revealed to me the Negro and the mulatto for what they are – with the effects of the environment or cultural experience separated from racial

[105] Key commentators include Benzaquen de Araújo (1994), Souza (2000) and Burke and Pallares-Burke (2008).
[106] Term referring to the miscegenation between African and Amerindians.

> characteristics… It is upon this criterion of the basic differentiation between race and culture that the entire plan of this essay rests … (Freyre 1986: xxvi-xxvii).

After reading *Black Skin, White Masks*, Freyre's reference to the Brazilian mestizo sailors as "caricatures of men" has retrospectively stricken me as a somewhat Fanonian moment. But the situation here is different: it is not about seeing oneself being seen by a (racist) other, as tragically happened with Fanon in the train (Fanon 2008, 91). This was a member of Brazil's white elite looking at exemplars of the mixed-race Brazilian populace and seeing them as they would have been seen by a (racist) other – this time not a French child but an "American traveler". Freyre's gaze at the mestizo seamen is that of internal colonialism; but this inferiorizing gaze is itself profoundly shaped by another relation of subalternity, vis-à-vis a hegemonic other. In this sort of two-directional double consciousness – to use Du Bois's (1994) term –, the Creole elite intellectual's subjectivity is torn between these two relations, one where he is (to stick to Fanon's Hegelian universe) the master and the other where he is the slave, and where both counterparts (the Brazilian mestizo and the white American) are at once other and self to him.

In these recollections, a disheartened young Freyre would have been comforted had somebody convinced him that those men's "mongrel aspect" stemmed less from biology than from an unfavorable environment that made them "sick". A few years later, Freyre would – according to Pallares-Burke (2005), in retrospect – identify that somebody with no one other than Franz Boas, the founding father of American culturalist anthropology. In a context of "intense preoccupation" with "Brazil's destiny", Boas's defense of culture as an analytical alternative to race came in handy as a solution for the "age-old question" of miscegenation faced by Freyre and "others of his generation". At that moment in Brazil, race-based thinking was not only prevalent among many scientists and intellectuals, but sustained a whitening ideology that proposed the augmentation of the European component of the Brazilian population through immigration as a way out of the degeneration straitjacket imposed by miscegenation (Stepan 1991, Skidmore 1993, Pallares-Burke 2005).

The Master and the Slaves' tour-de-force therefore consisted precisely in turning what was up to then regarded as a hindrance to the flourishing of "Brazilian civilization" into a unique positive asset for the country's nation-building at a moment when this was in high demand.[107] The replacement of an analytics of race with one of culture allowed not only for discounting biological explanations according to which the solution to the problem of miscegenation would be a dubious whitening process,[108] but for a shift in self-consciousness whereby Brazil came to see itself as more "civilized" than racially segregated nations like the United States. Even though Freyre's story is itself more complex, what came down in history as Brazil's nation-building commonsense was the notion of the Brazilian *Volksgeist* as a harmonious mixture of the three races, with the African component occupying center stage side-by-side the Portuguese.[109] In the

[107] The 1930's are generally understood in Brazilian historiography at the moment when modernization took off, after the fall of the oligarchic, rural-based elites that monopolized the federal government seat during the so-called First Republic (1889-1930).

[108] Even this solution was questioned at that time, as the Portuguese, Italian, and other Latin peoples were seen by many eugenists as second-class whites (Pallares-Burke 2005).

[109] The third term – indigenous peoples – is not central for Freyre. About the way indigenous peoples have been incorporated in Brazil's internal colonialist imaginary (through the prism of state indigenist policies), cf. Ramos (1998).

miscegenation of races prompted by the Portuguese's supposedly inherent tendency to mix with tropical peoples (i.e., their colonial subjects) would lay Brazil's national character, its unique contribution to the Herderian garden of the common good – one could hypothesize, another echo of the Romantic vein Freyre shared with the Boasian school. As the dimension of culture was brought to the foreground, its underbelly – race (and racism) – became eclipsed without however disappearing: it became a spectral presence in Brazil's dealings with Africa and African-Brazilians.

As I have argued (Cesarino 2012c), Freyre's postcolonial thrust was therefore not anti-colonial strictly speaking, but was a response to a context of "double colonization" (Santos 2002, 144) where the cultural legacy of the former Portuguese metropolis became not only a sort of "friendly colonialism", but itself an element of subaltern affirmation vis-à-vis a new hegemony, that of Western Europe (and then U.S.). But *The Masters and the Slaves* was also predicated on a sort of *internal* postcolonial thrust whereby Freyre tried to simultaneously rescue the lost prestige of his own subaltern region, the Brazilian Northeast, by elevating the status of its culture from regional to national. Colonial sugar estates in the Northeastern coast are, after all, the stage on which the foundational myth of Brazilian nationhood is played in Freyre's masterpiece. By the time he was writing it, this region had long lost the political and economic weight it held during colonial times to Rio de Janeiro and São Paulo in the Southeast. From the standpoint of this new domestic hegemony, the Northeast came to be seen in terms of the same dichotomies through which Brazil saw itself in relation to Western normativity – traditional/modern, backwards/progressive, rural/urban (Albuquerque Jr. 1999, Silva 2012).

Finally, a couple of decades later, Freyre's ideas folded back into Portugal's own colonial imaginary: while his 1933 classic focused on the cultural formation of the Brazilian nation, from the 1950's onwards similar claims were extrapolated to the second wave of Portuguese colonization, in Africa and Asia (Freyre 1953, 1961). *Lustropicalismo* thus became a transnational alternative to Western European normativity based on "a distinct mode of 'assimilation' engendered by the Portuguese colonial presence in the tropics based on the three pillars of miscegenation, cultural fusion and absence of racial prejudices" (Pimenta et al. 2011, 226). Just as the racial harmony ideology appealingly catered to nationalist appetites in Brazil, Lusotropicality was eagerly taken up by the ideological apparatus of the Estado Novo regime (1933-1974) to shore up its colonial project against mounting independence struggles in Africa and international pressure by, among others, the United States, the United Nations, and the nascent non-aligned movement.[110] Many Brazilians joined Portugal's ranks in this ideological struggle, not the least Gilberto Freyre himself, who "found a patron in the Portuguese government, and seized upon what he saw in the Portuguese African colonies as a present-day laboratory demonstrating the processes of cultural and racial mixture that he described in colonial Brazil" (D'Ávila 2010, 15).

Freyre's vulgarized after-life in Brazil and in Portugal unfolded largely through channels like diplomacy, the educational system, and dimensions of popular culture such as music or soccer (Saraiva 1993, Vianna 1999, Pimenta 2001, Maranhão and Knijnik 2011). As is often the

[110] At this particular historical juncture (i.e., sixties and fifties), *lusotropicalismo* painted a picture of Portuguese colonialism not only as less racist and violent than its Western European counterparts, but as a "form of resistance against both the 'barbaric' Soviet communist influence, and the also 'barbarian' process of Americanization and capitalist expansion" (Vale de Almeida 2008, 7). Freyre's major works on Lusotropicality were written in the aftermath of a 1951-2 tour to Portugal's colonies in Africa and Asia sponsored by the colonial government, at that moment under the authoritarian grasp of António de Oliveira Salazar.

case, in this process of popularization the richness of Freyre's genius was reduced to a simplistic, usable version. As such, it was able to circulate farther and amalgamate into later waves of nation-building and international projection efforts in Brazil and elsewhere, reaching up to present South-South cooperation activities. Along this way, as we saw, contradictions inevitably sprang up between such imaginations about Africa and Brazilians' concrete engagements with Africans.

The way Brazilians' views on Africa have been infused by Freyre's ideas is highly suggestive of parallels with Edward Said's *Orientalism*. In this, I am particularly inspired by Said's claim that when the West looks at the East as its other, it sees it less in its coeval actuality than in terms of imaginations that have more to say about the seers than those who are being seen – that respond "more to the culture that produced it than to its putative object" (Said 1978, 22). Thus, as in Orientalism, in Brazil's official discourse on Africa the latter does not always figure as an actual, coeval, heterogeneous continent; much too frequently, it is an imagined Africa, homogeneous and frozen in time somewhere between the sixteenth and mid-nineteenth centuries – when the last wave of African slaves arrived in Brazil. But differently from Said's original notion, this imagination stems not from the imperial impetus of Western powers, but from ideologies supporting the construction of Brazil as a nation, and more specifically, the place of Africans in it. Here, the African appears less as an ambivalent other (as in Europe) or as a clearly distinct part of the self (as in the U.S.) than as part of a hybrid self that is distinguishable through dimensions like arts, music, bodily techniques, food, language – in one word, culture.

Here I will refer to this modulation of Orientalist discourse as *nation-building Orientalism*. Nation-building has been a more commonly deployed term to describe the historical process that I am otherwise referring to here, following subaltern studies and Latin American postcolonial scholars, as internal colonialism (Stavenhagen 1965, Cardoso de Oliveira 1972, Mignolo 2000, Santos 2002). This terminological option conveys more clearly what is for me the key contrast vis-à-vis Said's account of Orientalism: the empire-building character of British, French and U.S. discourse on the Orient. Other than that, the discursive mechanics follows similar lines, and the nation-building version of Orientalism may be even thought of as a historical outgrowth of it. Said himself had suggested as much when he envisaged the potential of this kind of discourse to travel beyond hegemonic centers and be appropriated by the subaltern: in *Orientalism*, he had wished to call the attention of "formerly colonized peoples" to "the dangers and temptations of employing this structure [Orientalism] upon themselves or upon others" (1978, 25). This is precisely what Brazil and other post-colonial nation-states have done, in relation to subaltern groups such as Afro-descendants and indigenous peoples (e.g., Ramos 1998). But as our discussion of Freyre has shown, the addressee of nation-building discourse is not limited to those who are being internally colonized. This inward coloniality implicates an outward one, directed to hegemonic centers in relation to which post-colonial nations see themselves as subaltern, and from which they seek recognition. To become a donor is, as I have suggested in Chapter 1, one of the ways in which this pursuit of recognition has been currently carried out by Brazilian diplomats.

2.4 Concluding remarks: on culture's postcolonial lives

Much of the mismatches and contradictions pointed out in this chapter, both historically and contemporarily, have to do with the notion of culture implicit in Brazil's nation-building Orientalism. The culture Africans are assumed to share with Brazilians has an essence, is

bounded, and has changed very little throughout the centuries; it has an ontological quality that is conducted through specific material and ideational channels (food, language, music, sports, religion, bodily techniques), being therefore separable from other domains like politics, the economy, and so forth. Although anthropologists have helped create it, this is a notion of culture that most of them have abandoned by now. Norbert Elias's (1994) classic historical discussion of the emergence of the German *Kultur* in opposition to the French and English civilization or *civilisation* had already pointed to how culture has always been, from its modern beginnings, fundamentally political: a productive notion in certain historical formations attending to situated political stakes; in short, a cultural politics.

The foregrounding of presumed affinities in the domain of culture prevalent in Brazil's views on Africa may seem to fall in line with academic arguments stressing the centrality of non-textual forms of "embodied subjectivity" in Africa's trans-Atlantic diaspora, in prominent works such as Gilroy's *Black Atlantic* (1993, 76).[111] But from the point of view of this dissertation, what it indicates most forcefully is the peripheralization of both regions during the rise to hegemony of the West, and its dominance in other dimensions such as (industrial-capitalist) economy, (liberal-democratic) political institutions, and (techno-scientific) knowledge. Thus, what would be the proper terrain for relations across the Southern Atlantic was eventually left to what is understood, according to Western modernity's normativity, to belong to the domain of culture (or, as we shall see, nature). This is also linked to the fact that, to a large extent, it is in this dimension that African-Brazilians have most often excelled in Brazil. Both fieldwork and the historical literature show that Brazilian diplomats, government officials, businessmen, or technical professionals were and are mostly fair-skinned; most black Brazilians involved in cooperation with Africa, on the other hand, have been "cultural" agents such as athletes, musicians, or actors.[112] In other words, internal coloniality has largely reproduced its external counterpart, which relegated Africa itself to the most peripheral end of the world system (Ferguson 2006).

One of my suggestions therefore is that the insistence in bringing culture to the fore of Brazil-Africa relations is an outwards projection of an unresolved internal problem of how to deal with Brazil's domestic race relations – what I wished to indicate here through the notion of nation-building Orientalism. In this sense, the problem is not that questions of race and culture have been misplaced or misconceived in Brazil's diplomatic discourse on Africa; it is, rather, that these should not have been there at all, at least not at forefront position they have occupied throughout the decades. In this sense, assertions that domestic race-based movements would be an "internal arm" of Brazil's Africa policy (Saraiva 2012, 111), or that *quilombola* communities and other African-Brazilian groups should mediate South-South cooperation efforts (Cabral and Shankland 2012), may make little practical sense, especially in technical fields like agriculture.

Besides concealing a generalized lack of knowledge about actual Africa, this kind of discourse discourages the intensification of public debate on South-South alignments and Brazilian foreign policy at large (Penha 2011, 18). Indeed, Brazil's views on, and policies for, Africa have not been nearly as thoroughly subjected to internal debate and critique as has been

[111] An important lacuna in Gilroy's account relates precisely to technique (and technology), which is after all also a form of embodied knowledge. Historical studies such as Carney's (2001) have been gradually filling this gap.
[112] I have mentioned the exception that proves the rule, ambassador Dantas. Besides the already-mentioned Pelé, D'Ávila's (2010) account also mentions the participation of other African-Brazilians in diplomatic initiatives such as the decorated Olympic athlete Adhemar Ferreira da Silva.

the case for instance of Europe's Africa Orientalism.[113] A debate of this kind would be important not for the sake of critique per se, much the less for gratuitously "bashing Brazil" – as I was surprised to hear once from a senior anthropologist in Brazil. If anything, an awareness of the contemporary complexity and historical density of Africa and of its relations with Brazil would be important as a "reality check" (Olivier de Sardan 2001, 733) and beacon for field and office operators, as well as policymakers, involved in the provision of cooperation. I disagree however that this knowledge gap should be filled exclusively, or even predominantly, by the hiring of development experts and consultants.[114] For the reasons discussed in Chapter 1 (and in Cesarino 2012a,b), I would give precedence to the learning that is already taking place on the ground, especially since much of knowledge production subsidizing Brazilian projects in Africa has occurred directly between Brazilian and African frontliners, with little mediation from specialized bureaucratic apparatuses (cf. Chapters 4-5).

In *Orientalism*, Said disparaged at the "total absence of any cultural position [in the West] making it possible either to identify with or dispassionately discuss the Arabs or Islam" (1978, 27). As this chapter suggested, in Brazil such passions are generally reserved to domestic debates, such as the recent ones on racial quotas. In this case, cultural domination in the sense put forth by Said is less about Brazil's relations with Africa than about internal power relations. His assessment therefore does not necessarily hold for Brazil's nation-building Orientalism on Africa. My experience with cooperation frontliners convinced me, on the contrary, that it *is* possible to have a less fanciful and passionate view on Africa and its problems. Whether this virtuality will be in any way actualized, is a whole other story. In order for this to happen, relations with Africa(ns) will have to multiply and become robust enough to outgrow the discursive hold of nation-building Orientalism – in other words, to *create more of a context for itself*.

Indeed, this is how the remainder of this dissertation will look at cooperation activities at the frontline. The next chapter will suggest how early steps in this context-making direction were being taken by contemporary *cooperantes* working in the domain of agriculture, during capacity-building trainings and other technical cooperation activities implemented by Embrapa. Significantly, in this case there was a discursive privileging of dimensions other than culture, such as natural environment and developmental temporality. And even though Embrapa's official discourse remains, as Itamaraty's, fundamentally based on an affinities idiom, as one moves to the frontline of its cooperation activities analogies between Brazil and Africa turn from Orientalist assumptions detached from practice into the very "stuff" on which the *cooperantes* work.

[113] This literature is quite extensive; reference works for anthropology include Mudimbe (1988), Comaroff and Comaroff (1991), Fabian (2002), or Mbembe (2001).
[114] As suggested for instance by Cabral and Shankland (2012).

Chapter 3

Demonstrating Development: Agriculture in the Tropical Savannahs

If culture has been the object of ample investment by Brazil's official discourse on Africa throughout the decades, in contemporary South-South cooperation its ontological double – nature – has joined it on center stage. This chapter will discuss how these two sides of the modernist divide (Latour 1993) have been articulated in the case of a particular socio-technical sector, agriculture. In this regard, official discourse has been also based on claims to similarity and sharedness, but privileging two other domains: natural environment and the temporality of peripheral development. Many of these assumptions are also shared by other emerging donors (Mawdsley 2012), but in the case of Brazil-Africa relations the focus has been on a particular developmental experience: agriculture tailored to the tropical savannahs, the Brazilian version of which is called *cerrado*.

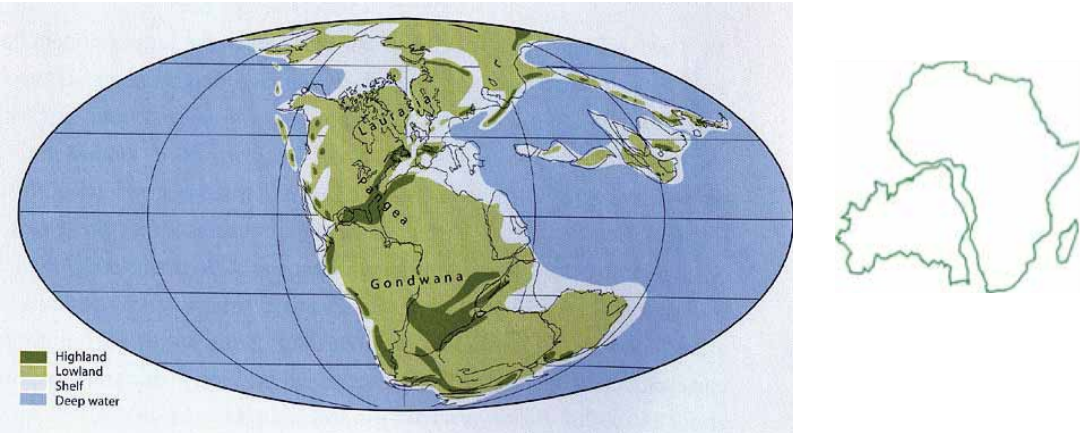
This chapter will begin by looking at how narratives about nature and the temporality of development appeared in official cooperation documents and studies, and in the capacity-building trainings held in Embrapa's new center in Brasília. Here, the work of *cooperantes* largely involved demonstrating Brazil's agricultural experience, and proposing a comparison with its African counterparts. For the most part, this exercise did not take the form of taken-for-granted analogies based on long-held imagined affinities, such as in much of Itamaraty's discourse on culture. But neither was it based on standardized methodologies framing African realities according universal expert knowledge aimed at planned intervention, as with much of traditional development aid (cf. Chapter 1). It involved, rather, the *demonstration of a situated experience*: that of Brazil's *cerrado* agriculture, in which Embrapa itself played a major part.

As will be argued, more than "rendering technical" (Li 2007), these demonstrations ended up rendering explicit much of the heterogeneity that underlays any developmental experience, through necessarily selective and situated context-making and scaling operations grounded in the Brazilian *cooperantes*' own experiences and politics. For this, they drew less on general guidelines found in cooperation policy than on Embrapa's own domestic experience as a public research (and, to a lesser extent, technology transfer) institution. As will be suggested, this experience has sedimented particular strategies, based on demonstration, for dealing with its main sponsor (the state), the public at large, and various kinds of Brazilian farmers. These demonstrations were not mere contemplative exercises, however. In the case of South-South cooperation, they had a performative intention: to entice the African partners to join in and extend the comparative effort being proposed from their own situated perspectives. Therefore, rather than inscribing a divide between "trustees" and those "subject to expert direction" (Li 2007, 7), this modality of engagement requires the active participation of recipients in order for it to gain any robustness – something for which Brazilian cooperation's "hands off" approach shows mixed possibilities.

3.1 Shared nature: the tropical savannah

The way natural similarities between Brazil and Africa have been portrayed in official cooperation discourse cuts across a wide range of environmental elements, from geology to

climate, from soil to vegetation. Rather than incidental, these are regarded as part of a shared environmental history, being therefore less about analogy than about contiguity in time and space. The picture below, from a report on Brazil-Africa cooperation published by the World Bank in collaboration with a Brazilian think-tank (World Bank and IPEA 2011, 2), was accompanied by the caption: "Millions of years ago, Africa and Brazil were joined together in a single landmass":



Picture 2. *Bridging the Atlantic*: Gondwana (on the left) and chapter logo (on the right) (World Bank and IPEA 2011, 2).

Before the World Bank/IPEA report was released on December 2011, I had already heard this sort of origin myth of Brazil-Africa relations during cooperation activities: how, as in a very easy jigsaw puzzle, the Eastern coast of Brazil and Africa's West fit each other perfectly, united as they once were before the Atlantic Ocean came into existence. This assertion of a shared geological past paves the way for a variety of other claims to environmental similarities across the Southern Atlantic.

The same report goes on to affirm that "the two regions are natural partners with strong historic and cultural links and similar geological and climatic conditions. Because of these shared conditions, Brazilian technology is easily adapted to Africa" (World Bank and IPEA 2011, 10). Here, the presumed naturalness or spontaneity of the relationship between Brazil and Africa, noted in the previous chapter with respect to historical and cultural ties, is extended to the realm of nature through a stress on "similar geological and climatic conditions". Together, these shared natural-cultural conditions suggest that contemporary South-South cooperation would only be actualizing a potential that had always been there, and – most importantly – that would translate, in practice, into a presumed smoothness in the adaptation of Brazilian agricultural technologies to African contexts. This discursive thread can be found over and again in official cooperation documents and statements, especially from Itamaraty. The imagery included in the logo of Embrapa's Africa-Brazil Innovation Marketplace, for instance, is also evocative of this:

Picture 3. Brazil-Africa Innovation Marketplace logo (www.africa-brazil.org).

In Brazil-Africa cooperation materials, the highest currency of the natural similarities assumption refers less to geology than to edaphic-climatic conditions. The latter are normally cast under the rubric of *tropicality*, of a tropical environment shared between the two regions and expressed in arguably similar patterns of soil, vegetation, and climate. Like most everything else in contemporary discourse, the pervasiveness of the trope of the tropics is not something new. During what Saraiva (1996) called the golden years of Brazil's Africa policy in the seventies, the idea of tropicality was extensively deployed in both political and commercial forays. Brazilian manufacturers, for instance, would target Nigeria's burgeoning consumer market by advertising domestic appliances especially suited to tropical areas. According to one of the ads from that period, which brought soccer star Pelé as poster boy, these appliances, "tested at the source: a tropical country, Brazil", were made to work "no matter the conditions of heat, humidity and voltage fluctuations" (D'Ávila 2010, 240-1).

The notion of tropicality to qualify natures and peoples existing at a certain latitudinal range of the globe is, as many have shown (Stepan 2001, Anderson 2003), part of Europe's "discursive construction of tropical nature" (Stepan 2001, 34) during its colonial outreach to the New World, and then to Asia and Africa. This has involved a view on the tropics as an environment radically different from that of Europe, "where the superabundance of nature was believed to overwhelm human endeavor and reduced the place to nature itself" (Stepan 2001, 34), and whose inhabitants were closer to nature than those living in temperate regions. Even if, like in Freyre's *lusotropicalismo* (Chapter 2), when appropriated by the colonized the notion of tropicality may have been pressed into a different kind of (postcolonial) service, this has not meant a clean break with the colonizer's view. It is remarkable for instance how, even in today's cooperation discourse, claims to similarities between Brazil and Africa typically evoke dimensions similar to those foregrounded by their European predecessors: either nature, or "softer" social spheres like culture.

This movement of postcolonial re-appropriation of the tropical can also be found in the domain of agriculture, especially in Embrapa's status as a world-class institution in research and development of technologies appropriate for tropical agriculture – a reputation for which the institute has made not only significant investment in technical training and research, but also in PR and communication. Since much of Sub-Saharan Africa shares Brazil's tropical nature, Embrapa's singular R&D achievements are promoted as a comparative advantage of Brazilian cooperation not only over Northern aid, but also over other emerging donors that are not situated

in the tropical strip such as Russia, Arab countries, Eastern European countries, or, in part, South Africa and China.

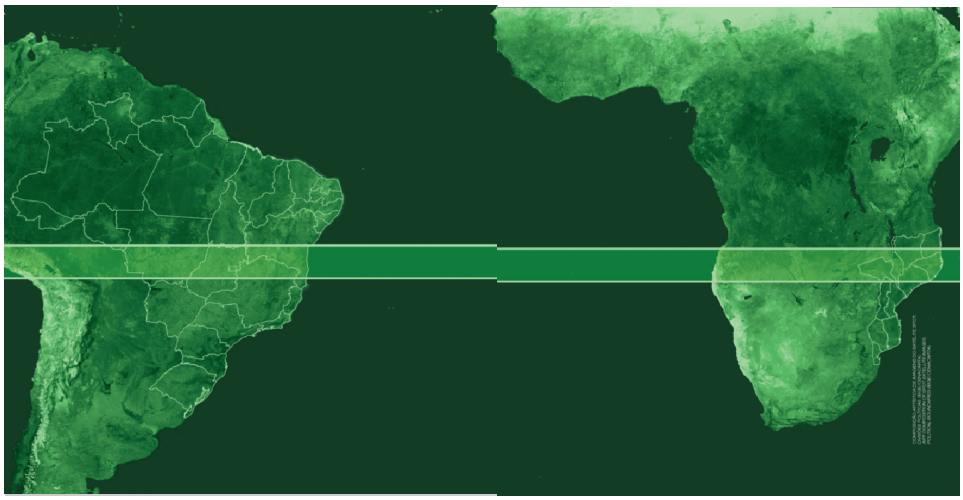
But while the emphasis of Stephan's (2001) remarkable account of Europe's Orientalist views on tropical nature is on Latin American forests, where nature is mysterious, sumptuous and overwhelming, in Brazil's cooperation the pride of place is reserved to the tropical savannahs. And the reason is no mystery: it was on the Brazilian savannahs – the *cerrado* – that the biggest expansion of the country's agricultural frontier happened, during the last quarter of the past century. Here, views reproduce, again, Europe's "nature Orientalism", for instance in their ambivalence: tropical nature is both generous and plentiful, and unruly and wild. Thus, while early colonial investments in cotton and other cash crops in Sub-Saharan Africa were based on a poorly grounded "belief in tropical abundance" (Isaacman and Roberts 1996, 14), Europeans quickly learned about the great effort required to make agriculture succeed in tropical environments. By the mid-twentieth century, on the eve of Embrapa's inception, there were even doubts as to whether a high-productivity kind of agriculture along the lines of that found in temperate regions could ever thrive in tropical areas. As Embrapa's PR extensively highlights, Brazil's experience would prove it wrong: differently from the rainforest, the Brazilian savannah has been fully conquered by technique, turning from a barren wasteland into Brazil's (and now part of the world's) thriving breadbasket.[115]

Even if Brazil has run agriculture projects in all corners of the African continent, the savannahs have been indeed the privileged biome, both discursively and practically. Discursively, it has been the preferred locus of assumptions about natural similarities and the possibilities of reproducing Brazil's developmental experience in Africa. It has also been the stage for Embrapa's two largest projects in the continent: the Cotton-4 in West Africa and the Pro-Savannah in Mozambique. It is in a recent Embrapa study on the Nacala corridor in Mozambique called *Paral**elos***[116] that we find what is probably the most outstanding expression of the spatial dimension of such claims to similarities (Batistella and Bolfe 2010).

The book itself is an interesting hybrid of technical and political document; different from regular scientific works, its hard copy design is beautifully designed, and indeed it has been the object of much ritual gift-giving between Brazilian and African officials since it was released in 2010 (and not only Mozambicans; it is in fact bilingual, Portuguese-English). As the picture below, reproduced from the book, elegantly conveys, Brazil and much of Sub-Saharan Africa are situated along the same latitudinal strip. The almost point-by-point coincidence between the Nacala Corridor in Mozambique and Brazil's Center-Western *cerrado* is highlighted in light green, between latitudes 13-17 S:

[115] An article in *The Economist* that circulated widely in 2010 titled "The Miracle of the *Cerrado*" is a good illustration of this kind of argument. Many in Brazil, including Embrapa researchers I met during fieldwork, would contest this image of the *cerrado* as a wasteland, which is often evinced through sa contrast with the luxuriousness of the rainforest. They have called attention for instance to how the apparent uniformity and poverty of the *cerrado* landscape hides not only a significant store of unique biodiversity, but a major underground reservoir of carbon and biomass (for this reason, the *cerrado* is sometimes described as an "upside-down forest").

[116] The word in the title, *Paral**elos***, encapsulates a polysemy that is only partly captured in English; while "parallel" in both Portuguese and English has the double sense of comparison and of geographic latitude, the second, bolded syllable – "elos" – means "links".



Picture 4. Brazilian *cerrado* (states of Mato Grosso and Goiás) and Mozambican savannahs (Nacala corridor) (Batistella and Bolfe 2010, 32-33).

Each map included in the book brings a spatialized overview on soils, relief, climate, land use and cover, accompanied by ground level pictures of landscapes (and some farmers) found in Mozambique. These spatial paralleling devices, especially in the form of comparative maps, were quite common in official documents (such as the 2011 World Bank/IPEA Report) and power point presentations showed in CECAT.

These abstract parallels do find some experiential resonance on the ground. Rural landscapes in Mozambique and elsewhere in Sub-Saharan Africa, such as in the numerous ground level pictures displayed in *Paral**elos***, can be remarkably similar to those found in many parts of Brazil. An Embrapa researcher once told a group of Ghanaian trainees about a trick he played with his friends after returning from a trip to Angola, where he would show pictures of natural landscapes and have them guess whether they had been taken there or in Brazil; according to him, they would often be clueless. Indeed, as a Brazilian myself I could not avoid sharing such sense of déjà vu, especially when travelling by road in West Africa. If, as remarked in the previous chapter, even the human landscape in rural areas sometimes evoked impressions of familiarity, resonances in terms of topography, plants, animals, waters, and weather were almost absolute. Such comparative exercises were quite common in informal conversations between the Brazilians in all West African countries I visited. "It's the same thing, the very same thing", one of the Embrapa researchers put it categorically. He paused. "But only there [in rural areas]. When we come to town, it's all different."

These micro-impressions expressed by Brazilians working in Africa echo a macro-trend formulated by academics: as one moves from nature to society, from rural to urban areas, similarities become less evident and may, at certain points, turn into sharper divergences. If one takes society here in terms of domains like (geo)politics or the economy, for instance, Africa's historical experience may seem to share more with that of Asia – and indeed, the latter is a favorite comparative counterpoint in academic and policy debates on economic development in Africa.[117] Both continents ushered into national independences at around the same time, ended up split into many nation-states divided by largely arbitrary borders, and the pioneering

[117] For instance, Mkandawire and Soludo (1999). The comparison is also common in World Bank reports and other documents produced by the international development community pipeline, and more recently, emerging donors (e.g., Xiaoyun et al. 2012).

experiences of India and other parts of the British and French colonial empires effectively played a part both in enticing liberation struggles and in shaping the politico-institutional legacy of colonialism in the African continent (Mamdani 1996). Indeed, there is much debate among Africans as to why much of post-colonial Asia has succeeded in developing itself, while their own continent was left behind. In my experience, comparisons with Brazil or Latin America along the same lines are much less frequent; in *The Wretched of the Earth*, Fanon even mentioned Latin America as an example *not* to be followed by the newly decolonized world.[118]

This recognition of diverging histories is not commonly manifested in official discourse. Instead, it continues to draw on an affinities idiom to claim that, as peripheral countries, Brazil and its African counterparts share similar developmental challenges.

> Because the problems faced by Brazil in past decades overlap with many of those today in countries from the global South, the solutions found through Brazil's innovative public policies tend to be useful to southern countries. This is especially true in Africa and South America, where cultural, historical, demographic, geological, and socio-economic links with Brazil are strong (World Bank and IPEA 2011, 39).

This is a temporal counterpart to the shared environment claim made in spatial terms for the tropical savannahs. But this supposedly shared temporal dimension is less that of nature than that of development – more precisely, of peripheral development. Here, space and time are rearticulated in the presumption that the developmental experience of *cerrado* agriculture, which happened relatively recently in Brazil but whose roots stretch way back before the seventies, could be reproduced today in the African savannahs.

3.2 Shared temporality: peripheral development

Perhaps even more than the assumption about shared cultures or natures, that of a shared development timeline seems to be the most widespread in South-South cooperation at large; after all, potentially it can encompass the entire global South. It is based on the assumption that, along their peripheral developmental path, emerging countries such as Brazil would have "accumulated expertise that could be shared with other southern countries facing similar challenges" (World Bank/IPEA 2011, 44). As with other discursive claims, this may stand for a shared past between world regions that have in fact come into closer contact only recently, such as Brazil and countries outside of its historical areas of influence in Africa. Here, such un- or little-connected pasts are brought together by an abstract universal scale: the modernization timeline, which once ranked all countries according to a same classificatory grid of developed, developing, and underdeveloped.

This common scale can be indeed regarded as an effect of Western discursive hegemony (Escobar 1995), sustained by an apparatus of economic and military dominance during Europe and the U.S.'s colonial and imperialist expansion. But the assumption of a shared development timeline present in the discourse of today's emerging donors is neither an imposition from the North, nor a mystifying, contradictory legacy of their colonial pasts. Much to the contrary, it is a

[118] In independent Latin America, Fanon saw a "semicolonial state" (2007, 117) where former colonizers merely gave way to national elites dependent on foreign capital and markets, therefore leaving untouched the subordinated status of the masses. In the idiom deployed by this dissertation, he saw the persistence of coloniality in the form of internal colonialism.

strategic deployment that aims to (re)draw a line between North and South, this time to the latter's benefit. This move in fact echoes another one, which took place over fifty years ago: in his mythic 1949 Point Four speech, which arguably first named international development as such (Escobar 1995, Sá e Silva 2009), President Truman called for putting the United States' "store of technical knowledge" to the service of developing nations (Cooper and Packard 1997, 8). And just as, speaking in the immediate aftermath of the World Wars, he was "keen to distance his project from [Europe's] old-style imperialism" (Gardner and Lewis 1996, 6), today's emerging donors strive to differentiate South-South cooperation from "old-style" – that is, Northern – development aid.

Like the U.S. in the aftermath of World War II, Brazil and others regard themselves, and are largely regarded, as emerging powers in a context of geopolitical and geoeconomic re-accommodation. But the U.S. never thought of itself as part of the Third World, while for emerging donors of today belonging to the same geodiscursive space as the world's poorest countries – the global South – is at the very core of their self-assigned identity as donors. The narrative of modernization theory had allowed Truman to arrange the rest of the world along the same scale as the U.S.. But with Europe ruined by war, the American president was speaking alone at the top of the development ladder: this is what allowed him the "god trick" of claiming that his country had the (technical) solutions for everyone else's ills (Escobar 1995). Emerging donors, on the other hand, do not regard themselves as being at the top; but rather than being a handicap, it is this precisely this "subaltern expertise" Mawdsley (2012, 158) that would make them better donors than the U.S. and the rest of the global North. And just as in the thirties Freyre's culturalism frontally contested prevailing racial paradigms imported from Europe in order to turn a peripheral experience into a positive asset vis-à-vis central models, South-South cooperation today is partly built on a claim of failure of the world development project championed by the global North since Truman's times.

In this sense, it can be argued that South-South cooperation rides the wave of the decoupling of the two axes of the modernization timeline – that of time, and that of status – claimed by Ferguson (2006) for contemporary globalization.[119] Ferguson argued for this decoupling in terms of a discursive and practical failure of the original, all-encompassing, unilineal modernization project. This recognition of failure would hold more, however, for *some* regions of the global South, while others would be still "offered a role in the convergence narrative" (184); epitomes of these poles would be Sub-Saharan Africa on the former, and emerging economies such as the BRICS on the latter. But while "no one talks about African economic convergence with the First World anymore" (183), this is precisely what emerging donors have been talking about: this time, in relation to themselves rather than to the First World.

Emerging donors do reject the notion of a single, un-situated "package" (Ferguson 2006, 183) solution to the world's problems along the lines of modernization theory. But as much of what goes on in South-South cooperation, this movement is highly ambivalent, since provincializing the North's development god trick does not imply a rejection of the achievements

[119] According to him, with contemporary globalization there has been a shift away from modernization theory's narrative of a point-by-point coupling between time and status (so that the Third World would one day reproduce wholesale the First World's development experience). In its place, "once modernity ceases to be understood as a *telos*, the question of rank is de-developmentalized, and the stark status differentiations of the global social system sit raw and naked, no longer softened by the promises of the 'not yet'" (Ferguson 2006, 186). Modernity, in this context, appears for Ferguson "not … as a set of wonderfully diverse and creative cultural practices" - as multiple modernities perspectives would have it - but "as a global status and a political-economic condition: the condition of being 'first class'. Some people and places have it; others don't. The key issues are of membership and rank" (187).

of modernity as such, especially in technical fields like agriculture. While modernity is, as Ferguson suggested (2006, 188), indeed decoupled from a teleological timeline that follows point-by-point the North's path, this is not about coeval societies negotiating separately their own brand of modernity either. In South-South cooperation discourse, the developmental experience is resituated in time and space according to each country's national developmental experience, against the backdrop of a historical experience of being at the world's peripheries that is presumably shared by all of them.

Indeed, during fieldwork, in all sorts of technical and non-technical contexts, it was common to hear Brazilians remark to their African colleagues how "we were in the same situation X years ago". One Brazilian farmer I met in Ghana had even "calculated" how far back in time were local agricultural techniques: "around 80 years". An idea behind the original Embrapa Africa model was to transfer technologies whose patents had already prescribed, but which could be nonetheless useful for Africans, since "varieties released in Brazil twenty years or more ago, in the public domain and even outdated in Brazil, can be very useful here given the countries' technological backwardness" (Simões 2009).

While still following a teleology of progress, these notions manifest the decoupling noted by Ferguson: Africans do not need to (or cannot) absorb the latest development package wholesale, but could profit from *some* technologies that, even though (or precisely because) no longer the cutting-edge in their sites of origin, could be better suited to their (backward) infrastructural conditions. A problem with this, as with "appropriate technology" kinds of schemes in general, is that African researchers usually *do want* the latest technology. Many of them have been trained in the global North and/or are well aware about the state-of-the-art in their own scientific fields, and often that is what they demand from cooperation partners. Biotechnology and transgenics in particular have been a recurrent focus of interest in all my field sites. In spite of the demise of modernization remarked by Ferguson (2006), one domain where teleology still (or even increasingly) holds sway and produces vast material effects has been precisely techno-science, especially technology research, development & innovation and its speedy treadmill.

In Brazil-Africa cooperation, therefore, there is an ambivalent and sometimes contradictory coexistence of different temporalities on on-the-ground assemblages, somewhat along the lines of what Mbembe (2001, 16) referred to as "time of entanglement".[120] This is reflected in Brazilians' views on (possibilities of) Africa's agricultural development. The denial of coevalness (Fabian 2002) found here was not grounded in inevitabilities or determinisms tracing the roots of African underdevelopment to any domain outside of history, be it biology or the environment. These reflected, rather, Brazilian actors' own experiences, in two ways. On the one hand, and resonating with basic tenets of dependency theory, African underdevelopment was generally traced to its peripheral position in the world system, in a *historical* process that was regarded as having some analogies and connections with that of Brazil. This appeared for instance in expressions of sympathy such as that "we have also been colonized", or that both Brazil and Africa were still imposed unequal conditions by Northern countries in global trade.

On the other hand, views on African development were largely refracted by views on Brazil's own experience of domestic development, shaped by the hierarchical topography

[120] In *On the Postcolony*, Mbembe (2001, 16) argued that postcoloniality in Sub-Saharan Africa is characterized by an "emerging time" that is "not a series but an interlocking of pasts, presents and futures that retain their depths"; it is "made up of disturbances … of a bundle of unforeseen events", and it is "not irreversible" neither reducible to models of "stability and rupture".

inscribed by internal coloniality. Denial of coevalness is not total, since it is not the case that African countries (or even Africa) taken as a whole were regarded as being the past of Brazil taken as a whole. Part of what Brazilian frontliners saw in African institutes was considered fairly "up to date", such as the technical background of many African researchers. Other domains were, conversely, deemed more or less backward, such as the state of equipment and infrastructure in the research institutes. As one left the institutes to peasant areas, this temporal-hierarchical continuum became more clearly mapped onto a spatial one, translated into comments along the lines of "we were in the same situation X years ago, and in *some places* in Brazil this is still the case", or "here [in Brazil], we've passed through the stage where you [Africans] are now, but we're still living all stages at the same time".

Indeed, many of the familiarities Brazilians recognized in African countries referred to the inferior term in (internal) coloniality's dichotomies. African peasants were often associated with rural areas in the semi-arid hinterlands of the Brazilian Northeast, where a less technology and capital-intensive kind of family agriculture has historically prevailed. This contrasted both to the Center-West, characterized by large agribusiness farms, and to the South and Southwest, where family farmers make more intensive use of modern technologies and associational models like cooperatives. But as in all forms of coloniality – the iconic one being probably the cannibal/noble savage dyad –, the inferior term might carry contradictory connotations. Thus, while peasant agriculture was generally regarded as backward and unable to compete in the contemporary globalized world, for many at Embrapa it was also something to be defended and respected, including in terms of farmers' special experiential wisdom for taking care of the land.

These and other temporal-spatial analogies made during cooperation activities were however far from exhaustive; African farmers, policies, research institutes, soil, climate would never find a perfect fit in the Brazilians' classificatory grids. Sometimes, these misfits would elicit a loosely articulated recognition of the complexities of Africa's agriculture precisely through the contradictions it showed when compared to the Brazilian experience. Even if, in cooperation settings such as CECAT, these problematizations were not usually carried forward or systematized, they would inevitably lead to an acknowledgement of the potential difficulties for engaging in effective, sustained technical cooperation with African partners. Even in official discourse, Embrapa *cooperantes* tended to be more cautious than their counterparts in Itamaraty. Thus, in the concluding paragraphs of *Paralelos*, after over sixty pages of "parallels" one finds a somewhat dissonant caution note: "It should be kept in mind that this work is not a mere transfer of the experience obtained at the Brazilian *cerrado*, since there are significant socio-economic differences. Thus, the project to be implemented will take advantage of the lessons learned and the techniques developed in other Embrapa initiatives, considering the peculiarities of Mozambique" (Batistella and Bolfe 2011, 69).

This brief admonition about the significance of "socio-economic differences" between Brazil and Africa and the need to take into account the "peculiarities" of recipient countries as well as "lessons learned" on the ground in fact encapsulates a remarkable challenge: how to do technology adaptation and transfer in a domain like agriculture, which is highly context-sensitive? And how to do it without the bureaucratic apparatus and bountiful resources available to Northern donors and multilateral institutions?

The remainder of this chapter will look closer at one of Embrapa's South-South cooperation modalities – capacity-building trainings – to suggest how some of these questions have been explicitly raised *and* pursued by means of a mode of engagement that differs from that

of Northern aid, and which I will characterize here as being based on demonstration rather than intervention.

3.3 Demonstrating development: agriculture as the engine of national development

In an interview to the Brazil-Arab News Agency in mid-2009 (Daniel 2009), the newly appointed CEO of Embrapa spoke of his ongoing "talks with the president of the Republic" about creating a new international center in Brasília for receiving trainees from the global South. Instead of carrying out small, separate projects in multiple countries, as had been largely the case up until then (cf. Chapter 1), Brazil would maximize efforts and resources by concentrating capacity-building activities in one site. "But thus far, this is just at the level of ideas", he concluded. Less than one year later, in May 2010, this idea had become concrete in cement, steel and silicon, and President Lula personally inaugurated the modern new center amidst the events of the "Brazil-Africa Dialogue on Food Security, Fight Against Hunger and Rural Development", a high-level meeting of state officials from Brazil and 45 African countries. In that occasion, President Lula proudly talked about CECAT as "a technology training center where we'll receive many agronomists and technicians from Africa so they can be trained in Embrapa, learn the technologies we have here, and take them to Africa in order to produce there the same as we produce here".[121]

During fieldwork, I attended the first two capacity-building trainings held in CECAT, one in October 2010 and the other in April 2011. Small changes were made between one and the other as part of a reflexive learning process by its newly formed team, some of whom were researchers recruited from other Embrapa units, while others were hired anew from specialized fields such as pedagogy and languages. The two trainings maintained however a similar overall structure. The first half was held at the new center by the Embrapa headquarters in Brasília, and consisted mostly in indoor presentations by Brazilian officials from diplomacy, federal ministries (especially of agriculture) and other governmental institutions, Embrapa research and management personnel, and guest speakers from other organizations such as universities and extension and research institutions from different Brazilian states. None of these were workers in the international development and cooperation industry; even the ABC personnel who took part in these trainings were usually actual or aspiring diplomats. African trainees, on their turn, typically included researchers from technical fields such as agronomic science, veterinary medicine, or crop breeding, or employees from institutions related to agriculture such as extension agencies and federal ministries.

In the second part, the trainees were taken to one of Embrapa's decentralized units and shown some of the technologies that Brazilian *cooperantes* fathomed could be of interest to them. The topic was chosen based on demands previously presented by African partners through diplomatic channels. The first event in October 2010 took 42 trainees from 24 African countries to look at seed production in research units and farms located around Brasília, or to learn about pastures in Embrapa's livestock center in Mato Grosso do Sul. The following year, a similar group was split between the Embrapa center in Sete Lagoas, where they looked at maize production in family agriculture, and the soybean unit in Paraná. I attended the maize and seed production trainings. Seed production was potentially applicable to a broad variety of crops of

[121] Available at, http://www.biblioteca.presidencia.gov.br/ex-presidentes/luiz-inacio-lula-da-silva/discursos/2o-mandato/2010/1o-semestre/10-05-2010-discurso-do-presidente-da-republica-luiz-inacio-lula-da-silva-na-cerimonia-de-abertura-do-dialogo-brasil-africa-sobre-seguranca-alimentar/view. Last accessed, 16 Dec 2012.

interest to African countries, from commodity grains to garden vegetables and greens. Both livestock and maize are, on their turn, key components in much of Sub-Saharan African agriculture, including in West Africa, where they are combined into the cotton production system (cf. Chapter 4-5). African countries are not major producers of soybean, but this is a potentially promising export market for them due to growing demand from China and elsewhere in Asia, and one in which Embrapa has significant expertise.

The overall purpose of the trainings was, in the words of one *cooperante*, to provide for an "immersion of African trainees in Brazil's agricultural realities, including social and environmental". The focus was to look at agriculture as an "engine for national development" – an arguably defining trait of Brazil's developmental experience seen as especially promising to African countries lacking wealth in mineral resources (largely the case, for instance, of the C-4 countries to be discussed in the next chapters). Such "immersion" was created through the demonstration of Brazil's experience in multiple, technical *and* non-technical domains. As with the dimensions of culture/race discussed in the previous chapter, these demonstrations were highly selective, foregrounding some elements and domains while backgrounding or eclipsing of others. They involved less the presentation of abstract technical content to be learned than a call to join in and extend the comparative exercise between the situated experiences of Brazil and African agricultures. In the coordinator's words, "this is just a testimony; here we are not teaching you a lesson." It was up to the trainees to accept (or not) the invitation to look at these demonstrations as an inspiration for facing their own developmental challenges. These challenges were rarely "rendered technical"; in fact, most of the trainings addressed non-technical dimensions of agricultural development.

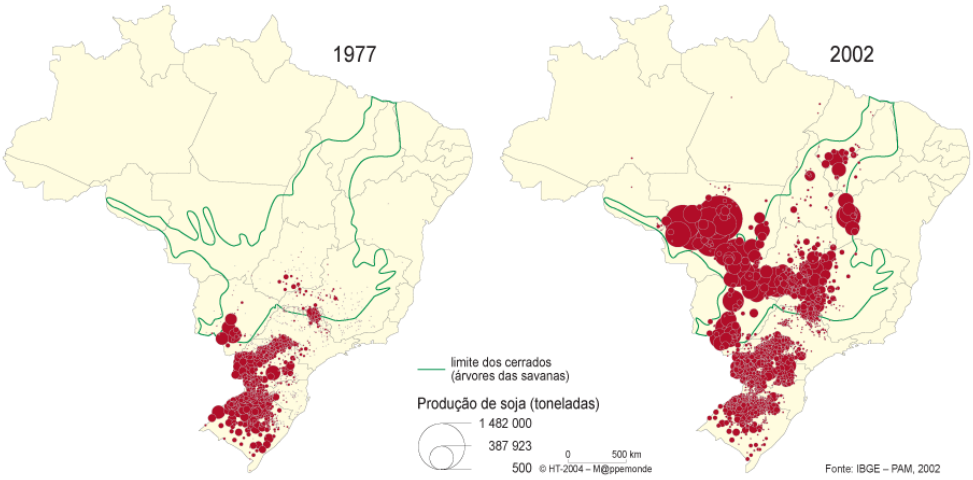
While this demonstration of Brazil's experience could not be but a situated perspective on it, it nevertheless purported to be authoritative; but this authority was grounded less on abstract expert knowledge than on a particular kind of experience. Above all, most *cooperantes* took for granted that this experience had been highly successful. In particular, they underscored how the country's productivity boom during the past thirty years or so turned Brazil from a recipient of food aid until the sixties, and a net importer of food until the eighties, into one of the world's leading exporters of agricultural products. From other perspectives, this "success story" was discontinuous and had multiple historical paths.[122] Yet, the trainings privileged two narrative threads, also found in other cooperation modalities: the expansion of the agricultural frontier into the *cerrado*, and Embrapa's enabling role in this process. In CECAT, this historical process was generally accounted for in terms of a virtuous symbiosis between the Brazilian state, research institutions, and farmers.

Gaúcho *farmers in the* cerrado*: the two sides of the population coin*

In these and other accounts of the occupation of the *cerrado*, the population factor is commonly recognized as a central piece of Brazil's agricultural development puzzle. As a Brazilian diplomat serving in West Africa put it, while we discussed the possibilities of success of Brazilian cooperation there, "for the development of our agriculture, we had a really important agent"; to which I completed tentatively, "a strong state?" "That, too. But I'm thinking about the *gaúchos*". Strictly speaking, the term *gaúchos* denotes those coming from Brazil's southernmost

[122] In the eighties, for instance, Brazilian agriculture was hit by the broader debt crisis, pushing many farmers out of business and eventually increasing land concentration in some regions. For a typical narrative along the lines of the one found in CECAT and elsewhere, cf. Martha Junior and Ferreira Filho (2012).

state of Rio Grande do Sul and parts of bordering countries, especially Argentina. But in this case, this category can be expanded to include those from the other two states in the southern region, Santa Catarina and Paraná, where a colder, sub-temperate climate and a white population of European descent prevail. Today, this group incorporates the colonial *bandeirantes*'[123] mythical reputation as daring trailblazers and frontier-explorers – this time, not only in a geographic but also in a technological sense.[124] They are regarded as exceptionally entrepreneurial, in their will to move into, and colonize from scratch, enormous swaths of "unproductive" land in the Center-Western *cerrado*, in what eventually became the country's latest, and most productive, agricultural frontier.[125] This was one of the largest migration flows in Brazil's recent history, and went all the way up to the "legal Amazon" zone, where agricultural production in transitional rainforest areas is legally bound by much stricter conservation rules than those presiding over the *cerrado* areas. Many power point presentations in CECAT represented this process visually in graphs and maps along the lines of those below, showing pictures of the enormous, highly modernized farms established by these migrants in the new frontier.



Picture 5. Map of soybean expansion (in red) into the *cerrado* (whose boundaries are demarcated by the green line, north of which is the Amazon rainforest).[126]

[123] The *bandeirantes* were private parties who pioneered the exploration of Brazil's backlands in search for Indian slaves and precious metals during colonial times. They did get to Goiás and Mato Grosso do Sul where gold was found, but not farther North. This historical process has been the subject of many historical works, including by prominent "interpreters of Brazil" such as Sérgio Buarque de Hollanda (1994).

[124] The *gaúchos* were generally regarded as more prone to adopting technological innovation than other population groups – as will be seen in the Chapter 5, it were farmers of European descent from the Brazilian South who spearheaded the adoption of no-till, a soil management technique broadly deployed in *cerrado* agriculture.

[125] In fact, the latest frontier for Brazilian agriculture has been at the so-called "Matopiba" region, an acronym for the border area between the states of Maranhão, Tocantins, Piauí, and Bahia. This is also a *cerrado* region bordering the Amazon rainforest, but this time on the other (Eastern) side. Most *cooperantes* subsumed this second frontier to the Center-Western *cerrado*, and for the sake of simplicity I will do the same here.

[126] Source: http://revistaescola.abril.com.br/geografia/pratica-pedagogica/cartografia-analise-diferentes-mapas-mundo-brasil-584372.shtml. Last accessed, 20 April 2012. Based on 2002 data from the Brazilian Institute of Geography and Statistics (IBGE).

Picture 6. Soybean being harvested while maize is sowed in sequence (*up*). Maize sowed over plant cover in no-till system (cf. Chapter 4-5), native *cerrado* vegetation on the background (*down*) (From one of Embrapa-SRI's institutional slides).

In the summer of 2008, I visited some of these farms in the state of Mato Grosso along with a UC Berkeley research team.[127] There, the prevalence of a white population was indeed remarkable, as was the recognition of bonds with Europe expressed by the people we talked to. Some of them even traced to this ancestral relationship their will to implement best agricultural practices such as strict compliance to environmental laws and fair labor policies. (This relationship has a quite contemporary drive, though: Europe is a major market for fair trade and environmentally correct products.) Farms were enormous and well equipped with modern machinery and large, well-structured facilities. The endless landscape of soybean, cotton or maize fields was only occasionally interrupted by rectangular patches of native rainforest required conserving by law.[128] Roads were narrow, but new and smooth. Many towns, too, were new, planned, and well tended – quite different from older agricultural areas elsewhere in the country. In what was considered an exemplary town in the region in terms of environmental and social best practices, we were hosted by a family of migrants from the South where one brother ran the family's model farm, the other owned one of the town's best restaurants (a modern grill and pub), and the third was the mayor.

Two years later, I visited another *gaúcho* farm – this one, many thousand miles away, in the Eastern part of Ghana. These unlikely investors had been led to Ghana through a series of fortuitous paths, some of which had been loosely prompted by the recent approximation with Africa championed by Brazilian diplomacy. With no experience in Africa, very poor English skills, and no substantial help from governments from either side, they built their enterprise virtually from scratch, finding the land to lease literally on their own, after driving around at random over 12,000 miles. What made it worth crossing the Atlantic in order to plant rice, the manager explained to me, was the figures: the cost of land was incredibly low, and they got

[127] I thank especially Professor Alastair Iles for the opportunity to accompany his team in this trip, which also led us to sugarcane farms and ethanol plants in São Paulo.

[128] Mandatory legal reserves of native rainforest reach eighty percent of farm areas above parallel 13 in Mato Grosso. Not all farmers respect this norm, however, and during my fieldwork the farm lobby successfully pushed for amnesty for non-compliants and relaxation of environmental regulations in the Brazilian Forest Code.

almost twice for the ton of rice than what was paid in Brazil.[129] Their aim was Ghana's domestic market, which they regarded as a big opportunity.

I found their experience so remarkable to the point where the *gaúchos*' "trailblazing spirit" started to seem like a convincing thread in the narrative of the conquest of *cerrado*. In this sense, Africa would be just a next frontier for the *gaúchos* to explore. But at the same time, it points precisely to the impossibility of reproducing in Africa the story as it happened back in Brazil. Firstly, the population that turned the savannahs into the country's "breadbasket" does not correspond to the country's African heritage. On the contrary, they descend from those who were brought from Europe precisely to complement (and in some cases replace) the African labor force freed from slavery in 1888. Most remarkable however is the fact that none of the accounts of Westward expansion I heard during fieldwork addressed the *other* side of the population coin: if migrants and their huge farms took over the area, whatever happened to those who occupied that land originally? As with Brazil's invisible history of reluctance to actively oppose South-African apartheid and Portuguese colonization discussed in Chapter 2, this story is not on top of the mind of most Brazilians either. Yet, this is an unavoidable question for any significant developmental scheme for agriculture in Africa today.

The historical movement that eventually led to Brazil's agricultural production boom involved more than the common story, reproduced in CECAT, about the military rulers' might to guarantee the country's domestic food supply and redress an unfavorable balance of trade in the 1960's and 70's. Begun in earnest during a previous dictatorship – Getúlio Vargas's Estado Novo regime (1937-45) –, Brazil's "March to the West" had a broader, two-directional vector: one geopolitical (to defend the country's so-called dry frontier from foreign threat),[130] and one of internal colonization (to integrate the sparsely populated western backlands into the national polity).[131] This double directionality is powerfully encapsulated in the motto, widely deployed by governments during the seventies, *integrar para não entregar*: to integrate in order not to abdicate (territory to foreign powers, that is). This process entailed centrally planned colonization policies, including large-scale relocation of populations living in the *cerrado* area (Garfield 2001, Heredia et al. 2010).

Two main groups occupied Mato Grosso and the surrounding backwoods at the dawn of the twentieth century: indigenous peoples, and what could be called *caboclos*. The latter comprised a sparsely settled, mixed-race[132] population of cattle ranchers and small farmers descending from those who remained in the region after a relatively short-lived mining boom during the eighteenth century. The first group included a diverse range of aboriginal groups, either originally from the region or who had been pushed inland (westward) during the centuries of colonization concentrated on Brazil's coastal/eastern areas. While the *caboclos*, mostly squatters on state land, were partly absorbed by settlement schemes during the Vargas and

[129] Availability and lower cost of land was in part what had driven the *gaúchos* to the Brazilian Center-West in the seventies, but now land there has become more concentrated and costly.

[130] The Brazilian military, concerned about the country's "defenseless" western borders, were a key support group to Vargas's regime (Garfield 2001, 30).

[131] The project of occupying Brazil's hinterlands was in fact as old as Independence in 1822 (Holston 2008), when it already included the idea to transfer the capital away from Rio de Janeiro on the coast – which effectively only happened with the construction of Brasília in 1960 (Holston 1989). Producing more food for a growing urban population was also a major concern during the first Vargas administration (1937-45) and its almost obsessive focus on industrialization (Garfield 2001).

[132] Strictly speaking, as noted in Chapter 2, the term *caboclo* designates the mixture of white and indigenous "races". In the region, there was however some presence of African slaves, who had been brought to work in the mines.

subsequent administrations, indigenous groups were deliberately removed or driven away to make room for the newcomers. Many studies have documented this lengthy process, which did not happen without resistance from indigenous groups, and whose contested character reaches well into the present (Ramos 1998, Garfield 2001). As I wrote these lines, a fierce struggle was raging in Brazil over land rights, between indigenous groups and farmers in Mato Grosso do Sul and elsewhere – a battleground into which anthropology itself has been dragged through a smear campaign against the discipline's expert authority championed by sectors of Congress and of the national media.[133] But the very demarcation of indigenous territories by the Brazilian state – the first being the world-famous Xingu Park in the northeast of Mato Grosso, established in 1961– was the flip side of Vargas's project of colonizing the Center-West and turning it into "productive" land. In one of those paradoxical effects of internal coloniality, even if there has been sharp opposition and fierce disputes between indigenous peoples and farmers over land rights in the *cerrado* region, historically one would not have come about without the other.

The land-population equation is key not only to understand current struggles in the Brazilian *cerrado*, but to assess the possibilities for successful transfer of Brazilian agricultural experiences to Africa. In spite (or perhaps precisely because) of that, in the demonstrations at Embrapa only one of the sides of this equation was explicitly foregrounded. It does not take deep knowledge of African realities, however, to envisage the serious difficulties, if not impossibility, of reproducing anywhere in that continent a resettlement scheme of the type and scale of the one underlying *cerrado* agriculture. Historically, the colonial and internal colonization processes involving indigenous peoples in Africa have differed sharply from those in Brazil.[134] With the exception of parts of southern Africa,[135] governments have not (and today, cannot) confine entire populations to native reserves, as was done in Brazil. In most African countries, moreover, rural areas are still fairly populated,[136] and, as many of my interlocutors pointed out, pressure for fertile land has been all but mounting. Concerns shown by many of Brazil's partners with respect to large-scale agricultural schemes, for instance, regarded the likelihood of massive migration to the cities, which would pose an unbearable burden to already fragile urban infrastructures.

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[133] This has included accusations, by members of the farm lobby as well as missionaries and farmers who went on to get anthropology degrees, that Brazilian anthropologists' technical opinions legitimating the recognition of indigenous territories were biased, ideological, and even fraudulent. Giving in to pressure from the farm lobby, in mid-2013 the Rousseff administration virtually stalled ongoing processes of indigenous territories recognition, and announced a broader reform of land demarcation procedures aimed at opening them up to other government agencies besides the indigenist authority (Funai) – among which, Embrapa itself.

[134] A full-fledged comparison along this scale is no simple task, and would require a project of its own. Just to scratch the surface, while indigenous populations account for less than 0.5% of the Brazilian population according to 2010 Census data, in the African continent "indigenous peoples" are pretty much everyone – from the poorest of peasants to the most decorated of scientists. While in Brazil the *índio* is regarded as an ambivalent "other" by the state and the general population (Ramos 1998), in much of Africa virtually every urban resident has close kin ties to the villages, and speaks at least one, but often more, local languages different from that of the former colonizer. This does not mean that in African countries there are no internal colonialist divides, but that these have been traced differently than in Brazil. Examples could include Mamdani's (1996) well-known thesis about the "subject" and "citizen" bifurcation inherited from European colonial rule, or Ferguson's (1999) "localist" versus "cosmopolitan" distinction.

[135] In some territories based on settler colonization, most notably in South Africa, the colonial administration instituted native reserves to house the families of laborers who migrated cyclically to work in the cities and industrial enclaves such as mines.

[136] A country like Burkina Faso, for example, has an almost inverted urban/rural ratio than Brazil: around 75% of its population lives in rural areas, while in Brazil this figure is of 15% (according to 2011 UN data).

Although these issues did not come up frequently as questions during the trainings, they were occasionally remarked in informal situations by some of my Brazilian interlocutors, including explicitly as a potential complicating factor for Brazilian cooperation. This was the case for instance of Embrapa's only project in Africa that will involve intervention in land settlements, the Pro-Savannah in Mozambique. Not by chance, it is Brazil's most (and as far as I can tell only) controversial agricultural project in that continent. It has been squarely categorized by Mozambican peasant organizations as land grabbing – a label normally associated with enterprises by multinational corporations or development projects from Europe, Japan, or arable land-scarce Southern donors like China or Arab countries. In a recent statement, they expressed a grave concern about the "massive influx of Brazilian agribusiness farmers, who will turn Mozambican peasants into their employees".[137] Among urban sectors, while many have welcomed the Brazilian investments, others have shown concern about African countries running "the risk of copying more the flaws than the advantages of the Brazilian model", as a Guinean UN official recently declared with respect to Brazil's "unregulated land occupation system".[138]

Agricultural policies: the strong hand of the State

The second focus in the capacity-building demonstrations concerned public policies for agriculture. In times of neoliberal hegemony, this domain has become a field of intense debates in Sub-Saharan Africa since subsidies to farmers and other support policies were removed by structural adjustment programs in the eighties and nineties, and became the target of global trade negotiations (cf. Chapter 4). Today, most agribusiness farmers in Brazil operate with no direct state subsidies. They are however backed by a mixed, public-private system providing agricultural credit for inputs and machinery at cheaper rates, rural insurance partly paid by governmental funds, support to commercialization of production in the private market through minimum price and other policies, support to compliance with sanitary regulations, organization into cooperatives, construction and improvement of logistic infra-structure for production outflow, and so forth.

This was a domain that raised the interest of many African trainees, especially in the case of policies for family agriculture, and one of the things they often wished to know more about was how they were funded. They were less excited to learn that resources for supporting both large and small agriculture have come, more or less directly, from the state budget itself. As many of my African interlocutors remarked, most states in the continent do not, and in some cases cannot, have a robust, continuous policy for inputs, credit, and technology development and extension for effectively supporting domestic agricultural production. Even when good policies are drafted, states may lack in resource availability; when resources are forthcoming, governments may lack in implementing capacity, or funds may be lost somewhere along the extensive patronage network connecting tax or foreign revenues (be it through trade or aid) to African state bureaucracies, urban elites, rural elites, and finally peasant villages. Moreover, few African countries can rely on a large domestic market with enough purchasing power, such as is the case in Brazil, China and other emerging economies (Bates 1981, Xiaoyun et al. 2012).

[137] Statement issued in October 2012 by Mozambique's National Peasant Union. Available on the UNAC website, http://www.unac.org.mz/index.php/documentos-de-posicao. Last accessed, 12 Dec 2012.
[138] http://www.opais.co.mz/index.php/internacional/56-internacional/21975-africa-corre-o-risco-de-copiar-melhor-os-defeitos-do-que-as-vantagens-do-modelo-brasileiro.html. Last accessed, 12 Dec 2012.

There is also a difference in timing, which some of the *cooperantes* did not fail to remark. In Latin America during the early twentieth century,[139] and later on in other Third World regions, nation-states' investments in agriculture aimed not only at feeding their own populations, but above all at creating wealth to finance national industries. As one of the senior speakers in CECAT put it, "at that time, the right policy to pull Brazil out of backwardness was industrialization, not agriculture … But today, this model might not work everywhere. In Africa, I think, you'd have to strike some kind of balance between industry and agriculture". But while in the aftermath of, or in tandem with, industrialization and urbanization Brazil and others made an effective effort towards guaranteeing a minimal level of domestic food supply,[140] agricultural policies in most African countries remained almost exclusively focused on export cash crops. This was, and still is, the case for instance of cocoa in Ghana and cotton in Mali and Burkina Faso; as my interlocutors in those countries emphasized, these are among the few sectors that count with more structured policies and sustained support by the state. This emphasis on export crops often happened at the expense of food crops for domestic consumption, especially cereals, introducing a dichotomization that remains central today (cf. Chapters 4-5). In other words, in contrast with the long-standing support Brazilian farmers have been receiving from the state through agricultural policies, when African peasant farmers grow food crops aimed at subsistence or sale in local markets, they often do so in spite of, and sometimes even against, the state. Along the way, and especially more recently when comparative trade advantages came to the fore of the food security equation,[141] some African countries became increasingly dependent on food imports. As observed during fieldwork, imported grains such as rice or wheat in particular have increasingly catered to the taste of a growing urban population, while traditional staple cereals such as sorghum or millet come to be regarded as "villager" food.

Embrapa and the technical conquest of the cerrado

A third focus of demonstration in the CECAT trainings – the final link in the developmental loop – referred to agronomic research, especially Embrapa's role in the historical process that led to Brazil's agriculture boom. In their presentations, the *cooperantes* reproduced a common list of technologies developed by Embrapa that enabled and sustained the expansion and diversification of large-scale agriculture in the *cerrado* region, especially those aimed at fixing the low nutrient content and high acidity and toxicity of its soils. These typically included appropriate soil management and fertilization techniques, new crop varieties better adapted to *cerrado* conditions (the "tropicalization" of soybean being an oft-cited achievement), and later on, others such as no-till and biological nitrogen fixation.[142] To make a long and technically

[139] In the case of Latin America, industrialization received a further push by a strong external constraint: the 1929 crisis and World War II, which led many countries in the region to sustain import-substitution policies. In the case of Brazil, resources from coffee exports financed much of the earlier impulse towards industrialization.

[140] As explained in CECAT, originally Brazil's agricultural policies were also almost exclusively focused on export crops such as coffee and sugar. Policies for guaranteeing food supply for the domestic market have oscillated over time, but an effective effort to address this issue did not take place until the seventies.

[141] In the new global neoliberal environment, the notion of food security has been displaced from a question of national sovereignty over food production, to be regarded as approachable through complementary global trade. According to Xiaoyun et al's data, only 12 out of 53 African countries were *not* net importers of agricultural products (2012, 25).

[142] Tropicalization of soybean refers to the use of germplasm coming principally from the U.S. to breed new varieties better adapted to certain particularities of tropical environments, such as day lengths and diseases. Biological nitrogen fixation, on its turn, enables crops to capture "for free" an essential agronomic nutrient.

complex story short, these new tropical technologies allowed farmers to successfully overcome natural barriers to high-yielding agriculture, turning "Brazil's greatest liability, the *cerrado*, into our greatest asset".[143] And this was portrayed as a conquest not only for the Brazilian nation, but for science at large; in an institutional video shown to the African trainees, a proud Embrapa researcher affirms that "according to Dr. Norman Borlaug[144]… the transformation of the *cerrado* into a productive zone for agriculture was one of the greatest achievements of agronomic science in the twentieth century".

This affinity between the conquest of the *cerrado* and Embrapa's techno-scientific developments was not a felicitous convergence; the very existence of the latter owes to the former. The story widely disseminated in Brazil, and reproduced in CECAT and other South-South cooperation initiatives, is that Embrapa was created by the military government in 1973 as a rearrangement of previously existing research institutions in order to solve a *concrete* problem: how to enable the expansion of Brazilian agriculture into unproductive areas.[145] Japan, then eager to diversify its international cereal supply, helped fund the technical arm of the conquest of the *cerrado*: the Prodecer Project, which spanned over two decades and was led by Embrapa. This arguably successful international cooperation partnership has been reproduced in other triangular projects, most notably the Pro-Savannah in Mozambique.[146]

The picture painted in CECAT also included an exposition of non-technical elements undergirding Embrapa's success, in particular the high investment made in scientific excellence. In tandem with the institute's inception, the Brazilian government made, partly through foreign loans, massive investment in training at the graduate level; in a few years, hundreds of Brazilian bachelors received M.A.'s and Ph.D.'s in multiple agriculture-related fields from reputable universities around the world. As one of my interlocutors recounted it, "in the seventies and eighties, Embrapa would take young agronomists right as they came out of [Brazilian] universities with their degrees, and put them on a plane to go do their graduate studies abroad", usually in the United States and Europe. Most of the senior or retired researchers I met during fieldwork had been beneficiaries of such programs. This was less the case of younger researchers hired more recently, the majority of whom were fully trained in Brazilian universities.[147] Despite

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Attributed to the work of an Embrapa researcher born in Czechoslovakia and naturalized Brazilian, Johanna Döbereiner, this technique utilizes a bacteria naturally found in the roots of certain species of leguminous plants to capture nitrogen found in atmospheric air (N_2) and make it readily available for the plant. No-till is a soil conservation technique that will be explained in greater detail in Chapters 4 and 5.

[143] Delfim Netto, in *Valor Econômico*, 13 April 2012. Materials produced by the institute itself tell much of this story; for general accounts on the political and technical history of Embrapa, cf. Cabral (2005) and Silva et al. (2002).

[144] A Nobel Peace Prize laureate in 1970, Borlaug developed high-yielding wheat varieties in Mexico as part of a broader production model that quickly spread to other parts of the world, in what became known as the Green Revolution.

[145] This was not only a problem of food supply and soaring food prices, caused by rising demand from a growing urban population and decades of under-investment in agriculture (as compared to industry), but related to a "macroeconomic" problem: Brazil's rising levels of foreign indebtedness and the urgent need to offset balance of trade deficits.

[146] The Pro-Savannah is openly advertised as having been modeled after the Prodecer; it is funded by the same agency – the Japanese International Cooperation Agency (JICA) – and, according to one of my interlocutors at Embrapa who worked in the Prodecer, includes some of the same Japanese individuals. On the geopolitics underlying the Prodecer during the 1964-84 Military Regime, cf. Inocêncio (2010).

[147] In a context of diminishing resources during the nineties, the Labex model described in Chapter 1 eventually replaced this kind of longer-term training program. With the Labex, Embrapa keeps sending some of its employees

much of the nationalistic tone of narratives about Embrapa, the institute has always been engaged in international research and training networks, and this is what ultimately rendered possible its technological achievements. In this history as recipient of international cooperation, Embrapa followed a pattern it is now replicating with the global South: to maintain other national agricultural research institutes as privileged partners for implementation of projects and trainings.[148]

African institutes have also been enmeshed in global scientific networks from the start, and many of the African researchers I met held M.A.'s and Ph.D.'s from reputable institutions in the global North. But what happened in the early years of Embrapa that did not happen in most of them was, on the one hand, that researchers were actively valued, including financially, so that they would *stay* in the institution: as one of the speakers in CECAT explained it according to the common metaphor, "a team that does not have a Pelé will never win a championship". On the other hand, brain drain continues to be a serious problem in much of Sub-Saharan Africa. Based on my fieldwork interactions, my impression is that this relates not just to low pay per se – a major issue, if the salaries of African researchers are compared to those of their counterparts elsewhere – but to the poor working conditions found in many of the local institutes, especially in terms of untied research budgets and available infrastructure. It should be remarked however that, while it is true that many of those whom I met would leave Africa provided they had the opportunity (an aspect emphasized, for instance, by Ferguson 2006), many others declared they preferred to stay in their countries, for personal reasons but also out of a sense of duty to contribute to national development.

Finally, another concern addressed in CECAT was on the top the mind of many of the African researchers I met: budget. The demonstration of Embrapa's experience emphasized the nourishing of connections between the institute and Brazil's broader political environment in order to guarantee a steady and sufficient flow of state funds for science & technology that, left to itself, would tend to diminish. This account portrayed a conscious effort by the institute's agents to cultivate channels with top decision-makers in Brasília, especially in the Ministry of Agriculture and the National Congress, as well as in all corners of the country through its (today 47) decentralized units. This has proceeded not only through personal-institutional networks, but also through mechanisms for quantifying research's "returns rates" to society, most notably Embrapa's Social Balance.[149] The kind of reasoning underlying the Social Balance – "X reais invested in research returns X reais in impacts for society" – is quite widespread in the institute, and many of the researchers I interacted with seemed to have internalized it even in informal situations. As an Embrapa researcher working in the cotton project one day fancied explaining it to me, "it's estimated that biological nitrogen fixation in soybeans alone has saved the country seven billion dollars every year in nitrogen fertilizers.[150] This would have already covered decades of the Brazilian state's investment in Embrapa [whose budget is currently at around U$1

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for research and training abroad by taking advantage of cutting-edge facilities available elsewhere, while continuing the international scientific networking with Northern institutes that has been so vital for its technical achievements.

[148] The so-called national agricultural research systems (NARS) – the Brazilian version of which is headed by Embrapa – can be found all across the global South, even in very poor countries. They are themselves an effect of the globalization of agricultural science and research since colonial times, and, along with the CGIAR centers, have played an important role in enabling and spreading the Green Revolution worldwide.

[149] The Social Balance has been published annually in the last couple of decades, and its results are disseminated broadly through institutional and media channels.

[150] In Brazil, fertilizers are mostly imported. The country has its own wealth of mineral nutrients, but, as one of my field interlocutors explained, it has preferred to save them as strategic reserves for the future.

billion/year]". It was this kind of self-presentation that Embrapa personnel were strongly suggesting that their African peers incorporate: if agriculture is the engine of national development, research is the engine of agriculture.

Besides government, another privileged public for Embrapa has been the Brazilian media and society at large, reached through communication and PR strategies broadcasting the institute's brand and its impacts on national development. This has also been a conscious effort from the start, as explained by a speaker in CECAT who urged African trainees to do the same in their own institutes: "We have always valued our journalists and other communication staff as much as we value our research scientists; they are also well paid and trained up to the PhD level". The outcomes of this strategy are indeed remarkable; Embrapa has a extraordinarily positive public image in Brazil, and significant control over what is said and not about itself in the media and in the Brazilian public sphere – something that has not failed to impact my field interactions as well as the writing of this dissertation.[151] Finally, Embrapa's international networks were also remarked as an important channel for persuading Brazilian politicians to keep supporting the institution financially.

In other words, the sheer existence and full-fledged operation of a public research institute was portrayed not as something to be taken for granted, but as the outcome of an active, continuous work of persuasion and building the right alliances with political groups and constituencies, both domestically and abroad. Those in African institutes did perform a work of persuasion and alliance-building in order to secure resources for their research work. But in Sub-Saharan Africa, given the fragility of most state budgets and their under-investment in agriculture, this work of brokerage – to use a key term in the anthropology of development (Bierschenk et al. 2000, Lewis and Mosse 2006) – seems to be much more fragmented (i.e., between the national states, bilateral and multilateral donors, NGOs, private companies) and not streamlined with a robust strategy led autonomously by the institutes or even national states.

It is not surprising, then, that the image that ultimately stood out from this demonstration of Brazilian agriculture's achievements for many of the trainees I talked to was that of a strong state seriously committed to developing the country's agricultural sector and willing to make the necessary investments towards this end. This is a different picture from most African governments' historical disregard towards the agricultural sector, as lamented by many of my African interlocutors and extensively discussed by both the academic and the development literature.[152] The fact that this process took off in Brazil during a military dictatorship did not generally come as a surprise for them, and some even contended that top-down, state-led schemes perhaps may be the only way to effectively push for such a "revolution". But again, timing was key: the foundations for Brazil's agricultural boom were laid way before the recent neoliberal wave, while African countries had only a couple of decades of existence before being engulfed by it in the eighties (Mkandawire and Soludo 1999). Part of this foundation can be found in an interest group that, historically, has not been extensively present or sufficiently powerful in Sub-Saharan Africa: rural lobbies.

[151] This is more obvious in the case of the mainstream media, but holds even for the internet and academia. Google "Embrapa" and you will be astonished at the amount of entries that were written either by the company's employees or by their privileged interlocutors in the Brazilian media and government. Even academic works on the institute, including on its international cooperation initiatives, have been largely produced by their own personnel or their relations (cf. Introduction).

[152] According to data compiled by Xiaoyun et al (2012, 129), the average fiscal budget dedicated to agriculture in Africa has revolved around 5%. Structural adjustment programs (SAPs) during the eighties and nineties mandated the further removal of state supports to the sector, with deleterious outcomes in many countries (Moyo 2006).

Rural lobbies and the "two agricultures"

Dictatorships in Brazil, even if indeed behind much of the decisive push towards conquering the *cerrado* (both in Vargas's Estado Novo and in the 1964-84 military regime), were circumscribed in time. A more long-lasting and unbroken historical vector, I suggest, lies in the political muscle of farm lobbies in Brazil. While this has been a strong political force virtually as old as the Brazilian state itself (Holston 2008), in much of Sub-Saharan Africa an indigenous landed elite did not emerge until much more recently, and still it rarely matches the political force of urban groups and constituencies in most countries.[153] The organization and lobbying power of farmers remains, on its turn, quite limited in much of the continent; this especially true for West Africa, dominated by peasant farming on customary land.[154]

A consequence of the pattern of territorial occupation especially where customary law under indirect rule prevailed, has been the absence of an extensive private market in land. As a result, in much of Sub-Saharan Africa the land question has been as much about guaranteeing equitable distribution of land use as about creating a market in land through the regularization of land titles. This is however a very complex, double-edged issue: while land titling could benefit smallholders by guaranteeing security of tenure, providing access to credit and other support policies, and so forth, it could as well go the other way to enable further land concentration by local elites or foreign investors. The land situation is, moreover, highly diversified across the continent, while being somewhat unique when compared to other post-colonial regions (Mamdani 1996, Moyo 2006, 2008). The next chapter will suggest some of the effects the African land question(s) may have for Brazilian projects carried out on West African grounds.

In Brazil, land tenure reform happened in the mid-nineteenth century, and largely crystallized the privileges landed elites held since colonial times (Holston 2008). In this country as in much of Latin America, the agrarian question has historically involved a sharp dichotomy between large and smallholders, and the uneven distribution of land between them. In Brazil, this polarization has translated into a bifurcation of representation of these interest groups not only in Congress – where the *bancada ruralista*, linked to the agribusiness lobby, constitutes the largest organized bloc –, but even institutionally at the level of the Executive. Today, Brazil has one ministry for dealing with agribusiness (the Ministério da Agricultura, Pecuária e Abastecimento, MAPA), and another one for dealing with land reform and policies specific for smallholder agriculture, which includes family farmers,[155] land reform settlers, and indigenous and *quilombola*[156] communities.[157] While the first group focuses on large-scale commodity

[153] Some have argued that landed elites emerged not against, but as a result of, government policies for industry. As part of the clientelistic network of governments, they would have no incentive to push for universal agricultural policies that would also benefit small farmers (Bates 1981, 60). Others have suggested that "the most likely way in which agriculture will get more favorable prices and investment from governments is for rural class formation to proceed to the point of creating a strong rural landowning class", able to successfully lobby for better agricultural policies for themselves, and indirectly for smallholders (Barker 1984, 24).

[154] Lobbying governments is a costly endeavor, both financially and organizationally. For authors such as Bates (1981) or Hart (1982), this is at the root of the political feebleness of African peasants, who tend to be not only resource poor but organizationally scattered.

[155] Brazil's legal framework defines family farmers according to certain criteria: primarily, those owning land no larger than four fiscal modules (which may range from 4 to 100 hectares depending on the region) and employing no more than two permanent workers.

[156] Communities of descendants of runaway African slaves.

production for export, the second is mostly oriented to food crops for the domestic market. Through the new ministry, the federal government has implemented special polices and programs for family agriculture that include even the direct purchase and redistribution of part of its production by the state.

This domestic dichotomization has shaped Brazil's international cooperation efforts. Some commentators have even singled it out as a chief characteristic of Brazil's South-South cooperation for agriculture, underscoring how the country's "piecemeal approach" (cf. Chapter 1) has led to "contrasting narratives on agriculture development … reflecting competing visions of development held by the various Brazilian actors involved in agricultural cooperation" (Cabral and Shankland 2012, 15; Pierri 2013). These authors' claims refer mostly to the split between the Ministry of Agriculture (MAPA) (under which Embrapa is subsumed) and the Ministry of Agrarian Development (MDA), as both carry out separate cooperation activities in Africa. But this polarization is not as clear-cut as the institutional bifurcation may make it seem. It can also found within Embrapa itself, in terms of both research areas and political camps,[158] from the scale of institutional arrangements to individual expertises and subjective sensibilities. During fieldwork, I met researchers who could be distributed all across this spectrum: from champions of export-oriented, large-scale agribusiness to those with greater technical and personal affinity with family and other kinds of small-scale, ecologically oriented agriculture. As perhaps would be expected, the latter were usually more attuned with the South-South cooperation's solidarity-based (as opposed to commercial, pragmatic and self-interested) drives.

In CECAT, this dichotomy was also made explicit, but mostly in a de-politicized manner that tended to naturalize that separation. Debate could go on endlessly, for instance, about whether this institutional division of competences into two federal ministries did not amount to a de-politicization of the agrarian question in Brazil, by naturalizing a peaceful coexistence between two, as it were, "separate but equal" developmental models for agriculture (as opposed to a view that would, for instance, see large agribusiness as a hegemon asphyxiating the flourishing of other, subaltern models). A general move in this direction has been suggested by other claims I heard during fieldwork, for instance that after successive settlement of landless farmers during the Fernando Henrique Cardoso (1995-2002) and Lula (2003-2010) administrations, pressure for land would have diminished to the point of rendering land reform obsolete. Or, more pervasively, that family agriculture was to be regarded not in opposition to, but as *part of*, commercial agriculture: as an Embrapa CEO once put it bluntly, "agriculture is one and the same thing".[159] The narrative of agriculture as the engine of national development, which set the tone for the demonstrations, is itself a rhetorical strategy deployed extensively, and quite effectively, by the farm lobby.

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[157] During the second Fernando Henrique Cardoso administration (1998-2002), federal jurisprudence over smallholding agriculture was removed from the Ministry of Agriculture and assigned its own ministry, renamed Ministry of Agrarian Development (Ministério do Desenvolvimento Agrário, MDA) during the Lula administration.

[158] Historically, Embrapa has carried out research on both fronts, which are today reflected in its so-called macro-programs (one of which is exclusively dedicated to family agriculture). The institute remains nonetheless submitted to the Ministry of Agriculture, where the hold of agribusiness prevails. In Africa, some institutes are attached to ministries of science and technology (e.g., the CSIR in Ghana and INERA in Burkina Faso).

[159] "My foremost dream is that agriculture be stripped of this ideological connotation that sometimes exists concerning the size of properties", he mentioned in a 2009 interview (Daniel 2009). This was a claim I also heard in the CECAT trainings as well as in the Brazilian National Congress, during public hearings in 2011 about the internationalization of Embrapa Bill.

On the other hand, when agriculture in Africa is described as having a "dualistic structure" (Xiaoyun et al. 2012, 213), this refers less to property size and capital intensity per se (as in Brazil) than to the unequal coexistence between (unprivileged) subsistence food crops and (privileged) export cash crops. In some countries, it may even happen that the *same* farmers produce both, as has been the case of cotton in West Africa. Here one could think again of a potential for contradiction between Brazil's discursive claims about the reproducibility of its experience in Africa, and Africa's realities – that is, between the prevalence of large-scale agriculture in Brazil, and of peasant farming in much of Sub-Saharan Africa. My experience however was that in Embrapa there is enough diversity and flexibility in terms of both technology and personnel for its products to be potentially adapted all along this polarity.

I would argue, rather, that the most fundamental disjunction potentially preventing the effective travelling of technologies across the Southern Atlantic lies somewhere deeper than the domain of technology adaptation and transfer per se. The very demonstration of Brazil's experience in CECAT brought to surface the multi-scalar range of socio-technical mediators that ultimately make (a certain version of) agricultural development possible: investment in research and technology; farmers' organization and adaptation to a market logic; continuous state support through policies for credit, insurance, inputs, commercialization; planned spatial occupation schemes; government support and advocacy for farmers in international trade. All these have been differently related to Brazil's and Africa's respective postcolonial experiences, and modes and timing of their incorporation in the global system.

The development "trap"

It was from the seventies onwards that Brazil, China, India and other developing countries consolidated their respective "Green Revolutions". In much of Sub-Saharan Africa, on the other hand, this period marked the beginning of stagnation and even decline in agricultural productivity.[160] Thus, precisely at a moment when much of agriculture in the global South "stepped up a gear", as Xiaoyun et al. (2012, 50) put it, most African countries stepped, on their turn, "into a technology trap rather than an effective 'Green Revolution'" (2). The trap idiom is indeed apposite here: while African countries did not take to full fruition the productivity-enhancing promise of the Green Revolution (nor, one could add, its associated externalities of over-pollution, land concentration, etc.), in a world where technology-intensive, high-yielding agriculture is the hegemonic horizon they could not afford to do without it either. In times of neoliberal globalization, African farmers and governments have had to contend with the added challenge of increasingly open markets, competitiveness imperatives, and the tightening grip of global free trade rules over which they have little control (more on this in the next chapters).

A similar "trap" can be found at the scale of agricultural research & development. In Embrapa, as some of my interlocutors pointed out, the rising neoliberal tide has led, among other effects, to significant losses in the institute's share of the Brazilian seed market to multinational corporations against which it cannot possibly compete. This is a lament I would sometimes hear from Embrapa personnel: how hard it is to compete with a Monsanto or a Syngenta, which invest heavily in marketing and advertisement, besides providing farmers with seeds along with all

[160] In the aftermath of African independences in the 1960's, policies targeting especially export crops did result in significant yield increases in many countries, but production stagnated or declined from the seventies onwards. During the eighties and nineties, Structural Adjustment Policies eventually proved unable to raise production up to the levels found elsewhere in the global South.

inputs to go with them, plus technical advice, sometimes credit and even an agreement to purchase part of their production.[161] While these multinationals have gradually expanded their business portfolio over the decades from the chemical sector to pharmaceutics, agrochemicals, and plant biotechnology, Embrapa has remained an agricultural research institution. This new trend in Brazilian agribusiness – a paradoxical effect of Embrapa's own success, as one of my interlocutors put it – has prompted researchers, managers and policymakers to rethink the institution's mandate, mode of operation and funding strategies. As I write this dissertation, a Bill is running in the Brazilian National Congress proposing to open up the Embrapa's capital to private stakeholders – or in the view of some, to privatize it –, in a process that is bound to be lengthy and contested.

African national research institutes, for their part, have been caught in a trap that is somewhat different, and more long-lasting. As a high-level manager in Ghana's CSIR explained it to me,

> we do have our strategic planning laying out national priorities; if you ask me right now what kind of research is needed to develop agriculture in Ghana, I'll tell you. … But we don't have the means to make it concrete. The state supports us with little, and foreign donors have their own ideas figured out about what to do in the projects they fund.

In much of Sub-Saharan Africa, state funding for agricultural research has been historically insufficient, and reliance on foreign donors, perilously high.[162] This has meant unstable research budgets and insufficient strategic planning and coordination, as each donor typically presses for its own priorities. Besides the lack of coordination between foreign-funded projects, they are not always streamlined with research priorities favored by local scientists and policymakers. This was a quite common observation among my African interlocutors, which were always impressed by the unremitting support Embrapa has received from the Brazilian state while maintaining a fair degree of autonomy as far as research directions are concerned.

These and other points raised by the demonstrations of Brazil's agricultural experience brought to surface the question of socio-technical controls in technology and knowledge transfer, that will be resumed in a different light in Chapter 5: in a field like agriculture, the socio-technical network that has to be assembled in order for a technology or technique to travel, thrive and spread beyond its place of origin is multi-scalar and extends much beyond the scope of research itself. Embrapa personnel were perfectly aware of this, and indeed part of their demonstration procedures involved showing how the institute has handled its interface with government, farmers and markets, so that not only would their technologies spread outside the institute's walls, but so that resources and support would keep flowing *into* them from government, farmers, public opinion, or international partners.

This is a different kind of engagement than the one described in the literature about traditional aid, based on a highly bureaucratized apparatus aimed at intervening in broad swaths

[161] As I was told, these and other companies have made huge strides in the Brazilian market of inputs, seeds, and even credit and support to commercialization. Embrapa has been engaging in partnerships with them, most notably for developing genetically modified crops. Resonating a more general trend, one of my interlocutors has underscored the new role of an institute like Embrapa in this new context as being mostly regulatory, in the sense that instead of trying to compete directly with multinationals it would provide a "safety net" of sorts, including similar and different kinds of technologies to remain available to Brazilian farmers.

[162] According to Beintema and Stads (2011, viii), this problem is particularly acute in Francophone West Africa.

of local realities in a planned manner, subsidized by authoritative knowledge specialized in the field of development – which I will synthesize here under the rubric of "intervention" (Ferguson 1994, Long 2001, Mosse 2005, Li 2007). The concluding section will elaborate on the notion of demonstration to characterize this alternative mode of engagement, and suggest some of its effects on Brazilian cooperation's potential for robustness.

3.4 How to engage? Demonstration and robustness

The previous section begun with the hope, manifested in President Lula's words when he inaugurated the CECAT in 2010, that Embrapa's technical cooperation would help raise Africa's crop production to Brazilian levels. The account of the capacity-building trainings provided in this chapter made evident however how little technical and hands-on they in fact were. I was left wondering, then, exactly what type of capacity was being built there?

My suggestion is that, rather than effectively transferring knowledge or technology across the Southern Atlantic, this work of capacity-building could be better characterized as an effort to make a context for relations that had little precedent. There was, above all, a clear diplomatic aspect to the trainings. With them, their sponsor, the Brazilian Cooperation Agency, realized its guideline of concentrating resources in order to make cooperation more standardized, less costly, and more visible to a wider African public. In each round of trainings, Brazilians had access to representatives from a broad sample of African countries at a relatively low cost. There were moments in which this drive became explicit, such as when the campaign of José Graziano, a former minister of Lula and then candidate to head the FAO, was briefly discussed in CECAT and pamphlets were distributed to the African trainees. But most often, diplomacy's intentions were loosely articulated, consisting simply in advertising Brazil to African countries. In the words of one of the Embrapa speakers, "it is hoped not only that particular technologies will be discussed here, but that each of you will take home a message that Brazil is a brother country, which wants to share what it has learned with its African brothers".

It would be reductionist however to assert that the whole purpose of the trainings was politico-diplomatic. The demonstration of Brazil's "developmental success" involved elements and procedures that came out of Embrapa's, not Itamaraty's, experience as a research institute. I would like to conclude by suggesting that this mode of engagement through demonstration has two vectors. On the one hand, it relates to the broader organizational assemblage of Brazilian cooperation, which, as argued in Chapter 1, has led to a more "hands off" approach. On the other hand, it stems from the kind of work that Embrapa employees were used to perform domestically – and which also happens to resonate well with the general principles of South-South cooperation described in Chapter 1.

Early on in this dissertation and elsewhere (Cesarino 2012a), I claimed that Brazilian cooperation has been inspired less by the international development apparatus' expert protocols and policies than by sector-specific, domestic experiences, and that institutions operating at frontline like Embrapa, and even their individual agents, enjoyed significant autonomy from the level of policy to design and implement projects and trainings. In the case of Embrapa, this has been reflected in the fact that demonstration as display of technological achievements is not something crafted specifically for its South-South cooperation activities. It is a major part not only of its techno-political domestic routine, but also of technology transfer in agriculture at large. In this sense, Embrapa *cooperantes*' mode of engagement with African partners has been

largely mirrored on their relations with the Brazilian government and public on the one hand, and farmers on the other.

In the emic jargon, technology transfer, or TT, is the stage that follows Research & Development (R&D); it refers to the transfer of technologies already validated by research to *farmers*. Agronomic research is itself carried out with an eye on adoption by farmers, for instance by taking into account the cost of technologies being developed.[163] In the Embrapa decentralized units visited by the African trainees, crop technologies are not confined to trial fields; they are set up in demonstration units (*unidades de demonstração*) that are both experimental sites and displaying windows (*vitrines*) for farmers and other kinds of lay publics. Embrapa researchers occasionally carry out terrain TT activities such as *dias de campo* (field days) and *treino e visita* (training and visit). Many of these techniques are based on models disseminated globally by multilateral agencies such as the World Bank, but Embrapa and other local institutions have improved and adapted them over the decades.

Even though extension services to farmers are not really part of Embrapa's mandate,[164] the institute does engage in other modes of technology transfer. It has a TT department centered on seed production and "technological business" (*negócios tecnológicos*), for dealing with more entrepreneurial types of farmers. It also makes its own investment in reaching out directly to all kinds of farmers through different media (TV, radio, brochures). During the CECAT trainings, African partners were taken on a tour to Embrapa's modern media facilities, including its own TV and radio studio, and a large graphic press for producing booklets, manuals, and other dissemination and publicity materials targeting farmers and the general public. Embrapa also participates regularly in other modalities of technology transfer held by the private sector, such as agricultural fairs and expositions.

In all these, new technologies are demonstrated to farmers, who will adopt them only if they see advantages relatively to what they already deploy, usually conceived in the form of productivity gains or some other economic parameter. This is, as one of the *cooperantes* put it, part of an "open" (albeit increasingly oligopolistic[165]) system where technical recommendations are not imposed on farmers but demonstrated to them. It is up to the farmer to go on the market after the seeds, fertilizers, and whatever other inputs he decides he needs – be it at Embrapa or elsewhere. As will be seen in the chapters that follow in the case of cotton, this contrasts with the picture found in much of Sub-Saharan Africa, more akin to the colonial development "toolkit" (Isaacman and Roberts 1995) mixing coercion and market signals, and to a "Green Revolution" model of technology diffusion[166] where formal extension channels are top-down and "closed", whatever falls outside of it being largely left to little regulated informal markets.

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[163] Economics motives are generally regarded as the main drive behind farmers' choices; this is also the case in the African institutes (cf. Chapter 5).

[164] The national system ascribes to local institutions, the so-called EMATERs, the task of transferring technologies to farmers through extension systems based on the state level. Structured extension programs are the classic modality of technology transfer, but they are not the only one (Dereti 2009).

[165] More recently, as explained in CECAT and in conversations with various Embrapa researchers, the intensification of mergers and acquisitions in the seed, biotechnology, and agrochemical sectors has meant an increasingly concentrated private market at both ends: supply of seeds and accompanying inputs (and sometimes even technical assistance on how to use them) on the one hand, and absorption of farmers' production by these same companies on the other. In a situation like this, the notion of farmer "choice" can be no doubt rendered problematic; but here I will bracket this question out because Embrapa researchers generally work with the assumption that farmers do exercise choice.

[166] As a TT analyst at Embrapa put it, this "classic extension model" associated with the Green Revolution and diffused worldwide by the Rockefeller Foundation (Cueto 1994), is "autocratic by definition ... as it arrogates the

Finally, as we have seen, demonstration has also been part of Embrapa's daily routine in another way, this time addressing less farmers than another kind of public: government and the Brazilian society at large. Since its early beginnings, the institution and its employees have been constantly called to give an account of themselves in terms of impacts on national development, lest they would run the risk of going underfunded or even perishing. In their demonstrations during cooperation activities, *cooperantes* were providing a similar kind of self-account, convinced as they were that part of the solution for their African partners, at least from the point of view of research, would be to do the same.

Therefore, by carrying out demonstration in both technical and non-technical domains, Embrapa *cooperantes* were not doing anything radically different than they used to do domestically. But here they were being asked by an external agency (i.e., Itamaraty) to address a public they did not have significant relations with. For these relations to multiply and produce concrete effects on the African landscape, researchers and other *cooperantes* did not count with the established channels they enjoyed in Brazil, linking them to other research institutions, farmers, politicians, the media, and so forth. As a result, Brazilians came to regard African partners themselves less as recipients of cooperation than as vital and necessary *mediators* for its initiation and reproduction. Much of the former's efforts during the trainings were towards enticing the latter's interest in the Brazilian experience, and their participation in the comparative effort being proposed.

From these attempts at engagement, however, something may or may not come out. There are those who participate in international cooperation activities mostly as an opportunity to travel around, to meet and network with new people for a variety of purposes, or simply to save some money on daily allowances. Embrapa personnel consciously tried to avoid having trainees who privileged these motivations, but they had little influence over assignment procedures, which happened back in African countries. But even when this was not the case, networking could take a life of its own and become largely self-referred, as happens in much of traditional aid (cf. Chapter 1). In CECAT, indeed, rarely did interactions show a potential for robustness. This would require not only extending interpersonal and inter-institutional relations beyond the scope of cooperation itself, but embedding them in preexisting socio-technical assemblages.

From the point of view of the Brazilian *cooperantes*, this kind of follow-up was a next step to be taken by the African partners, if so they wished. Demand-drivenness had to be therefore constant, not just a kick-start for beginning a relation – much the less a nice word to put on a PR brochure or institutional power point. Many of the Africa trainees did express interest for instance in returning to Brazil for long-term study, or in proposing joint scientific projects with Embrapa researchers. But most of them expected that further support for this would come from their partners; and although Brazil does have some provisions in this respect such as research funding and scholarships for the global South, they were limited in number and scope, and were not generally streamlined with technical cooperation activities.[167]

Today, moreover, these same African countries, institutions, and even individuals are being courted by a growing number of international partners – just like Brazil, China, Australia,

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primacy for guiding technological succession and presupposes the absolute prevalence of academic knowledge over all understandings of reality held by those who are supposed to adopt the technology [i.e., farmers], except in one aspect: economicity" (Dereti 2009, 33).

[167] Embrapa *cooperantes* discussed with trainees for instance the possibility of submitting joint research projects for the Africa-Brazil Innovation Marketplace (cf. Chapter 1). A couple of Brazilian ministries provide scholarships especially for Portuguese-speaking Africa, but this is framed as academic cooperation, therefore organizationally separate from technical cooperation.

India and many others have been eager to generously share with Africa their successful agricultural experiences. But rather than creating a smooth, enclosed context for themselves, these relations become inevitably caught up in Africa's rugged "entangled landscapes", where "multiple spatialities, temporalities, and power relations" (Moore 2005, 4) meet and combine in manifold, overlapping assemblages. The two chapters that follow will describe one of these assemblages, formed around the C-4 Project in West Africa, and look at how context-making, demonstration and the question of robustness have appeared in the case of a full-fledged technology transfer project.

Chapter 4

The Cotton Project in West Africa (I): Assembling Context and Technology

This chapter and the next will provide an account of one of Embrapa's flagship projects in the African continent. By placing it towards the end of this dissertation, I am following my fieldwork path: it was not until after one year in the field, in Brazil and in Ghana, that I was able to get official authorization to attend project activities on Malian grounds. After a shorter visit in February 2011, I returned to Mali and Burkina Faso during the project's high season that year, between September and November. In March 2012, as I made plans to return in the Summer after the December-May dry season (during which project activities were significantly reduced), a surprising coup d'état quickly followed by massive occupation of two-thirds of Mali's territory by Tuareg separatist and Islamist groups rendered my immediate return impossible. I eventually came back to the region later on that year, but this time to Bobo-Dioulasso in the west of Burkina Faso, only going briefly into the Malian border to talk to some of the researchers at the cotton center in Sikasso – according to my Burkinabe hosts and Brazilian diplomats, road travel further north to Bamako was not recommended for security reasons. My access to the C-4 Project, which was suspended for a few months after the coup before activities were resumed with limitations as the 2012 rainy season began, has been therefore unexpectedly curtailed by these unfortunate circumstances. This predicament has personally impacted some of the Malians I have met, and I write these lines with my thoughts on them, hoping for a solution as swift as possible for the political instability that still confronts the country.

Different from the CECAT trainings, the C-4 is a full-fledged technology adaptation and transfer project. During its first years (2009-2013), however, it involved less the direct transfer of Brazilian technologies to African farmers than their adaptation within partner research institutes in each project country. In order for the technologies to travel to their ultimate destination – i.e., cotton farms in the C-4 countries –, the *cooperantes* first had to assemble virtually from scratch a whole socio-technical network around the four institutes that were assigned by diplomacy as Embrapa's partners in project implementation. This chapter will provide an account of how this context for technology transfer was being made by the Brazilian *cooperantes* along with their African counterparts.

It begins at the scale of global cotton politics, to tell the story of the project's early steps at the WTO headquarters in Geneva, from where various institutions from Brazil and West Africa were assembled in an unprecedented interface. It then proceeds, in the second section, to the scale of organizational relations, at which institutional and individual actors were made to relate to each other along the lines described in Chapter 1. It provides a brief account of the project's drafting and early implementation stages, underscoring how the project's conceptual and practical assemblage emerged less through planned policy than through a gradual, ad hoc composition of knowledges and interests. The last section zooms in on the capacity-building trainings in the three technical areas covered by the project: no-till, plant breeding, and integrated pest management. Similarly to CECAT, these trainings involved a demonstration of Brazil's experience with these technologies, aimed at evincing a workable version of the local context of cotton production. In this case, this version also became a basis for the project's emerging

strategies of experimental adaptation and technology transfer to farmers, to be discussed in the following chapter.

Technical cooperation projects analogous to the one that I will approach here have been the subject of studies both in STS and in the anthropology of development. Development projects in agriculture almost always include a component of technology transfer to farmers. Transnational technology transfer initiatives, on their turn, are often carried out within the scope of development projects. But while STS analyses of technology transfer tend to be restricted to the micro scale of technology-environment-user relations (Ackrich 1992, 1993, De Laet and Mol 2000, De Laet 2002, Müller-Rockstroh 2012), anthropologists of development are usually focused on the organizational-political aspects of projects, rarely taking the technologies and other non-humans as agents on their own right (e.g., Ferguson, 1994, Mosse 2005, Li 2007).

Here, I assume that technology adaptation and transfer are multi-scalar processes that go beyond the more immediate technology-environment-user interface, and even beyond the organizational outlines established by the projects. But rather than taking the relation between macro-processes and micro-practice as one of external causality, I privilege how the actors themselves bring scales and contexts to bear on their work – and how, as scales and contexts are made, their work is simultaneously shaped by them. My perspective is therefore different than mainstream, policy-oriented thinking on technology transfer for development; but it also seeks to take a step further from available accounts of technology transfer based on actor-network theory (ANT). The first section will be dedicated to spelling out this perspective, before proceeding to the account of the C-4 Project's emerging assemblage.

4.1 Technology transfer in STS and South-South relations

A common view on technology transfer in the policy world goes somewhat like this:

> The success of these transfers, at any level, usually is determined by the ability of the recipient country to sustain the technology after outside support is removed. Usually a gap is discovered after the technology has been transferred. The gap exists because the enabling environment of the developing country was not the same as the donor's environment. The challenge to development becomes not the technology itself but the processes involved in closing the gaps (Masten and Hartmann 2000, 263).

In this introduction to a symposium on technology transfer to developing countries held in the U.S., assumptions about relations between travelling technologies and their departure and arrival "environments" follow closely the broader Euro-American formula described, among others, by Marilyn Strathern (1990, 1992). Here, the terms – technology and context(s) – precede their relation: the first is a bounded entity that travels from one preexisting context to the other; the challenge is not in the technology itself, but in how to appropriately sew it to its new context, "close the gaps" between the two.

Both anthropologists and STS scholars would readily point out, as indeed some of them have, problems with this kind of reasoning: technologies are not bounded, free-floating entities; they are always enmeshed in socio-technical networks that constitute and are constituted by them; that is why presumably universal technologies and knowledges "fall apart, and regroup differently, when they travel" (De Laet 2002, 1). In an idiom common in the anthropology of

development, they are "resisted" by their recipients – be it by through outright refusal or evasion, be it through mishandling or redirecting them for their own purposes.[168]

These assumptions about relations between technology and its context(s) are not just a cosmological matter, or a reflection of the ways in which "moderns" have discursively constructed their natural-social ontologies as separate (Latour 1993, Akrich 1993). They stem from more fundamental power asymmetries. In *We Have Never Been Modern*, Latour affirmed quite categorically that what he calls the external divide – between us and them, moderns and non-moderns – is an "exportation" of the internal one, inscribed by Western science between nature and culture (Latour 1993, 97). The literature on postcolonial techno-science and its predecessors in the history of science and empire have rendered this assumption highly problematic: Europe's scientific revolution was not an endogenous development, but was, at the very least, co-produced along with the emerging European nation-states' religious-military-economic expansionist impetus from the sixteenth century onwards.[169]

Today, this power asymmetry is evident in the fact that, when technology travels as part of development initiatives, it typically does so one-way: from the "more" to the "less" developed context. As De Laet (2002) noted, this is at the core of the dominant user-centered view: while "some users (mostly located, if not physically, then in spirit, in the North) 'have' (knowledge of) technology, others (in the South) don't" (218). Technology transfer is taken as a cognitive issue, she argues, when it is also a practical-material one: technologies "are dependent for their operation on a network of subtle, sometimes tiny, but always crucial elements – all of which need to be in place for them to function. And many of which often aren't" (218-9). Our discussion of the C-4 Project will corroborate this common claim in ANT-based approaches to technology transfer. These works however tend to be limited to the unraveling of the socio-technical network at the micro scale of recipients, not always giving symmetric attention to how technologies were assembled in their original context, nor to the scaling operations that take place as one moves from one point to the other.

This relative inattention to points of departure and scaling moves may also be tied to the asymmetrical character of technology transfer. In the journey between asymmetrical contexts, a technology created in the departure point (that is, the more developed one) tends to be quite literally naturalized. As Brazilian STS scholar Ivan Da Costa Marques (2005) put it, the "colonized" comes to "see artefacts constructed in the extended modern laboratories of the 'colonizers' as if they were natural objects" (149); in other words, what in the centers was artifactual, constructed, becomes, in the peripheries, natural, a given. This naturalization happens not just because the recipients don't "know" – have a cognitive deficit – about the workings of the technology. It may be because they lack an equivalent artifactual apparatus (the extended laboratory) necessary for unraveling it, or because they are constrained by what happens at other scales, such as intellectual property laws or other legal arrangements that are ultimately based on power, not just cognitive, relations (Strathern 1996, Hayden 2007).

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[168] The historical archive on cotton in West Africa, for instance, is full of examples of local farmers' resistance to the technologies and crop management protocols introduced by colonizers and the post-colonial agencies that followed them (Isaacman and Roberts 1995, Roberts 1996, Mamdani 1996, Beusekom 2002).

[169] Ultimately, both Latour's assumption and whatever contestation of it along the same grounds cannot be but rhetorical. Which divide came first, the internal or the external, is not something that can be adjudicated in "objective" historical grounds, but can only be a situated claim arising from contemporary concerns. Reviews on the literature on science and Empire include Osborne (1999) and Patty (1999). For historical works along these lines applied to Latin America, cf. the reviews by Corry (2005) and Portuondo (2009); on the Atlantic space, cf. Delbourgo and Dew (2008); on Africa, cf. Tilley (2011), Oseo-Asare (2008).

A corollary to this naturalization is that, as the technology travels from center to periphery, it is no longer seen as having social ties to its departure point. That is why, in policy-oriented views on technology transfer, this process is reduced to closing the gaps between the technology and its *new*, less developed context: this, a truly "social" one. Correspondingly, people – local farmers, researchers, technicians, policymakers – become the chief challenge: in order for the gaps to be closed, they are expected to change themselves according to the new technology, more than the other way round. Indeed, STS scholars working from / on the global South have variously noted how, in Latin America and elsewhere, the "social" entanglements of techno-science come to the fore more visibly (Vessuri 1987, Kreimer 2007, Hayden 2008). Much of this perception stems from the perceived lag between techno-scientific practices in the peripheries and those in the centers.

What happens, then, when technology travels along a South-South axis? It must be clear by now that, more than geographic locations, center and periphery indicate *a kind of relation*, and that South-South relations may be ambivalent and even contradictory in this respect. Thus, as I will try to show below, in the C-4 Project relations *were* asymmetrical in terms of the direction in which knowledge, technologies and resources flowed, and of the relative availability of these on both sides. Yet, they were *not* marked by the intervention, imposition, or patronizing – in one word, the verticality – often remarked for Northern aid. Moreover, similarly to what was argued in the previous chapter for the capacity-building trainings, more than "rendering technical" (Li 2007), engagement through demonstration most often denaturalized the travelling technologies by laying bare some of their socio-technical entanglements on both the provider and recipient sides. The transfer process therefore appeared as a co-production between technology and context in a more explicit and reflexive way than is described in the STS literature referenced here. Neither is this literature sufficiently attentive to two key dimensions of technology transfer foregrounded in my account: the scaling moves that are performed by the actors themselves, and the asymmetries they perceive not only between recipient and donor countries, but between different levels of context within these countries.

4.2 Global cotton politics: North-South trade disputes

When I first introduced myself to the president of the national cotton producers association of Burkina Faso as a Brazilian PhD student during my last field trip to Africa in late 2012, he opened a broad smile and exclaimed, "Oh, Brazil! Our allies in Cancun. Welcome, welcome". This was something different than the ubiquitous soccer-soap opera friendly tune. It was a reference available to certain actors directly concerned with the global politics of cotton, and points to an emerging interface, outlined in Chapter 1, at which Brazil and the global South have been brought together during the past decade or so: negotiation rounds at the World Trade Organization, particularly on agricultural trade.

In July 2003, the president of Burkina Faso, Blaise Compaoré, and his Malian counterpart Amadou Toumani Touré (to be ousted by the March 2012 coup) took the pages of the *New York Times* in an op-ed piece entitled "Your farm subsidies are strangling us" (Touré and Compaoré 2003). Published a couple of months before the WTO meetings in Cancun, it circulated worldwide, and became a matter of concern that was not limited to their countries. Their words were firm, and would continue to resonate for the years that followed in global trade and development circles (I quote them at length):

> Africa needs to be allowed to take its destiny into its own hands. Only self-reliance and economic growth and development will allow Africa to become a full member of the world community. … As the presidents of two of Africa's least developed countries – Burkina Faso and Mali – we are eager to participate in the multilateral trading system and to take on its rights and obligations. Cotton is our ticket into the world market. Its production is crucial to economic development in West and Central Africa, as well as to the livelihoods of millions of people there. … This vital economic sector in our countries is seriously threatened by agricultural subsidies granted by rich countries to their cotton producers. … Such subsidies lead to worldwide overproduction and distort cotton prices, depriving poor African countries of their only comparative advantage in international trade. Not only is cotton crucial to our economies, it is the sole agricultural product for our countries to trade. Although African cotton is of the highest quality, our production costs are about 50 percent lower than in developed countries even though we rely on manual labor. … In the period from 2001 to 2002, America's 25,000 cotton farmers received more in subsidies -- some $3 billion -- than the entire economic output of Burkina Faso, where two million people depend on cotton. Further, United States subsidies are concentrated on just 10 percent of its cotton farmers. Thus, the payments to about 2,500 relatively well-off farmers have the unintended but nevertheless real effect of impoverishing some 10 million rural poor people in West and Central Africa. … Our demand is simple: apply free trade rules not only to those products that are of interest to the rich and powerful, but also to those products where poor countries have a proven comparative advantage. We know that the world will not ignore our plea for a fair playing field. The World Trade Organization has said it is committed to addressing the problems of developing countries. The United States has convinced us that a free market economy provides the best opportunities for all members of the world community. Let us translate these principles into deeds at Cancun.

In Cancun, these two countries joined two other cotton producers in West Africa[170] – Benin and Chad – to propose an initiative on the matter at the WTO. This became known as the Cotton-4 (or C-4) group, after which the Brazilian project would be named. Since then, the cotton question has been repeatedly singled out as an epitome of North-South injustices in the contemporary global trade system.[171] What they were asking seemed simple: that rich countries play by the same rules they have been imposing on the developing world. Behind this apparently straightforward statement lies however a complex battleground where major global players, North and South, have been struggling for the past decade or so over international trade rules and their deployment. It is a battleground for which players needs to be well-equipped with money, expertise, and as many allies as possible. Among the poorest in the world, the C-4 countries could not but appeal to the rest of the world's sense of fairness. A major exporter of agricultural commodities and a so-called emerging country, Brazil has been a leading player in such trade negotiations, and a relentless critic of the U.S. and Europe's agricultural subsidy policies.[172]

[170] Chad is technically located in Central Africa, but for the sake of simplicity it will be assembled with the others in this dissertation.

[171] For instance, in Moseley and Gray (2008), Calderisi (2007), Xiaoyun et al (2012, 89).

[172] Trade in agricultural commodities has been a key area in Brazil's foreign relations. A few years ago, Itamaraty has even instituted the position of "agricultural attaché" in some strategic embassies (the only one in Africa being in Pretoria, which was, by the way, occupied by an Embrapa researcher at the time I did fieldwork).

While the C-4 countries were making their plight known worldwide, Brazil was taking action and pressing a case against the United States at the WTO based on the claim that their cotton subsidies breached free trade rules. Even though its case seemed strong, to face the U.S. in such a dispute is far from a trivial matter; Brazilian diplomats and government officials were well aware of the high costs and political risks involved in such an action. The C-4 countries declined to join in as formal parties; according to a diplomat I talked to, they were scared off by ill advice from "foreign NGOs".[173] Nonetheless, these African countries offered political support to Brazil, and it was during this process that a technical cooperation project to improve cotton production in the C-4 countries was idealized by Brazilian diplomats along with their African counterparts at the organization's headquarters in Geneva. During discussions in 2007 at the level of the WTO Cotton Initiative, Embrapa confirmed its willingness to become the implementing institution in this enterprise (ABC 2009).

In 2009, the WTO board issued an unprecedented decision granting Brazil the right to retaliate against the United States. After a period of negotiations, Brazil chose instead to settle for financial compensation to its cotton producers. The U.S. government agreed to pay every year an amount equivalent to the estimated losses incurred by Brazilian farmers due to American cotton subsidies, as long as they remain in place. During my last stages of fieldwork, the word going around in Brasília was that a small portion – 10% – of this yearly fund of around U$140 million would be channeled to South-South cooperation, in the form of technical cooperation projects on cotton in Africa and South America. As 2012 came to a close and so did Phase I of the C-4 Project, it was expected that Phase II would benefit from part of these funds.

This background makes the C-4 Project particularly interesting and somewhat unique, since its very existence is directly linked to processes pitting North against South at the scale of global trade – an arena where, despite the complexity of internal alliances, if one looks at a certain distance the hemispheric opposition takes on a relatively clear shape. In spite of its fundamentally technical character, the project regularly reports to the Brazilian delegation in Geneva, and from the point of view of Brazilian diplomacy it became a flagship project – a model of South-South cooperation, even before its first results were given enough time to mature and take shape. In early 2011, for example, it was described by an Embrapa manager as an example of "how it is possible to secure long term outcomes, with socioeconomic impact on the countries involved",[174] at a moment when "outcomes" had not even left the experimental fields. The project's unique origins have therefore persistently hung over it in the form of its special political visibility. As a result, even though frontliners were perfectly aware of the need to proceed at the right pace in order to enhance the project's potential for robustness, they seemed to face added pressure relatively to other, lower-profile projects. In other words, in this case technical failure was not an option because politically, the project had already been born successful.

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[173] According to a Brazilian law student who wrote a short ethnographic account of the early stages of the WTO cotton dispute (Azevedo, 2007), the case against the U.S. was originally framed and proposed to other countries such as Australia by the Geneva-based law firm where she worked as a trainee. At first hesitant, Brazil eventually decided to take up the case. For a first-hand account of this process by the Brazilian cotton farmers' association (Abrapa), cf. Costa and Bueno (2004). The "behind-the-scenes" account of the dispute by Goldberg et al (2005) indicates these NGOs to be Oxfam and IDEAS, which did advise the C-4 governments throughout the process.

[174] Francisco Basílio, then head of the SRI (Agroanalysis 2011). Or, in a somewhat hyperbolic brochure that could as well have been published by the World Bank or any other traditional development agency, it is affirmed that the project "is bringing solutions" to "improve production systems … ensure food security for the population, manage natural resources, produce high quality seeds", while "increasing cotton yield and quality" (Embrapa, n.d.: 6-7).

The C-4 Project was remarkable for other reasons as well. It was the first of the structuring kind (cf. Chapter 1) to be implemented by Embrapa in the African continent. As such, it was a pioneer project, and a frequent reference in statements by diplomats, Embrapa officials, and in reports on Brazil as an emerging donor produced by Brazilian institutions and the international development industry.[175] From the point of view of the emerging interface between Brazil and Africa discussed in Chapter 2, the C-4 Project is somewhat unique for encompassing countries that, different from those involved in Embrapa's two other structuring projects in Africa,[176] have had little or virtually no historical relations with Brazil. All of them are French-speaking and, with the exception of Benin (the only C-4 country by the coast and home to Brazilian returnees), they are predominantly Islamic, landlocked, and are situated closer to the Sahelian band than to the coast, where the Brazilian presence in West Africa has been historically concentrated. They are among the poorest in Sub-Saharan Africa and, with the exception of Chad, have no major reserves of strategic resources[177] (which are, after all, an element in the weaving of geopolitical alliances and commercial ties).

Moreover, this project focused on a crop for which the competition concerns discussed in Chapter 1 and 2 have relatively lower relevance. As some of my interlocutors were quick to point out, despite the importance of cotton for the C-4 countries' export revenues, even when taken together their cotton output did not amount to 5% of the world market (Menezes 2013, 98). And even though Brazil is one of the leading world exporters of cotton, this commodity ranked behind others such as soybeans, sugar, coffee or meat in the country's exports, and most of its production was absorbed domestically.[178] I am not sure how incidental this is, as considerations about commercial competition are likely to be taken into account during alliance-building in trade negotiations. Nonetheless, this means that this project seems to have been largely spared domestic pressures stemming from competition fears, and therefore possible pressures against it coming from the strong agribusiness support base in Brazil's federal government coalition.

Like most others, the C-4 Project was conceived at the high tide of Brazil's South-South impetus during the Lula administration. When his successor Dilma Rousseff took office in early 2011, she quickly closed the resource tap for cooperation, as part of wider budget cuts. Cooperation with Africa was also hit hard, as during the Rousseff administration the pendulum of South-South relations swung back to Brazil's historical priority, its South American neighbors. Still, the cotton project was likely to feel the blow less than other bilateral projects, because of the extra resources to be provided by the U.S. compensation fund. As I completed this dissertation, it was bound to move forward into a second phase due to begin in late 2013 – which means that, at this stage, any balance on its outcomes cannot be but provisional.

The sections that follow will outline three assembling movements that unfolded from diplomacy's foundational gesture: recruiting institutions and their members to take part in the project; crafting the project document and kick-starting its implementation; and assembling the socio-technical context to which the Brazilian technologies would be transferred.

4.3 Assembling individual and institutional actors

[175] E.g., UNCTAD (2010), World Bank and IPEA (2011), Embrapa (n.d.).
[176] The other two are the Pro-Savannah in Mozambique, and a rice project in Senegal.
[177] Mali may be taken as a partial exception since it has recently become an exporter of gold.
[178] According to 2010 data from MAPA, http://www.agricultura.gov.br/vegetal/culturas/algodao. Last accessed, 20 April, 2012.

Both in Brazil and in the C-4 countries, participation in the project was a demand that came to the research institutes from "above": that is, from their respective federal governments. Itamaraty and its counterparts in West Africa recruited the research institutes to implement the project, and partnered up with a global brokerage agency – the United Nation's Development Program (UNDP) – to manage it. Each institution was, on their turn, in charge of enrolling in this effort their respective sub-units and individual staff.

Institutional actors

The project's core organizational architecture was reflected in the composition of its highest decision-making instance, the steering committee: one member from the Brazilian Cooperation Agency (ABC), two from Embrapa (the project coordinator, plus a focal person from the Secretariat of International Relations), one from the United Nations Development Program (UNDP), and one from each of the four African institutes: Mali's Institut d'Économie Rurale (IER), Burkina Faso's Institute de l'Environnement et des Recherches Agricoles (INERA), Benin's Institut National des Recherches Agricoles du Bénin (INRAB), and Chad's Institut Tchadien de Recherche Agronomique pour le Développement (ITRAD). The committee met every year, in Brasília or in one of the C-4 capital cities, and concentrated the project's management functions and joint decision-making processes.

Other relevant institutional actors were not formally represented as such in the committee. One of them was Embrapa's cotton center, based in Campina Grande in the Brazilian Northeast, but with an important nucleus in Goiânia (closer to the large agricultural zone in the Center-West). Most of the researchers involved in the project worked in this center. Embrapa's decentralized units are subjected to, but enjoy some autonomy from, the headquarters in Brasília, where the Secretariat of International Relations is based. Between Campina Grande/Goiânia and Brasília there was an important inter-institutional channel on the Brazilian side that commanded, for instance, the choice and availability of the researchers who would go to Africa to participate in trainings and experiments, or the organization of study visits and other projects activities that took place in Brazil. Various researchers and managers from the cotton center played a central part in the project's early stages, before a coordinator for Phase I was hired. Personnel from this research center were likely to come to the fore again during Phase II, when the current coordinator is supposed to leave.

Another second set of actors included personnel from the Brazilian embassies in the C-4 countries (except for Chad, which does not have one). Brazilian ambassadors, their families and embassy officials of all ranks played a major support role during project implementation. Even on a more personal key, it makes a difference to have one's countrymen to show you around and even provide emotional support in countries that speak a different language and count with a minimal presence of Brazilian expatriates (keeping in mind, moreover, that most ordinary Brazilians do not have the cosmopolitan habitus of their Northern, and many of their African, counterparts). Brazilian researchers and managers who came to Bamako to work in trainings, technical missions and other project activities were regularly in contact with embassy personnel. It was common for the ambassador in Bamako to throw convivial welcome dinners in the charming four-story house located by the banks, and with a great night view, of the Niger River – a far cry com the imposing fortress aspect of embassies from the U.S. or European countries. They were always available for whatever kind of support that turned out to be necessary, a kindness that I have also enjoyed at points, both in Mali and in Burkina Faso.

The role of the Brazilian embassies was also operational. In a way, they made up for the lack of a network of cooperation offices abroad like the ones available to larger donor agencies such as USAID or the French AFD (cf. Chapter 1). In fact, the three Brazilian embassies in the C-4 countries were established simultaneously with project negotiations: Benin in 2006, Burkina Faso and Mali in 2008. In the intricate bureaucratic pathway whereby the project budget was transferred from Itamaraty to African grounds, some funds have passed through the embassies' accounts. Occasionally, they have also intermediated the international transfer of genetic material (seeds).

Finally, ambassadors and their families were also recruited to play a foremost role in a kind of project activity that is possibly as important as the technical work itself: official visits to project grounds. Several ABC and Itamaraty officials (including Minister Amorim), besides Malian government officials from all levels (including the President Amadou Toumani Touré), have visited the project parcel in Sotuba (cf. Chapter 5). These kinds of visits also happened in the other C-4 countries. Many of them were broadcasted in local television, radio, newspapers, and the internet. Visibility for the donor (as well as local politicians and other development brokers) is not just a means, but itself one of the goals, of cooperation. At this level, the Brazilian diplomats' role was eminently ritual, and their dealings with African politicians, at least as far as the project is concerned, did not seem to go much beyond that. Differently from France and other Northern donors present in these countries since much longer, Brazilian diplomats do not usually meddle in local politics.

African partners, especially from Mali, repeatedly remarked the importance of ambassador visits to project grounds, besides other high authorities such as the Brazilian foreign minister in 2009. "It's unprecedented", one of them told me; "the French ambassador has never bothered to come and see a project here [in IER]." "I still remember, first time the Brazilian ambassador [in Mali] came", another pointed out, "the first maize we planted had barely germinated; we didn't have much to show yet, but he came anyway". The importance they saw in this, especially at the early stages of the project, was that it made them more confident about the Brazilians' commitment and the importance they ascribed to this project. These were, after all, partners with whom most African researchers had never dealt before, who came to them suggesting an alternative model of technical cooperation they had no previous experience with.

Management

Like most others, this project was originally a request that came to Embrapa from Itamaraty, which also set aside the funds for it: 5 million dollars. Although not particularly impressive if compared to budgets from major Northern and multilateral agencies, this has been the largest apportion of funds for a bilateral project implemented by Embrapa in Africa.[179] At that time, Embrapa's regional office in Ghana was still in place, so it played a key role in articulating the project with the cotton unit back in Brazil. After the Secretariat of International Relations re-centralized the coordination of all projects at the Embrapa headquarters in Brasília in 2010, it came to play the managerial role, which it shared (and it seemed to me, partly overlapped) with the Brazilian Cooperation Agency. UNDP became a necessary operational broker, for the project to make acquisitions and payments outside of Brazil. Given the legal configuration described in Chapter 1, project funds must flow from the ABC to the UNDP office in Brasília, and from there to the UNDP office in Bamako, before they could be spent according

[179] The Pro-Savannah in Mozambique has a larger budget, but it is a triangulation with a Northern donor.

to what was prescribed by the project – sometimes after a few other local hurdles were transposed.[180] The fact that Brazilian cooperation is not based on direct transfer of resources to partners meant that the institutes had to pay upfront for some of the project's operational activities, to be reimbursed later on. Another share of ABC funds was transferred to Africa in the form of daily allowances paid to employees from Embrapa, ABC and the African institutes while traveling on project missions, regulated according to UNDP standards.

This cannot be but a rough sketch, since the entire accounting process is very complicated, detailed documental information was not always forthcoming, and this was not my privileged ethnographic focus. But it did interest me inasmuch as it impinged directly on the project's frontline activities, and this happened throughout. Already during the early months of project implementation in 2009, for instance, the Brazilian Cooperation Agency's official for the project remained out of the loop for over a month, until he could be re-hired through another UNDP consultancy contract (cf. Chapter 1 on ABC staff turnover). Also at this stage, until all formalities for resource transfer through UNDP fell into place, project frontliners had to rely on temporary fixes such as to transfer funds through the embassy, or make front payments on their own. But even when the ABC-UNDP system was on track, bureaucratic constraints on resource availability and transfer persisted (due to the red tape in licensing, auditing, customs clearing and other procedures required by Brazilian and African legislation, and UNDP regulations), and were probably the most widespread qualm expressed by those involved in implementing the project. Along with the budget cuts during the Rousseff administration in 2010 and the unexpected political crisis in Mali in 2012, this was considered one of the chief "externalities" jeopardizing project execution.

The overarching issue here, also found in traditional aid (e.g., Rottenburg 2009), seemed to be that bureaucratic temporality and requirements were frequently at odds, if not outright contradiction, with the rhythm and needs of project activities on the ground. In the project's early moments, needs regarding purchase of equipment or payment of personnel – basic tasks in any project implementation – would sometimes clash with standardized bureaucratic provisions. For instance, anyone formally hired in the project through UNDP, even a driver, would receive significantly higher pay than the local researchers' salaries; or, UNDP would pose obstacles to changes in the purchase plan included in the original project documentation. The first project coordinator was particularly keen to underscore conflicts between bureaucratized provisions at the managerial level (which, in institutions like UNDP, have a global scope) and the practice of project implementation as it unfolded locally: while a detailed project plan has to be crafted in advance of implementation, "accommodations that eventually need to be made [at the frontline scale] can only appear *during* implementation".

This kind of contradiction also came up in the case of scientific experiments. Bids for equipment, licenses for exporting and importing seeds, rigorous bookkeeping required for auditing procedures – these and more sometimes made it difficult for researchers to strictly follow the project's technical protocols, or introduced an extra time and energy burden to their work. At times, for instance, sowing happened after the optimal date due to delays in seed transfer from Brazil. The construction and equipping of lab infrastructure at the Sotuba station in Bamako, which was supposed to support the project's training and experimental activities, were not concluded until Phase I was already coming to an end. "Nature can't wait", one of the

[180] Related, for instance, to the process for reimbursing local institutes, or for transferring funds from the institute's central management in Sotuba to the cotton program in Sikasso, where most researchers working in the project were based.

Embrapa researchers put it, exasperated. "I want to tell you about this because it is really important that this be registered". One of his African counterparts insisted along similar lines: "With France and other partners, things are more simple. This has to change. One day Brazil will have to sort this out". Everyone I met, including at the ABC and Itamaraty, was aware of these issues; but as remarked in Chapter 1, effectively addressing them would involve reforming cooperation legislation as well as the Brazilian Cooperation Agency itself; and this, as far as I could gather, wasn't anywhere on the near horizon.

Frontliners

At the project frontline, not all Embrapa researchers were fully acquainted with, nor terribly interested in, the project's political-commercial backdrop described in the previous section. For those who did, the tendency was to take to heart the project's avowed purpose: to engage in an interest-free sharing of knowledge and technology with the ultimate aim of reaching those who really needed it, the African peasants. For those who did not, this disinterest and unawareness did not really seem to interfere with the practical task at hand – they were there quite simply to execute a task demanded by their home institution. Not that they did not care about the work they were doing in Africa. On the contrary, given that recruitment to work in this kind of project always had some leeway for negotiation with the heads of Embrapa's decentralized units, and that researchers got little extra financial or career incentives for doing it, in most cases there seemed to be some degree of personal interest in it, even if a simple curiosity to get to know a different part of the world. In fact, I even wonder how representative of the ensemble of Embrapa staff is the sample of researchers I ended up with, since not everyone is willing to commit to a modality of project that does not normally bring the obvious professional benefits of scientific cooperation with Northern countries or other emerging economies, for instance in the Labex (cf. Chapter 1).[181]

While some seemed to take their work in the project as part of a routine job, others ended up developing a more personal kind of commitment towards it. As I discussed with a Brazilian diplomat in Africa the somewhat uncertain future of South-South cooperation in the post-Lula era, he contended that "at this point, projects are moving forward because there is people out there willing to *vestir a camisa*" – literally, to "put on the jersey", another soccer metaphor meaning to wholeheartedly embrace a challenge. My impression however was that this commitment stemmed less from a sense of historical indebtedness towards Africa, allegiance to South-South politics, or a sense of duty towards their home institution or the country, than from the concrete engagements they effectively came to establish with the other frontliners – their African partners, but especially their Brazilian peers also involved in the project. For the Brazilian frontliners, the project was an exceptional enterprise in their professional and personal lives, and it is not clear whether such dedication to group work could be reproduced on a regular basis – even if institutional incentives eventually come to concur to a routinization of motivations (in other words, if Brazilian cooperation becomes more professionalized, specialized, and bureaucratized).

[181] Comments by third parties have reinforced this impression. Once I met an Embrapa researcher who did not work at the C-4 project at a random situation during my last trip to West Africa, and told him about the dissertation research I was doing. As I listed the researchers with whom I had engaged during fieldwork, some of whom he knew, his joking remark was, "But these are all great people! This way you'll think Embrapa is better than it really is."

This contrasted with many of the African *cooperantes*' perspectives: for them, international projects were a major part of their institutes' quotidian landscape. In general, these external resources were welcome, since their own states' budget provided them with insufficient support. Individual researchers and managers do however negotiate their participation in projects, and, unless they see benefits, may choose not to commit (be it formally or de facto). Through the Brazilian project, individual researchers got mostly immaterial benefits, such as expert support for their research work, capacity-building, or networking opportunities. The question of resource transfer was sometimes a source of discontent, especially by those in charge of managerial functions, but also researchers; occasionally, even they would have to disburse upfront personal resources to get project-related activities going. The fact that they were willing to do it even if a salary surplus or funds from other projects were not forthcoming indicates the personal interest and commitment the project was able to arouse in some of them.

Brazilians, who got better and more regular pay by Embrapa than their African colleagues, would show less concern about financial incentives for participating in the project. But one point that was consistently raised instead regarded career incentives. "It's been some time here in Embrapa that researchers have been made to follow the academic logic, and publish every year in good journals", one of them explained to me. "The time we spend travelling for projects, then writing reports when we return – one for the ABC, one for Embrapa, sometimes more –, we could be writing an article for publication". This grievance was further reinforced by the fact that projects of this kind typically do not involve new scientific work worth publishing, or at least not in the short term. Management of the cotton unit also expressed concerns about overburden, especially with respect to the project's second phase and to the possibility of replicating it in other countries.[182]

Different from those in specialized development bureaucracies and their associated industry of consultancy firms and NGOs, frontliners in this project were research scientists employed in national research institutions. As such, their primary commitment was to their routine research work, which not always happened to be streamlined with the technical content of the project. This configuration seems to have a bright side, though: the fact that researchers from both sides recognize each other, and reciprocally value each other's engagement in project activities, *as* researchers. African researchers were recognized for their good technical knowledge and sense of method, and their Brazilian partners were complimented for their skills in doing hands-on research work and non-patronizing ways. In spite of asymmetries in availability of material resources and infrastructure and some divergences in technical background, at bottom the work of an agronomist or a cotton breeder is not radically different in Brazil and in Africa. But this is not just a matter of common training, often in the U.S. or other parts of the global North (as underscored for instance by Amanor 2013). Embrapa researchers had not just been trained in these expertises at an early point in their lives and then went on to a career in development projects and consultancies; they have been continuously *applying* them to research work back in Brazil, sometimes in close contact with farmers. This was a major difference vis-à-vis Northern projects remarked by the African partners, and a far cry from the disconnections between expert developers and their target groups found in the literature on

[182] In mid-2012, there were talks about an "Eastern" version of the cotton project being negotiated (if my memory does not fail me) with Tanzania, Kenya, Uganda and Burundi, also to be funded by resources from the U.S. compensation fund. Later on that year, I heard that much, or perhaps even most, of these funds would go to projects in South America. By the time I finished writing, none of this had been officially confirmed.

development (e.g., Li 2007). As I will discuss further ahead, this may entail a potential for robustness different than traditional aid's.

4.4 Assembling the project framework and early implementation

The task of the *cooperantes* initially recruited by the Brazilian Cooperation Agency was to draft the project document, and kick-start its implementation on African grounds. This involved diagnosing the "problem" with cotton production in the C-4 countries, and proposing means to address it. In much of the anthropological literature on aid projects, solutions appear as coming before problems – or, in what Tania Li (2007) calls problematization, local problems are framed according to technical solutions already available in the agencies' expert apparatuses. In the C-4 Project, the framing of problems was also directed by technical expertise; but this involved less the implementation of policies and methodologies consolidated in the development apparatus than an intermittent and somewhat malleable process involving much ad hoc accommodation between various organizations, and in which the research institutes played an equivalent, or even larger, role than the cooperation agencies themselves.

The project's overall technical scope was already sketched at the level of the WTO Cotton Initiative, where the idea for a project between Brazil and the C-4 countries first came into being. The three technical areas eventually included in the final version – genetic improvement of cotton varieties; soil management; and integrated pest management (ABC 2009, 12) – were however only vaguely indicated. A more precise diagnosis was elaborated through a series of missions of "technical-political character" (ABC 2009, 13) to Benin, Burkina Faso, and Mali, of which both Embrapa researchers and ABC officials took part.[183]

In 2006, a breeder from Embrapa's cotton center was convened to execute a first fact-finding mission to these three countries. Having had no significant experience working in Africa, he suggested that a retired Embrapa agronomist who did would come along with him (in 2009, this person would become the project's coordinator during the first semester of implementation). Both the diagnosis and ensuing recommendations were crafted in conversation with employees from the C-4 research institutes, government offices, and cotton companies. Their report produced a common diagnosis for the cotton sector in all four countries, identifying *low productivities* as the chief problem. Through conversations with researchers from the local institutes in West Africa and other (at that time, only potential) *cooperantes*, the cause of low productivities was traced primarily to the poor nutrient content of soils and the "insignificant amount of fertilizers" used by local peasant farmers on the one hand, and to the irregularity of rain patterns in the region on the other.

These problems are as old as colonial cotton production in West Africa. Isaacman and Roberts (1996) referred to poor soils and irregular rainfall as the two main issues confronting colonial administrators and agronomists, as they set out to seriously invest in cotton cultivation in Sub-Saharan Africa. The following quote would apply perfectly today, except for the assumption that cotton would "naturally" thrive in tropical environments – that much, as remarked in the previous chapter, Brazilian agronomists knew quite well:

[183] Chad was probably excluded from the beginning due to factors such as poorer infra-structure, more complicated logistics, recent history of political instability, and the fact that cotton is not as central an export item as in the other three countries (Chad is well-endowed with oil reserves).

> The reality that colonial planners confronted on the ground rarely confirmed to their preconceived notions. Cotton was thought to thrive in warm, humid, tropical environments. Tropical soils, however, are generally deficient in nutrients as a result of leaching and erosion. Cotton exacerbated this problem by robbing soil of nutrients ... To complicate matters still further, throughout much of the continent tropical rains fall irregularly through the rainy seasons. Cotton requires regular rains spread over a five-month period, which should taper off before harvest ... If the rains are delayed, sporadic, or insufficient, poor germination or even total crop failure is likely. Excessive rain can produce flooding and late rains will damage the boll and interrupt harvesting (Isaacman and Roberts 1996, 14).

The solutions recommended by the C-4 report came out of a compromise between the availability of technological expertise for addressing them at Embrapa, the demands made by the African partners, and the financial and organizational constraints posed by the Brazilian Cooperation Agency and UNDP. Solutions were as much tailored to local contexts as the latter were assembled according to the available technological options. And although the project was bilateral, it had clear normative references at broader scales, especially with respect to global trade on agricultural commodities and international scientific networks.

Thus, different from other world producers such as the United States or Australia,[184] both in Sub-Saharan Africa and in Brazil cotton is virtually only rain-fed. Embrapa had no significant expertise in irrigated cotton, and the cost of a large-scale irrigation scheme probably would have made it prohibitive for Brazilian cooperation anyway. The water problem therefore came to be addressed by the project by means of varietal selection and crop and soil management techniques aimed at maximizing humidity retention and crop resilience to irregular rain patterns, such as no-till.[185] These were also supposed to address the problem of degraded soils, by improving their chemical and physical condition and deploying varieties more efficient at absorbing water and nutrients. Already at this point, this was coupled with the project's two other technical components: breeding and integrated pest management. All three catered to some of the demands posed by the African counterparts from the local research institutes, as these were scientific fields in which they already worked but needed more financial and expert support. "At first they wanted everything", one of the Brazilian negotiators conceded, "but we ended up boiling it down to those three". Other "strong demands" by the African partners considered at this point were excluded later on. This was the case, for instance, of post-harvest processing: while those in the C-4 countries wished to aggregate value to the cotton grain and fiber, which they exported in raw form, this exceeded Embrapa's competency as an agronomic research institute.

During a long conversation I had with the first report's main author, I repeatedly insisted about what exactly guided him in his fact-finding quest – or, in the idiom privileged in this dissertation, what was his context-making logic. Having in mind the formal expert procedures according to which developers go about designing diagnoses as described by the literature (e.g., Mosse 2005, Li 2007, Rottenburg 2009), I was expecting to evince the name of some particular

[184] Another cotton project that was being negotiated with the C-4 countries at the time I did fieldwork, with Australia, apparently would involve the construction of small dams for capturing rainwater. As I was concluding dissertation writing, I heard that USAID was also proposing a cotton project to the four West African countries.

[185] The rainy season in the *cerrado* tends to be longer, better distributed and more predictable than in the Sahelian savannahs. Moreover, Brazilian commercial farmers deploy technologies to maximize the effective usage of rainfall, such as growth hormone regulators to homogenize the plants' life cycle and concentrate key maturation stages such as flourishing in periods of greater availability of water.

project methodology. But in response to my insistence he simply declared, "well, at bottom I just used my common sense as an agronomist". And even though he was well aware that ultimately the problem with the cotton sector in West Africa goes much beyond low productivities, from the perspective of an agronomist there is not much point in improving other links in the production chain without addressing the productivity issue. This was not due to a civilizational urge to lift a traditional agricultural system out of age-old darkness as the only path towards development. It stemmed, rather, from the fact that West African peasants *already* made use of improved varieties, chemical inputs and other technologies introduced by previous (national or foreign) development initiatives, but these were not preforming up to their potential. This reasoning was also reproduced at the level of the productive system: soil management became the crux of the matter since without addressing it there could be "no expectation of changes in productive performance, even with the improvement of other aspects of the production system" (ABC 2006, 9). What came out of this preliminary stage was not a deep diagnosis of the cotton value chain in the four countries, but a foray into the possibilities that fell within the more circumscribed scope of technical cooperation (cf. Chapter 1).

Rather than continuing along a linear bureaucratic path in the organizational pipeline, no immediate follow-up took place after this first fact-finding mission was concluded. After a period when this project of a project was "sort of left aside", as I was told, the Brazilian Cooperation Agency finally decided, most likely driven by politico-diplomatic considerations, to resume it by hiring a senior consultant: a former Embrapa staff with extensive international experience at the FAO. Himself an entomologist specialized in cotton, he drafted the project jointly with ABC officials and researchers from the Embrapa cotton unit. "I had been in several ABC missions previously, but these were smaller projects, with one or two Embrapa researchers," he told me. "The idea then was to make a different project, with much more participation from the recipient countries." According to him, the idea of investing in this new modality, which became known as structuring project (cf. Chapter 1), was championed by an ABC official who was particularly engaged in the South-South cooperation impetus during the Lula presidency.

During the drafting process, he requested feedback from representatives of the African institutes during his own mission to Burkina Faso, Benin and Mali in 2008. At this point, the African counterparts did not demand much to be changed or included: "they were pretty much happy about what we had to offer", he told me. Even if partly based on facts and figures from studies by multilateral agencies such as the WTO and the OECD, according to the accounts I collected, the main source of data for the diagnosis on the local context was direct contacts with the African partners. The document reproduces much of the previous report, while being more specific and detailed; its technical framework nonetheless remained somewhat open-ended. "If you read the actual project, you'll see it's all very general", one of the Embrapa entomologists advised me. "We are the ones specifying the technical work to be effectively carried out". To a large extent, those who drafted the project were not the same as those who came to be involved in actual implementation.

In practice, most of the project work was to remain circumscribed to the local institutes, involving adaptive research of Brazilian technologies in their research stations, training their researchers and technicians in the concerned expertises, and building basic research and demonstration infra-structure.[186] Only at the end would it take a step outside the institutes

[186] As stated in the project document, the four stated objectives are as follows: (i) to set up a "Pilot Unit of Adaptive Research and Technology Demonstration"; (ii) to develop "adaptive research on breeding, soils/nutrition/no-till, and

towards technology transfer proper, through diffusion brochures containing recommendations to local extension agents and leading farmers, based on the techniques validated by the adaptive research carried out during the project's first three years.

The consultant's second task was to choose in which country the project's headquarters would be based. After visiting three of the C-4 countries in late 2008 (cf. footnote 179), he prepared a ranking based on heterogeneous criteria such as interest shown by local governments, quality of technical/scientific personnel, accessibility, areal hub, hotels, etc. Mali and Burkina Faso ended up technically tied, and it was left for Itamaraty to decide. In Mali, the consultant had suggested an IER research station in Sotuba, in the outskirts of Bamako, which did not belong to the institute's cotton program proper. The Burkinabe partners, on the other hand, were fighting for the project to be based in INERA's cotton center, which was located in the country's second largest city, Bobo-Dioulasso, way more distant from the capital city (350 km). The Sotuba station in Mali therefore won by a nose due to the logistic aspect.[187] While this choice indeed facilitated logistics immensely and allowed for close support to the project by the Brazilian embassy, Sotuba was not where most local researchers participating in the project were based (the IER cotton center in Sikasso was located about 380 km south of Bamako[188]). It therefore became yet another mediator in an already intricate chain whereby resources, personnel, and materials flowed.

Once a final version of the project was concluded in 2009 and all *salamaleques*,[189] as a Brazilian researcher once put it, were completed, the ABC recruited back the retired Embrapa agronomist who had been on the first fact-finding mission. He would join his entomologist colleague who wrote the final project document to kick-start activities in Sotuba: the latter stayed in Mali for another month; the former, during six. Both were former Embrapa researchers, but their career profiles were quite distinct. In fact, their complementary expertises seem to have been an important asset in those early moments of context-making. The entomologist was a Mississippi PhD, who, during the eighties, played a role in fighting a pest crisis that almost decimated Brazilian cotton production. When the C-4 Project was being conceived, he had retired after working for almost twenty years at the FAO, and was heading Embrapa's international relations advisory body (which became the current Secretariat of International Relations after an internal reform).

The second consultant did not hold a graduate degree, and did not have a past career neither in management nor in international agencies. His expertise came, rather, from his somewhat rare long-term experience as an agronomist working in Africa during the early

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integrated pest management"; (iii) to provide capacity-building trainings for "researcher, technicians, and leading farmers" on the new technologies; and (iv) to "prepare and distribute diffusion materials on the knowledge validated" by the project.

[187] I once heard that this decision might have had a political component: "Lula has never been to Mali, so let's do it there so he can go'." President Lula never did make it to the project headquarters in Sotuba, but his foreign minister Celso Amorim inaugurated it along with the Malian president in 2009.

[188] This is a common configuration; in all C-4 countries, as well as in Brazil, the cotton program is based on locations far from major urban centers, because closer to production areas.

[189] This version in Brazilian Portuguese of the Muslim greeting *as-salāmu ʿalaykum,* which also exists in French, designates an excessively pompous formal attitude, with little utility beyond its ritual value. Indeed, there is a level of cooperation that involves highly formalized activities, a protocol of official meetings and document-signing before frontliners can step in: technical cooperation agreement (signed by governments); complementary agreements (establishes an executive program with reciprocal responsibilities); memorandum of understanding; protocol of intent; and then, finally, the project document proper. To complete the whole bureaucratic sequence may take some time, even years, and sometimes it ends up being abandoned halfway through.

eighties, and for shorter periods later on. As discussed in Chapter 2, that was a moment when both Brazil and parts of Africa were experiencing an economic bonanza that brought together the two sides of the Southern Atlantic, before crisis would hit them hard later on that decade. One of Africa's rising stars was then the Ivory Coast, where he lived with his family for six years. "You know, I speak French, but mine is African French!", he warned me jokingly, but also kind of proudly, as he picked me up at the bus station in Goiânia in the summer of 2012. As he proceeded to recount later on that day, while showing me incredible post cards of a very modern Abidjan, pictures, newspaper clippings and other documents from that period he still kept, that project consisted in four seed production farms centered on soybeans. Like the C-4, it was bilateral, but, in an arrangement which is today unusual, it was co-funded by the Ivorian state. According to him, the country's *pére fondateur* and president until his death in 1993, Houphouet-Boigny, "loved all things Brazilian; he even wanted to build a capital in the hinterlands like Brasília," and decided to partner up with Brazil for mechanizing soybean production "in order to get rid of France." The project deployed an *apprentissage* method where each Brazilian had an African trainee "24/7, like a shadow", who had to learn their new métier from scratch, "in intense field activities". As happens to many projects, today these farms are no longer operational, but it left some traces in the Ivorian landscape: "the seed analysis laboratory that was built is still there, the Ivorian project director at that time still makes consultancies." He joined Embrapa not long after this project was completed in 1986, and since then has returned to Africa multiple times as a consultant, including for the Brazilian Cooperation Agency.

Even though the C-4 Project had a quite distinct organizational format than the one in the Ivory Coast, in terms of practical relations at the frontline his extensive experience would prove crucial for implementing the project virtually from scratch and within a very tight deadline. Much of the early work of the two consultants consisted in setting up the experimental parcel and getting it going so that year's crop season would not be fruitless. That first year was almost entirely concentrated in Mali; only in 2010 would the project look more carefully to the other three partner institutes. The three hectare piece of land put aside by the Malian institute for the project was unused land. In it were some of the huge trees that can also be found elsewhere in the station, home to an incredible amount of bats that put up quite a spectacle every day at dusk. I was shown a picture of the site when the consultants got there in mid-2009; the Sotuba director had provided for cutting the trees, but their huge stumps were still around, as well as heaps of weeds and waste of all sorts. To get it ready for sowing within just a couple of weeks – when the first rains would start – seemed indeed like a Herculean task.

This was a moment of disjunctions, but also of learning and adapting to how things worked locally. As one of them recalled it,

> We hired people from the local community to clean up all the garbage in the field; at first, they would laugh at the idea of taking the trouble to do it … They would stop working and go home by noon. We went to town to buy them lunch so that they would stay for a bit longer. We got them sandwiches and juice, but they wanted Coke. … We leveled the ground, arranged the lines for sowing … Especially pregnant women had to use gloves, because the seed is treated … It took us a while to find gloves for them, but we did … We hired people to scatter the manure, to dig the drainage system… As the *hivernage* came [heavy storms that open the rainy season in the region], the fields were flooded. We would then hurry up to look for the slopes so we could drain the plot … Small things that seemed impossible to happen, but they did.

At that point, the Malian partners seemed to them to be highly skeptical about whether the project would ever happen, "especially because it was not clear how the funds would get there … [At that moment] we had no financial management, the local UNDP office didn't even know about it", one of them recounted. "They and the French were saying, 'the Brazilians won't be able to make it'. But when they saw that we were there to sow that very same year, [the Sotuba station director] budged, got institute money to pay for the tractors to clear the field … He would make payments upfront and the project reimbursed him later … he assembled the personnel … Without him we wouldn't have done it."

The rhythm and networks consolidated during this period largely persisted from then on: the technicians who executed the experimental protocols in the parcels; the Malian researchers who co-designed the protocols and supervised their application; the hiring of locals for doing less skilled tasks according to the institute's routine procedures and patronage networks. The team on the Brazilian side underwent some changes after this initial period, as the first coordinator left and new Embrapa researchers joined the project team in Brazil while others dropped it. Still in 2009, the project hired a coordinator to stay in Bamako on a more permanent basis. He was recruited from within Embrapa's ranks, and even though not a researcher in the cotton center, he was an agronomist well experienced in the interface between research and farmers. The only Embrapa *cooperante* fully dedicated to the project, the coordinator was a key mediator between the Brazilian researchers and their African counterparts, and even between researchers and managers on the Brazilian side. In the opinion of some Brazilians involved in the project, much of the project's success stemmed from his personal dedication and skills, and of those before him. Indeed, he not only executed basic managerial functions of making planned project activities happen on the ground and reporting regularly to Brasília, as did technical work at the experimental fields on a daily basis – weekends included.

The annual cycle of project activities converted the project's abstract orientations into on-the-ground practice. As remarked above, objective (i) prescribed the construction of new research infra-structure in Sotuba: a biotechnology lab, a pest control lab, a cold chamber for storing germplasm, a meeting room, some office space, and a generator to guarantee reliable power supply.[190] When I first visited Sotuba in March 2011, only the buildings' basic structure was in place. When I returned later on that year, the buildings were almost done, and much of the machinery to equip it had arrived; however, the actual equipping of the facilities was not yet on the near horizon. The new facilities were supposed to provide support for the project's experimental activities and host capacity-building trainings, remaining as a legacy for the Malian institute after the end of the project. However, they could not be used at all during Phase I; this component of the project was the one to suffer most from delays in acquisition processes.[191] Meanwhile, basic operations such as soil analysis were made through the infra-structure already in place at the institutes.

The capacity-building trainings, on their turn, were carried out every year during the crop season, when the experimental parcel was in place. Typically, two or three researchers recruited from Embrapa's cotton center would come to conduct them, one for each of the project's technical axes: typically, the first one would be entomology, secondly agronomy (no-till), and

[190] The stability of power supply is an issue in all countries I visited, and is particularly sensitive for laboratories with expensive equipment.

[191] These are likely to be issues on the African side as well, such as untying equipment from local customs. I was not able however to collect reliable information about this.

thirdly breeding. I participated in the ones carried out in Sotuba in 2011. In that occasion, the first week of trainings targeted researchers and technicians who were participants or potential participants in the project, and the second included non-research personnel (extension agents, employees from the cotton companies, etc.). In 2012, due to the coup d'état in Mali, trainings took place separately in each country (except for breeding, which happened in Sotuba but involved a group of trainees smaller than the usual).

The third group of project activities was adaptive research at the project's experimental stations. It was not until 2010 that the experiments were set up in the other three countries; they were always, therefore, one year behind Sotuba. Of these, I have been twice to the one in Burkina Faso, located in Finkolo, about 10km from Bobo-Dioulasso, in the country's cotton producing region. From the beginning, it was decided that each institute would set up its own experimental fields, following the project's general outlines but adapted to local conditions and priorities. The last chapter will zoom in further on the parcels and their experimental design; the remainder of this chapter will approach the second group of project activities, the capacity-building trainings.

4.5 Assembling the context for technology transfer

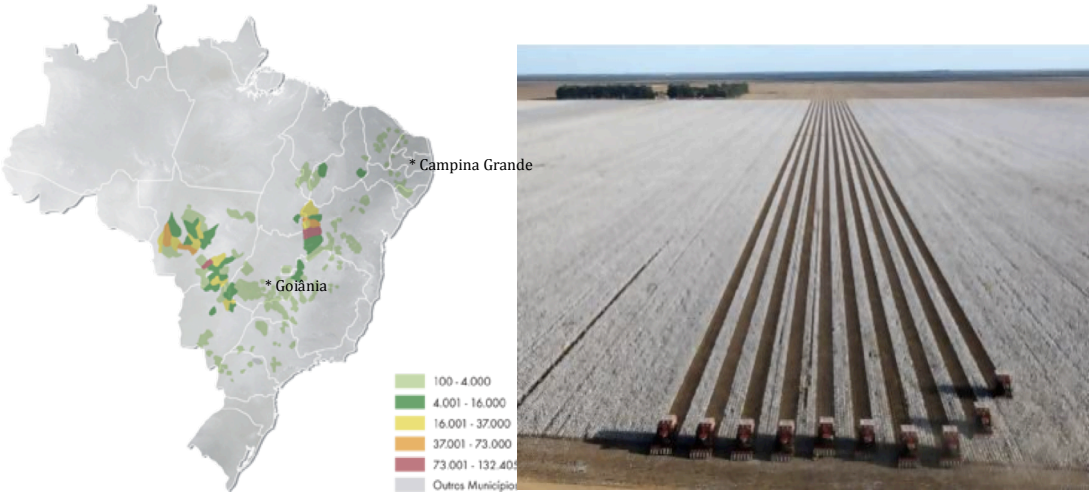
Taken together, the project's three technical components cover much of what agricultural production systems are about: soil, water and nutrients (no-till); the crop plants themselves (breeding); and their predators and parasites (integrated pest management).[192] Knowledge transfer in each of these components involved key individual researchers from the four partner countries, who crossed the Southern Atlantic several times for special training at Embrapa units, presenting papers in Brazil's annual cotton conference, and co-designing experimental protocols along with their Brazilian counterparts. They also participated in, and were expected to gradually take the lead of, the project's annual cycle of capacity-building trainings, which was carried out separately for each project component.

Different from the CECAT trainings, here capacity-building had a fundamentally technical character; but technical content was conveyed as much in the form of abstract knowledge as part of a demonstration of the situated context in which the technologies were developed and disseminated in Brazil. Neither did the trainings take the form of unilateral transfer of knowledge. They sought, rather, to elicit from the African partners both their interest in and commitment to the project on the one hand, and data on the local contexts that could be put to practical use in transfer to farmers on the other. But as in CECAT, the concrete effects of these comparative exercises did not immediately come to surface during the trainings themselves, even if there were methodologies devised to this end. More fundamentally, it was expected that the African partners, especially the researchers who were directly involved in the experimental activities, would spontaneously take up a central role in figuring out how to put each technical component to work for the project.

The three-pronged technical package assembled by the project was made up of technologies that are not necessarily found together in their original context. Each emerged from

[192] As some of my African interlocutors remarked, this configuration did omit important agronomic aspects, most notably phytopathology (plant disease). None of the cotton programs in the C-4 institutes had an expert in this area, and although diseases were a lesser problem than pests or drought, every year there is incidence of unknown diseases in production areas. The project also excluded altogether pre- and post-harvest activities like seed production, storage, ginning, quality control, biosafety, and others.

interactions between researchers and farmers, not necessarily in the same research centers and agricultural regions. In Brazil, cotton production cuts across the dichotomous configuration between large agribusiness and smallholder agriculture described in the previous chapter. It was originally a smallholder crop, grown in its perennial, creole version (*mocó*) mostly in the Northeast, whose semi-arid portions have been posed by internal coloniality as the epitome of backward Brazil. Following the guideline of establishing research centers close to production areas, Embrapa inaugurated its cotton center in 1975 in the city of Campina Grande, Paraíba state (cf. map on Picture 7 below). Less than a decade later, however, the boll weevil – a small beetle that had caused major losses to American cotton growers since the early twentieth century –arrived from the U.S. to Brazil in 1983, devastating production in these areas. Cotton would only reemerge as a significant commercial crop a decade later, and elsewhere: in the new agricultural frontier opened up in the Center-Western *cerrado*. In this new environment free of its nemesis pest, cotton disseminated as a large-scale, highly technified commercial crop. It was brought into a new production system that included other commodity crops, modern machinery, and conservation tillage techniques (among which no-till). In this process, the cotton plant itself changed significantly: from a semi-perennial plant in Northeastern agriculture, harvested by hand several years in a row by family farmers, in the *cerrado* it became a short-lived annual crop that is planted anew each year by cutting-edge machinery.



Picture 7. *Left*: map of cotton production in Brazil (by planted area in hectares), showing Embrapa cotton centers in Campina Grande (Northeast) and Goiânia (*cerrado*). *Right*: aerial view of cotton farm in the latest agricultural frontier in the Bahia *cerrado* (Source: ABRAPA website).

Embrapa itself came to reflect this new assemblage. While its cotton center maintained its headquarters in the Northeast, research nuclei and experimental stations were established closer to the newest production areas (in yellow, red and dark green in the map above). These became responsible for developing cotton varieties and crop management systems adapted for large-scale commercial agriculture (including transgenic varieties), while the center in Campina Grande became more restricted to niche domains such as breeding colored cotton varieties and agroecologic production systems, besides expanding its portfolio to other crops such as castor oil, sisal and groundnuts. One of these colored cotton varieties was included in the C-4 Project's breeding portfolio, even if the African institutes' chief interest was in the white ones demanded

by the mainstream global textile industry. It is also in Campina Grande that entomologists did research on another project component: biological modalities of pest control, based on reduced use of pesticides and deployment of natural enemies to fight cotton pests. While Embrapa researchers participating in the project (breeders in particular) were drawn from both centers, the no-till experts have typically come from the Goiás or other off-campus nuclei (in Mato Grosso, Bahia or Ceará).

In what follows, I will describe, for each project component, how co-production between context and technology was taking place: that is, how the farming context to which the technologies were expected to travel was assembled, how the Brazilian technologies were being accordingly adapted, and how the immediate context for transfer at the research institutes was being shaped through capacity-building and other project activities.

No-till[193]

This component was considered by many to be Project's mainstay (even if others would probably argue for the prominence of breeding). From my perspective, most relevant is the fact that it was here where visible results were the most advanced at the time I did fieldwork; moreover, its systemic aspect made of no-till a good articulator of the project's non-human assemblage at large. No-till was chosen as the main technique in the project's soil component "due to the advanced stage of degradation of African soils, and Brazil's vast experience in this sector" (ABC 2009, 30). Here, the availability of a successful experience in the original context for dealing with a problem diagnosed in the recipient context (i.e., degraded soils) is attributed to common environmental conditions (i.e., tropical soils). Both within Brazil and in its South-South engagements, no-till is lauded as an effective soil and crop management technique especially suited for tropical soils, due to the latter's higher potential for leaching and erosion relatively to their temperate counterparts. I was therefore taken by surprise by one of the Embrapa agronomists who one day explained to me the technique's origins – a story the general lines of which he also presented to African trainees during the trainings. As it turns out, no-till is, as many others, a travelling technology: just like soybeans, it went from the United States to the colder areas in the Brazilian South, before it was "tropicalized" for the *cerrado* agriculture in the Center-West.

Also unexpected was to learn that the introduction of no-till in Brazil did not originate primarily in government policy; it was, rather, the outcome of a joint initiative by farmers and research institutes, partly funded by resources from international development aid. One of these foreign partners was the German Cooperation Agency (GTZ), same national origin of the first farmer to try no-till in Brazil in the early seventies, out of his own initiative. During the nineties, the system followed the expansion of the agricultural frontier (and its trailblazers, the *gaúchos*) and spread across the *cerrado*, coming to be deployed at increasingly larger scales for the production of export commodity crops such as soybeans, maize, and cotton. It is estimated that no-till accounts for around 70% of the total agricultural area in Brazil, today a "world leader" (ABC 2009, 12) in this research field.

[193] *Plantio direto* in Portuguese, or *semis direct* (also referred to as SVC, *semis sur couverture vegetale*) in French, is normally referred to as no-till, minimum tillage, or conservation tillage in English. The literal translation – direct planting – is much less common, so I will use no-till here as this was the term used in the Project's PR materials in English.

No-till is not really one technique but a multifactorial soil and crop management system; as such, I will suggest, it is an especially fluid technology, in the sense put forth by De Laet and Mol (2000). This system is always gauged in comparison to the so-called "conventional system", and its principal aim is to enhance soil conservation – to sustain fertility and humidity over the long run –, often as a fix to a problem created by decades or even centuries of the latter.[194] In the Portuguese/French common terminology (*plantio direto* or *semis direct*), "direct" means that sowing (*plantio*/*semis*) happens without previously tilling the soil. In conventional agriculture, continuous tillage, especially by heavy machinery, creates over time an underground compaction layer that prevents the infiltration of water and roots deeper into the soil, leading to surface runoff and erosion. Nutrients present in the topsoil are then washed away, and the soil becomes increasingly poor and unable to hold fertilizers, water and other inputs. Part of the project work, in its capacity-building power points and demonstration fields, involved rendering visible these processes, which were normally concealed underground, out of the view of farmers or even researchers and technicians. In thus exposing them, the researchers simultaneously created them as problems for the project to tackle.

According to the project, this situation of degraded soils, caused by continuous deployment of the conventional system, was the key factor behind low cotton productivity in West Africa relatively to other world producers.[195] And this difference was not trivial: while in the C-4 countries productivity averaged between 800 and 1,200/ha, in Brazil it would reach up to, or even surpass, 5,000 kg/ha. Here, another scale came into play. These figures in themselves are not problematic, but they become so when brought together comparatively according to a common reference: on the one hand, a liberalized world market on which both Brazilian and West African cotton is sold, and on the other, a shared global technology treadmill. Productivity was indeed a key concern shown by both Embrapa frontliners and their partners in the African research institutes before they came together for the C-4 Project.

This lag, found in facts and figures standing for these broader scales, could also be dramatically visualized in the materiality observed in micro-practice. The soil in some of the peasant cotton fields I visited in Mali and Burkina Faso was so hard and light-colored (indicating low organic matter content) that one would be amazed at how such a fragile a plant could ever have sprouted and grown in there. In these conditions, the cotton plant became short and meager, with few flowers or cotton capsules – a far cry from the ones thriving in the project's parcels:

[194] In the age of global warming, another advantage of the system is that carbon that would have been released through tillage remains sequestered in the soil. This is a chief reason why many today herald no-till as a green technology; it was presented at the Rio +20 Conference in 2012 as one of Brazil's chief steps towards sustainability, amidst an otherwise unimpressive performance.

[195] This was especially the case of traditional production zones: following a broader pattern observed in the African continent, the spike in cotton production during the 2000's was largely driven by expansion of the cultivated area, rather than by productivity increase (as was the case of Brazil and others).

Picture 8. Cotton grown in peasant land in the conventional system, a few kilometers South of Bamako (*left*). Cotton in the project's no-till experiment (*right*). (The two pictures were taken by the author at about the same time in October 2011, but the project's cotton was sowed later so the bolls had not opened yet.)

In genetic terms, these cotton plants are not fundamentally different; they came from either the same or very similar seeds.[196] Whence therefore the sharp discrepancy in appearance and productivity? Commonsense would get the answer right: context. Even the same seed, when enmeshed in a different set of relations, will look different; roughly, this is actor-network theory's basic claim about technology transfer. But why is this difference important? This question requires taking a step further, because the difference observed here is not just mere difference, but is perceived as a *lag* that must be closed. That is, at bottom, what the actors in the project were working so hard to achieve: to make the first plant look more like the second. In order to close this gap, they had to work simultaneously on both context and technology.

The lag between peasant farms and the no-till experiments shown in the picture above was not however the only one that mattered. The project's experiments, as the following chapter will detail, involved a controlled comparison between cotton as it was grown in the conventional system prevalent in the C-4 countries, and cotton managed through the Brazilian no-till system. But the difference observed in the picture was true not only for the parcels managed through no-till. This is because there was a fundamental gap in the conventional system itself, between what local research and extension recommended to peasant farmers, and what they actually did in their fields. Technology adaptation and transfer therefore unfolded along at least three contextual levels, from Embrapa to the African research institutes, and from the institutes to peasant fields.

It is in terms of this configuration that a first adaptation to no-till was introduced: the system made its way into the West African context not just as an alternative to the conventional system aimed at long-term soil conservation (as was the case in Brazil), but as a repertoire of

[196] Although the first one, grown in peasant land, could not be identified with certainty, it must be one of the few varieties that the Malian institute commonly transfers to peasants through the existing extension system (NTL100, in the second picture, being a chief one).

potential fixes to the *current* system itself, which showed an "internal" lag between research institutes and peasant land. A second set of adaptations concerned more fundamental differences between the agricultural context in which no-till was assembled back in Brazil, and its expected ultimate destination in West African peasant land. These differences were evinced through a demonstration of how no-till emerged and worked back in Brazil, during the capacity-building trainings, study visits, and other technical project activities. Like the demonstration of Brazil's success story of agricultural development in CECAT, these efforts involved stabilizing a version of the no-till system. This version was organized according to three "pillars".

As the Embrapa agronomists put it, the system's main difference in relation to conventional agriculture is to avoid tilling; this is its first and indispensible pillar. No-till does not dispense entirely with soil preparation, but typically this happens only once (or once in a cycle of many years), as a preliminary stage before the system is put in place. In the Brazilian *cerrado*, this stage involves breaking down the structure of the soil in depth by specialized machinery, and applying massive amounts of lime (in order to balance out its elevated acidity and toxicity) and fertilizers. In Brazil, these procedures are usually guided by detailed soil analysis and mathematic equations estimating the optimal amount of each chemical element, to avoid both under and over-application. To get this process right is vital so that the soil is in a good starting condition; otherwise, the system may go astray over the long term.

The Brazilian frontliners quickly learned about the difficulties entailed in carrying out these preliminary preparations, as well as in keeping up with subsequent fertilization cycles, in the West African context. In none of the project countries was there availability of specialized no-till machinery, or sufficient or readily available supply of lime and even some fertilizers. Even soil analysis – a very basic step in conventional agriculture, necessary for estimating the dosage of fertilizers to be applied – was far from common practice among West African peasant farmers. For the project plot in Sotuba, the alternative was to apply a good amount of organic fertilizer – 6 tons per hectare of animal manure – in order to at least rebalance the soil's low organic matter content. The project got the manure from the institute's livestock program, but such amount far exceeded what was typically produced within most local farms, and even what was generally available for purchase by peasant farmers. Nonetheless, part of the trainings versed on technical parameters for using animal manure as organic fertilizer, since, in the absence of an open market of chemical inputs and credit like the one existing in Brazil, this was one of the few options potentially available to local farmers.

The second pillar – soil cover – encountered even more "resistance" from the recipient context. In Embrapa's version of the system, soil should not only be left undisturbed, as it must remain covered in-between cropping seasons – a period of four to five months in the *cerrado*, but which may linger for over half the year in the C-4 countries. Coverage can be provided for by using the residue of the crops that rotate with cotton. In Sotuba, the project was experimenting with locally developed varieties of maize and sorghum, two of the most common cereal crops grown in West Africa. Ideally, however, coverage should be maximized by the introduction of a secondary, specialized plant called cover crop (*planta de cobertura* / *plante de couverture*), which is sowed simultaneously with the main crop, in-between its lines (Picture 9). When the main crop is harvested (in West Africa, manually), its residues as well as those of the cover crop(s) are supposed to remain in the fields during fallow. The soil coverage that results reduces the loss of humidity through evaporation during the dry season, and erosion and runoff during the rains. Moreover, as it decays, it restitutes important nutrients to the soil that can be recycled to the next season's crop, which is planted directly on top of it without tilling the soil.

Picture 9. No-till in one of the project's pilot tests (photo by author, Sanankoroba, November 2011): maize (main crop), crotalaria (cover crop sowed in-between the maize, with the yellow flowers on top), and brachiaria (the light green, grass-like cover crop intercalated with crotalaria).

Cover crops are an element of the system that concurs significantly to its overall fluidity. There are basic criteria for choosing a good cover crop: rapid growth and substantial production of aerial biomass; the more biomass, the better and longer covered will be the soil. This characteristic may also be combined with other benefits. Some cover crops are chosen for the capacity of their roots to infiltrate, and therefore aerate and capture nutrients from, deeper soil layers, bringing them up as they decay; others (certain leguminous plants) may be chosen for their capacity to fixate nitrogen from the air and restitute it to the soil after decay. Sometimes, these characteristics are combined in a same plant, or more than one cover crop is used. Much of the research on no-till carried out at Embrapa is about figuring out the best combination in each case. In the project, the choice of cover crops reproduced Embrapa's extensive experience with certain grass and non-edible leguminous plant species (Picture 10), but researchers from the four project countries were encouraged to devise their own mix of cover crops to be experimented with, and to prospect for local alternatives or complements to the plants brought from Brazil.

Picture 10. Cover crops brought from Brazil in the project's seed bank in Sotuba. Crotalaria (*left*), existing in both Africa and Brazil, is a non-edible leguminous plant that fixates nitrogen from the air and does not demand much water. Brachiaria (*right*), a grass plant of African origin genetically improved in Brazil, has abundant aerial biomass and is highly appreciated by cattle. Other cover crops experimented with in Sotuba and elsewhere included Pigeon pea, *Stylosanthes*, *Mucuna* and *Panicum*.

Indeed, some African partners proposed adaptations to this element of the system, such as experimenting with cover crops that could increase no-till's potential for dissemination among local farmers. In the view for instance of the head Malian agronomist, edible leguminous crops were likely to be more appealing to peasants because of their more visible, short-term benefits. This immediacy was in fact a recurrent constraint met by the project as it eyed the transfer of Brazilian technologies to West African farmers – especially in the case of no-till, which is, at heart, a long-term conservation technique. But rather than constraints defined negatively as preventing effective transfer, project frontliners sought to regard these and other pieces of context as potential enablers of technology dissemination already available locally – as long as the appropriate adaptations were figured out.

In this sense, one of the system's elements to be encouraged in its new context was the root system. Indeed, much of the work during Phase I was focused on it. In the Brazilian version of no-till, a powerful root system was already a relevant experimental parameter, for its capacity to move and aerate the soil. In West Africa, it became also a way of performing the preliminary soil-revolving function that in Brazil was normally given a jump-start with the assistance of specialized no-till machinery. Thus, crotalaria has an aggressive pivotal root that pierces the soil vertically, while brachiaria has a very fine and abundant root system that spreads out horizontally (Picture 10). Besides revolving the soil in breadth and depth, their roots restitute organic matter and nutrients to it as they decay. In Brazil, the two were regarded as a good complement to each other, and Embrapa frontliners reproduced this configuration in some of the project plots (Picture 9). Here, certain components of the system were tapped for their capacity to make up for elements present in the technology's original assemblage that were missing in the new context: in this case, as a substitute for artifacts – machinery and inorganic fertilizers – that were not readily available in the C-4 countries.

But just as, in this work of context-making, some of the technology's components came to the fore as especially enabling at the arrival point, others receded to the background as their original purpose was rendered less significant or altogether reconfigured. This was the case of another challenge to no-till related to its second pillar, and which also came to be coped with by tapping on the root system: the difficulty, or even impossibility, of maintaining the soil covered during fallow in peasant land. In some areas, this is due to slash-and-burn, but most often it stems from the fact that cotton is normally grown as part of a highly diversified system that, in all four countries, almost always includes cattle and other livestock, which are left to feed on crop residues after harvest. Project plots were fenced off from animals and guarded full time; outside of the institutes, however, this was a variable neither Brazilians nor Africans could control. As one of the Embrapa agronomists put it when I asked him about this key issue early on, "there's no way these fields can be all fenced off. They have, one, three hectares each. There isn't even enough barbed wire in the world to fence all these". His half-joking comment had some literal truth in it; as some of the African partners explained to me, unilateral attempts to fence off peasant fields generally failed. Even if a peasant does not own cattle, someone else's animals will come and feed on his crop residues. Fencing or whatever alternative to it such as hedgerows or route management would have to be adopted by all or most peasants in a same region – something that does not seem to lie within the current horizon of possibilities.

Ultimately, as local researchers were very much aware, this imbroglio is deeply tied to the broader land question (the *probléme foncier*, as they put it), itself a legacy of colonial land regulations that are somewhat unique to Sub-Saharan Africa (Mamdani 1996, Moyo 2008).[197] In West Africa, the prevalence of customary tenure and peasant farming is even higher than in the rest of the continent, since settler plantation schemes were not widely deployed by colonial administrators.[198] Customary tenure left however an ambivalent legacy: while it did prevent land concentration in the hands of a white elite during colonial times, it did not necessarily guarantee "land to the tiller" either.

Lack of security of tenure is repeatedly mentioned by those in policy-making and development circles, including many of my African interlocutors, as a major obstacle to attempts at implementing agricultural development policies in general. But while development schemes such as the ones championed by the World Bank in the African continent have often called for private land titling and other market-based schemes as a way of encouraging investment and

[197] Mamdani (1996) has put his broader thesis of the bifurcated state in Africa to work for the question of land: it was colonialism that created the notion that land is the customary property of a tribe, and should therefore be allocated for household use by the tribal chief. "It is customary access to land", he writes, "that defines the free peasantry in Africa as distinct from small peasants elsewhere" (144). This legacy yielded a rather intricate link between the agrarian and the land questions in Africa; as Moyo (2008, 16) has put it: "That Africa has an agrarian question, which can be characterized mainly as an aborted agrarian transition reflected in low productivity and food insecurity, and one founded on exploitative labour relations and unequal trade, is generally agreed. The preoccupation of the debate on Africa's land question is whether or not there exist extensive unequal land distributions, derived from land alienation founded in tributary social formations or colonial practice, which has led to the classic problems of landlessness and captive agrarian labor".

[198] This is true of both main colonizers in the region: not just of the French (with the exception of Côte D'Ivoire) but also the British, who introduced settler and plantation schemes elsewhere, especially in Southern Africa. European colonial cotton policy oscillated widely between the plantation and the peasant models. In Francophone West Africa, after costly experiments with large-scale enterprises that utterly failed, the peasant option eventually came to prevail. The most remarkable of such failed colonial projects was no doubt the Office du Niger in the French Sudan (Beusekom 2002). In today's Mali, what is left of its irrigation infra-structure legacy has been used for rice and sugar cane (cf. also Isaacman and Roberts 1995).

credit in agriculture, local scholars such as Sam Moyo (2008) have cautioned about the danger of assuming that in West Africa peasants would have ample and equitable access to land just because ownership has been customary. Indeed, as some of my interlocutors in the African institutes remarked, there can be marked imbalances in terms of access granted by local chiefs to peasants depending on their kin and patronage networks, and differences in ethnicity, age, gender, or migration status. Especially for immigrant peasants and those in areas of high pressure on arable land, the assignment of land plots to households by village authorities is far from secured. "It can be taken from the peasant at any time, if for some reason the elders decide that the true owner of that piece of land is somebody else", one of the Burkinabe researchers explained to me.

These issues stretched far beyond the technical scope of the C-4 Project. Nonetheless, as Brazilian frontliners quickly learned, they impinged directly on the possibilities of transferring Embrapa technologies to peasant land. Most germane to the project was the fact that this situation tended to discourage long term planning and farmers' investment in the land plots they worked.[199] And no-till was considered a technique that necessarily requires long term thinking, since many of the benefits driving its original development are not immediately evident in the short term. In terms of the project's main problem – productivity –, the benefits of soil conservation are manifested less as immediately rising yields than as preventing their decrease in the long run. And while the agronomist or planner sees both, the peasant – my interlocutors insisted – sees only the former. As will be resumed in the next chapter, the question of evidence – how to convince farmers that the problem exists, and how to demonstrate that the proposed solution is working or will work – became one of the keys to the project's technology adaptation and transfer strategy.

Finally, no-till's third and last pillar – crop rotation – involved yet another set of context-making and scaling operations. Crop rotation is a major piece of context in Brazil's experience with no-till cotton: if in much of West Africa cotton has been "king" (Mamdani 1996, 159) since colonial times, in Brazil's late-century agricultural boom cotton has thrived on the heels of queen soybean. In the aftermath of the boll weevil crisis, cotton re-emerged during the "soybean cycle"[200] as a succession culture to that which is today the paramount crop in *cerrado* agriculture, largely aimed at export to Asian markets. In a common configuration, cotton is planted in the window that was opened in the *cerrado* agricultural calendar by the introduction of more precocious varieties of soybean, with life cycles as short as 100 days. This means that, between the harvest of soybean and the end of the rainy season, there is enough time to plant a second crop (usually cotton, maize or beans), and sometimes even a third one of pasture for feeding cattle.

Even though some Embrapa researchers showed nuanced views about this highly intensive and technified production system,[201] it was this configuration – rather than that of

[199] A reason frequently evoked is the farmers' inability to use land as collateral for credit. This market-based view is not however without its limitations and potential traps (Moyo 2008). Alternatively, there are special support policies, including in Brazil, that waive small farmers of the obligation to provide collaterals.

[200] It is common to organize the history of colonial and post-colonial Brazil in terms of "boom and bust" cycles associated with primary export products in which the country became specialized during particular periods. First, there was the Brazil-wood cycle (early 16th century), then the sugar cycle (16th-18th centuries), the gold cycle (17th-18th centuries), the coffee cycle (19th-early 20th century), and in more recent accounts, the soybean cycle beginning in the 1970's (Reifschneider et al, 2010).

[201] They showed concern, for instance, that some Brazilians farmers may be taking intensive methods too far by disregarding technical parameters of crop rotation and fallow in favor of economic parameters of short-term profit,

smallholder cotton production in the Northeast – that they presented most often to African partners. This seeming incongruence only appears as paradoxical, however, if one takes the scale of property size and capital-intensity. In fact, by and large, Brazilian and African peasants do *not* grow cotton for the same market: the latter produce for the same world market in which Brazilian large-scale farmers sell their cotton, while Brazilian smallholders produce mostly for domestic or niche markets such as organic or colored cotton. African peasant farmers are faced with higher demands in terms of productivity, timing, or quality standards.

Technically speaking, in no-till crop rotation follows a logic similar to that of conventional agriculture: to recycle and better utilize soil nutrients, interrupt the cycle of pests, diseases and adventitious weeds, and improve soil structure by alternating root types. Project frontliners did not foresee many difficulties here, as West African peasants already grew cotton amidst a diversified pool of crops, and did some rotation between them. This was however done differently than in the Brazilian *cerrado*. In West Africa, at current levels of technification of production, rain patterns typically allow for only one crop per year. In-between, there is a long dry season of around seven months – also known locally as "hunger season" – which is, according to many of my local interlocutors, getting increasingly lengthier "due to climate change". Other plants are therefore intercropped with cotton simultaneously, competing against it for land, labor and inputs.[202] This complementary-competitive relationship between cotton and food crops has been one of the defining features of the system in West Africa, and, as will be seen in the next chapter, of peasant decision-making locally. The project took it into account by giving food crops almost as much attention as cotton itself. The idea was that the improvement of cotton production within a mixed system would bring in its stead more and better food crops, *and* vice-versa. "I say that cotton can be the main food crop in these countries", the project coordinator was fond of saying.

This ambivalent coexistence between cotton and food crops is also a legacy of French colonialism. In its modern version,[203] cotton was already born as an industrial *and* global crop. Since it did not grow well in Europe's temperate climate, cotton was encouraged in Sub-Saharan Africa and elsewhere (notably, India) by all colonial powers as an export item to metropolitan markets.[204] More than any other crop, it shares the iconicity and global character of the economic sector that raised it to world prominence: the textile industry. A central stage of the origin story of Western modernity so powerfully recounted by Marx in *Das Kapital*, the textile industry and its associated cotton supply chain played an important part in the process that led to the abolition of the slave trade during the *Pax Britannica*, and from there to the scramble for Africa later on in the nineteenth century. The "cotton famine" during 1861-65 – a period of acute supply shortages

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based on fluctuating prices in global commodity markets. Where this happens, the whole point of no-till – to conserve the soil and save on nutrients – is lost.

[202] Especially where land and labor are in high demand and their deployment for both cash and food crops overlap in space and time (Barker 1984, 26).

[203] By this I mean cotton varieties and associated production systems introduced by European colonizers; Africa is one of the origin centers of the species, and has had its own cotton varieties and modes of cultivating and processing them into textiles since centuries before colonization (Roberts 1996). Those participating in the project coming from both Brazil and the other C-4 countries were always taken to Bamako's "cotton museum", which harbors an impressive collection that includes archaeological specimens of very ancient cotton fabrics.

[204] Most prominently, France and Britain, but also Portugal, Belgium and Italy (Isaacman and Roberts 1995). Their goal of capturing local production was not always successful, though. Roberts' (1996) seminal historical study showed for instance how France's plan of creating a supply of raw materials for its rising textile industry in its West African colonies was defeated by competition from a dynamic regional market, that for a while absorbed most of the cotton grown in the colonies.

caused by the civil war in the U.S., by then the largest world cotton producer – was a key factor in pushing Britain and other industrializing European nations to tighten their imperial grasp over tropical possessions in Asia and Africa (Isaacman and Roberts 1995). As Mamdani (1996, 38) eloquently framed this link between nineteenth-century colonialism and Western Europe's Industrial Revolution, "in [the] constellation of raw materials that would feed European manufacturing, the pride of place belonged to cotton. The three *c*'s that Livingstone claimed would together rejuvenate Africa were cotton, Christianity, and civilization".[205]

In much of colonial Africa, cotton was, as Mamdani put it, the "archetypical forced crop" (1996, 159). As such, it participated in colonialism's regime of compulsions[206] that gave rise to the overall food versus cash crop dichotomization remarked in the previous chapter.[207] In the case of West Africa, historians prefer to talk about a mixed system featuring both coercion and market incentives, which confronted peasants with "a set of constraints and opportunities over which they often had little control" (Isaacman and Roberts 1995, 3; also Roberts 1996). Even today, no peasant farmer is, strictly speaking, *forced* to plant cotton; but they often have little option outside of it. This may be also reflected at the level of nation-states; as I once heard a group of Beninese agronomists teasing their Chadian colleagues as they arrived early in the morning for one of the project meetings, "What are you guys doing here anyway? Why do you even bother with cotton? You have oil!"

As far as the technical make-up of no-till is concerned, however, production scale, market destination, or property size are not constraining factors *per se*. No-till is a highly flexible crop and soil management system, and there are endless possibilities of permutation within and between the three pillars; what adaptive research does is precisely to try to find the best fit according to each "context". In Brazil, the system is applied to a broad variety of crops, from soybean to trees, from beans to pasture; it is found from cold regions in the Brazilian South to hot and humid Amazonic conditions; from large-scale, mechanized, input-intensive industrial agriculture to small agro-ecologic family farms. Moreover, its adaptive potential goes beyond the domain of "nature" proper, including "social" factors in terms for instance of what crops will be chosen (as main crop, cover crop, rotation crop, association crop[208]), what outcome will be emphasized (productivity, conservation, soil recovery), or what kind of productive structure is available locally (size of property, use of machinery, availability and cost of inputs, etc.).

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[205] In fact, the correct quote from Livingstone is *commerce*, Christianity, and civilization; but then, at that moment commerce largely meant cotton and textiles.

[206] Mamdani's claim is strong. According to his account, peasants who failed to meet production or acreage quotas were punished with fines, prison or corporal punishment. He mentions an estimate that between 300,000 and 400,000 peasants fled forced cotton cultivation from the "French colonies of Niger, Upper Volta [today's Burkina Faso] and Mali to Ghana – and certainly many more to Nigeria" (1996, 162) – during the early 1950's. Considering the lower population levels of that period, these figures – roughly the amount of people displaced in Mali by the 2012 separatist-Islamist occupation – are quite remarkable.

[207] During colonial times, cotton cultivation often relied on peasant labor forcibly diverged from subsistence crops. "Not only were peasants forced to divert attention from foodstuffs to cotton, but the production cycle of cotton often coincided with that of sorghum, millet, rice, and a number of legumes, creating a very real labor bottle neck" (Isaacman and Roberts 1995, 35). In some cases, the food shortages that resulted were dealt with by mandating a shift from labor-intensive, protein-rich crops such as millet to starch-filled, low-labor ones such as cassava (Mamdani 1996, 158).

[208] By main crop I refer to the most economically relevant one; where cotton is planted in West Africa, it is usually the main crop. Cover crops are generally planted in-between the lines of the main crop, and its primary aim is to produce surplus aerial and root biomass for keeping the soil covered. Rotation crop is the one that alternates with the main one in the same field plot in subsequent seasons. Finally, by association crops I mean the ones that are intercropped with the main one (i.e., cotton) in the same season.

Thus, adaptation to each production region, and ideally to each production unit, is an inherent feature of the technique itself: research is a continuous effort, even after technology transfer to farmers has been accomplished. It became essential, therefore, to enroll the African researchers into the project's effort not just formally. In the world of development, participation in projects in itself is not so much the problem; as especially actor-centered approaches have shown, local actors have their own interests in engaging with foreign partners, and will do it even if for only as long as projects last (Biershenk et al. 2000, Lewis and Mosse 2006). In the C-4 Project, the effort was, rather, to nourish a commitment with a longer term *research* enterprise – in other words, to achieve robustness beyond its organizational scope as described in the first section.

In this sense, the C-4 researchers were encouraged to gradually take the reins of technical decision-making in the adaptive research process. Brazilian frontliners recognized this as a slow and to some extent open-ended process: "What we're doing here is sowing a seed. The benefits will be not for these children you see, but for their children and grandchildren", the project coordinator would tell me every once in a while. Note that he did not say "the benefits, if there are any" – despite all the difficulties envisaged in adaptation and especially transfer to farmers, there was a confidence, which the African agronomists tended to share, that the technology *was* good, and that one day it could bring concrete benefits to West African peasant farmers. At this stage, however, no one could predict the exact form – or most likely, forms – that no-till and its accompanying systemic components (i.e., crop varieties and modalities of pest control) would take in their new environment. As one of the Embrapa researchers put it, referring to the difficulties involving soil cover, "who knows, maybe in West Africa no-till will end up with only two pillars". As De Laet and Mol's (2000) bush pump, no-till was regarded as fluid enough to remain functional even if one of its three legs went missing as it made its way across the Southern Atlantic.

But while the project did take into account the potential constraints involved in transferring the Brazilian version of no-till to West African peasant farmers – especially the problem of cattle, land tenure and agricultural inputs –, not all were incorporated into the experimental work (cf. next chapter). Many, or perhaps most, of these ended up being bracketed out so that the Embrapa *cooperantes* would first focus on making sure that their partners in the local institutes acquire robust scientific mastery over the technique itself. The African frontliners dealing most immediately with no-till, usually agronomists by training, had at least basic knowledge about its underlying logic, and local versions of no-till could be found in some patches of rural areas for instance in Burkina Faso.[209] But these were quite limited in number and scope, and few of the local agronomists had received systematic training or done specialized research on the system previously to the project.

An important exception was the project's head agronomist in Mali, who worked for a few years on no-till as part of a project with the French CIRAD[210] and wrote his PhD dissertation based on that experience. But even the agronomists from the other institutes seemed to have

[209] In Burkina Faso, previous projects have tried versions of no-till in certain areas to the east (the C-4 Project grounds in Burkina Faso are located on the westernmost part of the country). The FAO ran a long project during the 2000's that included dissemination of no-till techniques, and CIRAD has also tried to introduce some of it.

[210] In fact, no-till has been one of the techniques championed by CIRAD in Sub-Saharan Africa, and the institute has partnered up with researchers from Brazil before, including at Embrapa. Contrary to the "tropical expertise" claim (cf. Chapter 3), national research institutes from Southern countries are not the only ones to work on technologies targeting tropical environments. Africa and other parts of the global South have been for long laboratories for colonial and imperial powers, including in agronomic research (Tilley 2011).

developed a particular interest in the technique, and along with it, in the project itself. In fact, my impression was that within this project, agronomists were more valued and enjoyed a leading role that they may not normally have in their institutes, at least when compared to breeders, weed scientists, entomologists and other researchers whose work tend to relate more closely to the development of commercial products such as improved seeds and agrochemicals. On the other hand (though without this being a rule), the kind of research work agronomists did often brought them closer to farmers and the latter's own ways of taking care of the crops and the land.

In the project's two other technical components, the adaptation process unfolded at a slower pace. There, too, the identification of problems to be addressed stemmed both from local demands and the availability of expertise back in Brazil; capacity-building involved both abstract technical content and a demonstration of Brazil's and Embrapa's experience with these particular technologies; demonstration and adaptation proceeded through selective context-making and scaling operations; and – a point to be elaborated in the following chapter – the prospect of transfer to farmers brought to center stage of technical decision-making the question of how agency, or controls, were distributed across scales of context beyond the research institutes and the project scope.

Integrated pest management

In its original context in Brazilian cotton agriculture, pest control became a major issue in the aftermath of the abovementioned boll weevil crisis during the eighties. The fight against this devastating pest was carried out in multiple fronts, in what is known as integrated pest management. This mode of control originally emerged in response to the adverse effects caused by the ample use of chemical pesticides in the aftermath of World War II,[211] particularly the development of resistance to these products by major insect pests. As presented during the project's capacity-building workshops and didactically exposed in banners in its demonstration fields, pest management includes the reasoned integration of different kinds of controls: chemical (pesticides), varietal (breeding varieties resistant or unwelcoming to certain pests, or inserting resistance by means of genetic modification), and biological (use of the pest's natural enemies to control its population). The entomology axis of the project took all three into account, but since the project was first drafted the experimental emphasis was placed on the last modality, biological control.

As I once talked about the project with a Burkinabe entomologist who was not part of it, he was surprised and skeptical about the focus on biological control: "But is it really deployed in cotton farms in Brazil?" Indeed, although Embrapa does have extensive research experience with the use of natural enemies to fight pests in maize, cotton and other crops, with one exception – sugarcane – this modality of pest control is not really widespread in Brazilian agriculture. This is even less the case in agribusiness, fundamentally reliant as it is on transgenic insect-resistant varieties and industrialized chemical inputs that may end up affecting pest and beneficial insects alike. In West Africa, chemical control (pesticide spraying) is generally part of extension's recommendations to cotton farmers, but its use is less widespread in food crops. As one of the Embrapa entomologists explained to me, "different from here [Brazil], their environment is relatively 'virgin' of massive use of chemicals. It is still possible to come up with an integrated pest management strategy that includes biological control in a significant way".

[211] As is well known, many modern agrochemicals were spinoffs from products used in chemical warfare, such Monsanto's infamous Agent Orange, widely deployed in Vietnam for defoliating forest cover.

An integrated pest management strategy seeks to minimize excessive pesticide use by compensating it as much as possible with biological and varietal controls. This is based on an assumption that no insect is, in itself, a pest; it only becomes so after its population reaches levels capable of causing significant damage to the crops. In the project, the balance was focused on biological and chemical controls, since no cotton variety included in its breeding component had been specifically bred for pest resistance. The essays conducted by the entomologists consisted largely in observing how the Brazilian cotton varieties introduced by the project behaved in relation to the insects found in their new West African environment.

Here as with no-till, travelling technologies were met with significant potential constraints as frontliners glanced beyond research institutes to peasant cotton farms. In particular, an effective integrated pest control strategy requires that farmers carry out a periodic estimation of different insect populations by counting samples in their fields. Chemicals are supposed to be deployed only after a certain threshold, the so-called control level, is achieved. As with no-till, the ultimate parameter is crop productivity: research establishes the control level as that likely to cause economically significant damage to production. However, West African peasant farmers did not do measurements of insect populations. Following recommendations by local extension, they usually followed the method of pesticide application "by the calendar": that is, every fourteen days regardless of insect population levels. This poorly regulated use of chemical pesticides not only eliminated beneficial insects unnecessarily,[212] but was leading to the development of resistance by major pests such as caterpillars (Picture 11).

Pest resistance to chemical control had been identified as a key problem during the project drafting stage. Others were health concerns due to lack of protection gear during the spraying of chemical pesticides, and of appropriate ways of disposing of their empty bottles. In the project plot, selective pesticides were applied according to sampling procedures, and the technicians who did the spraying (using a backpack device) were required to wear complete protection gear. Much like in no-till's focus on long-term soil conservation and what happens under the ground, the entomology trainings insisted on a change of mindset regarding massive pesticide spraying practices. It was not obvious, however, that protection gear would be readily available to peasants, or even that they would be willing to wear them. As a peasant leader in Burkina Faso put it, "It's hard to wear the protective gear, look at the sun, here in the Sahel it's just too hot. You estimate where the wind is blowing before spraying, but then the wind changes direction and the pesticide falls all over your face. That night, the wife goes to sleep elsewhere [laughs]."

Neither was it the case that peasant farmers could do insect samplings on a regular basis. As one of the C-4 entomologists explained to me, "during projects, there will be people from the project or paid by it to do this counting regularly; then it might work. But when the project is over, the peasants cannot afford to divert labor force to this task; they need to do weeding and other tasks, not just for cotton but for the food crops". Again, these constraints were similar to many of those found for no-till, especially with respect to the (lack of) control peasant farmers had on the socio-technical elements necessary to fully carry out the technical recommendations transferred by extension.

Experimental activities in this project component were at first subsumed to breeding: phytosanitary surveillance was the first task for which entomologists were recruited into the

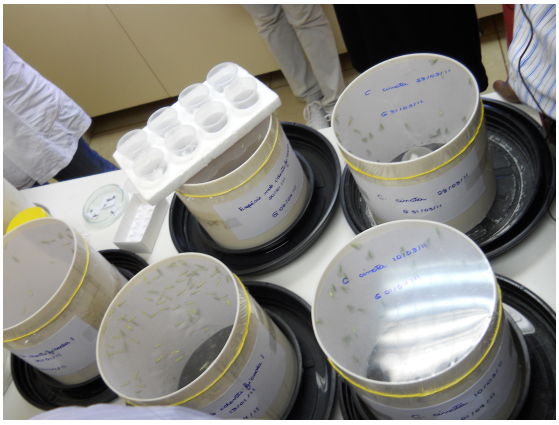
[212] The action of so-called selective pesticides is limited to certain kinds of insects; the project was suggesting those that did not interfere significantly with the populations of natural enemies, most notably the Trichogramme spp., which it aimed to introduce in the institutes (see below).

project. Great care was taken so that the Embrapa cotton seeds would not bring in dangerous invaders – it is believed that the boll weevil first arrived in Brazil coming from the U.S. precisely at a research institute. Brazilians would rejoice at how the African continent was "blessed" by the absence of this dangerous pest. Yet, the cotton plant is a target for many other insects. At the time I did fieldwork, the pests which Monsanto's Bt cotton, grown in Burkina Faso, had been designed to combat were the chief ones affecting cotton production in the region at large: the so-called *carpophage*, or capsule-eating, caterpillars.

Picture 11. Caterpillar pest attacking a cotton boll, held by one of the project's technicians (Mali, photo by author).

The actual experiments in entomology had a much slower start when compared to the other two components. The project's biological control focus was concentrated on the main pest species then present in the region, *Helicoverpa armigera* (cotton bollworm), a moth that feeds avidly on cotton bolls during its caterpillar stage. The idea was to make use of a natural enemy well studied in Brazil and elsewhere for cotton and other crops such as maize, cassava or tomatoes: a tiny wasp species named Trichogramma. This insect parasites the pest's eggs by laying its own eggs inside them, thus killing them before the larvae can emerge and cause damage to the bolls. This method of control requires the production en masse of this natural enemy and its host in specialized laboratories.

The head Malian entomologist in the project happened to have long-term experience with this natural enemy, and promptly embraced the project. Even though his institute had basic entomology labs, sufficient for instance for breeding caterpillar eggs to feed the natural enemy, no infrastructure for massive production of the latter was available. A new, fully equipped laboratory for Trichogramma production along the lines of the ones found in Embrapa centers was part of the facilities that were being built by the project in Sotuba.



Picture 12. *Left*: part of the equipment used in a biological control lab for breeding natural enemies and their hosts (Embrapa Maize and Sorghum, Sete Lagoas, Brazil, April 2011). *Right*: improvised lab in Sotuba where *Anagastha* was being bred, while the project's lab was being built (IER, Bamako, October 2011).

Something even more important was missing from the context, however: the Trichogramma itself. In West Africa, there were no identified local species of this insect. Both the Malian entomologist and its Brazilian counterparts were certain that they existed, and that it would be worth looking for them locally rather than introducing exotic species from Brazil. In October 2011, I went on a field mission with them to look for caterpillar eggs infested with Trichogramma. They would do the search at random fields in cotton production areas, after asking permission from the local farmer or a relative to enter. The infected caterpillar eggs were tiny dark spots, and were searched visually, under the leaves or stuck to the capsules. Their agility in finding them was impressive; it took me a couple of hours just to learn how to differentiate a caterpillar egg from insect feces or a mere speck of dust.

Picture 13. Author holding a cotton leaf with a caterpillar egg on the stem (Mali).

Eventually I did get the hang of it, and even if at that time of the year the high season for eggs had already passed, I was happy to give my humble contribution by finding a handful that seemed to be infected. The entomologists took whatever was found to the lab, where they carefully cut around the leaf pieces and put the eggs in cotton-sealed test tubes smeared with a drop of honey. With luck, after a few days or weeks some larvae would emerge, and then be sent to Brazil for identification. As I followed up with them after my return to the U.S. in 2011 and

2012, I learned that even though some of the eggs had hatched, none of the hatchlings were identified as Trichogrammas.

This project task became part of the Malian entomologist's personal quest: "I'm putting my own money into it, to pay for the gas, the food so that the technicians can go collect the eggs. I even dream about it at night", he told me excitedly as I met him again for the last time. As a senior researcher, he is not far from retirement. If a Trichogramma is found and identified as a new species, it will be his legacy to world science, along with his technicians and his Brazilian partners. As I bade him farewell in November 2012 in what was to be my last field trip to Mali, he said again, "wish us good luck". I replied that I was hoping the great event would happen still in time to register it in my dissertation.

Plant breeding

Plant breeding or variety improvement (the latter, a term closer to the Portuguese and French, *melhoramento* or *amélioration génétique*) was one of the key areas of interest shown by the African partners. It includes not just conventional breeding, but conservation of genetic resources, germplasm exchange, and advanced fields like biotechnology and its regulatory science, biosafety. Demands were made, and partly attended to, in all these sub-fields. While some parallel cross-breeding between the Brazilian and local varieties was carried out by the head Malian breeder, the focus during Phase I was on the transfer of Brazilian cotton varieties to the four African research institutes, and on building technical capacity among breeders.

The project's chief experimental activity in this component was the adaptation of ten cotton varieties spanning Embrapa's portfolio of conventional (non-transgenic) cultivars. Eight of them had been bred for adaptation to environmental and productive conditions found in the *cerrado* agriculture. The ninth cultivar, a hybrid of herbaceous cotton and the *mocó* arboreal varieties typical of the Brazilian Northeast, had been bred for that semi-arid region, including for manual harvest and lower availability of fertilizers. The tenth was the most unique: a colored variety (brown) developed at the Campina Grande center. These and other Embrapa cultivars were still commonly grown in Brazil, even if, since the introduction of the first genetically modified cotton variety in 2005, seeds from biotechnology multinationals have been gaining steady ground in the *cerrado* agriculture.[213]

Unlike the other two project components, whose products appear explicitly in the complex form of systems, breeding has a more readily identifiable output: the improved cotton seed. But the apparent simplicity of the seed's materiality eclipses the extensive socio-technical network that presided over its development, as well as the new one that must be put in place when the seed is sowed anew. In fact, even more than no-till or pest control, breeding is a science that must address multiple scales of the production system. New cotton varieties are bred not only according to so-called agronomic parameters (such as pest or disease resistance, life cycle lengths adapted to rain and other environmental patterns, efficient absorption of nutrients, or plant architectures suited to mechanical or manual modalities of harvest). As importantly, cotton breeding looks beyond the farm to the post-harvest scales of industrial processing and

[213] Around 40% of the cotton grown in the 2010/2011 season in Brazil was genetically modified, all from agrochemical multinationals (Source: http://www.souagro.com.br/integracao-das-tecnologias). On top of Embrapa's traditional partnership with private foundations run by Brazilian farmers for the production of new cultivars, the institute has been partnering up with these companies for the development of genetically modified cotton and other crops (cf. Chapter 3).

global trade – the so-called technological or industrial parameters, such as ginning outturn or quality of fiber (length, uniformity, fineness, tenacity, degree of yellowness, or reflectance).

According to my interlocutors, cotton is not that complicated a plant to breed. In fact, the commercial varieties found on both sides of the Southern Atlantic are "kin", ultimately coming from a common genetic poll. Although both South America and the African continent are origin centers of cotton species, the ancestors of most cotton grown in both places today came from the United States.[214] Like so many other elements in the cotton production systems in both Brazil and West Africa, this common ancestry comes from a shared scale in the industrial and global origins of modern cotton remarked above. In fact, the scientific breeding of cotton varieties predated (or perhaps even anticipated) by a few decades the mid-twentieth century Green Revolution and its focus on germplasm exchange and variety improvement for high yields. U.S. upland cotton was introduced in Africa during colonial times for a practical reason: by the late nineteenth century, American cotton was the world standard according to which European spinning machinery was normally calibrated (while African and Indian cotton, for instance, had shorter fiber lengths) (Isaacman and Roberts 1995, 17-18). Much of the work undertaken in the colonial research institutes and botanic gardens consisted in adapting these foreign crop varieties to the environmental conditions found in Sub-Saharan Africa, on the one hand, and to the demands and standards required by the global textile industry, on the other.[215] After independence, breeding remained a privileged research field in the national institutes, which today develop and distribute their own improved cotton seeds to farmers.

But in colonial times as today, to develop new varieties "drawing on the best of imported and local cotton" was not enough. Improved seeds required that rural extension programs be simultaneously implemented in order to change farmers' traditional practices into "'modern' plowing, planting, and harvesting skills" (Isaacman and Roberts 1995, 18).[216] This is because, failing to transform the context into which improved varieties were to be introduced, these seeds would not be able to actualize their full productive potential: the more technified the seed, the tighter and more specialized has to be the socio-technical network sustaining it. This project component therefore faced the same basic challenges of the other two, concerning the availability of proper agricultural inputs, labor, and rains in peasant fields. But while the others, especially no-till, could be transformed more rapidly according to this new context, conventional improved seeds can only be changed through cross-breeding, which is an extremely slow, statistically oriented process.

As with the other project components, in breeding the enrollment of human and non-human actants also went beyond cotton itself. Its annual capacity-building cycle also targeted breeders working with other plants commonly intercropped with cotton locally, such as sorghum, maize or rice. They were generally well trained and had good basic technical knowledge; several of them, especially the senior ones, had received college and graduate training abroad, in France and other European countries, the United States, or the former Soviet Union. More than the other

[214] The upland cotton widespread in the U.S. (*Gossypium hirsutum*) is original from Mexico and Central America. Other cotton species have origins in South America (*G. barbadense*), and Asia and Africa (*G. herbaceum* and *G. arboretum*).

[215] As Isaacman and Roberts (1996, 17) remarked, good quality of fiber has been a major piece of colonial policies' "toolkit", so that Sub-Saharan African cotton would be able to "'compete' with alternatives on the world market".

[216] As historical works on French Africa have shown, colonial cotton policies entailed no less than the remaking of both nature and society: they "drew upon a tool kit designed simultaneously to yield cotton for metropolitan mills and to remake African societies" (Isaacman and Roberts 1995, 17). Cf. also Roberts (1996), Beusekom (2002), and Isaacman (1996) for Mozambique.

two project components, the breeding workshops dwelled largely on abstract technical topics such as genetic resource conservation, genic flow, and quantitative genetics – the more advanced stages of the latter, I must say, I had difficulty following up, even with the rudiments of this field I had learned during a cassava project with Ghana the previous year. Even if, as the Brazilian researchers themselves underscored, breeding is both a science and an art which requires an "eye" that can only be cultivated through experience, technical knowledge in this field required, more than in the others, increasingly specialized and sophisticated material apparatuses in order to be put to work. This was notably the case of statistical software: it was the only workshop where trainees were required to bring along an artifactual attachment, a laptop computer (which may have been provided by previous projects; indeed, some still had USAID stickers on them). In 2011, much of the trainings involved teaching how to use the new software: two open-source statistical programs that had been reverse engineered at a Brazilian university. Some of the trainees eventually did adopt them in their regular research work.

Similarly, breeding was the component for which the African partners made most demands for material infrastructure, especially in biotechnological fields such as marker-assisted breeding. Many of the Brazilian researchers, however, were of the opinion that the high financial investment required for setting up and maintaining state-of-the-art biotechnology facilities generally did not yield worthy returns in terms of actual applications; in their own experience, it was cheaper and easier to outsource certain tasks to other labs. Still, the project did accede to some of these demands: as Phase I was coming to an end in 2013, a biotechnology lab was being finalized in Sotuba, and a local researcher was to be sent to Brazil for training on how to run it. The rationale for the project's decision-making in this case, as I understood it, was that in relatively resource-poor institutes such as the ones in the C-4 countries, the point of a lab like this was not necessarily to produce immediate, cost-beneficial results. It would, above all, fulfill a pedagogic function of supporting training and learning of junior researchers. For senior researchers, it would enable the practical enactment of a kind of advanced knowledge that would remain otherwise idle. In this sense, it would also have a sort of "prosthetic" effect: after being trained overseas, the knowledge acquired at the "centers" would go to waste without an appropriate material base through which it could be put work in their home institutes. More than the other project components, thus, breeding brought to the fore, at the scale of research institutes, an asymmetry similar to the one observed between research recommendations and peasant practices: that is, between available knowledge and the artifactual network required to put it in practice appropriately.

Besides biotechnology, another sub-field where this appeared quite clearly in the project was genetic resources conservation.[217] African institutes were generally limited to forms of conservation that require less "de-contextualization" (i.e., less intervention by scientific artifacts), such as *in farm*, *in situ*, or *ex situ*.[218] The cotton germplasm bank in Farako-ba (Burkina Faso) was of this latter type, and included a range of creole cotton plants found across the country: some were as tall and lean as trees, others were low and bushy; some had light yellow flowers, others had dark pink or purple ones (Picture 14). This was a very different

[217] This refers to the preliminary work of identifying, collecting (or exchanging) and conserving the stock of genetic materials to be made available to breeders for their crossings.

[218] As breeding itself, which may range from traditional methods employed by peasant farmers to highly advanced transgenic technologies, conservation may be carried out according to methods that involve from lower to greater de-contextualization. The less decontextualized type of conservation is *in situ*, that is, in the plant's original habitat. *In farm* modalities involve conserving crop varieties among farmers. Researchers can also collect such creole varieties in peasant areas and grow them in experimental plots at research stations (*ex situ* conservation).

picture than the regular experiments, where the untrained eye would hardly perceive any significant difference between the Brazilian and African improved varieties:

Picture 14. One of the best performing Brazilian varieties in the project (*left*) and the regional control variety, developed in Togo and planted by farmers all across West Africa (*middle*), in the project's *vitrine* at the experimental station in Sotuba. *Right:* creole cotton in Burkina Faso (photos by author, October 2011).

After many breeding cycles over the course of decades, diversity of traits becomes narrower and related to hardly perceptible variables such as pelosity of the stem, length of fiber, relative capacity to absorb certain nutrients, or degree of yellowness. Even among breeders, increasing mediation by artifacts becomes necessary so that the precise difference in performance between the varieties can be ascertained: scales to weight harvest samples and statistically estimate productivity, soil and leaf analysis to calculate nutrient absorption, or highly specialized equipment to measure the various technological parameters for quality of fiber. The African institutes had some of these artifacts, but not others, and rarely did they have their latest versions according to global standards. Moreover, none of them had fully functioning facilities for the more de-contextualizing forms of germplasm conservation such as cold chamber or in vitro tissue culture. Not surprisingly, this was part of the demands posed by the project partners, and again, they were partly fulfilled: a cold chamber was being built as part of the project's central facilities in Sotuba, but not in the other institutes.

Finally, the African partners showed significant interest in the possibilities for germplasm exchange opened up by the project. What they sought in the Brazilian varieties was not the plants as such, but certain traits that could potentially ameliorate the varieties created by them and their predecessors in the national institutes. The introduction of Brazilian cotton varieties would provide for an always-welcome enlargement of the genetic pool available to the institutes' cotton programs and their breeders. "Our cotton has good quality fiber, better even than the Brazilian, and it's longer", one of the C-4 breeders explained to me. "It's also better adapted to our environment. But the Brazilian varieties have very good productivity", and some had whiter fiber. For the Brazilians, quality of fiber and resistance to drought were traits of potential interest in the African varieties. This was an exchange between peer researchers; in spite of the narratives

on resource plundering and biopiracy often associated with the global flow of genetic resources, as in bioprospection (Hayden 2003) they do not necessarily lead to commercially viable products: "it's always good to have this kind of germplasm around, just in case", one of the Embrapa breeders put it plainly.

Having being de-contextualized from its original assemblage in Brazil, relations between germplasm (seed) and context had to be remade anew at the arrival point: this was precisely what the breeding component's adaptation experiments were about, as will be seen in the next chapter. But to take validated Brazilian varieties or cross-bred hybrids outside of the C-4 research institutes will be a whole other story. Rarely does one single variety carry all desirable traits, and systematic cross-breeding is a lengthy process: ten or more years may pass before a stable variety can be ready to be transferred to farmers. Aside from such technical issues, there are also explicitly political ones: the direct transfer of Brazilian varieties to African farmers as such will not necessarily be of interest to all local actors, and would call for an altogether different level of legal discussion in terms of cultivar protection and licensing procedures. This is one of the few areas where a potential remains for economic gain by public agronomic research institutes, rendered possible by the worldwide expansion of legal frameworks enforcing intellectual property rights (IPR). This makes breeding a more sensitive field than the other two, something that also concerns the ethnographer: indeed, at points some of my interlocutors seemed more worried about the identity of the plants than their human counterparts. As others have also remarked (Hayden 2005), in the age of IPR, anonymity seems to be as much an ethical matter for non-humans as for humans.

4.6 Concluding remarks: co-production revisited

Early on during fieldwork, in the CECAT course on seed production in 2010, I had learned that the seed is one of the most effective forms of technology transfer. That one small grain contains years, often decades, of research efforts by breeders and other experts that can, in such condensed and disembedded form, be taken to farmers with relative ease. A year later, in the C-4 project, I learned that to unravel all that knowledge and technology again out of the tiny seed once it gets to its new destination implies launching a whole other – reverse, if you will – translation chain (Latour 2005) in a socio-technical assemblage that will necessarily differ from the original. This difference between contexts, which seemed minor at the level of official discourse because based on analogies that took them for granted as shared preexisting backgrounds for relations, came to the fore at the frontline where the researches operated; in fact, it became the very "stuff" on which they worked.

How the new context differs from the original, and with what consequences for technology transfer, is not something that is given previously to the relation, but that is actively made by those who work across the new interface. Cooperation frontliners from both sides of the Southern Atlantic were, in this sense, brokers; but rather than brokering flows of material and symbolic resources through a multi-layered social network, as normally emphasized by the literature on development (e.g., Bierschenk et al 2000, Lewis and Mosse 2006), they brokered the making of social *and* natural contexts for the network itself.

Technology transfer in this case turned out to be less about "rendering technical" (Li 2007) through planned intervention than about demonstration, collaborative context-making and scaling operations, co-production between technology and context, and, as will be seen in greater detail in the next chapter, attention to the controls available to actors at various scales. These

characteristics stem not just from South-South principles of horizontality or demand-drivenness, but from the organizational and practical conditions of Brazilian cooperation remarked in Chapter 1. Here, the technologies being transferred did not appear as "a blueprint for an ongoing reorganization of farming so that the latter corresponds with the assumptions and requirements built into the technological design" (Long 2001, 63). More common was for the technologies to be changed according to the version of the local context that was collaboratively assembled by Africans and Brazilians at the project frontline. The project's scope of action only reached as far as its more immediate context in the research institutes, which it sought to make more receptive to the new technologies through the provision of knowledge (capacity-building) and research infrastructure (experimental fields, new facilities, lab equipment).

In their influential study, De Laet and Mol (2000) argued that the fluidity of the technologies is crucial in the transfer process, because it is what makes them more or less malleable to local adaptations by users. Indeed, some of the C-4 Project's technologies turned out to be more fluid than others. While improved seeds are one of the most compact ways in which agronomic techno-scientific developments travel, they are also more rigid than technologies that function in the disaggregated form of systems, such as no-till. If the former demand significant interference in the local context in order to perform the work for which they were originally designed,[219] the latter is more malleable to changes in its internal composition and arrangement so that particular elements can be combined "selectively with other, more local elements, so as to fit better with existing styles of farming" (Long 2001, 63).

As with De Laet and Mol's (2000) bush pump, therefore, in the C-4 Project fluidity was fundamentally linked to the degree of disaggregation and substitutability of the technologies' component parts. The tighter these parts were integrated, the harder it was to make adaptations. What these authors do not emphasize enough however is how this "quality" is imparted to the technologies according to the way they are assembled in the original context. As we saw, in Embrapa itself no-till was part of an ongoing research work involving regional adaptations and close interaction with different kinds of Brazilian farmers. But fluidity also depends on the way the technologies are reassembled and co-produced in the new context; without the special interest in this project component shown by the African agronomists and the project coordinator, for instance, no-till probably would not have been as fluid. Fluidity should not be seen therefore an essential quality intrinsic to a technology, but as itself a function of the process of assembling, transferring and reassembling it in the new context, as this new context is itself being (re)made in relation to the technology.

Moreover, technology transfer involves not just reshaping technology and context in a conceptual sense, as if an optimal balance between the two could be ascertained by getting technology design right once and for all. As our account of the C-4 Project showed, the adaptation and transfer process was explicitly concerned with the relative controls that the various actors in the network exercised, or were expected to be able to exercise, at various scales. In other words, not just the way the contexts for transfer were made by selectively comparing them across common scales, but how agency was distributed across the project's relational chain – between Brazilian and African researchers, and between these and technicians and farmers –, were key to the project's potential for effecting successful, or robust, transfer. This attention to

[219] As the case of GMOs makes clear, such interference may even go as far as national legal frameworks, most notably intellectual property laws. While improved seeds were the flagship technologies of the Green Revolution, today soil fertility and water resources are coming more visibly to the fore as key areas of research and intervention in Africa, as a precondition for enabling their widespread and effective adoption (Xiaoyun et al 2012, 176).

the relative distribution of agency across contextual levels was not just conceptual either; it imposed itself through a series of practical issues that the project workers had to face along the way. These issues were generally perceived as stemming less from mere difference than from asymmetries between contexts. The scales along which the Brazilian and West African contexts were brought together were not exclusive to their relation, but referred to a more diffuse kind of normativity – at time implicit, at times explicit – linked to globally hegemonic forms of agronomic research, farming, trade and governance. The next chapter will approach this issue by looking at the scaling moves and socio-technical controls involved in the project's adaptive experiments.

Chapter 5

The Cotton Project in West Africa (II): Scaling and Socio-Technical Controls

The previous chapter concluded by looking at the C-4 Project from the perspective of how technology and context were co-produced in the case of each of its technical components. In various ways, the contexts in the C-4 countries "resisted", or were expected to resist, the reassembling of the travelling technologies according to the same configuration in which they had been originally assembled back in Brazil. This was especially true when it came to their ultimate destination, peasant land, but was also found within the project's more immediate organizational scope. Even if Embrapa and the African institutes shared much of the artifactual network necessary for carrying out collaborative adaptive research with the new technologies, transactions clearly unfolded along an asymmetric contextual topography.

For an analysis that would follow strictly Latour's prescription of "myopic" ethnography (Latour 2005, 171; cf. Introduction), this would not fundamentally alter the character of the network-based account. But when other scales beyond micro-practice are brought into the ethnographic picture, the constraints these asymmetries pose on the movement within the network become clearer, and the question of agency comes irresistibly to the fore: even if indeed distributed, agency is not evenly so. The evocation of broader scales in this case is not an illegitimate smuggling, a "ride from [a] faster vehicle" (Latour 2005, 171) taken by the analyst to explain away the fundamental world-making processes unfolding on the ground, as Latour's critique would have it. It was, rather, a major part of the latter, that is, of the context-making work carried out *by the actors themselves*. And they did it because, different from the myopic ethnographer, they were very much concerned with what would happen *next*: whether or not would the technologies disseminate to their ultimate context, the cotton farms. In other words, they were fundamentally concerned with present and future virtualities, not just with the flat immanence of actual practice. As we saw, during Phase I this concern took the form of projections about potential obstacles to transfer in local farming contexts, most of which laid beyond the project's organizational scope. But if the project could not directly address many of these, it could at least try to provide for some of the local actors to do it themselves. This is, I will suggest in this chapter, one of the things towards which some of the frontliners were working by the time I left the field.

The key to technology transfer therefore came to lie not just in getting context-making right in a cognitive sense, but in addressing practical controls, or the relative distribution of agency along the various scales of the project's broader assemblage. This chapter will propose an account of how levels of context beyond the research institutes were scaled down into the most localized of project activities: field experiments. In this process, political controls at macro levels such as global trade or agricultural policies were scaled down into technical kinds of experimental controls at the micro level of adaptive experiments. While here, as in the "rendering technical" (Li 2007) of development aid, there was a mutation of socio-political problems into technical ones, this did not imply a substitution of one for the other, or an eclipsing of broader socio-technical assemblages and the ways agency was (unevenly) distributed across them. As I will argue, technical controls exercised over non-human agencies were predicated on political controls exercised over human agencies, and vice-versa. This

suggests that it is the opposition between political and technical controls that needs rethinking; anthropologists of development would therefore gain in looking at them as anthropologists of techno-science do: as being ultimately of the same kind.

Even if, as I left the field for good in late 2012, the project's next steps did not yet have one, clear direction, this chapter will conclude by addressing the question of technology transfer beyond the research institutes. This was the main concern of project frontliners by then: how to make technologies thrive in the absence of the same socio-technical controls that shaped its development in the original context. Mine won't be a disembedded – normative or theoretical – answer to this question, but a situated account foregrounding those lines of flight I see as promising for both field and desk (Mosse 2006, cf. Introduction). In terms of the first, it will be up to my field interlocutors to judge according to their own concerns. In terms of the latter, I will suggest how this experience in South-South engagement sheds light on aspects of technology transfer, and on the workings of techno-science more generally, to which the STS literature has not always given due significance. The section that follows will be dedicated to laying these out, before moving on to the account of the project experiments.

5.1 ANT's minor script: vitalities and socio-technical controls

One of the first things that struck me when going to biotechnology, soil, entomology and other research facilities in Embrapa and especially in the African institutes was how particular seemed to be the lab based on which Bruno Latour crafted his theory about techno-science and its relation to modernity (Latour and Woolgar 1986, Latour 1993). During fieldwork, it quickly became evident how fact construction in the way he described it is a privilege of *some* research scientists, while not so much of others. I do not think that this invalidates actor-network theory's key insights; in fact, I am grateful to Latour for much of the sensibilities I brought with me to the field, and, self-fulfilling prophecy or not, they did turn out to be a quite valuable compass. What I wish to do, as I wrap up this dissertation, is a kind of critique that does not dismisses but works through and along some elements that are indicated but not sufficiently nourished by his theory.

One can point to some of these eclipsed elements in Latour's ethnography itself. After doing fieldwork, for instance, it became obvious that what Latour saw inside the walls of the Salk Institute was allowed for by a much larger network of controls that stabilized not (just) the chemical substances scientists were looking for and the scientific arguments they crafted for constructing them as facts, but the institution in which they worked itself. I am talking here not about experimental but political controls. These controls, largely invisible in Latour's account, made sure that the Californian laboratory enjoyed a generous and reliable supply of the resources it needed for constructing facts: from an up-to-date collection of books and journals to a dependable electrical current; from well-paid and well- trained researchers and technicians to cutting edge equipment and materials. These preconditions for fact-construction are guaranteed by power, not by epistemology; as such, they are not equally shared by all laboratories everywhere.

This question of political controls at broader scales turns out to be, indeed, one of ANT's blind spots. As discussed in the Introduction, this is a particularly common qualm in the field of post-colonial science and technology studies. One of the things that the workings of techno-science in peripheral settings make irresistibly evident is precisely its embeddedness in power relations and deep-seated global asymmetries. A point that has not been much explored in this respect refers to the scaling moves whereby such broader power relations are brought to bear on

"science in action", not as external causality but as a constitutive part of it. This chapter will suggest how multiple scales came to be part of the assemblage brought together by the C-4 Project, and make a claim for the hybrid character of the controls – both political and experimental – involved in this process.

A question raised by the literature on science and technology that deserves further exploration in this respect relates to what I will refer here as *socio-technical controls*, and the vitalities they aim at channeling. These twin aspects were especially salient in the kind of techno-scientific work carried out by the project frontliners. The chief aim of their experiments was not to produce new, readily universalizable scientific facts, but to test and re-calibrate the potential of certain technologies according to new sets of relations. Every technology is created (or, in the ANT idiom, stabilized) with a performing potential in mind, and this potential is only actualized if it is calibrated according to an appropriate arrangement of controls, and made to work by an appropriate infusion of vitalities. This performance is shaped by normative directions that, as was argued in the previous chapter, refer to scales beyond micro-practice, such as global trade, techno-scientific networks, or public policies.

Therefore, controls in this case are to be understood in a simultaneously technical *and* political sense. This hybrid, socio-technical character is a sensibility that is by now commonsensical in science and technology studies. But it seems to be also present in the emic notion of experimental controls itself: much as in common notions of political control as one's (in)capacity to influence the behavior of others, what experimental controls do is precisely to direct the behavior of certain non-human entities and make them act in certain ways in relation to others. Knowledge about nature is evinced from the observation of such controlled behavior (Hacking 1983). In socio-technical networks, actants are made to circulate and mutate in certain ways, and not in others; techno-science is not just about metaphysics and epistemology, but fundamentally about practical controls.

In both technical and political controls, moreover, agency is not a matter of one-to-one relations, but can be potentially traced to ever-unfolding scales of context. And just as actor-network theory is timid about "social" power relations that lie beyond the phenomenological reach of the myopic ethnographer, it does not have much to say either about the agency of non-humans beyond the immediate reach of the scientists' transcription devices either; in particular, it downplays their more elusive, uncontrolled systemic interactions. But the kind of research that African and Brazilian frontliners were performing in their adaptive experiments dealt not with dead mice or synthetic substances within a lab, but precisely with a vast range of living elements freely interacting in an open-ended assemblage over which field researchers have much less control than their laboratory counterparts. As will be suggested here, their work was less about constructing facts through successful stages of purification than about channeling vitalities that were otherwise in certain ways and to certain ends. In other words, and echoing the classic Spinozean question so beloved by neo-vitalists and affect theorists, it was less about figuring out what they *were* than what they *could do*. Just as in lab science, this task demands inscription artifacts and experimental protocols; but it relies as often in personal experience, subjective evaluation and even intuition. Vitality in this sense is the Janus face of controls, in society as in nature: it is that which controls try to break down into predictable sets of relations, and channel according to certain ends.

Although these aspects were particularly evident in the kind of research observed during fieldwork, they seem to be as true to basic research in the lab as to adaptive experiments in the field. Latour (1988) sees field and applied sciences as an extension of the laboratory into the

world out there; indeed, as technology transfer makes evident, a whole socio-technical apparatus has to be put in place to sustain the reproduction of a technology in the world out there. But the reverse claim can also be made: lab science, as described in Latour's own ethnography (Latour and Woolgar 1986), may be viewed as a highly "compressed" version of field research, involving many more controls in a much more artificialized environment. Again, in both cases, techno-scientific work is about figuring out what these entities are (constructing them as facts) by looking at what they can do: in Hacking's (1983) terms, to represent natural entities *by* intervening in them, and vice-versa.

This chapter will provide an account of the field experiments from the double point of view advanced here: the controls deployed, and the vitalities they aimed at channeling. This account will progress along with the project's scaling moves, identified here through emic idioms encountered in the field: the *filière* (the cotton sector), the *milieu paysan* (the peasant environment), the *parcelle* (the experimental parcel), and the *dispositif* (the experimental design). At each level, the agency of certain actants and the relative controls available to them are foregrounded: the cotton companies that mediate between local production and world markets; the peasant farmers that grow cotton; the project frontliners's technical-political work of influencing human and non-human behavior; and the non-human actants in their (re)actions to the controls introduced.

5.2 The *filière coton*

What does cotton production in the C-4 countries look like? This was one of the first questions the project had to tackle, since the project's ultimate goal, broadly advertised by diplomats and the Brazilian Cooperation Agency, was to help increase cotton production in the four countries. But cooperation discourse, as I argued early on, may go a long way on its own, even without being a faithful reflection of frontline practice. In the latter, the broader context(s) of cotton production became important for practical reasons: above all, because the experimental design required a scaled down version of it. Adaptive research involves a controlled comparison between at least two situations: business-as-usual (called control situation), and the control situation including the new elements to be transferred. The aim is to evaluate how the new technologies will behave in the new environment by controlling common variables that are deemed significant across the two situations.

But how to bring such a wide, heterogeneous reality – cotton production in the C-4 countries – into a couple of hectares of field in the project's experimental plot? This section and the next three will provide an account of the concatenated scaling down operations that made this possible. Not unlike the "rendering technical" (Li 2007) of traditional development aid, at each step heterogeneity and complexity were replaced by an increasingly narrow set of quantifiable and controllable variables. But these context-making and scaling moves took into account projections of the differential controls exercised by the various actors in the cotton assemblage. This was done with an eye on the next stage, when the technologies and its surrounding networks would be scaled up again during transfer to cotton farmers.

The broadest scale of the cotton assemblage in the C-4 countries is what I will refer to here as the *filière* – a rough but not perfect equivalent to the term production chain, or the cotton sector more generally. It is a technical term deployed by economists and other development

experts that also appeared in common parlance in the C-4 countries I have been to.[220] Internally, it encompasses not just the cotton farms, but all pre- and post-harvest links in the production chain, from basic agronomic research to commercialization, until the cotton fiber is exported. Externally, it is the key structural mediator between local actors involved in cotton production – peasant farmers, research scientists, extension agents, government officials – and processes happening at global scales. As was seen in Chapter 4, it was at the latter scale that the Brazilian *cooperantes* were first brought into relation with their African counterparts. And even if, by design, a technical cooperation project has to be selective in terms of the *filière* actors with which to engage during implementation, the frontliners had to work with a projection of how the cotton sector at large functioned.

In the project's original text, as we saw, the cotton sector in the C-4 countries was described largely in terms of its failure to keep up with "the technological developments found in other producing countries in other parts of the world" (ABC 2009, 11) – not just in the North, but in much of the global South. And, in a globalized world, this seriously jeopardizes their competitiveness. Cotton peasant agriculture and the rest of the production chain were therefore portrayed not as in need of being brought *into* the modern technological innovation treadmill (as classic modernization discourse would have it), but as having been pushed to its bottom. A diagnosis like this – that the fundamental problem with the cotton sector in West Africa is its low competitiveness vis-à-vis other producing regions – is typical of a post-neoliberal reforms environment. According to this logic, for instance, the problem with the subsidies question is not the rules of free trade themselves, but the fact that the very countries that have championed their universalization (in this case, the U.S.) abide by them only selectively. As was evident in the editorial brought in Chapter 4, these rules, which the WTO strives to impose on national legal frameworks worldwide through more or less coercive means, were also taken for granted – at least in discourse – by Brazil's African partners. It was not by chance that the cotton sector in the C-4 countries came to the center of debates on global trade: in a highly liberalized trade environment, peasant farmers' income was directly, and hopelessly, affected by world prices distorted by American subsidies.

This highly asymmetric local-global entanglement, manifested most dramatically in the low purchasing price paid each season to West African cotton farmers, has been in place since the early beginnings of cotton production for the rising European textile industry during colonial times. But judging from the available historical literature, ironically by then many cotton farmers actually seemed to have more options, since West Africa was home to a dynamic regional textile industry that,[221] in the wake of decolonization and then neoliberal globalization, has been largely outcompeted especially by Asian textiles. African cotton farmers were left at the mercy of global processes over which not just them, but their own national governments, had little control – thus Compaoré and Touré's appeal to the rest of the world's sense of fairness in the pages of the *New York Times*.

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[220] Its origins can be traced to French colonial policy for agriculture in Sub-Saharan Africa. Cf. Raikes, Jensen, and Ponte (2000) for a comparison with the concept of commodity chain.

[221] As Roberts (1996) showed, in West Africa colonial companies faced a tough competition with local textile markets, which often offered better prices to farmers and were less demanding in terms of quality and color standards. This was largely why, after World War I, the balance of French cotton policies shifted away from a free market strategy to various mixes of incentive and coercion. But even so, while many peasants "brought their harvest staple to the colonial markets ... many others covertly traded at the parallel markets" (Isaacman and Roberts 1996, 21).

Many development analysts and even scholars would be satisfied with tracing the roots of West African farmers' plight to this asymmetric global configuration; but although this is a key – or perhaps even *the* key – scale, it is far from the complete picture. The relation between local farmers and global markets is importantly mediated at a national level by the way the *filière* is structured. The *filière* mediates not just how much peasants get for the cotton they grow, but minimal industrial-technological standards for the cotton fiber they should follow, or the cost and availability of agrochemicals and other inputs to production. In all four project countries, the *sociétés cotonnières*, or cotton companies, are the backbone of the *filière coton*. They are the ones that provide peasant farmers with inputs on credit in the beginning of the crop season, and purchase their production at the end. They are also in charge of most other links in the value chain, both upstream (i.e., taking the results of research to farmers through rural extension, and in some cases funding research done in the local institutes) and downstream (i.e., transporting, ginning and marketing the cotton fiber). In countries highly reliant on cotton exports like Burkina Faso and Mali, they also wield significant political influence. The cotton sector in the C-4 countries is also an articulation of two-directional processes: both inwards, and outwards to the global stage.

The extremely verticalized character of the *filière coton* is quite straightforwardly a legacy of cotton's colonial history in Sub-Saharan Africa. Like their predecessors in the colonial monopsonies,[222] the cotton companies remain as the crop's exclusive buyers, and where there is more than one company, they are assigned jurisdiction over specific production zones. Even if, as part of the Structural Adjustment Programs (SAPs) that took Africa by storm during the eighties and nineties, the national *sociétés* have been today fully or partly privatized,[223] in many ways the "free peasant economy" still lies "at the interstices of markets and compulsions" of various kinds (Mamdani 1996, 147).[224] Strictly speaking, no West African peasant is today forced to plant cotton – just as no national state is forced to keep relying fiscally on it. For some

[222] "Single official buyers, usually state marketing boards or concessions, given monopoly buying rights over specific areas" (Isaacman and Roberts 1996, 18).

[223] The basic World Bank/IMF prescription included removing subsidies to cotton production and extension services (Moseley and Gray 2008), a slow and uneven process in terms of the hold national states were able to maintain on the *filière coton*. The Burkinabe state for instance succeeded in securing influence on this strategic sector by sponsoring partial ownership of the main cotton company by a national producers association promoted from the top down during the late nineties. Privatization of Mali's CMDT has been, on its turn, more controversial and slow-paced. The Malian state kept a majority of the shares, along with Geocoton (the latest mutation of the former French colonial *compagnie*, itself fully privatized in 2010). Upon the coup in March 2012, the company was being subdivided and put out for sale, with a Chinese group alone in the bid for two of its subsidiaries. Relations between peasants and the cotton company have been tenser than in Burkina Faso due, as one of my interlocutors put it, to the "union-like" character of their organizations. In Benin, where cotton is limited to the Northern region, liberalization of the *filière* went far, but with less than ideal results: production decreased to a point where in the 2011-12 season the government decided to suspend the *société* scheme in an attempt to revive farmers' interest in cotton. In Chad, which is an oil exporter, cotton production is much more timid than in the other three countries. There, the hold of the French on the cotton sector is still tight in the various links in the chain, from the cotton company to the research institute itself.

[224] During colonial times in Francophone West Africa cotton policy oscillated between market incentives and more or less coercive measures imposed on peasant farmers. The latter "entailed a more sustained effort at surveillance of the daily agricultural regime of Africans. … formal regulations were often implemented that defined how, when, where, and by whom cotton was to be planted. Extension agents, *moniteurs cotons*, and armed guards often patrolled cotton fields to insure that these rules were followed" (Isaacman and Roberts 1996, 18). On the coercive character of cotton production in Sub-Saharan Africa, Mamdani mentioned peasants in Zaire who, as late as in the 1970's, would see the agricultural extension officer as a policeman and "often flee when he appears in the village" (quoted in Mamdani 1996, 164).

countries, however, cotton has remained one of the few feasible options. As a researcher from Burkina Faso explained it to me, "Chad has oil, Mali has gold, Benin has the coast; we have but cotton. Not even Thomas Sankara's revolutionary government could afford to disinvest in cotton, even if it was considered a colonial crop".[225]

Similarly, in West Africa rarely does a farmer grow exclusively cotton, but most often a mixture of this export cash crop and others aimed at local consumption or regional markets. In all four countries, however, cotton is the only crop that counts with an organized *filière*: in practice, this means a structured way by which farmers may access basic agricultural inputs, especially fertilizers. Outside of the *filière coton*, an open market in agricultural inputs (let alone credit or insurance) is either absent or little developed. This lack of control over inputs to production is at the root of the previously mentioned gap between research's recommendations and peasants' practices: fertilizers provided by the companies to be applied on cotton are diverted to food crops.

In spite of the centrality of the *sociétés* for the cotton sector in the C-4 countries, during Phase I the project worked closer with the two other major components of the *filière*: the research institutes and, secondarily, farmers. As the first project coordinator recounted, since the project's preparatory missions the focus was on the possibilities for technical cooperation with the research institutes, rather than finding solutions to the cotton sector at large. However, even if the local research institutes were not formally submitted to the cotton companies, and neither were the latter the only existing conduit for technology transfer to farmers (NGOs or peasant associations were others), they did become unavoidable. This was so both practically – the companies control the distribution of basic inputs – and politically, due to their muscle vis-à-vis both research institutes and governments, especially in those countries highly dependent on cotton exports. Thus, in spite of the project's encouragement of direct demonstration to peasants (cf. below) and of their active participation in the technology adaptation and dissemination process, the vertical and all-encompassing character of the *filière* (im)posed the *sociétés cotonnières* as obligatory points of passage (Latour 1987). Indeed, they are bound to become protagonists in the project as it proceeds to extend beyond research institutes into technology transfer to farmers during Phase II.

Phase II is outside of the chronological scope of my fieldwork, so the cotton companies were not really central actors in the assemblage I observed. There was however a fundamental way in which they, and the *filière* at large, came into the core of the project during this first phase: through the way they shaped local production systems. Local production systems came into the project's experimental grounds, on their turn, less in terms of how peasants actually grew cotton than in terms of a working notion that was available in the research institutes and elsewhere in the partner countries: the *milieu paysan*.

5.3 The *milieu paysan*

The notion of the *milieu paysan*, or peasant environment, indicated how cotton production was carried out in rural areas in the C-4 countries, fundamentally made up of smallholdings in customary land. This is a vital scale of context: the ultimate destination of the technologies being transferred by the project. As remarked, local production systems came into

[225] Thomas Sankara, also known as the "African Che", was president of Burkina Faso from 1983 until he was ousted and murdered in 1987, giving way to the current president Blaise Compaoré. Sankara's government focused on food sovereignty, and invested heavily in the domestic production of food crops.

the experimental work not as actual practices but as the control situation – the *témoin* (witness) – against which the performance of Brazilian technologies would be tested. How did the Brazilians get at a standard working definition of the West African *milieu paysan*?

Some basic facts and figures about cotton production systems in the C-4 countries were included in the original project, usually in comparison with equivalent Brazilian figures: average production per hectare, average availability of capital goods and labor per household, deployment (or its absence) of basic inputs such as fertilizers, seeds, pesticides, or growth-regulating hormones. The working notion of peasant agriculture employed at the project frontline did not come however from preliminary reports or hired consultancies. It was, rather, largely taken as the local partners in the project presented it. African researchers and technicians would commonly speak in terms of a generic figure of *le paysan*, even if they were well aware that, on the ground, peasants' practices showed myriad variations.

This image of the *milieu paysan* was far from that of an autochthonous peasantry practicing age-old traditional farming methods, in need of salvation by modern science. On the contrary: it denoted people who had already been touched by modernization – that is, by previous development initiatives –, and who had not been saved by it. For the African partners, the picture was well-known: constraints to increased productivity and farmers' incomes had been relatively well studied, but the means to overcome them were not always forthcoming or under the control of research institutes, *sociétés cotonnières*, or even national governments. Some of the most intractable ones mentioned by them referred to instability of world prices, increasingly irregular rainfall patterns in the Sahel, and poor state policies and lack of budget and capacity to implement them.

But like Embrapa in Brazil, its counterpart institutes in West Africa were fundamentally occupied with problems at those scales in which they could potentially act, that is, those approachable through research: better cotton varieties, more efficient deployment of fertilizers and pesticides, or enhanced soil conservation techniques. These research results were passed on to extension agents (who generally worked for the cotton companies) before they would get to farmers. As already indicated, however, the path between research, extension and farmers was far from smooth; yet, the working notion of peasant production scaled down into the experiments largely reproduced extension's recommendations.

The average picture of peasant production in the C-4 countries with which the project worked was that of a diverse landscape, quite different from the photos of massive, rectilinear commercial farms Brazilians would sometimes show in their power points (cf. Picture 7). In a typical West African peasant farm, you are likely to find a cotton field of one to three hectares, occasionally punctuated by *karité* (shea) or mango trees, surrounded closely by other crops – basic staple grains such as maize, sorghum, millet or *fonio*, and perhaps *niébé* (cowpea), groundnuts, or sesame. Many farmers will have a couple of heads of oxen to till the soil, and half a dozen members of his extended family (usually women and children) to sow the crops, apply mineral or organic fertilizers, do the weeding, spray pesticides, and harvest – first the *cultures vivrières* (food crops), then the cotton. After harvest, the plant residue is left on the soil for the animals to feed on (Picture 16).

Picture 15. Cotton field on the foreground; cereals, trees and cattle on the background (Mali, November 2011, photo by author).

Cereals and other food crops are sold in local markets or purchased by the villagers' organizations or local private firms. This is typically done immediately, for the farmer, who is the household head, needs cash in order to hire extra hands for the cotton harvest, pay school fees, or buy medicine for a sick child or relative. He will typically sell his harvest in a period of high supply, when prices are at their lowest. The purchasing price of cotton, on the other hand, is normally fixed by the cotton companies in advance of the season, so it is assumed that the farmer will use this information to estimate what and how much to grow that year.

The households' cotton harvest is then collected by the villagers' association and passed on to the cotton companies, which will gin, process, and commercialize (most commonly, export) the fiber. A couple of months after harvest (sometimes more – delays are not rare), the peasants are paid their production, after the credit for that season's inputs is subtracted from the *prix d'achat*. Even when this price is established in advance, given an upgrade, and the cost of fertilizers is subsidized by the state – as may happen when companies and governments wish to encourage farmers to grow more cotton that year, or to revert a declining trend in production –, the price paid to farmers tends to remain low (or, in the view of many in the literature and in the field, plain exploitative).

This picture of cotton production in the West African *milieu paysan* was compounded by certain assumptions about peasant behavior. It was most often seen through economistic lenses: assumptions of rational decision-making are what makes, for instance, price incentives so central to cotton policies in these countries. In the same vein, like much of the policy and academic literature (e.g., Moseley and Gray 2008, West 2009), local researchers generally depicted West African peasants as being highly risk-averse. This tendency would stem less from irrational, tradition-bound behavior than from their particularly severe vulnerability to factors outside of their control. "One major difference in relation to Brazilian farmers", one of the C-4 agronomists pondered in an interview, "is that here [in West Africa] the peasants' threshold for sufferance is much lower". Government policies and peasant associations' funds provide for quite a limited safety net; this is worsened by regional environmental conditions, which allow for only one crop a year, and even that one crop may fail if the rains do not come as expected. "Their cereal harvest has to last during the entire dry season, otherwise they'll just go hungry", the same agronomist continued. "If there is a drought, pest, or some other fatality and the peasant loses his crop, he loses everything." And their predicament may not end there, since it is not even evident

that an increase in productivity will bring long-lasting benefits to individual farmers – on the contrary, it may bring losses, depending on where they are situated in the local power structure. This can happen, for instance, when the right to exploit a plot of land that is producing well is reclaimed by the chief or elders precisely because it is doing well; for many, especially women, youth, migrants and other less privileged groups, there would be no incentive for investing in improved land fertility.

These assumptions were regarded as rational drives behind the peasants' resistance to technological change: their tendency would be to stick to what they already know – that is, what they think they can control – for they cannot afford the risk implicated in trying something new. Suspicions about new technologies were not appeased by the promises of increased productivity lavished upon them by researchers, technicians, and extension agents. In fact, technical expertise in and of itself did not seem to attract, much less convince, them. African frontliners were virtually unanimous in affirming that the only ones capable of making a peasant farmer get interested in a new technology and change his behavior accordingly are *other* farmers – something the Brazilians, for their part, were not surprised to hear. And this would happen less through persuasion and explanation than through imitation and a certain dose of productive agonism. "You know, if the neighbor is using something and it's working well, the peasant will feel challenged to also try it", one of the local researchers explained to me. "It's that challenge that makes him do it". Horizontal, farmer-to-farmer links were therefore regarded, and to some extent acted upon (cf. below), as a promising dissemination channel aside from the formal extension networks run by the cotton companies.

Reflecting on the possibilities of transferring the project's technologies to the West African *milieu paysan*, one of the C-4 agronomists pondered:

> New crop management techniques [such as no-till] are usually harder to introduce than technologies we can bring ready-made such as fertilizers or other inputs. But even there, change may be difficult. Take soil degradation, for instance, which is a major problem here. We had to change the fertilization package because over the years the soil became degraded and productivity fell as a consequence. But the peasants still hesitated about incorporating the new formula, because what they know is that the old formula had been working well until recently. They are not able to see the parallel process of soil degradation, that the problem itself had changed over the years and thus demands a new solution.

This supposed inability of the peasant to see abstractly over the long run was taken as a key constraint to technology adoption, especially in the case of no-till. Fertilization practices in particular became an area where peasant behavior was vital. In the West African *milieu paysan*, fertilization was done using animal manure and/or fertilizers provided on credit by the cotton companies. But both the quantity and quality of this application was highly problematic from the point of view of the researchers; it was not just quantitatively deficient but qualitatively uneven, especially if compared to the highly technified processes found in Brazil and elsewhere. Most significantly, it was common practice for peasants to deviate a portion of the fertilizers received for cotton to the fields where they grew cereal crops. It was even said that, for many farmers, access to inputs for the latter was the main reason why they grew cotton in the first place. This preference for food crops did not stem only from immediate subsistence needs, since not all of it is consumed in the household. It was also linked to the more dynamic, and less controlled,

character of the markets for these crops. "For cotton they have to deliver production and wait until they can get paid for it; cereals they can sell directly in the local market and get the cash right away", one of the Burkinabe researchers explained. "It's just reasonable that they privilege them; wouldn't you do the same?"

Cereals and other food crops were also part of peasant farmers' risk management strategies, in case pests, drought, or disease came to differentially affect their crops. This diversification strategy also included cattle and other kinds of livestock such as goats. As remarked in the previous chapter, these were a key piece of the *milieu paysan* puzzle, especially as far as no-till was concerned. Attachment to livestock has been a topic in anthropological debates on African rural life, made famous in the field of development by Ferguson's (1985, 1994) take on the so-called bovine mystique.[226] Brazilians would occasionally make their own analogies about farmers' behavior towards cattle. The fact that peasants may use oxen as a sort of savings account, for instance, is something they also recognized in rural Brazil. As one of the Embrapa agronomists illustrated, "I once asked a farmer back home why was he keeping ten poor milking cows when he could exchange them for two very good ones and have the same milk production or more. He replied, 'because if my daughter gets sick and I have to sell one of them, there goes half my herd'."

Picture 16. Cattle feed on crop residues after the harvest of maize (rural area, Mali, October 2011, photo by author).

But even though the cattle question was a major constraint to the project's chief technological component, for the Brazilians and their partners it remained as such: a constraint to be grappled with, and not a problem amenable to intervention. Anthropological considerations about cattle-related beliefs and behaviors along the lines of the bovine mystique problematic were, at bottom, irrelevant. In other words, it did not matter why West African peasants wished to keep their livestock and resisted to interventions aimed at changing their cattle-related practices. The fact was that they did, and it was up to the project to adapt to these circumstances rather than the other way round.

[226] The bovine mystique denotes the quality many African societies attach to cattle as a special kind of property, which renders problematic their exchange for money. In his early work on Lesotho, Ferguson (1985) opposed both "rational choice" and dualistic (modern versus traditional) kinds of explanations for it, proposing instead an approach that looks at traditional cultural rules in their connections with "modern" processes.

This working notion of the *milieu paysan* in the C-4 countries was, in its broad outlines, the one miniaturized in quantifiable form as the control situation in the adaptive experiments set up in the various project plots. It did not correspond to how peasants actually did things, but to how they were supposed to be doing them if they followed the technical recommendations crafted by the research institutes and delivered by local extension agents. The African partners and their Brazilian counterparts did not however close their eyes to the potential – or better said, inevitable – "noise" between research stations and the peasant environment. Rather, as will be discussed shortly, they recognized that peasants were likely to both follow *and* not follow the recommendations.

This ambiguity reflects the broader "uncaptured peasantry" problematic discussed, among others, by Mamdani (1996, 12-13). As this author remarked in his critique of two polar approaches in academia and policy-making circles,[227] African peasants are neither capitalists in the waiting, eager to be freed from the shackles of state patronage, nor labor of a pre- or anti-market kind that have failed to be (or resist being) successfully captured by the state or global capital. It is neither one nor the other; the challenge is to trace empirically how processes of capturing peasant labor for global markets have succeed or not, but most likely have been caught somewhere in-between. This "in-betweenness" resonates with some of our previous discussions: the cotton *filière*'s relations with global processes, the technology trap remarked in Chapter 3, or the lag between soft and hard domains discussed in Chapter 2. In fact, in its general outlines, it could even be extended to describe the postcolonial condition at large.[228] And as many postcolonial scholars have done (cf. Introduction), rather than striving to overcome these ambivalences and contradictions, the project tried to work through some of them, with the tools it had at hand. The next section will describe a third spatial-temporal scale assembled by the project, in fact its most visible face: the so-called *parcelle*.

5.4 The *parcelle*

[227] One is epitomized by Robert Bates, who provided neoliberal policy-making for Sub-Saharan Africa with an academic pedigree during the eighties (e.g., Bates 1981), by claiming that the strong grasp of African states on the agricultural sector benefited a "narrow circle of urban elites and party functionaries at the expense of farmers" (Amanor 2013, 23). The other is Goran Hyden, who championed the notion of "economies of affection" to describe African peasants' "autochthonous" political economies.

[228] Perhaps most famously, Homi Bhabha (1994) has drawn on the notion of in-betweenness with respect to the domain of culture. My perspective goes however beyond culture; cf. Introduction, and Chapters 1 and 2.

Picture 17. Malian peasants visit the project parcel in Sotuba. The demonstration is conducted in Bambara by two of the project's technicians (November 2011, photo by author).

The picture above, taken in October 2011 at the Sotuba research station, shows four Malian peasants who had been randomly approached in a cotton farm not far from Bamako, and invited to come see the project grounds. They were shown how cotton was supposedly grown in the *milieu paysan*, alongside how cotton would be grown using the new seeds and crop management techniques brought from Brazil. Little by little, the project technician (who used to conduct the visits in Bambara; none of the peasant farmers I met spoke fluent French) explained to the farmers what was new about the plot with the Brazilian technologies, while pushing off the branches to call attention to the residues from the previous year's crops in-between the lines; inviting them to feel the temperature difference across the height of the cotton plant, significant enough to be noticed without the need of a thermometer (around 5°C); and taking them to no-till's chief visual enabler, the pit, where they had access to what was going on with the plants' roots under the ground (Picture 23 below).

This kind of comparative device is basic to adaptive research and transfer anywhere; new technologies are not just introduced into a random sample of the local environment. It is always against a certain rendition of "business-as-usual" that they will be experimentally calibrated, and comparatively evaluated. This evaluation is done not just by researchers and technicians, but by those who are to be the ultimate recipients of the technologies: in this case, peasant farmers. This rendition of the local context is therefore as constructed as the one to which it will be compared, that includes the travelling technologies.

But the Malian peasants in the picture were impressed by both sides in the experiment: not just the crop lines managed using the Brazilian technologies, but the control situation representing the *milieu paysan*, yielded beautiful and loaded plants. At a first glance and without expert guidance, the differences between them would not be easily perceived, but both were clearly more productive, healthy and homogeneous than the plants found in their own fields (Picture 14, Chapter 5). This is not surprising, given the discussion already made here – even if the seed sowed in the experimental fields and in the farms were the same, the assemblages of which they were part were very different. Research institutes had not only more resources at their disposal, but much more control over their experimental fields; they were in this sense closer to the original context where technologies were developed in Embrapa's own research stations. This was especially true of the project plot in Sotuba, which enjoyed a budget of its own, full-time technicians, and the dedicated presence of the Brazilian project coordinator, himself an

agronomist. The only significant environmental variable that was not controlled – in other words, that was fully shared between experimental and farmer fields – was rainfall.

What these peasant farmers were seeing however were not finished technologies, ready to be brought to their fields, but adaptive experiments. These fields had a hybrid character. On the one hand, they were experiments, generally structured along the same lines of the ones routinely set up in research stations both in Embrapa centers in Brazil and elsewhere in the African institutes. In this sense, they brought non-humans into the project assemblage in a controlled and directed manner. On the other, they were demonstration sites, assembling various kinds of humans as a supporting public for the project.

The project's main experimental field was located in the Malian institute's research station in Sotuba, in the outskirts of the capital city of Bamako. Brazilians referred to it as *parcela*, and the Africans as *parcelle* – the English equivalent land parcel (or plot) is close enough to be maintained here. While technically speaking, parcel refers to the area where the experiments were being performed, the word was used more broadly to identify the piece of land that the Malian institute had assigned to the project. Different from its counterparts in the other three project countries, this parcel was supervised closely by the Brazilian project coordinator along with the Malian experts in each of the three components (who were based at the institute's cotton center in Sikasso, but who would come to Sotuba regularly; cf. Chapter 4). The local institute provided the project with two local technicians to be full-time at the researchers' disposal in order to execute the experimental protocols and other project tasks (project parcels elsewhere, in Sikasso and the other three countries, had to share personnel with the regular routine work at the institutes).

The project grounds in Sotuba were made up of two parcels, side by side. The smaller included a varietal test where the ten new cotton varieties brought from Brazil were being adapted and displayed, alongside their five regional counterparts. It also contained an in situ seed bank for cover crops brought from Brazil (Picture 10, Chapter 4), and part of it grew local cereals as a preparation for future no-till essays. The same written word, *vitrine*, was used to designate this half of the parcel in both French and Portuguese, so I will keep it here.

Picture 18. *Vitrine* entrance, to the right (Brazilian and African cotton varieties). The panel says "welcome" in French, and displays the five country flags (Brazil plus the C-4 countries), as well as the Embrapa, ABC, and UNDP logos (November 2011, photo by author).

Picture 19. *Vitrine* entrance, to the left: Brazilian colored cotton (BRS Safira) on the foreground, local variety of sorghum on the background. The panel displays the Malian institute's name and logo (November 2011, photo by author).

The remainder of the parcel, twice as large as the *vitrine*, contained the no-till test fields, the largest and most visible of all plots (Picture 20). At the left corner as one entered the main gate, one could spot the only building within the *parcelle*, a small shack built by the project to store equipment and seeds. It was located right by one of the few trees that were left to stand within the fenced area, under which visitors and project workers would happily gather for a break from the scorching Sahelian sun. A bit farther behind the shack, in front of the first field (which in 2011 grew cotton) stood a couple of panels, identifying the project and displaying a schematic picture of the no-till production system.

Picture 20. Main *parcelle*: storage shack, project Toyota under the shade tree on the background, no-till test (cotton) on the foreground (*left*). Project demonstration panels in front of no-till field growing cotton. On the very far background, maize about to be harvested prepares the land for crop rotation (*right*) (November 2011, photo by author).

As one walked further through the aisle that separated this cotton field from the maize field to its right, another couple of panels stood on each side: one showed the symptoms of nutritional deficiencies in the cotton leaves, and the other did the same for maize (Picture 21). Like the pit (cf. below), these were key visual enablers in the *parcelle*. Other panels, set up in the *vitrine*, displayed a schematic description of pest control modalities.

Picture 21. *Left*: project technician demonstrates to peasant farmers how to visually recognize deficiency of key nutrients in maize. *Right*: ethnographer and a Chadian trainee by panel showing nutrient deficiency symptoms (nitrogen, phosphorous, potassium, magnesium, sulfur) in cotton (November 2011, photo by author).

When I got there in September 2011, the other half of the maize field grew *niébé*, a leguminous plant that has abundant biomass and fixates some nitrogen – two common criteria in Embrapa's no-till research in Brazil. But different from crotalaria, *niébé* was used locally for food – something which could potentialize adoption of the system by peasants. Towards the end of that season, local women hired by the project harvested the *niébé* beans and the corn ears, while the stalks and straw – the biomass – were kept in place as a variable to be measured in that experiment. After a sample of the production harvested was carefully weighed and recorded, these and whatever other edible grain was produced were informally distributed to the local community, or donated with a bit more formality at charity events by the Brazilian ambassador and/or his wife.

Picture 22. Maize from no-till fields harvested and cleaned by women from the local community (November 2011, photo by author).

Between the two parcels, I would occasionally see a boy playing a monotonous beat in a drum; it was to scare away the birds, eager to get at the loaded heads of sorghum in the *vitrine*. On the extreme opposite side of the no-till parcel, behind the crops, a guardian – a middle-aged man from Côte d'Ivoire – would sit down everyday during the evenings and nights. Just a few meters from him stood the wall that separated the Sotuba station from the surrounding

community; without surveillance, maize ears would not wait in the stalks to be harvested by the project. These, as well as the women who harvested the crops and performed other operations such as weeding were recruited from the local community through the channels already available at the institutes, and were paid by the project.

The parcel was therefore structured to be both an experimental and a demonstration site. Its demonstration aspects were a bricolage of elements from different technology transfer methods commonly deployed by Embrapa in Brazil (cf. Chapter 3). Embrapa research units normally include *unidades de demonstração (*demonstration units) that display to farmers the institute's technologies, so they can be evaluated and perhaps adopted by them. It may include a direct comparison with alternative methods deployed by local farmers, as was the case with the C-4 Project plots. *Vitrine*, which means "display window", is also a demonstration device. In Brazil, they are set up in events such as agricultural fairs, where new technologies are displayed and explained through short lectures delivered to farmers and the specialized media. *Treino & visita,* which involves continuous training of technicians and extension agents in charge of disseminating the technologies among farmers through "visits", resonates with the project's capacity-building cycles and more informal training of local technicians. Finally, there were elements of *dias de campo* (field days), when multiple farmer groups and individuals were invited to come see the technologies at the institute's experimental stations, or on pilot tests set up in farmers' land.[229]

Who were the addressees of demonstration in this case? The parcel's first public was the researchers and technicians from the C-4 institutes who worked for the project. They weren't however mere spectators: researchers participated in the design and evaluation of experimental protocols, while technicians worked in implementing them. Besides this core group, demonstration targeted other researchers and technicians working in the local research institutes and adjacent agencies (such as extension services), but not formally within the project. They were recruited as trainees for the capacity-building cycles, and were expected to become multipliers of the project's technologies. Much of their training took place outdoors on the parcel, and the chief aim of demonstration in this case was to produce a "paradigm shift" in their minds – in particular, about not tilling the soil, which seemed counter-intuitive to most of them. For the technology to disseminate, this ultimately would have to happen along the entire transfer chain: as a Burkinabe agronomist put it, "in order to succeed in convincing others, we have to be ourselves convinced". For researchers endowed with the abstraction habitus of techno-scientific practice, it did not take much to see the benefits of no-till even if most of them would not become salient until after a few cropping seasons. The agronomists and other researchers I met seemed indeed well convinced by it. "But the farmer", some of them told me, "whatever we say it's no use. The farmer needs to *see* it".

This is a refrain Brazilian researchers would promptly recognize. Indeed, many of the demonstration techniques deployed by the project (as in Embrapa back in Brazil) were visual. The main one was the pit (*fossé* in French, *trincheira* in Portuguese), a hole usually around 4-5 feet deep dug by a test plot in order to expose a vertical slice of soil (Picture 23). This technique was deployed in the no-till fields in all participating institutes, to display the compaction layer (cf. Chapter 4) and the different plant roots. Indeed, within only a couple of years, the difference

[229] The project was implementing pilot plots with no-till tests in a few sites in the Malian *milieu paysan*. In the one I visited in 2011, the project field stood alongside a couple of others from other foreign projects. The farmer, leader of the local village association, seemed to be a typical *courtier*, in the sense put forth by Bierschenk et al. (2000; cf. also Lewis and Mosse 2006).

in length between the cotton roots in the no-till field and in its control counterpart was remarkable. The roots of the different cover crops were also a common target of demonstration through this technique; the brachiaria pits in particular unveiled a whole underground root ecology that is normally not visible, and therefore not taken into account, by farmers and even researchers. The pit displayed elements that were not immediately visible without the mediation of scientific artifacts: even when comparative variables measured in the experiments (such as yields) had not yet shown significant differences between no-till and the control situation, for instance, the underlying problem (soil degradation) could be quite readily visualized in the materiality of the compaction layer.

Picture 23. Demonstration pit, showing brachiaria's abundant root system (*left*); close up on the longer cotton root in the no-till plot (*right*) (Sotuba, October 2011, photo by author).

Panels were another visualization device deployed at the parcel, to address a key problem found in the *milieu paysan*: inappropriate fertilizing. Given local farmers' little access to soil analysis, visual identification came to the fore as an alternative, though much rougher, way of estimating nutritional deficiencies in cotton and other crops (Picture 21 above). "Some of them are easier; if the cotton leaf is yellow, the peasant knows he should add urea [i.e., nitrogen]", one of the local researchers explained. The reason why it was easier to identify nitrogen (N) deficiency as opposed to others was more practical than cognitive: it had less to do with the clarity of the symptom itself than with the fact that this was the only nutrient for which peasants counted with a disaggregated fertilizer. For other basic agronomic nutrients, most notably potassium (K) and phosphorous (P), fertilizers were provided by the cotton companies in a single formula, the *complexe coton*, making it harder to disaggregate what symptoms were linked to which nutrient deficiency.

There were multiple other visualization devices, such as pictures of insect pests and natural enemies in catalogues brought from Brazil or already available locally (the ones that I saw had been published by the French CIRAD), removal of the cotton plant's leaves so that its architecture could be examined, collection of in-depth soil samples to show in detail the composition and texture of the compaction layer. Other sensual channels for demonstration like smell or touch also boiled down to a minimum the need for scales, thermometers and other

artifacts; these non-human mediators were not always available in the recipient context – most obviously among peasants, but sometimes even in the research institutes.

Finally, some pieces of equipment were the object of demonstration at the parcel. The main attraction was the wheeled pulverizing machine, a device I also came across during the CECAT trainings. It had been developed in Embrapa for small-scale agriculture, and was able to carry more liquid and cover more lines than the common back sprayer used by West African farmers, while sparing the laborer of a quite heavy load. Also commonly demonstrated was a plastic bottle device for applying granulated fertilizer; it was cheap – in fact, virtually free – and easy to make. It also reduced the harshness of labor for, when tied to a stick, it could be used standing up straight rather than bending down (as peasants normally did), besides guaranteeing homogeneity in the distribution of fertilizer dose per hole – an important benefit from the researchers' point of view. These were all potential technologies in the waiting to be one day transferred to farmers – their deployment in the project parcel was therefore also experimental. Peasants who visited the parcel did seem to show interest in them, but without the provision of support to their local production and sale, dissemination of brand new artifacts seemed unlikely.

The technologies displayed at the *parcelle* were therefore aimed principally at researchers, technicians, extension agents and farmers – that is, those directly involved in growing cotton. But the project parcel also targeted another audience that was almost as important: government officials, politicians, diplomats, journalists from television and other media, local schools, and occasionally, ethnographers and other academics. As remarked in Chapter 4, visits of this kind were an important project activity, as they sought to assemble a public around it that was essential to sustain the overall network. This lay audience was generally incapable of judging technical matters; it was able however to make a basic aesthetic judgment. Therefore, besides appropriately following all technical parameters, the parcel had to be, above all, beautiful. As the first project coordination recollected,

> once we succeeded in making the parcel real and it became nice-looking, the authorities began to show up. I had the technicians do the presentations to them; it was also a way of making sure that they were on a par with what was going on in the experiments … Even visitors to the station who didn't have anything to do with the project would go there, to see the most beautiful plot.

Picture 24. Malian President Amadou Toumani Touré and Brazilian Foreign Minister Celso Amorim lead the C-4 Project's groundbreaking ceremony in October 2009 (Source: Afribone).[230]

[230] http://www.afribone.com/spip.php?article22679. Last accessed, 20 April 2012.

This aesthetic aspect was also emphasized in other project activities such as the construction of the lab buildings, for which the Brazilians were commended for their care with "presentation and cleanliness", as the first project coordinator put it. Similarly, in the project fields, plants had to be uniformly tall, green, and loaded with – depending on the time of the year – yellowish flowers or snow white cotton capsules. They had to look alike all across the field, aligned very straight to fill up perfect rectangles and squares. The alleys between the fields had to be free of weeds, with the grass cut short. The whole area had to be clean, with no random objects or garbage thrown around. Panels had to be unsoiled, visible and placed on the right spots. Two *chiwaras* were tied up to either side of the *vitrine* gate, providing a charming finishing touch to the whole scene (Picture 25).

Picture 25. *Chiwara* wooden sculpture, purchased at a local market. This antelope-like figure, of Bambara origin, became one of the best-known symbols of the Malian nation. It also appears on the local institute's logo (Picture 19) (November 2011, photo by author).

Finally, these systematic methods were compounded by another kind of demonstration that happened at the parcel, of a more subtle and practical kind, which was routinely embodied by the only researcher fully dedicated to it, the project coordinator. This was the demonstration of a certain work ethics, which, even if involving much discipline and some degree of ascetism, was not the Calvinist ethics made famous by Weber. It consisted above all in continuous presence and care, from very early morning, as farmers themselves do, until later in the day (and sometimes even at night): supervising the work of technicians, doing hands-on work, running multiple research and administrative errands that inevitably appear on a daily basis. The reason for this deep commitment was, above all, practical – as remarked in Chapter 4, among some of the Brazilian *cooperantes* there was a sense that this project could not afford to fail, and therefore that the parcel, as its most visible face, could not be allowed to "go bad". This is something that could easily happen if the controls introduced by the project were removed. The beauty and exemplarity of the project parcel was sustained by a delicate composition of controls that were both technical and social: from the rigorous execution of experimental protocols to continuous vigilance against animals, crop looters and other external hazards; from constantly touching base with UNDP and other financial channels so that resources would keep flowing at

the pace and magnitude necessary, to making sure that partners in the local institutes were up to date and committed to the project's routine work. Moreover, this can also be seen as a strategy of enrollment in the Latourian sense, addressing other frontliners through display of exceptional commitment and dedication, and some personal challenging.

As both an experimental and a demonstration field, therefore, the *parcelle* was a highly controlled environment, both in a technical and in a social sense. On the one hand, it was protected from external disturbance: it was fenced, guarded, continuously surveilled; it was constantly supervised and acted upon so it would remain aesthetically and technically appropriate; there was a continuous effort to keep local frontliners from being diverged from it to other tasks and interests. On the other hand, the parcel was also controlled in a positive sense: those who worked on it enjoyed resources that were not always available to those outside, most notably the peasants but also some of the local researchers and technicians; plants, soil and other non-humans were continuously nourished by vitalities and protections that they would not otherwise enjoy; its aesthetic and technical qualities resonated farther than its boundaries through a selected public (in which, I believe, this anthropologist is included) that was being formed as the experiments unfolded.

Multiple elements of context were therefore brought in (and out) in a controlled manner, and this was true not just of material but conceptual entities. Most notably, the *milieu paysan* could not be brought into the parcel but in an abstract and standardized form; actual peasants would go there to compare the new technologies with something other than what most of them did in their own fields. In the parcel, this abstracted *milieu paysan* met the new technologies that came from Brazil, who had also been disembedded from their original context. In the experiments, these were brought together into yet another interface, at the most micro of the scales to be approached in this dissertation. There, they were compared by making non-human actants relate to each other in certain ways and by nourishing them differentially in certain directions; the plan according to which this happened was the experimental *dispositif*, to which we now turn.

5.5 The *dispositif*

The C-4 researchers deployed the term *dispositif* to refer to the experimental design orienting the tests in the parcels. It is what made the parcel more than just a demonstration site, but, as fundamentally, an experimental one, aimed at testing the behavior of travelling artifacts and techniques in a new environment. It is also that which allowed for scaling down broader contexts – the *filière* and the *milieu paysan* – into the parcel's bounded time-space. As noted, this was done by converting the cotton sector in the C-4 countries into the so-called *témoin*, or control situation. This control situation worked as yardstick for evaluating the performance of another, which added new elements to it: Brazilian cotton varieties and cover crops, and the three pillars of no-till. This was done by measuring and comparing the behavior of plants and other actants in the two situations according to common factors.

This comparison between local system and the local system including the travelling technologies was not one-to-one but multi-factorial, that is, the experiments involved statistically mediated comparisons of multiple factors at the same time. This was done following a common design in agricultural experiments, the so-called split-plot: the experimental field was delimited and successively sub-divided into units of equivalent area, forming a nested configuration in which each sub-unit was "treated" according to a factor that varied quantitatively or qualitatively

(i.e., plus or minus), so that the effects of differential treatments in each of them could be compared both within the same and across different cropping seasons. This way, the project's three components were simultaneously brought together in the overlapping treatments performed in each sub-unit. While a set of treatments ("A") defined for instance the cereals to be grown as main crop (say, maize or sorghum), another ("B") prescribed association with different cover crops for each of them. The following year in the same plot, a set of treatments would define the cotton varieties to be sowed, and another would prescribe no-tillage or tillage. These would intersect in such a way that one sub-unit always act as the control situation (that is, as a proxy for the *milieu paysan*).

Other than the variations in treatment prescribed by the *dispositif*, the remaining factors were kept constant: environmental conditions such as rainfall and presence of insects, fungi, and other small forms of life, and basic crop management operations such as sowing, fertilizing, thinning, weeding and harvesting. Each treatment was repeated in as many sub-units as possible (that is, as available resources allowed, which normally meant between 2 and 4 repetitions) for the results to be considered statistically reliable – or, as one of the researchers put it, "scientific". The technicians and researchers then measured, at certain dates and for each sub-unit, the effects of these controlled interventions on variables established beforehand as relevant: crop yields, plant biomass, physic-chemical characteristics of the soil, plant density and height, appearance of first flowers and leaves, or, in the case of cotton, both agronomic (e.g., percentage of fiber, average weight of the cotton capsule) and technological indicators (e.g., micronaire, maturity, length, uniformity of length, tenacity, reflectance).

The experimental *dispositif* therefore commanded how actants were to be organized and made to relate to each other within well-defined limits of space and time. This was done so that vitalities within its scope were channeled according to a predetermined notion of what desirable elements were to be made to flourish, and what undesirable ones were to be allowed to wither away or be forcibly diverged to its exterior. Incidentally or not, *dispositif* is the same word Foucault chose to name the apparatus through which power flows in society. In one of his rare explicit renditions of the term (Foucault 1980), apparatus (also variously translated as "device" or "deployment") is defined not as a thing in itself but as a "system of relations", a "network" that brings together a "thoroughly heterogeneous set" of elements, the "said as much as the unsaid". The "nature" of this system, he goes on,

> is essentially strategic, which means that we are speaking about a certain manipulation of relations of forces, either so as to develop them in a particular direction, or to block them, to stabilize them, or to utilize them …The apparatus is precisely this: a set of strategies of the relations of forces supporting, and supported by, certain types of knowledge (quoted in Agamben 2009, 2).

Like most of those that followed on his wake, in his oeuvre Foucault was concerned mostly with the government of human life. The experimental *dispositif* is also a manipulation of relations of forces, but of a non-human kind. Other than that, the similarities are remarkable. Like the Foucauldian *dispositif*, it is sustained by a particular kind of knowledge, manifested in the three expertises concerned here. This manipulation is also strategic, in the sense that it had a clear direction: what it did was to translate normative parameters that were external to the experimental domain into a technical, either quantifiable or discreet (+ or -), form. These parameters came from the upper scales of context previously outlined: from global trade to the

filière, to assumptions about the peasant environment, these were scaled down, at the micro level of the *dispositif*, into a central concern with *yields* as the core experimental parameter. Even conservation – as explained in Chapter 4, the chief purpose of no-till – becomes important inasmuch as it helps sustain productivity in the long run, and does not significantly undermine it in the short run. The experiments sought to strike a balance between short-term, economistic demands for high productivity, and long-term demands for soil conservation. In all three project components, brought together into the *dispositif*'s nested structure, experimental adaptation ultimately converged towards this end: increased yields became the ultimate sign that the system was working and thriving in its new environment.

Thus, in their experiments, entomologists were chiefly concerned with mapping out and anticipating potentially significant pests – that is, insects that could cause sudden and sharp decrease in yields (as had been the case in Brazil with the boll weevil, and in West Africa with the *carpophage* caterpillars; cf. Chapter 4). In the project parcel, standing just above the layer of cotton at regular intervals there were white triangular boxes; these were insect traps, the only visible artifact of the pest control component in the parcel. The boxes, brought from Brazil, sheltered cards smeared with pheromone for attracting male insects, meant for a survey of insect populations in the area – a preliminary work to devising a biological pest control strategy appropriate to local conditions. During the first year, as the Malian entomologist explained, "there were observations, not results. For scientific results, it is necessary that a statistic *dispositif* be put in place". The entomology *dispositif* proper was assembled in 2011 on the *vitrine* simultaneously with the varietal (breeding) assay. In this trial, technicians observed and registered the magnitude and kind of damage inflicted to the different cotton varieties so that the behavior of the Brazilian ones would be compared to their control counterparts across two treatments: one consisting in zero chemical control, the other consisting in pesticide spraying according to recommendations for the *milieu paysan*.

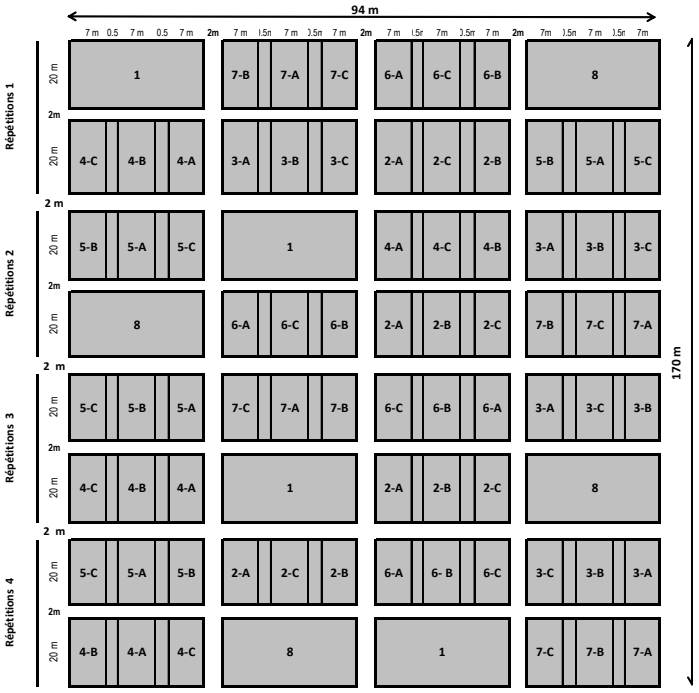
In the varietal test on the *vitrine*, yield, measured as a projected amount of kilograms per hectare, was the main parameter for comparing the ten cotton varieties introduced by Embrapa among themselves and to their local counterparts (one from each of the C-4 countries, plus the Togolese regional control; cf. Chapter 4). In the first season, productivity was also the main criterion according to which the head breeder from the Malian institute selected the two best-performing Embrapa varieties to move further into the no-till fields the following year, where they would join the local varieties acting as controls. Performance of the different cotton varieties was also observed and compared according to other factors: level of damage by insects and disease, plant development (germination, flowering, opening of capsules, plant height, number of branches and capsules), and the technological criteria listed above. In these evaluations as in genetic improvement research at large, breeders strived to strike a compromise between competing external demands on the cotton plant: farmers preferred bolls with heavier grain, as they got paid by kilogram of unprocessed cotton; ginners were concerned with the proportion of lint in seed cotton weight; the textile industry had its own standards of quality and color. Whiteness and brilliance of the fiber, for instance, were emerging from the trials as traits with the potential to improve local cotton varieties through cross-breeding with the Brazilian ones. But these and other parameters only became important provided that the concerned variety was also *productive* compared to the others.

Similarly, in the no-till trial, most measurements were geared towards evaluating the impact of this new crop management system on the yields of different cotton varieties and the cereals (maize and sorghum) grown in association or rotation with it, as compared to the control

situation (i.e., conventional system including tillage, no cover crops, and no soil coverage). Thus, the *dispositif* aimed at figuring out the best possible balance between biomass and yields: while cover crops intercalated with main crops were expected to produce as much biomass as possible in order to keep the soil covered during fallow, they also competed for nutrients, water and sunlight with the main crop, therefore potentially impacting its yields. This trial was therefore principally concerned with estimating the best sowing date for each combination of plants: one treatment prescribed sowing the cover crop on the same day as the main crop, the other fourteen days afterwards. Other factors measured in this experiment addressed physic-chemical characteristics of the soil, and indexes of plant vitality such as leaf analysis, plant height and density, and germination.

Yields and productivity, the focus of the economy of vitalities managed by the *dispositif*, depended most fundamentally on the right amount and quality of nutrients to feed the crop plants (besides other factors that influence their absorption such as humidity and composition of the soil: pH, or clay and organic matter content). In this respect, agronomists explicitly deployed in their experimental work a suggestive foreign trade-like idiom of nutrient export and import. Export is a normal part of agriculture, as much of the biomass that is nurtured inside the fields leaves them along with the harvested crop; the challenge is to make sure that these lost nutrients are replaced by equivalent import, in the form of mineral or organic fertilizers. Chronic soil degradation becomes a problem when more nutrients are being exported than imported over the long run. In West Africa, as we saw, not only was there excessive export of nutrients through leaching, runoff and the cattle that feeds on crop residues, but there was far from sufficient import of nutrients through fertilizers. As a result, peasant cotton farms developed, so to speak, a serious "trade deficit" in nutrients with their surrounding environment. The inevitable outcome is reduced productivity.

As with the territory of nation-states, this idiom was predicated on the delimitation of a bounded space in-and-out of which elements travel: not just the nutrients, but actants that carry them or dis/enable their action such as water, insects, weeds, and the crops themselves. Much like in customs and immigration, this movement had to be registered, quantified and controlled (except for the lines by the edges of the parcel, which were disregarded in the measurements due to their higher potential for contamination from the outside). As represented schematically in the picture below, this bounded space was geometrically delimited and internally organized according to the *dispositif*: size and form of the overall area (parcel), number and arrangement of internal sub-divisions (blocks and sub-blocks), distance between blocks (alleys), number of lines in each sub-block (spacing), number of plants per line (density).



Picture 26. Schematic representation of a split-plot design. The numbers and letters indicate different treatments.

Import of nutrients through inorganic fertilizers focused on primary minerals (macronutrients) indispensible to plant development. In the entire parcel, these were typically brought in along the lines of the *complexe coton* distributed in the *milieu paysan*: the elementary tryad NPK (nitrogen, phosphorous and potassium) plus sulphur and borum, followed by a second dose of nitrogen through urea. Part of these nutrients left the parcel in the form of harvest – along with cotton bolls, maize ears, or sorghum heads. The rest of the biomass was measured by cutting out from the soil and weighing a square meter sample; it was then left on the fields, to be reabsorbed and made available for the next season's crops.

Water was another key factor that remained constant across the parcel. Measured and registered every day on a black board in a common area in the research institute, rainfall was an uncontrolled variable – in fact, the only significant one – that the project fields fully shared with peasant farms. Rains commanded the opening of the season in both sites, since only after a first significant stint of rain has fallen it is possible to sow. In the project parcels, however, sowing did not always occur simultaneously with peasant farms: at points, cotton and cover crop seeds did not arrive from Brazil in time due to the ever-present bureaucratic hurdles discussed in the previous chapter. This did not compromise the realization of the experiments, but recombined the *dispositif* in terms of a sowing date different from the one practiced in peasant land. Unplanned constraints could be turned into useful trials, since the sowing date to be recommended to farmers was itself one of the problems local researchers had been struggling with, given the growing unpredictability of rain patterns in the region. Towards the end of Phase I, this date was purposefully anticipated in order to demonstrate how no-till dispensed with waiting for a significant stint of rain in order to be able to till and then sow. In testing how the new technologies responded to local rainfall, researchers were gradually adjusting the tests so that an appropriate combination of variables – seed varieties, sowing date and depth, spacing,

combinations of crops – would make up as best as possible for the irregular rain patterns found in the West Africa savannahs.

Insects were another kind of external actant that would come and go freely. The entomologists' protocol involved observing and comparing the damage inflicted on the different cotton varieties (frequency and kind of damage, by what kind of insect or disease) according to two treatments: spraying on the calendar, as recommended to the *milieu paysan*, and no spraying. Like their fellow agronomists, the work of entomologists was ultimately concerned with controlling the flow of nutrients. But more than the foreign trade idiom found in the soils component, or the kinship framing typical of breeding science, the entomologists' task was most often conveyed according to a militaristic language of warfare: to "defend" crops (*défense des cultures*) from "natural enemies" (*ennemies naturels*) through different "fight methods" (*méthodes de lutte*). It basically involved protecting the crops from external threat: to make sure their vitalities were not significantly exported, or diverted away from the cotton plants, by insects and other undesirable actants such as viruses, bacteria, or fungi. Other such entities – the nitrogen-fixing rhizobium bacteria, or insects that could act as natural enemies in biological control (cf. Chapter 4) – were being recruited in the opposite direction: *into* the experimental effort. Therefore, whether these and other actants would be allies or enemies, depended on their relation with the target plants and on their effects in the economy of vitalities configured by the experiments. Plants other than the main crops such as weeds were discouraged or removed, while cooperative species such as cover crops were nurtured in a controlled manner. Even water and the mineral nutrients themselves could turn from friend to foe, if present in excess: they could cause, for instance, runoff or toxicity. In all cases, the ultimate parameter was their effects on crop productivity.

Besides mediating transactions with the surrounding environment, internally to the parcel the *dispositif* organized a whole domestic economy of nutrients and vitalities. Spatialization prescriptions based on statistic models oriented how plants were supposed to be distributed in the area, linearly organized by forced settlement and displacement schemes of intercropping and alternate sowing. Spatialization was not just horizontal; researchers also looked at the plot according to a vertical axis where cotton and the other crops stood between two domains, one subterranean and one above the ground. The plants mediated much of the traffic between them, and were themselves regarded as segmented in terms of subterranean (roots) and aerial parts (stems, leaves, fruits, flowers).

For no-till, as remarked, what happened under the ground was as much or more important as what happened above it: soil was the ultimate repository of nutrients responsible for bringing about higher yields. A chief concern was to make sure that fertilizers were effectively captured by the roots and utilized by the rest of the plant so that they would not be "wasted" (that is, not pressed into the service of productivity). Soil was itself regarded as a segmented domain: mineral elements accumulate and move differently across various its strata; while some tend to stay in place where it is applied, others are more mobile and tend to sink into greater depths. No-till tapped into the plants' differential ability to absorb nutrients: those with deeper and more extensive roots were able to profit better from dispersed nutrients. This became a capacity that the system was nurturing in the cotton plant by gradually undoing the compaction layer so that its roots would have more room to grow. The length of cotton roots was a chief parameter of visual comparison when pits were opened in the no-till essay. Plants that had strong root capacity – cover crops such as brachiaria and crotalaria – were recruited into the system to perform a service of revolving the soil and bringing nutrients up. Crotalaria and other leguminous plants

were further tapped for their capacity to bring nutrients down: that is, to capture nitrogen from atmospheric air (cf. Chapter 4) and transfer it to the soil as their biomass degraded during fallow.

These transactions were monitored and encouraged (or discouraged) not just in space but also in time, especially with regards to intergenerational relations between the same and/or different crops. Plants in a same generation – that is, coexisting in the same cropping season – may compete or cooperate: maximizing the latter and minimizing the former was one of the ends towards which the no-till *dispositif* was oriented. Central to it was the legacy that one generation left to the next: the main crops – cotton or cereals – were to be the privileged heirs of nutrients recycled from all other crops grown in the previous season. Successive generations of the same plant variety were also observed and compared across time, to ascertain the stability of the results concerning yields and other measurements.

Scaling down the parameter of productivity entailed, finally, making sure not only that the cotton (or cereal) plant would thrive more than other actants in the parcel, but that certain *parts* of it would do so more than others. As with soil, researchers saw the cotton plant as a segmented entity; the abovementioned relationship between the plant's roots and its aerial part was an important segmentation for the researchers. Within the latter, the flowers and bolls were their ultimate point of attention – several measurements in the *dispositif* tracked whether vitalities were being appropriately channeled into their multiplication, maturation, and quality: date of first budding flowers, first capsules opened, when bolls were ready to be harvested; number of branches and fruit sites; quantity and quality of fiber in the bolls.

In this hierarchical redistribution of vitalities, however, the plants had their own priorities, which were not always aligned with the experiments' productivity-centered frame. Much of breeding, in fact, is about reprogramming them to better respond to external demands, so that they will for instance yield faster, more abundantly and homogeneously. In the project's *dispositif*, plant agency often took the form of "natural" forces that its arrangement was designed to countervail. Researchers frequently talked about it by means of analogies with human organisms: the cotton plant "feels thirsty", "looks happy" or "becomes sick, just like we do". "Do you see all these dead flowers on the ground?", a Burkinabe entomologist once explained, as he showed me the effects of different cotton pests in one of the tests. "These are not pest-related. If there is hydric stress [i.e., lack of rain], the plant will sacrifice its flowers in order to maintain the capsules that have already budded. It is as if a mother, in a moment of scarcity, would prefer to abort a baby in order to save her children who have already been born." Or, as a Brazilian agronomist explained in another occasion, if hydric stress is severe the plant may "abort the capsules before they are ready, sacrifice them in order for the plant itself to stay alive. It's more important for the plant to survive." This was because while cotton evolved to be a perennial plant, in commercial agriculture it is harvested as a whole and sowed anew each season; the plant becomes just a means to its offspring, the cotton bolls.

Agriculture at large, not just the agronomic sciences, is fundamentally about understanding and controlling the behavior of these non-human agencies, about avoiding the dispersion of their vitalities by channeling them to certain ends that are extraneous to "nature itself" – productivity being the paramount end in mainstream scientific agricultural systems. The incredible rise in yields brought about by the Green Revolution was however predicated on other, broader changes: the more technology advanced, the more controls on the plant's natural *and* social contexts it came to demand. This appeared at the micro scale of experimentation in the three project components, all of which ultimately revolved around how to make improved seeds express their full productive potential as it was envisaged by breeding. While the more

technological a seed is, the more controls are required for its potential to be actualized, in less capital- and technology-intensive types of agriculture, the less technological – or as agronomists say, rustic – the seed is, the less external controls it demands. As a result, its vitality is more dispersed and does not concentrate on the quantity and quality of cotton capsules to the same degree as in improved seeds: in one word, productivity is necessarily much lower. Its resilience, on the other hand, is much greater.

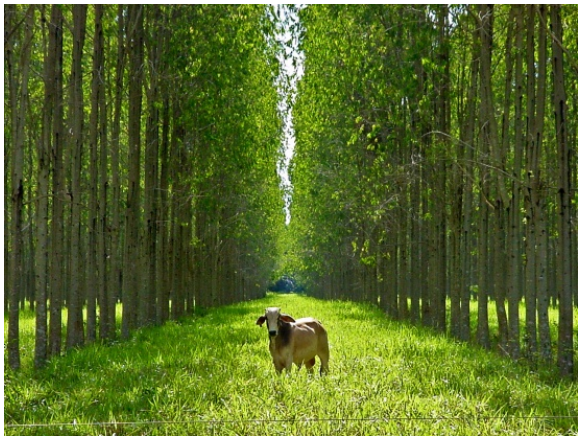
One can therefore see the *milieu paysan*'s predicament as stemming from a lag between technology and context: peasant farmers deployed improved seeds without the attachments required for them to express their full normative potential. The project's experimental *dispositif* largely followed the pattern of technology-intensive agriculture: more than in peasant farms, it successfully organized and controlled agencies and vitalities that would be otherwise free-floating, dispersed in and around the space and time of the parcel, acting according to their own designs. The outcome was, as described above, a beautiful and vigorous parcel. The *dispositif*'s capacity for directing non-human agencies was limited by its very design: by prescribing a range of controls to be imposed on the actants within the parcel, it simultaneously limited its range of action to them; outside of prescribed controls, actants were pretty much out of its reach.

There were however many other agencies that laid beyond the reach of the *dispositif* and the researchers. Experimental controls deployed in the project parcel were made (or prevented) to act by *other* controls – I am referring here to the capacity of researchers, technicians, and other frontliners to implement the *dispositif* itself. Somewhat like peasant farmers, though in a lesser degree, project frontliners did not, or could not, always follow the technical protocols with the rigor ideally required for a statistical design. One would be tempted to refer to these as "social" controls exercised on people, to differentiate them from "technical" controls exercised on things. But what I propose here, following actor-network theory's basic prescription of symmetry between humans and non-humans, is an exercise in looking at them as being ultimately of the same kind. The chief effect of this exercise, as I saw it, was to bring to the fore how experimental controls were ultimately predicated on broader controls, that oriented those inscribed in the *dispositif*'s design but, paradoxically, also prevented their deployment as such. This "gap" in controls found in the C-4 Project – and probably in all others, since, as was discussed above, technology transfer is itself predicated on a preexisting asymmetry between departure and arrival points – brings to light agencies situated at scales beyond the ethnographic present and location, which are not always included in more "immanent" accounts of social-technical assemblages and their actants: agencies that make them act, but upon which they *cannot act back* – at least, not with the same force. There is, here, a fundamental asymmetry in the distribution of agency that is not normally recognized in actor-network theory's basically "flat" networks (Latour 2005, 171): an asymmetry that elsewhere in the social sciences and humanities has gone by the name of systems, structures, the postcolonial condition, and many others.[231] The following section will illustrate this asymmetry through one of its most common manifestations in the field, related to how scientific enterprises operate through homogenization and standardization, and explore its consequences for technology transfer to farmers in the C-4 Project.

5.6 Lost in Latourian translation: techno-science and the post-colonial condition

[231] STS scholars writing at the interface with postcolonial studies have noted the contradiction in different ways, for instance between Latour's symmetry and Chakrabarty's provincialization (Redfield 2002), or Latour's spokesperson and Spivak's reflections on the possibilities of subaltern representation (Hayden 2005).

In all three project components, homogeneity was something to strive for in various domains: spatial, temporal, genetic, operational. Picture 7 in Chapter 4, showing cotton fields in a *cerrado* farm, is an extreme version of how homogeneous a highly technified agricultural landscape looks like. Another remarkable visual representation of this is evinced by contrasting the picture below, showing an exemplary verison of Embrapa's livestock-forestry-agriculture integration system, with the non-scientific, "rustic" way of integrating trees, cattle and crops commonly found among peasants in West Africa (Picture 16 above).



Picture 27. A typical combination in Embrapa's integration system for crops, trees and livestock. Homogeneity is not just spatial-temporal, but also genetic, in the case of the three elements depicted here: brachiaria, eucalyptus, and improved Zebu breed (Source: Embrapa website).[232]

To reach such levels of technification was never the aim of the C-4 Project, which was working, rather, to strike some kind of balance between the new technologies and local production systems. Nonetheless, standardization was a concern at certain key points. Crop management procedures should be the same across the entire field so that, upon harvest, the final product is as homogeneous as possible: cotton fibers of similar length, color, free of contaminants, and so forth. This was a strong demand coming from another, much higher scale, shared by cotton producers in Brazil and elsewhere: the world market.

Lack of homogeneity was an issue recurrently noted by researchers for the *milieu paysan*; even a layperson such as myself could clearly perceive the contrast between the homogeneity of the project and peasant fields, where cotton plants would often have variable sizes, colors and amount of flowers or capsules. Since the seed was supposed to be the same, heterogeneity would come from factors such as variable soil inclination (which makes water and nutrients accumulate differently), or the uneven application of organic (manure) and chemical fertilizers. Most of these ultimately stemmed from a contextual element not found in *cerrado* agriculture: prevalence of human labor. Human labor necessarily entails greater diversity (women, children, men, of variable ages, sizes, levels of experience, would carry out operations differently), discontinuity (labor may get scarce at certain moments in the crop season, particularly in periods of concentrated demand such as harvest), and fewer mediation by artifacts (which were normally limited to simple devices such as oxen-driven plow, back sprayers, or hoes and other local tools).

But even at the institutes, when workers were outsourced from the local communities to perform less skilled tasks such as harvest or counting damaged plant parts, homogeneity could be

[232] http://www.embrapa.br/imprensa/noticias/2010/abril/3a-semana/integracao-lavoura-pecuaria-floresta-e-tema-de-dia-de-campo/. Last accessed, 20 April 2012.

lost, for instance through lack of continuity. "We try, we train them, but then one day comes a woman, two days later comes her sister, and then she does it differently or loses track of the previous counting", one of the African researchers told me. Sometimes, technicians themselves would be absent sick, too weak to work due to fasting during Hamadan, or would for some reason decide to harvest earlier than planned. Seeds would be sowed late because of intractable trans-oceanic bureaucratic hurdles. Measurements and other standards would be found to vary between the Brazilian and the African institutes: one used volume, the other used weight; one soil classification was based on the U.S. system, the other on the French system. As one of the African frontliners put it, even in the researchers' joint work, "approximations" were often necessary. In other words, between Brazil and Africa, Embrapa and the C-4 institutes, experimental stations and *milieu paysan*, something almost always became lost in translation.

But were they lost in Latourian translation? In *Reassembling the Social*, this notion was recruited by Latour (2005) to perform nothing less than the task of replacing the "social" itself. Translation indicates a relation that, rather than carrying causality between "intermediaries", associates "mediators" that make each other "do things" (107): "a connection that transfers … transformations" (108). The network is the ethnographic inscription of such concatenated translations: "what is traced by those connections in the scholars' accounts" (108). In this sense, there is nothing to be "lost"; each translation is immanent, in the sense that it configures its own reference, with no determination beyond itself. In this view, actor-networks are as if in a process of perpetual emergence: "in each instance, we have to reshuffle our conceptions of what was associated together because the previous definition has been made somewhat irrelevant" (6).

Yet, there was among my interlocutors a pervading sense of inappropriateness – that the "real" thing laid elsewhere – that I could not just theorize away. African researchers had often been trained abroad, were fairly up to date in what was going on in their scientific fields, and participated in a global techno-science that had, quite literally, much of its reference elsewhere – usually, still, in centers of excellence in the global North. They knew how a *dispositif* should be correctly implemented, and how a good laboratory of soil analysis or biotechnology should look like. More often than not, however, this was not what they had in their own institutes. But on the other hand, what they had in their institutes *was* the real thing, their daily work environment. As with the "not-so-captured" African peasantry discussed previously, their regular condition was to be in-between – as Boaventura de Sousa Santos (2002, 16) put it in an apt, and candid, formulation on the paradoxical nature of the postcolonial condition, they "live in the margins without living a marginal life". Despite the asymmetry in resources between Embrapa and the local institutes, their Brazilian counterparts did, for the most part, understand that. The situation found in the local institutes was not entirely unfamiliar to them; even back in Brazil, some would declare to have already shared many such frustrations: corn ears get stolen from the parcel, sloppy technicians ruin experiments, funds run out in the middle of a research project.

In this project, therefore, the faltering in rigorous obedience to protocols, appropriate inscription artifacts, fully shared scientific standards and codes, strictly disciplined workers, was at once the object of the transfer work being carried out by frontliners, and its very operative context. Even though these would sometimes bring frustration and temporarily stall the flows in the network, they did not become an impediment to project work. Noise across the project's interfaces was dealt with most often, as remarked, through "approximations", or ad hoc adaptations. These approximations did not seem however to be unfortunate though necessary fixes occasionally appended to the translation chain so that it would keep running its otherwise

smooth flow; paradoxically, I will suggest, they were becoming its very condition of possibility. After all, if ever, it is like this that these technologies will ultimately get to West African farmers.

5.7 Concluding remarks: noise, controls, and robustness

Until now, I have been gradually raising but holding off the issue of noise within the project's socio-technical network. But this is a question that cannot be avoided: if peasants do not really follow the technical protocols devised by research, how will the project ever expect to transfer to local farms the technologies adapted within the institutes? As prescribed in the formal framework of Phase I, the project's final product was to be a material inscription, but of a different kind than a scientific paper: a handbook of agricultural best practices. As I wrote these last pages, this material was being crafted by Brazilian and African researchers based on the four years of project work, subsidized by Embrapa's internal publications. It will contain basic technical information on the three project components, to be distributed to extension agents and leading farmers in the four countries.

It is unlikely however that, whatever its content, a handbook will, in itself, guarantee technology dissemination, and project frontliners are well aware of that. Their technology transfer strategy is being thought out as I write, as the project prepares to usher into Phase II with a relatively different structure and composition. This last chapter will therefore conclude with what the analytics orienting this dissertation foregrounded as an "interesting" (to polemicize with Akrich 1992; cf. Introduction) movement in this direction that I observed in the field. Whether this movement will be eventually codified into the project framework, or will remain a hesitating line of flight that will continue to coexist with it or eventually vanish, is not something that can be said at this point. Here I am therefore largely treading the domain of the *virtual*, something for which the Deleuzian version of the assemblage is a more appropriate terrain than Foucault's apparatus or Latour's actor-network.[233]

> One thing that has impressed me in the Brazilian project is their technology transfer method. In our country, technical recommendations are imposed on farmers. In Brazil, there's people specialized in explaining things to them. Not just show the finished results, but explain to them how they got there. You know, the peasant farmer is independent, he has his own mind. He will only adopt the technology if he wants to, if he thinks it's of his interest. If he understands how the process works, he can make his own adaptations. He must do them, because he will not implement the recommendations as such.

This is part of a conversation I had in November 2012 with an agronomist from one of the C-4 countries who had just participated in one of the project's capacity-building trainings. He was suggesting that technology transfer stood a better chance of success if the recipient (in this case, the peasant farmer) himself took a lead – and before that, an interest – not only in receiving the technology, but in making his own adaptations to it. This comes out of an acknowledgement that extension and other bureaucratic apparatuses have only a very loose grip on peasant farmers: in other words, that technology transfer will necessarily unfold in a low-governmentality setting.

[233] The different kinds of insight that are allowed for when one looks at relations within an assemblage not just in terms of actualities but also virtualities, have also been remarked by those who have been thinking through Deleuze in the anthropology of techno-science (Jensen and Rödje 2010, Pyyhtinen and Tamminen 2011).

This is a somewhat paradoxical but real (or realistic) way of recognizing the relative autonomy of the recipient's agency – and the naiveté in presuming that his behavior can be fully changed according to the requirements of the new technologies. It would therefore make more sense to expose to them the *logic* underlying the technologies than to expect a strict adhesion to technical protocols. This was an exemplary formulation of such an understanding, but it was one that I also saw, in partial and less explicit forms, in other African partners in this project.

The previous chapters have suggested how demonstration as a mode of engagement strived less to intervene than to draw into participation and commitment to further context-making the various links in the project's relational chain: in particular, African researchers, technicians, and farmers. This was coupled with a partial acknowledgement of the distributed and asymmetric character of agency, and that, for this reason, adaptation and transfer could not, and even should not, aim at "perfection", or total control by project workers. This was partly rendered explicit in the project's "philosophy", condensed in metaphors like the "C-4 alliance" or the *forgeron.*[234] This philosophy foregrounded horizontality, consensus-building, and mutuality in a continuous learning cycle open to the joint shaping of the project's *avenir*. This was, again, not an objective description of relations, but a way of making them, of enrolling actors in the assemblage so that they would participate in tracing the future of the network.

"One thing I like about the project is the philosophy", one of the C-4 agronomists told me once. "It gives leeway to actors at each point in the chain to do their own thinking about things". Thus, researchers were called to share the preparation of the experimental design and protocols, and were expected to design their own model of the productive system as its technical logic was being conveyed and assimilated through the formal cycle of project activities. Technicians were taught about why they did what they did when implementing the protocols at the experimental fields, were encouraged to make their own thinking about it, and were often recruited to carry out the demonstrations at the parcel. Extension agents were trained on the underlying technical content of the three project components in the capacity-building workshops, and invited to provide their input into how to address the local context. Leading farmers were being gradually approached for the establishment of pilot tests in their lands, and as potential allies in future technology transfer to other farmers.

Not all African partners were equally enthusiastic about this philosophy; but many did feel compelled towards it. There seems to be not one single reason for it, and an actor-centered approached focused on the African side would probably unveil myriad reasons.[235] But from the standpoint of their work of *as researchers* at the project's core interface, which is my analytical focus, I felt that it ultimately had to do, again, with the question of control.

> The French sometimes send people here who look like they're trainees, who don't really have the expertise. Same thing with others. Recently I was called into a project [offered by another wealthy European country] and I had to be firm with them. 'You know, I'm not a technician. It's not for you to come here and tell me that I should do this or that in my own country, which I know pretty well. If it's to do it like this, I rather not do it at

[234] *Forgeron* is a metaphor evoked by one of the Malian project frontliners, and taken up by the coordinator, to denote the kind of relationship to be established between the partners in this project, as well as the shared nature of the work they were suppose to carry out. The term refers to one of the traditional métier-based classes in Mali and elsewhere in the region.

[235] Based on my experience, I would suggest career interests, personal and professional background, research expertise and experience, past and present engagement with other projects, and broader political interplays within and without the research institutes.

> all.' Now, the Brazilians, they sent real researchers, really good ones. I have been to two cotton conferences there and was able to attest to the quality of the scientific work being done in Brazil. And it is in this capacity that they exchange with us. … Of course, they got here at first with ideas about what should be done, about what will or will not work. That's normal. The difference is that they were open to listening to us, and incorporating our knowledge, from the beginning. We devised all the experimental protocols and evaluate them together; what we do here [at the experimental station] is really a mixture of their experience back in Brazil along with ours. As [the coordinator] says, the idea is that we forge the project together.

Other African researchers made comments along similar lines, sometimes emphasizing other aspects, for instance their own agency in making the Brazilians change their minds about the original proposals they brought for the project. But I found this statement particularly significant for it came from a researcher who was not as politicized, for instance as others who would think that to do a project with Brazil (or any other Southern country) is by default better that remaining under the umbrella of the French. His qualm about European cooperation was not political strictly speaking, but concerned how he thought the relation between counterparts in a techno-scientific project should unfold. African researchers know the terrain like no one else, are well-trained and well-experienced; why should they come into a project implemented in their own country to do the work of technicians? In saying this, he was not demeaning the work of technicians, but pointing to a more or less implicit common technical hierarchy that relegated African researchers to the periphery of the creative process and decision-making within projects. In short, he felt that, in this project, he was more in control of things.

Here, the question of controls straddles again the society-nature divide, for greater technical control entails greater political control. A point remarked by some of the frontliners, for instance, concerned the project's potential for empowering local researchers vis-à-vis their management, other projects or the cotton companies, or for improving the standing of technicians within the institutes. Others recognized the project's positive effect of bringing closer together the C-4 researchers, who do not always have enough resources for interacting even if they work with very similar realities. Conversely, greater technical control also requires greater political control over the conditions necessary for doing research and technology transfer. The project provided extra resources and controls that the local researchers did not always have in their daily work at the institutes, but it also required that they shared all steps in the project cycle and whatever resources they had available – upfront payments for many of the project activities, deployment of technical and non-technical labor within the institutes, provision of physical infra-structure and materials for trainings and experiments. This was for some a source of discontent, accustomed as they were to receiving resources from Northern donors; others thought that this was not only a fair deal in a South-South kind of engagement, as it was an assertion of their autonomy even on the face of limited resources. Here as elsewhere, greater room for control by the African partners had to do as much with South-South cooperation principles as with Brazilian cooperation's loose bureaucratic grip and limited resources. In other words, frontliners from the C-4 countries *had* to take a lead in project activities for them to happen at all.

Here we arrive at the vexing question of ownership in development aid, or the appropriation of projects by their recipients after the donor leaves. In the idiom deployed in the Introduction and in Chapter 1, we could ask, what are the effects of the kind of engagement emerging at the interface of Brazil-Africa cooperation on its potential for robustness? The

experience of the C-4 Project, which is likely to be somewhat particular even within Embrapa, suggests less a definite answer than directions to be explored both academically and in practice. As noted in the previous chapter, many of the African partners underscored the need to provide for, as one of them put it, a *pérennisation* (rendering perennial) of relations between themselves and Embrapa researchers. But as any other project in the world of development cooperation, the C-4 is by definition a spatially and temporally circumscribed enterprise; its discourse and practice are explicitly organized in terms of a cycle, with beginning, middle, and end. In terms of the problematic of ownership, it is almost as if cooperation projects, Northern and Southern alike, are doomed to fail by design.

But as discussed in Chapter 1, since at least Ferguson's pioneering ethnography we know that development projects are not really about "development", but about the concrete effects that they produce among recipients (and I would add, among donors themselves). Since the kind of engagement emerging here is, as I have argued in this dissertation, not of the same kind as the one analyzed by Ferguson and other anthropologists of development, its effects could be of a different kind than bureaucratization and de-politicization. As such, it may overflow its formal spatial-temporal frame to differentiate further into other, yet unpredictable kinds of relations (Strathern 2005, Venkatesan and Yarrow 2012). And as the *other* project with which this dissertation is deeply concerned – that is, itself – also comes to an end at the desk, so I hope this will be its faith as it returns to circulate in the field.

Conclusion

As I was doing the last revisions in this dissertation, I heard from one of the researchers in the C-4 Project that a Trichogramma had been finally found in Mali. The little wasp still needed to be sent to Embrapa in Brazil for proper characterization, but the project workers were certain that this was what they had been looking for since early on in the project. As recounted in Chapter 4, the senior Malian entomologist, already on his path to retirement, had put exceptional effort into finding it, including making payments out of his own pocket so that technicians would continue to make collections in the fields. Meanwhile, an apparatus for breeding this natural enemy at the massive levels required for biological pest control was being inaugurated in Sotuba along with the project's new headquarters and research facilities just as I was writing these lines, in the hope that experiments with the new species could start soon. Yet, it is unlikely that biological control will be deployed at a large scale anywhere in the foreseeable future in Mali or any other of the C-4 countries. Why, then, to invest in this modality of pest control?

When the project was being drafted, this was established as an appropriate technical solution for a problem diagnosed by preliminary project missions on a "macro" scale: in West Africa, caterpillars were developing strong resistance to the most commonly deployed chemical pesticides, and that was seriously jeopardizing cotton productivity in the region. Burkina Faso farmers had decided to tackle the problem by introducing varieties of Monsanto transgenic cotton, and others continued to spray ever-increasing dosages of pesticide; in theory, biological control is a more sustainable alternative to both. Upon closer inspection, however, this choice also turned out to stem from affinities on a more "micro" level: entomologists at the Embrapa cotton center involved in Trichogramma research were among the most enthusiastic *cooperantes* on the Brazilian side; the head project entomologist in Mali happened to be trained in biological control, an expertise that he rarely had the opportunity to put fully into practice during his regular research work. Moreover, as an ecologically sound technique, it bode well for the Brazilian diplomats' discursive aspirations to differentiate their cooperation from business-as-usual. Thus, even if there were uncertainties about the technique's potential for thriving outside of the research institutes, in the more circumscribed project assemblage it was finding fertile ground.

As the other technologies being transferred between Brazil and West Africa, therefore, this project component stemmed as much from "macro" processes at the level of international relations, cooperation policy and scientific expertise as from the practical relations that gradually unfolded between African and Brazilian natures-cultures in the multifaceted assemblage originally conjured up by diplomacy. The transit between these scales was not directed in advance by an established bureaucratic apparatus along the lines of that described for Northern aid; in fact, as this dissertation suggested, the practical enactment of South-South principles was often prompted precisely by the absence of such an apparatus. Moreover, neither were these scaling moves unidirectional, with macro-processes (identified by the anthropologist as) "causing" or "shaping" micro-practice. They were, rather, a major part of the knowledge practices that the actors themselves deployed as they made a context for, and navigated as best as they could, the emerging interface of Brazil-Africa cooperation.

In its general lines, these remarks can, I believe, be extended to Brazil's South-South cooperation at large, and perhaps also to other emerging donors. As remarked in the Introduction, "emergence" is a characteristic of many of the subjects studied by anthropologists

today (Maurer 2008). In the case of South-South cooperation, this emergence happens where new relational interfaces, some of which are unprecedented, are being formed. In this process, new conceptual and material contexts are made, analogies are tested against each other and against practice, scales are shifted back and forth, multiple domains are evoked and reshuffled. Organizational structures, diplomatic discourse, technical expertise, domestic politics and economy, global governance and trade, natural environments – as the different chapters in this dissertation sought to show, Brazil's recent reach to African countries and other parts of the global South has not been limited to the bureaucratic confines of the international development apparatus, but has involved an intensive, and at times explicit, mobilization and rearrangement of all these domains and scales.

But the picture of South-South cooperation evinced by recourse to a relational and perspectival analytics inspired in Strathern's work brought to the fore not only emergence and context-making. It also pointed to asymmetries and contradictions that are more familiar to fields such as postcolonial studies. In the account provided here, this cross-fertilization between literatures happened in two chief ways. On the one hand, the gap and contradictions between discourse and practice found in much of Brazil-Africa relations both historically and contemporarily were approached in Chapter 2 through the notion of nation-building Orientalism. Inspired by Said's original idea, this notion aims at shedding new light on the seemingly paradoxical phenomenon of "Southern donors", by foregrounding the interplay of coloniality in its double directionality: both internally and externally to post-colonial nation-states. Different from the empire-building impetus driving classic Orientalism, in its postcolonial iteration this kind of discourse is fundamentally refracted by nation-building concerns, which are themselves shaped by the historical experience of having been colonized. This double directionality of coloniality helps make sense, I believe, of the ambivalent and sometimes contradictory character of South-South cooperation.

On the other hand, insights from postcolonial critique were brought to bear on the account of empirical domains that are normally addressed by the literature on science and technology studies. The cases of knowledge and technology transfer approached here not only reaffirmed assumptions, common in the STS literature, about the co-production between technology and context. They also begged for a richer perspective on the question of agency – more precisely, the "gap" in agency perceived by both Brazilian and African actors in multiple domains, from geopolitics to organizational capabilities, from agronomic research to agricultural practice. This called for questioning anew actor-network theory's assumptions about the flatness and transparency of socio-technical assemblages. The notion of socio-technical controls, elaborated in the last chapter, aimed at providing an idiom for talking about enduring power asymmetries and the sense of in-betweenness experienced by actors all across the South-South assemblage approached here. Controls in this sense straddle the nature-culture divide, seeking to offer a more balanced analytical hinge between two literatures – STS and postcolonial studies – that do not always endeavor to take their dialogue into greater theoretical depths.

Finally, all this can, and should, be applied reflexively. As I was writing these concluding pages, one day an acquaintance asked me what anthropology was about, and how was it different from other social sciences. I took the easy avenue and answered in terms of its "particular" method, ethnography. After I explained what we were supposed to do during fieldwork – basically, "hang out" with people –, he asked, "so you don't do controlled experiments?" This question is a common one to hear from non-anthropologists, but for the first time it rang differently in my ears. As I hesitatingly replied, "no, we just observe", I thought of Ian Hacking's

reflections on which I drew here, about knowledge in science being evinced through intervention as much as representation – or, better put, representation *through* intervention. Like in the experimental field sciences analyzed here, the ethnographer produces new knowledge not through mere contemplation, but by bringing into relation in an active, controlled manner the different kinds of knowledges and agencies that she encounters both in the field and in academia. This is an insight that has been around since at least *The Gender of the Gift* and its "controlled fictions" (Strathern 1990). But these controls are also socio-technical in the sense put forth here: they have to do as much with epistemology as with power relations – relations which, in the case of a Brazilian scholar writing for a North-American audience, further intersect with the problematic of coloniality also discussed here. Finally, the "study up" character of this research effort meant that controls coming from my field interlocutors were often as much, if not more, forceful than those coming from academia. The account provided in this dissertation results therefore from a careful balance between these two kinds of demands that were, and will continue to be, made on myself and on this dissertation. In this sense, this entire research effort may be also a way of enhancing transactions between the two networks of relations that the anthropologist mediates in a privileged, sometimes even exclusive, manner: the "field" and the "desk" – indeed, of bringing closer together these two facets of the anthropological métier that have been kept separate for too long.

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