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Published in *Capitalism Nature Socialism* 21(2): 64-86, June 2010

Global Agrofuel Crops as Contested Sustainability
Part I: Sustaining What Development?*

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Introduction: Sustainability in Dispute

Governments have been promoting biofuels for various stated aims—to help reduce greenhouse gas (GHG) emissions, to substitute for oil imports, to enhance energy security, and/or to gain export income. Finding substitutes for oil imports is a high priority for industrialized countries such as the United States, European Union member states, and Brazil. Governments also claim that biofuels from crops will benefit rural communities by enhancing economic development and employment. To stimulate biofuel markets, governments give subsidies, set targets for biofuel use and provide research funds for its future technoscientific development.

The European Union has set mandatory targets for "renewable energy," which must comprise nearly 6 percent of transport fuels by 2010 and 10 percent by 2020. Dating from at least 1997, "this renewable energy policy was founded on the need to address sustainability concerns surrounding climate change and air pollution, improve the security of Europe's energy supply and develop Europe's competitiveness and industrial and technological innovation," as reiterated in recent legislation.[2] The latter aim includes proprietary knowledge on technoscientific means to modify plants and convert them more efficiently into energy. The targets are meant to reduce dependence on fossil fuels but depend greatly on imported feedstock, which are generally cheaper than domestic sources.

More generally in E.U. policy, economic competitiveness is linked with reliable, stable imports of raw materials: "More than ever, Europe needs to import to export… Energy will be particularly important," its Global Europe strategy states.[3] In particular, the transport sector "is forecast to grow more rapidly than any other up to 2020 and beyond," thus potentially increasing dependence on oil imports.[4] Although biofuels are supposed to alleviate that dependence, in practice they may complement rather than reduce oil imports, thus helping to sustain the growth in transport.

Claims for biofuel production or imports as "sustainable" have been widely disputed. Even considering only direct effects, some biofuel crops may not reduce GHG emissions, at least not

* This article draws on a research project, "Land Use, Bioenergy and Agro-biotechnology," funded by the German Advisory Council on Global Change (WBGU) in 2008, as a contribution to its report, *World in Transition—Future Bioenergy and Sustainable Land Use*, available online at: http://www.wbgu.de/wbgu_jg2008_engl.html. Some research also received funding from the European Community's Seventh Framework Programme under grant agreement n° 217647. Carried out during 2008-10, the project called Co-operative Research on Environmental Problems in Europe (CREPE) had a part on agrofuels, www.crepeweb.net

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[2] Directive 2009/28/EC of the European Parliament and of the Council of April 23, 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC Renewable Energy Directive, *Official Journal of the European Union* L 140, June 5, 2009, pp. 16-62.

[3] Global Europe: Competing in the World. A Contribution to the E.U.'s Growth (Brussels: Commission of the European Communities, 2006).

[4] "Biofuels and Other Renewable Energy in the Transport Sector," Directorate General for Transport and Energy, European Commission, 2009 online at: http://ec.europa.eu/energy/renewables/biofuels/biofuels_en.htm

in a cost-effective way.[5] Prevalent accounting systems ignore significant sources of GHG emissions: 'This accounting erroneously treats all bioenergy as carbon neutral regardless of the source of the biomass, which may cause large differences in net emissions', according to a scientific article.[6] The European Commission predicts multiple benefits for the global South: "The production of biofuels from suitable feedstocks could also generate economic and environmental benefits in a number of developing countries, create additional employment, reduce energy import bills and open up potential export markets."[7] These claims for economic and environmental benefits have also faced widespread challenge.

Biofuel crops have been blamed for numerous harmful effects in the global South. These include: competition for land use, land-grabbing, higher food prices, greater agrichemical usage, shifts to agri-industrial monocultures, loss of rural livelihoods, peasants' expulsion from land, and deforestation. Beyond the impacts of planting a specific crop, indirect harm also results by displacing production across the globe. For example, since 2007 U.S. farmers have increased their corn production for biofuels while decreasing acres planted in soybeans, which shifted elsewhere. In Brazil, new soybean farms use land that was previously cleared by cattle ranching, which in turn moves to frontiers in the Amazon forest.

NGOs gave early warnings about harmful effects of changing land use for biofuels. Some critics challenged the ambiguous, deceptive term "biofuels."[8] They emphasized the threat from "agrofuel because of the intensive, industrial way it is produced, generally as monocultures, often covering thousands of hectares, most often in the global South."[9] As a protest slogan says, "Agrofuel—no cure for oil addiction and climate change" (see Figure 1).[10]

Similar criticisms and concerns were taken up later by some state bodies. Partly in response, governments have set "sustainability criteria" for biofuels that would count towards mandatory targets.

This article analyses various causes of sustainability problems from agrofuels, especially from agri-industrial production methods in the global South. We will discuss the following questions:

- How are agrofuel crops being promoted as sustainable, beneficent sources of energy – and at the same time criticized as malign, even unsustainable?
- How does this conflict involve different accounts of sustainability?

Critical Perspectives: Global Markets, Capital Accumulation and Dispossession

For analyzing biofuels, two critical concepts are essential here: the biofuels market as a global integrated network, and capital accumulation by dispossession. Industrial strategies integrate states and natural resources in networks of commodity flows. This integration enhances opportunities to identify, appropriate, and exploit resources as capital, i.e., as self-expanding value. As a basis for capital accumulation, economic elites gain greater control over human and

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[5] The cost of biofuels 'is much higher than alternative ways to save GHG', according to an expert report, considering only money costs. See R. Edwards, S. Szekeres, F. Neuwahl, V. Mahieu (authors), and G. De Santi (ed.), "Biofuels in the European Context: Facts and Uncertainties," Joint Research Centre, European Commission, 2008, page 15.

[6] Tim Searchinger et al., "Fixing a Critical Climate Accounting Error", *Science,* Vol. 326. No. 5952, 23 October 2009, pp. 527-528, http://www.sciencemag.org/cgi/content/short/326/5952/527

[7] "An E.U. Strategy for Biofuels," Communication from the Commission, SEC(2006) 142, Commission of the European Communities, Brussels, 2006.

[8] For similar reasons, in this article we generally use the term "agrofuels," except where an original source or policy uses the term "biofuels."

[9] Biofuelwatch, Carbon Trade Watch/TNI, Corporate Europe Observatory, Econexus, Ecoropa, Grupo de Reflexión Rural, Munlochy Vigil, NOAH (Friends of the Earth Denmark), Rettet Den Reganwald, and Watch Indonesia, "Agrofuels: Towards a Reality Check in Nine Key Areas," June 2007, p. 6, online at: http://www.econexus.info/pdf/Agrofuels.pdf.

[10] Action for Solidarity, Environment, Equality, and Diversity (A SEED), photo of protest sign: "Agrofuel, no cure for oil addiction and climate change," 2008, online at: http://www.aseed.net, also http://lasojamata.iskra.net/en/node/117

natural resources, thus dispossessing communities. Moreover, states have a weaker capacity or incentive to protect general livelihoods and environments, especially in the global South. 'Eco-efficient' technological solutions are promised as means to avoid future harm by reducing the need for natural resources, yet analogous innovations have stimulated greater resource usage in the past.

Market as a Global Integrated Network

Biofuels epitomize the capitalist globalization process. Until recently, biofuels were promoted for mainly local or national uses, especially as a substitute for oil imports; sometimes national biofuel production was protected from foreign competition. However, greater industrial integration and commodity flows have been globalizing biofuels, thus deterritorializing relations between production and consumption. An emerging "global integrated biofuel network" (GIBN) is characterized by greater transboundary flows, weaker influence by states, a homogenization of products and processes, and an integration with analogous networks of fossil fuels, observes Arthur Mol. "Overall, there is a tendency towards standardized products that can be detached from the local space of place and be transferred in a globally integrated network."[11]

Embryonic small-scale, local biofuel networks have been undergoing pressures for integration into national biofuel regions and then into international commodity flows, as exemplified initially by Brazil. "Local marginal farmers become increasingly dependent on powerful global players in the GIBN," he says.

> These national biofuel regions result in large-scale monocropping biofuel production and the increasingly centralized, homogenized production and refining of these crops, while local biofuel regions are losing their relevance. Secondly, there is a clear tendency towards the development of a GIBN in which production, trade investment, consumption, control and governance lies beyond the control of nation-states.[12]

Such systems damage local environmental resources. Large-scale, high-input monocultures degrade soil and water, undermining food availability and affordability for local populations.

Despite increasing global pressures, many local biofuel regions have significant barriers to agri-industrial cultivation methods. Where land access and cost structures are unfavorable, biofuel crops could possibly be developed as a local energy substitute, especially in peripheral localities that are not well served by conventional fossil-fuel infrastructures.[13] Conversely, profitable investment depends upon overcoming those barriers and thus incorporating localities into global value chains. Current economic drivers tend to ensure that production is subordinated to global production and consumption patterns.

Under pressure from civil society, government policies may incorporate efforts to address environmental issues, for example, by monitoring whether biofuel production saves or increases carbon emissions. However, it is much more difficult to mitigate new social vulnerabilities in the global South, given the structural change in power relations between global traders, developing countries, and small-scale farmers, Mol says.[14] Even if governments want to protect local resources and livelihoods from dispossession, they have less capacity to exercise effective control.

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[11] Arthur P.J. Mol, "Boundless Biofuels? Between Environmental Sustainability and Vulnerability," *Sociologia Ruralis,* Vol. 47, No. 4, 2007, pp. 297-314.
[12] *Ibid.*, pp. 305-307.
[13] *Ibid.*, p. 304.
[14] *Ibid.*, pp. 309-310.

Accumulation by Dispossession

Current dispossession of resources, especially in the global South, has analogies with the primitive accumulation that originally turned resources into private property. In "the historical process of divorcing the producer from the means of production," entire populations were "forcibly torn from their means of subsistence," Marx observed. Furthermore, "The expropriation of the agricultural producers, of the peasant, from the soil is the basis of the whole process." [15]

David Harvey extends Marx's concept as an ongoing process called "accumulation by dispossession." This trans-historical concept draws present-day analogies with early capitalism:

> A closer look at Marx's description of primitive accumulation reveals a wide range of processes. These include the commodification and privatization of land and the forceful expulsion of peasant populations; conversion of various forms of property rights (common, collective, state, etc.) into exclusive private property rights; suppression of rights to the commons; commodification of labor power and the suppression of alternative (indigenous) forms of production and consumption; colonial, neo-colonial and imperial processes of appropriation of assets (including natural resources); monetization of exchange and taxation (particularly of land); slave trade; and usury, the national debt and ultimately the credit system as radical means of primitive accumulation…. All the features which Marx mentions have remained powerfully present within capitalism's historical geography up until now.[16]

Harvey also draws links between types of dispossession, within and outside the labor process, including broader forms of commons:

> … there has been a tendency for Left traditionalists and labor organizers to ignore struggles against dispossession, while those struggling against dispossession through enclosure of the commons, privatization and the predatory behaviors of corporate capital in the spheres of consumption, reproduction (for example, health) and environmental degradation sometimes view the traditional labor movement as hostile to their concerns. I marked the difference in order to try to establish some of the commonalities—dispossession occurs in the labor process as well as outside of it, so why not put them together in a broader-based coalition politics of the dispossessed?[17]

Such dispossession remains central to capital accumulation in its recent forms. By analogy to the original enclosures of common land, new strategies seek to enclose broader resources for private use, especially in the face of collective efforts to protect them as common resources. This can mean promoting new areas of commodification vis-à-vis resistance, or preserving old areas of commodification vis-à-vis social struggles attempting to reclaim them as common resources. These commons include land, water, and knowledge.[18]

Enclosures often depend upon violence. In the concept of "violent environments," the environment is an arena of contested entitlements, where actors play out claims over resources, labor, and societal recognition. New conditions in the environment and natural resources generate a shift in the power relations of resource users.[19] Moreover, violence can act as an agent of such changes: "violence leads to the transformation of resource systems, which in turn impacts upon associated livelihood systems through processes of socio-environmental transformation."[20]

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[15] Karl Marx, *Capital*, Volume 1 (London: Penguin, 1976), Chapter 26, pp. 875-876.
[16] David Harvey, *The New Imperialism* (Oxford: Oxford University Press, 2003), p. 145.
[17] David Harvey interviewed by Alberto Toscano, *Development and Change*, Vol. 38, No. 6, 2007, p. 1134.
[18] Massimo De Angelis, "Separating the Doing and the Deed: Capital and the Continuous Character of Enclosures," *Historical Materialism*, Vol. 12, No. 2, 2004, pp. 57-87.
[19] Nancy Peluso and Michael Watts, "Violent Environments," in N. Peluso and M. Watts (eds.), *Violent Environments* (Ithaca, NY: Cornell University Press, 2001), p. 25.
[20] Hans-Georg Bohle and Hartmut Fünfgeld, "The Political Ecology of Violence in Eastern Sri Lanka," *Development and Change*, Vol. 38, No. 4, 2007, p. 671.

All those dynamics were linked by Karl Polanyi to analyze mass starvation in British-ruled India:

> Under the monopolists the situation had been fairly kept in hand with the help of archaic organization of the countryside, including free distribution of corn, while under free and equal exchange, Indians perished by the millions…. The catastrophe of the native community is the direct result of the rapid and violent disruption of the basic institutions of the victim… These institutions are disrupted by the very fact that a market economy is foisted upon an entirely differently organized community; labor and land are made into commodities, which, again, is only a short formula for the liquidation of every and any cultural institution in an organic society.[21]

As another historian has noted, market pressures drove Indian and Chinese peasants into debt as a strategic instrument of dispossession: "Instead of profiting from exchange, they were forced by the market into the progressive deterioration of their conditions of production, i.e., the loss of their property titles."[22]

Small-scale producers may undergo dispossession even while maintaining formal ownership of their land. Contract farming is proposed as a way of incorporating small farmers into global markets and enabling small farmers to enter carbon markets. Generalized commodity production internalizes capitalist social relations in the organization of small-scale farming. Loss of land may be a later stage of the commodification process.[23]

Through various pressures since then, small-holders have been effectively forced into global commodity markets, thus undermining the earlier basis of food security and cultivation methods. As another commons essential for local community needs, forests have been cleared for agri-industrial production. Low productivity is often blamed for food shortages, environmental destruction, and deforestation, as if these were essentially technical problems that result from non-intensive land use practices. Yet the causal relation is often the reverse: technological development has made it possible to intensify land use to the point of large-scale deforestation.[24]

Causes of Sustainability Problems

Agrofuels are mostly produced in environmentally and socially destructive agri-industrial monocultures. Key drivers are corporate quests for more profitable products along with governments' search for export markets, foreign currency and foreign investment, especially as speculation moves into agriculture and land. Agribusiness stimulates and fulfils a greater global demand for animal feed and fuel; those commodities become integrated with other industrial products through processes of vertical and horizontal integration, initially with the energy industry. Agrofuels thus provide both an incentive and a pretext for grabbing land. Expectations that agronomic and/or technological changes can increase productivity provide further incentives to obtain more land for agrofuels.

Agrofuel promotion often describes land as "marginal," "idle" or "degraded" in order to justify how land use for biofuel crops need not compete with food production. According to a UK government report by Ed Gallagher, further pressures on agricultural land should be avoided by several policy measures: 'This includes use of appropriately defined idle agricultural land,

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[21] Karl Polanyi, *The Great Transformation* (Boston: Beacon Press, 1944), pp. 159-160.
[22] Hans Medick, "The Proto-Industrial Family Economy and the Structures and Functions of Population Development under the Proto-Industrial System," in P. Kriedte, et al. (eds.), *Industrialization Before Industrialization* (Cambridge: Cambridge University Press, 1981), p. 44.
[23] Henry Bernstein, "Rural Livelihoods and Agrarian Change: Bringing Class Back In," in N. Long and Y. Jingzhong (eds.), *Rural Transformations and Policy Intervention in the Twenty-first Century: China in Context* (London: Edward Elgar), forthcoming.
[24] Susan Hecht, "Invisible Forests: The Political Ecology of Forest Resurgence in El Salvador," in R. Peet and M. Watts (eds.), *Liberation Ecologies* (London: Routledge, 2004), p. 67; see also A. Angleson and D. Kaimowitz, *Agricultural Technologies and Deforestation* (London: CAB, 2001).

marginal lands, wastes and residues and intensification of current production'.[25] That report has been cautiously cited for prospective land availability in the global South. According to a development agency of the European Commission,

> The use of land for energy crops could affect either agricultural or high value natural land. In both cases it can imply an incremental natural resources pressure on the given area as these crops usually require more fertilisers and pesticides than traditional ones. Also water and land requirements are bigger in the case of energy crops in order to obtain a large-scale production that could increase the investment profitability. The Gallagher Review has estimated however there is sufficient land available to satisfy demand for food, feed and fuel to 2020, but this needs to be confirmed in a local and regional context before global supply of bioenergy increases significantly. [26]

Such accounts remain cautious about any conflict-free, sustainable availability and use of land. Yet they give credibility to deceptive concepts, without asking: "marginal" to what and whom? According to a report by the International Forum on Globalization and the Institute for Policy Studies, "indigenous people depend on these now marginal lands for their livelihoods." With the rise of a global agrofuels market, moreover, "[t]he drive to use increasing amounts of marginal land for energy crops will also require more fertilizer use, create more erosion, and further degrade soil fertility, which is essential for food security."[27] As that report shows, even some agrofuels critics speak about "marginal" land.

"Idle" land is likewise deceptive. In another report, the International Institute for Environment and Development noted:

> [Although] identifying "idle" lands may help bring underutilized land into production, it may also create risks of dispossession. Where forms of local resource use are perceived as low productivity, land may risk being classified as idle or underutilized, and therefore available to prospective investors, despite the economic, social or cultural functions it performs for local people.[28]

Thus such concepts involve assumptions about productive or wasteful use of resources. In the context of the agrofuels market, "marginal" or "idle" means previously unproductive for capital accumulation, regardless of other societal uses, now or in the future. Agrofuel expansion looks for "abandoned cropland" which can be "freed" for biomass plantations. Such language ignores livelihoods of communities who do not practice intensive agriculture, especially pastoralists and women.[29]

Even where smallholders contracting with agri-industrial corporations retain access to land, their labour is exploited and subordinated to global market pressures. They are easily caught in debt traps; often they must borrow funds to buy tools, seeds, as well as basic necessities at a price set by the companies buying the crop. Thus small-scale producers become vulnerable to dependency upon a large, well-organized company that dominates the local infrastructure.[30] These power relations may constitute local or regional monopolies.

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[25] Ed Gallagher, *The Gallagher Review of the Indirect Effects of Biofuels Production*, p.12 (London: Renewable Fuels Agency, 2008), http://www.dft.gov.uk/rfa/_db/_documents/Report_of_the_Gallagher_review.pdf

[26] "Position on Biofuels for the ACP-EU Energy Facility," EuropeAid, Brussels, 2009, p. 4.

[27] Jack Santa Barbara, "The False Promise of Biofuels," a report from the International Forum on Globalization and the Institute for Policy Studies, September 2007, pp. 8, 11, available online at: http://www.ifg.org/pdf/biofuels.pdf.

[28] Lorenzo Cotula, Nat Dyer, and Sonja Vermeulen, "Fuelling Exclusion? The Biofuels Boom and Poor People's Access to Land," International Institute for Environment and Development (IIED) the Food and Agriculture Organization of the United Nations (FAO), 2008, pp. 46-47, available online at: www.iied.org/pubs/pdfs/12551IIED.pdf.

[29] Gaia et al., "Agrofuels and the Myth of the Marginal Lands," a briefing by The Gaia Foundation, Biofuelwatch, the African Biodiversity Network, Salva La Selva, Watch Indonesia and EcoNexus, 2008, available online at: http://www.econexus.org/.

[30] Marcus Colchester and Norman Jiwan, "Ghosts On Our Own Land: Indonesian Oil Palm Smallholders and the Roundtable on Sustainable Palm Oil," Forest Peoples Programme and Perkumpulan Sawit Watch, 2006, available online at: http://www.forestpeoples.org; J.W. Oosterkamp, "Oil Palm: Comparing Chocó (Colombia) with West Kalimantan (Indonesia)," CordAid, Bogotá, January, 23, 2007.

In contrast to agri-industrial systems, traditional agricultures provide many benefits, in particular:

- Small-scale, locally focused, diverse agriculture already fulfils nutritional and livelihood needs for hundreds of millions of people in the global South.
- Poly-cultures such as inter-cropping produce a wider range and greater quantity of useful bio-material for local populations than monocultures do.
- Given their biodiversity, such systems are more resilient to shifts in climate and water resources than large-scale monocultures.
- Farmers develop and exchange their own crop varieties, by selecting and breeding in diverse characteristics that can respond to new threats such as climate change, pests, or diseases.
- Such small-scale systems could (or do) produce biofuel for local use in ways that are socially and environmentally less harmful, while still giving priority to local food needs and thus minimizing competition for land use
- Sustainability means optimizing the use of local resources and thus minimizing dependence on distant markets.

Such systems depend upon commons of many kinds: access to land; use of local resources which help to avoid debt traps; forests providing diverse resources such as food, firewood and grazing areas; the right to save, exchange, breed and re-use seed; control over what to grow; and direct sales to an open local market. Agrofuels undermine such agricultural systems, the various commons on which they depend, and community bonds that sustain them.

As a related issue of agri-environmental sustainability, agrofuel crops also threaten water resources. Agriculture consumes at least 70 percent of all water used worldwide; crop cultivation for fuel increases this usage. Furthermore, considerable water is required to process crops into fuels; for example, 4 gallons of water are needed to produce 1 gallon of ethanol—far more than for petroleum. Crops that depend on intensive irrigation, and extraction from declining reserves of fossil water, aggravate the global crisis in shortages of clean, safe fresh water.[31]

In those ways, agrofuels extend harm already caused by agri-industrial crop production for animal feed, edible oils, fabrics and other commodities. This link is illustrated by three main examples below: soy in Latin America, oil palm in Indonesia, and jatropha in Tanzania. The latter two crops cannot yet be harvested by mechanical means, so small-scale farmers in theory could benefit from cultivating them for agrofuels; yet oil palm and jatropha involve similar conflicts.

Soy Monocultures in Latin America: From Animal Feed to Agrofuels

A genetically modified (GM) herbicide-tolerant crop, Roundup Ready (RR) soybean, has been crucial in expanding soy monocultures in Argentina since 1996. More than a decade later, RR soy covers more than 15 million hectares in Argentina. The crop is designed to survive the application of the broad-spectrum herbicide glyphosate. This is sold to farmers as Roundup, which contains surfactants and other additives (designed to make the active ingredient more effective) that make its action distinct from that of glyphosate alone. Often sprayed from small airplanes or large trucks, Roundup herbicide is applied to remove weeds and "volunteer" crops from previous plantings. Large areas are cultivated by direct-drilling machines that apply fertilizer, seed, and pesticide in a single pass through the field. This modernizes and simplifies the farming process, often reducing the farmer's need for labor. On their own criteria, these systems initially had some success in mass producing a single crop, which has benefited some large-scale producers.

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[31] Committee on Water Implications of Biofuel Production in the United States, National Research Council of the National Academies of Science, *Water Implications of Biofuel Production in the United States* (Washington, D.C.: National Academies Press, 2007), online at: http://www.nap.edu/catalog/12039.html.

However, soy monocultures have significantly harmed rural communities, local food production, biodiversity, the livelihoods of the majority of rural people, and land access. Like most commodity producers around the world, soy farmers in Argentina, are caught between high input costs and low prices for their crops. Land prices and debts have risen. In addition to these difficulties, threats and actual violence have driven people off their land, many fleeing to urban slums. In one region, where some peasants refused to leave, 'armed groups would steal their cattle, burn their crops and threaten them with violence'. [32]

In areas dominated by soy monocultures, general prosperity and nutrition have declined. Mixed farming in Argentina once produced a wide range of staple food products and provided employment and adequate incomes for rural communities. But mechanization and monoculture have greatly reduced the number of jobs. Milk and other foodstuffs now have to be imported into a country that used to produce ten times its own food needs. Hunger and malnutrition have been reported from some regions. Thus, diverse nutritious food production has been marginalized by soy. Furthermore, attempts to replace meat with soy have caused health problems among the urban poor, since Argentine soybeans reportedly contain less protein and amino acids than soybeans from the U.S., China, and Brazil.[33]

Aerial herbicide spraying harms the health of people, animals and crops. Illnesses typically manifest in skin, respiratory, and digestive ailments and cancers. Despite the direct health threat of spraying, communities generally are given no advance warning and have no escape. Though they lose their own crops and local biodiversity, their protests have been often met with violence.

Massive soy plantings have seriously damaged forests in Argentina. The Chaco Forest previously survived a century of smallholder farming, but by 2004 large areas had been cleared for growing GM soy. The removal of forest lands has led to lower rainfall, more flooding, local climate change, and losses of unique biodiversity. Illnesses such as leishmaniasis[34] have increased in some areas of intense deforestation.[35]

Despite the massive use of chemicals to avoid pests, soya monocultures create perfect conditions for pests to proliferate. The application of huge amounts of a single herbicide induces herbicide tolerance in weeds. By 2002 research had documented herbicide resistance in about twelve common weeds in Argentina, and additional herbicides such as atrazine and paraquat are now required to clear the weeds after the harvest.[36]

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[32] Lilian Joensen, Stella Semino, and Helena Paul, "Argentina: A Case Study on the Impact of Genetically Engineered Soya: How Producing RR Soy is Destroying the Food Security and Sovereignty of Argentina," a report for The Gaia Foundation, April 2005, p.3, online at: http://www.econexus.info/publications.html. Also *Soy and Agribusiness Expansion in Northwest Argentina - Legalized deforestation and community resistance. The cases of the Wichí communities of the Itiyuro River Basin and Misión Chaqueña, the Creole families of the Dorado River Basin and the Guaraní communities of El Talar,* published by CAPOMA (Argentina), La Soja Mata and Chaya Comunicación (Argentina), with the support of: BASE Investigaciones Sociales (Paraguay), http://lasojamata.iskra.net/.

[33] Lisa K. Karr-Lilienthal, Christine M. Grieshop, Neal R. Merchen, Donald C. Mahan, and George C. Fahey, Jr., "Chemical Composition and Protein Quality Comparisons of Soybeans and Soybean Meals from Five Leading Soybean-Producing Countries," *Journal of Agricultural and Food Chemistry*, Vol. 52, No. 20, 2004, pp. 6193-6199, http://pubs.acs.org/cgi-bin/abstract.cgi/jafcau/2004/52/i20/abs/jf049795+.html.

[34] Leishmaniasis is a serious and in some cases life-threatening parasitic disease transmitted by sand flies. Weeks to months after the victim is bitten, long-lasting large, red, weepy, scarring skin sores appear, often along with fever. Leishmaniasis can damage the spleen, liver, and cause anemia.

[35] Lilian Joensen, Stella Semino, and Helena Paul, "Argentina: A Case Study on the Impact of Genetically Engineered Soya: How Producing RR Soy is Destroying the Food Security and Sovereignty of Argentina," a report for The Gaia Foundation, April 2005, p.23, online at: http://www.econexus.info/publications.html

[36] Lilian Joensen, Stella Semino, and Helena Paul, "Argentina: A Case Study on the Impact of Genetically Engineered Soya: How Producing RR Soy is Destroying the Food Security and Sovereignty of Argentina," a report for The Gaia Foundation, April 2005, online at: http://www.econexus.info/publications.html; Michael Altieri and Walter Pengue, "GM Soybean: Latin America's New Colonizer," *Seedling*, January 2006, online at: http://www.grain.org/seedling/?id=421.

Soy monocultures have also become vulnerable to disease attacks. One disease, Asian rust, which can reportedly wipe out 80 percent of the crop within weeks,[37] has been active in Argentina. Fusarium, a devastating fungal pest, has also become a threat, requiring farmers to apply fungicides, come up with new strategies in growing the crop, and use different farm equipment that has not handled fusarium-infected crops. As this experience illustrates, "[e]xcessive reliance on a single agricultural technology, like RR soybeans, sets the stage for pest and environmental problems that can erode system performance and profitability."[38]

Soy monocultures have also damaged soil quality and water resources in Argentina. After more than a decade of agri-industrial production—often growing the same crop year after year on the same piece of land—evaluations revealed that soil nutrients needed replacement and soil structure had been damaged, especially by compaction. Glyphosate herbicide harms earthworms, which otherwise help maintain soil fertility. And the conventional, synthetic fertilizers used in large-scale monoculture farming generates N_2O emissions, which are likely to counteract any benefit gained from soy-derived biofuel in replacing fossil fuels.[39] Furthermore, yields are not increasing, so any further growth in production takes place at the expense of biodiversity, forests, soil quality, water and the communities that depend on these resources.

Politics and economics have been driving Argentina's expansion of Roundup Ready soy. From 1989-1999 the government of Carlos Menem undertook a privatization campaign that tripled Argentina's enormous national debt. At the same time, it subsidized investment in facilities for grain transport from agri-industrial areas to ports, as well as for container shipping. The Menem government granted U.S.-based chemical and biotechnology giant Monsanto Corporation the licence to commercialize RR soy. As a means to accommodate intense political pressure from creditors, most soy production in Argentina is exported for animal feed to earn foreign currency in order to service the national debt.

The expansion of soy cultivation generated tremendous conflicts over resources, as the following example illustrates:

> The worst episode occurred when the government of the northwestern province of Salta stripped the Pizarro nature reserve of its legal status as a protected area in order to auction off part of the land to agribusiness firms. However, after 20 months of an intense campaign by environmentalists, indigenous groups and local residents, the sale of land was cancelled and the reserve's protected status was restored.[40]

In recent years, biodiesel demand has further escalated the expansion of agri-industrial soy cultivation in Argentina. Biodiesel provides a supplementary market for the oil, complementing the animal feed market for the cake. According to Grupo de Reflexión Rural, a Buenos Aires-based NGO that documents the negative impacts of industrial agriculture and works to support small farmers:

> Soy biodiesel is not a business to be carried out on a small scale, as cost, running the machinery, the distribution of the forage cake by-product, [and] the size and cost of the overseas freight for exporters means that the industry can only be taken on by large businesses. As the main producer of soy oil, Argentina is in [a] prime position to satisfy internal and external demand.[41]

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[38] Charles Benbrook, "Rust, Resistance, Run Down Soil, and Rising Costs: Problems Facing Soybean Producers in Argentina," *AgBioTech InfoNet*, Technical Paper Number 8, 2005, online at: http://www.greenpeace.org/raw/content/belgium/nl/press/reports/rust-resistance-run-down-soi.pdf.

[39] P.J. Crutzen[1,2,3], A.R. Mosier[4], K.A. Smith[5], and W. Winiwarter, "N_2O Release from Agro-Biofuel Production Negates Global Warming Reduction by Replacing Fossil Fuels," *Atmospheric Chemistry and Physics Discussion*, Vol. 7, 2007, pp.11191-11205, online at: http://www.atmos-chem-phys-discuss.net/7/11191/2007/acpd-7-11191-2007.html.

[40] M. Valente, "Argentina: The Environmental Costs of Biofuel," *Inter Press News Agency*, April 20, 2005, online at: http://ipsnews.net/news.asp?idnews=32959.

[41] Stella Semino, "Future Perspectives of the Soy Agribusiness: Biodiesel, the New Market," in Javiera Rulli (ed.), *United Soy Republics: The Truth About Soy Production in South America* (Buenos Aires: Grupo de Reflexión Rural & La Soja Mata, 2007), p. 3, available online at: http://lasojamata.iskra.net/en/?q=node/91

In recent years this agri-industrial model has been extended across the border into Paraguay, where violence against peasants has become widespread. This violence results from the agro-export model: "An additional consequence is the recent spate of forced evictions within the rural peasant communities because of the advance of mechanised and commercial agriculture." [42]

Brazil too has greatly increased both soy production and its sugarcane crop for export. In some regions, land and grain use has shifted—from food to animal feed and agrofuels—stimulated by higher market prices. Effects on deforestation are indirect but traceable:

> Soy producers buy up land already cleared by cattle ranchers, who then acquire cheaper land deeper in the Amazon jungle, replacing virgin forest with vast pastures. The rocketing of soy prices—72 percent in the past year—has been widely blamed for the accelerating clearances.[43]

Driven partly by soy cultivation, rainforest destruction and food prices have increased in Brazil, despite government claims to the contrary (see Figure 2).

Soy production has also resulted in dependency and dispossession of small-scale cultivators. The NGO Foodfirst Information and Action Network (FIAN) studied such developments in the Cerrado, an enormous savannah area:

> … the Cerrado, like the Amazon, is not an empty and uninhabited area available for the expansion of agricultural crops for energy production, as some government documents on agri-energy try to show…. Although the biodiesel production program takes socio-environmental elements into account, it has privileged the use of soybeans as [a] raw material, which benefits particularly the soybean multinational corporations, and not the peasant family farmers…
>
> In the biodiesel production project, we found food vulnerability as a result of the low income of the families living in the settlement, insecurity regarding land tenure, intimidation of free organization, [and] dependence of settled farmers on the company, which generates debt and hampers the development of family producers.[44]

For a long time in the Southern cone countries, government policies for agricultural mechanization have favored a technology paradigm that undermines small-scale family farms. Their marginalization has generated a rural exodus to urban areas.45 About 220,000 people left rural areas of Santa Fe province during the two decades between 1980-2001.

Agrofuels development extends previous conflicts over land use. "The current model of bioenergy production is sustained by the same elements that have always caused the oppression of our peoples: appropriation of territory, resources and the labor force," as an NGO coalition stated in its declaration, "Full Tanks at the Cost of Empty Stomachs."[46] According to Via Campesina Argentina, the Argentinean countryside faces a 'war' between two production models: small scale farming versus large scale soy plantations.

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42 Javiera Rulli, "Soya Expansion and the Paramilitarisation of the Countryside", *United Soy Republics: The Truth about Soy Production in South America*, 2007, p.221, Buenos Aires: BASE Investigaciones Sociales, http://lasojamata.iskra.net/en/node/91; Spanish-language text available in *Paraguay Sojero*.

[43] R. Carroll and T. Phillips, "King of Soy," *Guardian*, March 3, 2008.

[44] Sofia Monsalve Suárez (ed.), "Agrofuels in Brazil: Report of the Fact-finding Mission on the Impact of Public Policies Encouraging the Production of Agrofuels on the Enjoyment of the Human Rights to Food, Work, and the Environment Among the Peasant and Indigenous Communities and Rural Workers in Brazil," Foodfirst Information & Action Network [FIAN] International, July 2008, pp. 5-6, online at: http://www.fian.org/resources/documents/others/agrofuels-in-brazil/pdf.

[45] John Wilkinson, "Regional Integration and the Family Farm in the Mercosul Countries," in D. Goodman and M.J. Watts (eds.), *Globalizing Food* (London: Routledge, 1997), p. 40.

[46] M.L. Mendonça, M. Melo, P. Júnior, G. Cerdas Vega, J. Xacult, L. Saldivar Tanaca, H. Wittma, P. Urena, H. Mondragón, and G. Burgos Lino, "Agroenergy: Myths and Impacts in Latin America," Land Rights Action Network (LRAN), Network for Social Justice and Human Rights, Pastoral Land Commission, Gridos dos Excluídos Continental, and Serviço Pastoral dos Migrantes, October 2007), p. 51, online at: http://www.landaction.org/spip/spip.php?article210.

Moreover, government policies to redistribute land are being undermined by the new demand for agrofuels. In Brazil, "large landowners who had previously acquiesced to the principle of land redistribution are now holding more tightly to the land. This is reportedly due to the higher economic returns that may be generated by biofuel cultivation."[47] Agrofuels expansion is thus "limiting the possibilities of a land reform and threatening the control traditional peoples have over their territories and resources."[48] Protest has linked agrofuels with social injustice (see Figure 3).

Facing criticism about harm of many kinds, the soy industry gained assistance from the World Wide Fund for Nature (WWF). Together they responded in 2004 with a Round Table on Sustainable Soy, which later changed its name to "Responsible Soy".[49] This was followed up by a Task Force on Sustainable Soy, representing Dutch companies. Their "Draft Principles and Criteria" include issues of labour conditions, land rights, traditional land use, and community relations.[50] Despite doubts about accountability, in May 2009 the Third Round Table on Responsible Soy established voluntary production standards and set out to test them.[51]

Attempts at reform did not avoid harm from soy monocultures. The Global Forest Coalition of 130 NGOs called upon others to withdraw from the Round Table. By participating, "NGOs are legitimizing the expansion of large-scale soy monocultures that lead to massive deforestation," said the Coalition.[52] Likewise, "We denounce the corporate greenwashing of the niche market of certification," stated a declaration of civil society groups. [53] Despite these criticisms, WWF Brazil participates in the Round Table's efforts towards biomass standards, e.g; criteria for soy-based biodiesel to qualify for EU targets.[54]

Oil Palm in Indonesia: More Forest Destruction and Land Seizures

Oil palm takes several years to reach maturity and yield a crop. Smallholders sign multi-year contracts with companies, but have little influence over the price they are paid, as the case of Indonesia illustrates.[55] Such arrangements make small-scale farmers more dependant upon exporters and creditors than they were previously.

In Indonesia, oil palm has long been produced for food and cosmetics, among other uses. Large areas of peat have been burned and forest cut for oil palm plantations, which has turned Indonesia into the world's third largest CO_2 emitter. Local people have little means to prevent this destruction, especially the external forces driving it, according to NGOs, the Forest Peoples Programme and Perkumpulan Sawit Watch.[56] Although oil palm is not inherently destructive,

> The problems come when the crop is imposed on people's lands and lives without respect for their rights and freedoms. When introduced in this way it can reduce previously self-sufficient

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[47] Cotula, et al., *op. cit.*, p. 28.
[48] "Agrofuels in Brazil," *op. cit.*, p. 18.
[49] http://www.responsiblesoy.org
[50] The Principles and Criteria Document of the Round Table on Responsible Soy (RTRS) was approved unanimously, May 28, 2009, online at: http://www.responsiblesoy.org/news_room_detail.php?id=24&t=0.
[51]. http://www.responsiblesoy.org/news_room_rtrs.php?p=2; see also Nina Holland, "Against 'Responsible' GM Soy: Reply to Solidaridad, WWF," La Soja Mata – Soy Kills, November 2008, online at: http://www.lasojamata.iskra.net/en/node/289; "What is the 'Round Table on Responsible Soy' and its history," La Soja Mata – Soy Kills, online at: http://lasojamata.iskra.net/.
[52] "NGOs Brand WWF's Soy Roundtable a Failure," *ENDS Report* 400, May 2008, p. 24; also http://www.globaljusticeecology.org/connections.php?ID=109.
[53] http://lasojamata.iskra.net/node/110

[54] Round Table on Responsible Soy, Biomass Standards and Certification Workshop, November 2009, http://www.responsiblesoy.org/news_room_detail.php?id=32&t=0
[55] Oxfam, "Bio-fuelling Poverty: Why the E.U. Renewable-fuel Target may be Disastrous for Poor People," Oxfam Briefing Note, November 1, 2007, pp. 4-5, available online at: http://www.oxfam.org.uk/resources/policy/trade/bn_biofuels.html.
[56] M. Colchester and N. Jiwan, *op. cit.*

> farmers, in control of their forests, lands and lives, to powerless estate laborers, out-growers or dispossessed land-owners.[57]

Controversy has continued over whether Indonesian production could be justifiably certified by the Roundtable on Sustainable Palm Oil (RSPO), sponsored by Unilever. As the scheme recognizes, sustainability claims have been put further onto the defensive with the rise of the agrofuels market.

> [It] increases demand for land, which can cause conflict with regards to tropical biodiversity, community rights and other land uses…. It is therefore increasingly important that the industry develops in a socially and environmentally responsible fashion that is sustainable in the long-term.[58]

The RSPO has been controversial among NGOs. In late 2007, Greenpeace symbolically blocked a palm oil shipment at Rotterdam to highlight the harm underlying company claims for "renewable diesel." "[T] here's little to stop companies having certain parts of their operations certified by the RSPO while they continue to convert rainforests and peat lands into oil palm plantations elsewhere, giving them a green fig leaf to cover up their terrible environmental standards."[59]

Growing markets particularly in China, India, and Europe – for palm oil as both an edible oil and a fuel – have increased palm oil prices. Palm-oil imports to Europe more than doubled between 2000-2006 and continue to rise. Much palm oil is used in agrofuel power stations, e.g. in Germany and Italy. Malaysia and Indonesia aim to supply a fifth of Europe's agrofuel needs. The Indonesian government has sought domestic and overseas investors for oil palm plantations.[60] So far the list includes the China National Offshore Oil Corporation and Hong Kong Energy Holdings.

These new markets have further increased dispossession. Although some peasants have gained income by renting their land to plantations, others have lost land that they previously cultivated under customary land rights. Having received little or no compensation, some had to seek waged labor.[61] The rise of plantations has led to conflicts over smallholders' land rights, and there have been mass firings of workers striking over poor labor conditions on plantations.[62] According to the regional director of The Tropical Forest Foundation, a non-profit organization that promotes sustainable tropical forest management:

> [Oil palm] occupies the land totally and squeezes out local populations. They become marginalized. They become slave workers for the oil palm industry basically. There is no other economic opportunity for them.[63]

The establishment of oil palm plantations also leads to deforestation. According to Oil Palm Watch, around a third of palm oil concessions have been granted on land that was previously forested: "In clearing the land, they have to cut everything, they leave nothing behind

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[57] Marcus Colchester, "Promised Land: Palm Oil and Land Acquisition in Indonesia: Implications for Local Communities and Indigenous Peoples," Forest Peoples Organization, 2006, pp. 181-182, online at: http://www.forestpeoples.org/documents/prv_sector/oil_palm/promised_land_eng.pdf.
[58] RSPO position on Bio-energy, Roundtable on Sustainable Palm Oil, 2007, online at: http://www.rspo.org/.
[59] "Don't be Fooled: Sustainable Palm Oil is a Myth," blog posting, Greenpeace U.K. blog, November 28, 2007, online at: http://www.greenpeace.org.uk/blog/forests/the-myth-of-sustainable-palm-oil-20071128.
[60] "Indonesia Counting on Biofuel," *International Herald Tribune*, August 16, 2006, online at: http://www.nytimes.com/2006/08/16/business/worldbusiness/16iht-rupiah.2502063.html.
[61] J. Painter, "Indonesia: the Biofuel Blowback," August 30, 2007, *openDemocracy*, online at: http://www.opendemocracy.net/article/globalisation/politics_climate_change/indonesia_biofuel.
[62] Oxfam, "Bio-fuelling Poverty," *op. cit.*, pp. 3-4.
[63] Art Klassen, regional director of the Tropical Forest Foundation, quoted in T. Knudson, "The Cost of the Biofuel Boom: Destroying Indonesia's Forests," *Environment 360*, January 19, 2009, online at: http://e360.yale.edu/content/feature.msp?id=2112.

and that completely destroys the biodiversity."[64] Despite the ecological destruction involved in large-scale production of palm oil, proponents hail palm oil fuel, which must be mixed with diesel, as a potential savior for the environment. However, as *The Guardian* newspaper pointed out:

> [T]he more the ecological fairytale is scrutinized, the more it begins to look like a bad dream. Researchers from the Dutch pressure group Wetlands International found that as much as half the space created for new palm oil plantations was cleared by draining and burning peat-land, sending huge amounts of carbon dioxide into the atmosphere.[65]

The Indonesian government has classified some land as "marginal," i.e., not used for agriculture, that could potentially be available for oil palm. Marianne Klute of Watch Indonesia warns against the likely consequence of politicians labelling non-agricultural land as marginal: "[M]aybe the Indonesian government will understand this as a green light to open more peat forests" for agrofuel production.[66]

Biotechnologists are using recombinant DNA techniques to try to develop a dwarf oil palm that matures earlier to help mechanize harvesting. If they succeed, then large-scale plantations of dwarf oil palm varieties would undermine smallholders as current producers of oil palm. Through commercial incentives, greater efficiency can generate further environmental harm, especially greater destruction of forests.

Jatropha in Tanzania: Conflicting Development Models

Unlike food crops that are being turned into fuel, the jatropha plant is poisonous and can grow in marginal areas with little water. Jatropha has been used traditionally as hedging to protect fields from livestock. Oil from its seeds is used to produce soap, and it has many other traditional uses. It also yields oil that local people can process very simply for use in cooking and lighting.[67]

Recently jatropha has been promoted as a biofuel crop. Proponents argue that it will not divert resources from food production. While "jatropha dreams" claim that high oil yield can be obtained under adverse conditions, experience says otherwise.[68] Moreover, large-scale jatropha cultivation has already generated conflicts over resources in Africa and Asia.

According to an NGO study in Swaziland, jatropha cultivation usurps water resources. "[S]ome farmers are complaining that jatropha needs to be watered once or even three times a week and that water collection for [the] jatropha crop is competing with collection for domestic uses such as cooking and sanitation."[69] Moreover:

> The oil yield from jatropha when it is grown on marginal or waste land with no water, fertilizer or pesticide input is at best uncertain. The high yields needed to make jatropha commercially viable as a biofuel crop are far more likely to be obtained when it is planted on fertile irrigated land. This could mean that widespread jatropha plantations for biodiesel compete with food production for fertile agricultural land.[70]

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[64] L. Williamson, "Indonesia's Push for Biofuels," *BBC News*, February 1, 2007, online at: http://news.bbc.co.uk/2/hi/asia-pacific/6320285.stm.
[65] I. MacKinnon, "Palm Oil: The Biofuel of the Future Driving an Ecological Disaster Now," *Guardian*, April 4, 2007.
[66] Gaia, et al., "Agrofuels and the Myth of the Marginal Lands," *op. cit.*, p. 3.
[67] K. Becker and G. Francis, "Bio-diesel from Jatropha Plantations on Degraded Land," Department of Aquaculture Systems and Animal Nutrition, University of Hohenheim, 2003, online at: http://www.youmanitas.nl/pdf/Bio-diesel.pdf.
[68] Gaia et al., "Agrofuels and the Myth of the Marginal Lands," *op. cit.*, p. 6.
[69] Helen Burley and Hannah Griffiths, "Jatropha: Wonder Crop? Experience from Swaziland," Friends of the Earth, May 2009, p. 4, online at: http://www.foe.co.uk/resource/reports/jatropha_wonder_crop.pdf.
[70] *Ibid.*

Energy companies have been establishing jatropha plantations in Mozambique.[71] According to an NGO study there, jatropha cultivation depended on irrigation and attracted pests, which then spread to nearby food crops. It also replaced food crops otherwise cultivated by subsistence farmers. According to the authors, "this investigation seriously challenges jatropha as providing sustainable fuel and development."[72]

Thus jatropha poses a stark choice—between small-scale cultivation for local needs versus agri-industrial production for global markets. This choice intersects with wider conflicts over land tenure and local access to traditional commons, which still exist in much of Africa. Financial incentives encourage property claims and title deeds on land, often linked with new debt burdens. Both subordinate local production to global markets.

Jatropha initiatives are generating such conflicts in Tanzania. According to an academic study on jatropha prospects there, infrastructural aspects "such as transport, reliable and efficient equipment and its maintenance, and financial support, are seen as important barriers and uncertainties."[73] Conversely, more efficient infrastructure would provide incentives for agri-industrial systems:

> There is indeed a danger that if investment in jatropha does begin to take off in earnest, the sector could be taken over by big commercial players interested in setting up large plantations. In this scenario, less glamorous but socially useful small-scale projects aimed at energy provision by and for local communities could lose out.
>
> An influx of large investors could also lead to undesirable competition with food crops. Although Jatropha can grow in hostile conditions, there is increasing evidence that seed yields are sensitive to soil fertility and water availability. Farmers could be induced to become outgrowers for large buyers, converting too much prime cropland to jatropha cultivation. Poor villagers could also be induced to sell their land to large investors, while it is still unclear whether their short-term gains would constitute adequate compensation for long-term loss of livelihoods and loss of land for food production.[74]

In Tanzania's Kisarawe coastal district, for example, agrofuels development has been led by a U.K. firm, Sun Biofuels PLC, with support from the Tanzanian government.[75] Thousands of peasant farmers have been displaced from well-watered, highly populated land, to make way for a jatropha biofuels project.[76] This has appropriated large tracts of fertile land, much of it previously used or suitable for food production. "It is a serious matter that district authorities have also allocated fertile land for bio-fuel while some companies reversed their original intentions to make the matter worse," Agriculture, Food Security and Cooperatives deputy minister David Mathayo says.[77] The company eventually announced the acquisition of 8,000 hectares in Kisarawe with a 98-year lease.[78]

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[71] http://www.sunbiofuels.com/projects.html?projectId=2&page=0

[72] Daniel Ribeiro and Nilza Matavel, "Jatropha! A Socio-economic Pitfall for Mozambique," Justiça Ambiental & União Nacional de Camponeses, August, 2009, http://www.viacampesina.net/downloads/PDF/Report-Jatropha-JA-and-UNAC.pdf, http://www.swissaid.ch/global/PDF/entwicklungspolitik/agrotreibstoffe/Report_Jatropha_JA_and_UNAC.pdf.

[73] J. Van Eijck and H. Romijn, "Prospects for Jatropha Biofuels in Tanzania: An Analysis with Strategic Niche Management," *Energy Policy*, Vol. 36, 2008, p. 322.

[74] *Ibid.*, p. 324.

[75] "Thousands of Tanzanian Peasants to be Displaced for Biofuel Farm," *African Press Agency*, August 12, 2007, online at: http://pacbiofuel.blogspot.com/2007/08/pbn-thousands-of-tanzanian-peasants-to.html, and http://tech.groups.yahoo.com/group/biofuelwatch/message/855.

[76] W. Edwin, "Tanzania: U.K. Firm Invests $20m in Biofuel Farm," *The East African*, August 7, 2007, http://allafrica.com/stories/200708070929.html.

[77] "Tanzania: Govt on Spot over Biofuel Production," *The Citizen*, July 23, 2008, online at: http://allafrica.com/stories/200807240051.html.

[78] "Sun Biofuels Tanzania Ltd Acquires Lease to 8000ha of Land in Tanzania," company press release, August 4, 2009, online at: http://www.sunbiofuels.com/latest_news.html?newsId=17.

Agrofuels development threatens other uses of common lands in Tanzania. An Oxfam report emphasizes such a threat in a Kisarawe village whose land has been taken over for agrofuels:

> Although uncultivated, the land is used by the villagers of Mtamba, principally for charcoal-making, firewood, and collecting fruits, nuts, and herbs… it includes a waterhole which is the only place that they can collect water when it is dry. They also collect clay there to build houses.[79]

Villagers have no formal guarantees about keeping access to the land , nor about local employment by agrofuels projects. In such ways, prospects for agrofuels are causing tensions between the needs of investors and communities.[80]

Foreign companies have been buying up good-quality, well-watered land for jatropha in Tanzania. The government has allowed companies to develop jatropha according to the companies' priorities—to produce as much as possible under the best conditions, as soon as possible, for a global market. The drive for higher yield pushes farmers off good-quality land, where they formerly produced food and/or fulfilled other local needs. Such land is being treated as if it were "marginal," as a basis to enclose the commons and dispossess communities.

Following protests in Tanzania and Mozambique, those governments have recently taken a more cautious approach to changes in land use for agrofuels, e.g. by delaying or restricting land concessions to companies.[81]

> In both Mozambique and Tanzania, the land-grab has now been put on hold. In Mozambique, over 18 months, some 13 million ha were bid for and investigations soon revealed that targeted land overlapped with land vital to local communities. Now the conflicting claims have to be resolved.[82]

But global pressure for new energy sources will continue incentives for dispossession.

Conclusion: Driving Dispossession, Pre-empting Sustainable Production

Agrofuels have been promoted as a renewable and therefore sustainable energy source. In the global North, government policy emphasizes the aim to reduce GHG emissions, but it also has wider political-economic agendas. Goals include: to feed a growing demand for transport fuel, to substitute (or supplement) oil imports, to export technology under proprietary control, and to create non-food uses for crops and biotech. Together these efforts facilitate further capital accumulation. In the global South, governments seek foreign investment and export income from agrofuels. Some countries such as Brazil combine those aims.

Even before the rise of a global agrofuels market, agri-industrial monocultures were producing animal feed and edible oils (e.g., from soy, corn, and oil palm). Their production caused systemic harm—competition for land use, higher land and food prices, labor exploitation, insecure employment, greater agrichemical usage, and land grabs. New enclosures dispossessed rural communities of control over human and natural resources.

Those previous conflicts over land use have been inflamed by agri-industrial production of agrofuels for fuel, feed, and potentially other industrial products. A global integrated network has been linking national biofuels markets with global markets, while also horizontally integrating agriculture with the energy industry. As a result of new linkages and dependencies (such as debt). states have little capacity or incentive to protect livelihoods and environments, especially in the

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[79] Robert Bailey, "Another Inconvenient Truth: How Biofuel Policies are Deepening Poverty and Accelerating Climate Change," Oxfam Briefing Paper, Oxfam International, June 2008, p. 22.
[80] *Ibid.*, p. 22.
[81] Sarah McGregor, "Tanzania to Draw Up Interim Guidelines on Biofuel Production," *Bloomberg.com*, August 14, 2008, online at: http://www.bloomberg.com/apps/news?pid=20601116&sid=atoecyfXHv0o&refer=africa.
[82] Econexus, *Agriculture and Climate Change: Real Problems, False Solutions*, 2009, page 34, www.econexus.info

global South. Political and economic elites there accommodate the global forces dispossessing communities.

Agrofuels extend capital accumulation by dispossession, both within and outside the capitalist labor process. Land functions as capital—as a production factor for maximizing return on investment. Often enforced through violence, these changes in land use play several roles—dispossessing communities from land and labor rights, while aggravating environmental degradation and resource competition.

As an agri-industrial monoculture system, moreover, agrofuel production encloses commons in many ways: labor subordination via contract farming or waged labor, land grabs, competition for land use, property rights over seeds, and environmental degradation through agrichemicals. This system degrades or appropriates commons of many kinds: access to land; use of local resources which help to avoid debt traps; forests providing diverse resources such as food, firewood and grazing areas; the right to save, exchange, breed and re-use seed; control over what to grow; and direct sales to an open local market.

Conflict over agrofuels highlights antagonistic accounts of sustainable development. In agrofuel systems, "sustainability" is understood as an efficient input-output of resource use for flexibly producing multiple standard commodities for global markets. By contrast, agri-ecological practices can be intensive and energy-efficient in different ways than monocultures producing a standard commodity. In small-scale peasant agriculture, sustainability means optimizing the use of local resources and thus minimizing dependence on distant markets. Agrofuels undermine such agricultural systems, the various commons on which they depend, and community bonds that sustain them. Those alternatives are considered as obstacles to be overcome or resources to be appropriated for capital accumulation; as Marx noted, its very basis is expropriation of the peasants.

Traditional agricultural practices exemplify "the environmentalism of the poor." Its moral economy valorizes biodiversity, local livelihoods and community identity—against agri-industrial resource extraction at "commodity frontiers" such as agrofuels.[83] Under threat of enclosure, commons can become counter-hegemonic projects, suggesting alternative development pathways towards a more democratic, sustainable future.[84] Struggles around agrofuels can go beyond disputes over the promised "benefits" by counterposing and re-creating commons, as the basis for a different future.

Note: As a sequel to this article, Part II will analyse next-generation biofuels. These are being promoted with expectations to enhance sustainability through greater efficiency, thus avoiding competition with food uses. On the contrary, as we will argue: Such promises remain speculative, while serving to justify current biofuels expansion despite their sustainability problems. Moreover, such problems would continue even if next-generation biofuels are technically successful.

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[83] Joan Martinez-Alier, "Social Metabolism, Ecological Distribution Conflicts and Languages of Valuation," *Capitalism Nature Socialism*, Vol. 20, No. 1, March 2009, pp. 58-87.
[84] James McCarthy, "Commons as Counter-Hegemonic Projects," *Capitalism Nature Socialism*, Vol. 16, No. 1, March 2005, pp. 9-24.