Agrarian reform, food sovereignty and the MST: socio-environmental impacts of agrofuels production in the Pontal do Paranapanema region of São Paulo state, Brazil

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Abstract

In Brazil, the expansion of sugarcane for ethanol production has fundamentally altered the rural landscape and represents a significant change in the trajectory of the country's rural development and agrarian reform policies. Current policies are highly skewed in favour of agrofuel industries and are denying landless rural workers and peasant families, like those of Brazil's Landless Workers Movement (MST), access to land. In addition to the heavy social costs, the agrofuel industry threatens the environment by polluting the air, water and land. This paper elucidates the socio-environmental impacts of the burgeoning sugarcane-ethanol industry in the Pontal do Paranapanema, a region in the extreme west of the São Paulo state with a long history of land-related conflicts. While corporations reap astronomical profits from the agrofuel industry, the costs of agrofuel expansion in the Pontal do Paranapanema and in Brazil have been disproportionally borne by the environment and the most impoverished and marginalized members of society.

Keywords: MST, Pontal do Paranapanema, agrarian reform, sugarcane, ethanol, agribusiness.

Resumo

Reforma agrária, soberania alimentar e o MST: impactos socioambientais da produção de agrocombustíveis no Pontal do Paranapanema região do estado de São Paulo, Brasil

No Brasil, a expansão da cana-de-açúcar para produção de etanol tem alterado profundamente a paisagem rural e representa uma significativa mudança na trajetória de desenvolvimento rural e políticas de reforma agrária para o país. As políticas atuais são altamente enviesadas em favor das indústrias de agrocombustíveis e estão negando aos trabalhadores rurais sem terra e as famílias camponesas, como as do Movimento dos Trabalhadores Rurais Sem Terra do Brasil (MST), o acesso à terra. Além dos pesados custos sociais, a indústria dos agrocombustíveis ameaça o meio ambiente com a poluição do ar, água e terra. Este artigo elucida os impactos sócio-ambientais da emergente indústria da cana-etanol no Pontal do Paranapanema, uma região no extremo oeste do estado de São Paulo com uma longa história de conflitos relacionados à terra. Enquanto as corporações colhem lucros astronômicos com a indústria dos agrocombustíveis, os custos da expansão dos agrocombustíveis na região do Pontal do Paranapanema e no Brasil têm sido desproporcionalmente suportados pelo meio ambiente e pelos membros mais pobres e marginalizados da sociedade.

Palavras-chave: MST, Pontal do Paranapanema, reforma agrária, etanol, cana de açúcar, agronegócio.

Resumen

Reforma agraria, soberanía alimentaria y el MST: impactos socioambientales de la producción de agrocombustibles en la región de Pontal do Paranapanema en el estado de São Paulo, Brasil

En el Brasil, la expansión de la caña de azúcar para la producción de etanol ha alterado profundamente el espacio rural y representa un cambio significativo en la trayectoria del desarrollo rural y las políticas de reforma agraria del país. Las políticas actuales están altamente sesgadas a favor de las industrias de agrocombustibles y están negando a los trabajadores rurales sin tierra y a las familias campesinas, como los del Movimiento de los Trabajadores Rurales Sin Tierra (MST), el acceso a la tierra. Además de los grandes costos sociales, la industria de los agrocombustibles amenaza el medio ambiente con la contaminación del aire, el agua y la tierra. Este artículo expone algunos de los impactos socioambientales de la emergente industria de la caña-etanol en el Pontal do Paranapanema, una región localizada al extremo oeste del Estado de Sao Paulo, con una larga historia de conflictos relacionados con la tierra. Mientras las corporaciones cosechan lucros astronómicos con la industria de los agrocombustibles, los costos de la expansión de los agrocombustibles en la región del Pontal do Paranapanema y en el Brasil han sido desproporcionalmente soportados por el medio ambiente y por los miembros más pobres y marginados de la sociedad.

Palabras-clave: MST, Pontal do Paranapanema, reforma agraria, etanol, caña de azúcar, agroindustria.

Introduction

In light of extreme increases in the price of oil in recent years and the commodity's inherent non-renewable nature, as well as the worldwide attempt to reduce carbon dioxide emissions and the greenhouse gas effect, agrofuels have become a topic of national and international attention. In Brazil, the growing international search for renewable energy and "green" solutions to global climate change has manifested itself in the transformation of one of the country's founding industries—sugarcane—into the primary source for the production of ethanol. Today, Brazil is second only to the United States as the largest producer of ethanol in the world[1], producing 22.76 billion litres in 2011/2012 (CONAB, 2012), or almost 27% of the world's total – 84.5 billion litres (GRFA, 2012). 8.35 million hectares of the country's total arable land (estimated to be around 347 million hectares)[2] are currently planted with sugarcane (CONAB, 2012)[3] and there are expectations for the total planted area to expand to around 14 million hectares by 2020 (UNICA, 2008).

Wherever sugarcane can profitably be grown, the rapid expansion of sugarcane cultivation for ethanol production has fundamentally altered the rural landscape and changed the trajectory of the country's rural development and agrarian reform policies. Yet as the world's political and agro-industrial leaders hail the benefits of agrofuel as an answer to global reliance on non-renewable fossil fuels, the social, political and environmental costs of

[1] In 2006 the USA surpassed Brazil as the world's largest ethanol producer, producing over 18 billion litres. However, the primary feed-crop for ethanol in the USA is corn—Brazil is the largest producer of sugarcane ethanol in the world (UNEP, 2009).

[2] Unica and Conab (2008), published in *O Estado de S. Paulo*. Retrieved from: NEVES, Marcos Fava, CONEJERO, Marcos Antonio. In: *Estratégias para a Cana no Brasil*, 2009.

[3] Figures on the amount of land used to grow sugarcane in Brazil vary depending on the source. According to data from Brazil's Institute of Geography and Statistics (IBGE) the area planted with sugarcane in Brazil in 2011 was 9.6 million hectares (IBGE/SIDRA, 2012).

large-scale agrofuel production remain conspicuously absent from national and international public discourse.

The socio-environmental effects of the expansion of sugarcane for ethanol production are particularly evident in the Pontal do Paranapanema, a region in the extreme west of the São Paulo state with a long history of land-related conflicts. The rapid territorialization of sugarcane in the Pontal do Paranapanema over the last decade has added a new dimension to the agrarian question in the region, fundamentally altering the forms of production and involvement of both agribusiness and peasants in the regional political economy. Moreover, the rapid annexation of lands by sugarcane monoculture has escalated long-standing territorial disputes among the owners of large estates, agribusiness, and peasant movements active in the region – most notably, the MST, *o Movimento dos Trabalhadores Rurais Sem Terra,* Brazil's largest and most successful agrarian reform movement.

In Brazil, growing global and national demand for agrofuel presents new opportunities and challenges. On one hand, the increased demand offers an opportunity for the country to amass incalculable national wealth and further expand its burgeoning economy. An analysis of the expansion of sugarcane production in the Pontal do Paranapanema on the other hand, shows how the increasing territorialization of sugarcane monoculture and, ultimately, the national and multinational agribusinesses that promote them, have a negative impact on the environment, poverty reduction, sustainable rural development, and the implementation of a socially just agrarian reform policy. Agribusiness expansion and increased production of sugarcane and ethanol in the Pontal do Paranapanema, as with the rest of Brazil, serves only to further concentrate control of land and thus economic and political power (FELÍCIO, 2009). This at the expense of the agrarian reform movement and the livelihoods of small-scale farmers and the more sustainable small-scale agriculture, sometimes called a*groecology*, making it more difficult to achieve local and national food sovereignty.

The agrarian question in Brazil: historical evolution and recent changes

Historically, "the basic assumption of many rural development programs—that the 'rural poor' are 'small farmers'—neglects the widespread and growing fact that the poorest of the poor are often landless" (RAMISCH, 2009, p. 330). Brazil, a country of nearly 200 million people, is one of the top ten industrial economies in the world and is a significant global producer of several agricultural products such as soybeans, sugar, corn, coffee, cotton and cocoa, poultry products, and orange concentrates. However, Brazil is also a country where more than 5 million families, many of whom were once small farmers and rural workers, are currently landless (WITTMAN, 2005) and where the gap between the rich and the poor is among the world's largest[4]. Behind the media headlines heralding the country's phenomenal economic growth, agricultural output, agrofuel producing capacity and GDP lays a long history deeply marked by colonial exploitation, rural oppression, dispossession and disenfranchisement, and an extremely inequitable and increasingly concentrated system of land ownership (WELCH, 2007). In Brazil, concentration of land ownership is among the highest in the world with between 35 and 45 percent of the land resting in the hands of just 1 percent of the population (CARDOSO, 2006)—much of it owned in relatively few large estates, known as *latifúndios*, which have historically left large tracts unproductive. In 2003, for example, some 85 percent of farms occupied just 20 percent of agricultural lands, while just 1.7 percent of farms (large landholdings over 1000 hectares) occupied close to 44 percent (WITTMAN, 2005). Today, just 1.5 percent of all rural land owners (over 1000 hectares) effectively occupy 52.6 percent of all agricultural lands (DATALUTA, 2012A).

[4] Of the 136 countries ranked by the CIA's *World Factbook*, Brazil has the 16th most inequitable distribution of family income, with a 2012 Gini index of 51.9. Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2172rank.html [Accessed 10 November, 2012].

This grossly concentrated land structure has been a "foundation for the growth of stark inequalities in income, social status, education, health care, social services, participation in community affairs and access to the courts" (WOLFORD; WRIGHT 2003, p. xv). According to data of the International Fund for Agricultural Development (IFAD), about 35 per cent of the Brazilian population lives in conditions of extreme misery, subsisting on less than two dollars a day. The IFAD further reveals that in Brazil's rural areas poverty affects over half of the population. Considering that approximately 19 per cent of all Brazilians—some 36 million people—live in rural areas, this means that about 18 million rural people live in abject poverty (IFAD, 2012).

Brazil is a country well endowed with rich agricultural lands and has the geographic capacity to address the structural inequality that reduces much of its population to a life of poverty and misery by redistributing some of these lands. In 2008, it was estimated that of the 347 million hectares of cultivatable land in Brazil, only 292 million hectares were classified as being utilized—211 million hectares for pasture lands and 71 million hectares for crops—leaving 55 million hectares idle.[5] However, rather than rectifying the country's "extreme inequality of land tenure," recognized as being "[o]ne of the main causes of poverty" (IFAD, 2012), consecutive governments, including the former administration of Luiz Inacio 'Lula' da Silva, have tended to favour only more of the bitter neo-liberal medicine and capitalist solutions to solve the very problems that capitalist and neo-liberal policies have themselves caused (OLIVIEIRA, 2006; 2010).

Since the final years of the military dictatorship in the 1980s the agrarian question became a major issue in Brazil, largely due to increasing mobilization and organization of peasant movements, like the MST. An agrarian reform movement that formed officially in 1984 in the southern Brazilian state of Paraná, the MST in 2010 had a membership of over 1.5 million and a presence in 23 of Brazil's 27 states.[6] Frustrated by a political economy that has historically excluded the majority, along with neo-liberal and state-led rural development projects that have ignored the real needs of small farmers, rural workers and the landless, members of the movement decided to reclaim their right to have a place in the countryside by carrying out occupations of the country's idle land. These occupations are the primary means of access to land for the landless in Brazil; they also manifest dramatic protests against the brutal social and economic inequality that characterizes much of the country's political economy (FERNANDES, 2001).

The MST's claims to lands occupied are legitimized by Article 186 of the Brazilian Constitution of 1988, which stipulates that all land, private property included, must serve a "social function". According to Article 186:

> A função social é cumprida quando a propriedade rural atende, simultaneamente, segundo critérios e graus de exigência estabelecidos em lei, aos seguintes requisitos:
> **I** - aproveitamento racional e adequado;
> **II** - utilização adequada dos recursos naturais disponíveis e preservação do meio ambiente;
> **III** - observância das disposições que regulam as relações de trabalho;
> **IV** - exploração que favoreça o bem-estar dos proprietários e dos trabalhadores.

Thus, if land is left idle or unproductive, and if environmental degradation or poor labour relations by its current owners can be proven, then others can make a competing claim to the land by invoking this constitutional clause. The public nature of the land occupations, including the physical presence of landless encampments along highway right of ways, has succeeded in placing pressure on the government to fulfill its constitutional

[5] Unica and Conab (2008), published in *O Estado de S. Paulo*. Retrieved from: NEVES, Marcos Fava, CONEJERO, Marcos Antonio. In: *Estratégias para a Cana no Brasil*, 2009.
[6] Data retrieved from: www.mst.org.br [Accessed 7 July, 2010].

obligation, and its promises of various administrations, to carry out long anticipated redistributive agrarian reform in the country.

Until recently, the MST has had little problem identifying unproductive and under-productive land that does not meet its "social" requirement as stipulated in the constitution. As such, the majority of MST occupations have traditionally taken place on unproductive *terras devolutas* (public lands), much of which has remained under the control of *latifúndiarios* (large land holders) and has not been processed for redistribution. Over the last decade, however, as economic globalization has increasingly allowed for the consolidation of multinational agribusinesses—such as Amyris, Monsanto, Syngenta, DuPont, Louis Dreyfus and Cargill—on Brazilian soil, the MST has been forced to adapt its strategies. Multinational agribusinesses have been eager to buy up the unproductive lands of the *latifúndios* with the goal of producing agricultural commodities for the global food industry. More recently, the agrofuel boom has sparked even more interest in Brazil's fertile agricultural soils, provoking an influx of foreign direct investment (FDI) in the country's profitable and fully competent sugarcane-ethanol industries. There has been a flurry of mergers and acquisitions among national and international firms in the energy, agriculture, biotechnology and chemical sectors, and today foreign corporations and capital control about 22 percent of Brazilian sugarcane and ethanol companies (GEIVER; JESSEN, 2010). Given the changing geo-politics of agricultural landownership and investment in Brazil, the land occupations of the MST today take place on both unproductive *latifúndio* lands and productive agricultural lands owned or occupied by foreign multinationals or their Brazilian partners and subsidiaries.

According to the 2012 report from the National Data Bank of the Struggle for Land (DATALUTA) over 8,536 land occupations were carried out between 1988 and 2011 involving the participation of 1,198,513 families. This number suggests that more than 5 million people participated as Brazilian families are said to include 5 people each. As a partial result of this mobilization, the landless movement helped win farms for more than 1,000,000 families in 8,951 agrarian reform settlements located all across the country (DATALUTA, 2012A). However, despite its success in acquiring land for millions of people, over 96,000 encamped families across the country still currently await government recognition (ORIGUÉLA, 2010) and data from the 2006 Agricultural Census of the Brazilian Institute of Geography and Statistics (IBGE) shows that the concentration of land ownership in Brazil has only continued to increase over the last 20 years (IBGE, 2006; HOFFMANN; NEY, 2010)[7].

According to many analysts, fundamental changes to the historical land tenure system and current land use practices are essential to the equitable and just economic and social development of the country (FERNANDES, 1994; OLIVEIRA, 2001; BRADFORD; ROCHA, 2002; MST, 2010A). In a 2003 article that he wrote for the *Guardian,* then president 'Lula', asserted "agrarian reform is…fundamental if the Brazilian economy is to be rebuilt. And it will play a crucial role in making the country fully democratic." However, due to the neo-liberal leanings of the former "Lula" administration, redistributive agrarian reform was subordinated to profit-taking. Moreover, the decision of the Lula government "não fazer a reforma agrária por meio da desapropriação, e sim, principalmente, por meio da regularização fundiária, gerou um problema para os movimentos camponeses que mais atuam nas ocupações de terra"— like the MST (FERNANDES, 2008, p. 81). As candidate, Lula had long supported radical agrarian reform. As president, however, his position shifted with his policies as pressures to pay down Brazil's foreign debt, payback agribusiness supporters and consolidate Brazil's energy independence through the expansion and intensification of the country's ethanol industry led his administration to co-opt the social movements and design agrarian reform strategies that defused conflict such as the formal recognition of existing small farms. As a further consequence of Lula's alliance with large national and transnational agribusinesses vast unproductive *latifúndio* lands—primarily pasture lands in the South-Central states of Minas Gerais, Goiás, Mato Grosso do Sul, and

[7] Brazil exhibits a Gini index of land concentration of 0.856 in 2006 (HOFFMANN; NEY, 2010).

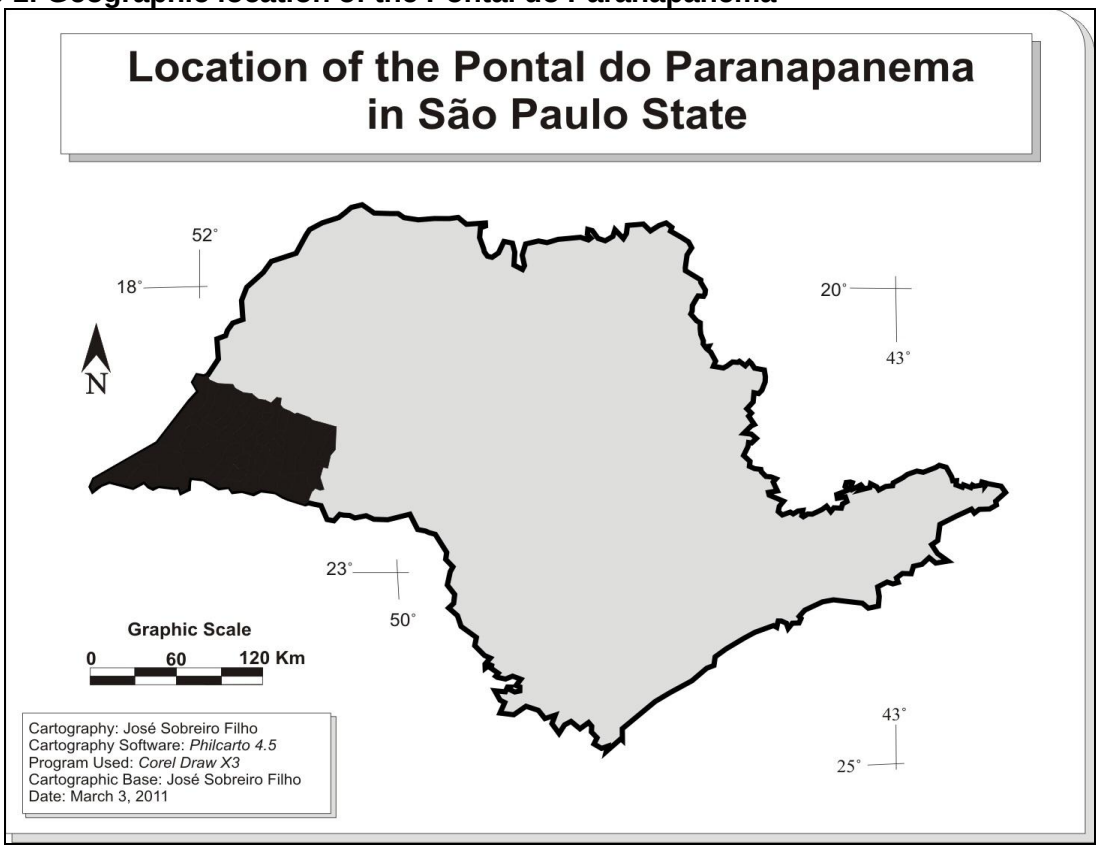
São Paulo—were transformed into large-scale monoculture of sugarcane for ethanol production, putting them out of reach of agrarian reform law.

The agrarian question in the Pontal do Paranapanema: a history of "grilagem"

The Pontal do Paranapanema is a region situated in the extreme southwest of the São Paulo state where vast tracts of pastureland are being rapidly transformed into sugarcane monoculture (see Map 1). As a result of both the historical process of illegal occupation of the region's lands and the recent rapid expansion of sugarcane in the region, the Pontal do Paranapanema has been one of the areas of greatest land conflict in Brazil.

Nestled between the state of Paraná to the south and Mato Grosso do Sul to the west, the region represents "one of the most outrageous examples of land fraud" (WOLFORD; WRIGHT, 2003, p. 301) in the history of São Paulo state—a process that began in earnest in the late-nineteenth century when the region began to be colonized. By all accounts the occupation of the region was characterized by exploratory and predatory land-grabs executed by pioneers and politically well-connected financiers with little regard for law, existing communities of indigenous inhabitants, or the environment (LEITE, 1998; SILVA; FERNANDES; VALANCIO, 2006; LEONIDIO, 2009). In order to understand the agrarian question in the Pontal and the current transformation of social, economic, political, territorial, and environmental realties in Brazil, it is useful to review the historical processes contributing to the land conflicts that mar the region today.

Map 1: Geographic location of the Pontal do Paranapanema



According to geographer José Ferreira Leite (1998), whose work is fundamental to analyzing the Pontal, the colonization of the region resulted from a particularly intense and protracted process of *grilagem.* The term *grilagem* "refers to the fraudulent appropriation of public or leaseholder lands" (MENDONÇA, 2009A, p. 68) through the falsification of land title documents and fabrication of illegal property registers. This process often occurred "with the

tacit collusion" of corrupt regional judiciaries (MENDONÇA, 2009A, p. 68), along with many prominent politicians and bureaucrats (LEITE, 1998). Through *grilagem* several high-ranking individuals reinforced their dominance as *fazendeiros, latifundiários,* or other types of land barons, concentrating in their hands not only territorial dominion but enormous economic and political power (FERNANDES, 1994; MENDONÇA, 2009A). "As a result of the historical linkages between [*grilagem*,] land concentration, and economic transformation in which workers were excluded from land access as a means to control labour" (WITTMAN, 2005, p. 97), a large portion of the region's rural population has been dispossessed from its lands, subjected to a life of poverty and misery, and subordinated to the financial and political will of the *grileiros.*

The process of deconstructing and reconfiguring the region's highly concentrated land ownership began in the 1980s when mobilization among social movements surged in the region. Most notable among these movements was the MST, which became the most active. In June, 1990 the MST carried out their first big occupation in the Pontal do Paranapanema municipality of Teodoro Sampaio, "iniciando o processo de territorialização de luta pela terra na região, causando um significativo impacto sócio-territorial" (FERNANDES; RAMALHO 2001, p. 241). Since 1985, more than 100 rural settlements have been created in the region with 6,257 families living on an area of 143,803 hectares (DATALUTA, 2012B). These agrarian reform settlements represent about 56% of the total number of settlements in the entire state of São Paulo, making the Pontal one of the regions in Brazil with the highest concentration of land settlements (FREITAS; SPAROVEK, 2008).

In the Pontal do Paranapanema the livelihoods of many rural families depend on the sale of milk produced from their small herd of dairy-cattle. About 11,358 litres of milk are produced by the settlements in Teodoro Sampaio each day. Regional dairy-processing plants buy the majority of the milk and the sales of milk and other produce by the settlers generate an average monetary income of about 622 reais per month. Dairy farming is the primary means of generating a stable income for settlers (SILVA, 2008). However, milk production represents only one facet of the agricultural activity that occurs on the settlements. Swine, poultry, eggs, and beef are also often produced and animal husbandry is combined with the production of several basic agricultural crops such as *mandioca*, sugarcane, cotton, maize, beans, coffee, pineapple, banana, castor bean, pumpkin and *acerola*.

The largest number of agrarian reform settlements are located in the municipalities of Mirante do Paranapanema with 1,625 families in 33 settlements and Teodoro Sampaio, with 21 settlements comprised of 865 families (DATALUTA, 2012B). In both municipalities the agrarian land settlements have not only entrenched new realities in the struggle for land, but improved the livelihoods of a large number of the settled families. They have also contributed significantly to the social and economic development of the towns in which they are situated, proving the value and importance of redistributive agrarian land reform to social equality and local food security in Brazil (RAMALHO, 2001; LEAL, 2003; SILVA, 2008). Insecurity has erupted in the region, however, with the explosion of agrofuel activity over the course of the past decade.

Agribusiness expansion in the Pontal

The agrarian question in the Pontal calls for the *terras griladas* (fraudulently appropriated lands) to be returned to the State as *terras devolutas* (public lands). As of the year 2002, 1,200,000 hectares of agricultural land in the Pontal had been legally transferred to the government or were determined by the State to be *terras devolutas* (Global Exchange, 2002). The government, however, rather than fulfilling its obligation to distribute this land to landless families camped in the region, has chosen to withhold most of it for other purposes. Indeed, much of the conflict that continues between social movements like the MST and the *latifundiários* in the region can be linked to a single cause: "a lack of will and the avoidance of responsibility by the state government" (GLOBAL EXCHANGE, 2002, n/p).

The state has had the will, however, to support the expansion of sugarcane in the region. Instead of advancing a land reform agenda on the Pontal's *terras griladas*, the government has encouraged the spread of sugarcane plantations and the construction of sugar and ethanol processing plants (*usinas*). Taking advantage of the sugarcane frenzy that now characterizes the region, *latifúndio* owners with dubious land titles are more than happy to sell or lease large tracts of their land to the agribusinesses that have flocked to the region. These agribusinesses have the capital and the technology necessary to turn the region's vast tracts of unproductive or "degraded" pastureland into productive sugarcane monoculture. The claim of agribusiness to productivity is pushing out the MST and their claim to the land.

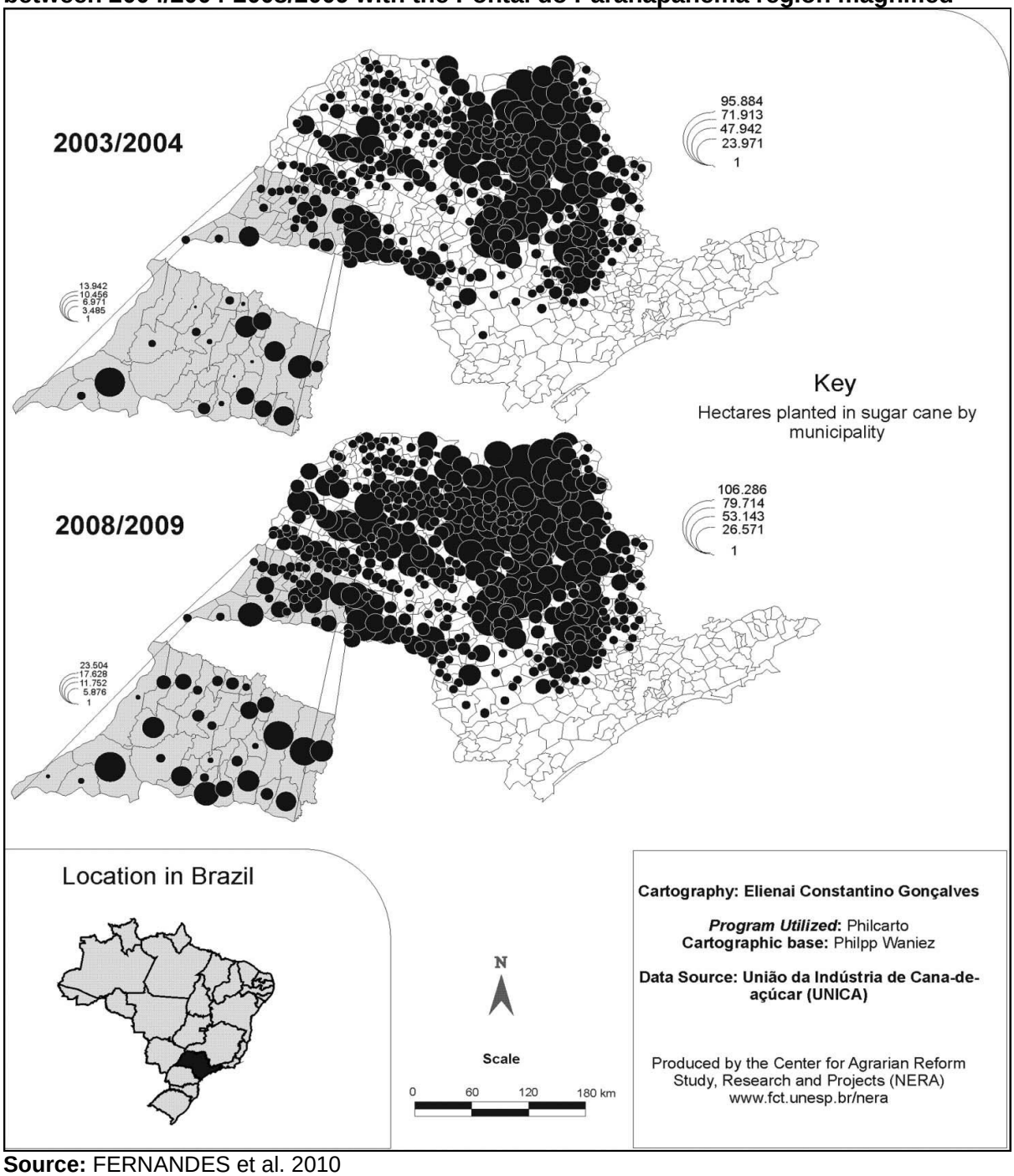
Aside from capital and technology, agribusiness has the support of the national and state government, and their respective financial institutions and investment agencies. In 2009, for example, Brazil's National Bank of Social and Economic Development (BNDES) issued over 6 billion *reais (*Brazilian currency symbolized by R$ and worth about U$ 0.50 each in 2012) in loans to major players in the country's sugarcane industry, including: Cosan (R$ 635 million), Iaco Agrícola (R$ 244 million), Brasken (R$ 565 million), Bertin Group (R$ 200 million), today incorporated as the Brazilian transnational corporation JBS-Fribo (which alone received R$ 3.5 billion), and ETH Bioenergy controlled by another Brazilian TNC, the Odebrecht Group (R$ 596 million) (SAKAMOTO, 2010; BNDES, 2012). BNDES is not only doling out exorbitant loans to national-based companies, it is also generously financing the activities of foreign transnational agro-corporations on Brazilian soil. Cargill, for example, received R$ 160 million from the development bank in both 2009 and 2010, while the privately owned Norwegian company Umoe Bioenergy received $R 96 million from the bank in 2011 (BNDES, 2012). Through the consistent and enthusiastic support of governmental policy and the significant largesse of national and foreign banks, firms, traders and organizations, the success, consolidation and continuity of the agrofuel industry in Brazil is ensured. In the Pontal, the Odebrecht Group and Umoe Bioenergy, which has recently finished constructing a *usina* in the region's municipality of Sandovalina, are especially important players with thousands of hectares of land owned and leased.

Expansion of sugarcane in the São Paulo state and the Pontal do Paranapanema

Currently, São Paulo state dominates the country's sugarcane industry. Data from Brazil's National Supply Company (CONAB) verifies that in the 2011/2012 crop year the state produced 305,636,000 tonnes of sugarcane, equal to 54.5% of the country's total annual harvest (560,363,800 tonnes). In the same crop year 4.37 million hectares were used to cultivate sugarcane, an area equivalent to about 17.6% of São Paulo state territory (CONAB, 2012). As the country's leading sugarcane producing state, São Paulo is, consequently, also the country's leading ethanol source—producing 11,870,700,000 litres, or 50.5% of the country's total (23,491,182,600 litres) in 2011/2012 (CONAB, 2012).

As the sugarcane industry has expanded dramatically over the last decade, particularly in the western region of the state (see Map 2) the Pontal do Paranapanema has experienced the effect of the industry's insatiable quest for new sugarcane growing lands—economically, socially, politically, environmentally, and territorially. And yet, the Pontal region possesses the greatest potential for further sugarcane expansion in the entire São Paulo state (FERNANDES et al., 2010).

Map 2: Expansion of sugarcane in São Paulo state and the Pontal do Paranapanema between 2004/2004-2008/2009 with the Pontal do Paranapanema region magnified



Source: FERNANDES et al. 2010

Sugarcane production in the Pontal surged initially in the 1970s and 80s, spurred by the 1975 introduction of the federal government's National Alcohol Program (*Proálcool*). Developed in the context of soaring global oil prices, *Proálcoo*l sought to reduce the country's dependence on external petroleum imports by substituting petroleum use with alcohol (ethanol). The program gathered speed with the introduction of the first fully ethanol-powered vehicle in Brazil the following year – the Fiat 147. In terms of decreasing national dependency on petroleum imports bound to fuel the nation's vehicles, *Proálcool* has been extremely successful: Brazil has replaced nearly 50% of its gasoline consumption with ethanol (UNICA, 2008). Today, one can buy either pure ethanol or a 25% ethanol 75% gasoline blend at any of the fuelling stations in the country and approximately 90% of the

vehicles sold in Brazil are now *flex-fuel* vehicles, meaning that they can run on any mixture of both ethanol and gasoline (UNEP, 2009).

This success has not been realized without consequence. Some of the consequences of the advance of sugarcane monoculture, rarely presented to the public by politicians, agribusiness or the mainstream media, include environmental damage through the pollution of land, water and air, expropriation of land (MENDOÇA, 2009B) and subordination of peasants (FERNANDES et al., 2010), violations of workers' rights (MENDONÇA et al., 2012), increases in land prices and rents (WILKINSON; HERRERA, 2010), and reduced food production/security in many regions where the industry has been consolidated (OLIVEIRA, 2008; MST, 2010B).

Since 2002, agribusinesses have sought opportunities for profit in the Pontal do Paranapanema through the purchase of *latifundios* or public land, *terras devolutas,* to cultivate the new "green gold" of sugarcane, or by buying or investing in existing or new *usinas*. Today, there are 26 sugarcane refineries in the western region of the state of São Paulo (including the administrative regions of Presidente Prudente, Dracena and Adamantina), according to data from the Union of Bioenergy Producers (UDOP).[8] More than half of these refineries are located in the municipalities of the Pontal do Paranapanema.

Constructed in 1975, the Alcídia distillery, located in the municipality of Teodoro Sampaio, is the oldest of the sugarcane refineries in the Pontal. ETH Bioenergy, a subsidiary of the Brazilian construction and engineering giant Groupo Odebrecht, bought Alcídia in 2007.[9] ETH has since completed construction of its second sugarcane refinery in the region, tellingly named the "Conquista do Pontal" (Conquest of the Pontal) in the municipality of Mirante do Paranapanema, and has future plans to construct refineries in the region's municipalities of Euclides da Cunha and Presidente Epitácio.

The social impacts of ETH's and other agro-energy corporations' activities in the Pontal are far-reaching. Agrarian reform policies and settlements are rapidly changing in ways that accommodate corporate imperatives and augment already exorbitant corporate gains, both politically and economically. From 2003 to 2008, for example, the area destined for sugarcane production in the Pontal do Paranapanema grew from 71,095 hectares to 152,027 hectares representing an exponential increase of 114%. The area devoted to land reform settlement, on the other hand grew from 127,438 hectares to 140,272 – a marginal growth of just 10% during the same 5-year period (FERNANDES et al., 2010).

In a 2009 article published in the online company journal *Odebrecht Edição Especial,* a different picture is painted, one of "beneficent biofuels". Reiterating Grupo Odebretch's perspective on the effects of the growing sugarcane-ethanol industry in the Pontal do Paranapanema, Ricardo Ardt euphemistically states:

> A força do agronegócio, com colheita mecanizada de cana-de-açúcar, tecnologias agrícolas modernas e preservação ambiental já começa a movimentar a economia local, gerando trabalho, renda e impulsionando os serviços municipais de educação, saúde e saneamento. Com isso, dinamiza-se a produção dos assentamentos de reforma agrária espalhados na região nos últimos 20 anos. Após 50 anos de grilagem e invasões de terra, a turbulência agrária no Pontal diminui. (ARDT, 2009, n/p).

Ardt's use of the terms "agribusiness," "modern agricultural technologies" (i.e. genetically modified varieties of sugarcane and agro-toxins) and "environmental preservation" present a proverbial paradox—agribusiness is profit driven; environmental

[8] Data retrieved from: www.udop.com.br [Accessed 17 July, 2010].

[9] ETH Investimentos (81.09% Groupo Odebretch and 18.91% Sojitz – a Japanese marketing company) currently holds a 65% share in ETH Bioenergy, followed by A BNDES Participações S/A – BNDESPAR – a subsidiary of the National Development Bank of Brazil – BNDES (16.33%); Ashmore, a London-based investment company (14.89%); Tarpon, a Brazilian investment company (2.79%) and minority shareholders (0.99%). Data retrieved from: http://www.eth.com/relatorio2011eth/arq/ETH_RAS2010_simples.pdf [Accessed 8 November, 2012].

preservation is and has always been secondary to the corporate bottom-line. “Modern agricultural technologies,” are not, as Ardt implies, aligned with “environmental preservation.” Over the last four decades the capitalist model of industrial agriculture has clearly demonstrated its incongruence with environmental preservation resulting, rather, in extensive deforestation, soil degradation, desertification and the contamination of a considerable portion of the world’s fresh water supply (MAZOYER; ROUDART, 2010). Modern “technological” fixes to the environmental problems that modern agricultural technology has caused are *not* solutions to the environmental challenges facing the region. Smaller-scale agricultural practices based on traditional local knowledge, polyculture and the principles of agroecology, on the other hand, represent an alternative that shows significant improvement in sustainability (i.e. rehabilitating soils, promoting biodiversity, placing less strain on scarce water supplies and requiring little-to-no fossil-fuels) (MST, 2007A).

Furthermore, Ardt’s implication that the “mechanization of sugarcane cutting” is “generating jobs” and “income” in the Pontal also fails to accurately describe the reality: mechanized sugarcane production requires well-trained workers and highly-skilled technicians to operate and maintain heavy machinery, while requiring relatively little manual wage labour. The sugarcane harvesting done by both ETH Bioenergia and Umoe Bioenergy in the Pontal, for example, is 100% mechanized, and thus the presence of these companies in the region does not necessarily translate into a significant number of jobs for sugarcane cutters or unskilled labourers. Moreover, production in the land reform settlements is not becoming more dynamic as a result of the presence of agribusiness in the region (FELÍCIO, 2012), and the “agrarian conflict” in the Pontal, has not “diminished”, as Ardt states, but rather, has been exacerbated and intensified by the powerful “force of agribusiness” and the expansion of the sugarcane-ethanol industry (ORIGUÉLA, 2011).

Despite the palpable realities observed and documented in the region by Antonio Thomaz Jr. (2007A; 2007B; 2009)[10] a researcher and professor of Geography at UNESP, Presidente Prudente, the encroachment of agribusiness and sugarcane monoculture onto the region’s “degraded” pasture lands continues, promoted and prolifically propagated by agro-energy corporations and regional and national governments under the pretence of “sustainable” rural development. Aside from being extremely profitable to the already affluent and politically powerful, the expansion of sugarcane is but part and parcel of a wider capitalist-driven political and ideological project that seeks to erase the history of territorial theft in the region by recognizing the false land titles of large landowners who plant sugarcane and sell-out to the agro-fuel industry (THOMAZ, 2007B).

Sugarcane monoculture: a threat to local food production

In the Pontal do Paranapanema changes in land usage have, inevitably, affected dairy and beef production, which has been the crux of the region’s economy since the 1940s. The dairy-cattle industry began its ascent to economic prominence after the international market price of coffee took a dive in the early thirties. The devastating drop in the price of coffee made production of the former cash crop economically unviable and, subsequently, many large coffee plantations were transformed into pasture land for cattle. Agent Orange, a highly toxic chemical (used by the U.S military during the Vietnam War) was extensively employed as a defoliant to clear forests for new pastures (ITESP, 2000). By the time the MST arrived in the region in the 1980s “rivers were silting up, soils were becoming exhausted and the region had become vulnerable to prolonged droughts” (BRADFORD; ROCHA, 2001, p. 212). The land won by the MST in the Pontal do Paranapanema is considered to be “[p]erhaps the most environmentally damaged land that the MST has ever conquered [...] in Sao Paulo state” (BRADFORD; ROCHA 2001, p. 212).

[10] See also: (BARRETO et al. 2009); (FERNANDES et al. 2010); (ORIGUÉLA, 2011); and (FELÍCIO, 2012).

Ironically, sugarcane proponents consistently point to the degradation of the region's soils as a basis for justifying the expansion of sugarcane monoculture (THOMAZ JÚNIOR, 2009). Marcos Fava Neves, a University of São Paulo scholar closely aligned with the agro-fuels industry and the agrarian capitalist paradigm reiterates this argument: "O avanço das plantações de cana-de-açúcar majoritariamente sobre áreas de pastagens degradas acaba favorecendo a produção de alimentos", since it represents a rotation of cultures "necessária para renovação do solo" (NEVES, 2009, p. 8). A study by Freitas and Sparovek (2008) found that about 609,207 hectares, or approximately 43% of Pontal's total land area, was considered suitable for sugarcane expansion. According to the same study most of this land was "characterized by large extensive beef-cattle farms" (FREITAS; SPAROVEK, 2008, p. 90)

Changes from the pasturing practices that have long exploited the region's soils to other agronomic activities could bring significant benefits to exhausted soils; indeed, changes to the region's current land-use patterns are ecologically necessary. Sugarcane monoculture, however, relies on the heavy application of chemical pesticides, which only degrade the region's soils further and irrevocably damage the region's already precarious ecology, especially its water resources. "Growing demand for sugarcane in Brazil creates a consistent and strong pesticide market," says Flavio Hirata of *Farm Chemicals International* (2006), pointing out a total pesticide sales increase of 355% for the sugarcane crop market between 1999 and 2005. Herbicides are the most common pesticide used on sugarcane and this culture alone accounts for 13% of the nation's total herbicide application (ALTIERI; BRAVO, 2009). While proponents of the sugarcane-ethanol industry tend to be acutely critical of the environmental damage caused by dairy and beef production, the reality is that chemical dependent sugarcane monoculture is hardly (if at all) better. A decade from now the lands currently occupied by sugarcane fields will be looking far less fertile and new lands will need to be sought out to replace them. Moreover, as sugarcane monocultures presently expand onto degraded pasturelands in the Pontal and elsewhere in Sao Paulo state, cattle-ranching operations are simply being displaced to even more ecologically sensitive areas in other states (NOVO et al. 2010).

In the Pontal, the contribution that the agrarian reform settlements make to regional food security cannot be overstated, and although much of the food produced on the settlements is for self-consumption, a significant amount of it is also destined for local markets. In Ricardo Ardt's 2009 article, José Ademir Infante Gutierrez, the mayor of Teodoro Sampaio, admitted that although the most impoverished families in the municipality are those living on the agrarian reform settlements, the settlement families are largely responsible for sustaining the region's two main grocery stores. While openly acknowledging the importance of the agrarian reform settlements to local food security, in the same article Gutierrez contradictorily maintains that ETH's sugarcane-ethanol mills (Aclídia and Conquista do Pontal) are the real impetus for the economic progress that is occurring in the region, enhancing and diversifying the local economy and creating new professional capacities and employment opportunities. Eduardo Piazzalunga, mayor of Mirante do Paranapanema, shares the paradoxical perspective of Gutierrez. "Com a instalação da ETH na região," Piazzalunga explains, "estamos transferindo o foco da quantidade de assentamentos para a qualidade da produção. Vamos consolidar o assentado como produtor rural" (ARDT, 2009, n/p).

Governments and agribusiness commonly make use of a convenient "causal assumption" regarding agrofuel production and rural development: that partnerships between small landholders and agro-industrial companies are "effective and balanced" and present a solution to "the cash problem" faced by small farmers (FRANCO et al., 2010, p. 671). This assumption, often pre-emptively adopted, has become crucial to the endorsement of agrofuel production—globally, in Brazil, and clearly, in the Pontal do Paranapanema. Such idealistic causal supposition builds naturally on two essentially normative assumptions:

1) An agrofuel industry dominated and controlled by multinational corporations can incorporate small farmers into the production process "as labourers in large-scale

mono-crop" plantations or "through contract-growing schemes" (FRANCO et al., 2010, p. 670) and;

2) Integration into the agro-fuel production process is desired by and beneficial to peasants.

The MST movement disputes such preconceptions and has adopted a more critical position in regards to agrofuel expansion and the (un)desirability of peasant "integration". As justification for their opposition to agrofuels, members of the MST point to several negative aspects of agrofuel expansion, including: the ecological damage exacted by agrofuel mono-crops and their significant chemical and water requirements; the transference of productive agricultural land from food to fuel production; the suppression of national agrarian reform policies based on land expropriations and redistribution; and the unequal terms by which peasants are being integrated into the agrofuels economy, forced to give up varying degrees of autonomy in exchange for a small role in the corporate agenda as producers of raw materials (MST, 2007B; MST, 2010B; JUNIOR; ALBUQUERQUE, 2010).

In Ricardo Ardt's article (2009), however, both Gutierrez and Piazzalunga suggest that the MST's participation in the region's agro-energy developments is a win-win situation for everyone involved. They suggest that the MST will not only benefit financially from integration into the agro-industrial complex, but improve their quality of life and social status by becoming a part of it. This simplistic view assumes that a better quality of life is gained only through the touted economic advantage of improved income realized by integration, ignoring many non-monetary values regarded as important in assessing that quality of life (i.e. autonomy over settlement lands, resources and alimentary production, environmental sustainability, preservation of traditional knowledge, community, and egalitarianism) that are compromised by integration. The expansion of sugarcane on the agrarian reform settlements poses a serious threat to the relative autonomy of the settlements.

Peasant-agribusiness partnerships: promises and disillusionment

Sugarcane-ethanol production in the agrarian reform settlements is not a new development in the Pontal. The first attempt to grow sugarcane in the region's settlements began in 1993 when ITESP—the São Paulo state government institution responsible for the regularization of lands and providing technical assistance to the land settlements—approved a proposal brought to it by the Alcídia mill. A joint-venture was established, with ITESP's approval, between Alcidia and eleven families living on the Agua Sumida settlement in Teodoro Sampaio, who had agreed to rent part of their land to the mill to plant sugarcane. In 1995 the Department of Geography at UNESP carried out a study to assess the socio-economic impact of sugarcane production in the Aqua Sumida settlement. The study found that, in retrospect, most settlers regretted having ever agreed to grow sugarcane for the mill, although they had initially considered Alcidia's offer as a good opportunity. The study concluded:

> At the same time that sugarcane seemed to be the only economically viable alternative for the small producer on the settlement, it also condemned them to dependency, to a lack of participation, and a loss of autonomy as the mill alienated them from their land and subjected them to conditionals imposed exclusively by the company. (ANTONIO et al., abud FERNANDES et al., p. 804).

Despite the prudent observations of UNESP's 1995 study, in 2004, the ITESP Foundation issued Regulation 77, which legally allowed sugarcane planting by the mills in the agrarian reform settlements. Today the so-called "partnerships" between agrarian reform settlers and sugarcane mills are realized as contractual agreements enabled by the magisterial means of ITESP's Regulation *77*. Despite the MST's staunch opposition to

agrofuel expansionism, many individual MST families have been beguiled into renting or leasing part of their lot to the sugarcane mills. Contractors for São Paulo state sugarcane firms often offer "at least 60 percent more as a promised income" than that which "can be made with the predominate system in dairy farming" (NOVO et al., 2010, p. 782) and such "generous" offers often prove too difficult for some income-poor settlers of the MST to resist.

As of April 2007, data from ITESP showed that 492 settlement families had formed joint ventures with sugarcane firms in São Paulo state under the 2004 regulation. Of these families, 88 were located in the municipality of Teodoro Sampaio. ITESP data from April 2009 revealed that there were 822 settlement families with sugarcane production contracts in the Pontal do Paranapanema alone (FERNANDES et al., 2010). Most contracts drawn up by the mill's promise that technical assistance will be provided for the settler by the mill and that the "mill will act as guarantor towards the Bank of Brazil, so that the farmer can get the plantation started. With the loans given to the settlers by the bank, they finance R$ 14,000 (PRONAF D*) per farm during the production cycle"[11] (FREITAS; SPAROVEK, 2008, p. 91). However, most settlers never actually see the bank loans. Instead, the loans are handed directly over to the mill, which, as guarantor towards the bank, is held responsible for the subsequent administration of the loan's funds to the settlers.

As part of a 2008 study on the socio-economic impacts of sugarcane production in the Pontal, 76 settlers who were producing sugarcane in co-operation with the mills were interviewed by agronomists Freitas and Sparovek. Some 53 of the settlers interviewed were from settlements located in the municipality of Teodoro Sampaio. The study found that 67.7% of the interviewed families' sugarcane income did not end up raising their total income and actually reduced their total income in some instances. The majority of interviewees were also dissatisfied with the outcome of their partnerships with the mills, feeling that the terms of the contracts were asymmetrically skewed in favour of the mills.

FAAFOP and the production of biodiesel in the Pontal

While some MST members have been lured into the agro-fuels enterprise as contract sugarcane producers, others have been incorporated as contract-farmers of castor bean, oil palm or soy—the three main feed-crops used to produce biodiesel in Brazil. In 2008, for example, José Rainha, a former MST leader,[12] was given one million *reais* by the federal government to start a biodiesel project in the region's settlements (INESC, 2008). Rainha's project, initiated through his Settled Farmer's Federation (FAAFOP), proposed the plantation of *mamona* (castor bean) by farm families in the region's settlements, on an area of only one hectare per family lot. Judging by the number of families that enlisted in the project—nearly 1000 families from almost a quarter of the region's then 109 settlements—Rainha's castor-contracting project was relatively well-received by families in the Pontal, at least initially. Of the original 1000 families that enlisted themselves as castor-producers, by harvest time in 2009, only 760 retained involvement in the project. Following the 2009 harvest 800 tons of seed were sold to Brasbiodiesel, a new subsidiary of Grupo Bertin, which, according to Rainha had also agreed to purchase 50 per cent of FAAFOP's 2010 yield (FERNANDES et al., 2010).

Contract-schemes between family farmers and biodiesel firms, such as between the members of FAAFOP and Brasbiodiesel, are supported by the federal government and facilitated through the National Programme for the Production and Use of Biodiesel (PNPB). Launched in 2004, the PNPB was an attempt by the government to "explicitly include…peasant agriculture within national energy policy" by providing incentives for firms to

[11] PRONAF D*: The Brazilian National Programme for the Strengthening of Family Agriculture, credit line type D.

[12] The MST formally disowned José Rainha in 2007 due to his views on peasant involvement in agrofuel developments and his proximate and deferential alliance with agribusiness, which run directly counter to the official views and objectives of the MST on the above issues.

contract with family farmers for a percentage of their feedstock (FERNANDES et al. 2010, p. 808). Buying raw materials from family farmers allows for firms to accumulate Social Fuel Certificates, which in turn make the firms eligible for loans from Brazil's National Development Bank (BNDES), as well as for generous tax exemptions.

As a result of effective organization in co-operatives such as FAAFOP, peasants have increased their influence in regional politics, and in some cases, their personal incomes. However, the fact remains that peasants simply cannot compete with the economic and political clout of agribusiness, even when they are effectively organized. Government, banks, and industry have specifically formulated agrofuel policy in ways that ensure this structured lack of competitiveness. Through peasant-agribusiness "partnerships" the peasantry is being vertically "integrated" into the capitalist agro-energy production chain, ensuring the continuation of the peasantry as suppliers of the raw materials used by industry, while largely denying them the ability to add-value to the fruits of their labour. As peasant autonomy is being undermined, relations of dependency are being built and strengthened (FERNANDES et al., 2010). Despite a slew of policies, which explicitly attempt to foster the inclusion of small farmers, only a handful of large corporations concentrating on only one industrially grown feed-crop-soybeans-control Brazil's growing biodiesel market. Only a very small fraction of the biodiesel produced in Brazil is the product of castor or oil palm grown by small farmers, while industrially produced soy accounts for over 80% of the total (WILKINSON; HERRERA, 2010).

In the Pontal do Paranapanema an "effective and balanced" partnership between small-farmers and agribusiness has yet to be proven possible. The expansion of agribusiness in peasant territories in the Pontal ultimately means that agrofuel feed crops like sugarcane and castor are expanding to areas where food is currently cultivated—thus, representing a challenge to the implementation of a successful strategy for regional food security.

Agroecology, food sovereignty and the MST

Data from the IBGE confirms that over 65 million Brazilians currently face food insecurity, almost one-third of the entire population (IBGE, 2010). Representatives of the Brazilian agro-energy industry persistently argue that food production in Brazil, and consequently food security, have not been compromised by the expansion of sugarcane for ethanol production. One of the leading proponents of this argument is the sugarcane industry association UNICA, whose more than 100 member companies represent over 50% of the ethanol and 60% of the sugar produced in Brazil. UNICA literature argues that relative to other agricultural activities, sugarcane occupies only a very small portion of land in Brazil — approximately 7.8 million hectares at the start of 2008 or 2.3 % of the country's arable land — and sugarcane for ethanol accounts for only half of the total — about 3.4 million hectares or about 1% of arable land (2008). While this assertion may hold as true when considered at a macro-level, when situated within unique geo-political dynamics of particular localities, like the Pontal do Paranapanema, such a bold assertion often fails to correspond with reality. In the Pontal expanding sugarcane production is occurring on land that could have otherwise been redistributed to landless peasant families and small farmers who would use it to produce food crops. In Brazil 70% of all the food consumed is produced by small farmers planting on only 30% of all the agricultural land (INESC, 2008). Thus, Brazil's food security — and potential food sovereignty — is largely dependent on small farmers, like those on the agrarian reform settlements of MST.

It is important to note here that food security and food sovereignty are two fundamentally different concepts, although they are sometimes used interchangeably in the literature. According to the United Nation's Food and Agricultural Organization (FAO, 1996), food security represents "a situation that exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary

needs and food preferences for an active and healthy life." On the other hand, food sovereignty is:

> The peoples' right to define their own policies and strategies for the sustainable production, distribution and consumption of food that guarantee the right to food for the entire population, on the basis of small and medium-sized production, respecting their own cultures and the diversity of peasant, fishing and indigenous forms of agricultural production, marketing and management of rural areas.[13]

The very concept of food sovereignty implies a revolutionary restructuring of the current international economy characterized by Ricardo's theory of comparative advantage, recently rejuvenated by neo-liberalism and its three core-policy tenets—privatization, deregulation, and trade liberalization (DESMARAIS, 2007). As such, the term "food sovereignty" is carefully avoided in national and international policy debates by governments, agribusinesses and the global governance institutions—the International Monetary Fund (IMF), the World Bank (WB), and the World Trade Organization (WTO)—that instead promote "food security" as a strategic policy alternative consistent with global trade.

In contrast to food sovereignty, food security does not imply a moral need to address the structural issues that underlie rural poverty and hunger—such as the inequitable distribution of land and financial resources necessary to purchase and/or cultivate food. According to agribusiness, the IMF, WB and WTO, the issue of food security can be addressed by simply increasing food production (i.e. through the use of higher-yielding genetically modified seed varieties and improved chemical fertilizers and pesticides) or by increasing international imports of cheap food stuffs. However, Via Campesina (DESMARAIS, 2007), the MST[14] and a growing number of food policy specialists (HOLT-GIMÉNZ, 2009; ALTIERI, 2009) hold that food security at any level (local, national, or international) cannot be extricated from the more fundamental concept of food sovereignty. The *Final Declaration of the World Forum on Food Sovereignty* (2001) states that "[f]ood sovereignty is the means to eradicate hunger and malnutrition and to guarantee lasting and sustainable food security for all...peoples."[15] Thus, the absence of food sovereignty is, ultimately, the cause of food insecurity.

Peasant movements and scholars from around the world are promoting agroecology, defined by Altieri (2002, p. 2) as "the application of ecological concepts and principles to the design and management of sustainable agroecosystems." They are holding that this would be a primary means to address food insecurity and achieve food sovereignty. More than just an agroecological design science, agroecology is also "the integrative study of the ecology of the entire food system, encompassing ecological, economic and social dimensions" (FRANCIS et al., 2003, p. 100). As such, agroecology represents a truly holistic approach to food that recognizes the need for a more comprehensive understanding of global food politics. Indeed, the way in which food is produced is important, but so is *what* kind of food, *by* and *for whom* it is produced and under what conditions.

As an agricultural model, agroecology deviates from the conventions of industrial agriculture in virtually every aspect. It employs mixed modes of farming, using animal outputs as vital fertilizer inputs; requires the use of no synthetic pesticides and few-to-no fossil fuel inputs; involves the cultivation of diverse and productive systems of locally adapted polycultures; places intrinsic value on all of nature's species (plant, animal and insect) as opposed to just those with instrumental or commercial value to humans; and emphasizes a return to natural soil-nutrient cycling processes. While combining elements from both

[13]World Forum on Food Sovereignty. Final Declaration. Havana, Cuba, September 7, 2001. Available from: http://www.ukabc.org/havanadeclaration.pdf [Accessed 15 October, 2010].
[14] Personal correspondence. 07/08/2010 Escola Nacional Florestan Fernandes.
[15]World Forum on Food Sovereignty. Final Declaration. Havana, Cuba, September 7, 2001. Available from: http://www.ukabc.org/havanadeclaration.pdf [Accessed 15 October, 2010].

traditional and contemporary systems of agricultural knowledge, agroecology places the utmost value on the traditional agricultural knowledge of small farmers themselves.

The farmers' own knowledge forms the fundamental basis upon which agroecologial principles can be adopted and/or adapted to meet the specific needs of individual families dictated by the ecology and agricultural requirements of their location. It has been said that the MST "não tem uma visão da agroecologia pois não existe somente uma visão de agroecologia."[16] For the MST[17], Vía Campesina (2009) and innumerable leading scholars and agronomists (ALTIERI, 1999; ROSSET, 2000; CARVALHO, 2003), agroecology is an alternative to current exploitative land use practices that represents perhaps the only potential means of solving the triumvirate of imminent global crises—food, environmental and energy—that currently threaten our collapse as a species.

In the Pontal do Paranapanema, the ability of MST settlements to implement agroecological initiatives is significantly jeopardized by the lack of credit and financial assistance available to settlement families. Better access to small loans and credit support programs for peasant farmers is imperative to the implementation of an agroecological model of agriculture that will sustain the land, the families and local markets. Increased financial support for settlers would help to ensure the recuperation of soils and forest-cover in the region, while assisting families in transitioning their farms to agroecological models that some estimates show can be "200 to 1000-per-cent more productive per unit area [than large farms]" (ROSSET, 2000). It can take many years, however, for an income-poor farmer to fully establish a productive agroecological farming operation, which is additionally dependent upon the quality of existing soils, infrastructure and the knowledge of a settler (GUTIERRES, 2006). The creation of food-bearing forest-like ecologies is part of any agroecological vision and such a feat, naturally, takes time to grow into fruition.

The cutting irony is that while billions of dollars are assiduously doled out to the agro-fuels industry and entrepreneurs with proposals to practice chemical-intensive industrial agriculture, there is little-to-no meaningful assistance for small farmers who want to practice ecological agriculture. Thomaz Jr. explains:

> O fato é os camponeses que estão longe de dispor de apoio e de políticas efetivas de estímulo à produção de alimentos, semelhantes às facilidades que os empresários canavieiros têm, para se apoderarem dos recursos do PRONAF-D, via esquema de *barriga de aluguel*, no qual os assentados cumprem o papel de viabilizar a utilização desses recursos para o plantio de cana-de-açúcar. Nesse sentido, se, na prática, há facilitação para a obtenção dosrecursos do PRONAF, o qual, para todos os efeitos, está vinculado ao nome dos assentados e,no final de contas, vai figurar nas estatísticas como usuários de recursos públicos – portanto,integrados às políticas de inserção dos camponeses aos recursos públicos –, de fato, isso se dá em detrimento do tão sonhado apoio para a produção de alimentos da cesta básica das famílias trabalhadoras. (THOMAZ JR., 2007B, p. 28).

Perhaps the greatest threat to the successful implementation of agroecology, however, is the dramatic loss of elementary knowledge regarding natural ecology by both rural and urban peoples alike. This process is what David Ehrenfeld, a professor of biology at the School of Environmental and Biological Sciences, Rutgers University, New Jersey, has called "forgetting."[18] "The more advances we make," says Ehrenfeld, "the more we forget" begging the fundamental question, "What use is our expensive technology in a sea of ignorance?" (1993, p. 71). Renowned Indian physicist and human rights activist, Vandana Shiva expands on Ehrenfeld's astute inquest:

[16] Personal correspondence. 07/08/2010 Escola Nacional Florestan Fernandes.
[17] Idem.
[18] For a more complete discussion on the concept of "forgetting," see: EHRENFELD, David. *Beginning Again: people and nature in the new millenium.* New York and Oxford: Oxford University Press, 1993. p. 65-72.

> As certain disciplines and specializations in science spin profits through commercialization, others are neglected, even though they are essential to the foundations of a knowledge system…. As molecular biology becomes a major source of techniques for the biotechnology [and agrofuel] industry, other disciplines of biology shrivel up and die. We are on the verge of losing our ability to tell one plant or animal from another, and of forgetting how the known species interact among themselves and with their environment. (SHIVA, 1997, p. 16).

Indeed, even though industrial agriculture is characterized by biological, cultural and intellectual heterogeneity, it has been reduced to its "production" characteristic, the mere sum of its costly technological and industrial inputs. The strict uniformity required by and characteristic of an agro-industrial model attempts to delegitimize all other traditional and indigenous forms of knowledge, while alienating people from their land, the food that they consume, and, ultimately, one another. Therefore, education in agroecology is necessary to the revival of traditional farming practices that cultivate both biological and cultural diversity, foster the growth of a sense of community and allow for the establishment of more harmonious relations between diverse peoples and their environments.

The MST's goal of gaining access to agricultural land in order to work, make a decent living and guarantee local food security is correlated with the movement's wider objective to live on the land in a way that will recuperate degraded soils and damaged ecologies and sustain, not just their immediate nutritional needs, but also the productive capacity and ecological integrity of the land, imperative to the subsistence of future generations. The MST's struggle is about far more than just land; it is about maintaining autonomy over lands its members acquire including the modes of production that occur within the geographical parameters that define their territories. At its core it is a struggle against neo-liberalism in all its many forms, requiring an advancement of a radically alternate ideological vision based on socialist values seen as fundamental to the construction of a more fair and equitable society.

Conclusion

This article has attempted to elucidate the ways in which the global "agrofuel boom" is altering the trajectory of agrarian reform policy and undermining local food security in Brazil. Redistributive agrarian reform is essential to reach a more sustainable social and economic development of the country that has the potential of embracing more of the country's vast and polarized population. However, the territorialization of agro-energy corporations threatens the realization of a socially just agrarian reform. Current policies favour agrofuel industries and limit landless rural workers and peasant families' access to land. The expansion of sugarcane monocultures, particularly in São Paulo, the county's largest sugarcane producing state, is occurring even on stolen land that properly should be public land available for land redistribution. In addition to these heavy social costs, the agrofuel industry threatens the environment by polluting the air, water and land.

In the Pontal do Paranapanema the increasing territorialization of the agro-energy corporations has come at the direct cost of food security for thousands of men, women and children who remain living in MST encampments – not to mention thousands more potential consumers of their production – in anticipation of government recognition and the attainment of land usage rights. Close to 3,000 MST families are currently encamped in the state of Sao Paulo and of these, 400 are living in encampments in the Pontal do Paranapanema (ORIGUÉLA, 2010).

Agrofuel derived from sugarcane or other plant-based crops will never be able to fulfil the insatiable and ever-growing need for fuel that a wasteful individual-car model of transportation demands. The current biofuel boom represents yet another short-term capitalist "solution" to the global energy/environmental crises, attempting to justify and temporarily sustain unsustainable levels of global consumption. The real solution to the

current global energy/environmental crises involves a dramatic decrease in demand globally, provoked by a profound paradigmatic shift towards more sociologically and environmentally mindful and harmonious ways of thinking and living in the world. The indispensable transformation in individual consumption patterns would inevitably have to correspond. Ironically, the discussion of real solutions to the imminent global energy/environmental crises remain virtually absent from the fervent international political discourse of "beneficent biofuels." Global "climate change is," as well-known author and activist Walden Bello so eloquently explains: "[…] the end point of the arrogant modernist dream of creating an artificial environment based on an imperialist industrialization process to supplant an ecology rooted in a more harmonious relationship between community and biosphere based on smallholder agriculture". (BELLO, 2007, p. 3).

Agroecology represents a sustainable alternative to the current agro-industrial model of agriculture that is largely responsible for the displacement of millions of indigenous peoples and small farmers globally, as well as the social impacts of these displacements. The conventional agro-industrial model is a significant player contributing to the complexities that have resulted in our current environmental crisis. An agroecological model reinforces the value of traditional agricultural knowledge based on a fundamental understanding of local ecology—that is, the numerous and complex interrelations among humans, their local geographic and climatic environments and the unique and diverse species and geological processes that exist and have naturally evolved over a millennia within those environments. Unlike modern agricultural practices, agroecology is chemical-free, utilizes systems of polyculture and crop rotation and requires few-to-no fossil fuels. While large agribusinesses focus on cultivating chemical-dependant monocultures for export, small farmers, like those on the land reform settlements of the MST, are responsible for Brazil's level of food sovereignty producing over two-thirds of all the fruits and vegetables consumed by Brazilians on less than one-third of all the agricultural land. However, in and of itself, agroecology is not a solution to the structural problems that are the real causes of hunger, poverty, and environmental degradation.

Ultimately, hunger results from poverty, and is exacerbated by inequitable systems of national and regional food distribution, and a lack of access to land is at the heart of these processes. Thus, simply producing or importing more food is not a solution to hunger. In order to address hunger, Brazil's skewed and highly inequitable systems of agriculture and land distribution must first be fundamentally restructured in ways that could result in the added benefit of permanently reducing rural poverty. Members of the MST hold that without land, the rest is meaningless. Redistributive agrarian reform is a prerequisite to the realization of food sovereignty in Brazil.

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