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Doing it for Themselves: Direct Action Land Reform in the Brazilian Amazon

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Summary. — The present paper considers a sometimes contentious process of land reform presently occurring in Brazil. This process, referred to in the paper as *Direct Action Land Reform* (DALR), involves organizations such as the Landless Rural Workers Movement (Movimento dos Trabalhadores Rurais Sem Terra, or MST) and more spontaneous actions of individuals desiring a piece of land for their own. Results of a survey covering 751 households engaged in such land reform actions in the Brazilian Amazon are presented, in order to describe participants and land reform processes. Evidently, social movement organizations provide for a modest degree of wealth accumulation, a welfare improvement that must be set against potential environmental costs. The paper concludes by calling attention to the challenge DALR may ultimately pose to the Brazilian state.

Key words — Latin America, Brazil, direct action land reform, environment, Amazon

1. INTRODUCTION

Land reform has long been advanced as a way to correct social inequities in countries with large rural populations. Following WW II and the collapse of longstanding colonial relations between the global north and south, a number of newly independent governments promoted programs of land redistribution in order to support democratic forms of governance and to eradicate vestiges of imperial domination. The United States and its allies assisted in such efforts as part of a strategic investment in less-developed countries to thwart communist insurgencies rising with the tides of populist discontent (Esteva, 1992). Governments across the Americas, Africa, and Asia hoped that the land reform agenda would re-

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solve persistent problems of rural poverty that were explained as symptomatic of land scarcity given the concentration of holdings in the hands of the few.

Reactions by the landed elite to these initiatives were often sharp, and in many cases led to violent rebukes of government policy (De Janvry, 1981; De Janvry & Sadoulet, 1989; Reidinger, 1995). Perhaps as a consequence, the fortunes of land reform as part and parcel of development strategy have waxed and waned in many places in the postwar years. During what has been referred to as the era of agricultural modernization, the paradigm of productive efficiency largely replaced the concept of rural justice, and efforts to resolve the issue of rural poverty were tied to technologies that would raise incomes through improved production techniques rather than access to land. Agricultural modernization was heartily embraced by rural elites, given its twofold promise of higher profits and reduced pressure for land appropriations. So long as outside interests and institutions such as the World Bank paid the bill, the proffering of new technologies was a win-win situation for those who sat on the upper end of the distribution of land holdings. With the waning of the cold war in the 1980s, and the dominance of neoliberal policies, agrarian reform was marginalized as a policy concept, and policies advocating such change were disregarded.

Today, the call for agrarian reform has once again become an integral component of development discourse, from both the neoliberal camp advocating market-based land reform (i.e., the World Bank) and the growing populist movements demanding land redistribution as a fundamental human right, and essential to food sovereignty (i.e., La Via Campesina). Land reform has likewise returned with force to the social agenda of many countries. Brazil, the focus of the paper, is one of the four important industrializing nations referred to as the BRIC countries (Brazil, Russia, India, and China). As such, it possesses one of the largest economies in the world, with *per capita* incomes that place it squarely in the upper quartile of developing countries when measured by conventional indices.

Nevertheless, Brazil also ranks amongst the worst with regard to both income and land distribution, providing fuel for a particularly vociferous land reform movement. The contemporary struggle for land has frequently turned violent, resulting in a reported 1,547 agrarian activists killed nationwide during 1988–2008, nearly half of those deaths occurring in Amazonia (Almedia, 1994; CPT, 1991–2008) (CPT, 1988–2008). Although the vast majority of victims were men, women, and children who comprise the rank and file landless and their advocates, there has been a rise in fatalities since the mid-1980s of large-landowners, their gunmen, and often their families, earning Amazonia its reputation as Brazil's notorious badland (Simmons, 2004; Simmons, Walker, Arima, Aldrich, & Caldas, 2007a).

Efforts to bring peace to Brazil's landless and alter the distribution of land holdings represent a tide of populist sentiment now gripping the South American continent, with similar cries for rural justice sounding in Bolivia, Venezuela, and Ecuador (Moyo & Yeros, 2005; Petras, 1998; Rosset, Patel, & Courville, 2006). Movement activists frequently communicate and interact across national boundaries, and share both information and resources in what is emerging as a transnational resistance project complementing the progressive regimes of the countries in which they are occurring. It is within this continental context that the paper focuses on Brazil, where land reform and violent land conflict have "broken out" in spite of industrial growth, urbanization, demographic transition, and what has all the appearances of a boom economy.

This land reform process manifests itself in the formation of settlements, or *Projetos de Assentamento* (PAs), through aggressive and sometimes contentious "*occupations*" of private and public lands by individuals and social movement organizations (SMOs). Since we focus the paper on the actions of the landless, we use the term *occupation*, a political distinction preferred by movement activists who maintain they "occupy" land, not invade, because they have the "moral" authority and constitutional right (Stedile, 1997; Wolford, 2004). Such settlement processes constitute what has been referred to as *Direct Action Land Reform* (*DALR*), in populist counterpoint to the top-down ventures of state-led programs of several decades ago (Sigaud, Rosa, & Macedo, 2008; Simmons et al., 2007a).

Present-day DALR in Brazil is often thought of in conjunction with its most famous SMO, the *Landless Rural Workers Movement* (MST), which has spawned a movement representing more than 1.5 million members (Fernandes, 2000; Stedile, 1997; Welch, 2006; Wolford, 2004). But other organizations crossing a rather broad political spectrum are also involved, including the *Pastoral land Commission* (CPT), the *Movement for the Struggle for Land* (MLT), the *Syndicate of Small and Medium Rural Producers* (SINPRA), the *Organization of Workers in the Country* (OTC), and the local rural workers unions (STRs) that are corporatist vestiges of the military government but remain active proponents of the rural poor (Hébette, 2004, p. 197; Martins, 1989, p. 67; Sigaud, 2005; Sigaud *et al.*, 2008; Simmons, Perz, Pedlowski, & Silva, 2002b; Simmons, Walker, & Wood, 2002; Toni, 1999). DALR represents a form of what has been referred to as grass-roots political mobilization. We resist this botanical metaphor, and opt for a labeling convention that links to a long history of left politics, particularly the anarchist resistance to communist discipline, and the philosophy that revolution can only be made through the concrete insurrectionary actions of the masses. The contentious nature of land occupation pursuant to DALR reflects a politics of direct action outside the organizational politics of leftist parties, not to mention the normal grievance channels of elected governments.

The prime motivation of the present paper is to provide an empirical account of Brazilian DALR, a relatively recent phenomenon in the region of study, Amazonia. Thus, land reform in Brazil currently possesses a critical environmental consequence, because the lion's share of current DALR activity in the country is in fact occurring here. Pará and Rondônia, the two Amazonian States that form the empirical basis of the research to be presented, accounted for almost a third of all families participating in land reform actions in Brazil during 1979–2007 (Table 1). These actions translated into the settlement of 5,072 km^2 annually, a sizeable fraction of the land being deforested yearly throughout the entire Brazilian portion of the basin over the period (10,000–20,000 square kilometers deforested per year). A growing number of researchers have expressed concern about this new threat to the forest posed by social justice movements dedicated to resolve the land issue, despite the avowed "greenness" of their often progressive ideologies (e.g., Fearnside, 2001; Simmons *et al.*, 2002, 2007a; Simmons; Caldas, Aldrich, Walker, & Perl, 2007b). Indeed, individual DALR actions involve coordinated efforts of 100s to 1000s of small farmers, who have already been implicated as agents of deforestation, and little consideration has been given to their cumulative impact on the landscape (see Simmons *et al.*, 2007a,b). Nevertheless, the paper emphasizes that large ranchers and agro-industry must be regarded as the greatest perpetrators of land cover change. Although these enterprises represent less than 4% of establishments clearing land in Amazonia, they accounted for more

Table 1. *Rural land settlements in Brazil: 1979–2007*

Region	# Settlements	%	# Families	%	Area km^2	%
North	1,617	21	355,896	40	471,742	71
Pará	824	11	207,202	23	128,349	19
Rondônia	133	2	33,414	4	18,743	3
Brazil	7841	100	902,078	100	660,863	100

Source: DATALUTA—Banco de Dados de Luta pela Terra, 2008. www.fct.unesp.br/nera.

than 50% of deforestation during 2001–05, and their future contribution is likely to become more pronounced as soy production for biofuel pushes further into the region (Alves, 2002; Walker *et al.*, 2000; Walker, 2003; Walker *et al.*, 2009).

Although the paper considers aspects of the environmental impact of DALR, its main goals are to (1) provide an introduction to Brazilian DALR through field-based description, and (2) examine the impact DALR has on the livelihoods of its participants. To accomplish this, the paper first considers how the Brazilian government has addressed *A Questão Fundiaria*, the issue of land, and social concerns that its maldistribution presents an enduring injustice and potential economic inefficiency. This section is essential to understanding contemporary DALR because state action has laid the legal foundation that justifies DALR, and state inaction provides the motivation (Sigaud, 2005; Sigaud *et al.*, 2008; Simmons *et al.*, 2007a). After this comes a review of what is currently known about Brazilian DALR, which covers a gamut from intensely political processes prosecuted under the banner of various left-leaning movements, to less organized expressions of individuals uniting to achieve the personalized quest of land acquisition for family production. A presentation of results from field surveys of representative DALR settlements in the Amazon basin follows. Here, the paper's main contribution is made, a description of participants and settlements that provides insight into conditions enabling DALR, as well as DALR demography, farming system sustainability, and formation processes. Specifically, the analysis examines the efficacy of DALR actions to improve the livelihoods of its participants and the potential for land conflict and environmental degradation in the process. This description leads to a discussion of Brazilian DALR, and the introduction of ethnographic information that allows for a nuanced interpretation of survey results. The paper concludes by embedding DALR within the broader societal context of neoliberal Brazil, and the developmental prospects of this powerful movement.

2. BRAZILIAN APPROACHES TO *A QUESTÃO FUNDIARIA*, THE LAND ISSUE

Brazil, motivated by wide concern for rural poverty and justice, has a long historical record of legislation and policies with implications for land distribution dating from the first Land Statute of 1850. These actions, typically prosecuted by the federal government in a centralized manner, we refer to broadly as state-led agrarian reform, or SLAR, which can be grouped within agrarian reform legislation, colonization, and current policies that outline Projetos de Assentamentos (PAs). An extensive literature addresses the history of agrarian reform and colonization efforts (Medeiros, 2002; Santos, 1984; Simmons *et al.*, 2007); here we limit discussion to an emphasis on the manner in which these actions influence contemporary DALR. In particular, agrarian reform legislation provides the institutional incentive for DALR action, while colonization supplies the demographic impetus. The remainder of this section considers contemporary policy that promotes the creation of PAs.

In terms of legislation, *Direito de posse*, first outlined in the Land Statute of 1850, recognized right of land possession if it was put to *productive use*, and sanctioned expropriation and redistribution of unutilized holdings by the state (Fernandes, 2000; Foweraker, 1981; Medeiros, 2002; Santos, 1984, 2001).[1] Since then, a series of constitutional amendments and laws have created ambiguity regarding these rights (Simmons *et al.*, 2007a). Of considerable significance to the emergence of DALR is the constitutional stipulation that all private holdings fulfill their "*social function*," a principle that has diluted the inviolability of private property and allowed for state expropriation of properties for non-compliance. It should come as no surprise that adversaries of present-day DALR narrowly define social function as economic productivity measured by an index limited to crop yields and stocking density, in sharp contrast to proponents of DALR who advance a multidimensional assessment that also includes items such as job creation and local staple food production. For DALR SMOs and the rural poor generally, social function has become convoluted with environmental quality and a just work environment, given newly drafted environmental and labor laws as stipulated in the Land Statute of 1964 and article 186 of the 1988 Brazilian Constitution (Fernandes, 2000; Medeiros, 2002; Simmons, *et al.*, 2002b; Simmons, Walker, & Wood 2002a; Treccani, 2001). The ambiguity in the law and the manner in which it is interpreted by the judiciary has pitted the landless and landowners in a fight that plays out in the courts, as well as on the landscape.

Although Brazil has elaborate legislation enabling the State to expropriate and redistribute land in the name of agrarian reform, it has never chosen to do so through sustained government intervention. Instead, it has substituted policies of colonization to address rural poverty by making unclaimed lands available for settlement and possession. This was especially significant in Amazonia during the early years of the military regime (1964–85), justifying the creation of the Institute of Colonization and Agrarian Reform (or INCRA) charged with organizing and prosecuting these policies, an agency that stands today. INCRA, which possesses the term *agrarian reform* in its very name, has gone through a series of metamorphoses, although most of its institutional history has been devoted to colonization. Colonization efforts were concentrated in the States of Pará and Rondônia, and involved plans that provided a variety of fiscal incentives to attract agroindustry, the construction of a vast highway network to integrate the region with the economic core of the country, the provision of land for small holder colonization, and the creation of a system of central places providing services to the new settlers (Browder, 1988; Browder & Godfrey, 1997; Hall, 1989; Ianni, 1979; Mahar, 1979; Velho, 1972). By the end of the 1970s, however, federal interest in the colonization of Amazonia declined, and efforts shifted to resource extraction, especially mining and timber. That said, the construction of highways and the development of mineral resource extraction,

especially the discoveries of gold deposits, unleashed waves of spontaneous in-migration providing the demographic impetus for DALR to this day.

Democratic change in Brazil restored interest in land reform, which quickly became a top priority for the new government. Economic malaise stymied concerted efforts, however, despite mounting populist pressures on federal government to fulfill longstanding promises about providing land for the poor. In parts of Amazônia, particularly southern Pará State, a low-intensity civil conflict simmered (Schmink & Wood, 1992; Simmons, 2004; Simmons *et al.*, 2007a,b). Perhaps in response to such incidents, which brought Brazil much unwanted international publicity, President Fernando Henrique Cardoso called for the creation of the *Novo Mundo Rural*, a new rural world, through the development of *Projetos de Assentamentos* (PAs), or settlement projects, to be populated by competitive small holders. To bring this about, the landless poor are to first organize themselves in associations and invest their labor power, with government subsequently supporting their efforts through the provision of resources and infrastructure (INCRA, 2000). In effect, this new PA program represented an important shift in agrarian reform efforts from state directed efforts during colonization, to state sanctioned PAs that necessitate and legitimate pre-emptive occupation of land by the landless and their movements (Sigaud, 2005, p. 256).

Cardoso also attempted to introduce a World Bank program for market-led agrarian reform, or MLAR, as an alternative to the inefficient efforts of the State, and as a means to moderate civil conflict (Deininger, 1999; Deininger & Binswanger, 1999; Riedinger, Wang, & Brook, 2001). MLAR is founded on the creation of a Land Bank capable of distributing loans to farmers and necessary mechanisms to support land markets between buyers and sellers with minimal government intervention. Many neoliberal theoreticians, however, criticize the efficacy of such efforts, with some labeling these policies *neoliberal populism* constituting nothing more than the re-packaging of ineffective programs of the past (Bernstein, 2002). From the left, critics maintain that MLAR amounts to a land giveaway to wealthy land owners, which also increases debt loads on the landless poor who were meant to be the primary beneficiary (Borras, 2003; Wolford, 2003). Despite limited claims of success in pilot projects in the South and Northeast of Brazil, MLAR has been eclipsed by DALR in the Amazon. Indeed, agrarian reform following the initial colonization phase is exclusively a direct action phenomenon leading to the creation of PAs.

3. DALR IN BRAZIL AND THE AMAZON

PA formation represents a considerable administrative commitment on part of the Brazilian state. Nevertheless, proactive, state-led programs have been few and far between, and the Brazilian government has largely passed the baton to civil society, thereby creating a momentous opening that SMOs and motivated individuals have exploited to create their own PAs (De Janvry, Sadoulet, & Wolford, 2001; Sigaud, 2005; Sigaud *et al.*, 2008; Simmons *et al.*, 2002b; Simmons, 2005; Simmons *et al.*, 2007a,b). In essence, the rural poor have taken agrarian reform into their own hands by exploiting the land law and the institutional resources made available by legislation. These actions constitute what we refer to as DALR, which to date has created over 7,000 PAs, and homes for about 800,000 families throughout Brazil (MDA/INCRA, 2007). As disclosed at the outset of the paper, Amazônia is increasingly a target for PA formation, presumably given the perceived abundance of land, and the ever-increasing accessibility of its most remote places. Nevertheless, DALR emerged as a notable movement in the southern part of the country in the mid-1980s, as part and parcel of the MST, its largest, most vocal, and most successful advocate to date (Stedile, 1997; Welch, 2006; Wolford, 2003a, 2003b, 2004).

Although MST is surely a notable exemplar of a DALR SMO, it is important to recognize that many other SMOs participate in DALR actions, and that many land reform actions occur with little or no SMO involvement whatsoever. As discussed at the outset, this observation provides an important empirical motivation for the paper, which seeks to describe the forms of DALR presently occurring in Brazil, and particularly in Amazonia. This task first involves an overview of PA creation processes, distinguished by type of DALR as best can be determined from the literature. We then move on to a presentation of survey results, and a description of DALR households, differentiated by the PA creation process. Finally, the results from our analyses, combined with insight gathered from key informant interviews, allow us to elaborate on some important complexities of DALR in Amazonia.

There is much precedence for creating a typology to describe and compare settlement efforts in Amazonia. For our study, we build on the notion outlined by Hébette (2004) that distinguishes processes and characteristics of farmers that settled as part of directed colonization schemes from those that moved into the region later as part of "spontaneous" colonization. However, we limit our focus to strictly those engaged in spontaneous colonization as opposed to state-led efforts. Based on the literature, we further delineate two fundamental forms of DALR in Brazil today, one involving SMO leadership, and the other emerging spontaneously, with little attention to politics or ideology. Thus, the discussion now moves to address each of these, with particular attention to the PA formation process.

(a) *SMO-led DALR*

DALR as a journalistic phenomenon appears mainly to implicate SMOs and their ideological quests. Perhaps for this reason much has been written about SMO-led DALR (e.g., Branford & Rocha, 2002; Fernandes, 2000; Simmons *et al.*, 2002, 2007a,b; Stedile, 1997; Wright & Wolford, 2003). A commonly portrayed case is the MST-style SMO, with a political agenda that goes beyond obtaining land. DALR under SMO leadership involves a coordinated set of actions designed to advance the political agenda as well as to obtain land for the creation of a PA. Mobilization, perhaps ironically, typically occurs in towns and cities, although a significant proportion of participants have migrated from rural locations where they were displaced prior to moving to the numerous frontier towns (Fanelli, 2001; Simmons, 2005; Simmons *et al.*, 2002, 2007a,b; Stedile, 1997; Veiga, 1990). To organize them, militants establish a contact center in the municipal seat, and initiate advertising campaigns *via* posted fliers, radio announcements, and even by loud speakers atop cars, cruising targeted neighborhoods. This organizational phase can last for several months to over a year, during which community leadership emerges and committees essential to PA implementation and governance are formed.

Following this, DALR selects its target property. For MST actions, the *frente de massa* is a key committee including local day labor and farm hands aware of the lay of the land. Often, sympathizers from government agencies such as INCRA provide intelligence about local properties vulnerable to

constitutionally stipulated expropriation. A prime objective of SMO-led DALR is to attack *latifundios*. Thus, the SMOs planning an occupation typically select large private holdings, and accuse owners of failure to comply with the constitutionally mandated *social function*, and, more recently, violations of environmental and/or labor laws as a legal strategy that opens the door to state intervention and expropriation (Simmons, 2005; Simmons et al., 2007a,b; Treccani, 2001). With the target selected, the "occupation" takes place, often in the early morning to avoid detection until such time as a large enough group has assembled on the target. [2] For security reasons, only a few individuals know the location and time of the planned occupation until the last minute when they are called to organize at a pre-determined rendezvous site, and the press is contacted in advance to ensure coverage as a way to avoid violent reprisals by landowners. INCRA, as the agency responsible for adjudicating land claims and conflicts, is also notified.

The final and most frustrating phase involves formal recognition of the PA. Although an SMO can organize and achieve an occupation relatively quickly, formal recognition is another matter given the checks and balances of the legal framework for adjudicating contentious land claims. Recent legislation has complicated the process, and delayed property expropriation and PA approval by years. Specifically, decree MP 2.183-56 enacted by President Cardoso and upheld by President Lula puts a moratorium of two years on INCRA investigations of DALR land claims, when such claims involve the mobilization and mass action as described. Since it is not unusual for DALR actions to involve multiple occupations before an INCRA investigation is even started, PA formalization can easily take over five years, during which the rank and file build a make-shift community, or *acampamento*. These have become familiar architectural features of many Brazilian landscapes, with their iconic black tarp roofs, and their colorful movement flags, whatever the SMO may be. Ideally, the *acampamento* is located on the actual land targeted for DALR appropriation. If physical occupation of the property proves daunting, the SMO may choose a strategic site, such as a roadside visible to passers-by and the media, or even the INCRA compound itself, which gives government workers strong incentives to resolve the claim. All the while, INCRA provides *acampamento* residents with subsistence foodstuffs in a monthly allotment referred to as the *cesta basica*.

INCRA's investigation is based on a *vistoria*, basically an appraisal of property investment and productivity. Herein lies an additional complication in the formalization process—specifically, the way in which productivity is defined. Landowners prefer the *estate productivity index* that was last updated in 1975, which uses explicit measures of crop yield and animal to pasture ratios to indicate a productive property. The DALR advocates, on the other hand, argue that such an accounting method must consider how the property and its productivity benefit the local population in terms of job creation and staple food provisions, which is mandated in the "social function" clause of the constitution. Regardless of INCRA's results, either side can bring the case before the courts to determine the fate of the land, which draws out the formalization process for many more years. Once this phase of the process concludes, and in the event the outcome favors DALR partisans, the property, if private, is expropriated in the state of interest, with compensation for the owner. Now, the actual development of the settlement begins in earnest. Administrative law of INCRA requires that DALR participants form an association and draft a Plan for the Development of the Settlement, or a PDA. This plan outlines a strategy for economic growth, typically based on agriculture but also possibly involving small-scale industrial activities, particularly in the food-processing sector. Once the PDA has been approved, INCRA must provide infrastructure, including roads, housing, schools, and health facilities, in addition to food subsistence with the *cesta basica*. The *vistoria*, development of a PDA, and final approval of the PA draws out the overall DALR process to over ten years in some cases.

SMO-led DALR possesses a significant ideological component. The MST, in particular, pursues a socialist platform, and views the PA as embryonic to the creation of a new, more humane, society. This society, to emerge from the rural areas, is to be based on family farms and cooperatives, meant to pave the way to an equitable industrialization that never loses sight of rural socialist enterprise. The MST organizes revolutionary instruction as part and parcel of its PA formation strategy, and maintains a free "school of political formation" in the state of São Paulo for training militants in movement ideology and rural strategy, in addition to linkages with Brazilian universities that provide participant education in agronomy. A key element of the MST agenda—and that of many other SMOs—involves the promotion of environmental sustainability (MST, 2007). This is to be based on appropriate farming systems, informed by ecology, and concerted efforts to husband environmental resources for future generations of DALR activists who will continue pursuing the various left-leaning SMO agendas. As a mirror to World Bank discourse, DALR SMOs promote the idea that long-run development must depend on sustainable relations with the environment. Whether rhetoric from either camp turns into action with the promotion of more sustainable practices is a topic open to great debate, both within Brazil and the International community.

(b) *Spontaneous DALR*

Although SMOs are very active in Brazilian land reform efforts, other modes of DALR take place without the significant influence of politics, ideology, and organizational forethought. Evidence has accumulated about efforts to spontaneously form PAs as a way to obtain land, a phenomenon of particular import in Amazonia given its land abundance, and the waves of directed and spontaneous migrants who have flocked to the region over the past several decades (Hébette, 2004). Of course, land "squatting" has a long history in Brazil, and in many other parts of the world where the rural poor have limited options (Hébette, 2004). The DALR actions we consider in this section focus on the acquisition of land and creation of a PA as a community venture that conforms to the administrative requirements of INCRA. As such, it becomes eligible for state investments in social overhead capital described in the previous section (Sigaud, 2005).

Research on small holder livelihoods (Caldas *et al.*, 2007; Hébette, 2004; Walker, 2003; Wood, 1983) and private interest road-building (Arima, Barreto, & Brito, 2005; Perz *et al.*, 2008) calls attention to spontaneous colonization with the formation of PAs as a practical afterthought. Spontaneous DALR—to be distinguished from the spontaneous processes considered by Hébette (2004) in its quest to form a state-sanctioned settlement—emerges from the gradual occupation of empty public lands—so-called *terras devolutas*—by on-site residents, without much political forethought or organization. [3] Factors enabling the onset of spontaneous DALR include (1) a prior history of government colonization in the area and (2) the condition of *parentesco*, or the availability of dense familial networks providing organizational and human resources for political struggle (Caldas, 2008; Hébette, 2004).

Thus, spontaneous DALR does not represent the outcome of the quest for a political objective, as shaped by an SMO, but a process of agricultural expansion initiated by prior, state-sanctioned colonization stemming from the 1970s. In contrast to the original colonists, however, spontaneous DALR participants receive little or no government assistance until a PA has been formed, at which time they become eligible for support from INCRA, just as in the case of SMO-led actions. Spontaneous DALR does benefit from local family networks, a source of encouragement, labor power, and human capital for confronting difficulties encountered along the way (Hébette, 2004; Caldas, 2008). [4]

In one stylized description of spontaneous DALR, participants reproduce the original settlement pattern of the government's initial colonization site, by extending the original roads (Perz *et al.*, 2008). This facilitates forest penetration, the demarcation of properties, and recognition of property holdings by INCRA, given the extra-legal occupation has the appearance of an extension of the original, INCRA-sanctioned development. The process begins with a search for land by individuals unknown to each other but with relatives living in the old colonization areas. Once he, or she, has identified a plot, an informal demarcation (*marcação*) of the land is made, reproducing the dimensions of the old colonization areas. Deforestation follows in order to demonstrate "productive" use, a legal precondition for gaining title by the principle of *usocapião*.

With the passage of time, the settlers acting individually form a small community. Once a critical mass has assembled, and developed collective awareness about the institutional opportunities afforded by the land statute, they petition INCRA in order to formalize their settlement, and to take advantage of the legally prescribed investments that follow the declaration of a PA (Caldas, 2008). In many cases the local rural syndicates intervene at this point, acting as intermediaries between the State and the landless (Hébette, 2002; Sigaud, 2005). From this point forward, spontaneous DALR must follow the same procedures as its SMO-led variant, with the development of a PDA, and a legal process alienating the land from public holdings into private ownership. The households also become eligible for the *cesta basica* once INCRA has taken up their case.

As described, spontaneous DALR is non-ideological, and treats the PA formation process in a somewhat opportunistic sense, as a way for individuals to gain access to land. Of course, this is largely the intention of the administrative rulings of Presidents Cardoso and Lula, and the agenda of INCRA, so the participants of spontaneous DALR can hardly be criticized. The lack of ideology stands in sharp contrast to SMO-led DALR, whose organizations may be more interested in the creation of an egalitarian society. Although the formation of spontaneous PAs typically does not involve an explicit ideological component, individual participants of course possess their own political notions and agendas, which can include concern for environmental sustainability. PDAs, in turn, are likely to reflect developmentalist rhetoric, which has grown increasingly green since the Rio Summit of 1992. That said, politics, environmental or otherwise, are not so pronounced and evolved as with SMO-led DALR.

In sum, both SMO and spontaneous DALR involve individuals acting to force the government to follow through on its promise of agrarian reform, both have among their primary objectives the acquisition of land and title for participants, and both require some degree of organization in order to meet these objectives. The key distinguishing feature between the two is the manner in which the initial occupation takes place and the point at which the participants organize. Specifically, SMO-led DALR settlements are initiated with a premeditated "occupation"—the almost overnight settlement of land, or invasion as the landowner might see it—necessitating an organized front. In contrast, spontaneous DALR is initiated only after a gradual and sporadic occupation has achieved a critical mass of settlers, capable of asserting social force.

4. THE EMPIRICS OF DALR

The discussion to this point has provided an overview of DALR processes, and suggests two basic modes, SMO-led and spontaneous. The paper now moves to field-based description, and presents results from survey research undertaken in the summer and fall of 2006. This research, motivated in part by the snapshot of DALR just presented, elaborates a set of hypotheses about distinctions between the SMO-led and spontaneous DALR. Hypotheses are now stated, and tested using survey-based field data and inferential statistics. The results are followed by a brief presentation of key informant ethnography. As will become apparent, DALR must be elaborated beyond the two types presented to this point in order to ultimately provide a comprehensive description.

(a) *Survey of DALR participants*

The literature suggests several key distinctions between SMO-led and spontaneous DALR that are now subjected to statistical investigation. Specifically, these modes of land reform differ in terms of (1) origins of participants, (2) procedures implemented for the selection of target properties, with implications for land conflict and deforestation, (3) access to capital and economic resources more generally, and (4) engagement with environmental sustainability concerns. With these differences in mind, we specify the following hypotheses.

Hypothesis 1 (Hyp-1) is that SMO-DALR involves mobilization of urban residents, unlike spontaneous DALR partisans, who are primarily rural.

Hypothesis 2 (Hyp-2a) states that SMO-DALR targets private holdings, and spontaneous DALR, unoccupied public lands, so-called *terras devolutas*. Property selection has serious implications for both land conflict and deforestation. Thus, hypothesis 2b (Hyp-2b) asserts that SMO-DALR is more likely to result in violence than spontaneous DALR for the simple fact that proprietors have strong incentives to defend their properties, and a constitutional right to do so. Hypothesis 2c (Hyp-2c) anticipates more deforestation in the aftermath of spontaneous DALR given the land targeted for occupation is likely to be forested.

Hypothesis 3 states that PAs formed by SMO-DALR will have developmental advantages due to deeper veins of social capital, and leaders savvy about pressuring INCRA to fulfill administrative obligations prescribed by law. Thus, we anticipate that participants in SMO-DALR, relative to their counterparts in spontaneously formed PAs, will experience livelihood improvements (Hyp-3a), quicker land titling (Hyp-3b), and superior access to credit (Hyp-3c) and agricultural extension assistance (Hyp-3d), all of which have been identified as essential ingredients for "development" success.

Hypothesis 4 claims that settlers in SMO-DALR settlements implement more highly productive agricultural practices given increased access to technology and inputs either directly from the SMO, or as a result of their ability to pressure the government for assistance. This will hypothetically manifest in pronounced usage of agricultural inputs including fertilizers,

pesticides, and herbicides (Hyp-4a); although not environmentally advantageous, such agronomic inputs would allow for higher yields. We also anticipate greater exposure to sustainable farm management techniques given greater environmental emphasis of many SMOs and increased access to extension, such as fallow management (Hyp-4b), contour farming, (Hyp-4c), green manuring, (Hyp-4d), terracing, (Hyp-4e), crop rotation (Hyp-4f), and mulching (Hyp-4g). These practices, shaped by the ideological drivers of movement rhetoric and programs, should reduce rates of fertility decline on SMO-led PAs (Hyp-4h) and reduce the incidence of wildfire contagion relative to the spontaneous case (Hyp-4i).

(b) *The survey and study areas*

The data used to consider the above-mentioned hypotheses were collected by field surveys conducted in the summer and fall of 2006. The survey, which assembled information for 751 DALR families, was administered in 26 settlements in Pará and Rondônia, two states with extensive development histories, and extremely active contemporary land reform movements (Table 2). The Pará sites focused on the so-called South of Pará, an area long notorious for contention over land, and the Transamazon Highway (BR-230) in the central part of the state, the region of the first PIC implemented in the early 1970s. The PAs visited in Rondônia came from all over the state, given its relatively small size and the quality of its highway system as compared to Pará. Of the 26 settlements visited in both states, 14 were SMO-DALR PAs, and 12 of them were spontaneous PAs (Figure 1 and Table 2). Classification by type of PA was made on the basis of key informants from INCRA, other government workers, and settlement residents. The main distinguishing characteristic, as stated above, was the way land was settled, either through planned SMO *occupation* in the case of SMO-DALR, or gradual and spontaneous small farmer settlement as we see in spontaneous DALR. Survey participants were identified by the opportunistic methods described in Caldas *et al.* (2007), which seeks geographic coverage and representativeness.[5] Representativeness of the survey sample is probably also guaranteed by sample size, given over 700 of the target population of about 4000 DALR households (Table 2) provided responses.

(c) *Methodology*

The survey instrument gathered household-level information on demographic history, farming system and agricultural practices, durable goods possession, and DALR experience. With respect to demographic and personal data, the instrument queried respondents about household structure, migration history, social and political networks, and personal background in DALR and land conflicts. Although settlement histories for each site enabled classification into the two categories identifiable in the literature, contemporary DALR in the Amazon, and Brazil more generally, is a process whose complexity is concealed by a simple, binary typology. Despite complexity within DALR types, this classification still holds for the purpose of analysis. A closer examination of DALR processes is aided by our subsequent key informant interviews that detailed settlement histories, to be discussed in the section that follows.

For Hyp-1, we use data derived from a question in the migration history component of the survey that explicitly

Table 2. *Study sites, settlements name, and DALR type*

Settlement	Municipality	Type of DALR Tactic	Year INCRA recognized	Families settled
Pará				
Transamazon:				
Rio do Peixe	Uruará	Spontaneous	10/25/1995	241
Surubim	Médicilândia	Spontaneous	5/18/1988	1344
Rio Trairão	Uruará	Spontaneous	10/7/1997	160
Tutuí Norte	Uruará	SMO-led	10/29/1999	341
Uirapurú	Uruará	Spontaneous	6/10/1997	252
Southern Pará				
17 de Abril	Eldorado dos Carajás	SMO-led	6/19/1997	688
1 de Março	São João do Araguaia	SMO-led	6/15/1998	349
Alegria	Marabá	SMO-led	12/9/1999	95
Castanhal Araras	São João do Araguaia	SMO-led	8/4/1987	83
Canudos	Eldorado dos Carajás	SMO-led	8/16/2004	56
Cabanos	Eldorado dos Carajás	SMO-led	3/7/2003	81
Palmares II	Parauapebas	SMO-led	12/13/2001	286
Santa Maria do Pontal	Eldorado dos Carajás	SMO-led	7/14/1997	67
Rondonia				
Asa de Avião	Machadinho D'Oeste	SMO-led	7/28/1999	69
Cautarinho	São Francisco do Guapore	Spontaneous	8/30/2002	213
Chico Mendes I	Presidente Medici	SMO-led	5/30/1997	67
Guarajus	Corumbiara	SMO-led	12/29/1995	124
Joana D'Arc I	Porto Velho	Spontaneous	6/9/2000	289
Joana D'Arc III	Porto Velho	Spontaneous	6/9/2000	495
Jose Carlos	Vale do Anari	SMO-led	5/5/1998	47
Marechal Rondon	Nova Mamore	Spontaneous	12/5/2002	64
Oriente	Buritis	Spontaneous	11/20/2000	93
Pedra Redonda	Machadinho D'Oeste	Spontaneous	12/29/1995	145
Primavera	Theobroma	SMO-led	9/18/1997	262
Rosana Lecy	Nova Mamore	SMO-led	11/28/2001	81
Serra Grande	Costa Marques	SMO-led	8/14/2001	120

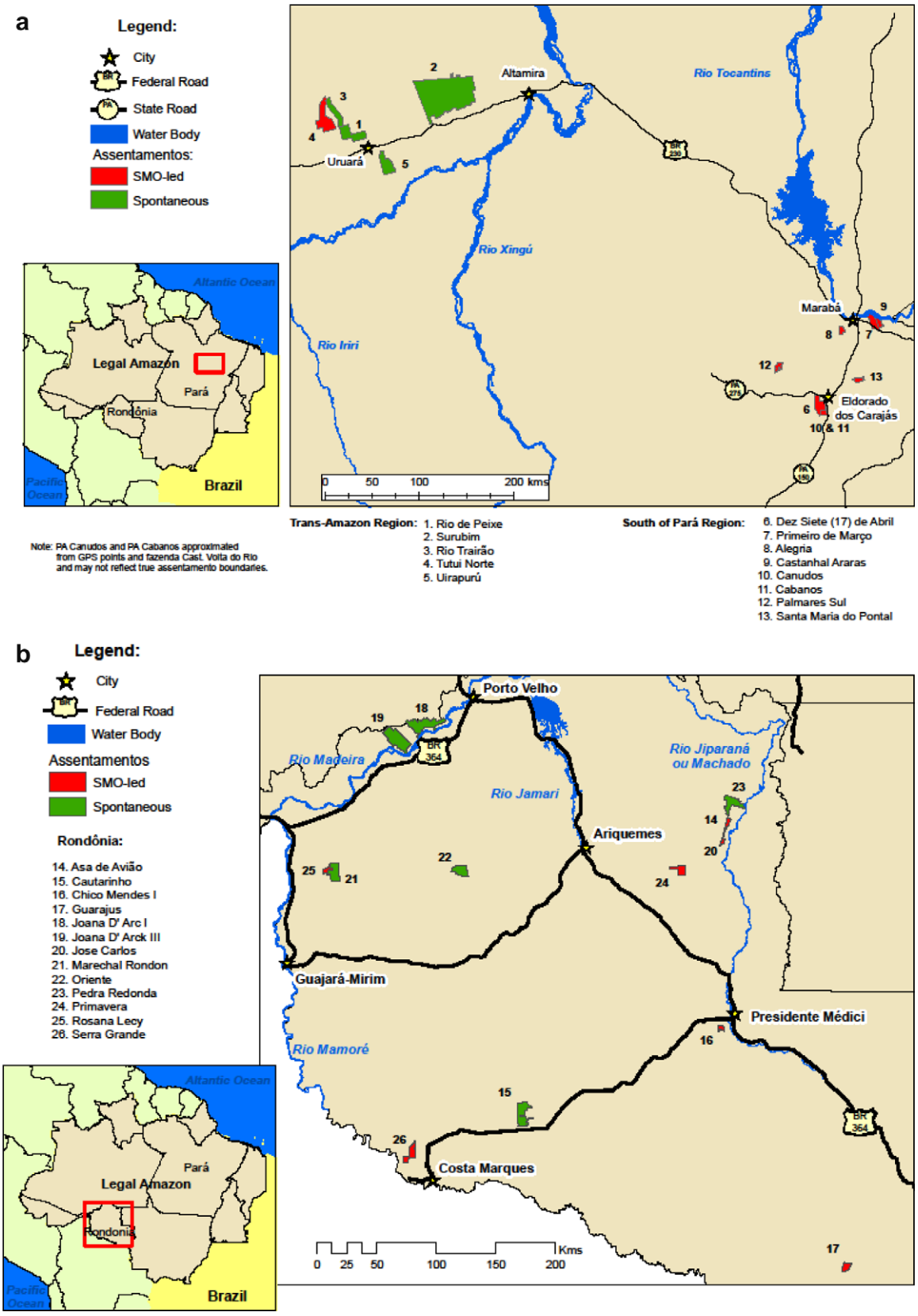

Figure 1. *(a) Assentamento study sites in Pará. (b) Assentamento study sites in Rondônia.*

asked whether the respondent lived in an urban or a rural site prior to moving to their current residence. To address Hyp 2a and 2b, we use data derived from questions that asked the respondent to identify if the land they occupy was previously

private or public, and whether they experienced conflict when they settled their land. For (Hyp-2c), we use data derived from the questionnaire that explicitly asks the percentage of land cover in forest at time of occupation, which gives us percentages for comparison.

In order to assess (Hyp-3a), that settlers in SMO-DALR settlements experienced greater improvements in wealth than spontaneous settlements, we followed precedent set by Walker, Perz, Caldas, and Silva (2002) and Caldas *et al.* (2007), using data derived from the surveys that reveal the ownership of an array of durable goods that correlate well to wealth (Morris, Carlleto, & Hoddinott, 2000).[6] Because we did not have prices of the goods, we did not create a single monetary value (Junming, 1997; Morris *et al.*, 2000), and rather than imposing a weighting scheme, we chose categories that could be used to define dummy variables (Menon, Ruel, & Morris, 2000; Weil, 1989). Four wealth categories were created ranging from 1, the poorest cohort, to 4, the richest. This was done for two time periods: (1) at time of arrival on the settlement, and (2), at the time of the interview (see Tables 3a and 3b). We next create an improvement variable that indicates whether the households moved up in wealth category, reflecting improvements in rural livelihood (see Table 3c), and use it in the analysis to examine whether a statistically significant difference between DALR type exists. Walker et al. (2002) and Caldas *et al.* (2007) used such categorical data successfully in statistical analyses similar to the one presented here.

To test Hyp-3b through 3d, we used binary (y/n) response information derived from questions on the surveys that query whether respondents received title, credit, and agricultural extension. Finally, to test whether settlers in SMO-DALR settlements have greater access to agricultural technology (Hyp-4a–g), we use responses from a variety of questions on the survey that illicit, yes or no, whether respondents used the agricultural practice. We also measured sustainability in terms of (yes or no) whether the respondent experienced (Hyp-5a) decline in land fertility and/or (Hyp-5b) exposure to wildfire.

(d) *Results and discussion*

As for general characteristics of the survey households and their farming systems, Table 4 shows them to be similar in terms of age (~45 years) and education level of household head (~3 years), number of co-resident family members (4.5), extent of market engagement, and consumption dependence on the production of annuals. Length of occupation of rural property is statistically different between the DALR types, although not substantial, and close to 8 years in both cases. The size of holding does differ meaningfully, with average properties on spontaneous PAs at 77 ha, almost twice as large as those found on the SMO-led settlements (41 ha). In terms of farming systems, the data show comparability, with diversification across annual crops (corn, rice, manioc, and beans) and perennials (coffee, cocoa, pepper, and banana). Nevertheless, households in spontaneous DALR settlements are more heavily engaged in perennials, particularly cocoa. They also have more cattle, 35 compared to 21 head in SMO-led settlements, although the difference is not significant and pastures are about the same in both cases.

Table 3a. *Wealth categories at arrival*

Wealth category at arrival	Spontaneous DALR	SMO-DALR	Total
1	187 (48)	203 (52)	390
2	73 (47)	84 (54)	157
3	57 (41)	82 (59)	139
4	21 (57)	16 (43)	37
Total	338 (47)	385 (53)	723

Notes: Wealth was defined on specific durable goods possession as queried in the survey.

Table 3b. *Wealth categories at time of interview*

Wealth category at interview	Spontaneous DALR	SMO-DALR	Total
1	77 (59)	54 (41)	131
2	107 (55)	86 (45)	193
3	119 (37)	207 (63)	326
4	39 (51)	37 (49)	76
Total	338 (47)	385 (53)	723

Notes: Wealth was defined on specific durable goods possession as queried in the survey.

Table 3c. *Wealth change, from time of arrival until time of interview by DALR type*

Development status over time of moves		Spontaneous	SMO
Stayed the same		171	156
Total % same		52%	42%
Improved			
	1	74	91
	2	55	99
	3	11	9
Total % improved		42%	53%
Declined			
	−1	15	15
	−2	3	2
	−3	1	0
Total % declined		6%	5%
Total = *n*		330	372

Testing the hypotheses on key distinctions between SMO-led and spontaneous DALR involved inferential statistics (i.e., chi square and *t*-tests), with results given in Table 5. As for Hyp-1, findings confirm that participants in SMO-DALR are more likely to come from urban areas given the prevalent strategy of SMO mobilization, with 41% of SMO-led DALR participants coming most immediately from urban areas, as compared to 25% for the spontaneously acting individuals. Results also support our expectation in Hyp-2a that settlers in SMO-led DALR settlements more often target private property (73%), while settlers in spontaneous DALR seek public lands (59%). However, we did not find support for our subsequent hypothesis, Hyp-2b, that because they target private land, settlers in SMO-led DALR experience more conflict than spontaneous DALR settlers. This is likely explained by the high residential turnover in SMO initiated PAs; data showed that 54% of the respondents in SMO-led PAs were not the original settlers on the land, compared to 46% in spontaneous DALR PAs.[7] Nevertheless, key informant interviews with long time residents, SMO leadership, and public officials, tell a tale of contentious land struggle in SMO-DALR sites specifically, which is supported with secondary sources such as local newspapers and CPT accounts that give detailed reports on violent conflict. Finally, testing on Hyp-2c supports the hypothesis that spontaneous DALR settlers have a greater potential for deforestation, given they occupy heavily forested lands, with an average of 91% under forest cover at time of occupation. Regardless, impact on forests by settlers in SMO-led DALR cannot be dismissed, given that average forest area at time of occupation is still high, at 80%.

Table 4. *Descriptive characteristics of settlements and households*

	Full sample mean (Std. Deviation)	SMO-DALR mean (Std. Deviation)	Non-SMO-DALR mean (Std. Deviation)
A. Households characteristics			
Age of household head (yrs)	44.55 (13.00)	45.20 (12.66)	43.80 (13.37)
Length of land occupation (yrs)*	7.81 (5.45)	7.27 (3.91)	8.44 (6.77)
Day labor bought*	15.49 (45.93)	17.54 (39.75)	13.09 (52.16)
Day labor sold	17.08 (52.58)	13.89 (47.97)	20.47 (56.96)
Number of people on property	4.52 (2.81)	4.50 (2.71)	4.55 (2.94)
Number of families on property	1.10 (0.42)	1.09 (0.37)	1.11 (0.47)
Education Household head (yrs)*	3.01 (2.62)	2.76 (2.36)	3.31 (2.88)
Consumption characteristics (%)			
Corn	53.59 (0.50)	56.10 (0.50)	50.71 (0.50)
Rice	52.39 (0.50)	54.86 (0.50)	49.57 (0.50)
Manioc	51.06 (0.50)	50.62 (0.50)	51.57 (0.50)
Market engagement (%)	56.76 (0.50)	57.18 (0.50)	56.29 (0.50)
B. Farm system characteristics			
Mean property size (ha)*	57.82 (57.10)	41.43 (25.31)	76.97 (75.15)
Annuals			
Corn (ha)*	1.10 (3.96)	0.95 (1.43)	1.26 (5.59)
Rice (ha)	0.96 (1.54)	0.95 (1.45)	0.97 (1.63)
Manioc (ha)	0.56 (1.26)	0.56 (1.21)	0.55(1.31)
Perrenials			
Coffee (ha)	0.68 (12.30)	0.61 (1.74)	0.76 (2.80)
Cocoa (ha)*	1.81 (7.45)	0.55 (3.43)	3.26 (10.09)
Banana (ha)	0.43 (2.37)	0.52 (3.07)	0.32 (1.10)
Cattle (heads)	28.92 (58.79)	23.41 (35.83)	35.18 (76.58)
Pasture area (ha)	22.60 (51.35)	21.35 (50.59)	24.01 (52.25)

Notes: Inferential statistics were performed on the indicators (chi-square and difference of the means as appropriate). Variables in bold with an * indicate significance at the .05 level.

Table 5. *Development and Sustainability Indicators, by DALR type*

	Full sample	SMO	Spontaneous
A. Settlement characteristics			
Hyp-1 Last residence—urban (%)*	34	41	25
Hyp-2a Land targeted for occupation*			
Private (%)	43	73	9
Public (%)	36	15	59
Hyp-2b Land conflict (%)	5	6	4
Hyp-2c Forest at time of occupation (average% in forest)*	86	80	91
B. Development indicators			
Hyp-3a Improvement livelihood (%)*	45	53	42
Hyp-3b Title security (%)*	62	48	77
Hyp-3c Credit (%)*	64	71	56
Hyp-3d Agricultural extension (%)	18	17	20
Top 3 sources	Cooperative EMATER INCRA	EMATER INCRA Cooperative	Cooperative CEPLAC EMATER
C. Agricultural technology			
Hyp-4a Inputs (%)**	5.5	3.6	1.9
Hyp-4b Years fallow (yrs)	1.3	1.4	1.2
Hyp-4c Contour farming (%)	3.8	4	3.5
Hyp-4d Green manure/plant cover (%)	12	13.7	10.6
Hyp-4e Terracing (%)	3.8	4.6	2.9
Hyp-4f Crop rotation (%)*	14.8	19.4	9
Hyp-4g Mulch cover (%)	10.4	9.2	12
D. Sustainability indicators			
Hyp-4h Decline in land fertility (%)	37	39	34
Hyp-4i Exposure to wildfire (%)*	45	50	38

* Statistically significant at .05.
** Statistically significant at .10.

The data analyses show a statistically significant effect on livelihoods as posed in Hyp-3a, with 53% of settlers in SMO-led sites improving their circumstances compared to 42% for spontaneous settlers. These results are further elaborated in Tables 3a, 3b, and 3c, which provide additional information on the dynamics of durable goods possession, showing that more households in spontaneous DALR sites experienced no change or a decline in wealth status compared to SMO-DALR participants. As for differences in access to title, credit, and agricultural extension, the results are mixed. Our findings reveal a statistically significant difference with respect to tenure security, Hyp-3b, but they contradict expectations, with a larger proportion of settlers in spontaneous settlements (77%) having title, as compared to those living in SMO-led DALR sites (42%). The reason for this may be SMO strategy. According to a number of key informants in SMO settlements, they prefer not to get title because that signifies the final stage of INCRA support, at which time the households are no longer eligible for *cesta basica* and other subsidies.[8] With regard to credit, Hyp-3c, results are statistically significant and agree with expectations that SMOs facilitate access.

Findings from the analysis of differences for Hyp-3d regarding access to agricultural extension were not significant, with nearly 20% of all households across DALR types receiving some form of agricultural extension. However, there is a substantive difference in terms of which organizations supplied this service for which DALR type. For SMO-DALR settlements, agricultural extension was primarily provided by government services, most importantly the State agency *Empresa de Assistência Técnica e Extensão Rural* (EMATER) and INCRA, followed by local cooperatives contracted by the local rural syndicates. In contrast, spontaneous DALR residents more often received extension from local cooperatives, followed by government agencies such as the *Comissão Executiva do Plano da Lavoura Cacaueira* (CEPLAC) and EMATER. The spontaneous DALR residents rarely mentioned receiving assistance from INCRA. In general, this gives some support to our hypothesis that SMOs are better able to pressure the government for services that benefit residents in their settlements.

Finally, with respect to measures of agricultural technology and sustainable practices (Hyp-4a–4i), results show statistically significant differences for inputs, crop rotation, and wildfire exposure. Findings for both inputs and crop rotation are consistent with hypothetical statements, with SMOs evidently managing to (1) acquire capital inputs to increase farm productivity, which may or may not be sustainable, and (2) employ green farm practices, in particular crop rotation that is used by nearly 20% of the SMO-DALR households surveyed. The application of green manure and mulch cover are also important techniques used by DALR households, with no significant difference between the DALR types. The sustainability result for fire, however, does not conform to expectations, a problem that appears more prevalent in the SMO-led settlements. In terms of land fertility declines, over one-third of households sampled said this was a problem, although no significant differences emerged.

In summary, analyses support a number of hypothesis statements. SMO-led DALR tends to promote relative wealth accumulation, and their farming systems are somewhat "greener" than spontaneous actions, with less settlement in areas of primary forest and greater reliance on agricultural inputs. That said, SMO-led PAs experience more wildfire, a critical concern in present-day Amazonia. As for wealth accumulation, it is important to point out that members of spontaneous settlements also experience wealth accumulation. That DALR participants in general appear to improve their life circumstances probably explains the widespread and aggressive nature of the movement. Perhaps ironically, but also in concert with expectations, large numbers of settlers in SMO-led PAs show urban residency prior to PA formation. Of course, such individuals are likely to have started out in rural areas, and where they lived immediately prior to DALR involvement often indicates a chain of circular migrations with return flows to the rural environment. In other words, DALR, and specifically its SMO variant, has the potential to instigate migration flows in reverse of the pervasive tendency of rural to urban movement that generally occurs with economic development.[9] In fact, a preliminary assessment of the data does indicate a significant difference with greater circular migration (rural–urban–rural) in SMO-DALR, supporting hypothetical assertions made earlier by Simmons *et al.* (2002b) and Simmons *et al.* (2007b). Such a migratory phenomenon possesses implications for the Amazonian forest, since much of the land occupied is forested (Fearnside, 2001; Simmons *et al.*, 2002b; Simmons, 2005).

(e) *Complexities in the PA formation process*

Evidently, the DALR categories as elaborated are instructive with respect to attributes of household and farming systems, and useful for distinguishing SMO from spontaneous DALR in an effort to examine rural livelihood improvements, as we demonstrate in the previous section. However, the typology does not reflect the nuanced differences that emerge in the formative processes within settlements in each DALR category. From a broader policy perspective, understanding how PAs come into existence is a key part of the story, and a principal goal of the paper. To this point, we have advanced from the literature a sharp contrast between SMO-led PAs on the one hand, and the spontaneous version on the other hand. This provides an intelligible distinction, with exotic SMOs importing a confrontational politics of occupation at one extreme, and local residents seeking their own opportunity *via* manipulation of the state, on the other extreme.

Nevertheless, the empirical processes of PA implementation present more complexity than described, and here we identify a select number of distinguishing features that contribute to a more nuanced understanding of DALR in Amazonia. Since the rank-and-file participants have little information on implementation, we draw on insight gained from key informant interviews in a re-creation of settlement histories. Two specific issues are paramount in this regard. One involves what we shall refer to as *locational contingency*, and the other, *hybridity* in the political forces—and agency—that set in motion and sustain the PA formation process. As for the locational issue, property targeting and DALR action, particularly with SMO-led actions, may bear a highly contingent relation to where the PAs are ultimately established. Specifically, there is not a necessary correlation between site of occupation and site of a new PA; in fact, the occupation may not be the precipitate factor to PA creation. A rather dramatic example is provided, perhaps ironically, by PA *17 de Abril* in southern Pará formed in response to the massacre in Eldorado dos Carajás in 1996.

This PA, organized by the MST, involved almost every tactic endorsed by the larger landless movement from occupations of the desired land and public buildings, encampments on roadsides, to well-publicized protests, marches and road blockades. Success, however, was unintentional, at least with regard to the precipitating event that led to the expropriation of Fazenda Macaxeira. In fact, it was the un-intended consequence of the road blockade and the subsequent massacre of

19 landless workers by the military police that led to the creation of this and many other settlements across the Amazon and the Brazilian countryside. In particular, the international and national press coverage of the events that transpired that tragic day were far-reaching, with an exposé in the New York Times, for example. The outcry in response to the bloody images of bodies on the roadside forced the government to respond to the needs of the landless, and consequently, several PAs in the immediate vicinity of Eldorado dos Carajás were established within the year, PA *17 de Abril* among them. [10]

Thus, DALR actions, particularly those precipitating violent response by the state or land owners, can have significant spillover effects, and the PA formation process may not unfold as planned by an SMO or individuals pursuing DALR. Specifically, targeted properties do not always fall to direct action tactics, particularly in the case of private lands judged productive by the relevant authority. In such circumstances, which are relatively common, INCRA seeks to provide alternative sites for settlement. Although the case of Eldorado dos Carajás is by far the most famous example of the intersection between violence and DALR pursuant to the desire to create a PA, an almost identical incident transpired the previous year in Curumbiara, Rondônia, with a military assault on an encampment on Fazenda Santa Elina that left 12 people dead, nine missing, and hundreds wounded. In its aftermath, the government promised to provide the surviving families land in a number of newly created settlements in the vicinity, several of which are included in our sample. [11]

Another empirical situation that does not meet our initial presentation involves the admittedly simplistic two-way categorization into SMO-led and spontaneous DALR, and the assumptions that SMO-DALR is initiated by an extra-local SMO, in contrast to endogenous agricultural expansion processes that unfold in spontaneous DALR. Specifically, DALR may reveal hybridized processes involving a diverse mix of actors, radical leadership that emerges endogenously, not *via* exotic import, and state *agency*, as when government officials, sympathetic to the landless, provide their knowledge, expertise, and support to SMOs and/or individuals seeking land. The PA Tutuí Norte, an SMO-DALR PA in the study area along the Transamazon Highway in the State of Pará, provides a good example here. [12]

The creation of this PA was instigated by an occupation of a ranch that was targeted not for expropriation, but simply as a means to force INCRA to provide the participants land, somewhere. The 30 families that participated in the occupation previously lived on another PA in the vicinity, PA *Rio do Peixe*—a spontaneous DALR PA—, from which they were evicted by INCRA and forced to move to town because the land lacked water. As it turns out, their leader, Senhor Gustavo, was a former employee of INCRA and therefore knowledgeable about the land statutes and administrative obligations of the agency he had worked for. To initiate DALR, Mr. Gustavo enlisted the local rural syndicate in the nearby town of Uruará (Figure 1a) for political support and assistance in mobilizing the urban landless for the occupation. Once the families occupied the property, its owner appealed to INCRA, at which point Mr. Gustavo indicated the occupied property was not large enough for their purposes. That is, their DALR actions were actually meant as a tactic in a longer-term negotiation with INCRA for a sizeable parcel. After more than a year, they succeeded with the establishment of PA *Tutuí Norte* on 34,000 ha of government land along the Tutuí River, taking on a shoe string shape so that all residents have access to water.

Finally, spontaneous DALR also reveals hybridity, with processes that do not always conform to the unplanned, unorganized, and endogenous settlement evolution elaborated in our typology. To the contrary, the vast majority of settlers in spontaneous DALR PAs across the study region were immigrants from the Northeast, and many received help in the initial stages of settlement from a diverse set of actors located outside their social network of family and friends. In several PAs, the rural syndicate working in conjunction with INCRA advised the participants on the best location for settlement in order to increase their likelihood of receiving title. Settlement histories also revealed a precarious relationship between settlers and loggers, with initial occupation triggering conflict over resources, but later turning into mutual exchange, whereby loggers built roads and supplied housing materials for settlers and, in return, the settlers gave them access to the wood from their land claim, lending legality to their illegal operations.

In sum, the initial categorization of DALR outlined at the outset is subject to internal complexity and variation. For instance, PAs are not necessarily created on the land that was originally targeted for expropriation, DALR evidently involves a broad cross-section of society, and actors in unexpected, difficult-to-theoretically-delineate, roles, and familial networks provide support but do not alone determine success of DALR. Nevertheless, the final distinction between SMO and spontaneous-led DALR is both empirically useful and valid. The ultimate distinction revealed by the ethnographic study is that the SMO-led actions shape the entire DALR process from land occupation to PA formalization; whereas the spontaneous variant involves the occupation of land by like-minded individuals in an unplanned and independent fashion, and only later in the process do participants come together to create the INCRA-mandated association.

5. CONCLUSIONS

The main objective of this research was twofold. The first was to develop a comprehensive understanding of DALR in the Brazilian Amazon, which is a new and growing post-development strategy to bring economic and social justice to the rural hinterlands, beginning with equitable land access. The second was to examine the impact of DALR on the livelihoods of participants, and the potential implications for the environment and land conflict. In order to address these issues we performed a cross-basin study involving both in-depth key informant interviews at national, regional, and local scale and 751 comprehensive household surveys in 26 settlements across the study region. In doing so, this study represents one of the first examinations of Brazilian DALR, as well as one of the few large-scale household surveys done at the cross-basin scale. As such, the findings from this research could have far-reaching policy implications for other regions and countries facing populist discontent with land inequality and their own form of DALR movement.

In general, we have found that DALR involves a complex and heterogeneous set of processes, although each settlement can be classified as either SMO-led DALR or spontaneous DALR depending on whether it was initiated by an occupation. Nevertheless, within each category exists a great deal of diversity, which is important to consider in the overall examination. When it comes to SMO-led DALR, our case revealed the collaboration of a multitude of actors including informal and formal social movements active at a variety of scales, from endogenous populist action spearheaded by a charismatic farmer to coordinated events initiated by national and international organizations. Indeed, the landless struggle in the Ama-

zon today involves a myriad of social movements, such as the Movimento dos Camponês de Corumbiara (MCC), an endogenous SMO that split with the MST, and others such as the Ligas Camponesas, Movimento Luta de Terra, Movimento dos Pequenos Produtores, each with their respective ideologies.

The examination of spontaneous DALR settlements revealed that our initial description did not always hold. In particular, settlers were often immigrants from the Northeast of Brazil who moved to the region in search of land to farm, and not from the local area as suggested in the demographic lifecycle. In many respects, this form of settlement resembles the initial wave of colonization, although these settlers do not have the same degree of subsidies and support by the government in the initial phase of occupation as the colonist farmers did in the early years. Instead, they rely on support from a vast network of family and friends. Key informants gave evidence that would suggest a process of chain migration and channelization is at work, connecting places in the Northeast through kin relations to specific sites in the basin, and, thereby, creating and recreating socio-economic and environmental conditions. Given the importance of social networks and chain migration to the success of spontaneous DALR settlements, these phenomena merit greater attention and future research.

While our research shows great diversity in DALR settlements, the households living in these PAs across the study region are quite similar. The typical head of household was born in the Northeast of Brazil, is middle aged, and supports a family of four. The main economic activity is farming, with an emphasis on rice, corn, manioc, and beans for consumption, and cattle and perennials for market. In general, farmers across the sample, regardless of whether they live in SMO-led or spontaneous DALR PAs, use the same agricultural technology and land management practices. Nevertheless, there were important differences. As we hypothesized, many settlers in SMO-led DALR sites came from urban areas and targeted private land for occupation, compared to settlers in spontaneous DALR PAs who more often came from rural areas and targeted forested land, each having potential impacts on land conflict and the environment.

When it comes to development, measured in terms of improvement in wealth, and access to title, credit, and agricultural extension, we expected residents in SMO-led DALR settlements to have better outcomes given greater access to political and social capital, and the subsequent power wielded by SMOs necessary to pressure the government for support. For the most part, this hypothesis was upheld by our research, particularly in terms of wealth improvements and access to credit. We found no statistically significant difference between participants in the two types of DALR PAs in terms of access to agricultural extension, although an assessment of the source of extension revealed that SMO-led DALR participants received the vast majority of assistance from the government, specifically INCRA. To the contrary, spontaneous DALR participants received negligible assistance from INCRA or any other government agencies for that matter, and this was the biggest complaint expressed by spontaneous settlers.

In a similar vein, we expected that SMO-led participants would have greater access to technological inputs and education on ecologically sound agricultural practices. As a result, we expected that their farming systems would be more productive and perhaps more sustainable than farmers in spontaneous settlement sites, leading to less fertility decline and accidental fire damage. However, the results from the analyses were not so clear. We did find that participants in SMO-led DALR sites did have greater access to inputs (i.e., fertilizer, pesticide, and herbicide), although across the sample the number of farmers using such inputs was less than 5%. Likewise, only a small fraction of farmers practiced the agricultural technologies identified. Of greatest importance was crop rotation, which was used by twice as many farmers in SMO-led DALR PAs than those living in spontaneous sites, nearly 20% of the sample. Two other practices, green manure (12%) and mulch cover (10%), were used by farmers equally across the sample. When it comes to sustainability, there was no statistical difference in the number of respondents reporting fertility decline, which revealed that across the sample more than a third experienced such degradation. Furthermore, contrary to expected outcomes, we found that settlers in SMO-led DALR PAs experienced greater accidental fire than those living in spontaneous DALR sites.

These apparent contradictory outcomes may reflect the inability of individuals living in SMO-led DALR PAs to maintain the political and social capital in the long term. Specifically, SMOs are successful at short-term organization and mobilization of people and resources prior to settlement formalization, when the precipitate factor to the struggle is still unsatisfied, and consequently, the settlers receive the immediate benefits for development. At the same time, it may also reflect their inability to maintain cohesion within settlements for the long term necessary for sustainability. This may explain widespread accounts of accidental fire in SMO-led sites, which led to damage of crops, equipment, and housing (Simmons, Walker, Wood, Arima, & Cochrane, 2004). Concern regarding the lack of social capital and organizational capacity was likewise expressed by respondents and key informants in the spontaneous sites, who explicitly stated that the associations created in accordance with INCRA regulations at the beginning of the formalization stage were basically non-existent today despite continued and pressing need.

Also important for consideration is the impact of DALR on land conflict. Specifically, SMO-led DALR targets private land for occupation, and the expectation is that this is likely to lead to contentious encounters between the landless and landowners. Despite the fact that our research showed no statistical significance in the prevalence of land conflict at time of occupation between SMO and spontaneous DALR, news accounts on an almost daily basis lend evidence to the fact that it is occurring. As noted earlier, more than 1,500 landless workers have been killed in the struggle, and in the recent years there has been an increase in violence (CPT, 2008). The prime objective of the larger landless movement is the eradication of *latifundios*, and the *occupation* of private holdings is the tactic of choice, which generates contention and violence whether as an externality of action or as part and parcel of the overall strategy. [13]

In terms of potential environmental impacts, our research shows that settlers in SMO-led and spontaneous DALR settlements target forest due to the protection it provides by the cloak of the canopy and the initial capital garnered from sale of valuable hardwoods. While spontaneous DALR is likely to have a greater impact on primary forest at the edge of the agricultural frontier, SMO-led DALR may result in a second wave of deforestation on the once hollow frontier (Simmons *et al.*, 2007b). Given the high rate of turnover in these settlements, it is likely that some residents abandon their land and return to nearby frontier towns in search of employment. There, these newly landless migrants may once again be recruited by the landless movement and return to the rural areas, initiating a new cycle of deforestation. Indeed, Brazil now recognizes DALR settlement formation as a significant deforestation driver. That said, we wish to re-emphasize the greater

impact that other actors, particularly large-scale ranchers, have on the Amazonian environment. Although we recognize the potential impacts of DALR on forest cover, our main focus is on development outcomes, and we leave a full treatment of DALR and the environment to future research.

DALR exists in contemporary Brazil because individuals are willing to build their own futures. Further, the organizational capacity of SMOs pursuing DALR represents hard won social capital that appears to be improving the lives of its participants. The policy implication is that the Brazilian Government has freely at its disposal substantial human and institutional resources, which it should use in shaping an approach to agrarian reform that increases farm viability as it mitigates environmental impact and social conflict. Cooperative engagement with the social movements is likely to improve livelihoods in the agricultural sector, thereby helping to resolve persistent problems of rural poverty that have plagued Brazil, even in this period of unprecedented growth and development. The Brazilian government, by providing minimal assistance in the selection of areas for settlement formation, and certain basic agricultural inputs, could create a viable family farming sector at low environmental cost.

DALR in Brazil today is a social movement that has taken Brazil by surprise, given that country's robust recovery from mismanagement by the military government, and the adjustments all have had to make to an increasingly globalized world economy. To be sure, President Lula da Silva's social welfare programs have wider sweep than those of his predecessor, President Cardoso, but many SMOs view Lula da Silva with suspicion, and they clearly represent a shadow government at local level in the PAs they have fought to establish. Millions of Brazilians interpret the world and their place in it through the optic of the DALR struggles they have endured, and the leaders who have inspired their efforts. Thus, SMO-led DALR, and DALR in general, must be recognized as a preeminent post-development phenomenon, a social welfare quest with its own philosophy, culture, and agenda, and with minimal governmental input. Because the Brazilian state never managed to create a life of dignity for the rural poor, it must now follow the lead of those who are doing it for themselves.

NOTES

1. Land Statute 601 of September 18, 1850, can be found on the INCRA website http://www.incra.gov.br/_htm/serveinf/_htm/legislacao/lei/601.htm.

2. Of course, from the landowner's perspective this same action constitutes an invasion of private property, which is also constitutionally protected. Herein lies the essence of the legal battle.

3. Terra Devoluta is unclaimed public land, not yet dedicated to specific uses.

4. Hébette 2002, analyzed what is referred to as ''parentesco'' off the Transamazon highway in Pará.

5. The difficulties of field data collection complicated formal efforts at geospatial sample design (Griffith, 2005). Moreover, random sampling by distance (every *n*th kilometer) and household count (every *n*th farmstead) proved impractical given proprietor absence and difficulty in house identification from the road. In addition, the remoteness of household locations made time a serious constraint on data acquisition. For reasons such as these, the analysis sample was collected opportunistically; in essence we conducted interviews with people we could find, building geographic representation by daily updates of the survey geography using regional maps. Evidently, the sample possesses both systematic and random spatial components, given the desire for representation on the many settlement roads, and the randomness of opportunity once sampling occurred on them. Such a sample possesses desirable statistical properties (Griffith, 2005).

6. The poorest households (category 1) possess none of the durable goods considered. Category 2 households possess either a stove or a chainsaw, and nothing else, and category 3 households possess a stove or a chainsaw, plus either (i) some good depending on electricity generation or (ii) a motorcycle. The wealthiest households (category 4) have what category 3 households own, but also possess either a car or a tractor. In essence, our categorization here elaborates the two categories used in Walker et al. (2002).

7. Analyses show a statistically significant difference with greater lot turnover in SMO DALR. So, it follows that many of the current residents were not involved in the initial land occupation and were not exposed to related conflict, as is reflected in the data.

8. KI Interview, Eldorado de Carajás, July 2006.

9. Although the data reveal a statistically significant difference in rural-urban-rural migration trends in SMO-DALR, this does not demonstrate a change in the predominant rural to urban trend at the regional scale (Perz *et al.*, unpublished manuscript). The substantive impact of this migration cycle is the subject for future research.

10. The number of PAs created throughout Brazil after 1996 almost doubled, from 992 at end of 1995 to 2,506 after. In Pará State the number of PAs tripled.

11. The decision to accept the government's proposition without the expropriation of the fazenda was a serious point of contention within the landless movement in Rondônia that eventually led to a split with the MST and the creation of Movimento dos Camponês de Corumbiara (MCC), a radical endogenous SMO.

12. The details on PA Tutuí Norte derive from key informant interviews in 2007. Names changed to protect identity of respondents.

13. Some have suggested that DALR SMOs plan their action to generate the greatest attention, and target land for political reasons.

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