MOVEMENTS IN EDUCATION:

THE POLITICAL ECOLOGY OF EDUCATION

IN THE BRAZILIAN LANDLESS WORKERS' MOVEMENT

by

DAVID DUNCAN MEEK

(Under the Direction of J. Peter Brosius and Julie Velásquez Runk)

ABSTRACT

What are the opportunities and constraints towards advancing agroecological education within Brazil's Landless Workers' Movement? In this dissertation, I advance a theoretical framework, which I term *the political ecology of education*, to help answer this question. The political ecology of education perspective incorporates insights from the political economy of education and political ecology into a holistic perspective. I first trace the intellectual genealogy of this perspective, and the reason agrarian movements mobilize around agroecology. I then apply the political ecology of education lens to illuminate how political and economic processes mediate the interrelations between an agrarian reform settlement of the Brazilian Landless Workers' Movement (*Movimento dos Trabalhadores Rurais Sem Terra* or MST), known as the 17 de Abril, and a series of social movement and state-funded educational spaces in southeastern Pará, Brazil. I draw upon the political ecology of education perspective to answer three interrelated questions. First, *why* does the MST see agroecology as a valuable ideological and practical tool? Second, *how* do MST activists access political programs and financial resources to facilitate the evolution of agroecological education opportunities in southeastern Pará? Third, *what* are the

opportunities and constraints towards disseminating agroecological education within the MST? Specifically, *how* does the larger cultural milieu influence efforts to disseminate agroecological education? I address these questions by drawing on 17 months of multi-sited fieldwork from 2009 to 2013, during which I conducted life histories, participant observation of agricultural and movement activities, and an analysis of archival aerial photography and multi-temporal satellite imagery. My analysis of these data reveals that activist professors serve as mediators between the state and MST. These professors are able to access, through every day struggle, the political and economic resources to provide institutionalized agroecological education opportunities. By collaborating with institutionalized education, the MST is able to develop its own autonomous radical educational spaces. However, I also identified various impediments to agroecological education, including the political participation of educators, and the histories of credit and agricultural extension. I advance scholars' critical analysis of the relationships between politics, economy, ecology and education by developing a political ecology of education framework.

INDEX WORDS: Political Ecology, political economy, political ecology of education, political economy of education, Landless Workers' Movement, MST, critical place-based education, territoriality, Gramsci, politics of scale, educational politics of scale, critical pedagogy, institutional activists, place.

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DEDICATION

I dedicate this dissertation to all the landless farmers in Brazil, and the marginalized communities throughout the world, who see alternative forms of agricultural knowledge and practice as resistance to environmental degradation.

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exploring the literature that would form the backbone of the dissertation. Diane's support throughout my time at UGA has been an unquestionable foundation to which I have turned again and again. Although an external committee member, Wendy Wolford has been a pivotal force in shaping both my research and this dissertation. Wendy has challenged me throughout my work to look at what really matters. I remember visiting her at Chapel Hill, where on a walk she pushed me to think critically about what constitutes political participation. This suggestion, and many others, have structured my research design, data collection, analytical framework and writing. I am grateful to Wendy for the time and effort she has devoted to ensuring that my research and writing are rigorous.

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ground, much less been successful. Dan Baron Cohen and Manoela Souza are tireless activists in the region where I conducted my fieldwork, and were instrumental in facilitating my introduction to the 17 de Abril settlement. The ground-work they did before I arrived for my first stint of pilot research in 2009 ensured a smooth landing, and set the stage for a lifelong series of friendships. Over the years they have been intellectual and personal advisers, providing support on all matters personal and professional. I am forever indebted to their friendship, and magnanimity.

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CHAPTER 1

INTRODUCTION

From the moment the plane arrives in Marabá, the conflict of agroindustry and peasant livelihoods is apparent. Clouds of acrid smoke waft over the tarmac—a reminder of the nascent burning season. A wall-sized mural advertising Dow Chemical's newest *pacote* (package) frames the baggage claim. A hodgepodge of individuals jostle for their baggage: ranchers with leather hats, American land speculators, indigenous woman in colorful dress, the urban middle class, and *campesinos*; these individuals are the faces of conflicting visions of Amazonia.

Brazil's Landless Workers' Movement (*O Movimento dos Trablhadores Rurais Sem Terra* or MST) is an agrarian reform movement whose members use squatting to pressure the government to take unused agricultural land and create settlements. Two foci of the MST's ideology are critical education and agroecology, which is the creation of agricultural systems based in ecological principles. Billboards along the route between Maraba and my primary field site, a MST settlement known as the '17 de Abril', provide cultural signposts, showing the competing economic forces and land management practices that shape the landscape.

Upon leaving Marabá's industrial belt and heading through the *campo*, the first sign is an entrance to the railroad operated by the transnational mining giant *Vale do Rio Doce*. The railroad carries both iron ore and migrants between Brazil's Northeast and Amazonia, passing by agrarian reform encampments and settlements, small towns struggling to be cities, and small cities struggling to become regional hubs. Next, Marabá's fairgrounds come into view. It´s green metal fences are currently chained shut, but it will soon be a cultural hotspot once again, whether it is for a lasso contest or the highlight of the year, the Expoama, the region´s largest cattle fair.

Southeastern Para's roads are characterized by potholes large enough to swallow a car. As the bus slowly side-steps a pothole that stretches across the road, a sign for "Pour-on" cattle vaccinations comes into view, advertising more than 2 million doses applied in Brazil. Wearing a lab coat, the scientist in the sign holds a glass beaker in one hand, and with the other makes a sweeping gesture in the direction of the road that stands ahead of him. A giant burned Brazil nut tree (*Bertholletia excelsa*) stands alone silhouetted black against the afternoon sun several hundred meters behind the sign. Without a leaf on it, or any branches below what used to be the crown, it has the appearance of an apocalyptic tree, welcoming you to the future with its single massive branch pointing—like the scientist's arm—over the horizon.

The bus passes by the Revemar *fazenda* (ranch) that occupies twenty-five kilometers of land on either side of the highway, and boasts a eucalyptus plantation. The contrast between the evenly spaced rows of trees and the bus's forward movement creates an optical illusion where two Brazil nuts trees in the distance, one dead and one still green, appear to dance with each other.

In a momentary flash, the bus passes a dirt road signaled by a scattering of signs. One sign shows the MST flag and reads *Educação do Campo*—Our Right—The State's Obligation. A second indicates that this road leads to the Federal Institute of Para's Rural Campus of Marabá (IFPA-CRMB), where the region's agrarian reform students can attend a vocational agroecology high-school program. Passing at 60 km an hour, the signs are nothing but a blip on the highway.

The rolling grassy hills give way to an open horizon, and provide an open and airy feeling to the landscape. However, gates are symbolic of a different, and contested landscape. The bus first passes the *Cedro* ranch where behind a twenty-foot tall wooden gate sits a white tent and an armed guard. Several months ago, MST activists had encamped here and attempted to occupy the land, denouncing the environmental crimes of the ranchers, including the ranchers' purportedly 'accidental' spraying of an MST encampment with pesticides. The attempted occupation would lead to the ranchers opening fire on the MST activists. The guard now remains stationed.

Just past *Cedro* is the MST's *Helenera Resende* encampment that is spread along a hillside. It has the appearance of a planned city, even if it is comprised of huts with either thatched or black plastic roofs. On the margins of the encampment are small fields where those encamped are trying to sustain themselves with small subsistence plots. *Helenera* too has a gate and a guard, a demarcation of agrarian space and identity.

Leaving the complex territorial entanglement of *Helenera* and *Cedro*, the bus passes a highly modernized cattle farm, with hundreds of cattle grouped and feeding at a trough, and a several-thousand liter stainless steel cylinder used for milk storage. Passengers on the bus describe the ranch as a sign of 'progress,' 'mechanization,' 'technology,' 'hygiene,' and 'increased profits'. What these passengers don't mention is that the modernity of this ranch arises in contrast to the assumed backwardness of smallholder agriculture, which industry laments as undeveloped, and waiting to be transformed by the sweeping hand of progress.

The bus hits a bend in the road known locally as the S-curve bus as it nears Eldorado dos Carajás, the small city closest to the 17 de Abril settlement. A curious monument stands at the location: 19 burned Brazil nut trees have been entombed in the ground creating a circle. This is a monument to the 19 MST settlers that were killed by Brazilian paramilitary officers. The survivors from the massacre would go on to form the 17 de Abril settlement, whose name pays homage to the day of the 1996 massacre. Now, the space serves a different function, and annually serves as a 'pedagogical encampment' where MST youth gather to learn about topics not frequently taught in their municipal schools, such as agroecology.

The bus stops at a dirt road that is marked by a large wooden sign, which reads: "Welcome to the MST's 17 de Abril settlement. 17 years of resistance. Occupy, Resist, and Produce!" Looking up the hill, a hundred head of cattle are stomping their way down the dirt road. The dust from the cattle funnels up and refracts the light from the setting sun. Whether the sun itself is burning red or not is unclear as a massive fire is spreading rapidly on either side of the line of cattle, spewing up a cloud of smoke that only intensifies the sunset. The fire is traversing the edge of area of reforestation where tens of thousands of endemic trees are planted.

I use this ethnographic example as an introduction to the dissertation's overarching question: *what are the opportunities and constraints towards advancing agroecological education within the MST?* To the knowing eye, the drive from Marabá to the 17 de Abril settlement traverses a complicated landscape of political participation, agroecological education, and regionally hegemonic land management practices. The railroad transporting iron ore, the monoculture eucalyptus plantation, and the modern cattle ranch exemplify the constraints the MST faces in advancing small-scale sustainable agriculture. Yet, the highway also points to the opportunities of resistance. Some are visibly obvious, such as the MST's *Helenera Resende* encampment; others are blips in time, like the MST's occupation of the *Cedro* ranch. The MST's occupation of space is tied to that of knowledge: the Rural Campus of Marabá and the pedagogical encampment are spaces where sustainable agricultural knowledge is being produced and disseminated. The tension between these competing landscapes highlights how culture, politics, and land management traditions are both *opportunities* and *constraints* to agroecological education's potential as an emancipatory force. In seeking to understand these opportunities and constraints, I posit the following questions about how politics, economics, culture, and education overlap within the educational spaces interconnected with the MST's 17 de Abril settlement in southeastern Pará:

> **Question 1:** The MST is a vocal advocate of agroecology. However, agroecology is defined in myriad ways, and valued for different reasons, by ecologists, development practitioners, and grassroots movements (Wezel et al. 2009). I ask *why* does the MST see agroecology as a valuable ideological and practical tool?
>
> **Question 2:** It is widely acknowledged that education is, at its core, both about politics *and* economics (Torres and Schugurensky 2002; Apple and Aasen 2003). I argue that understanding the evolution of agroecological learning opportunities requires an analysis of the linkages between power, resistance, ideology, educational policy, and economics. I explore *how* do MST activists access political programs and financial resources to facilitate the evolution of agroecological education opportunities in southeastern Pará?

Question 3: For the MST to be successful in its objectives of using education as a transformative tool, learning cannot solely occur among the select students who participate in MST courses. Knowledge must, rather, be disseminated through the wider movement. In seeking to understand the larger landscape of agroecological education within the MST, I question *what* are the opportunities and constraints towards disseminating agroecological education within the MST? Specifically, *how* does the larger cultural milieu influence efforts to disseminate agroecological education?

Theoretical Framing

> On a stifling day in April 2012, the shade of a mango tree provides a brief respite from the heat for 15 members of Brazil's Landless Workers' Movement who are sitting in a circle actively engaged in debate. This discussion group in southeastern Pará state is part of a ten-day workshop for MST members ranging from ten to forty years old, known as a "pedagogical encampment". 400 MST members are participating in this year's annual memorial pedagogical encampment. This encampment memorializes the events of April 17th 1996 when Brazilian military police massacred 19 members of the MST at this location on Amazonia's rural BR-154.[1] The survivors of this massacre became the first inhabitants of the 17 de Abril agrarian reform settlement, which is my primary field site.
>
> These students are learning about topics not discussed in their schools, such as agroecology. Maria, a 12-year old girl interjects in the discussion, connecting various points. "The Landless are tearing down the forest, just like the large landowners, they're applying pesticides; the Landless are doing the things that the Landless fight against. If we use pesticides, which we're buying from industrial agribusiness, we're participating in agribusiness, right?" "That's right," an MST state leader says approvingly, "Excellent job".

This ethnographic example highlights how agroecological education within the MST encourages students, such as Maria, to critically reflect on the contradictions between political ideology and the reality of agricultural land use. I use this ethnographic example to introduce the dissertation's theoretical framework, which is a synthesis of theoretical principles of political ecology and critical education.[2]

[1] Later in this chapter, I will discuss in greater detail the history and larger significance of this massacre, known as the massacre of Eldorado dos Carajás.
[2] Chapters 2 is devoted to expanding this theoretical framework.

Political ecology explores the relationships between environmental change and political, economic, and social processes (Bryant 1992; Greenberg and Park 1994; Robbins 2004). Political ecology can be contrasted with classic ecology, which apolitically explores relationships between organisms and their surroundings (Biersack and Greenberg 2006). Maria's reflections are at the intersection of four themes within political ecology: environmental degradation and marginalization, environmental identity and social movements, the politics of environmental knowledge, and the importance of scale (Zimmerer and Basset 2003; Robbins 2004).

The environmental degradation and marginalization thesis holds that state development interventions and increasing integration into regional and global markets are responsible for the transition from sustainable resource management to overexploitation of natural resources (Robbins 2004: 131). The Brazilian Amazon has been one site of extensive research within this vein. Early political ecology research on Amazonia focused on how what are seemingly local processes, namely the conversion of forest into pasture for cattle, are in reality linked to political and economic incentives at regional, national, and international scales. Employing a materialist analysis, Schmink and Wood's (1987, 1992) work explored how market expansion resulted in increasing class stratification, and that the deforestation was due not to individual loggers, but rather the contest between politically and economically powerful groups. Hecht and Cockburn (1989) looked, by contrast, at how the concomitant deforestation and economic development of Amazônia were the result of the Brazilian government's geopolitical strategy to control the Amazon region and its populace by creating regional road networks and colonization projects. Political ecology research that focuses on degradation and marginalization shows that land degradation is frequently not the fault of marginalized groups, but rather the result of larger political and economic processes (Bailey and Bryant 1997; Watts and Peet 2004; Collins 2008).

Maria's critical reflections on MST settlement inhabitants' land use practices at first glance seems at odds with political ecology scholarship on environmental degradation and marginalization; after all, Maria's point is that "the Landless are doing the things that the Landless fight against," such as using pesticides. However, this strand of political ecology scholarship actually provides a lens for understanding Maria's ruminations: while the blame does rest in part on individual MST inhabitants, their actions are better understood by analyzing how processes of agricultural modernization mold peasants' conceptions of appropriate agriculture (Stonich 1993).[3]

My analysis of the MST's agroecological education is also informed by political ecology's focus on environmental identity and social movements. A simplified version of this thesis is that that inequitable processes of environmental change create social grievances, and that groups construct their identities in opposition to these grievances, and politically mobilize to transform them (Robbins 2004: 189). These movements are novel because their common grievance is environmental change, and they are comprised of groups otherwise separated by class, race, and gender. Scholarship in this vein explores the unequal distribution of environmental risks, modes of peasant resistance, and the intersection of post-colonialism and ecology at the margins of society (Escobar 1998; McCarthy 2002; Peet and Watts 2004). Political ecologists have explored a range of broadly-defined environmental social movements—from the Zapatistas to the Chipko—noting how the performance of environmental identity is key to mobilizing around environmental and social justice (Moore 1996; Bebbington and Perreault 1999; Perreault 2003; Escobar, 2006; Gleeson and Low 2012). Delgado and Rommetveit (2012),

[3] In Chapter 4, I explore how agricultural modernization shapes the education of agricultural extension agents, the policies that govern their practices, and the ways their projects mold peasant agriculture into a pre-conceived vision of development.

for example, explore how the Brazilian Landless Workers' Movement (MST) has appropriated scientific ideas about agroecology, and reconstituted itself as an imagined community (see also Wolford 2003). Their analysis shows how the MST tactically uses these imaginaries of nature in order to achieve its objectives of agrarian reform (see also Rosset and Martinez-Torres 2012). Political ecology's focus on environmental identity and social movements sheds light on agroecological education within the MST. In the above ethnographic example, Maria is conflicted about the role of agroecology in her identity as an MST activist. She knows MST farmers aren't *supposed* to use pesticides, but many do so anyway. Maria's reflections on what constitutes *good* MST agriculture, namely following the MST's call to avoid using pesticides, highlights the important linkages between environmental identity, social movements, and education.[4]

Political ecology's focus on environmental knowledge also provides clarity on the role of agroecological education in the MST. To summarize, this strand of political ecology focuses attention on how differences between informal and formal knowledge systems both affects how certain accounts of "nature" and environmental processes become dominant, and creates the conditions for external interventions. Slater, for example, shows how Edenic narratives of Amazonia as pristine "nature" are idealized social constructions that obscure the heterogeneous histories and place-making practices of the people that have actively constructed the "pristine" rainforest (1995). Political ecologists have also explored the construction of environmental knowledge claims from the opposite perspective, showing how crisis representations create environmental "problems" where none exist in order to facilitate development interventions

[4] In Chapter 6, I discuss how a critical pedagogy of place provides opportunities for reflecting on the relations between environmental identity and land use, as part of a larger social movement strategy towards transformative social change.

(Jeanrenaud 2002). In addition to these analyses of "expert" environmental knowledge, political ecologists have also analyzed local environmental knowledge, and the place of these knowledge systems in political and economic contests over resources, such as in the case of bioprospecting (Brush and Stabinsky 1996; Bryant 1998; Jansen 1998). One strand of this scholarship particularly relevant to the present project explores how "ideas and narratives about nature and society are mobilized in environmental struggle (Robbins 2004: 116)". The case of agroecological knowledge in the MST is particularly fertile for such a political ecology analysis, as agroecology is increasingly defined simultaneously as a science, a movement, and a set of practices (Wezel et al. 2009). The MST's agroecological education programs embrace the complicated politics of environmental knowledge, because they are based around the synthesis of scientific and peasant knowledge systems.

The fourth focus of political ecology that informs this dissertation is the importance of scale. Since Blaikie's hierarchical and discrete description of scale as rural, local, regional, national, and international, political ecologists have developed more nuanced understandings of scale as not ontologically given, but rather socially-produced. As Zimmerer and Basset argue, attention to scale highlights how "environmental processes interact with social processes, creating different scales of mutual relations that produce distinctive political ecologies" (3). Scale is integral to many political ecology analyses because it illuminates how particular landscapes are produced by national and international policies (Zimmerer 2000; Swyngedouw and Heynen 2003; Walker 2003; Vasquez-Leon and Liverman 2004; Gezon 2005; Velásquez-Runk et al. 2010). Other political ecologists have fruitfully engaged with scale by exploring how place-based struggles internationalize globally prominent discourses of environmentalism (Escobar 2001; Paulson and Gezon 2005; Jewitt 2008; Karriem 2009). In Chapter 6, I argue that

attention to scale is integral to understanding how MST's agroecological education programs help students develop critical conceptions of place, and their role in the creation of emerging alternative forms of land management.

While these four themes in political ecology certainly can be used to illuminate aspects of the MST's agroecological education initiatives, they fail to provide a holistic analytical framework. I find traditional political ecology lacking for the present project, because political ecologists have not explored *education* in a direct and sustained fashion. I address this absence by developing a theoretical framework for the political ecology of education. This perspective combines theoretical perspectives from traditional political ecology with those of critical education, agricultural extension education, and the political economy of education literature. In Chapter 2, I review these literatures, and synthesize their interdisciplinary lenses into a working definition of the political ecology of education.

The Brazilian Landless Workers' Movement

> As the school bus, filled with students from the 17 de Abril settlement, reaches the S-curve it is stopped by an MST road blockade. We have reached the annual pedagogical encampment. Stepping out of the bus, the energy is more than palpable; it's audible. People are singing and the combination of a tambourine and drum set a rhythmic beat. Students stream across the highway from the encampment's black-tarp dormitory. A large white event tent serves as the central classroom. It is decorated with a motley assortment of solidarity flags, including from Palestine, Cuba, and Venezuela. Next to the tent stands the ring of burned Brazil nut trees, which mark the spot of the massacre.
>
> In the tent, a workshop on agroecology is take place. A speaker tells the several hundred MST students that 'Southern Para is a frontier, but not only in the normal sense, but in the context of a frontier in the struggle between agroindustry, the region's mines, and agrarian reform social movements. The frontier is a contest between exploitative industries and agroecology. Agroecology is a structural question. Creating change means creating debate, but it's not an easy debate to initiate, because it requires transforming the dominant agriculture model. We need rural education to become synonymous with agroecology. We need to advance the

discussion of agroecology in the schools if we want it to take holds.'

I use this vignette In the MST, education is as much about political trainging as it is about agroecology and history, the three frequently are fused, but it is important to remember and look at the intense political education that education in the MST forms

Both land and education have historically been concentrated in the hands of Brazil's ruling class. Brazil has one of the highest concentrations of property ownership in the world, with a Gini coefficient of land distribution at 0.872 (IBGE 2006). While this level of inequity stems from colonial land grants and 19th century land laws (Hall 1990), contemporary neoliberal agroindustrial policies and development projects have perpetuated it (Hecht 1993; Green 2000; Wolford 2005). Similar to the historically inequitable distribution of land is the geographic disparity in education provision, which is a function of a homogenous national policy. During the 1930s, an intellectual bloc known as the *Escolanovistas* (New Schoolers) critiqued the dominant Catholic system of education and proposed the state provide free and public education for all citizens (Tarlau 2013). However, this orientation explicitly sought to prepare students for the needs of urban middle-class society (Bourdieu and Passeron 1977). In addition to an educational policy that was more attuned to urban than rural realities, the political economy of education financing in Brazil has been directed towards supporting urban centers. This dynamic is particularly evident in intra-regional analyses of education financing, as rural municipalities in the countries' impoverished north and northeast historically received a sixth of the resources as those in the urban south (Gadotti 1992). The Brazilian ruling class has governed both land and education towards a dual set of aims: maintaining a consolidated agrarian structure, and an educational system that explicitly valorizes urban areas. These objectives are interrelated, because they preserve agroindustrial capitalism while shifting the peasantry to urban areas where

they will not be a threat, and will increase the need for agricultural products. However, there have long been fractures in this larger project.

Agrarian reform emerged as a major political issue in Brazil during the late 1950s and early 1960s (Cehelsky 1979).[5] Although grassroots movements began to mobilize for land reform in the early 1960s, the rising tide of activism was quashed in 1964, when the military coup obliterated any visible manifestations of activism (Ondetti 2008). Conditions began to change in the late 1970s and early 1980s that facilitated social mobilization. A political opportunity for political participation among civil society arose as the Brazilian dictatorship began to fail (Tarrow 1998). Additionally, various organizations, particularly those involved with the Catholic Church, provided institutional support for these landless peasants to begin organizing themselves (McCarthy and Zald 1977; Jenkins 1983). When combined with a social grievance of need for land, these factors constitute what Wolford terms the "genesis story" of the Landless Workers' Movement (MST) (Wolford 2003).[6]

The MST is comprised of marginalized peasants who became politically mobilized out of a desire for agricultural land. MST members seek to attain land by first identifying unused agricultural land, and then pressuring the government to expropriate it by squatting and forming

[5] The phrases *agrarian reform* and *land reform* are often used interchangeably, although they have different meanings. Cousins (2007: 17) describes the distinction as "Land reform… is concerned with rights in land, and their character, strength and distribution, while… [agrarian reform] focuses not only on these but also a broader set of issues: the class character of the relations of production and distribution in farming and related enterprises, and how these connect to the wider class structure. It is thus concerned economic and political power and the relations between them" in Ruth Hall and Lungisile Ntsebeza, eds., *The Land Question in South Africa: The Challenge of Transformation and Redistribution*, HSRC Press, Cape Town, South Africa.

[6] Although this "genesis story" explains many macro-level processes, Wolford (2003) argues it is not attuned to the complex politics of place, and does not account for important questions, such as who joined the movement, and what were their motivations. Through multi-sited ethnographic research in the countries' south and northeast, Wolford (2004) found that rationales for resistance were grounded in "spatial imaginaries", or particular understandings of space, such as notions of private property, which shape social life.

encampments (Wolford 2010). If these MST members are successful, the Institute of Colonization and Agrarian Reform (*Instituto de Colonização e Reforma Agrária* or INCRA), will create an agrarian reform settlement.[7] This tactic of squatting has historically worked fairly well for the MST's members, as the Brazilian constitution states that land must have a social value. Since its genesis in the early 1980s in southern Brazil, the movement has spread throughout the country, and is currently the largest agrarian reform movement in Brazil (Branford and Rocha 2002).[8]

Although the MST originated in the early 1980s, it was in the 1990s that it began to "green" itself by beginning to debate agroecology as a political and practical set of strategies. According to Rosset and Martinez Torres (2012), this greening was tactical. The MST had historically pressured the Brazilian government to expropriate land for peasant use, based on the argument that the lands were being "unused." However, increasing transnational investment in Brazilian agriculture in the 1990s resulted in a large percentage of Brazil's idle land being converted to agrofuel monocrop plantations (Novo et al. 2010; McMichael 2010). The MST, in turn, reframed their argument "by contrasting the ecological and social wasteland of agribusiness plantations ("green deserts") with a pastoral vision of agroecologically farmed peasant lands, conserving biodiversity, keeping families in the countryside, and producing healthy food for local markets ("food sovereignty") (Rosset and Martinez-Torres 2012: 6). Agroecology's importance continued to grow within the MST throughout the 1990s, as MST groups across the country debated how it could be used to advance food sovereignty and serve as a strategy of resistance to the agroindustrial model. At the MST's 2005 national congress, 11,000 members

[7] INCRA is the entity responsible for the official designation of agrarian reform settlements.
[8] For more comprehensive analyses of the MSTs origination and development see book length manuscripts by Branford and Rocha (2002), Wright and Wolford (2003), Ondetti (2008), and Wolford (2010).

formally ratified agroecology as the movement's foundation for small-scale farming (Altieri and Toledo 2011). Since then, the MST has worked to promote agroecology among its members by creating 12 agroecological schools throughout the country.

The MST has long prioritized education for ideological and practical reasons. Ideologically, the MST sees education as the responsibility of the state. As part of the movement's struggle for larger agrarian reform, it pressures the state to fulfill its obligations by providing services for all of its citizens. Caldart (2002) identifies three reasons why the MST advocates education as a practical means towards social transformation. First, education helps landless families recover dignity and a sense of purpose. Second, education enables the construction of a collective movement identity. Third, the MST uses education to train its activists in the political ideals and agroecological practices of the movement.

The MST's approach to education is significantly informed by Brazilian pedagogue Paulo Freire's critical pedagogy (1973). Two Freirean principles that ground the MST's pedagogy are conscientization and praxis. Conscientization refers to learning to perceive social, economic, and political contradictions, and to take action against that oppression. Praxis is the action and reflection on the world in order to change it. One way the MST emphasizes the links between conscientization and praxis is that school curricula should arise organically out of, and deal explicitly with, the problems that students identify in their settlements.

The MST has a complicated relationship with the state in terms of education provision. Although the MST sees education as the responsibility of the state, it believes that education within settlements should incorporate the movement's ideals and principles. At the site of a land occupation, known as an encampment, MST members will frequently build a temporary school as one of the first structures. These early schools are important locations for movement

organizing, and frequently are sites where MST-oriented pedagogy is quite strong. If the movement is successful in pressuring the government to create a settlement, education will begin to become more formalized as the state creates a municipal school. The pedagogical presence of the movement began to dissipate within many of settlements' schools over time. The reasons for this are varied. Sometimes educators' decreasing political participation results in their reluctance to include MST pedagogical methods and subjects within their classes. The question of educator's participation is potentially thorny, as teachers in the MST's schools will frequently be from other areas, and not necessarily as attuned to the MST ideals. Another reason complicating the MST's presence in the school is the inclusion of state curricula that are not attuned to rural realities.

The MST addresses this lack of culturally relevant curricula through its vocal position in an umbrella movement for education reform known as *Educação do Campo.*[9] The *Educação do Campo* movement is a movement of movements, "defined by its demands for quality and free education from infancy through university, and the construction of a distinctly rural school that is guided by a vision of rural development, which is based in social justice, agricultural cooperation, environmental respect, and the valuing of rural culture (Munarim 2008: 61)". It is comprised of the MST, the Movement of those Affected by Dams (MAB), Movement of Rural Women (MMC), Movement of Small Farmers (MPA), syndicates linked to the Confederation of Agricultural Workers (CONTAG), as well various local and regional level NGOs.

[9] *Educação do Campo* can be summarily defined as rural education. However, this definition obscures the original significance in Portuguese. The phrase *Educação do Campo* carries the significance of education that originates from and is relevant to rural areas. Throughout this dissertation, the original Portuguese phrase *Educação do Campo* is used to maintain this connotation.

The *Educação do Campo* movement is a major force in shaping rural education opportunities for agrarian reform settlement inhabitants. The *Educação do Campo* movement began in July of 1997, when educators and leaders from these movements converged in the capital of Brasília for the First National Conference of Agrarian Reform Educators (ENERA). As Breitenbach (2011) describes this history, the 1st ENERA conference precipitated other convergences, and through these gatherings, a consolidated movement arose. The consolidation of this movement has helped create a new emphasis within Brazilian educational policy and pedagogy towards locally relevant rural education as opposed to homogenous national programs that do not attend to local diversity in geography, culture, and history (Munarim 2008; Comilo and Brandão 2010; Breitenbach 2011). One way the *Educação do Campo* movement has advanced locally relevant education is by helping to create the National Program for Agrarian Reform Education (*O Programa Nacional de Educação na Reforma Agrária* or PRONERA) (Araujo 2004).

PRONERA, which was launched in 1998, offers funding for institutional partnerships between agrarian social movements and educational organizations (Molina 2003). PRONERA provides financial support for the education of movement members at levels ranging from basic literacy to graduate studies. In the last decade, PRONERA has enabled thousands of rural youth and adults to attain basic literacy training, high-school diplomas, university degrees and professional certificates in a wide range of subjects—from law to geography to medicine to agroecology (Molina 2003; Araujo 2004; da Silva et al 2011). I pay particularly close attention to PRONERA throughout this dissertation as an example of how political economy mediates educational opportunities, environmental knowledge, and relations to place.

The ethnographic example of CEFAC and the following brief introduction to the MST have illustrated how agrarian reform and agroecological education are intricately connected. This

linkage makes sense, because the MST is not exclusively engaged in "battle over land per se, but also very much of a battle over ideas" (Rosset and Martinez-Torres 2012: 395). Exploring agroecological education within the MST provides a fertile arena for analyzing how struggles over how, education, economics, and ecological ideals and practices come together. Perhaps nowhere in Brazil is the contest over these interrelated ideological and physical resources as vaulted as in Amazonia (Campos and Nepstad 2006; Fearnside 2008).

Regional Context

> My research assistant and I see the cloud of dust snaking towards us long before we see its source. Hardly a novelty, I think, given the recent cessation of the rains and the omnipresent dust that emanates from the dirt roads. As the dust cloud crests the hill, however, we stop in our tracks.
>
> Entering the village on a badly rutted dirt road is a double-decker luxury long distance bus. Of the air-conditioned and cushy sort one might enter for a multi-day cross-country trip. My research assistant has lived here for the last 17 years, since the agrarian reform settlement was created. I ask whether he´s ever seen a luxury bus here, in an MST settlement. ´Not until recently´, the words exit his mouth as if it were acid.
>
> This bus´s side is marked with only two words, *Vale Amazonia.* As it coasts to a stop at our feet the cloud of dust trailing it engulfs us. The door of the bus slides down, and with it mixes the refrigerated and rarefied air of the bus with the chalky and red dusty air that typifies rural Amazonia. Exiting from this surreal mixture in front of the political headquarters of the settlement is an even more bizarre sight: 10-15 workers, small day bags in hand, uniforms on. They disperse as if parrots at daybreak, and their bus turns around and beats its way back against the rutted road.
>
> "We´re losing all our militants to *Vale*. Clesio was chosen to participate in the MST's agronomy program, but is apparently going to work for *Vale* instead. Maneu is already gone". My research assistant says this with a mix of resignation and defeat. *Vale do Rio Doce* is one of the largest mineral extraction corporations involved in the environmental devastation of Amazonia. It operates the Carajás iron ore mine, which is the largest in the world. It is in many ways the face of the new ´enemy.´ Times have changed since MST mobilized in the early 1980s against the solitary landowner who was a readily identifiable and opposable force. What was once an easily recognizable target has become diffuse and unassailable:

> multinational corporations, assisted in various ways by international development banks, and with a system of production and capital so integrated with the state that occupying it is impossible.
>
> That members of this settlement are *even* working at *Vale*, as it is known here, much less that *so many* are doing so that the company is sending a luxury bus to bring them to work from two hours away is a contradiction that epitomizes the forces pulling at the settlement and its' members. Whatever life after settlement was envisioned to be, it was almost certainly not this: going to work for the personification of the force that one lost comrades struggling against.

This vignette serves as an introduction to the complicated everyday politics of my field site. Clesio, is an active MST member, and as a result of his active political participation was nominated to participate in the MST´s agronomy program. However, Clesio wasn't able to participate in the agronomy program due to economic necessity: the dearth of jobs in the community forced him to make a difficult choice to work for the large-scale mining corporation whose train tracks he himself had occupied for over a month only two years before. To better understand this complex scene, and the paradoxical migration of agrarian reform settlement inhabitants to serve as day laborers in the world's largest iron ore mine, I now illustrate the dynamic historical, economic, and political forces shaping Amazônia. I use this discussion of regional history to introduce this dissertation's primary field site, which is the 17 de Abril settlement, and three separate educational spaces in which I collected data. The origination and evolution of these four sites, and their interconnections, are inextricable from the regional histories of frontier expansion, deforestation, land violence, and resistance.

Although geography and its formative processes are never static, it is noteworthy that over the last forty years southeastern Pará has been defined by particularly extensive and intensive interrelated waves of political, economic, ecological, and educational change (Foweraker 1981; Hecht and Cockburn 1989; Schmink and Wood 1991; Neuburger 2000; Brown and Purcell 2005). One factor that fomented these processes was a major drought in the

Northeast of Brazil during the late 1960s, which proved a turning point for Amazonian development policies (Mahar 1979). Brazilian President Medici visited the Northeast's drought-affected areas, proclaiming that the country would 'take a people without land to a land without people,' a declaration that led to the first National Integration Plan (*Plano de Integração National*, or PIN).[10] The PIN sought to develop, exploit, and settle the Amazonian region, which the government felt was retarding the country's development (Lisansky 1990: 9). Two principle aspects of this plan were the commencement of a large-scale road network across Amazônia, starting with the Transamazônica Highway, and a large-scale colonization plan. The government intended to resettle thousands of Northeastern landless farmers on either side of the highway through these two projects (Moran 1981, 1989). To facilitate this plan, and the fundamental shift in public policy towards colonization, the Brazilian Institute for Agrarian Reform, the agency responsible for the colonization schemes, was renamed the Institute of Colonization and Agrarian Reform (*Instituto de Colonização e Reforma Agrária* or INCRA). Colonization was an attempt by the government to circumvent the land problem, moving the landless to Amazônia and leaving larger property structures intact (Almeida 1992). These 1970s colonization projects exemplify the form of agrarian reform known as *state-led agrarian reform* (SLAR) because they originated with the state (Borras 2003; Pacheco 2009).[11]

The MST was a latecomer to agrarian reform in Amazônia. Whereas SLAR has already been occurring since the 1970s in Amazônia, it was not until the early-1990s that the MST began

[10] Cultural geographers and archaeologists have shown that Brazilian Amazônia was not a land without people, but rather characterized by complex interconnected civilizations (Meggers 1971; Heckenberger 2003, 2006; Denevan 2006).

[11] As indicated previously, discontent with the pace and scope of SLAR, rural social movements began mobilizing throughout Brazil in the 1980s, and began to actively squat land they perceived was unused in order to pressure the government to expropriate it. This tactic is known in the literature as direct-action land reform, and is used extensively by agrarian social movements such as the MST (Simmons 2005; Simmons et al. 2007).

mobilizing in the state of Pará. One reason for this delay was that the MST wanted the government to conduct agrarian reform throughout the country, not simply using Amazônia as a sink for migration (Wright and Wolford 2003). However, the MST began mobilizing in southern Pará in the early 1990s in part because of the widespread social grievance of marginalized mine workers (Bastos 2002; Silva 2003; Rocha 2010).

The early 1980s were a boom period in southeastern Pará. The Carajás mine, which is currently the largest iron ore mine in the world, had recently been opened by the *Companhia Vale do Rio Doce*, and migrants flocked from Brazil's northeast to work in it. Unsurprisingly, labor conditions of the mine were difficult at best, and many *garimperos* (miners), left the mine and remained in the nearby frontier cities of Curionópolis and Paraupebas. Nearly all of the original inhabitants of the agrarian reform settlement where I conducted my research were originally from Brazil's northeast (principally from the state of Maranhão) and had come to work in the mine. These MST members all described the abhorrent working conditions as reasons for leaving the mine and temporarily settling in nearby urban centers.

During the early 1990s, the Landless Workers Movement (MST) began to organize these *garimperos* and other marginalized workers. Many interviewees recounted a nearly identical story of entering the movement: they remember MST activists driving a car with giant speakers around these frontier cities, broadcasting announcements that the poor should occupy unused land, saying that doing so was their right. After signing a ledger and entering the movement, they set up an encampment on the outskirts of Curionópolis. The MST made a petition to INCRA that the Fazenda Maxaceira in the municipality of Eldorado dos Carajás as an unproductive *fazenda* (farm) that should be expropriated, and created as a settlement for those encamped in Curionópolis. INCRA, however, disagreed that Fazenda Maxaceira was unproductive, and

offered to settle the MST members in a settlement project in Tucuruí. MST members were discontented with this offer, and on April 10th 2000 MST members began to march to the state capital of Belem in protest (685 kilometers). On April 16th, the group reached Eldorado dos Carajás and blockaded highway BR-154 in protest at a location known locally as the "S-curve." A spokesperson from INCRA reached a deal that day with these MST members where they would re-open the highway in exchange for transportation to Marabá, where they could discuss their demands with INCRA's superintendent. However, on the next day (April 17th) the MST learned that INCRA had no intention of providing transportation or engaging in dialogue, and so the MST re-occupied the highway. Several hours later, two battalions of military police arrived, surrounding the roadblock from both the direction of Paraupebas and Marabá. Although the exact events that transpired remain disputed, it is clear that the military police opened fire and killed 19 MST members.[12,13, 14]

The massacre of Eldorado do Carajás can be understood as part of a larger pattern of land violence that has come to characterize Amazônia. In Brazil, between 1980 and 2003, a total of 1671 rural landless activists were murdered during land conflicts (Simmons 2005). More than half of these murders occurred in Amazônia, and the overwhelming majority of these in southeastern Pará (Simmons 2005: 308). This Amazonian "land war" is not just a late 20th

[12] Many place the total at 21, but the bodies of two individuals were not accounted for at the morgue, and have never been recovered.
[13] For an academic account of the event in the context of larger regional land violence see Simmons (2005); a book-length manuscript (in Portuguese) is O massacre. Eldorado do Carajas: uma historia de impunidade. Nepomuceno, E. 2007. Planeta.
[14] This massacre, known as the Eldorado dos Carajás massacre, holds a similar place in Brazil's national consciousness to the Newtown or Columbine school shootings. Throughout my research in Brazil, if someone were to ask where I was working, upon informing them that I was working with the community that had survived the Eldorado dos Carajás massacre they would instantly know not only the geographic location in rural Amazonia, but the larger historical context in which the community originated.

century phenomena, but can be understood as a regional place-based process with historical antecedents in the War of Canudos (1821), Ronco de Abelha rebellion (1851), Quebra-Quilos rebellion (1874), Contestado rebellion (1912) and various other land-based conflicts (Simmons 2004). Seen through the lens of resource abundance, these conflicts characterize the region because of a persistent tension between resource abundance and scarcity. The abundance of natural resources, such as rubber and Brazil nuts, fomented rapid settlement. Additionally, the perceived abundance of land in the Amazon in comparison with the concentration of land in other parts of Brazil provided the incentive for a largely landless population to migrate to Amazonia. However, due to inequitable patterns of land ownership in the Amazon, land is in reality not abundant, but actually scarce because powerful groups hold the land, frequently relying upon fraudulent land titles (Fearnside 2001). From a political ecology perspective, the Amazonian land war is a place-specific process that is at once grounded in conflicting local histories of resource use, but also tied to larger-scale processes of land concentration and material transformation that are mediated by political and economic power (Peluso and Watts 2001). In addition to its multi-scalar causes, the Eldorado dos Carajás massacre also affected agrarian reform and education at various scales.

The massacre had two direct effects on the survivors, aside from the persistent psychological scarring. The first was the government's expropriation of the Fazenda Macaxeira complex, approximately 10 miles from the site of the massacre, and its rapid creation of the 17 de Abril agrarian reform settlement. The name of this settlement commemorates the day of the massacre. This settlement is my primary field site, and is 189 sq. km. in size, consisting of 690 families (Fig 1).

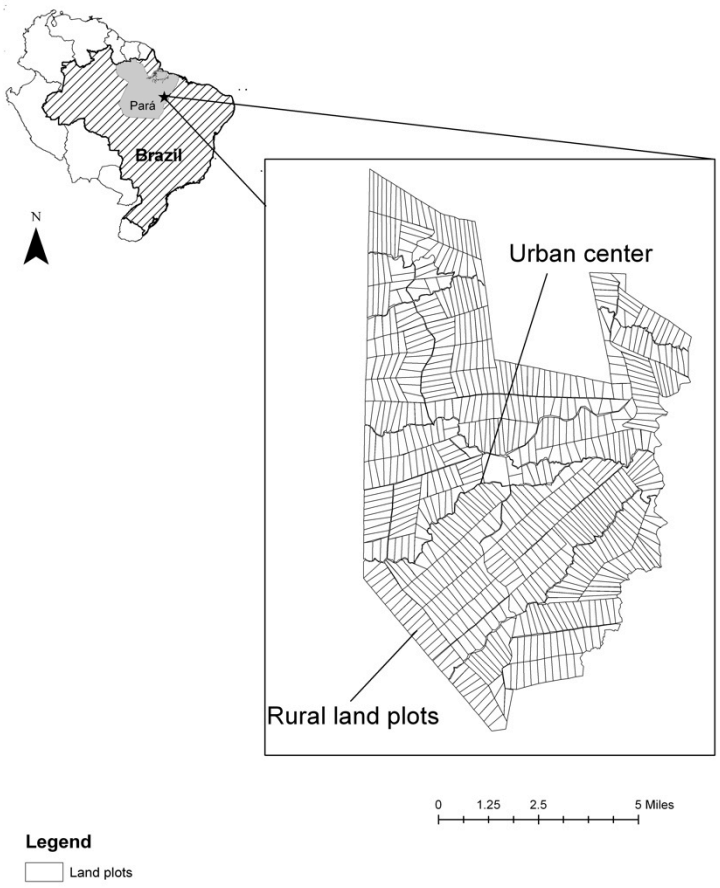

Figure 1: Map illustrating 17 de Abril settlement location and land plots

Description of Primary Field Site

The history of landscape of the settlement, much like that of its inhabitants, is tumultuous. In 1996, when INCRA conducted a survey of the land to determine its productivity, their technicians described the ecology of the landscape as an open, sub-montane, broad leaf rainforest, containing lianas in low-lying areas, a diversity of palm species, and an upper canopy

dominated by Brazil nut (*Bertholletia excelsa*) (INCRA 1996).[15] Prior to being expropriated by INCRA, this land area consisted of five farms, whose names were *Mucuripe, Ponta Grossa, Eldorado, Grota verde,* and *Macaxeira.* These five farms comprised the *Fazenda Macaxeira* complex. My analysis of archival aerial photography illustrates that by the late 1960s, the area of this complex was a frontier as its land owners had begun converting the primary forest into cattle pasture (Fig 2).

[15] As Balée (1989) indicates, stands of Brazil nut trees are an exemplar of long-term indigenous management; this is unsurprising given the contemporary proximity of indigenous territories (largely Kayapó), and the presence of indigenous artifacts, such as arrowheads, that have been found in the present-day settlement.

Figure 2: Map displaying late 1960s extent of cleared land in area of 17 de Abril settlement

The 17 de Abril settlement that was created in the area of the Fazenda Macaxeira complex has an urban center and is surrounded by a rural periphery of agricultural land. Following the massacre, each original settlement inhabitants received a small plot of land in the

urban center, and a larger plot in periphery region for agriculture (approximately 25 hectares) (Fig. 1).[16]

The 17 de Abril settlement in many ways reflects larger regional trends in terms of demographics. Most respondents to a survey I conducted indicated that they were born in one of Brazil's Northeast states, most commonly from Maranhao state (43.8%) (Fig 3). [17, 18,19] These inhabitant's common origination in Brazil's Northeast is unsurprising given the Brazilian governments push to colonize the Amazon with drought-stricken Northeastern migrants.

[16] Since the allocation of land there has been extensive (illegal) transfer of land. Many settlers have sold their rural land plots to other inhabitants. Ironically, and lamentably according to many of my informants, within the last 17 years there has also been a process of reconcentration of land, as exemplified by individuals' who own between 10-15 land plots.
[17] Throughout Chapter 1 the data presented in pie charts are from INCRA's 2005 survey, and those presented in text and in tables are from my 2013 survey.
[18] In the methods section of this chapter I provide information on this survey's design, testing, data collection, and analysis.
[19] The high number of survey respondents from Para state is due to the fact that these individuals are >20 years old and were born just prior to the encampment.

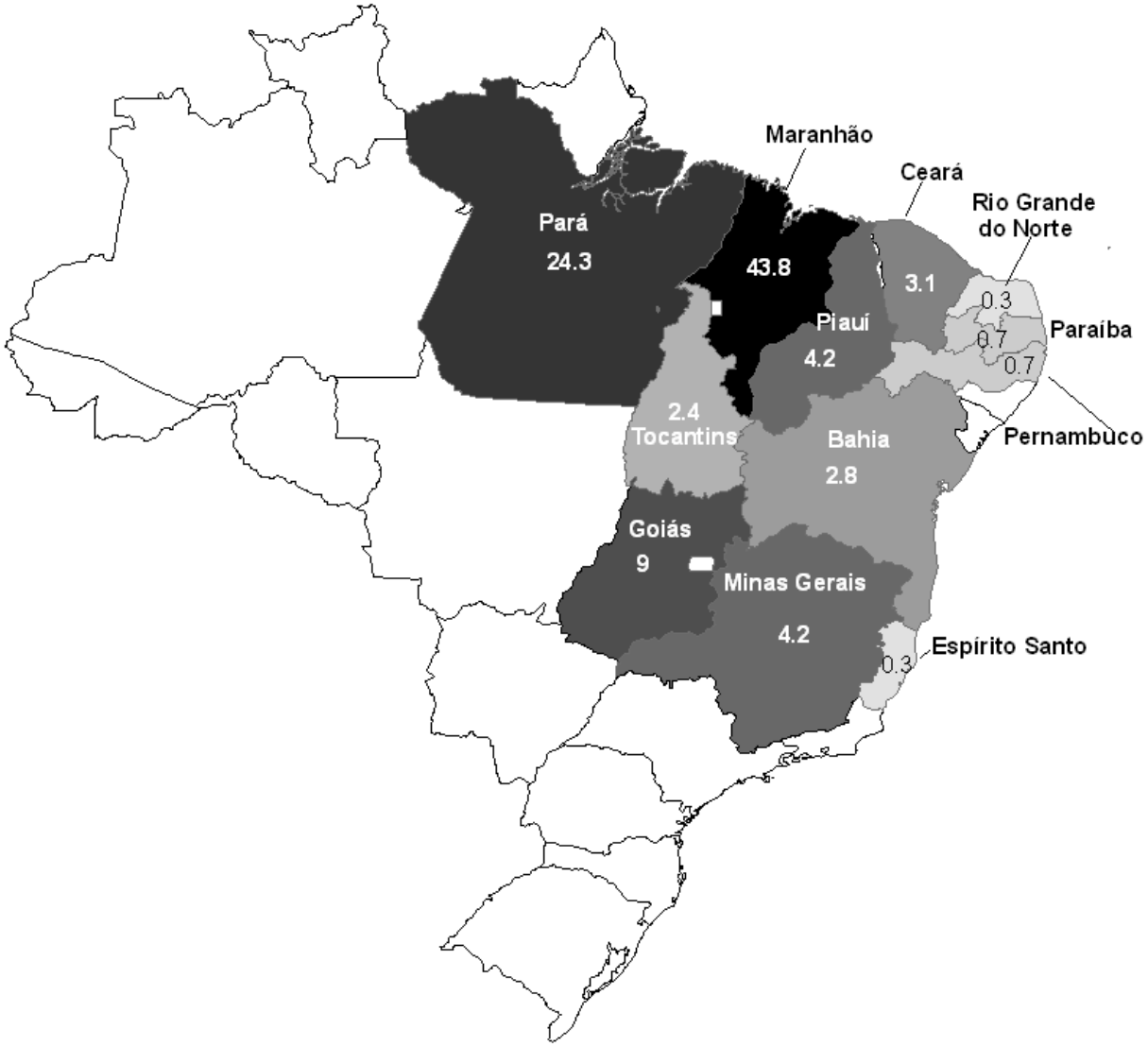

Figure 3: Percentage of survey respondents born in different Brazilian states

The majority of respondents (64%) have lived in the settlement since its origination. By contrast, some respondents have been living in the settlement for a short period of time (9%=4 years or less). Slightly larger percentages of respondents have lived in the community for 5-9 years (11%) and 10-14 years (16%) (Table 1). Many of those who arrived following the settlement's creation bought land here because it was "good land and cheap", others are relatives of the original settlers and moved to the area to be near their families.

Given that the majority of respondents have lived in the settlement since its occupation, and were encamped, most respondents fit into either the 41-60 age group (40.1%), or the 26-40 age group (25.8%).[20] The remainder of the respondents are either under 25 years old (16.8%) or above 61 (17.2 %). Given that most respondents are under 61, only 22% are currently receiving social security (INSS). By contrast, a relatively larger proportion of respondents (57%) are receiving "*Bolsa Familia*," which is a social welfare program (Table 1). Many of the respondents have participated in government-sponsored credit projects, such as "*Lavoura Branca*" (41.8%) a project for subsistence agriculture, and "*Projeto Gado*" (43.9%), which was a project that supported developing cattle production. Smaller numbers of individuals participated in a project for fruit tree production (cupuacu, 7.9%, and coconut, 2.1%).

[20] As the settlement was created in 1997, the majority of respondents would have been between 23-44 at that time.

Table 1: Demographics and Financial Support

The fact that the majority of people by all their food in the stores is:	
Perspective	% individuals
Bad	72%
Good	21%
Both	7%

The settlements' inhabitants have historically relied upon a diversity of production activities. A 2005 survey of all households in the 17 de Abril settlement yielded data on a variety of aspects of agricultural production. This survey highlights four forms of agricultural production in the community (Fig. 4).

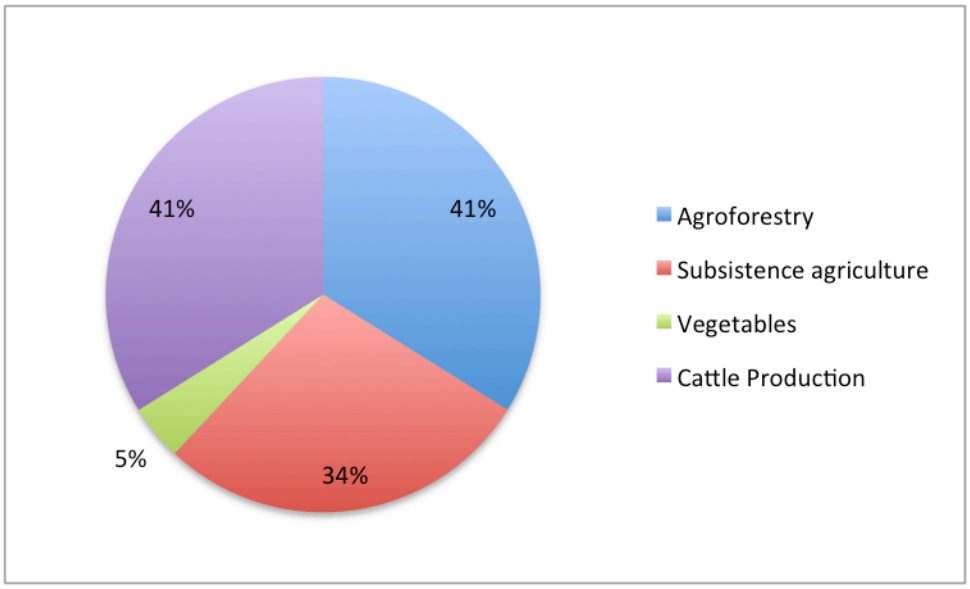

Figure 4: Percentage of settlement inhabitants who engage in various types of agricultural production (2005)

Results from the survey that I conducted indicate that the majority of settlers did not have agricultural or ranching experience prior to receiving land (Table 2).

Table 2: Levels of prior agricultural or ranching experience

Did you have previous agricultural or ranching experience?	
Response	% of individuals
No	61.3
Yes	38.7

Despite this lack of agricultural experience, many of the settlement's families engage in some form of agriculture. Similar to peasants throughout the world, these families take part in a variety of activities, but concentrate their activities around one dominant form of production (van der Ploeg 2008). Settlement families that engage in agriculture typically have monoculture plantings, for example, of dryland rice, that they sell portions of throughout the year. Three subsistence crops are dominant in the settlement: rice, corn, and manioc (Fig. 5).

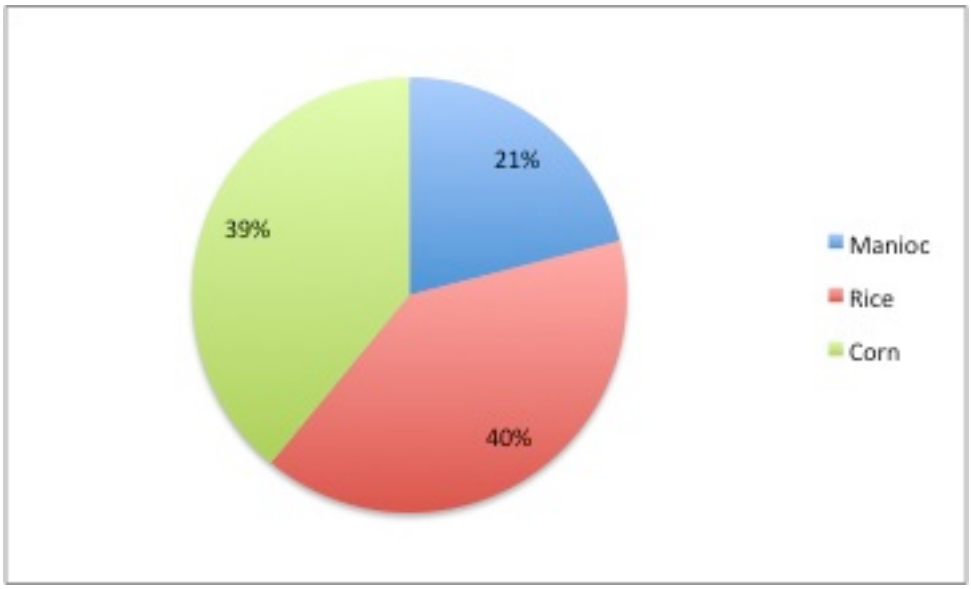

Figure 5: Percentage of settlement inhabitants who produce principal crops (2005)

Over time, many settlement inhabitants have decreased their subsistence agriculture activities, and shifted towards cattle ranching. In chapter 4, I discuss the cultural, political, economic, and educational factors affecting this shift. In addition to subsistence agriculture, many of the settlement's inhabitants engage in cattle ranching for milk production (Fig 6).

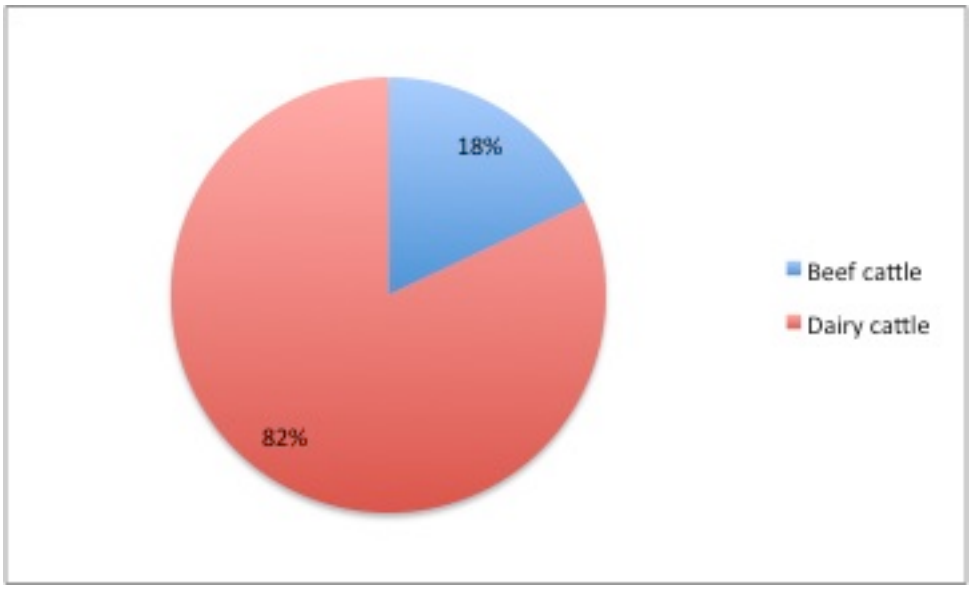

Figure 6: Percentage of cattle used for dairy and beef among ranching inhabitants (2005)

57% reported that the rationale for working with cattle is that it is generates more income. Another rationale, which many of my respondents cited anecdotally, was that many people received land that was already pasture.[21]

The settlement is largely divided concerning how the see the transition from subsistence agriculture to cattle ranching (Table 3). Two responses typify this division. The first is that 'without cattle ranching I wouldn't be able to live here'. Those holding this perspective have abandoned subsistence agriculture for one reason or another (most frequently due to either lack of forest to convert to swidden agriculture, difficulties with non-mechanized production, lack of

[21] I draw upon ethnographic and semi-structured data to explore this rationale in Chapter 4.

transportation for agricultural goods) and see ranching as the best available option. The other perspective is that 'the transition from subsistence agriculture signals the death of the MST'. Those holding this view lament the degree to which the settlement has moved away from the movement's ideals of self-sufficient smallholder agriculture. This perspective is encapsulated by the oft-heard critique among respondents that "we won this land in order to farm it, not to rely upon store bought foods'.

Table 3: Perspectives on shift from subsistence agriculture to cattle ranching

The transition from subsistence agriculture to cattle ranching is:	
Perspective	% individuals
Bad	38%
Good	41%
Both	21%

As this last anecdote indicated, one consequence of the transition away from subsistence agriculture and towards cattle ranching is that families rely upon small local stores for all of their sustenance. The majority of respondents (72%) see it as lamentable that the community as a whole is not producing its own food, and instead reliant upon the frequently under-stocked, and overpriced stores.

Table 4: Perspectives on commercialization of food provisioning

The fact that the majority of people by all their food in the stores is:	
Perspective	% individuals
Bad	72%
Good	21%
Both	7%

Although the MST ideologically espouses agroecology as the basis of its settlement's agricultural practices, the data that I present in this dissertation (Ch. 4, 5, 6) indicate that the reality is very different on the ground in the Amazon. I found that familiarity with the concept of

agroecology is low in the 17 de Abril (33% have heard the term). Most who expressed familiarity with the concept conceive of it as synonymous with ‘nature conservation’ or more broadly, ‘something to do with the environment’. Of those who knew of the concept described having learned of it through television (29%), MST meetings (22%), village discussions (19%), and MST courses (13%). Despite this lack of familiarity with the formal concept of agroecology, many respondents report engaging in practices that would be considered agroecological, such as saving seeds (49%), intercropping (41%) and using organic fertilizers such as manure (29%).

Table 5: Levels of engagement with traditional agroecological practices

Do you use organic fertilizer?		Do you save seeds?	
Response	% of individuals	Response	% of individuals
No	71%	No	51%
Yes	29%	Yes	49%
Do you intercrop?		Do you make compost?	
Response	% of individuals	Response	% of individuals
No	59%	No	84%
Yes	41%	Yes	16%

Additionally, many community members practice what scholars would consider agroecology by planting and maintaining perennial trees crops in both their urban and rural lots. Most families will maintain at least 5 different species of tree crops, with some families maintaining more than 40 species .

The political participation of MST members is another arena of settlement life that has changed since the community’s creation. In general, inhabitant’s levels of political participation in the MST are decreasing over time (Table 6). Whereas 19% of inhabitants described their participation in the MST as "high" at the time of the settlement's creation, at present only 7.8% described their MST participation as high. Additionally, there was an increase in those who described their participation as "low" from 44.6% at the time of the settlement's founding, to

65.5% at present. Over time, there has also been a decrease in the number of individuals with self-described medium levels of participation (36.4 in 1996 vs. 26.4 at present).

Table 6: Levels of MST political participation

MST political participation at present	
Level	**% of individuals**
Low	65.5
Medium	26.4
High	7.8
MST political participation in beginning	
Level	**% of individuals**
Low	44.6
Medium	36.4
High	19.0

Perhaps surprisingly, given these self-described low levels of MST participation, the majority of respondents still self-identify as “landless” (*Sem Terra*) (57.4%) (Table 7). Their rationale for this self-identification is overwhelmingly that they live in an agrarian reform settlement.

Table 7: Self-identification as "Sem Terra"

Self-Identification as "Sem Terra"	
Response	% of individuals
No	42.2
Yes	57.4

In addition to their self-identification as "*Sem Terra*," a small majority of respondents see the MST as retaining a role in the community's development (61%), largely through aiding in the acquisition of projects. Community members continue to support the MST, indicating that they would allow their children to participate in the MST if they were interested (62%).

Table 8: Parents' allowance of children participation in MST

Would you let your child participate in MST if they were interested?	
Perspective	**% of individuals**
No	37.9
Yes	62.1

While these respondents offered a diverse variety of reasons for allowing their children to participate in the movement, the largest percentage (8.4%) indicated that their rationale was that the MST offers opportunities for education. Another measure of continuing MST identification is in response to the question "what is the most important community event," 53% of respondents indicated that the anniversary of the 17 de Abril massacre was the most important community event, and 23% of respondent pointed to the anniversary of the founding of the encampment.

Education levels vary extremely within the settlement between illiteracy and post-secondary education (Table 9). Respondents formal education levels are relatively low with the highest percentage of individuals having completed primary school (36.6%). 20% of respondents are illiterate, and 7.1% can sign their name. These respondents expressed a large diversity of reasons for not pursuing education, including the most commonly cited rationales as "need to work" (35%), lack of opportunity (10%), and family obligations (8%). However, 18% of respondents are in secondary school, and 5% have gone on to participate in post-secondary school programs.

Table 9: Education Level

What is your education level?	
Level of Education	**% of individuals**
Illiterate	20
Can sign their name	7.1
Elementary school	13.7
Primary school	36.6
Secondary school	18
Post-secondary school	5

Although 73.9% believes that the MST does offer opportunities for individual growth, ranging from educational opportunities (38%), to learning to struggle for civil rights (25%), and personal growth (17%), 58.7% of respondents believe that the MST has not affected their own personal training and development. Similarly, only 8.4% of respondents indicated they participate in MST education opportunities.

Table 10: MST education opportunities

Do you participate in MST education opportunities?	
Response	% of individuals
No	54.1
Yes	8.4
Does the MST provide education opportunities?	
Response	% of individuals
No	26.1
Yes	73.9

Description of Secondary Field Sites

The Eldorado dos Carajás massacre also shaped agrarian reform at regional and national scales. As Wolford (2005) and others highlight, the negative publicity of this (and similar) massacres forced the government to expand the pace of creating settlements, as well as its public policies for agrarian reform (Vanden 2007). According to many interviewees, education was to be an area of policy that was directly affected by the massacre. Following the massacre, the MST held massive protests in which approximately 10,000 people encamped for months at a stretch, on multiple occasions, in front of the regional branch of the National Institute of Colonization and Agrarian Reform (INCRA), the entity responsible for the official designation of agrarian reform settlements. These encampments were pivotal spaces where the MST communicated the need of its members for the creation of additional agrarian reform settlements *and* diverse educational opportunities—ranging from basic literacy training to graduate

programs. More than simply demanding educational resources, the MST was actively calling for locally relevant education.

In 1996, the Family Agricultural School (*Escola Familia Agricola* or EFA) was created as part of the *Fundação Agrária do Tocantins Araguaia* (FATA) and its Agricultural-Environmental Center of Tocantins (*Centro Agroambiental Tocantins* or CAT). While this school's regional historical importance has been analyzed extensively (see the edited volume by Hebete and Navegantes (2000)), it is noteworthy here for two reasons. First, activist professors who work with the MST (and who will be returned to throughout the dissertation), unanimously highlighted its role as a springboard for regional discussions that led to the coalescence of the regional *Educação do Campo* movement. Second, the program, led by scholar Jean Hebete, brought together academics motivated by social and environmental justice concerns. As subsequent chapters will show, many of these instructors at CAT would go on to become central players in the leveraging of political and economic resources towards the creation of alternative educational opportunities for MST members. Also related to educational activism following the Eldorado dos Carajás massacre, the Marabá campus of the Federal University of Pará (UFPA) expanded its course offerings for agrarian reform inhabitants.

The Federal University of Pará, Campus of Marabá (UFPA) is my second field site, and is the first of three field sites where I explored the strong partnerships between the MST and educational institutions. The UFPA has the physical appearance of a hybrid academic-political space. Along the ground floor of the long two-story cement buildings are glittering tile mosaics and painted murals depicting scenes of political protest with the caption, “Never be quiet.” This ornamentation of the UFPA highlights the diversity of interconnections between the region’s social movements and the university’s professors and administrators. Although the UFPA was

created in the late 1980s, its professors rapidly became involved with social movements educational initiatives in the 1990s. Following the Eldorado dos Carajás massacre, the MST began demanding that the UFPA offer continuing education teachers from the settlements' schools. Coincidentally, these post-massacre demands for increased course offering occurred at the same time as the National Program for Education in Agrarian Reform (PRONERA) was rolled out.

As described above, the creation of PRONERA in 1998 was a major victory of the national *Educação do Campo* movement, in which the MST was a driving force. PRONERA opened up circuits of funding to support a diversity of courses ranging from basic literacy to graduate certificate programs for inhabitants of agrarian reform settlements. PRONERA is a prominent theme in Chapters 4, 5, and 6 of this dissertation. In these chapters, I explore how the MST's institutional partnerships enabled it to access PRONERA and fund agroecological education programs for its members. There has been a diversity of PRONERA-funded educational opportunities in southeastern Pará. As a professor who has been extensively involved with PRONERA courses emphasized, "this region has really pushed the development of PRONERA at a national level". Although this statement will be unpacked in greater depth in Chapter 6, it is important to indicate at present that educational activism following the massacre continually built upon itself. After the UFPA created the first course, the MST and university professors realized the necessity for additional programs at various educational levels, such as for high-school students. One of the region's most important agroecological education opportunities is a PRONERA-funded vocational high-school program in agroecology and ranching at the Federal Institute of Pará, Rural Campus of Marabá (*Instituto Federal do Para-Campus Rural do Marabá* or IFPA-CRMB).

The IFPA-CRMB is my third field site, and is a product of a two-decade history of educational activism, involving the MST and UFPA professors. As described above, during the 1990's professors from the UFPA who were aligned with the region's social movements became involved in the creation of an environmental education center known as the Agro-Environmental Center of Tocantins (CAT), and the Family Agricultural School of Marabá (EFA). The creation of the EFA is noteworthy for two reasons: 1) it was the first school in the region created specifically for the vocational education of farmers' children, and 2) the EFA provided a space where social movement activists and university professors mobilized the region's Educação do Campo movement. An important aspect of this mobilizing work was creating opportunities, such as workshops and seminars, that brought together UFPA professors from the agrarian sciences with those from the UFPA's pedagogy program.

In the early 2000s, this nascent partnership between the MST and interdisciplinary UFPA professors launched a concrete dialogue with the Secretary of Professional and Technological Education about the need for additional education opportunities at the high-school level. In 2003, these groups began to explore the possibility of creating a new school. When the newly elected Lula government promised to expand the professional and technological education system, which had been closed during the previous government, Marabá was included in the new government plan for the creation of a technological institute system. On October 25th 2007, Law 11.534 formally created the Federal Agrotechnical school of Marabá. However, this new school existed only in name, and was never formally built. On December 29th 2008, Law 11.892 created the Federal Institute of Education, Science, and Technology of Para (IFPA) system, which brought together the Federal Agrotechnical school of Marabá together with the Federal Agrotechnical school of Castanhal, and Federal Center of Education and Technology of Pará. What was the Federal Agrotechnical school of Marabá changed its name to the Federal Institute of Education, Science, and

Technology of Para- Rural Campus of Marabá (IFPA-CRMB). As the Federal Agrotechnical school of Marabá had never been built, and only existed in name, the MST and other social movements pressured the government to construct the newly renamed IFPA-CRMB. As a result of the MST's position in the Educação do Campo movement, the MST's 26 de Março settlement was chosen as the site of IFPA-CRMB campus. However, the construction of the IFPA-CRMB was plagued with delays.

IFPA-CRMB teachers and students experienced a variety of hardships as a result of these delays, and needed to engage in continued activism for the campus to be completed.

The technical high-school program in agroecology and ranching formally began in 2009, but construction on the school had barely started. Without a school, the classes began to meet in a variety of social movement spaces. The classes started in an inter-movement organizing space known as Cabanagem, which consists of two dormitories, an industrial kitchen, and a meeting pavilion. After several months at Cabanagem, the classes were moved to the MST's Florestan Fernandes National Training School-Amazônia branch, which is located just outside Marabá in São Felix do Xingu. The Florestan Fernandes school was also not a satisfactory location for long term study, however, as it had no dormitories, consisting of two covered locations for hammocks, and only the forest for a classroom. Classes were held there for a month. When it became clear that this space was untenable, classes were cancelled for several months. The IFPA-CRMB's administration reached a deal with the directors of a closed high school, known as Santa Terezinha school in Marabá. This school was reopened for the students of the IFPA-CRMB, and they spent a year there. By this time, construction at the IFPA-CRMB had reached the point where a rough structure of walls had been raised. However, progress on building the campus was moving very slowly, due to several of the contractors embezzling money. The IFPA-CRMB professors and students decided to take their classes to the half-finished campus as

a form of protest. As one student told me "we came here to where they were building the campus, because if we're here, the process of construction could be accelerated, it can go faster, because we're here and we can see what's going on, we can direct our demands". All CRMB students and faculty I spoke with described the incredible hardships of this period as they waited for the school to be completed. Their continual struggle paid off, however, in the completed construction of the CRMB.

As part of their studies, the IFPA-CRMB students conducted a social and natural history of the location of the school. This document is not only incredibly rich in details about the site, but also exemplary of the critical place-based education that I describe in Chapters 4, 5 and 6. I now draw on data they collected in their research project, to describe the social and ecological history of the area that is now the CRMB.

The CRMB is located on 354 hectares of what is now the 26 de Março settlement. In 2004, INCRA created the 26 de Março settlement from the Fazenda Cabaceiras, which had been owned by the Almeida family, which was one of the most powerful and feared families in the region. The Almeida's principal activity in Fazenda Cabaceiras was the extraction of Brazil nuts, which they sold to international markets. Like many fazendas in the Amazon, the Almeida family did not legally own the land of Fazenda Cabaceiras. They contracted migrant workers from other states under the promise of good housing, fair pay, and safe working conditions, and used hired gunmen to prevent the migrant *castanheiros* from escaping when the reality did not meet the promises. Between 1982 and 1989, these gunmen murdered 40 of the fazenda's migrant workers.

In 1989, the Almeida family sold the Fazenda Cabaceiras to the Mutran family. With the sale of the property, the form of labor changed from Brazil nut harvesting to the cutting of the Brazil trees, and the conversion of the forest to pasture land. The fazenda's gunmen once again murdered the migrant workers when they protested the working conditions under their new bosses. Many of

these workers were buried in a clandestine cemetery on the grounds of the Fazenda Cabaceira. Others' bodies were burned in bonfires of tires, and still others' thrown into nearby rivers.

As part of their research project, the student documented the ecology of the 354-hectare campus. Their report shows that the campus area is comprised of 53% floodplain, 25% pasture, 10% mature forest, 9% early successional forest, and 3% campus infrastructure. The mature forest area was entirely planted by the Almeida family. It is dominated by Brazil nut trees (*Bertholletia excelsa)*.

The pasture is dominated by a species of grass of the Brachiaria family known as *Brachiaria decumbens.* In the secondary succession areas of the campus, the students note the presence of ingá (*Inga vera*), pau-preto (*Cenostigma tocantinum*), pente-de-macaco (*Pithecoctenium crucigerum)*, paricá (*Schizolobium amazonicum*), axixá (*Annona crassiflora*), and coco-babaçu (*Orbignya phalerata*). As part of their ecological description, the students note that a variety of current campus initiatives will result in the amendment of the soil. These projects include new agroforestry areas, and subsistence farming plots where the students are composting, and using nitrogen-fixing plants to improve soil fertility.

In addition to the IFPA-CRMB, the Agroecological Institute of Latin America-Amazonia *(Instituto Latino Americano de Agroecologia*-Amazônica or IALA) is another educational space created by partnerships between the region's social movements and educational institutions. IALA, which is located in the MST's Palmares II settlement on the outskirts of the city of Paraupebas, is my final field site. The space where IALA now stands originally belonged to a collective, known as Children of the Land, comprised of 30 families from Palmares II. These families were trying to farm collectively using agroecological methods, and when their group dissolved, the MST began a discussion about using the land for an agroecological education center. In 2008, MST

members from Palmares II who are also state leaders in the Pará chapter of La Via Campesina began to discuss the idea of creating IALA-Amazônica.

La Via Campesina had already begun forming a network of agroecological training centers. In Latin America, this network consists of Venezuela's IALA-Paulo Freire, Paraguay's IALA-Guarani, Colombia's IALA-Andino, Ecuador's National School of Agroecology, Peru's IALA-Yacucho, and the Latin American School of Agroecology (ELAA)-Parana, Brazil.[22] The MST/LVC's intent with creating an IALA-Amazônica was to continue to expand LVC's strategy of using education as a tactic to advance agroecology.

IALA-Amazônica is intended to be a popular university, where agrarian reform inhabitants can participate in formal education programs at the high school, college, and graduate levels, as well as informal courses where rural activists can meet to exchange experiences. IALA-Amazônica's larger goal is to become a center of convergence for agrecological education, research, and extension.[23] To reach this goal, IALA seeks to train social movement members as agroecological community educators and technical experts. This training will be based in cooperative labor, and new forms of social organization that dovetail with agroecology. To attain these goals, IALA-Amazônica's current director describes the process of creating IALA as centered around building partnerships.

Since its origination, the MST/LVC state leadership have debated what kind of partnerships are required to develop IALA-Amazônica as a center that would have a wide impact in training MST members in agroecology, and building a larger project of resistance to industrial agriculture. In 2009, the MST/LVC leadership commenced a formal partnership with the UFPA

[22] Various other LVC agroecology training centers are either slated for development, or being constructed in Mozambique, Indonesia, India, and Zimbabwe.
[23] According to MST activists and UFPA professor, this idea of IALA as a center of convergence is diametrically opposed to the concept of extension as dissemination. A model of knowledge production is horizontal and requires the active participation and dialogue of society.

to develop a PRONERA-sponsored certificate program in Educação do Campo, Agroecology, and the Agrarian Question in Amazônia (Educação do Campo, Agroecologia e Questão Agrária na Amazônia), which would be based at IALA. The MST-UFPA partnership explicitly created this certificate program to help develop IALA-Amazônia as a space where agroecological methods and knowledge and collective labor practices could be developed and interchanged between agrarian reform inhabitants. In Chapter 5, I discuss in detail the role of this certificate program in the process of developing IALA.

The certificate program was based in three principles: an alternating pedagogy, student research, and the unity of theory-practice. The alternating pedagogy is a non-traditional course format that frequently characterizes Educação do Campo courses. It consists of students spending alternating periods of time in their home community and in residence at school.[24] This alternating pedagogy enables the interchange of academic and popular knowledge, the wider dissemination of this hybridized knowledge within the students' communities, and enables the students to continue their jobs. Research is an educational principle that is integrated throughout the certificate program. Students conduct experimental research on agroecological production at IALA, as well as field-based research in their home communities and a series of field trips. Students engage in the unity of theory-practice by actively disseminating the knowledge they produced in their communities as part of a larger process of social change. The unity of theory-practice emphasizes the interrelations between the alternating pedagogy's dual periods of community time and school time; in both spaces and times field research is being conducted.

I have presented these four field sites within a description of regional history, because all of the field sites are a product of the interrelated waves of regional and national processes of

[24] IALA in this context was the location of the "school time".

political, economic, ecological and educational change. However, as I now describe in the methods section, the MST members, IFPA teachers, and UFPA professors that are continually moving between these educational spaces also interconnect these four field sites.

Methods

> Breakfast this morning is a dinner roll, cup of *farinha* (dried manioc), and coffee for the MST youth leaders participating in a counter-mapping workshop. I sip coffee as I stand chatting with Francesca, a professor in the Federal University's agroecology graduate certificate program who is facilitating the workshop. The MST's three-week long national leadership school just ended last week, and now these youth have travelled to Maraba for yet another movement event. The following week will be also filled with events, as it is the MST's National Youth Week. We discuss this frenetic pace MST activists face in always travelling to events. Francesca muses, "the pedagogical value of marches, events, and workshops is complicated. It is a part of the rhythm of the movement to be constantly going to these events."
>
> Movement is what in large part characterizes life within the MST, travelling to meetings, workshops, actions, and short courses. Movement is important from the MST's perspective, for without ongoing participating in events there is stasis, and that spells the end of the MST. However, Francesca continues, "when there is so much movement there is no space for the generative reflection that leads to transformation and action. Meetings, actions, workshops are so short temporally, without dedicated spaces and processes for discussion they aren't formative. When they are properly prepared for, however, such as our course which combines a trip to a conference with field trips to other settlements and encampments in the region, than these events can be important as integrated pedagogical spaces". Herein lies the rub, and one of the pressing contradictions facing the MST. Education is one of the main opportunities the MST offers. Yet education and learning, whether they occurs in the streets, in a forested classroom, or in a distant state or country, takes its members out of the settlement, out of the community, disengaging from the community-based activism for which they are being trained.

Multi-sited research has become increasingly common in contemporary ethnographic scholarship (Marcus 1995; Falzon 2009; Coleman and Von Hellermann 2012). At an early stage of my fieldwork, I realized that my MST informants were rarely in their home settlement, my primary field site, because *movement* defined their lives in two important ways. First, they self-identified

as social movement activists. Secondly, they described their perceived need, as activists, to be "walking with the movement" (*andando com o Movimento)*, which meant actively participating in its various events. I found that this political participation, "walking with movement" as they described it, structured the daily rhythm of their lives as they travelled between a multiplicity of interconnected movement agroecological education opportunities. Due to their life of perpetual movement, it was necessary to accompany these activists in the MST's various educational spaces.

This dissertation draws upon fieldwork conducted over a period of 17 months in the 17 de Abril settlement, and a variety of interconnected educational spaces during three fieldwork periods between 2009-2013. The vast majority of time was spent in residence in the 17 de Abril settlement, with repeated shorter periods of up to a week, in the other three field sites.

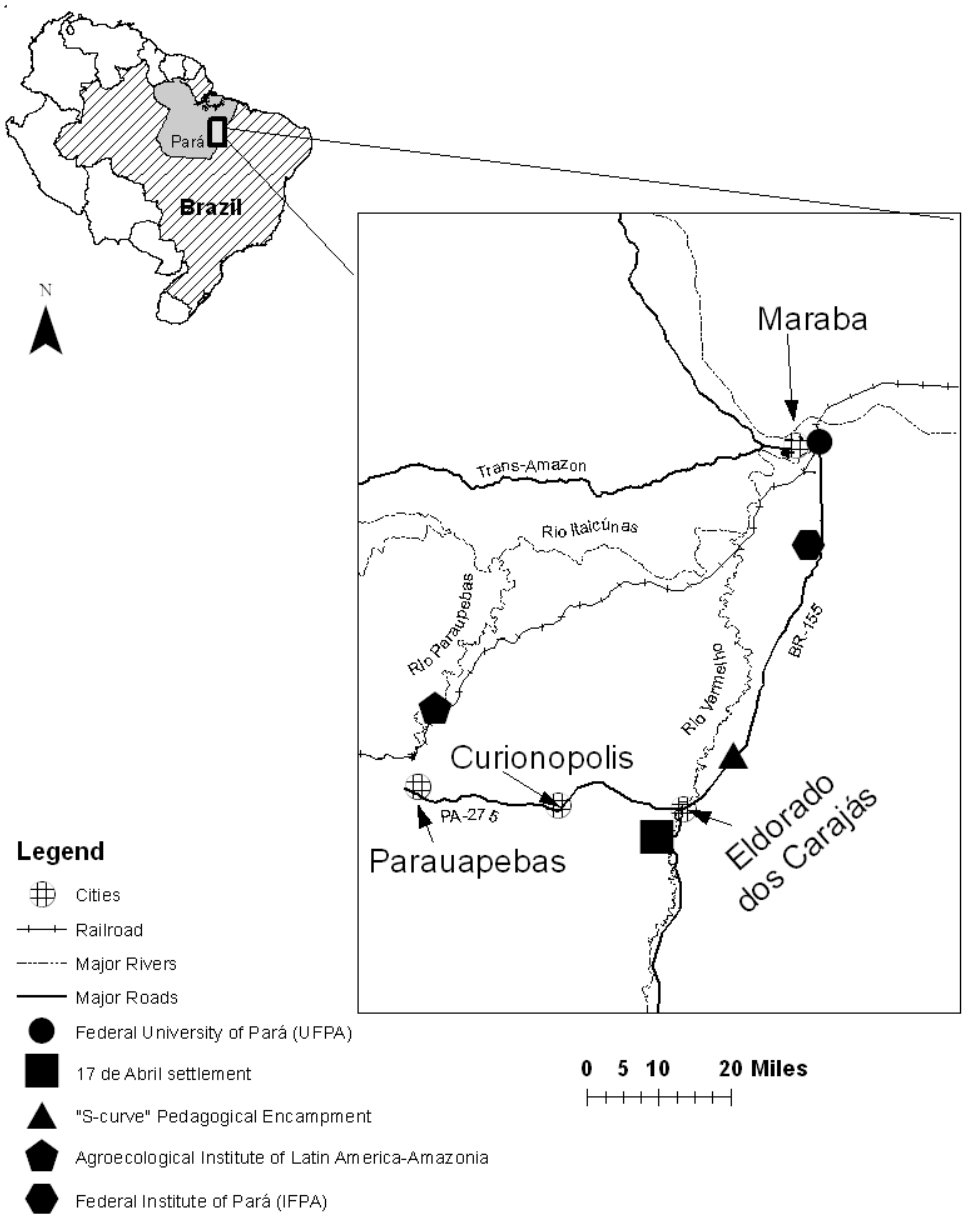

Figure 7: Map of Field Sites

In 2009, I came to Brazil for the first time, and conducted 9 weeks of pilot research in the 17 de Abril settlement. There were three objectives of this pilot research: 1) to begin developing research ties within the settlement, 2) to gain an understanding of land management and landscape change, and 3) to gather preliminary data on educational opportunities within the

settlement and region. During this first period of pilot research, I lived for three weeks at a time with three different families. Teenagers in these families were participating in an MST-affiliated youth group, known as the Evolution of Peasant Youth (*Evolução do Juventude Camponesa* or EJC), and chose to host me during my pilot research as part of what they described as taking on responsibilities related to their own political development. I conducted semi-structured interviews with these MST activists, their families, and neighbors. Through these interviews, I elicited data on land management and landscape change. Two of the families lived in the urban center of the settlement, but were actively engaging in agricultural production on a larger land plot in the periphery. A female single parent that did not personally engage in agriculture, but instead rented her land for cattle grazing, headed the third family.

I conducted participant observation of agricultural activities with the two families actively working the land. Together with members of each family, I used a GPS device (Garmin Etrex Legend) to map the families' land plots, and their neighbors' plots. Through this mapping exercise, I was able to determine that these plots consisted of a mix of primary and secondary forest with pasture, subsistence agriculture, and agroforestry. I determined that there were up to 50 species of fruit trees present in the agroforestry areas. As part of the mapping process, I engaged in informal interviews with these individuals about land management and landscape change. Through these interviews, I learned about the importance of credit projects directed towards cattle production, and the devastating effect of uncontrolled fires.

The other foci of this pilot research were the educational opportunities available within both the settlement, and the surrounding region. I sampled some teachers opportunistically, as they were either participating in the EJC, or were married to members of that group, and were interested in my evolving research. I sampled other teachers by reviewing the list of classes, and

interviewing those whose courses seemed potentially relevant to the research, such as the course entitled *Amazonia: Our Place*. I engaged in participant observation of each class in the settlement's high school. I sought to gain an understanding through this participant observation of the presence of the movement within the daily classroom experience of the students. During classroom participant observation, I gathered data on the style of teachers' presentations, the presence and absence of MST content within the class activities, and the nature of any student contributions, such as reflective statements. I also conducted a focus group interview with educators from the school. In this focus group, I asked educators about their perceptions of presence and absence of the MST within the school, and the ways in which the MST ideology was or was not being used as the pedagogical basis for the school. Through this focus group, I gained an appreciation for the complexity of daily politics within the settlement's school.[25] I traveled with members of the EJC to the city of Xinguara to participate in the Regional Forum of Educação do Campo (*Forum Regional do Educação do Campo* or FREC). By travelling to the FREC, I gained a preliminary appreciation of how movement members' political participation grants access to educational opportunities. The theme of that year's FREC was the educational opportunities for agrarian settlement youth. Over three days, I conducted participant observation of the debates that comprise the FREC, as well as the místicas, or cultural performances involving poetry, theater, music, dance, and sculpture. Through participating in the debates, I observed the important role that university faculty play in facilitating regional educational

[25] In Chapter 5, I look in more detail at how educators' personal politics affect the presence of the MST within the settlement's school.

events. The research connections I made with these activist professors were central to my larger dissertation research.[26]

I returned to Brazil in 2010 to conduct archival research and additional pilot research.[27] My objective with the archival research was to gather historical aerial photographs of the geographic area surrounding the present day 17 de Abril settlement to better understand the settlement's trajectory of land cover change. There was little record in the literature as to whether these data even existed, and as a result, I visited 12 different archives of conservation, development, mining, and military organizations in Rio de Janeiro, São Paulo, Bélem, and Marabá. Through this archival work, I uncovered an aerial photographic map index, and associated hard copy aerial photographs from a late 1960s aerial survey of the Tocantins-Xinguara region.[28] After digitizing, georeferencing, and mosaicking these aerial photographs, I conducted a supervised classification of the land cover in the area where the 17 de Abril settlement is currently located.[29] My return trip to the 17 de Abril settlement in 2010 was short, lasting only two weeks. During this period, I renewed relationships with my research connections, took stock of changes in the settlement, and discussed plans for subsequent dissertation research. I observed two particularly visible changes from the previous year. First, the EJC group, with which I had conducted extensive participant observation, had disbanded, as its most active members had left the settlement to pursue MST-sponsored advanced degree

[26] In Chapter 5, I focus on the FREC as an example of a dialogic space that is crucial in this region to the creation of agroecological education opportunities.
[27] I was able to conduct pilot research in 2010 as part of a funded research assistantship under Dr. Donald Nelson (UGA), during which I conducted archival research in Fortaleza, Ceara, Brazil.
[28] I was unable to pinpoint when these photos were taken, but was able to narrow the time period to between 1965-1969 due to the organizations involved in the aerial survey, and when the photos were entered into the archive.
[29] I conducted all of the mosaicking in Erdas Imagine, and the supervised land cover classification in ArcGIS 9.3.

programs in agronomy, medicine, and journalism. My observation that political activism in the settlement was negatively affected by the MST's own educational opportunities was a turning point in my evolving understanding of the complex relations between political participation and education access. Second, during the intervening year, a new school had been created in the settlement to replace the rough plywood school that had existed since the settlement's founding. Whereas the earlier school had many visible signs of the MST, such as flags, posters, and banners with revolutionary slogans, the new school lacked all of these vestiges of the MST and seemed like any other municipal school. My observation of change in the school's politicized environment built upon the focus group data on the variable presence of the movement within the school, and would provide points of entry for later dissertation research into the opportunities and constraints of formal agroecological education in the settlement.[30]

In 2011, I obtained a longitudinal series of 5 cloud-free satellite images from 1985-2009 (Landsat TM).[31] I used the ATCOR extension within Erdas Imagine to conduct atmospheric correction on the imagery. I used ground-truthed GPS points that I had collected during guided land plot mapping activities in 2009 as a classification guide. These GPS points showed the locations of primary and secondary and forest cover, agroforestry plantings, subsistence agriculture fields, pasture, and recently burned fields. By overlaying these points on 2009 Landsat TM imagery, I was able to extract the spectral signatures for each respective land cover class. With these spectral signatures, I performed a supervised classification on the Landsat time

[30] In Chapter 5, I present data on the relation between the opportunities and constraints of political culture within the school and agroecological education.

[31] GLOVIS.usgs.gov, search criteria: WRS-2 Path 22, Row 64, percent cloud <10%.

series data. I derived insights from these data on the historical trajectory of land use and land cover change both within the settlement and the larger municipality.[32]

In 2012, I conducted 11 months of fieldwork in the 17 de Abril settlement, with short research trips to the IFPA, IALA, UFPA, and neighboring settlements and encampments. This research consisted primarily of participant observation and semi-structured interviews conducted during agricultural, movement, and educational activities, and a large scale-survey.

In starting my research, I had to make the difficult choice of whether to live in the *roça* (the settlement's rural farming periphery) or the community's urban center. I knew this choice would largely structure my focus, because rural farms are only accessible via a 15-minute drive on rutted dirt roads, and living in the *roça* would decrease my engagement in the larger community's everyday activities. I chose to live in a house that was located near the central square of the settlement's urban center. In retrospect, I'm grateful that I made this decision, because I gained ethnographic access to innumerable moments of daily political life in the settlement, such as the experience that constitutes this chapter's opening vignette.

I conducted semi-structured interviews with professors and administrators from the UFPA, teachers and administrators the IFPA, and coordinators of IALA (n=15) to understand "*how do MST activists access political programs and financial resources to facilitate the evolution of innovative educational institutions in southeastern Para*" (Q2). I interviewed 100% of the professors, teachers, coordinators, and administrators involved in the programs that this dissertation focused upon. I conducted repeated interviews with the key individuals over the course of the year. During first-round interviews, I elicited data on the historical development of the IFPA, UFPA, and IALA, as well as the institutionalization of agroecology within each

[32] In chapter 3, I discuss this time series of thematic maps in the context of regional processes of land use and land cover change.

institute's curriculum. Throughout my fieldwork period, I kept coming across these professors and administrators at MST events, such as the pedagogical encampment and critical mapping workshops. By both being an active participant and observer in these MST educational events, I realized the key roles these educators play as mediators and featured speakers. I used follow-up interviews with these professors and administrators to gather data on the role of partnerships between the MST and professors in the courses. While in the field, I transcribed and coded interviews, and recognized that one emerging theme was the importance of PRONERA, and these professors and administrators ability to access it and direct its funding towards MST courses.[33] I conducted semi-structured interviews with the key individuals from the MST and various educational institutions involved in accessing and mediating these funds to better understand the history, opportunities, and constraints of PRONERA. These interviews focused on the funding priorities of the government, the curricular objectives of the MST, and opportunities and constraints that both MST activists and activist professor/administrators faced throughout the course of these programs. In November 2012, I attended one of the UFPA's certificate program sessions located at IALA. Through participating in this session, I observed that in addition to the students and professors, PRONERA was instrumental in enabling the MST-UFPA partnership to fly a handful of activists and renowned intellectuals from all over Brazil, as well as Paraguay, and Colombia to participate in the seminar. I gathered data through participant observation of this seminar's debates on the important role these intellectuals and activists played not only in the course, but also in determining the future of IALA.

I combined semi-structured interviews and participant observation of educational opportunities, such as workshops, to understand *what are the opportunities and constraints*

[33] I used F5 to transcribe interviews, and MaxQDA for qualitative data analysis.

towards advancing agroecological education within the MST? Specifically, how does the larger cultural milieu influence efforts to advance agroecological education (Q2)? I worked extensively with two teachers from the 17 de Abril settlement school that participated as students in UFPA certificate program at IALA, and one student from the IFPA vocational high-school program who was also from the 17 de Abril settlement. I conducted repeated semi-structured interviews with each of these three individuals. These interviews focused on the students' respective learning processes within these two educational programs. These interviews yielded rich data concerning the importance of critical place-based pedagogy in their learning process, as well as the cultural constraints of entrenched cattle ranching culture. After transcribing and coding these semi-structured interviews, I conducted subsequent interviews with each individual focusing on the cultural constraints of decreasing political participation. I conducted participant observation of the classes and MST-related educational events that the teachers who were involved in the UFPA certificate program participated in to gain a richer understanding of the opportunities and constraints for advancing agroecological education within the school. [34]

Review of Chapters

This dissertation is composed of seven chapters that explore the opportunities and constraints towards advancing agroecological education in the MST. I opened this first chapter with an ethnographic example that illustrates the complex interrelationships between political culture and agriculture in my field site. This ethnographic example segued into the research questions that guide the dissertation. I then provided a brief overview of political ecology, and made a case for the importance of developing a political ecology of education lens to shed light

[34] I present and analyze data from these participant observation activities in Chapter 6.

on the dissertation's research questions. The following section introduced the MST. I provided a historical account of how education and agrarian inequalities are interrelated in Brazil, and how the MST's agroecological and educational activism arose in relation to them. I then interwove a description of the dissertation's four field sites with an account of regional historical changes in political economy and education. Finally, I reviewed the methods I used to gather the data that are presented in this dissertation.

In Chapter 2, I will synthesize the literature on political ecology and the political economy of education into a new theoretical framework, which I term a political ecology of education. This chapter is divided into two sections. The first provides a review of the development of political ecology as an interdisciplinary research agenda, focusing on the dominant themes of analysis as well as the major internal shifts in theory. It also develops a definition of the political ecology of education. In the second section I provide *an* intellectual genealogy for a political ecology of education. I conclude the chapter by pointing to areas of emerging research that hold potential to inform the political ecology of education framework.

In the third chapter I explore *why* the MST has adopted agroecology as an ideology and set of practices. I argue that there are three reasons why the MST has turned towards agroecology. The first reason is the ideological importance of agrarianism. The second reason is the importance of agroecological practices in helping MST members remain on the land. This question of the permanence of the peasantry on the land is known in the literature as the "agrarian question" (Bernstein 1993; Akram-Lodhi and Kay 2012). The third reason that the MST advocates agroecology is because it enables the attainment of sovereignty in its various forms. In presenting these three rationales, I draw upon a variety of geographic lenses to show how agroecology enables the transformation of the land and systems of production.

In the fourth chapter, I explore the interconnections between competing visions of agricultural extension and the first and third Green Revolutions. I first argue that these two Green Revolutions have played a pivotal role in transforming the training opportunities for agricultural extension agents. Whereas the first Green Revolution established a top-down model of knowledge transfer, the MST is working to advance a Freirean approach to extension that is based on dialogue. I show how this training differentially molds the perspectives of the extension agents in particular models of agricultural development. I then analyze the diverse circuits of agricultural extension within this settlement's 17 year history. I focus on how extension, credit, and the history of landscape all intersect as constraints to agroecological production.

I explore in the fifth chapter how the MST has advanced its agroecological education opportunities. I identify three factors in southeasterrn Pará that the MST draws upon in advancing environmental education opportunities. First, activist professors are key players, serving as mediators between the state and social movements. Second, recurring events incubate environmental educational institutions and degree programs. Third, by collaborating with institutionalized education, movements are able to develop their own radical educational spaces. These three factors result in a gradual anti-neoliberal transformation in southeastern Pará's rural educational opportunities. The political ecology of education perspective is utilized to understand the relations between these three factors and educational change. Drawing attention to the educational politics of scale, I use this chapter to advance theories of environmental education in a neoliberal age.

In the sixth chapter, I explore how certain MST's agroecological education programs involve a critical place-based component that teaches students how to critically reflect on the landscape's history, and develop alternative form of production. I explore how this critical place-

based pedagogy can serve as a form of territoriality, which refers to the control of relations to and usage of land. I find that MST educators can serve as Gramscian 'organic intellectuals' by using a critical pedagogy of place as a form of territoriality to: 1) create relational conceptions of place; and 2) advocate counter-hegemonic land usage. However, I also show that educators' internal politics are a constraint towards advancing the MST's agroecological ideals.

In the seventh chapter, I first review the major findings, focusing thematically on the opportunities and constraints to advancing agroecological education in the MST. I then describe the ways in which my findings contribute to a variety of disciplinary and interdisciplinary debates. I turn to the broader societal implications of the research, and provide recommendations for both policy makers and grassroots movements. I conclude the chapter, and the dissertation, by exploring future areas of research related to the 17 de Abril settlement, agroecological education, and more broadly, avenues for engagement with the political ecology of education.

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CHAPTER 2

LITERATURE REVIEW: AN INTELLECTUAL GENEALOGY OF THE POLITICAL ECOLOGY OF EDUCATION

Introduction

Educational scholars face a challenge. Critical education scholars acknowledge that "education, every aspect of it one can imagine, is political" (Apple and Aasen 2003: 1). Yet, this understanding of education as fundamentally political is largely disconnected from an analysis of how education affects peoples' relation to and utilization of the environment. Political ecology is an interdisciplinary research agenda that has potential to help bridge this divide.

Political ecology explores the relationships among environmental change and political, economic, and social processes (Bryant 1992; Greenberg and Park 1994; Robbins 2004). Political ecology can be contrasted with classic ecology, which apolitically explores relationships between organisms and their surroundings (Biersack and Greenberg 2006). As Roderick Neumann indicates in the opening to his text Making Political Ecology, "the environment and how we acquire, disseminate, and legitimate knowledge about it are highly politicized, reflective of relations of power, and contested" (Neumann 2005: 1). Despite this clear articulation of the relations between the politics of knowledge and those of the environment, political ecology has itself traditionally lacked a framework for understanding how the reciprocal relations between political, economic forces and pedagogical processes—ranging from the tacit to the formal—

mediate resource access, control, and landscape change. My objective in this article is to develop a *political ecology of education* framework to illuminate these interrelations.

The article is divided into three sections. I begin the first section by reviewing the development of political ecology as an interdisciplinary research agenda, focusing on the major internal shifts in theory and dominant themes of analysis. I conclude this first section by building a working definition of a political ecology of education. I construct this definition by synthesizing different definitions of political ecology that scholars have enumerated over the its evolution. In the second section, I provide *an* intellectual genealogy for a political ecology of education. I describe this as *an* intellectual genealogy to highlight that it is partial, and ongoing. In the third section of the article, I conclude by pointing to methodological possibilities for a political ecology of education as well as areas of emerging research that hold potential to inform this framework.

Political Ecology: The Historical Consolidation and Evolution of a Research Program

Formative Interdisciplinary Debates

Political ecology is a broad and evolving research program that examines how power relations impact human-environmental interactions (Biserack and Greenberg 2006). In this section I first review some of the major historical debates in cultural ecology, cultural geography, hazard's research, and political economy that led to the origination of political ecology. I then enumerate the major themes of political ecology research since its coalescence as a distinct field.

I conclude the section by articulating a definition for the political ecology of education by synthesizing traditional definitions of political ecology.[35]

One traditional focus within both anthropology and geography has been the relations between people and the environment. Late 19th and early 20th century geographical scholarship took a largely determinist approach to understanding human-environmental interactions. The kernel of this perspective was the idea that environmental conditions, such as climate, soil, and topography, structured human culture (Ratzel 1896; Semple 1911). In anthropology, during the same time period, evolutionary approaches posited subsistence strategies and forms of technology as indicators of cultural development along a trajectory from "savage" to "barbarian" to "civilized" (Morgan 1877). Both environmental determinism and the evolutionary approach were based in and perpetuated an imperial, colonial, and often racist conception of culture and its relations to the environment. Political ecology developed as part of a larger trajectory of scholarship that has critiqued these assumptions (Robbins 2004).

During the mid-20th century, anthropologists put forth the culture-area concept as part of cultural ecology. This theoretical perspective explored how culture influences groups' physical management and understanding of the environment (Wissler 1940; Kroeber 1963). As opposed to earlier environmental determinism, this perspective saw culture as being influenced, but not determined by material forces. Rather, cultural factors, such as religious beliefs, were largely responsible for the form a culture took, and its interactions with the material landscape (Forde 1963). Later in the 20th century, cultural ecologists began to explore ecosystem models that saw humans as one element of a larger ecosystem, comprised of interacting biotic and abiotic

[35] My intention with this section is to provide a basic overview of the origin and evolution of political ecology. See the excellent book-length treatments of this subject by Zimmerer and Basset (2003), Robbins (2004), Neumann (2005), Paulson and Gezon (2005), Biersack and Greenberg (2006).

elements (Vayda and Rappaport 1967). This scholarship focused on how isolated subsistence communities maintained cultural practices that were adapted to their environment (Rappaport 1968). The attention of cultural ecologists to culture's generative capacity, and its recursive interrelations with the environment would influence the development of political ecology and its analyses of the place of culture in the production of the environment.

Mid-20th century cultural geography also influenced the development of political ecology by investigating the role of culture in historical landscape transformations. In the 1920s, Carl Sauer explored the morphology of landscape, which would lead to analyses of human transformation of the environment (Thomas 1956; Sauer 1963). Denevan's work on indigenous Mayan, Amazonian, and Andean populations exemplifies cultural geographical analyses of how socio-technological systems, involving raised field agriculture, swiddening, and aquaculture helped to maintain large population densities in an otherwise difficult environment (Denevan 1966). Cultural geography's attention to the role of indigenous knowledge in sustainable production systems, and these systems affect on transforming the landscape would serve as a foundation for political ecology. However, political ecology also emerged out of debates with cultural geography over the analytical importance of adaptation, the role of population and technology as driving forces in environmental change, and the need to account for the social relations of production and accumulation from a political economy perspective (Paulson, Gezon and Watts 2005: 22). A work that both broke with traditional cultural ecology and served as a bridge to political ecology was Kenneth Hewitt's (1983) *Interpretations of Calamity*, which was in the field of hazard's research.

Hazard's research, as typified by the work of Geographers Gilbert F. White, Ian Burton, and Robert W. Kates, was also developing in the 1950s and 1960s, and would serve as a

foundation for political ecology (see Watts 2000 for a review). This work focused on the perceptions and behaviors of communities and households in response to a variety of natural disasters, such as tornadoes, earthquakes, and floods. As this research evolved in the 1970s, it drew upon systems theory and organic analogies, much like cultural ecology and cultural geography (Watts 1983 in Paulson, Gezon and Watts 2005). Cybernetic approaches that provided lenses for seeing human-environment interactions as a system defined by flows of matter, information and energy were particularly salient (Odum 1971; Bateson 1972). Although early work in hazard's research had focused on the United States, by the 1970s there were extensive hazards studies being conducted in the developing world. This interdisciplinary scholarship would serve as another foundation for an emerging political ecology, because it argued that while many disasters are 'natural', the processes of prevention, preparation and response are fundamentally political.

Interdisciplinary scholarship in political economy provided another foundation for the emergence of political ecology. One major theme was peasant and post-colonial studies' critical examinations of exploitation, social stratification, and the differential affect of international markets on rural marginalized communities (Wolf 1969; Shanin 1970; Asad 1973). Another important facet was the resurgence of the presence of Marxism within world systems theory, dependency theory, structural Marxism, and Marxist feminism. This Marxist approach to political economy explored the linkages between power, the relations of production, access to and control over resources, and social marginalization (Paulson, Gezon and Watts 2005: 23). This work in political economy pushed cultural ecology from an understanding of scale as local to inherently multiple; subsistence communities do not exist in equilibrium or isolation, but rather are part of a world system that was impacted by markets, social inequalities, and political

conflicts. Through their focus on stasis, structure, and critique of the lack of attention to agency the research programs of cultural ecology, cultural geography, hazard's research, and political economy provided points and counterpoints from which political ecology developed (Robbins 2004; Paulson, Gezon and Watts; Neumann 2005).

The Evolution of a Research Program

In describing the development of political ecology as a distinct field, distinctions are often made between first and second-generation political ecology. To summarize this chronology, during the first generation there was a significant focus on structure and systems as opposed to the reorientation during the second generation towards symbols and agency (Biserack 2006). The influence of postmodern, post-structuralist, and postcolonial scholarship was particularly important in this transition (Geertz 1973; Said 1978; Foucault 1980). With the reorientation of the field, the symbolic and material became more closely linked (Biserack 2006). Drawing on constructionist scholarship emphasizing the importance of discourse, scholars began to reevaluate various concepts such as class, gender, and nature; these analyses had integral places in the evolving political ecology, providing tools for analyzing how power relations mediate resource access and resulting ecological changes.

In my review of political ecology research, I focus on six thematic trends: 1) degradation and marginalization; 2) environmental conflict; 3) conservation and control; 4) environmental identity and social movements; 5) scale and 6) the politics of knowledge.[36] I now present the overarching argument of each of these foci, and briefly illustrate exemplary research within each

[36] These are some of the main themes of political ecology discussed in Robbins (2004) and Zimmerer and Basset (2003). Three additional thematic areas of political ecology research that this review does not explore are urban and industrial environments, geospatial technologies, and north-south environmental histories. See Zimmerer and Basset (2003) for a review of these foci.

thematic area. I will conclude the article by highlighting future areas of research in the political ecology of education within each of these foci.

The degradation and marginalization thesis holds that state development interventions and increasing integration into regional and global markets are responsible for the transition from sustainable resource management to overexploitation of natural resources (Robbins 2004). Political ecologists have focused on a variety of forms environmental degradation, including soil erosion, deforestation, desertification, biodiversity loss, water pollution, and climate change (Bohle et al. 1994; Blaikie 1995; Adger et al. 2001; Rocheleau et al. 2001; Hammer 2004). One reason degradation has been an important focus of political ecology research is that marginalized communities who rely on natural resources for their direct subsistence are the first to experience the negative effects of environmental change (Pelling 2003; Gray and Moseley 2005; Mustafa 2005; Simon and Dooling 2010). Political ecologists have also focused on degradation as a critique of *apolitical* ecology, which sees anthropogenic interaction with the environment as inherently destructive due to ignorance, selfishness, and overpopulation (Robbins 2004: 90). In Land Degradation and Society, which is frequently considered one of the pioneering works in political ecology, Blaikie and Brookfield (1987) typify this critique by describing how land degradation

> is open to multiple interpretations. To a hunter or herder, the replacement of forest by savanna with a greater capacity to carry ruminants would not be considered degradation. Nor would forest replacement by agricultural land be seen as degradation by a colonizing farmer…Since degradation is a perceptual term, it must be expected that there will be a number of definitions in any situation (4).

What Blaikie and Brookfield drew attention to, and political ecologists have since explored, is how discussions of natural productivity, biodiversity, usefulness, and risk are

structured by political assumptions (Bryant 1992; Rocheleau 1995; Escobar 1998; Brown 1998; Le Billon 2001; Martinez-Allier 2005; Vandermeer and Perfecto 2005).

Another strand of political ecology research in this vein focuses on how what are seemingly local processes, namely the conversion of forest into pasture for cattle, are in reality linked to political and economic incentives at regional, national, and international scales. Key political ecology research in this area has centered on Amazonia. Employing a materialist analysis, Schmink and Wood's (1987, 1992) work explored how market expansion resulted in increasing class stratification, and that the deforestation was due to not just individual loggers, but rather the contest between politically and economically powerful groups. Hecht and Cockburn (1989) looked, by contrast, at how the concomitant deforestation and economic development of Amazonia were the result of the Brazilian government's geopolitical strategy to control the Amazon region and its populace by creating regional road networks and colonization projects. More recent work eschews the macro-scale analysis, and instead focused on large landowners dominant role in forest clearing (Walker et al. 2000). Political ecology research that focuses on degradation and marginalization shows that land degradation is frequently not the fault of marginalized groups, but rather the result of larger political and economic processes (Bailey and Bryant 1997; Watts and Peet 2004; Collins 2008).

Environmental conservation has been a second area of extensive research in political ecology. One larger argument of the political ecology of conservation is that in effort to preserve what conservationists perceive as "nature", environmental conservation policies prohibit access of local communities to their landscapes and natural resources (Brosius and Russell 2003; West et al. 2006; Dove 2006). One example of research within this area is of conservation as a form of what Foucault terms "governmentality", whereby social technologies (such as game reserves and

protected areas) are used to dictate what people can do, and social institutions crafted to enforce what norms and behaviors are desirable (Brosius 1999; Agrawal 2005; Brockington and Igoe 2006; Hanson 2007). Political ecologists, among others, have explored how it is frequently the resource management strategies of the commons, and not the state that are responsible for sustainable resource management (Moore 1993; Sheridan 2001; McCarthy 2002; Beitl 2012). Bound up in environmental conservation are imposed ideas of wilderness as devoid of people, a social construct that political ecologists have widely critiqued, showing how time and again communities are responsible for the production and maintenance of what conservationists see as "nature" (Cronon 1995; Kay and Simmons 2002; Slater 2002; Nyrgen 2004). Slater (1995), for example, shows how Edenic narratives of Amazonia as pristine "nature" are idealized social constructions that obscure the heterogeneous histories and place-making practices of the people that have actively constructed the "pristine" rainforest. The creation of conservation areas as strictly delimited areas has also been critiqued because it is both ecologically and socially problematic, not meeting the needs of preserving either biodiversity or livelihoods (Wilshusen et. al. 2002; Wolmer 2002; Brockington et. al. 2008). In this context, Neumann (1997) explores how the creation of protected area buffer zones that allow local communities to retain limited subsistence rights rely upon and enshrine a conception of local residents as timeless primitives that are ecologically noble, and do not account for these communities' historically dynamic land use patterns, or their integration into larger political and economic processes.

A third focal area of political ecology is the study of environmental conflict. The environmental conflict thesis holds that conflicts between groups, along axes of gender, class, and ethnicity, arise as the state, private corporation, and social elites enclose and appropriate natural resources and produce conditions of scarcity (Robbins 2004: 173). This research employs

a feminist perspective to understand how the gendered division of labor and power differentially mediates access to natural resources (Carney and Watts 1991; Hart 1991; Fortmann 1996; Rocheleau, Thomas-Slayter, and Wangari 2013). It also draws upon insights from property research that holds the management of property is a system of rights that is historically produced (Emel et al. 1992; Emel and Roberts 1995; Perramond 2012). Political ecologists also critically analyze how development assumptions about the role of class, race, and gender structure poorly articulated policies, and unsurprisingly differential results (Schroeder 1999; Zimmerer and Basset 2003; Peet and Watts 2004). Carney's (1993) work on the gender politics of development in the Sahel exemplifies this approach, demonstrating how development initiatives often fail due to lack of attention to local realities, such as the gendered control of land.

The fourth thematic research is the intersection of environmental identity and social movements. The thesis underlying this research focus is that environmental change provides the opportunity for social grievances to develop, groups to construct their identities in opposition to the grievance, and mobilize to remediate it. In the United States, for example, migrant farmworkers and other marginalized communities are differentially exposed, and have mobilized in relation to, pesticide and hazardous waste exposure (Bullard 1990; Pulido 1996). These environmental and social justice movements are novel in that their basis in environmental change as a common grievance connects groups otherwise separated by class, race, and gender. Scholarship in this vein explores the unequal distribution of environmental risks, modes of peasant resistance, and the intersection of post-colonialism and ecology at the margins of society (Escobar 1998; McCarthy 2002; Peet and Watts 2004). Political ecologists have explored a range of broadly-defined environmental social movements—from the Zapatistas to the Chipko to the MST—noting how the performance of environmental identity is key to mobilizing around

environmental and social justice (Moore 1996; Escobar 2006; Bebbington 1999; Perreault 2003; Gleeson and Low 2012). Delgado and Rommetveit (2012), for example, explore how the Brazilian Landless Workers' Movement (MST) has appropriated scientific ideas about agroecology, and reconstituted itself as an imagined community (see also Wolford 2003). Their analysis shows how the MST tactically uses these imaginaries of nature in order to achieve its objectives of agrarian reform (see also Rosset and Martinez-Torres 2012).

Scale is the fifth core theme in political ecology research. Since Blaikie's (1989) hierarchical and discrete description of scale as rural, local, regional, national, and international, political ecologists have developed more nuanced understandings of how scale gets made (Zimmerer and Basset 2003). These more textured visions of scale are not as ontologically given, but rather 1) socially constructed, 2) fluid and fixed, and 3) fundamentally relational (Brown and Purcell 2005: 609).[37] As a result, in political ecology "attention to multiple scales is now de rigueur" (Zimmerer 1994: 117). As Zimmerer and Basset (2003) argue, attention to scale highlights how "environmental processes interact with social processes, creating different scales of mutual relations that produce distinctive political ecologies (3)." Scale is integral to many political ecology analyses because it illuminates how particular landscapes are produced, and differentially rendered legible or illegible, by national and international policies (Zimmerer 2000; Swyngedouw and Heynen 2003; Walker 2003; Vazquez-Leon and Liverman 2004; Gezon 2005; Buzelli 2008; Velásquez-Runk et al. 2010). Other political ecologists have fruitfully engaged with scale by exploring how place-based struggles internationalize globally prominent discourses of environmentalism (Escobar 2001; Paulson and Gezon 2005; Jewitt 2008; Karriem 2009). Brown and Purcell (2005), for example, critically explore the scalar "local trap" that presumes

[37] For entry into the geographic literature on the politics of scale see: Smith 1992; Jonas 1994, Swyngedouw 1997a, b, Marston 2000.

that locally scaled struggles are inherently more emancipatory or environmentally sustainable. Their analysis of development projects in the Brazilian Amazon highlights that it is agendas rather than particular scalar arrangements that determines particular development outcomes (Brown and Purcell 2005: 620). I have reviewed a plurality of positions within political ecology; their diversity provides the material necessary to build a definition for the political ecology of education.

The politics of knowledge production, consumption, and resistance have occupied a prominent role in political ecology's evolution, and is the sixth core theme I review. Knowledge and power are centrally embedded in development discourse (Escobar 1995; Ferguson 1994), as part of a project of state legibility (Scott 1998), and intertwined with mistranslation, concealment, and ignorance (Matthews 2008). Knowledge matters from a political ecology perspective, for as Schmink and Wood (1987: 51) indicate, ideas are never neutral and always "either reinforce or challenge existing social and economic arrangements". Material struggles over resources are therefore struggles over meaning (Peluso 1992, Jarosz 1996). Bryant's (1997) analysis of colonial forestry in Burma was an early example of this approach. Colonial foresters used a discourse of scientific forestry as progress to replace traditional swidden land management practices with commercial timber production. Marginalized groups resisted scientific forestry through both arson and articulating their pre-existing rights. Importantly, in political ecology, these struggles over the politics of knowledge are sometimes separated from material resources. Demerrit's (2001) work on the social organization of climate change science and the concomitant social 'construction of global warming' exemplifies how the interconnections between scientific knowledge claims and political processes raise important questions about trust, uncertainty, and expertise.

Political ecologists have also focused extensively on the characteristics, distinctiveness, and interrelations between scientific and traditional ecological knowledge (Agarwal 1995).[38] Political ecologists, tend to see indigenous knowledge, which is produced through long-term interactions with the cultural landscape, as something to be taken into account to resolve local-level environmental resource conflicts precipitated by development and conservation initiatives (Brush and Stabinsky 1995; Warren et al. 1995; Brosius 1997; Ellen et al. 2000).[39] However, Agrawal (2002) critically analyzes the 'scientisation' of indigenous knowledge through the World Bank's Initiative on Indigenous Knowledge database, which involves documentation, particularization, validation, and generalization. To this end, work has been done on creating hybridized knowledge approaches that integrate aspects of scientific and traditional knowledge (Forsyth 1996).

Political ecologists have put forth a diversity of definitions of political ecology over the evolution of the sub-field. I now build a definition of the political ecology of education by synthesizing key definitions of political ecology, and integrating foundational principles of critical education studies. Each traditional definition of political ecology holds aspects that are key to developing an understanding of how the development and maintenance of knowledge

[38] Feminist political ecologists have explored the how women's voices and interests are marginalized in western science, how gendered metaphors are employed in scientific discourse, and how alternative women's experiential understandings of science are discredited (Joekes et al. 1995; Rocheleau et al 1996).

[39] Analyses of indigenous knowledge within political ecology frequently concern knowledge of biodiversity. Various actors, ranging from governmental agencies, to conservation NGOS, to indigenous groups to social movements engage in making claims on and about biodiversity, frequently as part of redefinition and assertion of cultural identities. This reassertion is frequently couched in terms of territorial defense, political autonomy, and cultural difference (Escobar 1998). At the core of political ecologists analysis of these claims concerning biodiversity, is that while there are material referents, biodiversity is in many ways a cultural and political construct, and knowledge about biodiversity is entirely so.

systems affects land management and landscape change. Each definition is first presented and then redirected towards clarifying the myriad relationships between education, politics, and ecology. By bringing lenses from these two fields together, scholars are afforded a framework for exploring how pedagogical processes and practices—in all their variety—intersect with political and economic currents to affect communities, their environmental knowledge systems, and the ecosystems they inhabit.

Greenberg and Park in their seminal article in the *Journal of Political Ecology* (1994: 6), characterize political ecology as a synthesis "of political economy, with its insistence on the need to link the distribution of power with productive activity and ecological analysis with its broader vision of bio-environmental relationships." A political ecology of education, to build on this definition, considers political economy, and its focus on the interrelations between political institutions, the political environment, and the economic system, as of primary importance. This attention to political economy makes sense, given that scholarship within the *political economy of education* has long been attentive to the power of funding circuits in mediating neoliberal education (Elmore 1984; Carnoy 1985; Torres and Schugurensky 2002; Mitchell and Mitchell 2003). Merging the concerns of the political economy of education with more traditional political ecology offers a lens for analyzing how particular funding mandates, and the policies that promote them, either differentially enable or preclude particular pedagogical practices, and the effect of these on the diffusion of particular conceptions of nature, and productive activities.

Directing attention to the intersection of politics in daily life, Stott and Sullivan's (2000) work adds an important definitional aspect, which is the need to identify "the political circumstances that forced people into activities which caused environmental degradation in the absence of alternative possibilities....involv(ing) the query(ing) and reframing of accepted

environmental narratives, particularly those directed via international environment and development discourse (4).” The goal of such an analysis is “illustrating the political dimensions of environmental narratives and in deconstructing particular narratives to suggest that accepted ideas of degradation and deterioration may not be simple linear trends that tend to predominate (5).” Several elements of this definition are germane to the present task. First is the role of “political circumstance,” which social movement scholars have explored within a body of research known as 'opportunity theory' that affords an analysis of how certain movements arise and gain power within particular political climates (McAdam and Snow 1997; Benford and Snow 2000; Ondetti 2008). Secondly, Stott and Sullivan draw attention to how communities become forced ‘into activities which caused environmental degradation in the absence of alternative possibilities’. In the context of education, analyses in this vein might explore how development programs promote particular types of knowledge and associated agricultural practices, which ultimately result in environmental degradation, at the expense of other forms of environmental knowledge. These concerns are closely related to the definition's third element, which is the importance of 'reframing of accepted environmental narratives'. Political ecologists working in this area have questioned accepted trajectories of land degradation using archival land records and historic aerial photographs (Fairhead and Leach 1996). Redirecting this lens towards education enables an analysis of how critical education provides communities with skills in critical readings of landscapes, empowering them to question histories of landscape change, and their role within those narratives (Gruenewald 2003; Johnson 2012).

Lastly, Hempel in a sweeping study of environmental governance defines political ecology as “the study of interdependence among political units and of interrelationships between political units and their environment (1996:150).” The salient aspect of this definition is its

emphasis on the importance of *interdependence* between political institutions. Applied to education, Hempel's perspective encourages a close examination of the reciprocal relations between educational units, and the political entities that sustain them financially and ideologically.

These traditional definitions afford various important elements to synthesize. To quickly summarize, these are the importance of political economy (Greenberg and Park 1994), the relations between political circumstances and environmental degradation (Stott and Sullivan 2000), and the interconnections between political institutions (Hempel 1996). Building upon these various aspects, I describe a political ecology of education herein as one attuned to how the distribution of power and resources among interconnected political and cultural entities mediates pedagogical processes—from tacit to formal learning—and related knowledge systems, affecting access and control over natural resources, interactions with the cultural landscape, as well as conceptions of nature-society relationships.

Intellectual Genealogy

This section fulfills one of the article's primary objectives by illustrating an intellectual genealogy of the political ecology of education. It achieves this by synthesizing key ideas from critical education, agrarian studies, human geography, and environmental anthropology with those from political ecology.[40]

Similar to critiques that both politics, policy, and ecology are absent in political ecology (Walker 2005, 2006, 2007), many will likely ask of a political ecology of education: where is the education? I use the term *education* broadly at the outset to refer to the gamut of pedagogical

[40] The conclusion of the article highlights other intellectual traditions that could easily be brought into dialogue with this genealogy.

processes that fall along a continuum of *formality*. This continuum runs from formal education, to non-formal education, informal learning, and tacit learning.

Formal education is commonly defined by its intention, by its set curriculum, by its attendance policy, mode of assessment, and by its location, occurring in an institutional space designated as educational, such as a school or university. Each of these factors provides insight into the politics of knowledge. As Apple and Aasen remind us "A critical question is whose knowledge is of the most worth. Only some knowledge gets declared legitimate or official" (2003: 1). To analyze the politics of knowledge, one must ask what is the purpose of education. Formal education serves as a technique for reproducing particular forms of culture, and in doing so the dominant social system (Bourdieu and Passeron 1977). By controlling the reproduction of culture, *vis a vis* the production of particular skills, education also influences the material conditions of production.

Non-formal education, by contrast, also takes place within a broadly defined pedagogical space, but one that is not necessarily state-sponsored. Definitions of non-formal education frequently focus on the absence of particular defining features of formal education, such as continuous attendance, assessment, or existence within a traditional educational setting (Ward et al 1974; Ahmed and Coombs 1975). Non-formal education means different things in different historical and geographic contexts. In the first-world, non-formal education is most frequently used to denote educational programs that are outside of school, such as in a nature center. In the developing world, non-formal education has frequently been used as part of a social justice agenda to “improve the participant's power and status either by adding to his or her stock of skills and knowledge or by altering basic attitudes and values toward work and life (La Belle 1984: 80).” In Latin America, non-formal education has a long history, existing since the 1920s,

as part of community-based programs, literacy education, vocational training, extension education, popular education, community schooling, and female-dominated social movements (La Belle 2000: 21). Non-formal education can also be integrated as part of the state's larger educational system. Nicaragua's Sandinista government, which institutionalized non-formal education as part of its efforts to base its restructured educational system in the revolution's ideals of social justice, exemplifies how non-formal education can be institutionalized in emancipatory contexts (Arnove and Dewees 1991).

Informal and incidental learning are frequently dealt with together due to their basis in experience.[41] In social movements, these forms of learning have been conceived of together as a "learning iceberg", as the learning is frequently invisible but of a massive extent (Crowther and Shaw 1997). Informal and incidental learning are two of the slipperiest forms of knowledge transformation to differentiate. Informal learning can be defined as "learning outside of formally structured, institutionally sponsored, classroom-based activities (Marsick and Watson 1990: 6–7)." Incidental learning is distinguished from informal learning by defining it "as a byproduct of some other activity, such as task accomplishment, interpersonal interactions, sensing the organizational culture, or trial-and-error experimentation (Marsick and Watson 1990: 6–7)." Whereas informal learning is denoted by its sometimes intentional and frequently planned nature, incidental learning is accidental and largely semi-conscious (Marsick et al. 2009). The following passage from Marsick et al. (2009) beautifully captures the nuances of these two learning forms:

[41] As Fenwick (2009) notes, experience is not unique to informal and incidental learning, but can characterize non-formal and formal learning as well. Experience is frequently a focal aspect of both informal and incidental learning because of its existence outside of the formal education system.

> Informal and incidental learning is an amoeba-like process, multi-dimensional in nature, consisting of iterative cycling back and forth among phases of the process—with frequent forays into conversation, work with other people, and exploitation of a wide array of resources…Typically, the learning process includes an element of *collective learning* as work groups struggle together to solve a problem or sail forward to creatively address a new challenge. Learning is often intertwined with *action* and sometimes *semi-conscious* at best. *Reflection* can take place before, during, or after action. While reflection aids such learning, it can also sometimes embed error into the learning process when it is private or more subjective than evidence-based. Finally, the learning is often so intrinsic to action that it remains unarticulated and preverbal, yet evident in the actions taken by individuals and groups (572).

A brief exploration of theories of experience in informal and incidental learning is warranted given the importance of experience to both of these forms of learning. Of the five main perspectives on experiential learning that Fenwick (2009) identifies, three are directly applicable to this intellectual endeavor.

In the constructivist theory, the individual constructs knowledge through reflection and interpretation of lived experience (Piaget 1966, Vygotsky 1978, Wells 1995). The situative theory of learning, by contrast, posits that knowing and learning are defined through engaging in social narratives, relations, and processes (Lave and Wenger 1991; Beckett 2002). Within this model, learning occurs within a community of practice, and as opposed to unilinear transmission, is characterized as a social process of knowledge co-production (Golding 2009). Knowledge within this model is explicitly contextual, situated in a specific spatiotemporal cultural and physical environment (Brown 1989; de Carteret 2008). Scholars advocating for a collective theory of social movement knowledge production have employed situative learning theory extensively to illustrate how individual and group meanings are produced through reflective collective action (Holford 1995; Foley 1999; Kilgore 1999, Overwein 2000; McCowan 2003; Endresen 2005). The objectivity of knowledge claims is particularly contentious in situative theories, as the knowledge is socially produced (Kilgore 1999). The fourth perspective on

experiential learning is critical reflection (Mezirow 1990; Fenwick 2009). Power is a focal issue of experience, and the processes of reflection and transformation key to learning (Giroux and McLaren 1994). Within critical learning, the dislodging of hegemonic beliefs and culture is key to reclaiming autonomy and agency (Mayo 2004). The work of Brazilian critical pedagogue Paulo Freire, specifically his ideas of praxis and conscientization, has been foundational for both critical pedagogues and social movements (Freire 1973; McLaren 1993; Ghanem 1998; Kane 2000). These critical perspectives indicate that the signs and symbols of experiential education are powerful forces in learning (Finger 1989).

Political Participation and the Continuum of Education

Research on political participation in social movements is directly relevant to the political ecology of education framework, because participation grants access to educational opportunities. Scholarship on social movements has historically sought to tease apart the factors resulting in differential social movement participation (McAdam and Snow 1997). During the 1970s and 1980s, resource mobilization theory was the prevailing school of research in social movement theory and informed understanding of collective resistance by illustrating the importance of resources for groups to carry out actions (McCarthy and Zald 1977; Mueller 1992; Oberschall 1973, 1978; for a then contemporary review of resource mobilization theory see Jenkins 1983). The strand of social grievance scholarship in turn examined how social movements coalesced when actors confronted similar issues (Holton 1978; Kurtz 2003; Melucci 1989; Morrison 1978). Political opportunity theorists added to an understanding of the forces resulting in social movement formation by stressing how changing political structures can create or negate spaces of resistance (McAdam et al 2001; Meyers 2004; Skockpol 1979; Tarrow

1998). In the context of a social movement, political participation is a variable that creates feedback loops between the various forms of education and learning. In addition to focusing on how political participation mediates access to education, a political ecology of education goes a step further by asking how this education affects land use. Agricultural extension education is a natural thematic area of education to explore the effect of education on land use (Engel 1990; Hassanein and Kloppenburg 1995; Coughenour 2003).

Agricultural Extension

Definitions of agricultural extension have changed extensively over the field's development; yet, at its most general, agricultural extension consists of educating farmers through the dissemination of new knowledge, which is often produced through scientific research. Black (2000) divides the field of agricultural extension into top-down and bottom-up approaches. Traditional agricultural extension is top-down, and is based on a positivist conception of scientific process and its products as first developed by experts through empirical trials and then disseminated (Thompson and Scoones 1994; Tsouvalis 2000). These top-down knowledge pathways have traditionally reified categorizations of the knowledge, and its purveyors as "experts" in contrast to that of its receivers, whom are devoid of real knowledge and seen as backwards (Carolan 2006). Freire (1973) critiques traditional agricultural extension, writing that:

> there is in the concept of extension an unquestionably mechanistic connotation of taking, of transferring, of handing-over, and of depositing something in someone. This something that is being brought, transmitted, transferred (in order finally to be deposited in someone—the peasants), constitutes a group of technical processes, which imply knowledge, which *are* knowledge, and which imply the following questions. Is the act of knowing that by which a subject, transformed into an object, patiently receives content from another? Can this content, which is

> knowledge *of,* be treated as if it were something static? Is knowledge submitted to historical-sociological conditioning? (97)

In critiquing traditional agricultural extension, Freire advocates a new model based in dialogue. Besides being based in communication, it is characterized by co-operative activity involving respect for local knowledge. Freire argues that dialogic agricultural extension is so distinct it actually shouldn't be referred to as extension, but rather communication. He makes the argument that, "…the real work of the agronomists in their role of educators…(is that they) must refuse to 'domesticate' people. Their task is *communication*, not *extension* (1973: 95)." Freire's theorization of extension *as* communication helped advance the move in the 1980s towards participatory development, and its bottom-up model of extension (Chambers and Ghildyal 1985; Thompson and Scoones 1994). This model, as first exemplified through the tools used in rapid rural appraisal, first positioned farmers as sources of information, and as a result their participation was rather limited (Black 2000). Rhoades and Booth (1982) sought to redress these silences and power dynamics by advocating for a "farmer-first" model, which starts with the knowledge, problems, and priorities of the farm families.

Agricultural extension is an under-surveyed arena in which myriad power relations—between actors as varied as state agencies, extension agents, seed and fertilizer networks, peasants, and activists, are enacted and contested (Gray 1997). Ingram (2008) notes that power, knowledge, and intervention are tightly coupled within agricultural extension. Particularly illustrative of this has been the link between agricultural extension and the rise of sustainable agriculture (Hassanein and Kloppenburg 1995; Morgan and Murdoch 2000; Coughenour 2003; Eshuis and Stuiver 2005).

Political Economy

Political economy is central to the political ecology of education. Both critical education scholars and political ecologists and have long paid attention to political economy as a mediating force (Elmore 1984; Carnoy 1985; Batterbury 2001; Mitchell and Mitchell 2003; Brown and Purcell 2005; Olssen and Peters 2005). For example, critical education scholars have focused on how multi-lateral banks, such as the World Bank and IMF, create funding streams for education that prioritize certain pedagogical approaches and systems (Heyneman 2005). Other educational scholars have explored the political economy of education as a part of a much larger phenomena, examining how neoliberalism, as a set of ideologies, has privatized education by turning it into a capitalized commodity (Torres and Schugurensky 2002). Yet, as Napier (2005) notes, analyses of the links between education and circuits of economic dependency need to be attuned to larger histories of colonialism, liberation, and post-colonialism, as these have created the context for specific structures of inequality. In critically analyzing the outcomes of educational reform, the source of reform is of paramount importance in comparing on the ground realities with the ideals of ideologues (Napier 2005).

The State, Social Movements, Hegemony, and Counter-Hegemony

Early 20th century Italian political theorist Antonio Gramsci's writings on hegemony, and those that have drawn on his writings to theorize counter-hegemony provide a constructive vantage for political ecologists of education to understand the juxtaposition of social movements and the state (Dore 2009). Hegemony, for Gramsci, is a combination of consent and coercion that is used to maintain the dominant ideas. The state employs *coercive* power through the police and the economy. Ideological *consent* is created through civil society institutions, such as the

educational system, that persuade the subaltern classes to embody the dominant ideas as 'common sense' (Jones 2006). Counter-hegemony is a term that Gramsci himself never used, but many have found his writings as a source for theorizing about counter-hegemony (Wainwright 2012). Counter-hegemony is essentially a form of 'popular common sense', or an ideology that is at odds with the dominant system of ideas and is vying for dominance (Karriem 2009). This juxtaposition between hegemonic ideas and efforts to advance counter-hegemony provides one account for the place of grassroots movements' institutionalization of education. Within the tradition of Marxist state theory (Poulantzas 1978; Jessop 1990; Boden 2011), institutionalizing popular education can be seen as part of a long-term strategy of state transformation, where struggles are occurring both inside and outside the state simultaneously. Gramsci referred to this long-term struggle as the "war of position" and saw educators, whom he termed "organic intellectuals" as playing a fundamental role as organizers in this ideological struggle (Coben 1995; Giroux 1999; Yogev and Michaeli 2011)

Resistance

Attention to resistance is key in order to understand how grassroots environmental education becomes institutionalized within the state. Resistance can take place through public actions as well as more quotidian forms. James Scott's work on everyday forms of resistance is quite instructive at this point. In Weapons of the Weak, Scott found that resistance was not simply of a massive and explosive extent, like what one would think about in terms of social movements. Rather, resistance takes place on a daily level through subtle means, which Scott terms 'hidden transcripts'. The juxtaposition between public and private forms of resistance provides an area of overlap between critical education and agrarian studies, and political ecology.

Curricula as Resistance: Critical Place-Based Education

Although it is frequently not thought of as such, the creation and institutionalization of curricula can be a form of resistance. Curricula serve as resistance when they help students critically reflect upon hegemonic forms of production and advance counter-hegemony. Critical place-based education is a synthesis of critical pedagogy and place-based education. Critical pedagogy helps students learn "to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality (Freire 1973: 17)." Place-based education has evolved from the historic lack of attention to local context in education (Sobel 2004). Place-based educators draw on "the power of place as a context for diverse experiences that do not and probably cannot happen in the institution of school…(they) advocate using diverse communities as "texts" for curriculum development… (Gruenewald 2008: 143)."

Gruenewald describes the primary objectives of a critical pedagogy of place as decolonization and reinhabitation (2003: 3). Decolonization as Gruenewald uses the term is "a metaphor for the process of recognizing and dislodging dominant ideas, assumptions and ideologies as externally imposed (Gruenewald 2003: 9)."[42] Reinhabitation seeks to advance "learning to live-in-place in an area that has been disrupted and injured through past exploitation" (Gruenewald 2003: 9).

[42] Gruenewald's usage of decolonization differs from that of Mingolo, Escobar and others who write about post-colonialism, and use it to mean the "decolonization of knowledge and being by epistemically and affectively de-linking from the imperial/colonial organization of society" (Tlostanova and Mingolo 2009: 132). While one could certainly connect these usages, doing so would detract from the objective of the present work.

Territoriality, the Geography of Learning, and the Learning of Geography

Attention to territory and territoriality provide one way to understand the importance of a critical pedagogy of place to a political ecology of education. Territory is comprised of material and immaterial aspects. Material territory consists of landforms and infrastructure, whereas immaterial territory is the ideologies associated with particular landforms (Fernandes 2009). As described above, a critical pedagogy of place uses decolonization as a methodology to uncover how particular ideologies structure environmental degradation. In Chapter 6, I explore how this pedagogical approach also uses field research to help in the process of reinhabitation, creating new connections between learners and places. Because education in this context can be used to influence individual's relations to the land, I find that it can be thought of as a form of territoriality.

Understanding education as a form of territoriality sheds light on a recent debate in human geography concerning how learning is a geographic process (see Professional Geographer 2013). There are two main questions in this debate. The first concerns the geography of learning, or how learning opportunities are geographically dispersed in space. The second questions how individuals learn about geography, including what constitutes space, place, and scale. Attention to how education functions as a form of territoriality, controlling relations to territory informs both questions within this debate.

Conclusion: Future Directions in the Political Ecology of Education

Although the field of political ecology has thrived and evolved in multiple directions since its inception, its internal coherence and theoretical contributions have been the subject of debate (Vayda and Walter 1999), bringing Watts to declare that it has in "a sense almost

dissolved itself . . . as scholars have sought to extend its reach" (Watts 2000: 592). Yet, political ecology is not a "project in intellectual deforestation" (Greenberg and Parks 1994 paraphrasing Wolfe), in which scholars simply knock down the work of their predecessors. Rather, theoretical efforts, such as the present, which seek to expand political ecology's purview can be seen as intercropping, seeking to build more dynamic and complex systems.

Here I have articulated a framework for a political ecology of education. I first briefly reviewed the intellectual debates that led to the coalescence of political ecology. I then highlighted the major thematic areas of research in political ecology. I synthesized various definitions of political ecology with insights from critical education and the political economy of education to come to a definition of the political ecology of education. Lastly, I highlighted the importance of various bodies of literature to the nascent framework of the political ecology of education. As indicated earlier in the article, this is simply *an* approach to the political ecology of education. Undoubtedly, various other literatures are relevant to a political ecology of education, and with these additional literatures, the research foci that fall under this approach will certainly expand. In concluding the article, I highlight some of these future theoretical and methodological directions.

I believe that research from a political ecology of education perspective can inform the various thematic areas of traditional political ecology that I reviewed earlier. One might explore how education transforms local community member's conceptions of degradation. If, as Blaikie and Brookfield indicate, degradation is "open to multiple interpretations" then a question becomes: what are the roles of education and the politics of knowledge in shaping these interpretations? For example, do development programs educational initiatives shape local understandings of environmental degradation, and in turn resource use?

Political ecologists interested in conservation would surely benefit by expanding their toolkit to explore the political ecology of education. Environmental education is a standard aspect of many conservation initiatives, yet the role of environmental education in conservation programs has received little attention by political ecologists. Using the lens of environmentality (Agrawal 2005), one might explore how conservation education programs train residents of protected areas to govern themselves. Another fruitful approach would be to explore the political economy of these education programs; for instance, how does conservation education concerning bushmeat affect livelihood strategies and land use practices in protected areas? By employing discourse analysis, one might also analyze how particular global conceptions of nature are promulgated through conservation education materials.

Political ecologists have analyzed how gender, class, and ethnicity are axes upon which conflict over environmental resources arise when the state, private corporation, and social elites enclose and appropriate natural resources, producing conditions of scarcity. I ask the question: is education another axis of conflict in the contest over natural resources? To explore this question, political ecologists of education might explore how the state's creation of rural schools differentially affects the gendered access to natural resources, resulting in social conflict. Common property systems might be another area for analysis; one question that emerges by turning the political ecology lens on education is how does knowledge about the rules of common property get communicated, contested, and reconfigured? For example, does the state's educational system lead to the degradation of the social rules governing the commons? From the flip side, one might ask what political and economic variables affect informal and tacit learning about common property regimes?

Environmental movements are a ripe area to explore the political ecology of education. Although there is a long tradition of scholarship on education within social movements, environmental education within these movements has received relatively little attention. Political ecologists who focus on social movements might explore how these movements create opportunities for education as part of their social struggles. A related analysis might explore how education shapes the identity of movement members, and in turn their participation in a movement. Still another approach would be to explore how political participation in social movements grants access to a continuum of environmental education opportunities from formal education to tacit learning, and the ways in which these opportunities affect natural resource management.

Scale is undoubtedly a natural area of analysis for political ecologists of education. Educational scholars have already begun to analyze how the scalar affects of public policies are socially produced, and interrelated. Political ecologists of education could advance these analyses of educational scales to explore how social movements simultaneously engage in local, regional, and national struggles for education reform that have direct affects on environmental learning and land use practices. A related analysis would be how national environmental education policies are interpreted and implemented in different ways at diverse governmental scales.

In addition to contributing to these traditional thematic areas of political ecology, I believe that there are a host of other questions ripe for future research in the political ecology of education. Explorations of temporal scale would undoubtedly contribute to a political ecology of education. In thinking about temporal scale, I am drawing attention to many countries' complicated historical trajectories from countries under colonial rule, through liberation, and to

the post-colonial present. Similar to political ecologists, who have explored historical forest policy's, such as in colonial Burma (Bryant 1997), I believe that there is room for theorizing the importance of temporal scale in understanding the relation between educational policies and practices and resulting ecological conditions. Future scholarship in the political ecology of education should also engage more directly with the question of culture, and cultural traditions of learning. Historical inequality in indigenous education is a particularly clear example of the necessity to pay attention to culture as a central focus within the political ecology of education. There is an extensive body of scholarship on how the state has used education as a means of repressing indigenous groups, forcing them to suppress their cultural traditions and native languages. From the political ecology of education perspective, one might ask what forms of traditional knowledge and practice are lost when indigenous students enter into state-sponsored educational programs. Taking the same question from a different vantage, one might ask what are the culturally-appropriate forms of knowledge transmission within indigenous cultures, and how can these traditions be valorized both within state-sanctioned educational spaces, as well as on their own.

This last example highlights the importance of applied research, which has been one of the central features of much political ecological scholarship, and I believe should be a defining aspect of a political ecology of education. Similar to a large body of scholarship on activist scholarship, I believe that political ecologists interested in education should see their research as a means to an end. That end, from the perspective of critical pedagogy is social transformation. That end from the perspective of political ecology, is leveraging an understanding of how particular economic and political processes collide to motivate change. Together, the end of a political ecology of education is recognizing that politics, economy and education can be used to

affect changes in environmental knowledge, conceptions of nature, land management practices, and ecology.

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CHAPTER 3

AGROECOLOGY AND RADICAL GRASSROOTS MOVEMENTS' EVOLVING MORAL ECONOMIES[43]

[43] Meek, D. Submitted to *Advances in Research: Environment and Society*, 11/1/2013

Abstract

Grassroots social movements are increasingly advocating agroecology as an ideological and practical basis to their activism. Agroecology plays a central role in these movements' evolving moral economies. I focus on the role of agroecology in rural proletarian social movements in this article. First, I highlight these movements' conception of agroecology as an important element of their political ideology. Second, I explore the value of agroecology in helping maintain the permanence of the peasantry. Third, I show that rural proletarian movements emphasize agroecology because it is key to attaining sovereignty. I draw upon the geographic lenses of territory, the production of space, and autonomous geographies, in positing these arguments. Throughout the article, I draw upon a case study of the Brazilian Landless Workers' Movement, one of the most vocal agroecological social movements, to illustrate these arguments.

Keywords: agrarian question, agroecology, Brazilian Landless Workers' Movement, food sovereignty, moral economy, repeasantization

Agroecology and Radical Grassroots Movements' Evolving Moral Economies

Introduction

Why are progressive grassroots movements increasingly incorporating agroecological ideas and practices into their activism? Agroecology, which can be defined as the integration of ecological principles into agricultural systems (Gliessman 2007), is the focus of an exploding literature (see reviews in Wezel et al. 2009; Wezel and Soldat 2009).[44] Similarly, academic analyses of agroecological social movements are also increasing, as these movements adapt their tactics and discourse to changing agricultural policies (Martinez-Alier 2011; Altieri and Toledo 2011; Van der Ploeg 2012; Guzman and Woodgate 2013). Martinez-Torres and Rosset (2014) argue that Latin American radical agroecological activism is made up of three types of movements: indigenous, peasant, and rural proletarian groups (10).[45] The objective of this article is to synthesize the interdisciplinary literature on agroecology in rural proletarian movements, and extract the reasons why these movements promote agroecology.[46] My central arguments are **1)** agroecology plays an important role in evolving agrarian moral economies; **2)** that rural

44 As an example of this trend in scholarship, the Journal of Sustainable Agriculture was renamed in 2013 the Journal of Agroecology and Sustainable Food Systems.

45 Martinez-Torres and Rosset's tri-partite delineation partially redresses Bernstein's (2009, 2014) critique that academics that are sympathetic to agrarian movements unwittingly homogenize them by describing them as 'peasant' movements (e.g. Desmarais 2002, 93). While Bernstein's critique is valid, it is important to acknowledge the possibility that these movements (perhaps tactically?) homogenize themselves. For example, leaders of the Brazilian Landless Workers' Movement (MST) frequently use the terms *campesino* and rural landless worker synonymously (see Garmany and Maia 2007, note 1). I feel that such slippage is exemplary of what Wolford (2003) and Delgado and Rommetveit (2012) refer to as the MST's efforts to create an 'imagined community' (Anderson 1983).

46 I focus on rural proletarian movements in general, and Brazil's Landless Workers' Movement (MST) in particular, because I have the most knowledge of these movements, having conducted four periods of fieldwork between 2009-2014 on agroecology in the MST.

proletarian movements advocate agroecology because the overlap between the environment and society is a primary site of conflict between neoliberalism and anti-neoliberalism, and **3)** these movements tactically use agroecology to create autonomous spaces of resistance where they can develop new forms of material production, and advance their objective of a socialist transformation. In making these arguments, I draw on a case study of the Brazilian Landless Workers' Movement (*O Movimento dos Trabalhadores Rurais Sem Terra* or MST), which is a member of the international umbrella movement La Vía Campesina (LVC), and is one of the most vocal grassroots movements advocating agroecology (Desmarais 2002, 2007; Delgado 2008; Rosset and Martinez-Torres 2012).

Neoliberal Values

Neoliberalism is at once a set of ideologies, principles and practices that at their core emphasize the privatization and deregulation of markets (Larner 2000; Harvey 2005; Castree 2010). Scholars have increasingly explored how neoliberalism affects access to and management of environmental resources (McCarthy and Prudham 2004; Heynen 2007; Lave 2012).

It might seem strange to speak of neoliberalism's value system. As Giroux writes (2004) neoliberalism places "capital and market relations in a no-man's-land beyond the reach of compassion, ethics, and decency" (124). Yet neoliberalism is explicitly predicated on values. Neoliberalism is a philosophy that sees market values as trumping all others. For the neoliberal, the primacy of market values extends beyond economics, to religious, political, ethical, educational and health dimensions. Neoliberalism is "a vision of society in which competition for wealth is the only recognized value (Faux 2006: 5)." Neoliberalism's market myopia delegitimizes the consideration of nonmonetary values, such as those surrounding the

environment and sustainability (Henderson and Hursh 2014).

The simultaneous beauty and danger of neoliberalism's value system is that it is both ubiquitous and unquestionable. As Bourdieu writes "Everywhere we hear it said, all day long—and this is what gives the dominant discourse its strength—*that there is nothing to put forward in opposition to the neoliberal view*, that it has presented itself as self-evident" (Bourdieu 1998: 29; italics mine). Ferguson (2009: 166) makes a parallel critique of the left's responses to neoliberalism, which he characterizes as universally centered on critique, rather than directed towards productive alternatives. Despite the merit of both of these analyses, they make illegible the normative visions of indigenous, peasant, and rural proletarian groups that are actively showing what "another world is possible" might look like (Fisher and Ponniah 2003; McNally 2006). Agroecology is one of the central arenas in which radical grassroots movements are actively constructing this other world.

A Historical Overview of Agroecology as Science, Practice, and Movement

The history of agroecology can be divided into two phases: the "old age" of agroecology (1930s-1960s), and "expansion age" (1970s-present) (Wezel et al. 2009). Since its origination, Wezel et al. admits to "80 years of history and confusion around definitions" (*ibid*: 503). Although elements of agroecology developed simultaneously within agronomy, zoology, and plant physiology, scholars often associate the origination of the concept in the late 1920s with Bensin, a Russian agronomist, who used it to define the application of ecology to agriculture (Loucks 1977; Guzman and Woodgate 2013). During the 1930s-40s, various researchers, such as Friederichs (1930), a German zoologist, and Klages (1928, 1940), an American agronomist, published studies that dealt explicitly with what would come to be known as agroecology, without using the term. Tischler, a German ecologist and zoologist, used the term in various

publications in the 1950s to describe the interactions between plants, animals, soil, climate, and human management within an agroecosystem (Tischler 1950, 1953, 1959).

During the expansion period (1970s-present), agroecology continued to develop as a scientific discipline. Partially in response to the Green Revolution, this emerging science explored the application of ecological principles, such as vertical integration, resilience, and nutrient cycling in sustainable agricultural systems (Conway 1987). Research began focusing on traditional and indigenous subsistence farming systems of tropical and subtropical developing countries (Alcorn 1981; Norgaard 1984; Altieri and Anderson 1986; Denevan and Padoch 1988). This research on the properties and principles of "agroecosystems" contributed to emerging debates concerning agricultural sustainability (Douglass 1984; Odum 1984; Gliessman 1990; Altieri 1992), and resulted in agroecology being increasingly defined as a way of protecting natural resources while promoting food security (Altieri 1990, 1995). As part of development work, which involved ecologists, agronomists, and ethnobotanists, in the 1980s the phrase "agroecology" began to be applied to historical cultures' agricultural practices as well as those of their contemporary counterparts (Altieri and Anderson 1986; Erickson 1992; Denevan 1995; Hecht 1995).

In the 1990s, certain groups began to define their engagement with agroecology as a social movement, whose objective is to foment a change in the relations between agriculture, nature, and society (Wezel et al 2009).[47] This movement evolved organically in many ways from the 1980s practice-oriented development work of scientists with smallholders, as well as scientific insights into the value of the integration of ecological principles into agriculture

[47] The existence of agroecology as a social movement does not mean that all agroecologists are social movement activists, in the same way that not all agroecologists are botanists or ecologists. These groups frequently share opposing understanding of what constitutes agroecological practices, and its utility. These differences are discussed in Wezel et al. 2009.

(Aliteri and Toledo 2011; Guzman and Woodgate 2013). In addition, the scalar shifts from the farm to the food system dovetailed with agrarian movements that were demanding fundamental changes in the food system (Altieri and Nichols 2008). The MST, which is part of the international peasant movement *La Via Campesina*, is one of the most vocal movements advocating agroecology (Rosset and Martinez-Torres 2012).

Radical Agroecological Grassroots Social Movements

Social movements' focus on agroecology draws attention to the tension between neoliberalism and anti-neoliberalism. Globally, radical grassroots social movements have become vocal critics of neoliberal agricultural privatization, and advocates of small-scale family farming (Edelman 1999; Guidry et al. 2000; Patel 2006; Borras 2008). Since its origination in 1993, *La Vía Campesina* (LVC) has become one of the most vocal movements advocating for agroecology. LVC is a global conglomeration of more than 200 million family farmers, peasant farmers, indigenous people, landless peasants and farm workers, rural women, and rural youth, that seek to defend small-scale family farming from the neoliberal privatization of agriculture (McMichael 2006; Borras et. al. 2008a; Borras et. al. 2008b; Wittman 2009).

For several reasons, the member organizations of LVC are actively forging a novel conception of environment and society relations based around agroecology. First, it helps maintain members' participation in the movement because it is a "socially activating" form of agriculture that is predicated on horizontal diffusion of new knowledge and techniques (Warner 2008). Second, it is an agricultural approach that is based in traditional agricultural methods and synthesizes peasant and indigenous wisdom with scientific knowledge (Leff 2002). Third, it is economically viable for small-scale farmers because it eschews external inputs and promotes the

usage of local resources (Van der Ploeg 2012). Fourth, agroecology seeks to increase productivity and sustainability by increasing diversity and integration of existing systems (Altieri and Toledo 2011: 599).

Focusing upon Latin America, Martinez-Torres and Rosset (2014) argue that the umbrella LVC movement is composed of indigenous, peasant, and rural proletarian movements. Peasant movements are defined by their mode of production and subsistence. Peasant movements can be largely comprised of indigenous members, but they frame their struggle in terms of land access, credit, subsidies, and crop and livestock prices (*ibid*: 10). Indigenous organizations within LVC, by contrast, frame their struggles in terms of language, territory, autonomy, and culture. Rural proletarian organizations are the most ideological of the three, and organize the landless to squat on land, and rural laborers into trade unions.

Each of these three groups mobilizes around and understands agroecology in different ways.[48] These differences center around the individual movement's unit of organization and mode of knowledge transmission (Martinez-Torres and Rosset 2014) Indigenous movements are based around the community as the unit of organization, and see agroecology as synonymous with traditional diversified farming systems whose management is governed by traditional calendars derived from the cosmos (Toledo 2000). Knowledge of these practices, like planting dates, are embedded in cultural traditions, and passed down over millennia (*ibid*: 10-11). Peasant organizations, by contrast, see the family as the basic organizational unit, and mobilize around agroecology due to lower production costs, and a more resilient source of subsistence (Toledo 2010). Agroecological knowledge in peasant movements is experiential, and transmitted through farmer-farmer methodologies, exemplified by the Cuban *Campesino a Campesino* movement

[48] Martinez-Torres and Rosset (2014: 10) note that these categories are fluid, and the identity of both movements in general, and their members in particular, will be along a continuum.

(Rosset et al. 2011). Lastly, rural proletarian movements are organized around the collective, and see agroecology as part of socialist ideology that is opposed to the expansion of capital. These movements see the transmission of agroecological knowledge as taking place in schools, and will result in trained technician members who are capable of helping collectives move towards ecological farming at semi-large scales.

Brazil provides a particularly interesting context to explore the conflict between neoliberalism and anti-neoliberalism, and rural proletarian movement's engagement with agroecology (Almeida et al 2000; Stahler-Sholk et al. 2007; Vanden 2007). Brazil has one of the highest concentrations of property ownership in the world, with a Gini coefficient of land distribution at 0.872 (Instituto Brasileiro de Geografia e Estatística 2006). While this level of inequity stems from colonial land grants and 19th century land laws (Hall 1990), neoliberal agro-industrial policies and development projects have perpetuated it (Hecht 1993; Wolford 2005). Landless peasants, or *sem terra*, are characteristic of Brazil's history of rapid modernization and development, and in many ways a product of neoliberal restructuring (Almeida et al. 2000).

Agrarian reform emerged as a major political issue in Brazil during the late 1950s and early 1960s (Cehelsky 1979).[49] Although grassroots movements began to mobilize for land reform in the early 1960s, the rising tide of activism was quashed in 1964, when the military coup obliterated any visible manifestations of activism (Ondetti 2008). During the late 1970s and

[49] The phrases *agrarian reform* and *land reform* are often used interchangeably, although they have different meanings. Cousins (2007) describes the distinction as "Land reform… is concerned with rights in land, and their character, strength and distribution, while… [agrarian reform] focuses not only on these but also a broader set of issues: the class character of the relations of production and distribution in farming and related enterprises, and how these connect to the wider class structure. It is thus concerned with economic and political power and the relations between them" in Ruth Hall and Lungisile Ntsebeza, eds., *The Land Question in South Africa: The Challenge of Transformation and Redistribution*, HSRC Press, Cape Town, South Africa.

early 1980s, conditions began to change that facilitated social mobilization. A political opportunity for political participation among civil society arose as the Brazilian dictatorship began to fail (Tarrow 1998). Additionally, various organizations, particularly those involved with the Catholic Church, provided institutional support for these landless peasants to begin organizing themselves (McCarthy and Zald 1977; Jenkins 1983). When combined with a social grievance of need for land, these factors constitute what Wolford (2003) terms the "genesis story" of the Landless Workers' Movement (MST).[50] Since its genesis in the early 1980s in southern Brazil, the movement has spread throughout the country, and is currently the largest agrarian reform movement in Brazil (Branford and Rocha 2002).

The MST is comprised of marginalized peasants who became politically mobilized out of a desire for agricultural land. MST members seek to attain land by first identifying unused agricultural land, and then pressuring the government to expropriate it by squatting and forming encampments (Wolford 2010). If these MST members are successful, the government will create an agrarian reform settlement. This tactic of squatting has historically worked fairly well for the MST's members, as the Brazilian constitution states that land must have a social value.[51]

[50] Although this "genesis story" explains many macro-level processes, Wolford (2003) argues it is not attuned to the complex politics of place, and does not account for important questions, such as who joined the movement, and what were their motivations. Through multi-sited ethnographic research in the countries' south and northeast, Wolford (2004) found that rationales for resistance were grounded in "spatial imaginaries", or particular understandings of space, such as notions of private property, which shape social life.

[51] Frequently the MST's land occupations are not successful, or drag on for more than a decade as the MST activists continue pressuring the state to expropriate land. One reason behind the slow pace of what the MST's direct action land reform approach is that a neoliberal model known as market-based land reform is increasingly dominant in Brazil (Borras 2008).

Although the MST originated in the early 1980s, it wasn't until the 1990s that it began to "green" itself by beginning to debate agroecology as a political and practical set of strategies.[52] The reason for debate was that the MST had originally adopted a large-scale agricultural approach, which was heavily influenced by Soviet and Cuban models, and theoretically based in orthodox Marxism-Leninism (Toledo 2002; Borges 2007; Barcellos 2009). The internal debate within the MST about agroecology continued until the MST's 2005 national congress, during which the assembled 11,000 members formally ratified agroecology as the movement's foundation for small-scale farming (Altieri and Toledo 2011).

The general failure of the MST's top-down cooperative model was a principal factor that led the movement to shift from a large-scale, high-input agricultural model to one that emphasized small-scale agroecological production (Barcellos 2009; Borges 2010).[53] The MST began to emphasize the creation of collectives in the 1990s as a response to the neoliberal policies of Brazil's president Fernando Collor who eliminated most forms of credit for the agrarian reform settlements (Diniz and Gilbert 2013). The MST leadership felt that its settlements would be insulated from the state's lack of support by creating collectives, which provided access to credit and increased production. However, in the early 1990s, the MST drew extensively on a rationalist conception of cooperativism, based in clear division of labor, large-

[52] Costa Neto and Conavesi (2002) expand this timeline by arguing that at the MST's first national congress environmental concerns were debated.

[53] MST's involvement in the nascent LVC movement in the early 1990s was another factor driving this agroecological debate. The MST's involvement in LVC is exemplary of "internationalization" (Tarrow 2005: 8), which is a process of increasing vertical integration between subnational, national, and international levels facilitated by formal internal movements structures and informal inter-movement associations (Borras 2008: 259).

scale production, mechanization, and top-down administration.[54] This approach denigrated traditional forms of peasant agriculture that were seen as antithetical to maximizing production and increasing capital. The MST sought to create a new person '*novo sujeito*' that was devoid of traditional peasant vices, such as "individualism," and "self-sufficiency" (Morais 1986: 23–39). Although the MST put extensive resources into nationalizing its cooperatives throughout its settlements, by the mid-1990s the movement recognized that this cooperative model was not working.[55] By 1997, for example, only 6% of MST settlements had operational cooperatives (Vergara-Camus 2009: 189).

The MST's difficulties with a rationalist model of cooperativism led the movement to develop a more endogenous form that valued traditional peasant ecological knowledge and familial working traditions (Leff 2002; Floriani and Floriani 2010). The MST's re-focusing on the family made sense as "the Brazilian camponês family is already itself a kind of collective, with its own distinctive patterns of division of labor and common property (Diniz and Gilbert 2013: 25). Following Santos (1985), the "internal structure of a family is a technical division of labor articulated according to the process of cooperation, resulting in a work day that combines the various members of the family. In this way the camponês family transforms itself into a

[54] The MST advocated this form of cooperativism based upon visits to Cuba, and the guidance of Brazilian sociologist Clodomir de Morais, who drew upon Kautsky, in arguing for the rationalization of production (See Diniz and Gilbert 2013 for details on de Morais's role). Important to note is that the MST's early vision of cooperativism was at odds with Chayanov's in that the logic of peasant production was envisioned to be centered around the increase of production and capital, and not the maintenance of the family (Borges 2010)

[55] The reasons behind the general failure of many of the MST's cooperatives are complex. The cooperatives lacked the ability to compete with subsidized industries that dominated the market. They lacked access to credit, and couldn't develop the capital to invest in improving their production, and cultural problems. Wolford explores how the cooperatives did not gel with traditional camponês practices, as it resulted in the gendered division of labor, didn't involve producing for subsistence, and were at odds with spatialized histories of labor.

collective worker (35 in Diniz and Gilbert 2013: 25, their translation)." The MST's focus on family-based cooperative production was a major step away from its previous large-scale agricultural emphasis, as collective action is the "motor of the agroecological transition" (Costabeber and Moyano 2000: 58). The MST's re-valuation of traditional peasant agriculture and organizational structures points to the role of agroecology within its evolving value system.

The MST's Agrarian Moral Economy and Agroecological Values

The MST in many ways operates from the epistemological antithesis of neoliberalism. Despite being a movement that seeks to transform the state, one central pillar of its value system is the responsibility it places on the state, from legalizing its occupations (*acampamentos*) and creation of formalized settlements (*assentamentos*) to providing credit, health, education and other services. Additionally, the movement pressures the state to have an increasingly regulatory role in managing the economy, advocating the creation of public policies, such as the national program for the acquisition of food (*Programa de Aquisição de Alimentos* or PAA), which purchases food from smallholders in agrarian reform settlements for use in schools, hospitals, and other public institutions. Another example of the MST's diametric opposition to the neoliberalism is the emphasis the movement ideologically places on the collective as opposed to the individual.

The concept of the moral economy provides a fertile arena to explore the evolving place of agroecological values in the MST. Historian E.P. Thomspon (1971) first promulgated the concept of the moral economy to describe popular protests in the face of expanding capitalism in England in the 18th century. These protests were not driven by hunger and fear, but the poor's perceptions that their moral right to feed themselves was being disregarded by millers who adulterated grains and merchants that hoarded them (Wolford 2005). Thompson's original

conception of the moral economy was "in general... confined to confrontations in the market-place over access (or entitlement) to 'necessities'-essential food, particularly profiteering and the beliefs, usages, forms, and deep emotions that surround 'the marketing of food in time of dearth' (1991:337-338 in Edelman 2005: 331).[56,57]

Since Thompson, various scholars have engaged with the moral economy concept in diverse ways. Scott's *Moral Economy of the Peasant* (1976), for example, explores how new forms of fixed cash land rent that accompanied the transition to French and Dutch colonialism replaced traditional tenancy relations that were based on labor rent and sharecropping. Similar to Thompson's analysis of 18th century English peasants, Scott found that peasants felt a moral right to "subsistence security" (1976: 35) that was sacrosanct and warranted rebellion when violated.

More recently, the concept of the moral economy has been applied to peasant and rural proletarian movements. Marc Edelman (1999, 2005) explores how peasants in La Via Campesina project a 'moral right' to culturally persist as agriculturalists. Edelman argues that many of La Via Campesina's arguments, such as those about "just prices" are "invoked as a transnational or even universal norm, rather than a local or national one. Some of the actors have changed and the relevant social field has widened to encompass global markets, but "just" behavior by the more powerful is an aspiration that still forms part of contemporary peasant activists' implicit moral economy (2005: 339)." As a result, Edelman sees that "the old moral economic discourses about just prices, access to land, unfair markets, and the greed of the powerful have echoes in today's

[56] For an excellent, yet now dated, overview of both the origins and evolutions of the moral economy concept see Thompson's 1991 essay "The Moral Economy Reviewed" (1991: 259-351).

[57] Edelman's (2005) review article is one of the most relevant reviews of academic engagement with the moral economy lens because it builds a data-driven argument for the concept's application to transnational agrarian social movement, such as LVC.

struggles against global trade liberalization, the World Bank's market-based agrarian reform programs, and corporate efforts to gain greater control of the food supply and plant germplasm" (*ibid*: 341).

Wolford (2005) employs the moral economy lens to explore the MST. She uses the term 'moral economy' in a different manner than Thompson or Scott to refer to "the moral arguments (ideal models or ideology) used by a particular group of people to define the optimal organization of society, including most importantly an outline of how society's productive resources (in this case, land) ought to be divided (243)."

Wolford employs the moral economy lens because it clarifies both the socially constructed nature of MST's "objective claim to resources" and their basis in a perceived moral heritage. The moral economy concept illuminates that in rejecting neoliberalism, MST members "are objecting to a worldview that labels their own poverty an indication of slothfulness and interprets their request for assistance as a sign of weakness (245)." The MST engages in moral economic arguments in order to legitimize their occupation of land. As Wolford describes it, "the presentation of a position as morally superior is, in fact, a necessary means of sanctioning or supporting the institutionalization of policies regarding the distribution of resources—particularly when the resource in question is considered (rightly or not) to be scarce" (2005: 257). I build upon Wolford's analysis to argue that the MST's moral economy is evolving and has expanded to make normative claims about forms of land management.

Rural proletarian movements employ agroecology as a moral economic argument because reframing their ideological arguments around sustainable land management makes political sense. The MST initially justified its land occupations on the basis that the lands were being "unused." However, increasing transnational investment in Brazilian agriculture in the

1990s resulted in a large percentage of Brazil's idle land being converted to agrofuel monocrop plantations (Novo et al. 2010; McMichael 2010). The MST, in turn, reframed their argument "by contrasting the ecological and social wasteland of agribusiness plantations ("green deserts") with a pastoral vision of agroecologically-farmed peasant lands, conserving biodiversity, keeping families in the countryside, and producing healthy food for local markets ("food sovereignty") (Rosset and Martinez-Torres 2012: 390). The agroecological values of this evolving agrarian moral economy are at odds with the neoliberal model. These values are the primacy of the community, through cooperation and collective organizing, and the importance of land, territory, autonomy, and food sovereignty.

Agroecology as Political Ideology

Rural proletarian movements, such as the MST, engage with agroecology for reasons that are dually moral economic and ideological. The moral economy of these movements, including what they value, what they frame as injustice, and what they see as ideal, plays a role in structuring their political ideology, because they draw on these moral arguments in framing their political struggle. Rural proletarian movements espouse agroecology as part of their larger political ideology, because it can be used as part their moral economic critique of the systemic inequality of the global food system, and their advocacy for counter-hegemonic forms of small-scale agriculture. As the MST's national leadership notes,

> This [capitalist] model of agriculture is the same that produces social exclusion and the expulsion of millions of peasant families to the slums, which led to hunger and poverty in rural and urban areas, and promotes the destruction of nature. We need to resist this destruction, exploitation of human beings, and the nature of capitalism. That's why for a numer of years the MST has been developing agroecology in their settlements….Above

> all, we understand that *agroecology is a way of organizing farmers* in search of social change, which proposes a new model of society where man and nature can relate without exploitation (MST 2007, my translation and italics).

Agroecology is a socially-activating form of agriculture (Warner 2008), and is part of the MST's political strategy to maintain its members' political participation. Levels of MST members's participation vary widely, especially after the primary social grievance of obtaining land is addressed, and a settlement is created (Wolford 2010). Agroecology is a form of agriculture that tends to be collectively organized, involving workparties, the horizontal sharing of knowledge and innovations (Wolford 2005). Agroecology is part of the MST's political ideology and moral economy because it places value on continued collective organization. The MST sees mobilization as not ending with the attainment of land, but as continual and necessary to pressure the government for public services and institutions, such as schools, hospitals, roads, and agricultural credit. By emphasizing agroecology, the MST reinforces the value of the collective as a foundation upon which a new model of environmental-society relations can develop.

External inequality is another foil of the agrarian moral economy and rural proletarian movement's political ideology. External inequality is related to the global decrease in the profitability of farming as a function of unequal exchange relationships between the agrarian, industrial, and service sector. By reducing the profitability of farming, this inequality pushes small farmers to farm more intensively with higher technological inputs, making them more beholden to the industrial sector. Agroecology redresses this lack of profitability through diversification and reducing the usage of external inputs (Altieri 1993, 1999). At the planning level, farmers choose to develop agricultural products and services with the intention of appealing to diverse markets, thereby dispersing the risks of market fluctuation or saturation. At

the farm scale, intercropping is integrated both spatially and materially with animal husbandry and the production of arable crops. According to Van der Ploeg (2012), agroecological diversification is also about increasing the value per unit of product. Farmers who diversify engage with other elements of the production process including on-farm processing (i.e. cheese production), and direct marketing through cooperatives, such as the MST's Terra Viva, Sabor do Campo, and Paladar (Diniz and Gilbert 2013). Agroecological diversification redresses the moral economic concerns related to external inequality by making viable small-scale production using traditional methods.

Agroecology addresses the social and environmental injustice concerns associated with the MST's moral economy, and remains intimately linked with collective organizing and the larger political project of transforming the social relations of production. According to the MST,

> We already know that *agroecological production is able to reduce production costs, reducing risk for the small farmer and the environment*. The main challenge we face is not technological. We already know that it is possible to produce in quantity and without the use of pesticides, GMOs and without further deforestation. But for that *we must unite and organize ourselves* in confronting the model represented by agribusiness. There is no way to transform Brazilian agriculture based on agroecology and social justice without defeating landlordism, agribusiness, and capitalism (MST 2007; my translation and italics).

The MST's engagement with agroecology, while mentioning principles of social and environmental equity is intrinsically defined on the one hand by its moral critique of the capitalist agricultural system, and on the other its political approach to transforming the industrial agricultural system through collective mobilization.

Agroecology cannot be reduced to the technical redesign of agricultural systems around ecological principles, but given the political nature of the food system, can only be advanced through systemic changes in political institutions. Proletarian movements engagement with agroecology is political because they seek to advance it by using collective action to reframe governmental policies. As João Pedro Stedile, a leader within the MST's national coordinating council, told Brazillian President Dilma Rouseff,

> We urgently need a national program to stimulate agroecology. A program of public policies that can recover a healthy agriculture, which plants foods without poisons. The more agrotoxins we put in our food, the greater the incidence of cancer. *It's a requirement to produce healthy food and to do this the techniques of agroecology are the most recommended.* But the government is missing in action and *we need to have public policies that compensate and encourage these practices* (Stedile 2012; my italics).

In the moral economy of the MST, the 'requirement' to have foods that are pesticide-free necessitates active governmental regulatory intervention. Less than a year following Stedile's mandate, Rouseff announced the Brazilian government was launching the *Plano Nacional de Agroecología e Produção Orgánico* (National Plan for Agroecology and Organic Agriculture). This national plan is unquestionably the result of massive mobilization involving numerous organizations that in addition to the MST make up the Brazilian Association of Agroecology (*Associação Brasileira de Agroecología*—ABA) (Gliessman 2014). It's development highlights the larger project of a political agroecology that sees a tight connection between the politics and practice of agroecology (de Molina 2013).

Rural proletarian movements see this political ideology of agroecology as being intimately linked to the transformation of agrarian landscape. Understanding the linkages

between agroecology as political ideology and agroecology as practice requires disentangling the relationships between territory, hegemony, and counter-hegemony. Territory can be conceptualized as the combination of material and immaterial aspects (Fernandes 2009). Material territories consist of natural elements, such land and landforms, and human-derived infrastructure Immaterial territories, by contrast, are the ideologies connected with landscapes, including ideas about what constitutes appropriate land use. Material and immaterial territories are intrinsically linked, in that the dominant ideas of a society dictate norms concerning proper forms of environmental management. Agroecology is exemplary of an idea that is at odds with hegemonic common sense of neoliberalism.

As Rosset and Martinez-Torres (2012) highlight, the discursive practice of advocating agroecology is one way in which social movements link immaterial and material territories, and in so doing draw upon their moral economy to advocate for counter-hegemonic models. The MST's João Pedro Stedile underscores the relation between the movement's conception of territory and agroecology as political ideology,

> …in the past we looked at a settlement mostly as a piece of land to work upon. Now we are taking into account that a settlement is more than that: it is a territory where we can have autonomy not only to produce, but *also to reproduce our culture, our family, and as such, to construct our own values*. And more recently we have also incorporated this debate together with the fight against agribusiness and the transnationals for the control of seeds, for the control of water, and for the control of biodiversity (Maia and Garmany: 189, my italics).

Within the MST's moral economy, land plays a pivotal role in social reproduction (Wolford

2005), and also the creation of new values based around human-environment interrelations. As Wolford (2005) found within her analysis of MST members moral economy, "land was believed to be key both to production and to social reproduction, where farmers who produced for their families were the proper stewards of the material environment (254)." This "greening" of the MST exemplifies Fernandes' (2009) tightly linked immaterial and material territories, showing the importance of agroecology in not only structuring land management, but also the MST's moral economy and political ideology. This highlights how agroecological ideas and practices, which are grounded in normative social and environmental justice concerns, are tactically advanced as an emerging counter-hegemony. Seeing agroecology as counter-hegemonic set of grassroots ideas and practices that are being used to construct an interconnected vision of environment and society speaks directly to the absence noted by Ferguson (2010), and informs understanding of the conflict between neoliberalism and anti-neoliberal alternatives.

Agroecology and the Agrarian Question

The century-old agrarian question, and its twin processes of *global depeasantization* and *repeasantization* provide another set of rationales for why rural proletarian social movements advocate agroecology within their moral economy (Martinez-Torres 2012). The agrarian question, known alternatively as the peasant question, concerns the impact of the expansion of capitalism on the rural peasantry. It arose towards the end of the 19th century in the work of Marx and Engels, Kautsky, and Lenin, and has raged among scholars ever since (Bernstein 1996, 2004; McMichael 1997, 2006, 2012; Araghi 2012). Karl Kautsky, one of the first scholars to pose the question, asked in 1899, "Is capital, and in what ways is capital, taking hold of agriculture, revolutionizing it, smashing the old forms of production and of poverty, and establishing the new

forms which must succeed?" (Banaji 1980: 46). Chayanov, a Russian agronomist, held an opposing view that the peasant economy was governed by its own logic that was apart from capitalism, and so the expansion of capitalism did not necessarily warrant the end of the peasantry. As opposed to the Bolsheviks, he saw individual peasant farms, and their collective institutions, as a springboard for a socialist society.[58] In the following century, there have globally been massive shifts in where and how the peasantry live, causing a debate about whether peasants continue to exist, or have been displaced by the neoliberal restructuring of industrial agriculture (Araghi 1995; Byres 1996; Akram-Lodhi and Kay 2012).

While many before have challenged the death of the peasantry, the emergence of new agrarian social movements with agroecological systems of production is yet one more refutation of the thesis of modernization and the death of the peasantry implied in the work of Kautsky and others. These social movements are thus posing what has been referred to as a "new agrarian question," consisting of a reframed development paradigm in which peasant knowledge, forms of land management, and group solidarity are valorized, and permanence on the land is made possible through agroecological practices (McMichael 2006: 471). McMichael describes this as a reformulation of the agrarian question as a question of food, which shifts the epistemological and ontological focus from production to social reproduction. These debates about the agrarian question and new agrarian question are fundamentally geographic in nature. The two processes of depeasantization and repeasantization are key to understanding the geographic nature of these questions.

[58] Chayanov undoubtedly plays an important role in the tradition of agrarian thought that led to agroecology (Guzman and Woodgate 2013). While certain of Chayanov's concepts, such as social agronomy, are quite relevant, Chayanov's modernization commitment, and related emphasis on machinery and chemicals as the path to agricultural productivity makes him perhaps ultimately less relevant to these movements' agroecological framing (Bernstein 2009: 61).

In the 20th century, a global-scale demographic shift, known as depeasantization, began as the rural agricultural population moved to urban areas (Araghi 1995). Depeasantization became pronounced in the post-World War II period, which "saw the most spectacular, rapid, far-reaching, profound, and worldwide social change in global history... [This] is the first period in which the peasantry became a minority, not merely in industrialized developed countries, in several of which it had remained very strong, but even in the Third World countries (Hobsbawm 1992: 56)." Whereas 29 percent of the global population, and 16 percent of the 'Third World' lived in urban areas in 1945, by 2012 that number had raised to 51, and 47 percent respectively (World Bank 2013). This forecast that the expansion of capitalism will slowly result in rural socioeconomic change by transforming peasants into wage-workers or large-scale capitalist farmers is known as the *disappearance thesis* (Araghi 1995).

By contrast, those advocating the *permanence thesis* hold that peasants follow a different logic than industrial capital, and are able to maintain their reproduction in rural areas through their adaptability. Van der Ploeg (2008) has used the term *repeasantization* to describe "in essence, a modern expression of the fight for autonomy and survival in a context of deprivation and dependency" (7). This "modern expression" is the contemporary phenomena of non-peasants and former peasants engaging in "autonomous" subsistence practices and production relations. Repeasantization is a backlash against depeasantization, and is a process whereby rural areas, which frequently are environmentally degraded, are once again being utilized for small-scale agriculture (Eldeman 1999; Leonard and Kaneff 2002; Sesia 2003; Van der Ploeg 2012). Depeasantization and repeasantization are two elements of rural proletarian movement's moral economy, because they are both about the value of land for social reproduction. Radical proletarian movements deplore depeasantization because land is a cultural heritage. These

movements value repeasantization from an ethical perspective because it enables social reproduction on the land. Agroecological practices are key tools for strengthening and reforming cultural ties with the land.

There are a variety of agroecological practices that grassroots movements use in repeasantization (Van der Ploeg 2012).[59] The first agroecological practice that enables repeasantization is the *reduced usage of external inputs*, which goes along with the increased incorporation of local resources. The practice of seed-saving is a clear example of this, whereby a family reduces its reliance upon agro-industry, saves financial resources, selects for seeds that are more adapted to local environmental conditions, and conserves agrobiodiversity (Nabhan 1985; Rhoades and Nazarea 1999).

The second practice is *regrounding farming upon nature* (Vandermeer 1995; Ewel 1999; Francis et al. 2003). This constellation of methods consists of everything from means of increasing soil fertility to biological pest control, all of which seek to improve the interconnected flow of resources (Ewel 1986; Altieri 1993). These practices reduce the usage of external inputs (Van der Ploeg 2012: 49).

Pluriactivity is the third practice, and involves the generation of income from non-farm related activities.[60] Pluriactivity is an important element of smallholder economies in both the global North and South (Amewaka et al. 2010). It exists along a continuum from temporary forms, such as seasonal migration, to more permanent forms. Pluriactivity can be considered an agroecological practice as it generates alternative sources of income that improve the possibility of a family remaining on the farm, by not relying solely on income from agricultural production

[59] Diversification, which was addressed earlier in the article, is the first principle that Van der Ploeg mentions.
[60] *Pluriactivity* is related to the discussion surround sustainable livelihoods (Scoones 2009; Amekawa et al. 2010; Amekawa 2011).

(Ricardio 2011). The fourth mechanism involves *local cooperation.* Examples of local cooperation include seed sharing networks and the collective attainment and usage of expensive machinery. The fifth mechanism is *increases in technical efficiency in production*, which seeks to maximize production given a static quantity of resources (Pandey et al. 2001; Parrot and Marsden 2002; Altieri 2004; Uphoff 2007). These five agroecological principles are elements of a moral economic response to the agrarian question; grassroots social movements utilize them in order to resist the expansion of capital, remain on the land, and advance alternative forms of production. The question remains as to how these movements are able to reach their objectives by utilizing agroecological practices.

In The Production of Space (1991), Henri Lefebvre provides a geographic lens that is useful for understanding how movements' attain their objectives through creating agroecological spaces. One of Lefebvre's central theses is that space is socially produced through material relations. "Social relations, which are concrete abstractions, have no real existence save in and through space. Their underpinning is spatial" (1991: 404). Repeasantization is necessary for agrarian social reproduction. To remain on the land, and to resist the expansion of capitalism, requires the re-production of space. The agroecological principles that constitute the process of repeasantization are the means through which space is actively re-produced. In addition to material relations, the role of ideology is equally important in the production of space.

As Lefebvre asks, "what is an ideology without a space to which it refers, a space which it describes, whose vocabulary and kinds it makes use of, and whose code it embodies (1991: 44)?" If agroecology is at once part of a dual moral economy and political ideology, then drawing upon Lefebrve, agroecology necessitates a space through which its practices can be engaged. The agroecological space is the one that is continually reproduced through the

agrecological relations of production. Agroecology, therefore, refers to a space of repeasantization that has been won through an ideological, moral economic, and often physical struggle with the state and the engines of capital. The *production of space* lens illustrates how movements use agroecology as an ideology, moral economy, and set of practices to socially produce a space through which they productively resist the expansion of capital and remain on the land.

Agroecology as a Means to Sovereignty

Rural proletarian social movements advocate agroecology as a means to attaining sovereignty. Sovereignty is a key element of MST members' moral economy (Wolford 2005: 255). There are three forms of sovereignty that grassroots social movements mobilize around: food, energetic, technological sovereignty (Altieri and Toledo 2011).

Of the three forms of sovereignty, grassroots social movements have been the most vocal about the need for food sovereignty. Food sovereignty can be defined as "the right of local peoples to control their own food systems, including markets, ecological resources, food cultures, and production modes" (Wittman 2011: 87).[61] As McMichael recently put it, food sovereignty "is ultimately about an ontological contest between distinct visions regarding agriculture: as an economic sector with producing units employing a short-term market calculus, or a landscape inhabited by farmers/pastoralists/fisherfolk geared to sustainable ecological relations" (20).

A "forgotten genealogy" of food sovereignty is currently emerging (Edelman 2014), which departs from canonical accounts of the concept's origination in the 1990s (i.e Wittman et

[61] The concept of food sovereignty is certainly not exclusive to social movements, having become taken up by NGOs, and policy circles, as exemplified by the 2002 World Food Summit and counter-summit, the Forum on Food Sovereignty in Rome.

al. 2010). According to this new genealogy, Central American governments were already using the concept of food sovereignty (*soberanía alimentaria*) in the 1960s to refer to national self-sufficiency of food production. In the early 1980s, both the Nicaraugan and Mexican governments created national plans centered on the objective of food sovereignty (Edelman 2014). By the late 1980s, Edelman reminds us, Costa Rican peasant activists were using the concept to critique the United State's dumping of surplus corn that lowered domestic prices. Several of these Costa Rican activists would become founders of La Via Campesina in the 1990s. La Via Campesina, most scholars agree, is responsible for globalizing the concept of food sovereignty (Patel 2009; Wittman 2011).

LVC adopted food sovereignty at its 1996 conference in Tlaxcala, Mexico as both a challenge to the industrial agriculture system and reigning discourse of food security, as well as a set of practical alternatives.[62] Since the Tlaxcala conference, there has an explosion of activist and academic attention to food sovereignty (Patel 2009; Perfecto et al 2009; Wittman et al. 2010; Rosset 2011; Fairbairn 2012).[63] Grassroots social movements increasing demands for food sovereignty are in part a reaction to neoliberal agricultural restructuring that has replaced food crops with biofuels, and led to the global food crisis of 2008 (Borras et al. 2010; Dauvergne and Neville 2010; Wilkinson and Herrera 2010; McMichael 2010).

Sovereignty is a rights-based argument that has historically been linked to space, and thus forces a reconsideration of the relations been society and the environment (Wittman, Desmarais,

[62] Edelman (2014) critiques the frequent argument that 'food security' and 'food sovereignty' are diametrically opposed, showing that there is indeed significant overlap as certain key definitions revolve around "'autonomy and self-determination', 'sustainability' and protection of 'the ecological system', and 'equity' " (9).
[63] As an example of this academic engagement, see the various papers that came out of the recent agrarian studies conference on food sovereignty at Yale University (http://www.yale.edu/agrarianstudies/foodsovereignty/).

and Wiebe 2010).[64] As LVC states in regards to food sovereignty: "We have the right to produce our own food in our own territory" (Patel 2009). The lens of autonomous geographies is useful for understanding how agroecology is employed in a rights-based claim to geography. As Pickerill and Chatterton (2006) define them, "autonomous geographies" are "those spaces where people desire to constitute noncapitalist, egalitarian and solidaristic forms of political, social, and economic organization through a combination of resistance and creation" (730). The MST's Stedile describes the conception of autonomous geographies from the perspective of a rural worker,

> In the political struggle for the land we're always disputing… space…but in the head of a camponês there doesn't exist this idea of "space". He thinks, "I want to have a place to live, a place that gives me security, where I can raise my family and where no one will bother me". Then the camponês begins to have a small feeling of individual *sovereignty*: "here I have *autonomy*, here I can develop my production, here I can have my culture, and here I can be a person". This is what's in his head (Garmany and Maia 2008: 188, my italics).

What Stedile underscores is that security is attached to sovereignty within the *campon*ês's moral economy. Through land occupation, MST members create autonomous spaces for individual sovereignty, and agroecological production. Stedile continues,

> …we're realizing that to have control over nature and biodiversity is a very important thing, that to have control of the water is a very important thing, and that to have control of the seeds is a very important thing. It's important for *autonomy*, for the future of the movement, and for the

[64] See both Edelman (2014) and Agarwal (2014) for critical discussions of changing conceptions of to what scale 'sovereign' refers.

future of camponês agriculture…(Garmany and Maia 2008: 188, my italics)

Autonomous geographies are relational places that enable the co-existence of resistance, creativity, and solidarity across multiple scales. While the concept of autonomous geographies was built around anarchist theory and movements, it does provide purchase for analyses of rural proletarian social movements (Featherstone 2003). Whereas these movements are frequently not autonomous in every sense implied by Pickerill and Chatterton, they do track these authors' concept of autonomous geographies in several senses. First, sovereignty is about autonomy because it emphasizes the necessity to provision sustenance within spaces that are free from neoliberal control. Returning again to Stedile,

> This [agroecological] model of agriculture is the only one that can…. develop a policy of food sovereignty, where each people –all peoples– can and must produce their own food….as José Martí warns us, "a people that cannot produce its own food is a people enslaved". He was correct, because the people that do not produce food will always depend on others for survival (2013: 15).

Second, peasant movements are actively creating a network of autonomous geographies by mobilizing these sovereign spaces together as part of a transnational movement. Third, these movements constitute autonomous geographies because their agroecological practices are a creative form of resistance to neoliberal privatization of agriculture. Autonomous geographies are a direct response to Ferguson's critique of anti-neoliberalism, because they focus on the creation of agroecological "futures in the present" (Cleaver 1993).

Conclusion

At the center of traditional accounts of the moral economy is the concept of the market place as a site of contestation (Thompson 1971; Scott 1976). In the era of neoliberalism, the market remains a locus of struggle, but not as a material, but rather immaterial territory, of ideas. Within neoliberalism, the free market is the center of all value. Rural proletarian movements, which frame themselves as opposed to neoliberalism, contest the primacy of the market as arbiter of value. The moral economy of these movements remains centered on the market as a site of protest, albeit they are "confrontations in the market place" of ideas. The role of agroecology in rural proletarian movements' evolving agrarian moral economies speaks to the absence noted by Ferguson (2010) and exemplifies a constructive vision of the interrelations between environment and society in a post-neoliberal world. This alternative vision consists of conserving agrobiodiversity, practicing ethical land management, and advocating a right-based approach to food production.

Agroecology plays a multi-faceted role in rural proletarian movements' rapidly evolving agrarian moral economies. These movements value agroecology because of its relevance to political ideology through emphasizing collective mobilization, decentralized land tenure, and the ethical right to sovereign food production. Agroecology's role within the agrarian moral economy demonstrates how value, ideology and practice are intertwined with the production of landscapes. Anti-neoliberalism and neoliberalism are similar in this way: both consist of value systems, ideologies, and practices that affect the access and usage the environment. However, the geographic nature of this similarity quickly dissipates, as neoliberalism strives to simplify through privatization, whereas rural proletarian movements embrace the complexity of diversity, which they advance through cooperation, integration, and self-sufficient adaptation.

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CHAPTER 4

CHILDREN OF THE CONTRADICTION: AGRICULTURAL EXTENSION AND THE LONG GREEN REVOLUTION

Introduction

The Green Revolution is inherently political. The term refers to the period of the 1940s-1970s in which a set of policies and scientific innovations developed "high-yield" seeds in Mexico, India, and the Philippines (Brown 1970; Dahlberg 1979; Pearse 1980).[65] Scholars also use the term to describe a second period beginning in the 1990s, when agricultural researchers began developing genetically modified seeds, in what was framed as an effort to end global hunger (Davies 2003; Lipton 2007; De Schutter and Vanloqueren 2011; Kerr 2012). More recently, agrarian social movements have begun describing a third Green Revolution based in agroecology, or the development of agricultural systems around ecological principles (Parrot and Marsden 2002; Gliessman 2006; Altieri and Toledo 2011; Horlings and Marsden 2011). Patel (2013) views the first and second Green Revolutions as part of interrelated processes of state power, class politics, private investment, and ecological change related to the establishment of food regimes (Friedmann 1982; McMichael 2009). I argue that the third agroecological Green Revolution is part of a similar historical process, yet is characterized by social movements' efforts to establish an alternative food regime (Friedmann 1993; McMichael 1997; Friedmann

[65] The time frame of the first Green Revolution is somewhat arbitrary. For example, some historians, such as Lewontin (1983) describe its' policy origins in the 1930s and 1940s, and Melillo (2012) traces the makings of the nitrogen fertilizer trade to the mid-1800s.

2005).

In this article, I illustrate how the politics of knowledge connect the first and third Green Revolutions.[66] The first Green Revolution involved more than the development of high-yield seeds; it was part of a larger project of agricultural modernization and the penetration of capital into developing rural areas (Cleaver 1975). The production and dissemination of particular forms of agricultural knowledge was one of the key tools of the Green Revolution (Chambers and Wickermanayake 1977; Cotter 2003; Reed 2004; Harwood 2009). In contrast, peasants launched the third agroecological Green Revolution in resistance to agricultural modernization and top-down knowledge and technology transfer, developing their own educational institutions to train their members in an alternative vision of agricultural development (McMichael 2006; Rosset and Martinez-Torres 2012). In both cases, agricultural extension education is a central thread connecting the politics of knowledge and alternative visions of agricultural modernization.

Definitions of agricultural extension have changed extensively over time; at its most general, it consists of educating farmers through the dissemination of new knowledge produced through scientific research (Brunner, Sanders and Esminger 1945; Scott 1970; Cash 2001). Agricultural extension education is in many ways a proving ground for the politics of knowledge in the Green Revolutions because "during periods of change in agriculture, extension practice is a primary location of tension and contestation" (Warner 2008: 759). Yet, extension remains an under-surveyed arena in which myriad power relations—between actors as varied as state agencies, extension agents, seed and fertilizer networks, peasants, and activists—are contested (Gray 1997; Morgan and Murdoch 2000).

[66] Unquestionably, the second Green Revolution, and its focus on biotechnology, is part of the process that agrarian social movements have responded to in calling for an agroecological revolution. I deal exclusively with the first and third (agroecological) Green Revolutions in this article because of the nature of the case study and the data I collected.

I believe a political ecology of education lens illuminates the relations between the fraught politics of knowledge in agricultural extension, political economy, and land use and landscape change. I describe a political ecology of education lens as attuned to how the distribution of power and resources among interconnected political entities mediates pedagogical processes and related knowledge systems, affecting access and use of natural resources. I employ this perspective to illuminate how the first and third agroecological Green Revolution affect the development of educational institutions, the training of agronomy professors and extension agents, the creation of particular development projects, and the formation of landscapes.

This article focuses on a case study of the 17 de Abril agrarian reform settlement of Brazil's Landless Workers' Movement (*O Movimento dos Trabalhadores Rurais Sem Terra* or MST) in southeastern Pará state, Brazil. The MST is an agrarian social movement whose members tactically occupy unused agricultural land. If their land occupations are successful, the government will create a community, known as an agrarian reform settlement, for these members[67]. If a settlement is created, its inhabitants can access agricultural extension and credit.

This article is divided into three sections. First, I review the literature on the first and third agroecological Green Revolutions, and their competing visions of agricultural modernization and agricultural extension with a focus on Brazil. Second, I explore how the agricultural extension agents employed in the first and third agroecological Green Revolutions are differently trained, resulting in competing visions of agricultural development. Third, I illustrate the history of extension, credit projects, agricultural practices, and landscape change in the MST's 17 de Abril settlement. I draw on ethnographic data gathered over 17 months of

[67] The MST faces a number of obstacles in getting its encampments legalized as settlements. These difficulties range from landowner violence, to municipal politics, to the ascending neoliberal model of market-led land reform (Borras 2008).

fieldwork between 2009-2013 in southeastern Pará, Brazil. This research included participant observation of agricultural extension education, and semi-structured interviews with extension agents, university professors, and teachers in an agroecological vocational high-school program. Over the course of the research, it became apparent that extension is the axis upon which different visions of agricultural modernization collide.

The Green Revolutions and Agricultural Extension

Brazil and the first Green Revolution

Beginning in the 1940s, many nations, international donors, and agricultural research agencies became concerned with the question of food production for a rapidly expanding population (Evenson and Gollin 2003). International organizations, such as the Rockefeller Foundation, proposed the Green Revolution as an answer to this problem (Perkins 1990). It consisted of several interrelated approaches: breeding programs for staple cereals resulting in high-yield varieties, development of high pay-off inputs such as fertilizers and pesticides, and new mechanisms for implementing these innovations (Griffin 1979; Shiva 1991). Proponents credited the first Green Revolution with the increased production of important staple crops, particularly high-yield Maize in Mexico, wheat in India, and rice in the Philippines (Alcantara 1973; Conway 1997), and the staving off of world hunger (Lipton and Longhurst 1989; Pingali 2012). Conversely, critics pointed to its role in the spread of capitalism, exacerbation of social and economic inequalities, rise of disease-resistant pests, and increased dependence of small farmers on unaffordable technology (Cleaver 1972; Perkins 1997; Kerr 2012).

In Brazil, the first Green Revolution took the form of agricultural modernization. It consisted of increased reliance on fossil energy (mechanization, chemical fertilizers, pesticides,

herbicides), reduced labor during production, and increased consolidation of economic surplus (Gutberlet 1999: 221).

In the Brazilian Amazon, agricultural modernization was part of larger geopolitical processes of frontier development (Foweraker 1981; Schmink and Wood 1992; Brown and Purcell 2005). During the late 1960s, a major drought in the Northeast of Brazil proved a turning point for Amazonian development policies (Mahar 1979). Brazilian President Medici visited the Northeast's drought-affected areas, proclaiming that the country would "take a people without land, to a land without people." The government sought to develop, exploit, and settle the Amazonian region (Lisansky 1990) by building a road network across Amazonia, and initiating a large-scale colonization plan. Although it initially intended to resettle thousands of northeastern landless farmers on either side of the transamzaon highway through these two projects (Moran 1990), the government soon shifted its vision of agricultural modernization from small-scale farming to large-scale cattle ranching and mineral exploitation (Hall 1987).

Brazil and the Agroecological Green Revolution

Peasants' discontent with the socially marginalizing effects of agricultural modernization and its negative environmental impacts helped propel the current agroecological Green Revolution (Altieri and Nicholls 2008; Borras 2008; Borras et al 2008; Wittman 2009; Altieri and Toledo 2011). One reason agrarian movements are mobilizing around agroecology is because Green Revolution technologies, such as pesticides and machinery, have degraded the lands that social movements acquire through land reform (Mancio 2008; Miranda 2010; Freitas et al. 2012). Agroecological practices, such as using nitrogen-fixing cover crops, can aid this regeneration **(**Ramos and Pelligini 2007; LVC 2010; Pereira et al. 2011; Junquiera et al. 2013).

In Brazil, the Landless Workers' Movement (MST) is a driving force of the agroecological revolution (Desmarais 2007; Delgado 2008). Widely recognized as the most successful agrarian social movement in Brazil (Branford and Rocha 2002), the Landless Workers' Movement has been engaged for almost three decades in the direct occupation of unused lands, through which they have demanded fundamental agrarian reform (Wright and Wolford 2003; Ondetti 2008).

Although Brazil's MST originated in the early 1980s, it was in the 1990s that it began to "green" itself by incorporating agroecology as a political and practical set of strategies. According to Rosset and Martinez Torres (2012), this greening was tactical. The MST had historically pressured the Brazilian government to expropriate land for peasant use, based on the argument that the lands were being "unused." However, increasing transnational investment in Brazilian agriculture in the 1990s resulted in a large percentage of Brazil's idle land being converted to agrofuel monocrop plantations (Novo et al. 2010; McMichael 2010). The MST, in turn, reframed their argument "by contrasting the ecological and social wasteland of agribusiness plantations ('green deserts') with a pastoral vision of agroecologically farmed peasant lands, conserving biodiversity, keeping families in the countryside, and producing healthy food for local markets ('food sovereignty')" (Rosset and Martinez-Torres 2013: 6). Agroecology's importance continued to grow within the MST throughout the 1990s, as MST groups across the country debated how it could be used to advance food sovereignty and serve as a strategy of resistance to the agroindustrial model. At the MST's 2005 national congress, 11,000 members formally ratified agroecology as the Movement's foundation for small-scale farming (Altieri and Toledo 2011). Since then, the MST has worked to widely disseminate agroecology among its

members, creating 12 agroecological schools throughout the country that are facilitating the transition away from Green Revolution technologies (Rosset and Martinez-Torres 2012).

Agricultural Extension Education and the Green Revolutions

Agricultural extension in the first Green Revolution employed technologies that were developed by technically trained scientists through empirical trials and then widely disseminated (Scoones and Thompson 1994; Tsouvalis 2000). These top-down knowledge pathways have traditionally reified categorizations of knowledge, and its purveyors, as "experts," in contrast to its receivers, who were devoid of real knowledge and seen as backward (Freire 1973).

Agricultural extension, funded by development agencies, national banks, and linked to scientific research centers, was a central method for bringing farmers into the global commodity chain (Patel 2013). As Cleaver writes of extension in the first Green Revolution, "These tactics...are more than efforts to bring development to rural areas. They are attempts to spread capitalism with all its business-based social relations and the markets such relations support (179)." Mathur (1970), too, concluded that, "Adult education thus becomes a critical factor in the bringing together of the village and the marketplace (8)."

In Brazil, the development of extension tracked the push for agricultural modernization (Cobbs 1992; Cueto 1994; Troian and Eichler 2012). Early extension, as Callou et al. (2008) argue, arose with North American influence and the development of capital. It espoused a colonialist approach of using education as a means to transform rural producers from backward agricultural practices to modern ones based in advanced technology and industry. In 1948, a partnership between the Minas Gerais state government and the American International Association for Economic Development (AIA), created the first Brazilian rural extension agency,

known as Association of Credit and Rural Extension/Assistance (*Associacao de Credito e Assistencia Rural* or ACAR) (Callou 2007). The AIA, which was funded by the Rockefeller Foundation, is of particular note due to its involvement at the time in other proto-Green Revolution programs (Fitzgerald 1986; Jonas 1989; Kohler 1991; Hart 2002). The objective of the ACAR program was to "establish a system of technical and financial assistance that will intensify agricultural and ranching production and improve the social and economic conditions of the rural areas" (Gabriel 1970: 27). As evidenced here, the educational function of extension was largely absent in the 1940s and 50s in Brazil; instead, extension was focused on technical and financial assistance.

Agrarian movements' push for agroecological extension is rooted in a bottom-up model that began to develop in the 1970s and 1980s (Chambers and Ghildyal 1985; Black 2000; Thompson and Scoones 2004). One of the most eloquent critiques of traditional agricultural extension comes from Brazilian pedagogue Paulo Freire. In *Extension or Communication?,* Freire unpacks the conception of rural extension:

> There is in the concept of extension an unquestionably mechanistic connotation of taking, of transferring, of handing-over, and of depositing something in someone. This something that is being brought, transmitted, transferred (in order finally to be deposited in someone—the peasants), constitutes a group of technical processes, which imply knowledge, which *are* knowledge… (97)

In contrast to extension, Freire writes that "the real work of the agronomists (is) in their role of educators…they must refuse to "domesticate" people. Their task is *communication*, not *extension* (95)." Since Freire, there have been more sustained efforts to develop an alternative form of extension. Rhoades and Booth (1982), for example, emphasized the "farmer-first"

model, which starts with the knowledge, problems, and priorities of the farm families. Others emphasize an ecological systems-based approach to agricultural extension (Pretty 1997; Rolling and Jiggins 1998). Warner (2008) describes agroecological extension as based on "social learning, which I define as participation by diverse actors as a group in collective, practical research and knowledge exchange to enhance common resource protection (757)." The MST is an ardent supporter of agroecological extension for its members (Delgado 2008), but its version of agroecological extension contrasts explicitly with that of the first Green Revolution.

Competing Visions of Agricultural Extension

Children of the Green Revolution

> The office of EMATER, an agricultural extension agency in Eldorado das Carajás, Pará, exemplifies the tension between industrial and peasant agriculture, and their respective forms of agricultural extension.[68] Four posters hang on its front door. On the right is a poster for the Brazilian Program for the Acquisition of Food, which will purchase food from family farmers for use in schools, hospitals, and other institutions. Below it is a sign with the MST logo, which reads "The Permanent Campaign against Pesticides." To the left of these are two others: on top is a sign of the State of Pará Agriculture and Ranching Defense Agency (ADEPARÁ).[69] The one below it reminds cattle producers that they will face stiff fines if they do not vaccinate their cattle. These four posters illustrate the ideological divisions within EMATER, which provides extension to both industrial and grassroots farmers.
>
> I interview EMATER's two head extension agents. Although I start with a seemingly straightforward question, "Please describe EMATER's approach to agricultural extension," a rupturing silence follows, filling the room with tension. Geraldo, dressed in a button-down shirt, is the more senior extension agent. He pulls out his cell phone and nervously starts playing with it, adjusting the volume up and down. Francisco, the other extension agent, wears a tie-dyed t-shirt, and also begins fidgeting, twisting his black coconut ring, which symbolizes his commitment to social justice. Francisco lets out an exaggerated sigh, and leans forward. In carefully metered words, Francisco describes how agricultural extension is a broad field, and since EMATER is a government agency it is required to provide extension services to both large and small-scale agricultural producers. Glancing from time to time at his

[68] The Corporation of Technical Assistance and Rural Extension (*Empresa de Assistência Técnica e Extensão Rural* or EMATER)
[69] *Agência de Defesa Agropecu*ária do Estado do Pará or ADEPARÁ.

> superior, Francisco explains how there are extension agents who prefer to work with agribusiness and others with the agrarian reform communities. His narrative is couched in bureaucratic legalese, which I later learn is because of Geraldo's presence.
>
> I proceed by asking what I think is an even more innocuous question, "Please describe your training," only to realize I'm once again mistaken. Geraldo is an agronomist. He is a career public servant, he tells me proudly, having worked for over 30 years first with ADEPARÁ, then with the Ministry of Agricultural Development, and finally with EMATER. As Francisco begins, Geraldo's phone rings and he disappears, not to return during the interview. Visibly more relaxed, and talking more naturally, Francisco explains that he, too, is trained as an agronomist, but his intellectual and professional pedigree is different from Geraldo's. Francisco became involved with the region's agrarian social movements in the early 1990s. In 1994, Francisco moved to Marabá and became a researcher affiliated with an agricultural school for students from agrarian reform settlements, known as the Agro-Environmental Center of Tocantins (CAT).[70] He intended to stay in the region for two years, but decided to remain to complete additional specializations in family farming in Amazonia and cooperativism. "I've gone on and done lots of short courses in agroecology. I've been able to pass on some of the knowledge I've gained about alternative forms of agriculture, to rally people around this alternative."

The tension between Geraldo and Francisco is at once ideological and practical. They support different views of the role of extension in agriculture, as well as different conceptions of what constitutes productive agriculture. These differing views are related to the Green Revolution, its push for agricultural modernization, as well as their training through the university system. This vignette introduces the complicated role of the Green Revolution in shaping the training of Brazilian agricultural extension agents and their extension practices.

Extension agents often agreed that the Green Revolution structured the development of Brazilian agricultural extension. The sentiments of Anderson Souza, who is an extension agent with EMATER, typifies this widespread belief:

> The creation of technical extension in Brazil is directly related to creating the conditions for the modernization of agriculture in the 1950s and 60s, which is the face of the Green Revolution in Brazil. Technical extension is in line with the Green Revolution, as much from the perspective of technology, in the sense of the technologies based in the fertilizers and pesticides and heavy mechanization, as

[70] *Centro Agro-Ambiental do Tocantins* or CAT.

> well as in the way in which technology is to be transferred, which is not through dialogue, not recognizing the farmer's knowledge, but rather, simply transferring ready-made technology that is foreign to the realities of the farmer.

Another widely held belief among extension agents and university professors in southeastern Pará is that the Green Revolution is responsible for structuring university agrarian science programs around agricultural modernization. Gemeson Brito, an agronomist by training, who has worked as an extension agent, and is now both a professor in the Federal University of Para's (UFPA) agrarian sciences department and a high-level university administrator, remarks,

> Another influence that perhaps is a little more indirect, is the influence of the universities' agrarian sciences program in the training of these technicians. What predominates in the agrarian science programs is a vision which is closely linked to that of the Green Revolution: models of technology based in monoculture, the use of industrial inputs, heavy mechanization, and prioritizing large land holdings.
>
> These institutions are based in the principle of production, and not in the principle of sustainability. Their intention is to train for the market, to train to increase production, to train extension agents so that agriculture can be developed to a large scale. That's why it is these people who occupy the spaces of technical extension. The agricultural modernization perspective in the universities results in the training of the perspective of a technician in the principles of the Green Revolution. This is really clear.
>
> There exists a profile of those that work in agricultural extension: they have a singularly technical perspective. They observe the results of extension in terms of productivity, in terms of numbers. And so the big question is that the technician who works in an agrarian reform settlement isn't able to visualize sustainability, he just thinks about production. It's as if he can't visualize *how* to work in agrarian reform settlements, because he can only implement a new technical form of production in a large-scale fashion, since he was trained to do that in the university, and he can't think of another way to do it. These technicians are the children of the Green Revolution.

Brito's description of this generation of technicians as the "children of the Green Revolution" highlights how their identities have been shaped by agricultural modernization to the point where they simply see production. However, this description does not account for all extension agents, as Brito notes: "In the last decade, agricultural extension has had in reality a double influence;

there's the traditional form of extension that is based in the Green Revolution, but there's an alternative vision of extension linked to the model of agroecology, and is being advanced by the social movements." Pausing for a moment, he begins to laugh and concludes, "We can describe these new extension agents as the children of the contradiction."

Children of the Contradiction

The "contradiction" that Brito references is between the Green Revolution's model of agricultural modernization and knowledge transfer, and peasant movements' agroecological vision of food sovereignty and dialogic knowledge production. Agrarian movement members are "children of the contradiction" because they are being trained in a new vision of agricultural development, but will remain working in the system structured by the Green Revolution.

The vocational high-school program in agroecology and ranching at the Federal Institute of Pará, Rural Campus of Marabá (IFPA-CRBM), typifies this alternative form of extension agent training.[71] The IFPA-CRMB is a product of a two-decade history of educational activism. During the 1990s, professors from the UFPA who were aligned with the region's social movements became involved in the creation of an environmental education center known as the Agro-Environmental Center of Tocantins (CAT), and the Family Agricultural School of Marabá (EFA). This vision started to become reality in 2008, when the Lula government created the Federal Institute of Education, Science, and Technology of Pará (IFPA) system. MST leaders serve as coordinators on the IFPA-CRMB's governing board, and along with activist teachers within the IFPA-CRMB have been instrumental in shaping the objectives of the institute. Owing

[71] Instituto Federal do Para-Campus Rural do Marabá or IFPA-CRMB

to the MST's vocal role in its creation, the IFPA-CRMB is located in an MST settlement, and caters to students from agrarian reform settlements.

The IFPA-CRMB seeks to train a new generation of extension agents in a dialogic paradigm. Marlete is a teacher at the IFPA-CRMB. During an interview about the school's pedagogical approach, Marlete begins by describing how traditional extension agents were trained in a Green Revolution model. Marlete then notes,

> The big advancement of the IFPA-CRMB is that it creates the conditions for the farmers to develop their own vision of agricultural development. It will be the farmers, as subjects, that will have the ability to think about and develop their own vision. These subjects will have access to a different type of education, they will have access to forms of knowledge that have been historically constructed, and they will be challenged to think of their own vision. The school's objective is to help them in this dynamic.

Marlete situates the IFPA-CRMB as an agricultural school in opposition to those influenced by the previous Green Revolution model. Marlete goes on to describe how the extension program is grounded in a Freirean approach,

> The technician should have an understanding of the educative nature of the act that he will be involved in, and it shouldn't be an act that is based in the perception that he has all of the knowledge. Because if he comes with this logic that he has all of the knowledge, and he is going to bring the knowledge, than he is practicing an act of cultural invasion. Now if he were to use a dialogic perspective, to get closer to the communities, to know the communities, to begin to understand what are their primary problems, and then construct together with them alternatives, that person would not be an extension agent but a dialogic educator. In this sense, the IFPA-CRMB is a school that aims to train a new type of technicians, with a different line of thought than the traditional model of technicians, with a different vision that is fundamentally based in agroecology, that respects local knowledge, and in the process contributes to the empowerment of these groups.

Part of the reason that the IFPA-CRMB is based in a Freirean dialogic model is that the region's agrarian reform settlements have time and again been the sites of "cultural invasion," where the culture that is being imposed is one of agricultural modernization. In the next section, I present

data that highlight the history of this cultural invasion in the 17 de Abril agrarian reform settlement, and the efforts of one IFPA student to redress that history.

The Agroecological Green Revolution?

The two biggest cultural events in the 17 de Abril settlement are profoundly interrelated, yet exist in explicit tension. The first is the settlement's anniversary, which occurs every November 5th. On this day in 1995, MST members formed their first encampment outside the city of Curionopolis; these members would be the founding inhabitants of the settlement. The second event is the anniversary of the military police's massacre of 19 MST members from this group, which occurred as the group marched in protest towards the state capital of Belém on April 17th 1996. These events both commemorate the founding of the community, but their forms are diametrically opposed.

On the settlement's anniversary, I am confronted by contrasting images while standing at the door of its administrative headquarters. On a bulletin board are a series of photographs. One photograph is of a man grinning widely as he harvests rice. In another photo, a group sits in a circle processing a massive pile of manioc to make *farinha* flour. The last photo, which was taken directly in front of the door where I now stand, shows an inhabitant giving the thumbs up sign while proudly displaying a variety of fruits and vegetables he produced. According to its date, this photo was taken five years ago today, when the settlement's anniversary took the form of a harvest festival. Today, there stands a different symbol of production: a truck with a banner advertising "More Technology, More Income, this is More Milk." Men wearing button-down cowboy shirts and wide brimmed hats surround the truck. The harvest festival that marked the settlement's anniversary has been replaced by a rodeo. This morning there will be a *calvagada* (horse parade).

Douglas, a large-scale milk producer who has become one of the settlement´s most powerful protagonists, tells me as he begins orchestrating the horse riders for the parade, "My dream is for this event to be on the scale of the big cattle expositions in Maraba, Paraupebas, and Xinguara." I mention to Douglas the presence of the truck advertising advanced dairy equipment. He nods, "What we really need is to have an agronomist to train folks. Incentives also, of course, people need financial incentives. Money and education together. You can't put the car in my hands without teaching me how to drive. This is what has happened since the beginning here, with the *farinha* production facility." Douglas's vision is that capital and extension need to go hand and hand.

There is a contrasting vision of agricultural modernization and extension on April 17th, 2012, the anniversary of the massacre. On this day, I sit under a tent with 400 students who are participating in a seminar on agroecology as part of the MST's 10-day pedagogical encampment where students commemorate the

> massacre of Eldorado dos Carajás by constructing a positive future through education. Seventy-five individuals wear identical green polo shirts with the letters IFPA-CRMB across the chest. Pedro is one of the IFPA-CRMB's students, and is the first audience member to speak following Francisco, the EMATER extension agent, who led the workshop. Pedro explains to the audience that from his perspective,
>
> > The question of agroecology is very difficult. Agroecology has incredible potential, but today it is largely only on paper. In practice, there are very few concrete experiences that exist. And why is that? As a student in the IFPA-CRMB's agroecological agricultural extension program, I can tell you there are many barriers to agroecology, and *one of the principle barriers is our family*. We study agroecology, but when we reach our farm and try to work agroecologically, our families don't let us. Why? It's because they only know of the dominant methods. And as a result, for us it's very difficult to change the practices in our own houses. This is a process of transformation that begins within the school.

These two anniversary celebrations epitomize the tensions surrounding modes of agricultural production, and agricultural extension in the 17 de Abril settlement. The members of this community, and their relation to the landscape, have themselves been transformed over the last 17 years from agricultural producers to agricultural consumers. These days, it is rare to find someone producing any staples like rice, beans, squash, or corn. Many of the settlement's inhabitants lament this abandonment of agriculture and say that now it's just "*gado, gado, gado*" (cattle, cattle, cattle).

Agricultural extension and associated credit projects played a major role in the settlement's transition from subsistence agriculture to cattle. The injustices perpetrated at the Eldorado dos Carajás massacre spurred the government to create the 17 de Abril agrarian reform settlement and several projects to benefit the survivors. In 1998, an agroindustrial project was implemented through a credit project known as the Special Credit Program for Agrarian Reform (*Programa de Crédito Especial para Reforma Agrária* or PROCERA). The PROCERA project in the 17 de Abril settlement attempted to create a dairy, *farinha* production facility, rice

processing plant, and a slaughterhouse for poultry and beef. The cost of this project was slightly more than two million Brazilian Reais, and was a group loan to the settlement's association.[72] However, the individual projects failed due to a lack of electricity, materials, and individuals trained to operate the machinery. As Douglas said, "You can't put the car in my hands without teaching me how to drive it." The settlement's administrative council fell into insurmountable debt following the failure of these projects. This debt, which continues to the present day, prohibits the administrative council from participating in similar large-scale group credit projects.

The settlement's engagement with extension only became more complicated over time. In 1998, the first extension team offered two PROCERA projects to the inhabitants. The first project provided a $2000 Reais per family stipend for subsistence agriculture.[73] In 2000, the settlement's inhabitants signed up for another credit project known as PRONAF-A.[74] This project consisted of $6500 Reais for each family, and enabled families to purchase cattle, supplies for building fences, corrals, and other ranching infrastructure.[75]

The PRONAF-A project reinforced the historical presence of cattle ranching in the settlement. Prior to the settlement's creation, the area consisted of a constellation of five farms known as the Fazenda Macaxeira complex. By the late 1960s, the landowners had already begun clearing the area of the Fazenda Macaxeira for cattle pasture (Fig. 8). This process of land conversion continued under the original landowner until 1996 by which point approximately 70% of the 17 de Abril settlement's area had been deforested (Fig. 9).

[72] Approximately USD 1 million.
[73] Approximately equal to USD 1,000.
[74] In 1999, the PROCERA was renamed the National Program for the Strengthening of Family Farming (Programa Nacional de Fortalecimento da Agricultura Familia or PRONAF).
[75] Approximately equal to USD 3,250.

Figure 8: Map of late 1960s extent of cleared land in area of 17 de Abril settlement

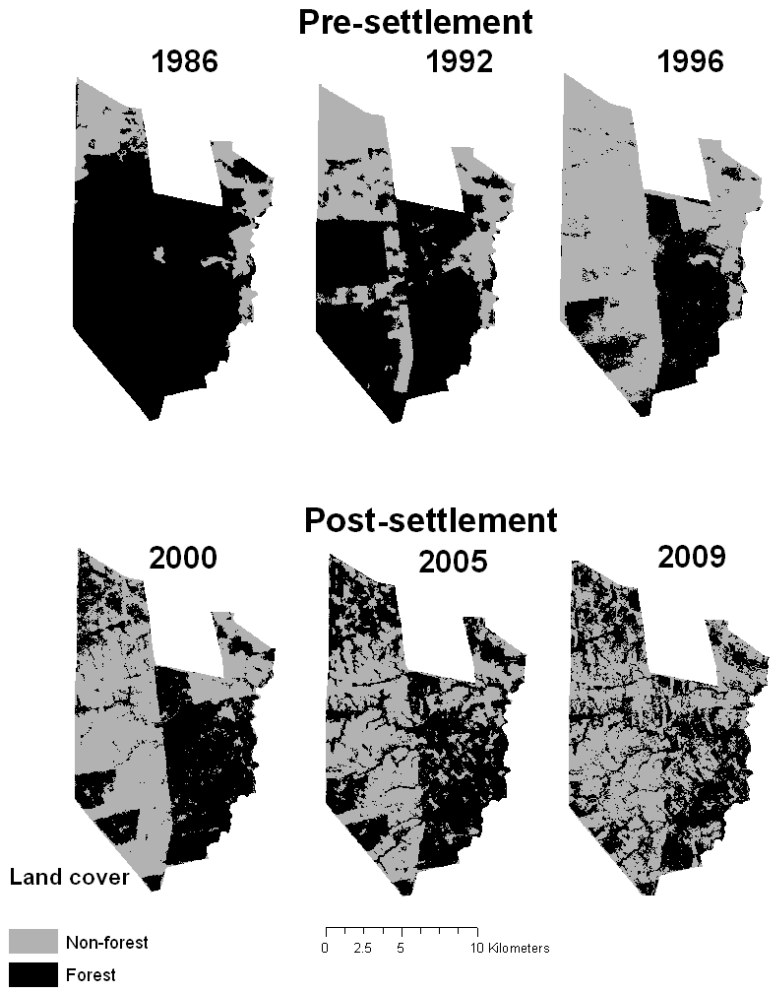

Figure 9: Longitudinal land cover change in 17 de Abril settlement

Two trends are clear in the above figure. First, the process of land cover conversion from forest to pasture began long before the MST settlement was created in 1996. Second, the settlements' inhabitants continued the already existing process of land conversion, albeit at a smaller scale.

The settlement's inhabitants commonly state that their land management practices are constrained by the landscape's history of large-scale deforestation for cattle pasture. Arnoldo, the settlement's current president, reflects, "When we got the land it was already significantly degraded, deforested and overgrazed by the land owner. When we arrived, people thought that

the land would be good for agriculture, rice, corns, manioc, beans, but this wasn't very successful because the land had already been prepared for cattle ranching." The combination of credit incentives and agricultural extension activities further strengthened the already dominant history of land use. As Arnoldo continues, "Additionally, one project came, and then another, that only supported cattle. And so the type of land use didn't really change. Only instead of raising beef cattle, which the previous land owner had done, most people opted for raising dairy cattle." These cattle projects weren't what many settlers originally wanted. Arnoldo describes, "When I first got my land I wanted to be the region´s largest producer of fruit pulp, but that never worked out, and so I ended up working with cattle. I didn´t know about cultivating fruit trees. I wanted to, but just didn´t have the knowledge."

Extension was essentially nonexistent in these projects. As Genival, an original settlement inhabitant who is now an extension agent, remarks, "These projects had an extension component, in that they were created by technicians. But that was the extent of it. These technicians weren't interested in helping the farmers." Rubbing his fingers together in a gesture to indicate cash, Genival concludes, "They were solely interested in the financial question, because the extension agents receive a percentage of whatever projects they create, and so what's going to earn you more as a technician: cattle or subsistence agriculture? Cattle, of course, and so the money goes straight into their pockets. As a result, the technicians were seen poorly within the community."

In 2002, the MST developed its own cooperative extension service to meet the needs of its agrarian reform settlements. This organization was known as COOMARSP, and included

MST state leaders on its coordinating council.[76] COOMARSP had a different vision of land use within the settlement. As Luis, a former COOMARSP technician told me, "In the beginning, we had a vision of diversification. We sought to achieve this vision of diversification by creating PRONAF projects devoted to agroforestry: plantings of coffee, cupuaçu (*Theobroma grandiflorum*), and coconut."[77] COOMARSP was much more in line with the MST's national vision of diversified agriculture, and opposed to the dominant model that was being extended through previous credit initiatives. "However," Luis continues, "in reality, approximately 70% of the projects that we created at that time were for cattle. And why is that? Because it's what works. Because you put cattle on the land, and they thrive. They don't have problems, they feed when they're hungry, go to the reservoir when they're thirsty." However, the problem with diversification also had a cultural basis in financial insecurity. As Luis explains, "All of these fruit or subsistence crops have a specific season; it's only during harvest season a farmer will make money. As opposed to this, cattle are a constant: they're a bank. If I need money, I can sell a calf in an hour and have money in my pocket."

The problems of financial insecurity associated with diversification were augmented by other constraints. One such constraint was bureaucracy. COOMARSP technicians would order thousands of tree saplings, but they would arrive six months after the destined date, in the middle of the dry season. Without irrigation in the rural plots, the overwhelming majority of these saplings died within a season. A second problem that spelled the failure of the diversification projects was the cultural tradition of fire usage. In the early 2000s, many of the settlement's inhabitants were using fire to clear forest cover in order to plant subsistence crops. Frequently,

[76] Cooperativa Mista Dos Assentamentos de Reforma Agraria da Regiao Sul e Sudeste do Estado do Para or COOMARSP.
[77] Cupuaçu (*Theobroma grandiflorum*) is a tropical rainforest tree related to cacao.

these fires would get out of control, ravage a neighbor's land, and destroy subsistence crops and fruit tree groves.

The MST's financial decisions were a third factor leading to the ultimate failure of COOMARSP's initiatives. In the early 2000s, INCRA provided an extension company funding at the beginning of a project period, and the extension company was the executor and administrator of project funds. Through its contract with INCRA, COOMARSP acquired four trucks and several cars. However, the MST leaders directing COOMARSP decided to use these vehicles to support MST land occupations, instead of COOMARSP's intended extension work. Additionally, several times COOMARSP borrowed against its allocated funds in order to fund struggling MST land occupations. When this became public knowledge, INCRA was forced to change its policy regarding extension work. No longer were funds distributed at the beginning of a project. Following the disgrace of COOMARSP, funding was only liberated after the completion of the project, and a demonstration of increased production. Additionally, the extension projects, which were either three or four years, were reduced to one year. The inhabitants increasingly saw agricultural extension in a negative light as a result of these experiences.

The following ethnographic example illustrates a common distrust among the inhabitants toward agricultural extension agents and their projects:

> "Are you going to eat that?" The question is completely out of the blue. I look up from my hammock to see Dona Maria reaching over my fence, asking if I am going to use the undersized cupuaçu that has fallen to the ground, and if not, could she eat it. Handing over the coveted football-sized brown fruit, I am struck by the irony of this interaction: while completely commonplace in one sense, the sharing of excess produce between neighbors, it is perplexing. I remember going to Dona Maria and her husband's land several years ago and being amazed by their several hundred cupuaçu trees. Why is Dona Maria requesting one from me?

Later on that afternoon, I sit with Dona Maria in front of her house, watching the mango trees turn a spectacular warm orange in the setting sun. We chat until Antonio, her husband, arrives home. I ask how everything is going on the farm, assuming that like most men he's been out at this time of day tending cattle, or attending to any of a multitude of farm tasks. He spits as he snickers. “There's nothing happening out there,” he says wiping the sweat and dirt from his forehead. But what about the cupuaçu, I ask, returning to the afternoon's encounter. “They're not doing anything, not producing at all,” he answers, shaking his head as he stares at the ground. “None of them?” I ask, surprised. “*Nenhuma* (none),” he replies. “Do you have any idea what could be causing it?” I ask. “Nope.” “Have you sought help from an extension agent?” I ask. He spits again. “What would they know? They have no experience with these kinds of problems.” “Have you ever worked with an extension agent before?” I ask, surprised that this is his impression of agricultural extension. “Oh yeah, we sure have,” Dona Maria interjects. “We participated in one of the early projects that sought to create fish ponds. We had an extension agent come out who decided that we should work with fish, money started flowing from the bank, and a crew came out, dug a ditch, filled it with water and dumped 5,000 fish in. Turns out they hadn't done a soil analysis, and before we knew it, the water ran out, and the fish died, and we ended up *sujo* (in debt). So yeah, we've worked with an extension agent before.”

Figure 10: The remains of Dona Maria and Seu Antonio's fish pond

Dona Maria’s story echoes many themes in Freire's critique of traditional agricultural extension. In the limited encounter between Seu Antonio and the extension agent, extension is

not a meaningful dialogue between subjects, but rather, as Freire phrased it, the extending of *something to*. The *something* is an external version of development not appropriately designed or accompanied, and is what Freire terms cultural invasion.

The misplaced development vision not only characterizes traditional extension, but interestingly, more contemporary agroecologically-oriented extension as well. The oral history of Adriana da Silva typifies this tension. Adriana is an extension agent who lives in the 17 de Abril settlement. She was trained in the "new model" of extension as community development, but she finds reality is quite different than her education. "I am the daughter of a farmer. I grew up in an agrarian reform settlement, distant from the city. I was educated at the Escola Familia Agricola (EFA), which was an opportunity for the children of farmers in the region." The EFA was the region's pioneering agricultural school, and is noteworthy for its grounding in agroecology. Although Adriana loved her time at the EFA, it was quite difficult. "My father sent me, but we didn't have much money: money for simple things like paying for the bus fare to get to school, or so that we had food at school. I frequently had to hitch-hike to school, and ended up going hungry while at school." The financial difficulties that Adriana describes are essentially universal among students who participate in distant educational programs. Of the four students in the 17 de Abril settlement who started the IFPA-CRMB course in agricultural extension with a focus in agroecology, only one finished the program, canvassing funds from family, neighbors, and powerful individuals in the settlement to fund his travels to school. The other three left the program, largely because of financial need. Adriana proudly continues, "I was able to struggle through this battle, end up graduating, and began to work in this region." Adriana notes that her education was different than the majority of her colleagues. "My studies were directed towards agroecology. All of the EFA's courses were related to agroecology. About ranching I actually

don't know very much. But about the recuperation of areas that are degraded, that's what I know."

Following graduation, Adriana began working for private agricultural extension companies who were contracted to INCRA. However, these contracts were just for one year, and as a result, she has been transferred every year for four years between extension companies. Exasperatedly she told me, "We're not able to form a close link with the farmers. These one year contracts strongly affect the provision of technical assistance, because you begin to develop a relationship, to become closer to the community, to the farmers, you become to feel like you're part of a family, and you begin to organize a project, to start it, but never finish. The contract simply ends."

The question of whether or not an extension company continues working in the settlement is fraught with politics. Adriana explained, "In order for us to return the next year, to have a contract to continue, we rely on the social movements. We *really* depend on them. In particular, we depend on the president of the association, who has so much power. *Soooooo* much power." Adriana continued, "The president of the association can go directly to INCRA and personally request that INCRA issue a new solicitation to a particular company."

This power dynamic is much more complicated than Adriana lets on. The current superintendent of INCRA's regional headquarters was previously a technician in the MST's COOMARSP extension agency, who had lived in the 17 de Abril settlement for three years. On several occasions, I joined Arnoldo to visit INCRA's superintendent. We never made an appointment. Rather, Arnoldo would call INCRA's superintendent on his cell phone while walking in INCRA's door, and then walk straight to his office, past the line of individuals with appointments, and without knocking walk straight to his desk and sit down. These messy daily

politics support Adriana's conclusion that "remaining in the settlement can be easy and it can be difficult. It really depends on the relationship between the company and the president of the association, but also of the extension agents and the farmers. Because there's an evaluation, and if the evaluation is positive, than it's easier to remain, and if it's not, then you leave and another arrives." Adriana went on to describe how difficult this constant uncertainty and transition was for her personally:

> You remain in limbo. Waiting for the company, which is itself waiting for a new request for extension proposals from INCRA, and you wait so long, sometimes two years to be called for an interview again. And a lot of people aren't able to wait that long, remaining unemployed for 1-2 years. And then you put your CV in and a company sees that you've worked for all of these different companies for a year at a time, and so they see you as a trustworthy worker, and so they hire you, or they trade you, to another company who has a contract, it's as if they were all just big friends, all of the owners of the companies that fulfill contracts for INCRA.

The political economy of agricultural extension is incredibly complicated. ProAgra is the recently created extension company that has the contract for the 17 de Abril settlement, and employs Adriana. ProAgra is owned by long time settlement resident Luis, who was introduced earlier. Prior to forming ProAgra, Luis had just finished a four-year term as the Eldorado dos Carajas' Minister of Agriculture. Before serving as Minister of Agriculture, Luis had been an extension agent in the MST's COOMARSP, and had lived together with INCRA's current president in the 17 de Abril settlement. ProAgra's pedigree is more than tangential to the story of agricultural extension in the 17 de Abril; it is, rather, exemplary of how politics and economics mediate agricultural knowledge, projects, and patterns of ecological change.

In 2012, Luis described to me his desire to create ProAgra as different type of extension company. In 2013, when I returned to conclude my research, Luis had convinced Adriana to work as an extension agent in his new company, promising that it would be "different". When I

asked her how it was supposed to be "different," she replied,

> Different in the way that the projects were created and executed with the farmers. We wouldn't just spend 6-8 months making a proposal, and not actually putting it into practice. When they invited me they said, look you're going to do projects, like PRONAF, you're going to do the visits, but you're going to actually put the projects into action.

But after working for six months, Adriana found this experience was no different than the previous extension companies. She explained, "It's exactly the same as the other companies. You work for a company that is contracted to INCRA, and so you have to develop a proposal." Adriana lamented, "It's gotten to the point where farmers are cynical about agricultural extension, they don't believe in the companies working in agricultural extension, seeing them as just promising and not doing anything."

Adriana had hoped that given her training in agroecology, she would be able to help shift the settlement's monoculture away from milk production:

> We try to give them various options, talking about the benefits of diversifying. If the farmer takes a portion of his land and really diversifies it in terms of having cattle, sheep, bees, pigs, an orchard and subsistence crops, then he could get much more economically out of the land, but also would be contributing positively to the environmental question in terms of needing less pasture, not compacting the soil as much. We try to train the farmers, because a lot of the areas are degraded and the springs are exposed, and as a result during the summer they essentially dry up, owing to compaction and solarization. For this reason we've been discussing getting a nursery started, to try to recuperate these areas.

I ask Adriana if many of the farmers are interested in diversifying. "Very few," she responds, "*Really* few." When I ask why she responds,

> Because since the settlement's creation, the projects have been set up for ranching. The farmers don't see any income coming from actual agriculture, and they see technical extension as something that was never present. Like in the past with the saplings, there simply wasn't the necessary technical assistance: the saplings arrived in the wrong season, were planted in the wrong season, and died. And so the farmers don't believe in agricultural extension any more. And so they stayed with cattle, because there was so much pasture, and they see the cattle as

> giving a better income. And so they're not interested in creating a project in order to have agriculture.
>
> The farmers don't really help us: we get there, and the farmers let us in, because that's what's culturally appropriate, but they just don't believe in agricultural extension in general, or in projects, or in the companies, or even in the settlement's association. You could be telling the truth. You could be there with a project in hand already approved by INCRA, but the farmers just don't believe it. They want money in their hands. And so for us to develop a project, regardless of in which settlement, whether it is in the 17, or in any settlement in the region it's difficult, *really* difficult, because it's the same situation across the board.

Adriana's description of the farmer's distrust is itself in considerable theoretical tension with her interest in moving the community beyond milk production towards agroecology. Perhaps because of the absence of these strong relationships with farmers, she is unable to develop an understanding of what the settlements inhabitants actually want in terms of a project. As a result, Adriana's interest in fomenting a shift towards agroecological production, without the sustained dialogue of community members, is ironically exemplary of the cultural invasion that Freire himself described.

An alternative to externally originating projects is place-based extension, where the extension agents are from the community, and know the history of the land. This is the educational approach of the IFPA-CRMB. In October 2012, I participated in an agricultural cooperativism class at the IFPA-CRMB. Francisco, the teacher, explains to the class how their final project will serve as their application for a new credit project known as PRONAF-Jovem, which is intended to fund sustainable agriculture. Francisco tells the class,

> You all will be doing a final project, known as Improving My Land. And the objective of this class project is to put together a document that can serve as your proposal for the PRONAF-Jovem credit initiative. To put forth your vision for your land, we want you to describe in detail the historical production of the landscape. I want you to do this in three ways.
>
> The first is a history of your lot; your objective is to understand the historical production of this agroecosystem: Think about what have been the social,

> economic, political changes in the system? When did electricity arrive? When did the road reach your house? What changes did this precipitate?
>
> Second, what are the technological practices that your family uses? You need to understand what practices a family uses, because it won't work to propose activities where a family doesn't have knowledge of a particular type of agriculture.
>
> Third, what are the rationales for the changes. How have they maintained their life within that space. For example, your land was already cattle pasture, and a PRONAF came along and you got cattle because that made sense, but then, electricity arrived, and you were able to have a refrigerator, and so you thought "we can preserve fruit now", and your family started investing in agroforestry. With this understanding of the history of your landscape, and your family's role in its transformation, you'll be able to better describe your vision for that landscape.

Back in the 17 de Abril settlement, I join Alan, the only remaining IFPA-CRMB student from the 17 de Abril settlement, on a walk around his family's lot to discuss its history, his family's role in its transformation, and his vision for the future.

When Alan's father originally got the land it was already part of the old fazenda, and hence was already pasture. The land had long been exploited prior to the fazenda, however, as Alan shows me an old dirt road that cuts through an area of secondary forest. "This was one of the original logging roads," Alan tells me. "It was here before the fazenda, and was used for illegal logging. They didn't ask permission from anyone, no rights to take the lumber on the land, but they did it." In the intervening four decades since this land was first commercially exploited, it has been transformed repeatedly.

Misael, Alan's elderly father, tells me that he had knocked down some of the forest in the area where the house now stands. Some forest still remains, but he points to it with a sweeping motion that encompasses the entire area: "*picado*" (burnt through). Misael reaches to the ground, and makes a spider-like motion with his hand. "A neighbor will set a fire at sunset, and it will pass under the ground, coming up again and burning

everything. We tried to maintain a forest reserve, as we had a lot of native cupuaçu and cacao, but every year it becomes more and more *picado*".

It wasn't supposed to be this way. In the beginning, Misael had taken part in the PRONAF-A credit program for *Cultura Permanente*, or agroforestry. It was a group credit project, in which he had to enter with a set of neighbors. However, this meant that they had to pay as a group, and so when one member didn't pay, they all remained in debt. Misael repaid his share of the debt by selling a neighboring plot of land he had purchased for Alan. In 2009, Misael signed up for the PRONAF program again, this time for cattle. The money was enough to build a watering hole for the cattle, construct a corral, and build a fence. “Was there technical assistance?” I asked. “Perhaps, but only to create the project. Here, it is really rare to see a technician," Misael responds as we walk the property.

As we traverse the field, we come across a herd of 38 cattle. I ask if they are beef cattle. "No, they're not for beef, nor for milk," Francisco tells me. "In reality, they're just an insurance policy. If someone gets sick or hurt, we take a cow, go to the village and sell it, leaving with money in our hand.” This conception of cattle as a form of embodied capital is common. More surprising to me was the fact that they did not keep any cows for milking or for meat.

Alan tells me that his family has given up on subsistence agriculture because it is too hard to prepare the land without machinery. We talk about the dependence on machinery, and its apparent contradictions within the context of agroecology. "We are all ‘*maquinarios mesmos*’ [technologically oriented],” he responds with a smile. "It's very difficult to work agroecologically." He gives me an example, pointing to the shrubs

growing up through the pasture. "My father wants to use herbicide to clean out this pasture, however, I think it would be better if we just worked the land by hand."

Alan is interested in improving his family's production on the lot; as part of his "Improving My Land" course project, he envisions trading in some of the cows they have for milk cows and beginning milk production. Another idea is to create an agroforestry area within the forest, but Misael would like to convert it into a swidden area to plant manioc. Alan, by contrast, thinks that planting cupauçu, coconut, and acaí would make much more sense. The tension between Alan and Misael concerning manual labor vs. herbicides, and swidden cultivation vs. agroforestry, underscores Pedro's previous reflection that the family is one of the great challenges in transitioning to agroecology.

Conclusion

The politics of environmental knowledge connect the first and third Green Revolutions. Education, political economy, landscape history, culture and power are intersecting axes upon which these respective Green Revolutions and their concomitant visions of development, and embodied politics of knowledge intersect.

Agricultural extension is a central site of contestation between the alternative visions of agricultural development advanced by the first and third (agroecological) Green Revolutions. The education of agricultural extension agents is strongly influenced by the competing development visions of the first and third agroecological Green Revolutions. The political ecology of education lens illuminates how the tension between these two extension education paradigms is a product of the interconnections between political ideology, visions of agricultural development, economic processes, and ecological imaginaries. Anderson Souza, an EMATER

extension agent, asserted that agricultural extension in Brazil was directly structured by the Green Revolution. Gemeson Brito explained that this was in part because of how political economy affects education. The Green Revolution, from Brito's perspective, molded university agrarian science programs in a model of agricultural modernization, reproducing the idea that agents could only create projects based on large-scale capitalist production: "It's like they can't see *how* to work in agrarian reform settlements." The IFPA-CRMB, by contrast, developed from two decades of educational activism in diametric opposition to these educational institutions. The IFPA-CRMB is structured around Freirean principles of extension *as* dialogic education, with the objective to train students who will engage in community development rather than in "cultural invasion." From the MST's perspective, the IFPA-CRMB heralds the future of sustainable agricultural production in the region's settlements.

Political economy ties these extension practices together. In the 17 de Abril settlement credit programs historically provided a financial incentive for inhabitants to shift from subsistence agriculture to cattle ranching. Extension agents were involved in these projects as brokers who mediated the inhabitants' access to the credit programs. When these projects failed, both individual inhabitants, as well as the settlement's administrative body, became indebted. More recently, students from the IFPA-CRMB program have been able to access the PRONAF-Jovem credit initiative. Education facilitates access to these funds, as it is necessary to have graduated from a vocational high-school agricultural extension program in order to apply for them. The IFPA-CRMB cooperative extension course was built around the opportunity afforded by this political economy: the students' "Improving My Land" project enabled them to reflect on the cultural, political, and economic factors influencing their family's land management history. Credit initiatives, such as PRONAF-Jovem, enable agrarian reform students to redress long

histories of land exploitation by developing alternative land management practices. In the 17 de Abril settlement, credit remains a driver for changing land management practices and, in turn, landscapes. Credit is not neutral, but ideologically charged. Agrarian social movements can advance their struggle by pressuring the government for credit programs, such as PRONAF-Jovem, that are linked to the movements' agrarian objectives, and enable the spread of sustainable land management practices.

I believe the political ecology of education lens in this context provides unique insight into how processes of environmental knowledge production and political economy intersect to differentially affect land use and ultimately landscape change. All of the credit initiatives are part of the same national PRONAF program. All also rely upon the legitimacy of a trained extension agent to access them. In the 17 de Abril settlement, what distinguishes the two is the educational orientation of the training program in which the agent participated: traditional extension agents were trained to develop projects to increase capital, whereas the IFPA cohort's objective was to increase agroecological production. The movement maintains its ideological strength by emphasizing education. The MST ensures it will be able to ideologically influence the training of students as agents of sustainable community-development by continuing to invest its political resources in forming institutional partnerships and developing new educational institutions.

The history of the 17 de Abril's landscape exists in a complicated feedback loop with these processes of political economy. Arnoldo, the settlement's president, described how land management options were limited first by the already degraded state of the environment, and then by the extension agents who kept advancing projects for cattle. Although Arnoldo wanted to become involved in agroforestry, he "just didn't have the knowledge." Genival, a long-term resident and extension agent, rubbed his fingers and remarked that one reason for the dominance

of cattle projects was because they yield more money for the extension agent. Although Luis, as part of the MST's COOMARSP extension service, wanted to diversify, several landscape factors proved obstacles. First, cattle simply work: the pasture already exists, and so they thrive. The ways that inhabitants have shaped the landscape's history also affected the contemporary options for Alan and his father Misael. The forest Misael tried to preserve is becoming more *picado* every year as fires cross onto his land. Seen from the perspective of the political ecology of education, it is not only the effects of politics and economics on education that affect patterns of ecological change; rather, patterns of ecological change structure economic opportunities in the form of credit, and possibilities against which education seeks to act. The future of agrarian change in the 17 de Abril settlement is in part dependent upon the MST's acknowledging, respecting, and developing ways to account for these reciprocal relations between landscape history, political economy, and education.

Cultural traditions also exist in a complicated relationship with each of these extension education paradigms. Pedro, the IFPA-CRMB student, told fellow MST participants at the annual pedagogical encampment that family is one of the principal barriers to agroecology. The tension between Alan and Misael over choosing between herbicide and manual labor, and agroforestry and deforestation, showed the height of this hurdle. As Luis reflected, cattle are a safety net, so changing these cultural traditions will be a slow process for financially insecure inhabitants. The cultural memory of the settlement's inhabitants is also a constraint, as Adriana indicated there is very little trust of extension agents. Cultural land management practices are at once an opportunity and constraint. Cattle are not inherently an obstacle to sustainable production, as many environmentalists would argue, and can serve as important nodes in agroecological systems. Advancing agroecology within the MST will require concerted dialogue

between movement leaders, educators, students, and their families about how to build new agricultural systems upon a foundation of existing cultural traditions.

Power provides opportunities and constraints to extension in the 17 de Abril. As the case of COOMARSP showed, the MST developed an extension agency, and was able to leverage that position to access resources. However, when its MST leadership devoted these resources to advancing its land occupations, it lost legitimacy with INCRA, and promoted inhabitants' distrust of extension agencies. Following COOMARSP's disgrace, two extension agents were able to gain high-level governmental positions as the superintendent of INCRA and Minister of Agricultural Development. These individuals remain intricately involved in the everyday face of extension in the 17 de Abril settlement. Luis, the previous Minister of Agricultural Development, went on to create an agricultural extension agency that sought to provide a "different" form of extension. As Adriana indicated, INCRA decides whether or not an extension company will continue working in the settlement. Ensuring the continuity of a company requires a close relationship between the head of the extension company, the settlement's president, and INCRA. A political ecology of education perspective clarifies how the power dynamics between these individuals mediate the economic resources and opportunities for extension, as well as the ability to remain in a community. Ultimately, the duration of extension agents efforts is much longer then their temporal presence in the community. The history of the landscape, and the agricultural practices that shape it, are slow to change. Investing in agroecological education is one way the MST can shape the future of its settlements, and their landscapes. The MST must continue to synthesize political economy, ideology, and cultural traditions in an effort to change existing educational institutions, and advance new ones.

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CHAPTER 5

TOWARDS A POLITICAL ECOLOGY OF EDUCATION:

THE EDUCATIONAL POLITICS OF SCALE

IN SOUTHEASTERN PARÁ, BRAZIL[78]

[78] Meek, D. Submitted to Environmental Education Research, 6/1/2013

Abstract

Social movements have initiated both academic programs and disciplines. I present ethnographic data that I gathered during 17 months of fieldwork with the Brazilian Landless Workers' Movement (MST) in southeastern Pará, Brazil to explore the MST's role in creating agroecological education opportunities. My analysis highlights three factors in southeasterrn Pará that initiate environmental education opportunities. First, activist professors are key players, serving as mediators between the state and social movements. Second, recurring events incubate environmental educational institutions and degree programs. Third, by collaborating with institutionalized education, movements are able to develop their own radical educational spaces. These three factors result in a gradual anti-neoliberal transformation in southeastern Pará's rural educational opportunities. I develop a theoretical perspective of the political ecology of education to understand the relations between these three factors and educational change. By drawing attention to the educational politics of scale, I help advance theories of environmental education in a neoliberal age.

Keywords: agroecology, *Educação do Campo,* Landless Workers Movement (MST), political ecology of education, institutional activists, curricular change

Towards a Political Ecology of Education: The Educational Politics of Scale in southern Pará, Brazil

Introduction

Social movements are challenging neoliberalism's dual vision of education and environmental resources as a market system of privatized services (McCarthy and Prudham 2004; Mein 2009). One-way social movements advance anti-neoliberal alternatives is through institutionalizing critical environmental learning. Yet, how and why do social movements institutionalize critical environmental education in the very neoliberal educational system? I address this larger question by exploring the following three sub-questions:

1) How do social movements access political programs and financial resources?

2) What facilitates the evolution of innovative educational institutions?

3) How can institutionalized education help movements train their members?

In this article, I begin constructing a theoretical framework to attend to these questions, which synthesizes insights from political ecology and the political economy of education.

Political ecology is an interdisciplinary sub-field that explores the relationships between environmental change and political, economic, and social processes (Bryant 1992; Greenberg and Park 1994; Robbins 2004). Political ecology can be contrasted with classic ecology, which apolitically explores relationships between organisms and their surroundings (Biersack and Greenberg 2006). Scholarship in the political economy of education, meanwhile, analyzes the relationships between political policies and the funding of educational programs (Elmore 1984; Carnoy 1985; Torres and Schugurensky 2002; Mitchell and Mitchell 2003).

As Roderick Neumann indicates in the opening to Making Political Ecology, "The environment and how we acquire, disseminate, and legitimate knowledge about it are highly politicized, reflective of relations of power, and contested" (Neumann 2005: 1). Yet, despite this

clear articulation of the relations between the politics of knowledge and the environment, there lacks a *political ecology of education.* In defining a political ecology of education, I expand on two traditional definitions of political ecology. The first is a synthesis "of political economy, with its insistence on the need to link the distribution of power with productive activity and ecological analysis…" (Greenberg and Park 1994: 6). Secondly, I draw upon the definition of political ecology as "the study of interdependence among political units and of interrelationships between political units and their environment" (Hempel 1996: 150). Synthesizing these conceptions, I define a *political ecology of education* as a framework for understanding how the reciprocal relations between political economic forces influence pedagogical opportunities—from tacit to formal learning—affecting the production, dissemination, and contestation of environmental knowledge at various interconnected scales. It also affords the possibility to explore downstream effects on access and control over natural resources, interactions with cultural landscape, as well as local conceptions of nature-society relationships.

I apply this nascent political ecology of education framework to a case study of the Brazilian Landless Workers' Movement (*O Movimento dos Trabalhadores Rurais Sem Terra* or MST), an agrarian social movement that has institutionalized critical environmental education. First, I unpack the concept of *scale*. I then provide a short background on the MST. I then present research results in three sections, each of which examines one of the questions posed above. I collected these data during 17 months of ethnographic fieldwork, involving participant-observation and semi-structured interviews, between 2009-2013 in a variety of MST settlements and educational spaces in southern Pará, Brazil. I accounted for response bias due to my subject position as ethnographer by triangulation, verifying data when results became redundant (Luhrmann 2006).

The Educational Politics of Scale

Despite three decades since Taylor's (1982) seminal work on scale, there remains little agreement on how operationalize the term (Marston et al. 2005: 16). I employ a combination of a *hierarchical* and a *horizontal* conception of scale. A *hierarchical* vision of scale is a nested set of territorial units, ranging from the global to the body (Brenner 2005: 9). *Horizontal* scale, by contrast, is a network that transgresses boundaries (Leitner 2004: 237). I integrate these two scalar lenses within the political ecology of education perspective to help explore the implications of what I term the *educational politics of scale*. My conception of an educational politics of scale draws upon previous scholarship of " 'educational scales' as the spatial and temporal orders generated as pupils and teachers move and are moved through educational systems " (Nespor 2004: 309, see also McKenzie 2012). I build upon Nespor's understanding of scale as networked by emphasizing how the interconnections between multiple sites of political economy and social contest structure the production of educational opportunities for environmental learning.

I understand the *educational* politics of scale as concerned with the spatial character of educational policy and action. Similar to Cox (1998), one might draw upon the educational politics of scale to ask, for example, whether anti-neoliberal educational actions are inherently local, regional, national, or international? Similarly, where can one geographically position the public policies that fund anti-neoliberal educational initiatives? By addressing these questions, I demonstrate that the educational politics of scale are central to a political ecology of education, and its analysis of how interrelations between political policy, economic resources, and educational action affect environmental knowledge production.

Case Study: The Brazilian Landless Workers' Movement

The Brazilian Landless Workers' Movement (MST) is widely recognized as the most successful agrarian social movement in Brazil (Wolford 2010). MST members occupy what they perceive as unused agricultural land and pressure the government to take the land and create a community, known as an agrarian reform settlement. Two foci within the MST are locally relevant education and agroecology.

The MST has a complicated relationship with the state in terms of education provision. The MST believes that education within settlements is the state's responsibility. Yet, the MST also believes these schools' curricula should incorporate the movement's ideals and principles. The MST seeks to create culturally relevant curricula through its vocal position in an umbrella movement for education reform known as *Educação do Campo.*[79]

The *Educação do Campo* movement is a major force in shaping rural education in agrarian reform settlements. The *Educação do Campo* movement is a movement of movements, "defined by its demands for quality and free education from infancy through university, and the construction of a distinctly rural school that is guided by a vision of rural development, which is based in social justice, agricultural cooperation, environmental respect, and the valuing of rural culture (Munarim 2008: 61)". This movement has helped shape Brazilian educational policy towards locally relevant rural education as opposed to homogenous national programs that do not attend to local diversity in geography, culture, and history (Comilo and Brandão 2010; Breitenbach 2011).

Agroecology, which is the integration of ecological principles into sustainable agricultural systems (Gliessman 2006), is another main focus of the MST and larger *Educação*

[79] I capitalize *Educação do Campo* when referring to the education reform movement; otherwise, the phrase refers to locally relevant pedagogy.

do Campo movement's educational agendas. The MST's ideological and material engagement with agroecology can be tracked to its role within the international umbrella peasant movement *La Via Campesina (LVC)* (Wittman 2009; Rosset and Martinez-Torres 2013). Agroecology is employed by the MST as a tool opposed to industrial agriculture and its conventional focus on environmentally damaging export crops, instead promoting agricultural sustainability (Altieri and Toledo 2011; Rosset and Martinez-Torres 2012).

The Contest between Neoliberal and Anti-Neoliberal Education in Brazil

Brazilian universities are key battlegrounds between neoliberalism and anti-neoliberalism. The formation of the Brazilian higher education system, particularly its agronomy programs, was interlinked with large-scale agribusiness and international financing. During the 1940s, the American International Association for Economic Development (AIA), funded by the Rockefeller foundation, founded university agronomy training programs that trained extension agents to transform rural producers from purportedly backward agricultural practices to modern ones based in advanced technology and industry (Callou et al. 2008). These programs increasingly focused on large scale, technical and capital-intensive agriculture. During the 1980s, with the fall of the Brazilian dictatorship, civil society began to critique the increasingly "American organizational model of a rational, capitalist university-enterprise focused on productivity" (Orso 2007: 79 in Carvalho and Mendes 2011: 133). However, the three successive national governments of Fernando Collor de Melo (1990-02), Itamar Franco (1992-03), and Fernando Henrique Cardoso (1995-8 and 1999-2002) put into place the neoliberal educational policies of the World Bank, which included privatization and outsourcing of

university activity (Segundo 2005). As Chauí notes, the university became characterized "as a service provider to private companies" (2001: 35-36 in Carvalho and Mendes 2011: 134).

Against this neoliberal backdrop, the MST has helped advance rural universities focus on *educação do campo.* In 1998, the MST and other social movements that comprise the larger *Educação do Campo* movement began challenging the market logic of education policy by advocating the creation of the National Program for Education in Agrarian Reform (PRONERA). PRONERA provides funding to support secondary and post-secondary courses for inhabitants of agrarian reform settlements. I see PRONERA as exemplary of an anti-neoliberal educational policy, because its programs do not further privatize, but instead strengthen existing state educational institutions, and seek to train students to attend to local social and environmental justice needs rather than those of the market system.

The successive Lula governments (2003-10) engaged in a paradoxical way with agrarian movements and their anti-neoliberal demands (Carvalho and Mendes 2011). On one hand, Lula terminated the privatization of the university system, and increased the number of PRONERA initiatives. However, Lula also maintained economic policies that strengthened financial incentives to agro-chemical intensive agribusiness, which is antithetical to the family farming practices that the MST advocates (Perreault and Martin 2005; Vanden 2007). Lula's tenure is highly contradictory, maintaining allegiances to conservative interests while at the same time strengthening spaces of popular knowledge production. PRONERA exemplifies this contradictory position. By 2008, more than 400,000 students from MST settlements in 22 states had participated in PRONERA-funded courses in 49 public universities' secondary school vocational education, higher education, and graduate courses (Carvalho and Mendes 2011). However, political conservatives who were allies of the Lula government publicly denounced the

PRONERA program, reducing its 2009 budget by 62%. Other legislative changes resulted in the cessation of payment of PRONERA professors for more than 18 months, serving as a major disincentive for professors to participate in the program.

I now turn to explore the interplay between the opportunities and constraints facing the MST's anti-neoliberal educational initiatives in the southeastern portion of the state of Pará.[80] The educational institutions I analyze are the Federal University of Pará (UFPA), the Rural Marabá Campus of the Federal Technical Institute of Pará (IFPA-CRMB), and the Agroecological Institute of Latin America-Amazonia branch (IALA). The IFPA and UFPA are regional federal educational institutions while the IALA is a social movement educational space. I focus on two MST educational programs that revolve around critical environmental learning. The first is a graduate certificate program entitled "The Agrarian Question, Agroecology, and *Educação do Campo*," which is a PRONERA course offered in partnership between the UFPA and IALA. The second is a vocational high-school program in agroecology that takes place at the IFPA-CRMB. Both involve critical place-based learning activities.[81] The only students who can participate in these PRONERA programs are inhabitants of agrarian reform settlements. Frequently, the students chosen to attend these PRONERA programs are the most politically active members of their communities. The curricular offerings of each of these three educational institutions are the product of a two-decade wave of educational activism involving partnerships between the region's social movements and the institutions' professors.

[80] I also include ethnographic data collected from the MST's Center for Study and Training in Agroecology and Cabana Culture (Centro de Estudos e Formação em *Agroecologia* e Cultura Cabana or CEFAC located in an MST settlement in the northern portion of Pará state.

[81] Space constraints preclude extended discussion of the content of these programs; in the present manuscript I focus on the origination of these critical environmental education opportunities, and the institutions that offer them.

1) How do the region's social movements access political programs and financial resources?

Two signs frame the entrance to the Federal Institute of Pará, Rural Campus of Marabá (IFPA-CRMB). The first indicates the amount of governmental investment in the campus's construction. The second shows the MST flag and reads *Educação do Campo*—Our Right—The State's Obligation. These signs' juxtaposition points to the ongoing struggle necessary to secure state resources for rural education.

On a Saturday in November 2012, a community forum is taking place at the IFPA-CRMB. The forum won't start for some time, and so Helix, a student in the program, offers to show me some of the students' experimental agroecology projects. We enter a garden area and find a tarp-covered piece of ground. A trellis with a PVC pipe surrounds it. This, Helix proudly tells me, is a biogas generator. "We just finished it, so no gas yet, but it would come out here", he points at a valve. "We bring the food waste from the school and mix it with manure, drop it under the tarp and let biodegradation do its work. When methane rises, the tarp will billow, and the only byproducts will be rich compost, and a liquid that is high in nutrients". Impressed, I turn around and find Marcos Aurelio, Helix's agroecology teacher, bending down in some bushes. Seeing Helix and I, he calls us over. In his agroecology class they´ll be talking about nitrogen fixation, and Marcos wants to show his class an example of rhizomes. "I want to show them what rhizomes look like. It can´t just be in theory, it needs to be in practice as well. The students need to be able to see and feel the rhizomes. He reaches down and pulls up a plant, gently fingering it´s roots. This will do." We walk back towards the auditorium and come to an area where beans are planted in amongst the grass. Marcos remarks "We´re doing research on these beans, looking at them as a method of combating the pasture grass. Rather than burning, farmers can plant beans, which not only give food, but also provide nitrogen to the soil. Early results look

promising." Heading towards the cafeteria where the presentations will take place, I reflect on how divergent these experiential agroecological learning opportunities are from the traditional educational system that reproduces a conception of high-input agriculture.

In the auditorium, the director of the IFPA-CRMB is giving a presentation to an assembled group of parents. A summary of the budget of the school's agroecology high-school program is projected on the wall. The director provides context for these figures by describing the ongoing struggles, victories, and setbacks that occur in the process of securing the state's promised education funding. The audience erupts into applause as the director concludes his presentation with a picture of him hugging Brazilian president Dilma Rouseff. "That was just three days ago in Brasíla!" he smiles. The image in combination with the director´s account of trials, struggles, and partial victories keeping the campus fiscally solvent paints a clear picture: the administration and faculty are directly linked to the seat of power, and will traverse geopolitical scales in order to pressure the government for the resources needed. Negotiating these educational politics of scale is essential to obtain the political and financial resources needed to continue the dual projects of advancing locally relevant education and the creation of agroecological education opportunities.

The Federal University of Pará (UFPA) is another site of anti-neoliberal action that is resulting in the creation of critical environmental education opportunities. The case of Gemeson Brito, below, illustrates how activists working within the university are crucial for motivating and sustaining PRONERA's activity. With his black coconut ring symbolizing his commitment to emancipatory social change, and MST movement shirt, Gemeson Brito contrasts from most high-level university administrators. Brito has directed nearly all of the region's PRONERA courses. When asked about the political economy of PRONERA, Brito responded, "PRONERA

only agrees to fund courses that have an involvement with a University or an educational institution, and social movements. And why is it this way?" he asked, rhetorically. "Because, the program was designed by the social movements themselves... But it's very unstable, because it is open to the evaluation of the *Ministerio Publico*, and the accusations of the *Bancado Ruralista* [a right-wing land owners' lobby group]." He goes on to explain,

> There was a crisis in which there was a congressional inquiry of the MST. They were going to evaluate government projects that finance the MST's projects. The first program that was analyzed was PRONERA, and almost two years went by without being able to liberate any monies, or almost any funding.

Brito's evaluation of PRONERA's political economy highlights two important points concerning the educational politics of scale. First, Brito draws attention to the role of a horizontally scaled social movement in molding the funding networks that influence local education. Social movements helped develop PRONERA in order to fund *partnerships* between themselves and universities. Additionally, Brito underscores the vertically scaled political economy of education: whereas the congressional inquiry into the MST's finances was at a national level, the experience of financial instability was inherently local.

Brito goes on to discuss the linkages between bureaucracy, financial instability and the everyday resistance of activist professors. When asked what his daily life is like as a coordinator of these PRONERA programs, Gemeson sighs, take off his wire rim glasses to rub his eyes, and continues, "In a variety of ways you simply have [long pause] ....to struggle, because you have to get involved. If you were just to send a memo requesting funds to be made available it can easily be forgotten." Brito continues, *"*So if you don't pick up the phone and call, and insist, and question--*so many times* I've had to personally go to INCRA, you understand? Because

sometimes to get access to a [financial] installment you need to get approval at five levels." Brito concludes:

> So you send in the protocol, but the thing doesn't move forward in the nice way that it should, and so you call and they say, 'Oh, it's stopped at the first level,' and so you go there personally: 'What's the problem?'.... 'Oh, it's missing this document, you need to correct this or that,' and so you need to exert this additional force, because if you don't these things take too long, you lose the window of time. There is an activist force, in the sense that you need to force the bureaucracy to function.

Brito's persistence is more than simply following up on his administrative responsibilities. His persistence is emblematic of quotidian forms of resistance (Scott 1987). Studies of such resistance, particularly among institutional activists negotiating bureaucracy (Katzenstein 1998; Moore 1999; Creed and Douglas 2003; Raeburn 2004; Arthur 2009; Banaszak 2010), highlight the importance of simple tactics such as picking up the phone.

Much like Gemeson Brito, Marcio de Souza's life is intertwined with education and activism. Marcio is a teacher in the IFPA-CRMB's vocational agroecology program. Marcio is a long-time member of various social movements and is extensively involved with PRONERA courses. He describes the accretion of educational opportunities in this area as an organic process arising from sheer need in the early 2000s.

> The first course was in literacy, and then it was like, 'How can you have literacy training without teachers' education?' So then there was teachers' education. 'Okay, so you've got teachers' education, well how can you not have a technical course?' So the technical course was the first in Brazil, but then we said 'Okay, you've got a

> technical course, how can you not have a university level course?' So then we got a university level program in agronomy and rural education. And then we asked ourselves, 'How can you have a university level program without a post-graduate program?' It was in this way that it kept developing in the region.

Marcio's perspective underscores how the relationality between educational scales is constitutive of gradual change. The creation of educational opportunities at various institutional scales—from high-school to university to graduate certificate to continuing education—enabled the "the vertical integration of courses," as another professor described it. The metaphor of "vertical integration" is a tactical deployment of the educational politics of scale, as the combination of local projects evidence regional change. The piecemeal manner that anti-neoliberal movements, and their interlocutors advance specific projects is, therefore, one way they articulate a counter-hegemonic vision of education within the larger hegemonic neoliberal system. The educational politics of scale constitute the examples of the director of the IFPA-CRMB's trip to Brasilia, the financial instability of PRONERA funds, and Souza's description of the vertical integration of rural education courses. From a political ecology of education perspective, institutional activists' negotiation of the educational politics of scale is a key factor in the production of critical environmental education opportunities.

2) What facilitates the evolution of innovative educational institutions in southern Pará?

The construction of the IFPA-CRMB has been a process involving extensive resistance on the part of students, faculty, and administrators. Walking across its' campus, I spot a rudimentary thatched pavilion with logs serving as benches. Flavio, a student in the IFPA-CRMB's agroecology program tells me that this space is connected

to the historical formation of the campus. When the program first started there was no infrastructure, and so

> We started out the program at Cabanagem, which is an autonomous social movement space. Then we moved to the MST's National Training School in Maraba. We were there for another month. Then we had no place to go, and didn't study for two months. Then we found some space at the Santa Terezinha school, and spent a year there. By then construction had started at the IFPA-CRMB: they were able to get up some walls here. But the construction process halted. We came here to this space, to hold our classes, and protest, because if we're here, the process of construction can be accelerated, it can go faster, because we're here and knowing what we're missing, we can then direct our demands.

The rudimentary classroom at the nascent IFPA-CRMB provided a space for students to hold classes, discuss what needed to be done, and protest, expediting the halted construction. Spaces of dialogue, such as these, are instrumental to creating anti-neoliberal environmental education opportunities, such as the IFPA-CRMB itself. Spaces that have an intended educational objective and whose purpose is to encourage critical dialogue with the ultimate goal of actualizing emancipatory social change are termed dialogic spaces (Rule 2004: 320). I found that dialogic spaces are integral to the creation of critical environmental education opportunities. As Eduardo, an activist professor who directs the agroecology certificate program at the UFPA, describes, debate is a key strategy for creating change within the University:

> Our orientation and partnership with the social movements is clear. You begin to occupy the university with debates, with actions, with videos, with week-long activities, which is part of our strategy…when you're bringing all this in, there's no

> way that the University can turn its back on it...you enable the reflection on what other forms the university can take.

Eduardo is explicit: both social movements and faculty seek to physically and ideologically occupy the university through the debates and activities they host. These debates are, according to Eduardo, used to integrate and legitimate the demands of activists from social movements in the university's public consciousness. These dialogic spaces have a trickle-up scalar effect. Although they started at a small scale, they caused a transformational process at the larger scale of the university itself.

Indeed, the origination of the Rural Campus of Marabá (IFPA-CRMB) grew out of the scalar politics of dialogic spaces. All professors I spoke with emphasized how this agroecological school arose from a series of debates and associated activism that took place at the Regional Forum of *Educação do Campo* (FREC) in 2005, 2009, 2011, consisting of seminars, plenaries, debates, and workshops.

The importance of the FREC to both the origination, and continued development, of the CRMB, is sustained by having a FREC representative on the CRMB advisory board. Jean Luc is the FREC representative. A 75-year old French agronomist, educator, and activist who worked in the region for the last 30 years, Jean Luc has only a handful of remaining teeth, evidencing that his life in the *campo* was not much different than the peasants with whom he works. When I ask Jean Luc to help me understand FREC's role in the region, he tells me:

> the Rural Campus of Marabá is the product of a dialogue that was created by the FREC. The FREC brought together the diverse institutions and movements that are working in the region--and from there created a debate that led to the creation of the Rural Campus of Marabá.

The CRMB is the only federally funded and managed agroecological technical institute within an MST settlement in Brazil. This achievement exemplifies a national scale change in the form of a space for radical education within the federal technical institute system. Employing a political ecology of education lens, the constitutive nature of the FREC and the various debates in the university draw attention to how the reciprocal relations between the spaces and scales of debate created the CRMB and a transformed university, providing new opportunities for critical environmental education to students from agrarian reform settlements.

3) How can institutionalized rural education help movements train their members?

Surreal is the only way to describe the MST settlement known as Luís Carlos Prestes. Unlike most settlements in the region, which are accessed by rutted dirt roads, one enters Luís Carlos Prestes via a professionally constructed cobble stone drive, the old *fazendeiro's* (land owner's) drive. This formal driveway provides an entry point for exploring why the MST re-appropriates space to achieve the interrelated objectives of land and education reform.

The original buildings of what *was* the fazendeiros headquarters are now the MST's Center for Study and Training in Agroecology and Cabana Culture (CEFAC). CEFAC consists of the original three buildings that made up the *fazendeiro's* headquarters: an air-conditioned wooden pavilion constructed of massive timbers, a house with soaring ceilings, and an office building. MST members have completely refashioned the complex to serve as an agroecological education space. They have transformed the house into a dormitory for visiting MST students. The office building is now a space for group discussions. The pool is now a fishpond that feeds the students. The glassed-in pavilion, which previously was a site for social functions, is now CEFAC's auditorium.

I am at CEFAC for the graduation ceremony of its first cohort in agroecology and rural culture. Joaquim takes the podium to address the gathered students and families.

> This was the *latifiundio's* space, but it is now one of the construction of knowledge that comes from us, not of knowledge that simply come from the universities. This space is a reaffirmation of our values, which are different. Why are we studying agroecology? Because the planet doesn't have more time. Because the agroindustrial model does not, and will not work. Because, we need an educational space that reaffirms our culture. Parents, your students left your houses for almost a month to come here, saying 'we are going to study, to understand reality, to debate, learn, and to engage in cultural interchange'. And we discovered here that that agroecology is our culture.

The *fazendeiro's* old complex is the most developed part of the Luis Carlos Prestes settlement. The fact that the community chose to convert it into an agroecological training center highlights the value placed on agroecological education. It also underscores how educational and agrarian reform are interlinked. As an MST educator, interviewed by Diniz-Pereira (2005), remarked: "Knowledge has been very concentrated... It is easier to knock down a *latifundium* fence than to overcome the invisible fence around knowledge…the "educational fence" is very hard to knock down (6)". In Pará, institutionalized rural education is facilitating the construction of radical education spaces, such as CEFAC, that are intended to augment the MST's reach in providing agroecological education to its members.

Take, for instance, the concluding section of the UFPA graduate certificate course in "The Agrarian Question, Agroecology, and *Educação do Campo.*" This event was a three-day seminar in December 2012 hosted at the Agroecological Institute of Latin America (IALA), located in another MST settlement. MST leaders and University professors organized this event

as an opportunity to strategize the development of this institute as a Pan-Amazonian center for radical agroecological training. Fifty MST and educator activists travelled from the Pan-Amazonian region to discuss how IALA can achieve its mission to be a space for agroecological convergence.

A state MST leader, Andreia takes the microphone on the second day and launches into a polemic: "The seminar, from yesterday, to today, to tomorrow, is a process for us to reflect about the necessity for the construction of a project, and the construction of a strategy." Andreia both goads and grounds the presenters: "One of the things that we've discussed through the weekend is that all that we've done at IALA up until this moment isn't sufficient to achieve what we've wished for, or for what we've been challenged to do... and for this we have the saying." Her voice slows and she speaks the next words like a mantra: "the IALA is a process of construction that is..." and the crowd collectively finish for her, "continual." During a break between sessions, Dayze, a dedicated MST activist, the long-time director of IALA, and a student about to graduate from the certificate program reflects on the collaboration of the nascent IALA with the certificate program, noting that:

> We began with the certificate because it was the only type of course that we could develop with the University, and because *then* it is easier to access other types of training programs, whether at the level of certificate or even at the high-school level. In addition, offering the certificate gives you a certain liberty to include in the course curriculum themes that help us to engage not only with the course itself, but to think about the challenge of the construction of IALA, what is it that IALA should be?

Dayze's sentiments, and the context in which they were given (namely, at a seminar weekend of a University course hosted in a radical agroecological institute) show that leaders within the MST strategically designed courses that would facilitate the creation of University partnerships. Lastly, Dayze explains that that the freedom built into course helps develop the institute itself; in other words, there is a scalar feedback loop between the IALA and the creation of the course. Similar to Marcio's description of "vertical integration," IALA is being constructed through an iterative scalar process, where scale is understood as educational, in terms of variety of course offerings, and both horizontally and vertically geographic, as exemplified by its course offerings that brought together students and activist intellectuals from across the Pan-Amazonian region.

In two ways, the concluding section of the graduate certificate course evidence how the politics of educational scale provide insight into the political ecology of education. First, recursive debates arose at IALA as students presented their research projects on agroecological production challenges in the region, leading to discussions about how IALA could better reach not only the region's 500 settlements, but the countless other rural communities in the Pan-Amazonian basin. These discussions were intended to create educational opportunities at vertically and horizontally interconnected geographic scales—from the local to the regional, national, and international. This scaling out was inherently horizontal, as the *regional* leaders of the MST, a *national*-level Brazilian movement, advanced the agroecological aims of the *international*, umbrella social movement *La Via Campesina*. Second, financial resources from the vertically scaled national PRONERA program enabled a horizontally scaled convergence as dozens of MST members, activist professors, and renowned academics converged in this MST settlement to debate the future of its evolving agroecological educational space. The certificate program was funded by the national-level PRONERA program, and was explicitly designed to

facilitate the construction of an anti-neoliberal educational space that would attend to the needs of various vertical and horizontal scales. It achieved this by embracing the politics of scale, and drawing upon a national vertically scaled program to bring together horizontally scaled local, regional, national, and international activists and intellectuals. The political ecology of education lens draws attention to the importance of iterative relations between scale, political economy, and the creation of critical environmental learning opportunities at educational institutions, such as those described here between IALA and the UFPA.

Conclusions

In this article, I proposed a theoretical framework for explicating the political ecology of education of educational institutions in Pará. The educational politics of scale are integral to this perspective, and offer a way of understanding how economics, policy, power and resistance influence both vertically and horizontally scaled opportunities for environmental knowledge production. I drew upon the political ecology of education framework to answer three main questions related to the evolution of opportunities for critical environmental education in southern Pará, Brazil.

How do the region's social movements access political programs and financial resources? As my results illustrate, institutional partnerships, and the activists that directed them, were key players in creating new rural educational opportunities. Specifically, I showed how movement insiders, such as both the director of the IFPA-CRMB and Gemeson Brito, leverage their institutional power and engage in a daily struggle to secure funding for movement courses. This draws attention to how both “local neoliberalisms” (Peck and Tickell 2002), and local anti-neoliberalisms are imbricated within wider networks. The contest between neoliberal and anti-

neoliberal tactics—between funding and blockage—produces *heartlands*, such as the capital of Brasília where policies are formed and disputed, and the *zones of extension*, such as rural Amazonia where they are implemented (Peck and Tickell 2002). Additionally, the politics of educational scale became clear as Marcio narrated how gradual change had occurred through the creation of piecemeal programs. Interestingly, paying attention to these scalar politics makes it difficult to trace historical points of origination and larger geographical trajectories of change (Steiner-Khamsi 2004). As they conglomerate, the existence of anti-neoliberal educational opportunities begins to take on the omnipresent and unquestionable nature of neoliberalism (Hursh 2007; Ferguson 2009).

What facilitates the evolution of innovative educational institutions in southeastern Pará? The ethnographic vignette of the IFPA-CRMB was the first example of how dialogic spaces result in a "trickle-up" politics of educational scale. Eduardo's narrative then highlighted how the UFPA faculty strategically held debates and activities to bring about a transformative discussion at the university level. Directing the focus to the incubation of institutions, Jean Luc's vignette provided a third example by pinpointing the FREC as the originating point of the CRMB. By exploring the relations between scale, space, and environmental learning, a political ecology of education lens showed how dialogic spaces affect the production of critical environmental education opportunities.

How does institutionalized education help social movements train their members? The CEFAC vignette illustrated how critical environmental learning re-enforces movement values. The IALA narrative highlighted how IALA was able to benefit from PRONERA funding by forging a University partnership, starting it on a perceived road towards expanded radical education provision at various educational scales. The results from IALA, when seen from

political ecology of education perspective, demonstrate that the MST fostered a unique feedback loop between the graduate certificate program and the construction of IALA, harnessing the resources and opportunities afforded by institutionalized rural education.

These three questions, and the analyses presented along with them, collectively highlight a central conclusion: by creating anti-neoliberal educational opportunities at various institutional scales, inter-institutional networks of MST and professor activists have fomented a regional transformation in agroecological education opportunities currently taking place in southern Pará. This gradual swell is occurring on various planes. The educational politics of scale were exemplified by "vertically integrated" courses, educational spaces, such as IALA that attend to Pan-Amazonian educational needs, and spaces of debate that led to the origination of the CRMB and a transformed university. This sea change is also pedagogical—based in an anti-neoliberal paradigm of education, known as *educação do campo.* Part and parcel of each of these facets are political and economic processes.

The political ecology of education perspective emphasizes the importance of power, resistance, and economics in mediating the construction of interconnected scales of agroecological education opportunities. Whereas three ostensibly separate questions guided this article, from the political ecology of education perspective they are part of a broader question about the relations between political and economic processes and changes in critical environmental education opportunities. This vantage point understands environmental education opportunities as a product of power, resistance, and scale. Future studies are needed to further develop both the theoretical implications and practical utility of a political ecology of education lens, bringing into focus the often messy scalar relations between politics, economy, education and ecology.

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CHAPTER 6

LEARNING AS TERRITORIALITY: THE POLITICAL ECOLOGY OF EDUCATION IN THE BRAZILIAN LANDLESS WORKERS' MOVEMENT[82]

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Introduction

Why do Brazilian agrarian social movements institutionalize education? The institutionalization of education seems paradoxical, because institutionalization often results in the state's co-optation and subsequent neutralizing of a progressive agenda. Yet, 'Movement institutionalization does not always entail the risk of deradicalization, depoliticization, or demobilization of collective action' (Suh 2011, 444). Social movements institutionalize their vision of education because it enables them to reimagine their tactics in relation to the state. Within the tradition of Marxist state theory, institutionalizing popular education can be seen as part of a long-term strategy of state transformation, where struggles are occurring both inside and outside the state simultaneously (Polantzas 1978, Jessop 1990, Boden 2011).

Antonio Gramsci refers to this long-term struggle as the "war of position," and sees activist educators as playing a fundamental organizing role as "organic intellectuals" (Coben 1995, Mayo 2008, Yogev and Michaeli 2011). Although Gramsci originally applied the organic intellectual concept to the industrial proletariat (Gramsci 1978, 8), I build upon Feierman (1990) and Del Roio (2011) by exploring its relevance to peasant movements. Following the introduction, I justify this application of Gramsci. I draw upon Gramsci's organic intellectual concept to explore the role of educator-students in Brazil's Landless Workers' Movement (*O Movimento dos Trabalhadores Rurais Sem Terra or MST*) as engaged 'constructor, organizer, and permanent persuader' (Gramsci 1978, 10). [83] I analyze how these educator-students learn about agroecology, which is the integration of ecological principles into agricultural systems (Gliessman 2006), and the opportunities and constraints they face in disseminating this

[83] I use the phrase "educator-students" the individuals I follow in this research are *both* educators, working as teachers in a primary school within an MST settlement, *and* students in a graduate certificate program.

agroecological knowledge. I shed light on how the MST is using institutionalized education to strategically reconfigure state-society relations in the Brazilian countryside by exploring the training of these educator-students *as* Gramscian organic intellectuals.

The MST is Brazil's largest agrarian social movement, and its activists pursue agrarian reform by occupying land deemed "unproductive" (Wright and Wolford 2003). This tactic evolved in response to the Brazilian constitution, which states that the government can expropriate land if it is not 'socially productive' (Wolford 2006).[84] Both agroecology and transformative education are central to the MST's ideology and struggle (Branford and Rocha 2002, Rosset and Martinez-Torres 2013).

The MST's engagement with agroecology is explicitly political, consisting of a critique of capital-intensive agribusiness and its support of a new model of cooperative production (de Molina 2013). Owing to Green Revolution era agricultural modernization in Brazil, the country's dominant agricultural model is large-scale, and based in high-inputs of petrochemical fertilizers and pesticides, as well as expensive machinery (Callou 2007, Troian and Eichler 2012). The MST critiques this model as socially and environmentally unjust, and advocates family farming in its place. Agroecological family farming is a small-scale form of agriculture that can help achieve food sovereignty (Patel 2009, Altieri and Toledo 2011, van der Ploeg 2012). The MST has institutionalized agroecological education by collaborating with other social movements and state entities in a broad-based educational movement known as *Educação do Campo.*

The *Educação do Campo* movement seeks to develop pedagogies and opportunities that are attentive to rural realities (Munarim 2008). This umbrella movement has helped create a new

[84] A voluminous scholarship exists on the MST, its origination, and complicated relation to the Brazilian state. See Branford and Rocha (2002); Wright and Wolford (2003); and Wolford (2010) for key perspectives.

emphasis within Brazilian educational policy on locally relevant rural education as opposed to homogenous national courses that do not attend to local diversity in geography, culture, and history (Breitenbach 2011). One way the *Educação do Campo* movement has attended to rural realities is through what Gruenewald (2003) terms critical place-based education. Critical place-based education is a synthesis of critical pedagogy's attention to transforming systems of oppression and place-based education's focus on learning's historical and geographic context. Critical pedagogy helps students learn 'to perceive social, political, and economic contradictions, and to take action against the oppressive elements of reality' (Freire 1973, 17). Place-based education draws on 'the power of place as a context for diverse experiences... using diverse communities as "texts" for curriculum development…' (Gruenewald 2008, 143). In certain contexts, the MST has institutionalized critical place-based education by creating agroecological programs funded by the National Program of Agrarian Reform Education (PRONERA) (Araujo 2004). PRONERA, which was launched in 1998, offers funding for institutional partnerships between agrarian social movements and educational organizations (Molina 2003).

I posit two interrelated arguments in this article. First, I argue that the MST institutionalizes critical place-based agroecological education through PRONERA-sponsored certificate programs, which helps transform educator-students into Gramscian organic intellectuals who are capable of influencing agricultural production by advancing counter-hegemonic agricultural practices. Second, I hold that these educator-students face difficulties in institutionalizing the agroecological learning they have gained through the certificate program because of the daily politics of settlement life. As a result of these difficulties, these educators are engaged within the school in a Gramscian struggle of territorial dispute.

In the next section, I explicate Gramsci's concept of the organic intellectual, and what

modifications are needed to utilize it in an agrarian reform context. I then draw upon a political ecology of education framework to disentangle the complicated relationships that exist between territory, territoriality, hegemony, and counter-hegemony in the MST. I introduce the research site through an ethnographic vignette. In the first of two ethnographic sections, I analyze critical place-based agroecological education in a graduate certificate course offered through a MST-federal partnership. I then explore in the second ethnographic section the opportunities and challenges educator-students in this program face in disseminating their critical place-based learning.

I gathered these data during 17 months of ethnographic fieldwork the MST's 17 de Abril settlement located in southeastern Pará state, Brazil. One focal point of the research was a two-year graduate certificate program entitled 'The Agrarian Question, Agroecology, and *Educação do Campo*', which was established for social movement activists of the 17 de Abril and other agrarian reform settlements. I followed the experiences of two educator-students, whom I call Diana and Lucinede, who participated in the program.[85] I gathered data by participating in the program and accompanying these educator-students on their field-based research. I conducted participant observation at the 17 de Abril settlement's school during events that were intended to disseminate the results of this course to the community. I contextualized these data by conducting a survey of 47% of all household heads in the community (n=330), which addressed political participation, landscape change, and agroecology. Five trained research assistants administered this survey by first dividing the settlement into five areas of comparable population, and then conducting a convenience sample by going house-to-house. I present descriptive statistics derived from these data to buttress the perspectives of Diana and Lucinede.

[85] All names used in this article are pseudonyms in order to protect individuals' identities.

Gramsci and the Question of Organic Peasant Intellectuals

Central to Gramsci's thought is the belief that subaltern subjects have the capacity to both understand and change the world. To do so, there needs to be an 'intellectual and moral reform' involving the critiquing of hegemonic ideas, and the advancement of popular ideologies. Popular 'common sense' can only gain the ability to become hegemonic through a long-term process of movement building that Gramsci termed the 'war of position' (Carrol and Ratner 1994, Meek 2011). Integral agents in this war of position are activist educators, which Gramsci termed 'organic intellectuals' (Mayo 2008).

Gramsci articulates the concept of the organic intellectual in opposition to the traditional intellectual. Traditional intellectuals were once organic to a rising class, but become complacent, and detached from life's social concerns. In the *Prison Notebooks*, Gramsci typifies traditional intellectuals as the 'man of letters, philosopher, artist' who see themselves as classless, and that their knowledge is apolitical (Gramsci 1978, 9**)**. Traditional intellectuals won't advance the struggle of the proletariat, because they are not ideologically committed to this class. Organic intellectuals differ because they arise from within, and are passionately connected to, the subaltern class. These educators play a pivotal role in the 'war of position,' by engaging in counter-hegemonic activity.

Gramsci believes that 'every social group, coming into existence…creates together with itself, organically, one or more strata of intellectuals (Gramsci 1978, 5).'[86] From an orthodox Marxist perspective, Gramsci's social groups completed an economic function.[87] It was the organic intellectuals' role to help their social group generate 'an awareness of [their] function . . .

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[87] Jones (2006, 84) argues that organic intellectuals are not necessarily attached to production, arguing that black intellectuals played a pivotal role in the emergence of a politicized black identity.

in the economic . . . social and political fields' (Gramsci 1978, 5.) For Gramsci, the origination of intellectuals results from class needs. New types of intellectuals historically arose alongside the development of capitalism, including entrepreneurs, bureaucrats, business lawyers, engineers, and industrial technicians (Jones 2006, 84). Intellectuals organic to subaltern movements also arise from class-based needs, because 'in the modern world, technical education, closely bound to industrial labor, even at the most primitive and unqualified level, must form the basis of the new type of intellectual' (Gramsci 1978, 9). By understanding how industry functions technically and administratively, subaltern groups can overthrow the bourgeoisie (Jones 2006, 85). Yet, these organic intellectuals must more than simply possess technical knowledge, but also turn this specialist knowledge into political knowledge. Organic intellectuals use this political knowledge to move beyond the 'eloquence' of traditional intellectuals, and become defined by their 'active participation in practical life, as constructor, organizer, permanent persuader and not just a simple orator' (Gramsci 1978, 10). However, Gramsci's particular vision of the organic intellectual requires modification before being applied to the MST.

Gramsci held what are seemingly oppositional accounts of the formation of intellectuals. On one hand, he writes 'every social group has its own stratum of intellectuals (Gramsci 1978, 60)'. On the other, he holds that 'the mass of the peasantry, although it performs an essential function in the world of production, does not elaborate its own "organic" intellectuals' (*ibid*, 6). This disjunction can be explained, because, following Marx, Gramsci believed the peasantry cannot become a class 'for itself' (Shafir 1980, 224).

Although Gramsci himself arose from peasant society, he saw peasant culture as archaic,

and fragmentary.[88] Gramsci is very critical of the political potential of subaltern movements, describing Italy's southern peasants as being 'in perpetual ferment, but as a mass…incapable of giving a centralized expression to their aspirations and needs' (Gramsci 1994, 327). He saw them as accepting hegemonic values and trying to emulate the characteristics of ruling classes (ibid, 327); yet, he also believed that peasants can inject non-hegemonic values into the dominant worldview (Gramsci 1978, 420; Cirese 1982, 226). In sum, Gramsci saw Italy's peasants as a class that maintained itself in subordination through internal weaknesses and its acceptance of the social, political and moral leadership of the ruling classes. Yet, they could also become a revolutionary class through alliances with workers, and the development of a class consciousness (Arnold 1984, 158-159).

In arguing for a non-orthodox application of Gramsci's organic intellectual concept, it is important to acknowledge his changing views on the peasantry. Following the success of fascism in 1922, Gramsci reassessed his previously held Enlightenment position, and began to see the peasantry as something that would not disappear, but could continue to grow under capitalism, and remain an important social and political force. In acknowledge their permanence, he realized that 1) any revolution must take into account the peasantry, 2) without understanding their world view there would be no chance of their mobilization, and 3) only intellectuals who were committed to the class could help solidify its worldview (Davidson 1984, 145). The justifications

[88] Perhaps as a result of his own lack of sustained focus on the peasantry, or the difficulty of extracting a coherent narratives from his Peasant Notebooks, Gramscian scholars tend to focus on his writings about the industrial working class in comparison with the peasantry (Arnold 1984), but see Davidson's (1977) *Antonio Gramsci: Towards an Intellectual Biography* for a critical analysis of this neglect, and Davis's (1979) *Gramsci and Italy's Passive Revolution* for a consideration of how the peasant problem is interconnected with his larger corpus of ideas.

of peasant movements themselves, who have long applied Gramsci's concepts to function in disparate historical and geopolitical contexts, are particularly instructive.[89]

In the late 1970s, Brazilian movements began drawing upon Gramsci to inform their political-pedagogical activities (Semeraro et al. 2011). Paulo Freire, for example, an influential Brazilian critical pedagogue, cites Gramsci as having a direct influence on his thinking about the role of peasant intellectuals (Freire et al 1986, 68). In situating the historical and political translation necessary to make Gramsci relevant to Brazilian movements, Marcos Del Roio (2011) first describes how Gramsci himself needed to translate Lenin into Italy's national context and Machiavelli to that time period, to understand the development of capitalism and the State, and strategies for socialist revolution. Del Roio considers one of the principle problems of translating Gramsci into a Brazilian context the form of popular social movements. Yet, he concludes that if one questions the nature of these movements from the position of the actors themselves, then we see how these movements understand themselves as 'a moment in the construction of the people, of the unification of subaltern classes, of the realization of a moral and intellectual reform, of a new hegemony that will result in the construction of a new State, and the translation of Gramsci will coalesce in praxis' (Del Roio 2011, 81; my translation). This revolutionary process, Del Roio goes on, is slow, and requires the type of moral and intellectual reform that can only come about through the accumulation of organic intellectuals that are organizing on behalf of syndicates, parties, and movements. The MST, Del Roio argues, is a paradigmatic example of peasant organic intellectuals. He qualifies this by describing how the

[89] Gramsci's concepts have been applied to peasant groups in diverse international contexts. Feirerman (1990) translates Gramsci's concept of the organic intellectual to rural Tanzania, exploring the formation of peasant intellectuals. Karriem (2009) draws on a Gramscian approach to understand the interplay between space, ecology, and politics in the Brazilian Landless Workers Movement.

MST's Escola Nacional Florestan Fernandes has built alliances between the rural areas and the city, restructuring Gramsci's vision of the nature of the alliance between workers and peasants (2011, 82). For Gramsci, it's clear that 'the typical organic intellectual of the proletariat is…likely to be someone who is technically trained and also a trade unionist or party activist' (Jones 2006, 85). In the context of the MST, I believe organic intellectuals are characterized by technical training they've received through the movement, and their active involvement in the everyday politics of the community as knowledge producer, disseminator, and mediator.

Education as a Tactic for Influencing Relations to the Land

I employ a political ecology of education framework to explore how MST educator-students function as Gramscian organic intellectuals, learn about agroecology through critical place-based education, and try to disseminate this learning in the wider community as part of a larger social struggle. A *political ecology of education* framework analyzes how reciprocal relations between political-economic forces and pedagogical processes mediate resource access, control, and landscape change (Meek 2010). Disentangling the complicated relationships between territory, territoriality, hegemony and counter-hegemony are key to understanding the potential for MST educator-students to affect agricultural production.

Territory consists of a combination of material and immaterial aspects (Fernandes 2009). Material territories are natural landforms and infrastructure (Rosset and Martinez Torres 2013). Immaterial territories, by contrast, are the ideologies connected with landscapes, including ideas about what constitutes appropriate land use. Immaterial and material territories are intrinsically interconnected through territoriality, which is a process of exerting control over territory (Sack 1986, Storey 2001).

Educators can employ education as a form of territoriality. One way educators exert control over territory is by promoting the dominant ideologies and associated forms of land use. An alternate way educators can influence territory is by critiquing the dominant ideas about land use, and advocating alternatives. Organic intellectuals have the potential to shape the material relations of production, such as forms of land management, by advancing popular common sense within the educational system. MST educators can function as organic intellectuals due to their ability to raise awareness about contradictions inherent in dominant economic, cultural, and material systems, and advance counter-hegemonic forms of agricultural knowledge and practices. [90]

The Struggle is Over and Now There's Just Victory

> I groan as the settlement's radio begins crackling at 5:30 a.m. Samio, in charge of the radio, can´t be starting this early I think. However, it´s the unmistakable first notes of the Brazilian Landless Workers' Movement's anthem that causes to me to sit straight up in bed. Although I've lived here for 17 months, it´s the first time I´ve ever heard the MST anthem played on the community radio of my primary field site in southeastern Pará state known as the 17 de Abril settlement. I head outside as the song's last admonition to raise one's fists in the air is chanted. However, I´m even more surprised as the song dies down, expecting Samio to wish everyone a happy settlement anniversary.
>
> Instead, the song begins again. I reach the central square, watching what would appear to be another normal morning unfold, if not for the fact that the anthem finishes and then begins again. After the fourth repetition, I hear a voice break the radical monotony, but it´s not Samio´s. Rather, it´s Arnoldo. Arnoldo is the settlement´s president, and extols the importance of the settlement's anniversary in the historical context of regional agrarian reform. Three other MST activists follow Arnoldo and each give speeches on the importance of the movement. Following these speeches Samio turns on a popular Forró song, whose refrain is 'the struggle's over and now there's just victory'.
>
> As if on cue, a vehicle lurches into the central square. It is a flat bed truck carrying sets of giant speakers bolted together. A man with a cowboy hat stands on a stage that rests atop the speakers. He does a sound check, and proceeds in what is clearly a professional rodeo announcer's voice: 'Welllllllllllllllcome Amazonian horsemen from all neighboring cities. Welllllllllcome to Amazonia's biggest rural horse parade!' As his call bellows

[90] As I discuss below, educators do not always fulfill this role as intended.

out, from all six intersecting streets men and women on horses begin to trickle out into the central square.

Douglas is orchestrating the horse parade. He is a large-scale dairy producer and in this role has become one of the settlement´s most powerful individuals. While directing the riders he tells me, 'My dream is for this event to be on the scale of the big cattle expositions. Complete with lasso events, and a real rodeo.' Douglas hands out flags to several horse riders: a state of Pará flag, a Brazilian flag, and one from the MST. Aside from this morning radio announcements, it would be the only sign of the MST on this settlement´s 17th birthday. Sometimes absences are more telling than presences.

Conspicuously *absent*, to me, are the signs of the movement on this day, such as the MST flags, banners, t-shirts, and hats. Also absent are the members of the MST´s state secretariat, or activists from other encampments or settlements. The colorful horse parade, a manifestation of regionally dominant cattle culture, occupies this negative space, and draws attention to the forces transforming the settlement.

This anniversary used to be a harvest festival, marking the importance of various subsistence crops. However, a number of factors ranging from credit incentives, to urban migration, to the failure of agricultural projects and cooperatives, have resulted in the large-scale transition away from agriculture and towards milk production. As a result, what used to be a harvest festival is now a rodeo. Yet, despite the dominance of cattle culture at this event there are still some indications of the settlement´s agrarian roots. José Batista is one vestige.

Although I had never met him, I knew of José Batista from attending a recent presentation about agroecology at the settlement's school. MST educator-students, whom had recently finished a graduate certificate program in agroecology, were presenting results to their students from their field-based research in the community. As part of this research they had analyzed environmentally destructive forms of production, such as intensive cattle production within the settlement. But they had also researched emerging alternative forms of production, such as agroforestry, that were environmentally sustainable. With an image of José Batista projected on the school's wall, one teacher described to an auditorium of students how through this research she found that the settlement was not solely comprised of cattle ranching, but rather, was a diverse universe of production. José Batista exemplified this rich universe.

On the settlement's anniversary, José Batista stands in front of a cart decorated with hanging fresh mangoes, papayas, squash, and various other agricultural products. A curious piece of technology sits on the cart´s edge: it is a home-made water wheel which is fed by a tank in the back of the cart, and drives a small wooden hammer that playfully crushes rice in a wooden trough. 'People hardly remember these', José Batista admonishes, 'but they should. I'm here to remind them, to represent the settlement, to represent the small family farmers and the various products they produce.' José's reminder is of the traditional agroecological experimentation that characterizes the community's agrarian history.

I use this ethnographic vignette to introduce the contest between hegemony and counter-hegemony in the 17 de Abril settlement. In what was once an agrarian reform settlement of politically committed activists, it is now an anomalous event to hear the MST anthem on the community radio. Political participation on the settlement's anniversary consists of the perfunctory carrying of an MST flag; as the song's refrain reminds us 'the struggle's over now there's just victory'. Agriculture is also a constraint: subsistence production has been replaced by export-oriented dairy production. The harvest festival, which was timed to coincide with the settlement's founding, has been replaced by a rodeo, paying homage to the importance of regionally dominant cattle culture. This political and agricultural context is antithetical to the MST's agroecological vision, and calls into question whether 'the struggle's over and now there's just victory'.

Despite, or perhaps because, of these constraints, critical education has incredible *potential* to transform the settlement's political and agricultural milieu. The settlement's teachers use José Batista as an example of an unseen universe of agroecological production to help their students challenge the hegemonic system of ranching. These critical education practices have the potential to help maintain students' ideological commitment to the movement, engagement with its agroecological practices, and role in a long-term movement towards social change.

The MST's 17 de Abril settlement was created in 1996, following the Brazilian paramilitaries massacre of 19 MST members outside the city of Eldorado dos Carajas on April 17th, 1996. The settlement consists of 690 families, who each have a small plot of land in a peri-urban village, and a larger plot of land (~25-50 hectares) in the surrounding rural area. The original settlers were largely from the Northeastern state of Maranhão. Since that point, due to failed credit projects, poor health, and the general difficulty of living off the land many settlers

have left the community for the neighboring urban centers, of Paraupebas, Curionópolis, and Eldorado dos Carajás. The majority of respondents (64%) have lived in the settlement since its origination. Given the emigration of many original MST members, and arrival of non-MST affiliated individuals the community has an incredibly heterogeneous feel, as described in the above ethnographic vignette.

Institutionalizing Critical Pedagogy of Place: Experiencing Place as Relational

Problematizing as creating relational place

The certificate program in 'The Agrarian Question, Agroecology, and *Educação do Campo*' exemplifies the institutionalization of critical place-based agroecological education. The course format consisted of alternating three-week segments in the home settlement and distant school community. During school time, students participated in field research trips, consisting of visits to sites representing opposing forms of production. My informants themselves described these opposing forms of production as hegemonic and counter-hegemonic. They told me that these trips provided clear examples of the abstract concepts of hegemony and counter-hegemony. While in their home community, they conducted critical field research and gained an appreciation for how these hegemonic and counter-hegemonic practices were manifest at a smaller scale.

Professors in the certificate program described the objective of the program's first section as problematization. Problematization took three forms: conflict mapping, 'dislocating' exercises (field trips), and field research. Professors used conflict mapping to graphically depict contradictory forces, such as the infrastructure of exploitative industries and the spaces of social

movement resistance. A professor indicated that conflict mapping was chosen as a form of problematizing in the course for several reasons. First, southern and southeastern Pará is a region historically defined by territorial land conflict; mapping helped students visually understand the political geographical nature of these conflicts (Simmons 2004). Second, conflict mapping advanced the course's 'political objective' to map 'strategies.' As a professor described it,

> We were trying to map the capitalist strategies that confront the students' own territoriality; we decided to focus not on industrial capital in an abstract sense…or the personification of the enemy, i.e. the large land owner, but rather on these strategic processes.

Student activists from dispersed settlements mapped these strategic processes by placing their communities on the map and discussing what geographic features spatially, politically, economically, and ideologically link their communities together. For example, a railroad line operated by *Vale*, a transnational mining corporation, runs from Paraupebas to Marabá, and then into the neighboring state of Maranhão. The students discovered that each community had been affected by Vale's strategy of extractive capitalism, whether through environmental pollution, land grabs, or exploitative labor. Students also mapped their resistance activities, such as where they had occupied the railroad in 2009, and agroecological practices such as agroforestry. Students visualized how community-level and industrial sites of extractive capital are interconnected. These mapping exercises helped to solidify abstract concept that scale is socially constructed, meaning it is not ontologically fixed as local *or* regional, but rather 'a contingent outcome of the tensions that exist between structural forces and the practices of human agents (Marston 2000, 220)'. Critical mapping can be understood as training these educator-students as Gramscian organic intellectuals, providing the tools to critically analyze the contradictions of hegemonic land use, and the spaces for popular resistance.

In addition to conflict mapping, the first section's focus on problematization consisted of

'dislocating' exercises. Dislocation pedagogy is 'the removal of students from what has become familiar by disrupting their geography...and their assumptions about…the authority of academic knowledge' (Goldewaska 2013, 385). In this program, dislocation consisted of several 2-3 day field research trips to aluminum smelters, cattle ranches, mines, as well as farmers' markets, agricultural cooperatives, and land occupation encampments. During one of these dislocation exercises, Diana, who is a long-term educator from the 17 de Abril settlement, critically recognized a contradiction between an industrial mineral extraction operation and its claims of environmental conservation:

> In Serra dos Carajás we went to the areas where they deposit the mine tailings. There (in the forest) we realized the contradiction that they say that this is an area of environmental preservation, but what type of environmental preservation is this, where they destroy the rainforest to discard the tailings that they don't want? What type of preservation is this? Was it set up this way to preserve, or was it to distance people from what they were doing, so they could be free to do what they want? These were the types of questions that we asked, *why* are they preserving?

Scholarship highlights how contradictory moments, like Diana's recognition of the contradiction between mining and claims of environmental conservation, are when learning happens (Mezirow 1990).

Diana subsequently elaborated that her learning during this trip was not simply about *those* mines, but about larger questions of how scale constitutes place:

> The experience involved the questioning of, "What space are we living in? What is happening here?" Because we live here, and lots of people say, "Oh this is happening over theeeeere in Amazonia." But hell, Amazonia is here, Amazonia is right here. They say, "Oh that is happening way over theeeeere in the mines of Serra dos Carajás," but you know what? Serra dos Carajás is right here.

Diana's scalar reflection typifies moving 'away from thinking of scale as an area or a circumscribed space—we should think of scale as a network, or a strategy linking local struggles to regional, national, or global events' (Jones 1998, 26). This conception of place as a product of scalar interactions is fundamentally relational.

A relational perspective of place opposes the conception of places as coherent and distinct locations (Massey, 1999: 14). Diana's narrative exemplifies Massey's (1999) description of place as 'the sphere of juxtaposition, or co-existence, of distinct narratives, as the product of power-filled social relations . . . This is place as open, porous, hybrid' (21–22). By asking, 'What space are we living in?' Diana called into question accounts of environmental change that see place as discrete and environmental devastation as distant. Rather, by seeing place as 'open, porous, hybrid,' and constituted through interconnected scales, Diana visualized how the strategies of extractive capitalism connect places in a 'sphere of juxtaposition' (Massey 1999, 22). Describing her understanding of how contesting scales constituted a relational place, Diana emphasized how *that* 'Amazonia [the one of extractive capital] is right here… Serra dos Carajás is right here.' Through dislocating pedagogy, students gained further training as organic intellectuals by developing a relational understanding of place as grounded in struggle at multiple scales.

Intervention through Problematizing

While the certificate program's first section dealt exclusively with problematization, the second section was structured around intervention. As one student explained,

> One of the grounding principles, for the professors and for us, in the course was that this cohort can't be simply another group of researchers who go to farmers' lands, take away an understanding of the problems, but never return. Rather, the proposal was that we conduct the research and then do projects that can help the farmers.

The program's grounding principle of applied research trained these educator-students as organic intellectuals who could advance counter-hegemonic forms of production. Bernardo, another participant in the certificate course, conducted research on one of the most prominent local

strategies of extractive capitalism: sand extraction. He sought to apply his research finding in the community, using critical place-based research as a form of territoriality.

Bernardo stood on the undercut bank of the *Rio Vermelho* with a community-managed agroforestry grove to his back. Motioning with his hand over the muddy river on which floated makeshift barges coughing black smoke into the air, he reflected upon his research, and its transformative potential for the settlement:

> The river is dying here. When you extract the sand you're going to take out all of the land from over there, and so all of the soil will continue sloughing off from the bank, filling in the river, and the river will dry up. While discussing this process in the course, we've been talking about how rural farmers become involved in these processes. Many rural farmers are having difficulties meeting their subsistence needs through agriculture, and see the best way to make a living as the easiest, which in these areas is the extraction of sand. But, they don't recognize that they're negatively affecting the environment. So, this research has enormous potential within the community. The community could control the sand extraction if they had the knowledge, and this is what we tried to do in the research, talking with farmers, but it's difficult, because they see it as the easiest way to make money.

Bernardo exemplifies how critical place-based education serves as a form of territoriality, by advocating for alternative forms of land use. Bernardo's usage of agroecological education as a form of territorial communication underscores Sack's perspective that 'human interaction, movement, and contact are…matters of transmitting energy and information in order to affect, influence, and control the ideas and actions of other and their access to resources' (1986, 26).

As part of the certificate program, the students conducted a final project that sought to unify the course objectives by both problematizing and creating solutions. Diana and Lucinede, the educator-students in the course who came from the 17 de Abril settlement, focused on related topics— milk production and pasture— that underscored the historical transformation of the region's economy and ecology. Although community members largely engaged in subsistence agriculture following their original settlement, in the last 15 years they have almost entirely

transitioned to dairy production. The majority of survey respondents indicated that they transitioned to cattle ranching due to economic necessity, because 'it's more income' (57%). Lucinede, an educator-student, adds context to these data with an exasperated sigh, 'The tendency in our settlement is ranching! In a little while, we won't be producing anything; we're simply going to be raising cattle for milk. I've realized that there are many families that have abandoned the practices of working the land for agriculture, and have become dependent upon working with cattle.' I found the settlement's inhabitants were divided as to whether or not this agricultural transition was positive: 38% of respondents saw the settlement's transition away from subsistence agriculture as a bad change, 40% viewed it as a good thing, and 22% saw it as both. Those seeing it as a good thing shared the view that it was 'less work and more money', whereas those who saw it as a lamentable change expressed a similar view that 'we shouldn't have to buy foods with pesticides, but instead be able to plant healthy food to eat'. Lucinede's frustration with the transition to cattle ranching motivated her research project:

> I began to observe this [the predominance of ranching] two years ago, and I talked about it with my friend, and it annoyed me. When I began the course, I wrote several assignments about this, talking about this irritation I had, and at the end of the course's first section, our professors proposed some assignments for our time in the communities, and the assignment was for us to work to identify the form of production in the settlement and through researching it, work to understand both hegemony and counter-hegemony.

When Lucinede's professors encouraged her cohort to focus on conflicting commodities, she chose milk production, because of its cultural, economic, and political value (Hoelle 2011). Once she settled on milk production, her professors urged her to research an alternative product, asking her, 'What is it that you have in your settlement?' In response, Lucinede

> discovered so many things, so many lovely things, so many interesting things. I discovered that there is a farmer, who has milk cattle, but he also has a mandala agricultural planting, he works with agroforestry, he has *cacau* trees. There's another farmer who works doing bee-keeping, but he also produces *cupuaçu* fruit.

> There's another farmer who is working with agroforestry and is working to reforest his land with native Amazonian forest species. And so I discovered within the settlement a universe that I had never seen, which was so broad, so vast, and so marvelous, filled with diverse experiences of production.

Although Lucinede had lived in the community for 17 years, she had largely internalized the narrative that one finds circulating both within the settlement and the surrounding cities, which is that in the settlement 'it's only extensive cattle ranching.' Lucinede's narrative highlights how researching the relations between hegemonic and counter-hegemonic forms of production led to a critical place-based rediscovery. This realization pushed Lucinede towards action:

> When I discovered this I thought, "I need to do something to show these people the potential that exists within the settlement, the potential for the diversification of production," and I realized that someone has to do something, and I thought that I can do this.

By working to communicate these realizations, I argue that Lucinede becomes positioned as a Gramscian 'organic intellectual' in several ways. First, she is dedicated to working in the community and not leaving it after she gets her degree. Secondly, as an educator in the settlement's school, she can share the counter-hegemonic examples of land use she uncovered, engaging in the long-term work of transforming territory from monoculture to agroecological polyculture.

Lucinede and Diana began to take action by discussing the creation of an agroecological 'brigade,' which would study agroecology in the settlement. This brigade would ideally work in the school, but also engage with the farmers in the community. However, as I show in the next section, Lucinede and Diana faced significant obstacles in the endeavor.

Transforming the school?

The school where Lucinede and Diana work is defined by the ebb and flow of political participation among both educators and the larger community. The micropolitics of educators'

political participation serve as both an impediment to and opportunity for agroecological change within the settlement. I first explore how educators themselves perceive their political participation as both an opportunity and obstacle for curricular change. I then examine how Lucinede and Diana, the educator-students from the certificate program, communicate their critical place-based research to influence their students' perceptions of land use.

The school's namesake points to its origination in struggle: Oziel Alves Perreira was a 17-year-old MST leader who, as local lore tells it, screamed 'Long live the MST' before being fatally shot during the 1996 Eldorado dos Carajás massacre. Following the creation of the settlement, the community was extensively involved in the building and staffing of a rudimentary wooden school. As infrastructure within the settlement began improving, the community demanded a 'quality' school. Students, parents, teachers, and administrators actively participated in the politics of the new school's creation. Between 2007 and 2009, the community held a variety of protests to pressure the government for the resources to construct the new school. Several times in 2006 and 2007, students, parents, teachers and administrators occupied highway PA-275 in the southeastern Amazon, transforming it into a makeshift two-lane classroom. Government officials eventually arrived and began a discussion, asking the MST activists what were their priorities in terms of creating a new school. Although building materials were promised at these protests, the months dragged on and there were no signs that the government would make good on its promises. When the school material failed to arrive, these MST activists and those from other encampments and settlements occupied the train tracks of the *Vale* Corporation for over a month. This action led to more substantial and formal dialogue with the state and municipal governments, which ultimately resulted in the construction of the school.

In the five years since the occupation of the railroad, both the school and the politics of

its educators have undergone a transformation. When I first conducted pilot research in 2009, the school consisted of classrooms separated by flimsy wood walls, and a cafeteria under a thatched-roof. At that point, construction on the new school complex was just beginning. When I returned in 2010, the old school was leveled, and the new school had been completed. At that time, I was struck by the visual absence of the movement in the new school in comparison with the old one. In 2012, when I returned for a year of fieldwork, the school had once again metamorphosed, taking on the appearance of a more radical space. MST posters now adorned the administrative wing. Two large spray-paint stencils of Che Guevara adorned the exterior walls. Slogans from revolutionary intellectuals like Rosa Luxemborg, and critical pedagogues, such as Paulo Freire, graced the wall, formed from cut-out letters created in a children´s art class project. When asked about this transformation in the school between 2010 and 2012, Edison, an MST activist who works at the school, pointed to the change in the coordinating council. 'When the coordinating council of the school changes, it wants to put on a face that represents itself.' The coordinating council of this municipal school is made up of six teachers who are elected by all of the teachers, and who function as the administration. Edison continued,

> This year is the first year that the coordination of the school has been completely composed of activists. As such, we´ve decided to give the school a makeover, to give it the face of what we represent. It happens all the time, if you have a coordination that is Evangelical, you´d expect to have an Evangelical 'face' at the school.

Edison's perspective points to the complicated daily politics within the larger settlement. The political participation of educators mirrors that of the larger settlement, in the sense that neither is a homogenous space of movement activism. The fact that all inhabitants of an MST settlement are not MST activists might be surprising, given the community's political victories. However, Wolford (2003) reports similar findings from multi-sited research on the MST: 'Settlers in both

places struggle over their understanding of what community means to them – they struggle inwardly and they struggle with each other. Sometimes the everyday experience of 'community' is not very communal at all' (501). Edison underscores this discord in his community:

> It's really quite complicated, this relation between the school and the movement. The school tries to work by following the organizational principles of the movement. But the problem is that not everyone who works in the school belongs to the movement. It's one thing to live in an MST settlement, it's another to belong to the organization. These two things are quite different, and it's difficult to reconcile these two aspects.

Part of this inconsistent participation is related to the influx of non-MST inhabitants, as many of the settlement's original inhabitants have left, due to failed agricultural efforts, lack of resources, or other problems. Another part of 'the problem,' as Edison called it, stems from the inhabitants' complacency, as they no longer see the need for political engagement. Whereas 19% of inhabitants described their participation in the MST as "high" at the time of the settlement's creation, at present only 8% see themselves as being actively involved in the MST. As one MST activist opined, 'Everyone's got their television, their house, their motorcycle. They have enough food, and can go and hang out with their cell-phone in the central square. What need do they have for the movement?' Other activists within the community continue to see the MST as a fundamental organizing force of the community, arguing, 'The struggle is continual. When one struggle ends, another begins.' These differing perspectives support Wolford's (2010) point about how people flow into and out of the movement, participating in a protest one year, and disassociating from the movement soon after. This ebb and flow of participation was manifest in the production of knowledge within the school. As Edison explained:

> There are a number of teachers that disagree with the MST's principles, and because they disagree with these principles it becomes difficult to direct this process [of integrating MST principles into the school]. For example, a teacher arrives, and he's from São Paulo, but he grew up in Goiana, and he grew up with a completely different reality than ours. And he arrives and wants to work with the

> principles that he brought from there. I'm not saying that the principles that he brought are wrong, and those that we have are right. We have an ideology, and so we want to preserve our ideology, and work with the grassroots, in the manner in which we think is correct. But it's really quite complicated.

Edison's description of these internal politics draws attention to the importance of geography, because, in his analysis, where a teacher is from structures whether or not they will defend the MST and its pedagogical principles of advancing alternative forms of knowledge.[91]

The geographic question inherent in educators' political participation is not simply about who is or is not from the settlement. Rather, *place*, and its attendant opportunities and constraints, are relational. Whereas all of the school's teachers give lessons in the same space, their understanding of that place, its transformation, and their role in it, is structured by their life trajectory of experiences. As Edison remarked, 'They may have lived in the settlement for several years, but so what?' The following example highlights Edison's point.

Luana is a biology teacher who works in several schools, spending three months in each of five communities on a rotational basis. At one class I observed, she showed pictures of the larval stages of bee development, and a student remarked, 'How in the world can we see it that close?' Luana informed the student that they would use magnifying glasses, which they should all have. 'Magnifying glass?' the student remarked. 'Where are we going to get money for a magnifying glass?' Luana jokingly responded with a tasteless play-on-words: '*Sem Terra*, I swear, it should be *Sem Nada* [those that have nothing]'. Luana's comment was an insult to the

[91] Although Edison describes these internal politics as geographical, not all agree. Salete Campigotto, who is known as the first educator of the MST, indicated in a personal communication to MST education scholar Rebecca Tarlau that whether a teacher is from the MST community, or not, is not important. According to Campigotto, some teachers born in MST settlements will refuse to use the movement's pedagogy, and some teachers from outside the community will become the biggest activists. Therefore, the MST should try to engage with all teachers equally. Following Campigotto, one's "place" (or where they come from) does not necessarily translate to how they defend or do not defend counter-hegemony in a particular territory.

students and the movement as a whole and illustrates how far removed Luana is from the realities of her students in the settlement. Although she occupies the same educational space, her relational sense of place has an entirely different referent than those like Diana and Lucinede, who have literally grown up, and developed as activist educators, within the movement's ideological spaces.

The relation between school micropolitics and those of the larger political sphere became pronounced in the weeks after the October 2012 municipal election. Municipal elections strongly shape settlement politics, because the winning candidate typically appoints his supporters to leadership positions in various institutions, such as the municipal school in the settlement. While elections strongly shape the school's political composition, MST activists disagreed about the ultimate impact of electoral politics on the school. The next vignettes explore these MST activists' differing perspectives, and yield insights about how the politics of place mediate curricular change.

The week after the election, Joata and Francisco, two of the settlement's most active MST leaders, met with Genilda, a state-level MST leader, to discuss the potential impact of the local elections on the school. Upon greeting them, Genilda, the state-MST leader, asked what would happen to the school´s director. Joata said resignedly, 'We haven´t decided yet who it will be.' 'She´s definitely going to be out, that much we know,' interjected Francisco, the other representative from the settlement. Genilda sighed in frustration, and added, 'This business with the elections has to end. Every time we have an election we have a change in administration in leadership within the school. Look at Palmares [a nearby MST settlement]; they have direct elections in the settlement for the school´s coordinating collective. Perhaps that could work in the 17 de Abril....' As she trailed off, Francisco and Joata both sighed and seemed uncertain.

Genilda continued, looking Francisco, the older and more influential of the two activists, directly in the eye, 'We *need* to retain our presence in the school. Who is being considered for the position?' Francisco responded, spitting as he said, 'Daniel, most likely. He has no interest in the MST. No interest whatsoever.'

As these comments make clear, these MST leaders saw having an MST-oriented school principal as crucial. As the MST-supportive party lost the election, the school's director will be replaced. In their perspective, this was a very important and unfortunate consequence, because, as Edison previously remarked, the director's personal politics affect the 'face' of the school and its curricular programming. Losing the current director would thus result in a transformation in the coupled ideological and material terrains of the school and, consequently, larger settlement.

Yet, not all MST activists placed such importance on municipal politics. Lucinede, one of the certificate program participants and a long-term teacher in the school, reflected,

> Sure, you can put a representative of the movement in the school, but if you don't have a consensus among teachers that education is a fundamental part of our transformation, than that opportunity is lost, because we won't be able to get it done [the integration of MST politics in the curricula].

Lucinede's understanding of the importance of electoral politics contrasts markedly with that shared by Genilda, Joata and Francisco. Lucinede emphasized that having a school director 'who walks with the movement,' as she often described it, is important. Yet, she exemplified a Gramscian perspective on the importance of advancing popular consent, arguing that if there is not a larger consensus among educators about the political role of education, then it can be difficult to create mobilization in spite of the director's MST sympathies.

Instead, Lucinede explained, the politics of the teachers themselves would ultimately determine whether or not the MST's pedagogy could be implemented:

> We have a series of problems in the school. Even within a settlement of the movement we have significant difficulty implementing the pedagogy of the movement; but it's not because the municipal government doesn't allow it. Having worked as the director of the school, I never had a directive from the municipal government or the secretary of education saying, 'You can't work with this. You can't work with that.' So, if the school doesn't function as it should, then the problem is us—the settlement—in implementing this work [the pedagogy of the movement]. The problem is not the municipal government.
>
> I've suggested at various times in various meetings that what we have to change is the mentality of the educators who are here within the settlement. Teachers used to be trained by the movement, and understand the importance of debate within the school. These days, frequently, you invite the teachers to come to a discussion and they don't come.

As Lucinede sees it, the crux of the problem is the educators' lack of consensus regarding the place of the MST in the school.

Lucinede's perspective draws attention to how educator's participation is *political* in two senses. First, the act of educating is a form of political participation because—depending upon one's intent—it either transmits or omits particular ideals supported by the movement. Those who function as 'organic intellectuals,' such as Diana and Lucinede, participate daily in the movement by communicating its ideology to other teachers and students. By contrast, those who either actively denigrate or simply do not acknowledge the importance of the movement practice their own ideological resistance, and simply drag their feet. Their daily resistance to MST's efforts to advance a counter-hegemony within the school took the form of not showing up at teachers' meetings where political projects were being discussed, and not encouraging their students to participate in movement events. Second, MST educators' teaching is political because it sees the school as a mechanism for achieving social and environmental transformation. MST teachers are thus organic intellectuals who have the power to advance a counter-hegemonic project. Each of these manifestations of educating *as* political participation is

intimately linked to the act of territoriality, because the terrain of ideas and land are interwoven.

Lucinede went on to describe how being an educator committed to the movement is at variance with the interests of the majority of educators in the school.

> Working with the movement is something that demands a significant focus: more availability on behalf of the people, in terms of being available to come to the school to discuss things, to become involved in activities. What we [MST educators] have found is that people don't want to be more available; they don't want to be present at the school more than is required in their little contract. For example, if my contract says you need to be there for six hours, I'm only going to be there for six hours. And so people are really caught up in the question of salary. And it's a salary that says I need to work for a total of 100 hours, and so at the end of that hundred hours I'm finished. The rest that needs to be done, such as extraneous projects, oh, just leave it to the side. But in the pedagogy of the movement it's more than this. The person needs to really be able to make time available to plan and organize, to propose activities, to involve the community in these discussions, and these discussions go forward veryyyyyy slowly within the community. You have to find methodologies that bring the community to the school, and we've not been able to achieve this because this requires time, it requires resources.

Particularly important, from Lucinede's perspective, is educators' personal political commitment to the MST's mission. This intrinsic motivation is necessary for transcending everyday concerns about the number of hours worked to achieve the larger objective of social transformation. If there is going to be a lasting agroecological 'face' at the school, consisting of anything from posters and slogans, to substantive curricular content and applied student research projects, it needs to arise from the educators' own political commitments.

I have presented two different perspectives regarding the links between the settlement's formal educational curriculum and the larger political environment: one represented by Edison, Genilda, Joata, and Francisco, which views the dominant political party, and subsequently the school administration, as the key driver of school politics; and one represented by Lucinede, who asserts that regardless of the larger political leanings of the school leadership, educators'

individual commitments to the movement are crucial. This exploration highlights how the politics of place—and in particular, a lack of consensus in the community and in the school regarding the importance of MST electoral and internal politics—can be a constraint for integrating the pedagogy of the movement within the school; the next section explores the flipside of how these politics provide opportunities for institutionalizing agroecological education.

Territory as opportunity

Various MST activities take place in the school throughout the year, and the driving forces behind them are usually the organic educators dedicated to the MST and its ideals of transforming the social and ecological relations of production. For example, in April there is an annual ten-day 'pedagogical encampment' where MST activists study agroecology and agrarian theory, during June an agroecological student garden is annually planted, and every August the MST Youth Journey (*Jornada de Juventude*) takes place.

The Youth Journey is a week when normal classes in the school are cancelled, and in their place MST activist youth and teachers lead lectures and workshops. One afternoon during the 2012 Youth Journey, which was devoted to the topic of agroecology, Diana and Lucinede led a session about the individual research projects they conducted during their certificate program. Lucinede told the students, 'Sometimes you'll hear people talk about certain things as if they were something that only took place really far away; but sometimes, those things are actually occurring quite close to you, it's just you're not able to realize it.' Lucinede's description is strikingly similar to Diana's previous comment about discovering a 'marvelous' and 'unseen universe' of agroecology in her own community. The students began to learn about these

invisible landscapes as Lucinede continued, 'Through this research we were able to learn many things, to discover many things here in the settlement. We observed a variety of agroecological initiatives going on, which are barely known by the population of the settlement.' Lucinede had lived in the settlement for 17 years without knowing of these agroecological areas. Her narrative ensured that the students learned about this unseen geography through a critical lens. Lucinede continued,

> I'm going to tell you all two stories from our research. One is an inhabitant in our settlement, and another is from another MST settlement, which we visited as part of our course. When we were visiting that other settlement, Mede took us on a tour of his lot. And he told us that the first thing he did was try to use the lot to raise cattle, but the lot was very small and didn't work to raise cattle, which is often the case here.

None of her students had been to this other settlement, but Lucinede painted a relational vision of place by using a description of *that* place to educate students, critically, about *this* place. She indicated that MST settlers in both settlements face similar constraints with the land and its small lot sizes, which are inadequate for cattle ranching. Lucinede also used her experience to instruct the students about how both settlements' inhabitants had similar agroecological opportunities available to them. Lucinede went on to describe, in exquisite detail, the ecological richness of Mede's land and how he was able to sustain his family through the agroecological products he and his wife sold from it, ranging from fruit pulps to natural cosmetics to orchids. Challenging the students, she asked rhetorically, 'Now, where is all this taken from?' 'From their lot,' a student interjected. 'From their lot is correct,' Lucinede responded, 'from Nature, exactly correct, so it's a different form of producing. They are able to survive without destroying the rest of Nature that still exists there.'

Lucinede's presentation then shifted from illustrating a relational geography, to explaining her critical place-based learning about hegemonic and counter-hegemonic production in the 17 de Abril settlement. 'Another place where we did research was here in our settlement. And sometimes you see someone's land plot that has a lot of forest, really high forest, and you say, 'Man, he's lazy,' right?' She stopped and emphasized her next statement, meting her words out slowly to describe a hapless imagined individual: 'We…see…them…as….*lazy*, now don't we?' Without missing a beat, the auditorium responded in unison, 'We do.' 'Right,' Lucinede continued, 'we see them as lazy because they've been on the land for 15 years, and you can see from the beginning to the end, it's just forest, *just* forest.' Lucinede drew upon the student's own experiences, setting them up for a problem-posing moment by asking what seeing '*just*' forest on someone's lot indicated about that person. 'But I don't think this is laziness,' Lucinede offered. 'You know what it is? It's a choice to engage in a new form of production. Do you think economically he just survives on cattle and pasture?' 'No,' the students all replied again. Lucinede probed further, 'Do you think that he just knocks down the forest to burn so that he can then plant crops?' 'No!' shouted the students. 'There are other forms of production,' Lucinede said in a voice that was reserved, yet forceful, and filled in the other half of the contradiction she had created: having one's land comprised completely of forest is not laziness, as the community tends to believe, rather, it can be tactical. Lucinede continued, 'What is lacking amongst us is knowledge of how to do this, and so for that reason we did this research, and through this research we learned that this individual has *açai*, mahogany, cedar, *cupaçu, cacau, goiaba*, he has a huge list of tree species, including *castanha do pará*. He has planted more than 5000 trees on his land.' Lucinede's research was, as she described it, a process of discovering the counter-hegemonic forms of production that constituted place.

Lucinede's talk took on an increasingly normative nature as she described the threats that this forest farmer faced: 'He needs to have a lot of courage, because many people say it's deplorable, they'll say that he hasn't *even* been able to generate any income from this. And what happens to all of the effort and resources he invests in this, travelling hours away to acquire native transplants, and then someone comes with a nice sharp machete and makes a trail to hunt the animals that are living in the forest, or to cut down the trees, right?' The students unanimously agreed, 'They will be cut down.' With statements like these, Lucinede's narrative directly confronts the competing ideologies and forms of land usage in this MST settlement. Drawing on this sole example from her research, she described to the students the conflict, within their own settlement, between the proponents of hegemonic forms of cattle production who see agroecology not merely as lazy, but as something that needs to be stopped, and counter-hegemonic forms of production based in agrecological diversity. Lucinede concluded her presentation by telling the students,

> These examples can be a way of encouraging our parents to work in a type of production that is not simply ranching. This new form of agroecological production is in equilibrium with nature, because one thing depends on the other. This type of work is gratifying because it creates in the person a perspective of a future that is more healthy, and that is much better than having someone take a land plot and mechanize the entire thing and plant pasture across it. And so these two experiences bring for us a new hope for life.

Lucinede's conclusion epitomized how education can serve as a form of territoriality, encouraging particular uses and relations to land through production.

Conclusion

I have explored in this article the opportunities and constraints facing the MST's institutionalization of critical place-based agroecological education. I found that both these opportunities and constraints were geographic in nature.

The certificate program in 'Agroecology, *Educação do Campo*, and the Agrarian Question' exemplifies the successful institutionalization of critical place-based agroecological education. This program was created by a partnership between the MST and the Federal University of Pará, funded by PRONERA. This institutionalization of critical place-based agroecological education was an *opportunity* for the MST, because it enabled the training of its educator-students as Gramscian organic intellectuals. This Gramscian training was structured into the certificate program, which was designed around the problematizing of hegemonic forms of production, and applying research findings about those system's contradictions and emerging counter-hegemonic forms of production. In this case, institutionalizing a critical place-based agroecological education helped the MST advance its struggle within the framework of the state. It thus became a way to begin transforming the state from within (Polantzas 1978, Jessop 1990, Boden 2011).

The critical place-based education helped educator-students develop a relational conception of place. Diana's description of the ties between Serra das Carajás and her settlement, Bernardo's analysis of sand extraction, and Lucinede's description of extensive cattle ranching all illustrate an understanding of place as relational, comprised 'of distinct narratives, as the product of power-filled social relations' (Massey 1999), yet also interconnected. This cohort learned through dislocating field trips and community research how scales are interconnected, and socially constructed through hegemonic forms of production, such as sand extraction and cattle ranching.

The certificate program also emboldened the educator-students to apply their research findings about alternative methods and systems of production. Bernardo visualized his research as having an 'enormous potential' to communicate the negative effects of sand extraction to his

community, filling a knowledge gap, and facilitating the control of small-scale mining. Through her research, Lucinede also realized that 'someone has to something' and that 'I can do this.' Together with Diana, they decided to form an agroecological brigade, and bring this debate about hegemonic and counter-hegemonic forms of land use into both the school and larger community. Bernardo, Lucinede, and Diana's efforts to use knowledge as a tool to transform material production within their communities highlight how agroecological education can be employed territorially, affecting the relation to and control over land. Although institutionalization provided opportunities, for these educator-students to develop as Gramscian organic intellectuals, there were also constraints.

Whereas the educator-students had the training to advance counter-hegemonic knowledge and practices, the geographic politics of the school were a constraint. As Edison cautioned, 'It's really quite complicated, this relation between the school and the movement.' Edison's warning signaled that educators in social movement schools are not necessarily counter-hegemonic agents simply because of their location within an agrarian reform settlement. The example of Luana, the temporary teacher who joked that her students were better characterized as '*Sem Nada,*' illustrated how all educators are the products of their particular spatial histories, which are relational and hybrid. The contrast between Luana, the temporary teacher, and Diana and Lucinede, the organic intellectuals, illuminates how educators' spatial histories of political participation mediate whether or not they will support MST counter-hegemonic objectives through their teaching.

Various theoretical perspectives could shed light on these issues. Critical educational scholarship takes as a foundational principle the idea that all education is political (Giroux and McClaren 1994, Apple 1995). Similarly, the political economy of education draws attention to

how public policies shape curricula (Carnoy 1985). Political ecologists draw attention to how struggles over power shape ecology (Neumann 2005). Yet, none of these perspectives illuminates the interconnections between politics, economy, education, and ecology. The political ecology of education lens provided insight into how mapping strategies of hegemonic and counter-hegemonic forms of production, which one professor described as the 'political objective' of the certificate program, influenced the students' independent and collective understandings and attempts at transforming place. This lens also shed light on how the MST is institutionalizing its projects within the state as part of a long-term war of position. This analysis of *why* movements institutionalize education clarifies the omnipresence of spaces of resistance within the larger project of neoliberalism.

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CHAPTER 7

CONCLUSION: THE POLITICAL ECOLOGY OF EDUCATION MOVING BEYOND MOVEMENTS

Introduction

Why does the Brazilian Landless Workers' Movement (MST) emphasize agroecological education? It does so because everything is at stake. As I show in this dissertation, agroecological education has the *potential* to maintain MST members' political participation, identification with the movement, utilization of the agricultural principles it advocates, and role as individuals committed to a longer process of emancipatory social change. I focus throughout this dissertation on illuminating the *opportunities* and *constraints* that the MST faces in actualizing the *potential* of agroecological education. I conclude the dissertation by thematically presenting the major results on these opportunities and constraints, discussing how these findings contribute to various disciplines, highlighting the implications of these findings to both policy and grassroots communities, and pointing to areas of future research.

Institutionalization: An Opportunity for Movements in Education

Institutionalization is a major opportunity for advancing agroecological education within the MST. Institutionalization is an opportunity because it enables the MST to develop educational spaces and initiatives, crucial funding for these projects, and a means towards using education to transform the state from within. Institutional partnerships also transform the state's

educational institutions. I focus on two institutional educational partnerships between the MST and the state in southeastern Pará. One partnership is between the MST and the Federal University of Pará. This partnership is based at the Latin American Institute of Agroecology-Amazonia branch (IALA), and consists of a certificate program in Educação do Campo, Agroecology and the Agrarian Question in Pan-Amazônia. The other example of institutionalization is the Federal Institute of Pará, Rural Campus of Marabá (IFPA-CRMB), which is located in the MST's 26 de Março settlement. I find that institutionalization of partnerships between the MST and the state helps the MST to attain its objectives of developing locally relevant educational opportunities, and the state's desire to attend to a larger segment of the population. I now review my findings on institutionalization as *opportunity* in three educational spaces: IALA, the UFPA, and IFPA-CRMB.

IALA: Accessing Resources to Develop a Vision

The Latin American Institute of Agroecology-Amazonia branch (IALA) is a major beneficiary of institutionalization. IALA is located in an MST settlement, and is run by individuals who are state leaders in both the MST and LVC. IALA is a semi-autonomous space because it is run by the MST and LVC, and retains their pedagogical practices and ideals, but is connected to the state since it provides a location for a Federal University certificate program. In Chapter 5, I present the perspective of Dayze, one of IALA's coordinators, who emphasizes that offering a certificate program not only enables the development of other courses, but that "…the certificate gives you a certain liberty… to think about the challenge of the construction of IALA, what is it that IALA should be?" The partnership between the MST and the UFPA enables IALA to establish its own trajectory as an educational institution, and also contribute to the slow

accretion of regional agroecological education opportunities that other activists described as "vertical integration".

These institutionalized partnerships are key because they enable the MST to access funding streams that constitute the National Program for Agrarian Reform Education (PRONERA). The example of Gemeson Brito, an activist professor who is a high-level administrator in the UFPA, illustrates how extensive everyday activism is necessary to liberate PRONERA funds (Chapter 5). Gemeson draws attention to the inherently interconnected scales of this political economy by describing how a national level congressional inquiry into the MST led to financial instability at the local level. Certificate programs, such as the one at IALA, would never be funded or put into practice without the commitment of these institutional activists. However, it is not only the social movements who are benefitting from their partnerships with the state's educational institutions, rather the UFPA itself is being slowly transformed through these institutionalized partnerships.

The UFPA: "There's No Way the University Can Turn It's Back on It"

Activist professors and administrators are transforming the university from within by collaborating with the region's social movements. As professors recounted this history, the UFPA was created in the late 1980s to advance the educational presence of the state into the interior of Amazonia. Over the 1990s, professors at this new university developed partnerships with the region's social movements. These activist professors collaborated with these movements in helping to develop educational spaces, such as the Tocantins Agricultural-Environmental Center (CAT), and larger regional educational debates, such as the Regional Forum of Educação do Campo (FREC) (Chapters 1, 4, 5). These activities increasingly occurred within the UFPA. In

Chapter 5, Eduardo describes this "strategy" as occupying the university "with debates, with actions, with videos, with week-long activities." I describe these events as dialogic spaces, because they have an intended educational objective whose purpose is to encourage critical dialogue between event participants, social movements, and different sectors of society with the ultimate goal of actualizing emancipatory social change (Rule 2004: 320). These dialogic spaces have a trickle-up scalar effect. Although they start at a small scale, they cause a transformational process at the larger scale of the university itself. As Eduardo notes, you keep advancing these debates "to the point where there's no way that the University can turn its back on it...you enable the reflection on what other forms the university can take."

The IFPA-CRMB: Advancing a New Vision of Agroecological Extension

The IFPA is another example of how institutionalization enables the advancement of agroecological education. The MST and other grassroots movements were able to institutionalize agroecological education in a high-school program by engaging in a two decade long series of debates and struggles in the interconnected educational spaces of southeastern Pará that led to the creation of the IFPA. Institutional activists played a key role in beginning these discussions at the CAT in the mid 1990s (Chapters 1, 4, 5). These institutional activists, who were active members in the region's Educação do Campo movement, became coordinators of the Regional Forum of Educação do Campo (FREC). As Jean Luc, an extension-agent and community educator, summarized, "The FREC… created a debate that led to the creation of the Rural Campus of Marabá (Chapter 5)." The FREC was unquestionably a dialogic space (Rule 2004). In the early 2000s, FREC's position as a dialogic space dovetailed with major national level changes in the political economy of education. The Brazilian government put forth a plan to expand the

professional and technological education system, which had been closed during the previous government. As part of this national level policy, Marabá became a site for a new vocational agricultural education campus. This campus is the IFPA-CRMB, and is grounded in a new vision of extension as agroecological community development (Chapter 4).

The IFPA-CRMB program creates tight connections between agroecological education, political economy, and the students' agroecological visions for their land. The IFPA-CRMB program enables students to gain the credentials necessary to access government credit through the PRONAF-Jovem program, which funds sustainable agriculture projects (Chapter 4). The students' "Improving My Land" capstone projects are an opportunity to integrate the various classes in the IFPA's program and put them into practice by developing a proposal for the PRONAF-Jovem project. A political ecology of education lens illuminates the linkages between the IFPA program curricula, the agroecological visions of the students, and the PRONAF-Jovem credit program, which provides funding for these initiatives. However, this lens also illuminates how agricultural modernization shaped the historical landscape, and facilitated the transition to cattle ranching, both of which are constraints to the potential of this agroecological vision (Chapters 4, 5, 6).

Agroecological Education: An Anti-Neoliberal Opportunity?

The interconnected educational spaces of IALA, IFPA, and UFPA play a complicated role in the contest between neoliberal and anti-neoliberal visions of education and environmental resources. IALA is an anti-neoliberal educational zone of convergence. Social movement activists, activist educators, and intellectuals can come together at IALA to share ideas and practices, and perhaps most importantly from the MST's perspective, organize evolving anti-

neoliberal tactics of resistance to neoliberal policies and practices (Chapter 6). IALA advances its anti-neoliberal agenda by accessing funding through PRONERA to bring international activists and intellectuals together to debate the future of IALA and how it can reach its objective of serving the countries comprising Pan-Amazonia. IALA's engagement with the certificate program provides it the financial and intellectual resources to work towards its objective of being a translocal center where "popular commonsense" knowledge and practices are being developed (Chapter 5).

The IFPA-CRMB straddles the competing educational ideals of neoliberalism and anti-neoliberalism. Lula's PT government created the IFPA-CRMB as part of a revamping of the vocational educational system, seeking to help re-produce the needs of the market. However, the strong regional Educação do Campo movement was able to embed its social and environmental justice ideals into the very structure of this new institution. As a result, the IFPA-CRMB caters to agrarian reform students, its professors are activist educators, and its pedagogy is intended to be a distinct departure from the Green Revolution influenced model that trained extension agents to extend pre-formed knowledge and create the conditions for technological intervention and landscape transformation. Now graduated, these students might stay in their respective home settlements. Yet, they are also qualified to enter the ranks of the public and private extension agencies (Chapter 4). If they do work for these agencies, the MST will have made strides in transforming the state from within, using education to help a new cadre of extension agents develop a "popular common sense," based in agroecological ideas and practices.

Similarly, the UFPA itself has begun to be transformed from within. Activist professors and administrators have facilitated debates, leading to the creation of new certificate and degree programs with a social and environmental justice focus. These programs are simply one example

of change within one university, and do not in themselves evidence a larger transformation of the larger educational system. However, as Marcio indicated in Chapter 5, educators in partnership with region's social movement have been able to achieve "vertical integration" of courses. There are now critical education opportunities for agrarian reform students from the grade school through graduate programs. Although the number of opportunities is certainly outflanked by the demand, this "vertical integration" is an example of the omnipresence of anti-neoliberal educational activism within the structure of the state itself.

Constraints: Politics, Economy, Ecology, and Culture

I found that there are a number of constraints to advancing agroecological education in the MST. These constraints can be thematically grouped into politics, economy, ecology, and culture. Political participation is, perhaps surprisingly, a constraint to agroecological education in the MST. As Edison acknowledged in Chapter 6, "It's really quite complicated, this relation between the school and the movement." Edison's warning drew attention to the fact that educators' political participation in the MST is not homogenous, and that this affects the advancement of the MST in the school. I compared Luana, the temporary teacher who joked that her students were better characterized as '*sem todo,*' with Diana and Lucinede, the organic intellectuals, to illustrate how educators' spatial histories of political participation mediate whether or not they will support MST counter-hegemonic objectives through their teaching.

The interrelated political economies of agricultural modernization, agricultural credit, and agricultural extension are also a constraint because these factors have helped solidify the hegemony of cattle ranching. As Brito indicates in Chapter 4, the Green Revolution structured the agrarian science programs' focus on large-scale production. These programs shaped the

vision of extension agents so that they "can't visualize *how* to work" in agrarian reform settlements, and simply reproduce the scalar logic of agricultural modernization. When this vision was supported by credit initiatives (PROCERA and PRONAF-A), the proliferation of projects directed towards cattle production fomented a shift in the 17 de Abril subsistence agriculture to where it is just "*gado, gado, gado*." Adriana, the extension agent in the 17 de Abril, evidences this perspective by indicating, "since the settlement's creation, the projects have been set up for ranching." These credit projects and agricultural extension have engendered distrust among the inhabitants of the 17 de Abril towards agricultural extension (Chapter 4). As the example of Dona Maria and Seu Antonio showed, improperly planned credit projects and non-existent extension can lead to insurmountable debt. Adriana lamented that "it's gotten to the point where farmers are cynical about agricultural extension, they don't believe in the companies working in agricultural extension, seeing them as just promising and not doing anything." The settlement's inhabitants' experiences with extension and perceptions of extension are a constraint to advancing agroecological education within the settlement. As Adriana, who is interested in advancing reforestation, indicated, "You could be telling the truth. You could be there with a project in hand already approved by INCRA, but the farmer's just don't believe it." The constraint of landscape history is closely related to the political economy of credit and extension.

The history of the landscape is a constraint to advancing agroecological education in the 17 de Abril settlement. As Arnoldo, the settlement's president, reflected, when the settlement's inhabitants received land in 1997 it was already largely degraded. The farmers' efforts at agriculture were largely unsuccessful, according to Arnoldo, "because the land had already been prepared for cattle ranching (Chapter 4)." The constraints of landscape history were reinforced by the combination of credit incentives and agricultural extension activities. Arnoldo distilled

this relationship, “one project came, and then another, that only supported cattle. And so the type of land use didn’t really change (Chapter 4).” The constraints of the political economy of credit, extension and their affect on landscape change were augmented by cultural beliefs about land management.

The cultural traditions of land management are also a constraint to advancing agroecological education. During the MST pedagogical encampment, Pedro, an IFPA-CRMB student, emphasized that “one of the principal barriers” to agroecological production is “the family”. Pedro drew attention to the dominance of shifting swidden agriculture as a constraint. Alan experienced the family barrier in a different form. For Alan, his father’s interest in using herbicides was a hurdle for Alan to overcome in putting his agroecological learning into practice. The hegemonic “commonsense” of cattle ranching is also a constraint. Financial insecurity means that cattle ranching is a more desirable form of land management than subsistence agriculture. As Luis indicated, “cattle are a constant, they’re a bank. If I need money, I can sell a calf in an hour and have money in my pocket.” In addition to having no specific harvest season, cattle are predictable. People ranch cattle, following Luis, “Because it’s what works. Because you put cattle on the land, and they thrive.”

Research Significance

These research findings are of interdisciplinary significance to the fields of anthropology, geography, adult education, social movement studies, and environmental education. My advancement of a political ecology education framework holds still wider potential, as it enables a sustained engaged dialogue between these perspectives. The political ecology of education

perspective is undoubtedly nascent, yet I have made important preliminary inroads in developing it in this dissertation.

Through a literature review, I first synthesize various traditional definitions of political ecology with principles of critical education and the political economy of education into a preliminary definition of the political ecology of education. I define this perspective as "attuned to how the distribution of power and resources among interconnected political and cultural entities mediates pedagogical processes—from tacit to formal learning—and related knowledge systems, affecting access and control over natural resources, interactions with the cultural landscape, as well as conceptions of nature-society relationships" (Chapter 3). I emphasize that this is simply one definition of this perspective, and similar to the historical evolution of the definition of political ecology itself, scholars will undoubtedly develop additional definitions as they explore the political ecology of education in other contexts. I help to illuminate what other contexts scholars might begin engaging with this perspective by briefly describing a variety of sub-fields of educational scholarship that are ripe for a political ecology analysis (Chapter 3). I solidify this theoretical framework by presenting three concrete cases in which this perspective was advantageous (Chapter 4, 5, 6).

The first looked at how larger political and economic processes of agricultural modernization related to the Green Revolution structured the training of extension agents, and inculcated a spatial imaginary of the agricultural landscape as industrially scaled and intended for the production of capital (Chapter 4). Yet, I also explore how the MST's role in a diametrically opposed agroecological revolution has dovetailed with the larger Educação do Campo movement, and the advancement of Brazil's technical educational system, to train a new cadre of extension agents as community development practitioners. Finally, I analyze the

differences between two different credit initiatives, PRONAF-A and PRONAF-Jovem, and how these different credit initiatives support particular patterns of knowledge dissemination, technology extension, and agrarian change. The political ecology of education lens clarifies the interconnections between competing ideologies, forms of credit, education, and landscape change.

In the second case study, I illustrate how the cyclical interconnections between the same larger community of social movement and institutional activists have enabled access to the political and economic resources necessary to create dialogic spaces of environmental education at various institutional scales (Chapter 5). These educational opportunities have the potential to foment an agroecological transition, because they seek to inculcate students in a new vision of land management based in ecological principles. Part and parcel of each of these facets are political and economical processes.

In the third case study, I employ the political ecology of education lens to understand how politics and economics are both opportunities and constraints towards advancing agroecological education in the MST (Chapter 6). In particular, I drew upon this perspective to understand both how the politics of place—and in particular, a lack of consensus in the community and in the school regarding the importance of MST politics—can be a constraint for integrating the pedagogy of the movement within the school, and how these politics provide opportunities for institutionalizing agroecological education.

The political ecology of education framework helps illuminate an emerging debate concerning how learning processes are innately geographic, and how these learning practices in turn shape geographic phenomena. Simandan, for example, in an introduction to the recent special section of the Professional Geographer (65:3) asks, if learning is a geographic process

then "what problems is it particularly suited to address?" (2013: 364). I engage directly with the interlinked questions of the learning of geography and geography of learning by advancing a political ecology of education framework that demonstrates: **1)** how educational spaces of debate that have an explicitly transformational purpose, or dialogic spaces (Rule 2004), influence the geography of agroecological learning opportunities, i.e., the production of particular environmental education spaces; **2)** how critical place-based learning can serve as a form of territoriality, influencing conceptions of territory and what constitutes appropriate land usage (Sack 1986); and **3)** how histories of land usage and political participation intersect to mediate the diffusion of agroecological learning. These conclusions are relevant to the debate concerning the learning of geography, and the geography of learning, because they demonstrate the linkages between the geography of land use and that of knowledge. In addition to the political ecology of education perspective, my findings contribute to research on the MST.

The MST has been a long-term focus of academic research (Branford and Rocha 2002; Wright and Wolford 2003; Wolford 2003, 2004, 2006; Hammond 2004; McNee 2005; Issa 2007; Ondetti 2009; Karriem 2009; Wittman 2009; Meek 2011). The MST's incredible three-decade existence warrants ongoing research to help understand the opportunities and constraints the movement faces in maintaining its members' mobilization, and the MST's complicated relationship with the state, which it simultaneously depends upon and seeks to transform. I address the need to understand continuing dynamics of movement engagement by exploring the role of education in maintaining active political participation. Employing a Gramscian analysis, I show how critical place-based education serves to transform MST educator-students into Gramscian organic intellectuals. Education helps reinforce not only these educator-students affiliation and participation in the movement, but also the political identity of their students in

the settlement's school. My research also explores the flip side of the participation question, by analyzing how active participation influences access to movement education opportunities, such as the IFPA-CRMB vocational high-school program and the UFPA certificate program.

I explore the MST's relation with the state by focusing on institutionalization, which is a complicated subject in studies of social movements. Typically, protest behavior follows a 'protest wave cycle' in which it becomes coopted by the state and rendered inert (Oomen 1990, Tarrow 1994, Kriesi *et al.* 1995, Suh 2011). Following this logic, the institutionalization of critical place-based education within PRONERA would be expected to be the death knell of a progressive agenda. I advance social movement scholarship by showing that in certain cases it is *through* institutionalization that the MST preserves its ability to advance its emancipatory objectives. Additionally, I explore the role of institutionalization in the advancement of counter-hegemony. The MST's partnerships with institutional activists are incredibly strong in southeastern Pará, and enable it to create education programs designed to develop a "popular common sense" among MST members. This "war of position" is a long-term struggle, as Gramsci notes, and requires extensive grassroots mobilization. My analysis of MST-state partnerships in training organic intellectuals to be agents in the "war of position" also contributes to the body of literature on Gramscian education (Coben 1995; John 1996; Giroux 1999; Schugurensky 2000; Mayo 2008; Dore 2009; Yogev 2011).

My exploration of MST's agroecological education contributes directly to the rich history of social movement education analyses (Belle 1984; Finger 1989; Holford 1995; Foley 1999; Holst 2002). At a more specific level, it also extends the well-developed corpus of research on MST education (Ghanem 1998; Kane 2000; Caldart 2002; Knijnik 2002; McCowan 2003; Diniz-Pereira 2005). It advances studies of social movement education by exploring the

interconnections between the opportunities and constraints of education. MST educators are able to obtain continuing education and become educator-students, because of their potential to advance the MST's ongoing struggles within the settlement's school (Chapter 6). However, education itself is also a constraint, as educators with low political participation in the MST espouse ideological resistance to the movement's presence in the school. The tension between different forms of agricultural extension education also highlights these interconnected opportunities and constraints (Chapter 4). Although MST students are becoming trained in a new vision of extension based in Freirean principles, their opportunity to be agents of agroecological change is constrained by short cycle production-oriented project funding and the affect of the Green Revolution on the landscape itself. The research contributes specifically to studies of MST education by exploring the interconnections between two relatively understudied and recent phenomena: the MST's role in the Educação do Campo movement and PRONERA. This analysis is particularly important, because I believe that one cannot understand the dynamic development of education in the MST without an account of the linkages between these movements and the political economy of education funding.

This research also contributes directly to an emerging body of research on the politics of environmental education (Gruenewald 2002, 2003; McLaren and Houston 2004; Mueller 2009; Somerville 2010; McKenzie 2012). Environmental education scholars are paying increasing attention to neoliberalism's affect on environmental education.[92] I help advance this discussion by exploring how an anti-neoliberal movement affects environmental education. Educação do Campo is an educational philosophy that is arguably anti-neoliberal, emphasizing the responsibility of the state, and not the market, in providing educational services. One of the

[92] See the upcoming special issue of Environmental Education Research (2014).

various foci of the larger Educação do Campo movement is agroecological education, which is directly related to rural realities, and can help strengthen the autonomy of agrarian communities. My analysis of the educational politics of scale shows how this anti-neoliberal paradigm is gaining increasing visibility in southeastern Pará through the "vertical integration" of courses. I helped complicate the already messy interrelations between anti-neoliberal and neoliberal environmental education by illustrating the feedback loops between the state's educational opportunities and financial resources, and movement education spaces. On one hand, I show how the MST was able to develop IALA by drawing on the state's PRONERA program to fund a MST-state sponsored certificate program in agroecology. On the other, I illustrate the importance of movement educational spaces, such as the FREC, but also Cabanagem, and the MST's Florestan Fernandes training center in the very development of the IFPA-CRMB and its agroecological vocational high-school program.

Policy Implications

The results of this dissertation have direct implications for agrarian reform policy in Brazil. The National Program of Agrarian Reform Education (PRONERA) is a major policy affecting the landscape of rural education in southeastern Pará, Brazil. My analyses demonstrate that this program has been instrumental in funding educational initiatives that have the potential to help rural communities develop more environmentally and economically sustainable forms of production. These PRONERA-funded programs, which are based in an alternating pedagogy, also enable students to remain both in residence and gainfully employed within their communities, thus stemming the rural-urban migration and depopulation of rural areas. However, the demand for these opportunities far exceeds the spaces available. I recommend expanding the

PRONERA program's funding and scope so that it continues to be a source of funding for developing equitable and innovative forms of education for marginalized communities.

My exploration of the historical role of credit in fomenting livelihoods and environmental shifts is also pertinent to ongoing discussion of agricultural development in Brazil. PRONAF-Jovem is a government credit program that has enormous potential to enable youth to influence their families' transition to sustainability. However, I find that this program's potential is quite limited, as it is only open to students who have completed a vocational agricultural program. I recommend changing the conditions of the PRONAF-Jovem project so that other agrarian youth can individually and collectively advance credit projects; one way to do this would be to designate innovative mentors in the agrarian sciences who could advise these youth in developing their projects.

Grassroots Implications

My research results are significant not only for the MST, but also for the other grassroots movements both in Brazil, and globally. One of my central findings is the importance of institutional partnerships between the MST and activist-oriented professors in creating educational opportunities for agrarian settlement youth. I believe that this finding has broad applicability beyond both the MST and education reform. Grassroots movements should understand that the state, in its many guises, is a powerful arena for fomenting social change. Movements can reach their objectives of wider social transformation by forming partnerships with individuals who have an affinity for social and environmental justice. In my research, the arena of education was an important locale for developing these partnerships. Individuals in

strategic positions can help mediate movements' access to state resources and grant legitimacy to grassroots projects.

My findings on political participation also directly support grassroots movements' efforts to reach their objectives. Movements must maintain the active political participation of their members in order to be effective at creating change. However, political participation often wanes following a movement's initial success in addressing a social grievance. My results illuminate recursive relationships between political participation and educational opportunities. Movements that provide educational opportunities to their most active members enable the training of activist leaders who will be the future of the movement. When these educational opportunities are designed as continuing education opportunities for educators, movements strengthen these leaders abilities to affect change on a much wider scale by training their own students.

Movement educational spaces are key incubators for larger scale processes of educational, social, and environmental change. I find that these educational spaces are often interconnected. Dialogues that begin in one space will be taken up in another, and this accretionary process will ultimately result in significant change. Movement educational spaces are also important because they create an arena in which to develop institutional partnerships. Grassroots movements can foster long-term partnerships by inviting activist professors and administrators to participate in movement activities in these movement spaces. Additionally, these spaces can be important temporal bridges, providing movement courses a space to function when the state fails to meet its educational obligations. Although creating and maintaining these spaces undoubtedly requires extensive movement resources and commitment, doing so is extremely valuable in the long term, and should be continued.

My research suggests that the agricultural extension system is at odds with the objectives of agrarian reform movements. In southeastern Pará, the MST has been quite successful in advancing a new conception of agricultural extension education in state educational institutions; however, the larger political and institutional system in which these students will ultimately work is driven by a short-term project-oriented system that is at odds with the realities of agrarian reform communities. I encourage social movements to take a two-prong approach to transforming agricultural extension. The first element is to continue transforming the educational institutions that train extension agents, moving these institutions from an agricultural modernization paradigm to one grounded in community development, food sovereignty, and agroecological methods. The second element is to begin a difficult debate about how to create a fundamentally different vision of extension that is community-based and does not rely upon production-maximizing projects. This latter aspect might take the form of extension collectives that fund themselves through value-added agricultural production (i.e. yogurt, cheese, fruit pulp) or through a community tax. By developing nuclei of trained community extension agents, or what Freire would simply term educators, agrarian reform settlements will be able to work towards developing knowledge sovereignty.

Future Research

The 17 de Abril settlement remains a compelling community to research because it originated from a national-level violent conflict that precipitated changes in regional and national agrarian reform policies, and remains one of the country's largest agrarian reform settlements. I feel that the Oziel Alves Pereira school in the 17 de Abril settlement is a bellwether of changes in the community. The school would be a productive site for extended ethnographic research to assess the success of its movement-affiliated educators in integrating MST pedagogy and ideals

into the curriculum. Scholars would undoubtedly learn important lessons by continuing to pay attention to the daily politics of educators' interrelations, and their interactions with students' parents concerning the role of politics in the school.

Rural areas that are rapidly urbanizing areas are important research sites for scholars of agrarian change and urban planning. Although the 17 de Abril settlement is still a rural area, it is increasingly urbanizing. Part of this is due to its location on the periphery of the city of Eldorado das Carajás. However, anecdotal data suggest that the aspirations of the settlement's inhabitants are also a significant cause of this urbanization. Given its geographic size, and number of residents, many of the settlement's inhabitants are pressuring the government to turn the settlement into its own municipality. I believe such a geopolitical change warrants focused analysis. Scholars interested in the future of Amazônia must pay attention to the phenomenon of urbanization. The 17 de Abril settlement would make an excellent site to explore how the geopolitical urban imaginaries of the settlement's residents intersect with the spatial expansion of Eldorado das Carajas to shape this evolving landscape.

The 17 de Abril settlement also provides a fascinating site for science and technology scholars to explore how technology is an opportunity and a constraint to sustainable land management. A common narrative in the 17 de Abril settlement is that inhabitants have given up on subsistence agriculture because of a lack of mechanized technology. However, this narrative appears, at first glance, to contradict the movement's emphasis on agricultural production based in traditional peasant forms of technology. An understanding of how the settlement's inhabitants view different forms of technology, and the role of these perceptions in shaping their actual and desired land management practices would greatly inform social studies of sustainability science.

Agroecological education has the potential to be socially and environmentally transformative; yet for this potential to be actualized, learning cannot remain solely with the students, but must be disseminated to their wider community. The cohort of the IFPA's vocational high-school program in agroecology offers an excellent opportunity for a longitudinal regional study of the transfer of agroecological knowledge. 75 students graduated from the program and have now returned to their respective 25 communities, which are spread throughout southeastern Pará. I encourage scholars to explore the dissemination of agroecological knowledge and practices in these students' social networks. Such research might focus at the farm scale on the opportunities and constraints that these students face in putting their agroecological education into practice. Another rich opportunity would be to explore these students' formal and informal social networks, and to what degree these networks differentially enable the dissemination of agroecological knowledge and practices.

The National Program of Agrarian Reform Education (PRONERA) is an innovative public policy that is shaping rural education opportunities. PRONERA would be an excellent organization to research using institutional ethnography. A multi-sited and multi-scalar research design would enable an analysis of connections between the *heartlands* of educational policy reform, such as the capital of Brasilia, and the *zones of extension*, such as the regional vocational schools, which are being funded by these policies (Peck 2002). Such an analysis would likely yield engaging results concerning the interrelations between neoliberal and anti-neoliberal educational policies.

La Vía Campesina's agroecological education centers are sites of enormous potential for scholars interested in how politics, economics, ecology and education intersect. This research illustrates how the IALA-Amazônia sees itself as a site of convergence for activists from the

various countries in the Pan-Amazonian region. Critical scholars of environmental education might explore what constitutes a convergence model of education, and how knowledge is produced and disseminated across geopolitical borders. Social movement scholars would likely gain fruitful results from analyzing how international solidarity networks are constituted through these educational spaces. A larger and more ambitious research project would focus on an institutional ethnography of La Vía Campesina, and how it is developing these educational centers in diverse international locales as part of a larger grassroots strategy of social and environmental justice.

The nascent political ecology of education framework holds wide potential for future research. Indigenous education has long been a focus of educational scholarship; scholars interested in environmental knowledge might explore how the politics and economics of indigenous education affect acculturation, and transmission of traditional ecological knowledge. In urban contexts, school gardens would be another fruitful area of research in the political ecology of education; when looking at these initiatives, a variety of questions emerge concerning in what schools these program are created, what is the cultural and socioeconomic background of these schools and their students, and what are the opportunities and constraints that teachers and students face in disseminating their learning. The higher-education system is another particularly important area for research in the political ecology of education. As universities increasingly "green" themselves, extensive funding streams for sustainability initiatives are becoming available. Political ecologists are well positioned to train their analytic lenses on their home institutions, exploring the forms, functions, and failures of sustainability education within the academy. Researching within the academy is not simply an opportunity for critical analysis, but also an arena for engagement.

Applied research has long been a focus of political ecology. I conclude this chapter, and the dissertation, by making a call for applied scholarship in the political ecology of education. The political ecology of education is a natural arena for applied research. Scholars who are in the academy have the ability to shape not only curricula, but also the trajectory of degree programs, and disciplines. Additionally, non-governmental organizations around the world prioritize education, making them a natural arena for collaborative project development and assessment. Lastly, as I have shown throughout this dissertation, grassroots movements can reach their objectives by forming institutional partnerships. Scholars engaged in research in the political ecology of education can collaborate with these movements, helping them identify the opportunities and constraints facing their educational projects of social and environmental transformation.

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