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Bulletin of Science Technology & Society 2009 29: 180
DOI: 10.1177/0270467609333730

Bulletin of Science, Technology & Society
Volume 29 Number 3
June 2009 180-188
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10.1177/0270467609333730
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hosted at
http://online.sagepub.com

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Restructuring Places and Spaces in the Global Food System

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Despite recent critiques of agrofuels, the industry is booming, signaling transformations in the world's food and fuels systems. International financial institutions, biotechnology firms, governments, and agribusiness are restructuring control over land, genetic resources, economic space, and market power. These moves prefer transnational capital at the expense of farmers in the North and extensive areas vital to the livelihoods of small producers in the Global South. This article suggests that the agrofuels boom may be a new—and particularly destructive—stage in industry's extractive transformations of agriculture. The movement-based logic of *food sovereignty*—people's right to define their own food and agriculture systems—suggests a rollback of the "agrofuels transition" is possible.

Keywords: *agrofuels; territorial restructuring; places and spaces*

Recent reports of rainforest destruction, land evictions, and food riots have tarnished agrofuels' image as a green pathway to a sustainable future. Criticisms of a poor energy balance (Pimentel & Patzek, 2005), negative carbon footprint (Searchinger et al 2008; Howarth et al 2009), massive deforestation (Morton et al., 2006; Silvius & Kaat, 2006), and a devastating impact on food security and rural livelihoods (Brown, 2006; Holt-Giménez, 2008a; Runge & Senauer, 2007) all indicate the industry is aggravating the very social and environmental problems they were ostensibly supposed to alleviate.

> While the debate around crop-based fuels often employs the term *biofuels*, this article specifically concerns itself with liquid fuels from crops grown and produced on a large agro-industrial scale known as "agrofuels." We consider *biofuels*, the term commonly used for agrofuels, to refer to small-scale, nonindustrial liquid fuels frequently made in owner-operated facilities for local consumption. Industrial agrofuels, such as ethanol and biodiesel, are currently produced from plants such as corn, oil palm, soy, sugarcane, sugar beet, rapeseed, canola, jatropha, rice, and wheat. Agrofuels are generally blended with gasoline or diesel, mainly to power the world's 800 million automobiles.

Nonetheless, despite recent market contraction due to lower oil prices and the global credit crunch, the industry has been expanding at a rate of over 120% a year since 2005 (Renewable Fuels Association, 2008). A recent report from the U.S. Biomass Research and Development Board argues forcefully that agrofuels are essential to meeting the U.S.'s "Twenty in Ten" goals of reducing the country's dependence on foreign oil by 20% in 10 years (Biomass Research and Development Board, 2008). To this end, the United States mandated the consumption of 36 million gallons of agrofuels annually by 2022 in its 2007 Energy Independence and Security Act. The mandate ensures a captive market for a product that also enjoys subsidies amounting to about half of its wholesale market price. The European Union has similar mandates for the 10% conversion of liquid fuels in 10 years.

The myth that northern countries could become "energy independent" through biofuels production has largely been debunked. The entire U.S. corn crop could only produce enough feedstock to replace around 12% of the U.S. gasoline consumption (Hill, Nelson, Tilman, Polasky, & Tiffany, 2006). While nearly one half of the world's energy is consumed in the Organisation for Economic Co-operation and Development countries, 84% of the additional land

available for agrofuels development is found in the Global South (Doombosch & Steeblik, 2007). With agrofuels, the poor, food-insecure countries of the Global South are being called upon to supply ethanol and biodiesel for the overconsumption of liquid fuel in the affluent North.

This article will argue that though agrofuels cause more social and environmental problems than they solve, they are attractive to industry and finance—and thus are promoted by governments—because they offer opportunities for new profit centers in agrarian value chains, and because their publicly subsidized expansion allows monopolies to further consolidate control over both our food and our fuel systems. The *agrofuels transition* taking place in the world's croplands, rangelands, peat bogs, and forests is the newest and perhaps final stage in the centuries-old transformation of agriculture by industry.

Agrofuels: Another Extractive Industry

Extractive industries are usually associated with "the resource curse"—the pillaging of resource-rich countries in the Global South by powerful corporate interests supported by the financial and military might of countries in the industrial North. However, extractive industries operate within northern countries as well, though usually under stricter regulatory constraints. Globalized extractive activity is characterized by the ability to maintain production in both the North and the South. The presence in northern countries provides an important base for political power, while southern operations provide a haven where corporations can offload social and environmental costs. This is particularly true with nonrenewable resources like oil, gas, and minerals, for which the need for northern governmental support is essential and the cost of social and environmental mitigation is high. Agrofuels follow this pattern of resource extraction because although they are technically "renewable" (like lumber, coffee, and other agricultural products), the resources on which their industrial production depends are finite, are concentrated primarily in the Global South, and incur significant and far-reaching social and environmental impacts.

Soil erosion, depletion of groundwater, mining of soil fertility, and the diversion of surface waters have all been associated with industrial agrofuels production. A civil society study of the Ogalalla aquifer in the Midwestern United States revealed that ethanol production is "speeding the depletion of fossil water reserves" (Roberts, Hale, & Toombs, 2007). In the Usangu basin of Tanzania, a river that supplied water to 1,000 small-scale farmers was diverted to a foreign-owned agrofuels plantation, forcing farmers off their land (GRAIN, 2007). The international peasant movement *La Via Campesina* reports that in the Brazilian valley of Jequitinhonha 270 streams have been desiccated following the construction of a eucalyptus plantation and a pulp factory (Via Campesina, 2006). Eucalyptus is one of the crops promoted as a possible "greener second-generation" ethanol feedstock.

Agrofuels extract nutrients and top soil as well. Particularly high rates of erosion accompany soy production (a major biodiesel feedstock), especially in areas where long cycles of crop rotation are not implemented. Soil cover loss averages 16 tons per hectare of soy in the U.S. Midwest and between 19 and 30 tons per hectare in Brazil and Argentina (Altieri & Bravo, 2007). In Argentina, industrial soybean cultivation has led to massive nutrient depletion. According to one estimate, this loss—a million metric tons of nitrogen and 227,000 metric tons of phosphorous—would cost around US$910 million to replace with synthetic fertilizers (Pengue, 2005).

Agrofuels and Territorial Restructuring

Of course, agrofuels extract more than just water and soil; they extract *value*. To borrow from Borras's (2006, p. 125) description of regressive land reforms, to do so they must exert control over "the nature, rhythm, magnitude and direction" of the production of goods and the extraction of surplus—as well as the distribution and accumulation of that surplus. Agrofuels giants like U.S.-based Archer Daniels Midland (ADM) and Brazil's Petrobras rearrange capital flows and relations of power, establish new forms of ownership over land and genetic resources, and transform markets on global scales (Gordon, 2008). Following capitalism's dual logic of capital and territory (see Harvey, 2003), the structural effects of the agrofuels boom can be understood by tracking the fundamental changes the industry creates in both the physical places and the political-economic spaces of the global food system. The agrofuels industry, like other extractive industries before it, engages in

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territorial restructuring; the reshaping of both places and spaces at the international, national, subregional, and local scales (see Holt-Giménez, 2007a). While international finance institutions (IFIs) like the World Bank and the International Monetary Fund use conditional loans to restructure laws, ministries, and regulatory frameworks in order to facilitate the penetration of industrial capital into the Global South, on the ground, physical territory is restructured by agribusiness and biotech firms in order to ensure the efficient extraction of surplus.

Places: First the Land

Many smallholders in the Global South have been driven to lands on the agroecological margins (Holt-Giménez, 2006). These "marginal" lands are now being appropriated and physically enclosed by agrofuels. Proponents of agrofuels claim that the world's abandoned cropland and marginal lands can be used to produce agrofuels in ways that do not compromise food production (Gopalakrishnan, Negri, Wang, Wu, & Snyder, 2008). One study using satellite imagery and historical data claims that 386 million hectares of such abandoned cropland exists (Field, Campbell, & Lobel, 2008). Such estimates ignore that fact that marginal lands are often the basis of subsistence for rural populations (Berndes, Hoogwijk, & van den Broek, 2003). In a recent report,[1] Jonathan Davies of the World Initiative for Sustainable Pastoralism puts it succinctly:

> These marginal lands do not exist on the scale people think. In Africa, most of the lands in question are actively managed by pastoralists, hunter-gatherers and sometimes dryland farmers . . . [Given] the current cavalier approach to land appropriation, [and] the disregard of the land rights of rural inhabitants in many countries, it is inevitable that agrofuel production will be done by large investors at the expense of local communities. (Gaia Foundation, 2008)

The report claims the agrofuels discussion has "ignored the presence of pastoralists, indigenous peoples, small scale farmers and women on these lands, and failed to understand that intensive agriculture/monoculture is not the only form of land use" (Gaia Foundation, 2008).

Reports of territorial displacement by agrofuels are widespread. In Columbia, according to one report, "[93 percent] of the land under palm cultivation . . . is located in the collective territorial zone of black communities." The report claims that nearly all traditional villages have been cleared and are being resettled with former paramilitaries and outsiders (Zimbalist, 2007). In the Eastern Cape of South Africa, 500,000 hectares of communal farmland is being fenced and planted with canola for biodiesel (African Centre for Biosafety, 2008). Locals have been forced to forgo their diverse vegetable gardens and grazing lands, while chemical giant Monsanto collects heavy subsidies for providing its chemicals and seeds "on the farmer's behalf" (African Centre for Biosafety, 2008). A British company has taken 3,000 hectares of communal pasture land in Ethiopia for a jatropha plantation in a populated area where 39% of the population already depends on emergency food aid (Gaia Foundation, 2008). In Guatemala, the expansion of palm oil and sugar plantations for agrofuels is prompting a powerful reconcentration of landholdings, significantly reducing the land available for food production (Hurtado, 2008). This list is by no means exhaustive.

Land grabs by rich nations and northern corporations are becoming commonplace as well. The *Financial Times* recently reported that the South Korean firm Daewoo is negotiating a 99-year lease deal for 1.3 million hectares of land in Madagascar. Daewoo will reportedly pay nothing to produce corn and palm oil on a tract of land the size of Belgium (Jung-a, Oliver, & Burgis, 2008). Similarly, the Tanzanian government has granted the British firm Sun Biofuels exclusive access to 22,230 acres of land for 99 years, free of charge, in exchange for $20 million worth of roads and schools, and a German company expects to have 494,000 acres under cultivation in Tanzania soon (Knaup, 2008). Similarly, high food prices and a strong dollar have prompted many Middle Eastern states with scarce food production capacity to purchase or lease land overseas (GRAIN, 2008).

In another example, Aracruz Cellulose, a leading supplier of eucalyptus paper pulp and one of the new players in cellulosic ethanol, evicted 8,500 indigenous families from their land in the Brazilian state of Espirito Santo, turning 11,000 hectares onto "Green Desert" (Meirelles, 2005). The plantations have dried up several rivers and streams, seriously threatening the water supply to small farmers (Friends of the Earth International, 2006). If the technology to commercialize cellulosic ethanol from wood products becomes widely available, as companies like Aracruz hope, more small farmers will likely be forced to migrate to the agricultural frontier or to urban slums by the march of fuel crops into the Brazilian landscape.

Places: Enclosing the Genetic Commons

The patentable genetic information within seeds is another place being restructured by the agrofuels boom. New genetically modified fuel crops will functionally enclose vast genetic resources, taking them out of the public realm and putting them into the hands of the private sector.

Monsanto and agribusiness giant Cargill have recently launched a joint venture called Renessen, a whole new corporation with an initial investment of $450 million. Renessen is the sole provider of the first commercially available GM-dedicated energy crop, "Mavera High-Value Corn." Mavera corn is stacked with foreign genetic material coding for increased oil content and production of the amino acid lysine, along with Monsanto's standard Bt pesticide and its Roundup Ready gene. The genius of this operation, and the danger to farmers, is that farmers must sell their crop of Mavera corn to a Renessen-owned processing plant to recoup the "higher value" of the crop (for which they paid a premium on the seed). Cargill's agricultural processing division has created a plant that only processes their brand of corn. Furthermore, due to the genetically engineered presence of lysine, an amino acid lacking in the standard feedlot diet, they can sell the waste stream as a high-priced cattle feed. Renessen has achieved for Monsanto and Cargill nearly perfect vertical integration. Renessen sets the price of seed, Monsanto sells the chemical inputs, Renessen sets the price at which to buy back the finished crop, Renessen sells the fuel, and farmers are left to absorb the risk. This system robs small farmers of choices and market power, while ensuring maximum monopoly profits for Renessen/Monsanto/Cargill (Shattuck, 2008).

The development of "second" and "third" generation agrofuels is proceeding apace under the direction of large biotechnology firms. Perhaps the development with the farthest reaching implications are the new feedstocks for cellulosic ethanol and the genetically engineered or wholly synthetic organisms designed to enable their processing.

Cellulosic energy crops can conceivably be produced from any plant material: corn stalks, trees, sugarcane biomass, or grasses. This fuel is made by distilling the sugars bound up in cellulose into alcohol. Because so much energy goes into teasing the sugar out of the biomass, cellulosic energy will not be commercially viable without major breakthroughs in plant physiology. In other words, cellulosic ethanol *must* be genetically engineered in order to ever reach the market. Unlocking the key stumbling blocks to cellulosic energy offers the industry unprecedented genetic material under private patent laws. Because so many crops can conceivably be used to produce sugar-based fuel from cellulose, the potential for expansion of proprietary genetic material is staggering (see Table 1).

Economic and Political Spaces: International Finance

IFIs are restructuring political and economic spaces to accommodate the agrofuels boom. Agrofuels are attractive for direct investments because they turn agriculture into the type of extractive industry that IFIs like the World Bank, the Inter-American Development Bank, and the African Development Bank have been promoting all along. One case in B razil is particularly illustrative. The International Finance Corporation (IFC; the private lending arm of the World Bank) recently loaned US$50 million to Cosan S.A. Industria e Comercio, the largest sugar (and ethanol) company in the world and part of billionaire Rubens Ometto Silveira Mello's Ometto Group, which owns several Brazilian sugar companies. Cosan is attracting international capital investments from Tate & Lyle, Mitzubishi, Hong Kong's Kuok Group (palm growers), and French sugar companies, Sucden and Tereos. Cosan's 2006 Initial Public Offering raised US$405 million (Magalhães, 2006). The IFC, aside from its capital investment (which Cosan apparently has little trouble attracting), proved its value to the group by granting the project a "B" classification designated for moderate environmental impacts and labor conditions. The IFC set the guidelines but allowed Cosan to perform its own audits on labor and environmental standards. The IFC monitored Cosan's compliance by reviewing copies of corporate memoranda and "management-certified completion of top priority corrective measures" (IFC, 2005).

Investing in Brazilian ethanol, the Dutch Rabobank specifically cited the IFC certification as the reason it felt it safe to invest: "Rabobank's reasoning was that if IFC approves this project and they classify it only as a class B, low risk project, we can safely invest [an additional] $230 million . . . in this corporation" (Lilley, 2004). The IFC's lax classification practices have facilitated investments for many highly destructive extractive projects, like the infamous 2004 soybean project loans to Brazilian governor and soy

Table 1
The Second-Generation Pipeline[a]

Range expansion, drought/freeze tolerance, growth on marginal land: Some of the most highly advertised traits being developed allow a plant to escape its own physiological limitations to grow on poor soils, in water scarce regions, and to withstand freezing temperatures. In other words, these traits aim to make industrial monocrops grow where they otherwise could not. Mendel Biotechnology, a privately controlled firm, with heavy investments by Monsanto and British Petroleum, has already identified and isolated genes for these new traits.

Increased biomass and faster growth: Another set of traits the biotech industry is working on code for faster growing plants that put more energy into producing biomass than products like sugars, nuts, oils, and tubers. Plants like the GE sorghum being developed by Ceres Incorporated (a small biotech start up with significant equity investment from Monsanto) trade their ability to produce a food product for increased biomass. Farmers growing this crop in the future will likely have to accept the price offered by the nearest ethanol refinery, instead of having diverse local and international food markets to fall back on when commodity prices inevitably fluctuate.

Reduced lignin content in trees: Lignin is the woody compound in the cell wall that gives trees both their structural integrity and their resistance to pests. Lignin is also what makes it difficult to pulp trees into paper and potentially unlock cellulose in wood to produce ethanol. ArborGen, a biotechnology firm with heavy investments from the industrial forestry industry, is developing trees with 20% reduced lignin content. Because genetic modification of tree species is a relatively new field, only a few companies have invested in GM trees. The CEO of Rubicon, an industrial forestry company and one of three owners of ArborGen, notes "the annual unit sales of forestry seedlings are well into the billions, recur every year, and span the globe. . . . There are no global competitors to ArborGen" (Langelle & Peterman, 2006).

Proprietary enzymes, bacteria, and catalysts: Processing cellulose into sugars is the largest hurdle in making cellulosic ethanol practical. At its current stage, processing is vastly inefficient. Regardless of doubts about the technology, the engineering of new enzymes and bacteria that can break down cellulose is a multimillion dollar race. Corporate partnerships, and not competition, are the norm in this sector. Codexis, one of the leading developers of GE enzymes, is partnering with Syngenta and Shell Oil for its research and development. Some enzyme biotechnology firms also own ethanol processing plants, like the Kholsa Ventures funded company, Range Fuels. Patents on this technology will essentially put a stranglehold on the cellulosic ethanol market: whoever controls the most efficient catalysts will have a virtual monopoly on processing fuel.

a. All information about the "Second Generation Pipeline" is freely available from the companies involved in their development and was taken exclusively from company web publications.

magnate Blairo Maggi that destroyed large swaths of the Amazon Rainforest (Lilley, 2004). Agrofuels' green image makes it possible for the IFC to provide favorable ratings to these projects, mitigating financial risk for the industry and securing the territory for further capital investment.

By investing in agrofuels, IFIs are also reinforcing the kind of capitalism that privileges export-based agriculture and extractive industries at a time of widely eroding support for neoliberal "market-led" approaches to development. In Latin America, new governments elected on antineoliberal platforms (e.g., Venezuela, Paraguay, Ecuador, Bolivia, Chile) are on the rise. The Doha Round of WTO negotiations appears permanently stalled, and the financial crisis has many former proponents of laissez-faire governance (including former chairman of the U.S. Federal Reserve, Allan Greenspan) questioning the wisdom of the neoliberal model (Andrews, 2008). Agrofuels offers neoliberal champions a practical way forward in times of widespread political resistance. Because they are considered industrial rather than agricultural products, agrofuels skirt knotty WTO negotiations and engage directly in global trade where other neoliberal policies have failed (Gordon, 2008).

Economic and Political Spaces: International Agribusiness

Agrofuels sparked a run-up in the value of grain commodities and, with it, a new round of consolidation and profit for agribusiness. In March 2008, even before the global financial crisis introduced extreme market volatility, wheat prices shot up 137% from the year before, soy was up 87%, rice rose 74%, and maize went up 31% (Holt-Giménez, 2008b). While some agribusiness, like U.S. feedlot operator Tyson Foods, were hurt by the inflation of grain prices, global grain traders thrived on the windfall. Corporations like Cargill and ADM both buy and sell grain. Because of their vast market power (Cargill and ADM together control 75% of the global grain trade; Vorley, 2003) they buy when prices are low and can withhold grain from the market until prices recover. This resilience to market fluctuations is clear in earnings. In a time

of global food crises and severe economic downturn, when most companies are suffering enormous losses, Cargill's earnings increased 62% for the quarter ending August 31, 2008, over the same quarter in 2007 (Black, 2008). Net income at Bunge, one of the top three global grain traders, increased 471% in the first half of 2008 (Ugarte & Murphy, 2008). Monsanto's net income was up 83% in the first 9 months of fiscal year 2008 (Ugarte & Murphy, 2008).

ADM, the world's largest grain processor, now gets 25% of its operating profit from agrofuels (Scully, 2007). In anticipation of the passing of the 2007 U.S. Energy Bill—a legislation that obliges U.S. citizens to consume 36 million gallons of agrofuels a year by 2022—ADM's stock surged nearly 20% from August to mid-December (Philpott, 2007). The company announced that it was "optimistic about the expanded role [agrofuels] will play in improving energy security, strengthening rural economies and helping to improve our environment" (ADM, 2007).

According to the Renewable Fuels Association (RFA)—the ethanol industry's lobbying group—out of a total of 176 operational ethanol processing plants in the United States, 40 were farmer-owned as of October 2008. Out of a total of 28 plants now under construction, 85% are owned by large corporations. This is vastly different from where the industry started. As recently as May 2007, farmer-owned plants were responsible for 40% of overall production (Hassan, 2007). That percentage has fallen to just 16.6% in 18 months. Five corporations control roughly 47% of all ethanol production in the United States (Hassan, 2007). The top 10 producers together control an estimated 70% (Hassan, 2007). Because of the economies of scale of its plants, and the fact that it can dominate the grain market in both food and fuel crops, ADM is emerging as the hegemonic player in the United States. While other ethanol companies are struggling with shrinking margins due to recent high corn prices, ADM has strengthened its market share and its profits (Birger, 2008).

Concentration of ownership of global agrofuels production by U.S. agribusiness is proceeding apace. Having recently bought the majority shares in Brazil's largest ethanol distillery, U.S.-based Cargill is now a leading exporter of both raw sugar and soybeans from Brazil—the former for ethanol feedstock, the latter for either feed or biodiesel. Cargill also has the largest capacity for processing oil seeds in Paraguay.[2] Over the past 3 years, venture capital investment in agrofuels has increased by nearly 700% (Reeves, 2007). Private investment in agrofuels is pouring into public research institutions, setting the agenda for agrofuels and eclipsing other research (Altieri & Holt-Giménez, 2007). New corporate partnerships are being formed between agribusinesses, biotechnology companies, oil companies, and car manufacturers.[3] Billions of dollars are being invested in the agrofuel sector in a development often likened to a "green gold-rush" in which countries are rapidly turning land over to agrofuel crops and developing infrastructure for processing and transporting them. New corporate partnerships and mergers are being formed at a dizzying rate: ADM with both Monsanto and Conoco-Phillips; BP with DuPont and Toyota, as well as with Monsanto and Mendel Biotechnology; Royal Dutch Shell with Cargill, Syngenta, and Goldman-Sachs; and DuPont with British Petroleum and Weyerhauser (ETC Group, 2007).

The Agrofuels Transition

The industrial brilliance of agrofuels is its perfect fit into the capitalist model of agriculture. The seasonal risks inherent in farming, the disjuncture between labor and production time, and the dependence on fixed, land-based production are all obstacles to the penetration of capital in agriculture (Mann & Dickenson, 1978). Capital minimizes or avoids these obstacles by investing in agriculture's labor processes and in the processing and distribution of agricultural products in what Goodman, Sorj, and Wilkinson (1987) refer to as appropriation and substitution. On one end, production factors (seeding, fertilization, pest control, cultivation, etc.) are appropriated by capital through the introduction of off-farm inputs like transgenic seeds, chemical pesticides, fertilizers, and herbicides. On the consumer end, capital substitutes industrial products for farm products by turning them into basic elements (sugars, starch, oil, etc.) for processed food and feedstock. This allows the agrifoods industry to add and capture value from primary production without incurring the risks of land-based production. By controlling inputs, processing, importing, distribution, and retailing, capital turns obstacles into opportunities and, in doing so, consolidates monopoly power over production (Walker, 2007). As consumers of expensive industrial products and producers of cheap raw materials, farmers are at a structural disadvantage, capturing less than 20% of the food dollar (from which they still must pay for inputs). This has driven the expansion of large, industrialized farms that operate on ever-shrinking profit margins.

Despite a 20-year trend in falling farm-gate prices and cheap food, global demand (purchasing power) has not kept up with supply (production capacity), leading to overproduction and surplus. Save the "food crises" of 1970 and 2007, grain has been cheap, and returns to industrial capital in agriculture have been declining as a whole (Moore, 2008). Because they add value to cheap grain, agrofuels are an industrial one-stop shop to solve the problem of falling rates of profit. The transformation of food into fuel (a) opens up new market space for overproduced commodities like corn, soy, and sugarcane; (b) inflates the value of those commodities in both food and fuel markets; and (c) creates more processing steps that allow corporate players to both add and capture more value. Unfortunately, this added value also sparked the food price inflation in 2006-2007, inviting the speculative bubble in grain futures in 2008.

The transformative power of agrofuels is reflected in their ability to influence policy, create markets, instrumentalize public institutions, consolidate monopoly capital, and transform landscapes on the ground. These agrarian transformations to our food and fuel systems constitute an *agrofuels transition*, competing with "creative" destruction, enclosures, class violence, and the subsumption of rural livelihoods to industrial capital (Holt-Giménez, 2007b). While this transition shares transformative characteristics with the agrarian transition of the Industrial Revolution, and mirrors many of the modernization strategies of the more recent Green Revolution, this time there is no expanding industrial sector to absorb displaced rural populations and no subsidy from cheap petroleum to ensure decades of industrial expansion. Rather, agrofuels represent an agrarian involution (see Geertz, 1963) in which the increasing social and environmental costs of production yield ever-declining social and environmental returns. The rents from agrofuels, however, squeeze value from a shrinking rural resource base and siphon capital from public sector budgets to provide lucrative and structural benefits to industry and finance capital. How and whether these benefits are distributed—and whether they can ever hope to cover the costs they have incurred—should be the subject of public debate rather than the de facto result of unregulated industrial expansion.

The restructuring taking place under the agrofuels transition is of grave concern for indigenous peoples, small farmers, and broader movements for food sovereignty. The long-term effects of the agrofuels transition on the global food system are yet to be seen. The physical restructuring of land ownership (in effect, regressive land reform) will be very difficult to undo. Once released, proprietary transgenes cannot be called back. The political and economic territory lost to global monopolies with the agrofuels transition will be difficult to regain as well.

Another Transition is Possible

Agrarian, environmental, and food justice movements must identify and come together territorially and internationally to defend the places and spaces under attack by agrofuels. To paraphrase the World Social Forum, "another agrarian transition is possible." This transition responds not to the logic of capital but to the redistributive logic of *food sovereignty*—people's right to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems (Via Campesina, 2007). "Another agrarian transition" privileges smallholder agriculture to rebuild national and local food systems. It requires an immediate moratorium and eventual rollback of agrofuels to explore the possibilities of locally owned, locally consumed, and locally controlled *biofuels*. It relies on agroecological approaches to production and protects the farmer's rights to seed, land, water, and fair markets. Food sovereignty requires the democratization of our food systems—their spaces and their places—in favor of the poor.

Notes

1. For the full report see Gaia Foundation (2008).

2. All information about the "second-generation pipeline" is freely available from the companies involved in their development and was taken exclusively from company Web publications.

3. With an estimated 13 silos and an illegal port facility built in the Amazon, Cargill is leading soy's invasion into the region—spurring the incursion of illegal farms and infrastructure to deliver soy to global markets. In 2005, Cargill became the majority shareholder of two palm oil plantations in Indonesia, on the islands of Sumatra and Borneo, and three more in Papua New Guinea.

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