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The Changing North–South and South–South Political Economy of Biofuels

Peter Dauvergne & Kate J Neville

ABSTRACT Since the 2007 food crisis, controversy has engulfed biofuels. Leading up to the crisis, world-wide interest in these fuels—which include biomass, biogas, bioethanol, and biodiesel—had been surging as states increasingly saw these as a way to meet greenhouse gas reduction targets and promote sustainable economic development. Now some consumers, notably in Europe, are scaling back demand as they worry that biofuels are responsible for increased food prices and deforestation. In contrast, some states—particularly Brazil and the USA, the world’s leading bioethanol producers—continue to promote biofuel development, especially in developing countries. Partnerships arising from these efforts, we argue, reflect new patterns in the international political economy, where trade relationships among developing countries are strengthening, and where economic lines between developed and emerging developing countries are blurring. Given previously observed patterns of resource exploitation involving complex webs of North–South and South–South trade (such as for resources like palm oil in Indonesia), we anticipate that the emerging political economy of biofuels will repeat and reinforce many of these same environmentally destructive trends.

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ARTICLE: An analysis of the expanding global biofuel industry reveals the increasing environmental consequences of economic and political relations among developing countries: what, for simplicity, we call the South–South political economy of the environment. In the case of biofuels, we argue, many developing countries are now establishing relations with each other that are likely to repeat—and thus reinforce—existing global patterns causing environmental harm. In the realm of climate change and carbon markets more powerful developing countries are building on the language of ‘South–South co-operation’ and ‘sustainable development’ to promote investment in—and resource extraction from—other developing countries.

These emerging developing country leaders, however, are not supplanting developed countries as financiers and consumers of biofuels; instead, they are bridging the divide between the global North and South by engaging in partnerships with developed countries. Although initiatives to promote new technologies and industries can have positive outcomes for the poor, they run the risk of creating incentives for short-term profit over long-term environmental and social sustainability. Increasing numbers of organisations over the past few years have shifted from seeing biofuels as a ‘win-win solution’ for farming and environmentalism to a ‘controversial and risky solution’ with the potential to drive up food and land prices, and increase pressure for land conversion and deforestation.

Biofuels are non-petroleum-based fuels, generally derived from plants and plant oils. ‘First generation’ biofuels—biodiesel and bioethanol derived from food crops—include palm oil in Indonesia, rapeseed in Germany, sugarcane in Brazil, and maize in the USA. ‘Second generation’ fuels are produced from non-food crops, usually on marginal lands, such as *Jatropha curcas* in India. Bioethanol is an alcohol produced by fermenting sugar or converted starch, which yields a high-octane fuel that can be used alone or blended with gasoline. Biodiesel is primarily produced through a process known as transesterification, in which oils (for example, vegetable oils) are combined with alcohol and a catalyst to create the diesel fuel and a byproduct (glycerine). The broad reach of the term ‘biofuels’ can contribute to misunderstandings. Some seem to assume that all biofuels are a positive alternative energy source; others seem to dismiss the potential of any biofuels to help mitigate climate change and provide socioeconomic and environmental benefits. The reality lies in between these extremes, with different biofuels contributing to different effects depending on many factors, including geography, production processes, land conversion, feedstock, subsidies, pesticides, fertilisers and technologies.

Leading biofuel producers from the North, most notably the USA, continue to promote the potential of biofuels to reduce fossil fuel consumption, and thus increase energy security and reduce carbon emissions. They have recently been joined by leading producers—most notably

Brazil— from the South. Initially these Southern producers argued that biofuels from the South were better for the environment than those from the North. However, the backlash against biofuels since the 2007 food crisis appears to have led these producers to ally themselves more closely with their developed country counterparts. The future of the global biofuel industry is uncertain as oil prices fluctuate, as the financial crisis overshadows environmental concerns, and as many states and non-governmental organisations consequently take a more cautious stance. The expectation of high market growth for biofuels from EU countries, driven by their early commitments to renewable energy quotas, has been tempered by concerns about the environmental and food security impacts and coupled with the requirement for sustainability criteria for biofuels. As a result, future demand for biofuels might be more likely to come from developing countries with rapidly growing energy needs, such as China. These countries may have less interest in demanding the sustainability criteria required by the EU as immediate development needs eclipse environmental considerations.

Given these new and still-uncertain trends in markets and production chains, this article explores what the growing controversy over the potential value of biofuels tells us about the changing dynamics of the South– South political economy of environmental change. We divide it into four sections.

We begin by explaining the surge—then the backlash beginning in 2007— in political support for biofuels over the past decade. We suggest that the environmental and food security positions towards biofuels are influenced by countries' positions as (potential) producers and consumers and reflect their strategic decisions to promote economic opportunities. Next, we offer a brief survey of recent work on the new global political architecture, particularly with respect to emerging relationships among Southern countries. In light of this, we assess the shift in partnerships to promote and support biofuels. Third, to illustrate the potential consequences of bigger biofuel markets, we analyse Indonesia's oil palm industry. Indonesia and Malaysia are now exploring ways to use palm oil, already in high demand from the food industry, as a biodiesel feedstock. We evaluate the potential environmental effects of further pressure for oil palm plantations by considering the well studied current effects of the industry on tropical forests and the likelihood that biofuel consumers will demand changes in these production processes. We then develop our main argument: that, out of this growing thicket of controversy, uncertainty and diversity, biofuel producers in the South look set to repeat and promote the already-existing exploitative and destructive patterns observed in other agricultural industries. Despite the positive environmental potential of some biofuels, given the support from current Northern and Southern producers and multinational corporations (MNCs), and with consumer demand rising

primarily in Southern countries, sustainability is not likely to be the driving force in—or the outcome of— biofuel development.

The rise and fall of the biofuel ‘solution’

The surge of enthusiasm and the subsequent pull-back in interest sets the stage for understanding the emerging partnerships for developing and promoting biofuels. The early stages of biofuel development provide particular insight into the economic and political interests of certain countries and regions—especially Brazil, the USA and the EU—in biofuels.

Experiments and research on biofuels were ongoing throughout the 20th century. Brazil in particular chose to invest considerable resources in biofuels.¹ Nevertheless, the global shift towards more ambitious policies to develop biofuels—and the corresponding emergence of stronger markets for biofuels—did not occur until interest in the USA and the EU took off in the late 1990s. This interest arose in part out of the influential language around climate change mitigation, domestic energy security and oil resource depletion. Biofuels were also attractive because they offered the possibility of solving several problems without fundamental changes to lifestyles in the North: biofuels required a shift to a new form of fuel, not a shift in patterns of consumption or economic growth.

A convergence of powerful economic and environmental lobby groups (notably firms in agricultural sectors and climate change activists) also helped the biofuel industry to gain ground against the oil industry and, to some extent, even get the latter on board, with companies like Shell investing in biofuels. In the UK, for example, support cut across sectors, with journalist David McCoy reporting: ‘Farmers are keen to see their products move from “field to forecourt”, an enthusiasm now shared by the EU Commission, cross-party MPs and Local Authorities, as well as environmental groups such as the RSPB [Royal Society for the Protection of Birds], Friends of the Earth and Greenpeace’.² Initially Greenpeace UK was a vocal supporter of biofuels, petitioning, for instance, in 2000 for a fund in the UK to support non-petroleum fuels.³

From 2000–06, as the EU and USA put in place policies to develop biofuels, the whole sector began to surge forward, with others now anticipating new markets. EU directives, including the 2003 Biofuel Directive, were particularly important as these put in place biofuel quotas that EU countries were unable to supply themselves because of limited land resources.⁴ Critics and sceptics were around, even in the early days: for example, the World Wildlife Fund (WWF) and BirdLife International, among others, were warning that mandating biofuel quotas would increase pressure to convert land, thereby threatening biodiversity. Some were calling for full

life-cycle analyses (water, soil, energy use) prior to implementing any policies.⁵ Nevertheless, the sector was increasingly portrayed as a ‘silver bullet’—a solution that could mitigate climate change, enhance domestic energy security, reduce fuel costs, support farmers and advance sustainable development.

A confluence of economic and political factors kept the reaction to biofuels primarily positive until 2006. Strong agricultural lobbies, including US corn and German rapeseed producers (already highly subsidised), were interested in new markets. National security departments were intrigued by the possibility of reducing dependence on foreign oil (particularly from the Middle East in the wake of 9/11). And climate change activists were hoping to promote alternatives to fossil fuels. Moreover, some environmental advocates felt that mandated biofuel targets would spur efforts to move from primary biofuels (for example, ethanol and diesel produced from crops like corn, sugarcane and rapeseed) to secondary biofuels (for example, ligno-cellulosic ethanol produced from crop waste and non-food crops). Even those concerned about possible spill-over effects—where, for example, fields with crops for food are converted to produce biofuels instead, or where more states allow the use of genetically modified crops to increase biofuel yields—saw significant environmental and social benefits from at least some of the biofuels and, despite reservations, were not ready to organise large-scale resistance to something with so much potential to do good.

The biofuel food riots of 2007

The 2007 food crisis, with riots in Haiti, Yemen and Zimbabwe, among other countries, unexpectedly put biofuels under an intense media spotlight. Some journalists were calling these ‘food’ riots, while others labelled them ‘fuel’ riots, attributing the rising prices of staple crops (such as rice, wheat and corn) to causes ranging from biofuels to high oil prices to market speculation in food commodities.⁶ Suddenly the biofuels industry was mired in controversy and bad press.

With estimates of the impact of biofuels on food prices varying wildly, from a low of 2%–3% suggested by the Bush administration to a high of 75% in a draft of a World Bank report (which became international news after the *Guardian* published it),⁷ the EU pulled back on its biofuel targets. The EU also postponed initial deadlines for decisions on renewable energy requirements. Further talks led to modified targets: legislation adopted in April 2009 established that renewables would account for 20% of the EU’s energy by 2020, and set out greenhouse gas emission savings as well as sustainability criteria required for biofuels to be counted towards

meeting this target.

In the EU the food crisis provided an opening for some countries to shift from quiet non-compliance to vocal opposition to biofuel targets. In part the discord in the EU appears to be linked to domestic political economies, with countries with the highest potential to produce biofuels tending to advocate strongly (Germany, France and the Netherlands, specifically, although they emphasise *sustainable* biofuels and not all support mandated targets), while those with little production capacity have been silent or actively opposed to the biofuel targets (particularly Malta, although also, to varying degrees, Greece, Italy, the UK and Spain, who have been reluctant or uncertain adopters of biofuel directives). Biofuel debates in the EU are also shaped by concerns about agricultural subsidies, which have been under attack in the World Trade Organization (WTO) meetings (particularly in the still-unresolved Doha Round). Countries that would have to import biofuels to meet the proposed EU-mandated targets tend to frame their opposition to the directive through the lens of food security concerns, and thus have an opportunity to avoid consenting to a costly regional policy without appearing to balk at environmental action.

The environmental benefits of biofuels came into even greater question as scientific studies raised doubt as to their true carbon footprint. Two 2008 articles in the journal *Science* were particularly damning. In a review of research on 26 different biofuels, 12—including corn ethanol from the USA, sugarcane ethanol from Brazil and palm oil diesel from Malaysia—were found to have greater aggregate environmental costs than fossil fuels.⁸ In the second article authors from The Nature Conservancy and the University of Minnesota found that biofuels derived from food crops in the USA, Brazil and Southeast Asia yielded a ‘biofuel carbon debt’ of 17–420 times the carbon saved by not using fossil fuels.⁹

However, less support for biofuels in Europe—and consequent policy and market uncertainty—has not stifled all global interest. In the next section, we evaluate the shift in partnerships to support biofuels, and argue that these illustrate a new political and economic role for a set of rapidly developing countries. To do this, we first offer a brief survey of recent work on the new global political architecture, particularly with respect to emerging relationships among Southern countries, and then consider these relationships in the biofuel sector.

A changing global architecture—South–South trade and North–South partnerships

Global trade and foreign direct investment (FDI) patterns suggest that Third World consumer markets are becoming more significant for Third World producers, and indicate that a new era of

South–South trade is distancing the global South from the unidirectional economic hold of the North. The pull-back from the EU and some others on biofuel mandates may not remove the incentives for developing countries to move forward on biofuels, as the growing demand for energy in emerging Southern economies has the potential to finance the industry.

Emerging economies, and Brazil in particular, are adopting new roles in biofuel investments and development. These emerging economies include, according to different analysts, Brazil, Russia, India and China (the ‘BRIC’ countries), South Africa, the ASEAN-4 countries (Thailand, Indonesia, Malaysia, the Philippines), and Mexico (together making up ‘BRICSAM’).¹⁰

Some characterise the new dynamics as a shift from North–South relations to interactions among the ‘three worlds’ of developed countries, emerging economies and the remaining highly diverse ‘Third World’ developing countries. As emerging economies compete for positions as regional hubs, they have built relationships not only with developed countries but also with other developing countries; moreover, many MNCs have established headquarters in the BRICSAM countries.¹¹ Politically, co-operation among the emerging economies is observed in declarations such as the one China, Brazil, India, Mexico and South Africa issued in July 2008 addressing issues such as climate change, food security, energy security, and the Millennium Development Goals: a statement that emphasised their roles as leaders among developing countries and highlighted the need for South–South cooperation.

Economically the relationships are apparent in financial flows, with a documented increase in South–South FDI.¹² The United Nations Committee on Trade and Development (UNCTAD) reports that trade among developing countries—with Brazil, China and India, described as the ‘dynamic South’, in the lead—has increased from \$577 billion in 1995 to over \$2 trillion in 2006. They compare trade flows within the South and between the North and South, showing that exports from developing countries to developed countries increased by 161% from 1995 to 2005, while exports from developing countries to countries with transition economies increased by 382% from 2000 to 2006.¹³ Similarly developing country imports from developed countries increased by 70%, and from transition economies by 123%. In the words of the Secretary-General of UNCTAD, ‘the urgent needs for energy and food security are pushing developing countries into one another’s arms’.¹⁴

The literature on regional co-operation and integration is growing. It includes work on ‘developmental regionalism’ in East Asia, where regional integration efforts do not require a developed country leader,¹⁵ and on the proliferation of regional trade agreements (RTAs)

involving BRICSAM, where, for example, Brazil has established nine separate RTAs within Mercosur.¹⁶ Such studies are documenting the growing power of emerging economies in the Third World and in the global economy.¹⁷

Brazil fits this pattern well. It is actively seeking investment and development opportunities outside the region, and across the global South. At the United Nations in 2007, a statement by Brazil to the General Assembly outlined a co-operative initiative between India, South Africa and Brazil, and explained its goal of ‘seek[ing] to enhance political dialogue and economic links with the Arab World, Africa, and Asia’;¹⁸ at a high-level meeting Brazil highlighted the increase in productive relationships within the global South, describing ‘a “notable upsurge” in South–South cooperation’ involving trade and investment.¹⁹

Even with this surge in South–South interactions, however, wealthier Southern powers still hesitate to adopt a large role as donors and aid providers. In 2005 Brazil stated ‘as a developing country, Brazil is not yet in a position to assume the responsibilities of a donor country’, and further emphasised that ‘South–South cooperation is not meant as a substitute for [Official Development Assistance] to be provided by developed countries’.²⁰ Rather than South–South relationships simply replacing North–South ones, development and co-operation activities are increasingly becoming ‘triangular’ projects, involving ‘North–South–South’ dynamics.²¹ Emerging Southern powers have significant political and economic influence in these partnerships (they are not relegated to subordinate roles), but most have not moved away from developed country involvement.

In the biofuel sector Brazil has fluctuated between positioning itself as a partner with and as a competitor to the USA. The USA and Brazil are the primary producers of bioethanol. Ethanol in the USA is mainly produced from corn, with production estimated to have doubled between 2002 and 2005.²² Brazil uses almost half of its sugarcane for bioethanol production. The USA took the position that biofuels are a necessary and positive contribution to the energy sector; Brazil supported this idea, but specified that sugar-based biofuels (its major industry) do not have the same negative impacts as the USA’s maize-based fuels. Drawing on recent research that disaggregated biofuels by their feedstock production processes, Brazil and the USA at first vied for position as ‘knowledge brokers’ to define the terms of the biofuel debates.²³ From an ecological perspective Brazil’s arguments in favour of its biofuels were bolstered by research showing that sugarcane-based ethanol differs significantly from corn-based ethanol in its ecological impacts (although, as noted, sugarcane production increases pressure to convert land,

which can undermine these advantages). Moreover, the economics of the industries differ substantially, as Brazil removed government subsidies for bioethanol production and (without US import taxes) Brazilian sugarcane-based bioethanol costs less per gallon than US corn-based bioethanol, at \$0.81/gallon compared with \$1.03/gallon in 2006.²⁴

Brazil implicitly challenged the USA on biofuels at a meeting held by the Food and Agriculture Organisation in June 2008. President Lula stated that ‘corn ethanol can obviously only compete with sugar-cane ethanol when it is shot up with subsidies and shielded behind tariff barriers’; and, later, ‘That is why some people compare ethanol to cholesterol...there is good ethanol and bad ethanol’.²⁵ However, more recently, with the environmental backlash to biofuels apparently strengthening, Brazil and the USA seem to be putting aside their differences to work together to promote them: a US government media report in November 2008 publicised the fact that ‘nine partner nations [are] to benefit from US–Brazil biofuels collaboration’.²⁶

Beyond collaborating in development (as Brazil does with the USA), developing countries are proving themselves to be reliable and attractive trading partners. While South–South trade and co-operation are unlikely to displace Northern countries completely, as EU countries hesitate, developing countries may provide alternative markets for biofuels, especially as their economic growth leads to increasing energy demands. As seen in the interactions between the USA and Brazil, the debates about biofuels are being used to broker a larger set of international negotiations on trade and global financing. The evidence for novel patterns of investment and trade in the biofuel sector itself is consistent with the prediction that these new South–South relationships will be significant drivers of biofuel production. Given the relatively short history of the industry, this evidence (which will be discussed in the fourth section) is still only anecdotal. To better assess whether biofuel markets are likely to follow these predicted South–South market trajectories, we look to the trends seen in related industries, since we anticipate that similar patterns will be observed across sectors. The next section therefore provides a brief case study of Indonesia’s oil palm industry: as a commodity that is in high demand in the food industry—and that also has potential as a high-yielding feedstock for biodiesel—this example provides suggestive evidence for concern about the environmental impacts of biofuel production in some developing countries.

An Indonesian case study: environmental effects of oil palm plantations

A few states dominate biofuel production, with the USA and Brazil accounting for more than 70% of global bioethanol,²⁷ and the EU for over 60% of the world’s biodiesel (see Table 1 for

2006 data). This is changing, however, as more developing countries invest in these growing markets. In 2006 Indonesia was not yet a significant biodiesel producer, with palm oil representing only a small percentage of biodiesel feedstock in the global market; however, its role appears set to grow as, along with Malaysia, it

TABLE 1. Biofuel production in 2006 (millions of litres, feedstock)

| |
|---|
| Bioethanol |
| Brazil (16 500, sugarcane) USA (16 200, corn) China (3000, corn, wheat) |
| Biodiesel |
| Germany (1920, rapeseed) France (500, soybean) USA (300, rapeseed) |

Sources: Modified from R Olver & T James, 'The opportunities in the global biodiesel market', presentation at the Biodiesel Expo, Nottinghamshire, UK, 'Energy Infrastructure Utilities', Deloitte & Touche LLP, 18 October 2006, at [http://www.biodiesel-expo.co.uk/download/1%20Deloitte%20Bio %20Diesel4.pdf](http://www.biodiesel-expo.co.uk/download/1%20Deloitte%20Bio%20Diesel4.pdf); and C Davis, March 2007 Monthly Update: Global Biofuel Trends, World Resources Institute, EarthTrends Environmental Information, 2007, at <http://earthtrends.wri.org/updates/node/180>, webpages accessed 6 January 2009.

positions itself to increase palm oil biodiesel production and potentially become a significant contributor to global supplies.

Currently, of the over 28 million tonnes of palm oil produced annually from the high-yielding oil palm (*Elaeis guineensis Jacq*), the majority is used in the food industry, with 90% being used for food-related products in the early 2000s.²⁸ Indonesia and Malaysia have been the world's largest producers of palm oil since the 1970s. Although the sector slowed in Indonesia in the late 1990s, with a drop in palm oil prices, the Asian financial crisis, and extensive forest fires on the outer islands in 1997–98, it has since regained momentum. In 2004 production of oil palm products represented 1.7% of Indonesia's gross national income, with palm oil exports worth \$4.1 billion.²⁹

Environmental costs of palm oil

While palm oil production tends to involve substantial chemical fertiliser and pesticide inputs,

the primary ecological impact from palm comes less from the active management of oil palm plantations than from their creation, which displaces other agricultural activities or causes deforestation.³⁰

In Indonesia oil palm plantations add to the threats to forests from timber harvesting, especially in Borneo's dipterocarp forests.³¹ Indonesia has about 8% of the world's remaining tropical forests, representing about three-quarters of Southeast Asia's remaining primary forest. About one-fifth of Indonesia's forests are under some form of national protection.³² However, Indonesia's forestry sector has a history of pervasive corruption, weak regulation and poor enforcement. Illegal logging expanded after the fall of President Suharto in 1998 and, in many so-called protected areas, logging and land conversion activities threaten the rainforests—including the wildlife they support, like Sumatran orangutans—particularly as so many timber concessions are now stripped of harvestable timber.³³

Concerns about replacing primary forest with palm focuses not only on forest and habitat loss, but also on the carbon emissions associated with logging, particularly from the peat soils that are most valuable for oil palm plantations. Forest degradation was a significant cause of the massive forest fires of 1997–98 in Indonesia; forest cover loss also increases the risk of peat fires. In terms of carbon dioxide and methane emissions, the net impact of conversion to biodiesel could be negative if more greenhouse gases are released in the creation of plantations than are offset by their use as a fossil fuel substitute.

Government policies and funding from international institutions already support the expansion of palm plantations for food production and— even though the plantations themselves are outside protected areas—by replacing lowland forests, they shift pressure from these lowland forest buffer zones to the protected areas. The constraints of limited capital, low technology levels and problems with land acquisition have slowed plantation expansion, but incentives to develop oil palm for biodiesel will help to overcome these barriers, and will compound the pressure on remaining primary forests.³⁴

Positive steps in changing the environmental damage from oil palm can be seen in the creation of the Roundtable on Sustainable Palm Oil (RSPO), initiated by the WWF in 2001 and formally established in 2004. The Roundtable, whose secretariat is in Malaysia, aims to include all stakeholders, from producers and consumers to banks and environmental conservation groups. As of 2006 the Executive Board included representatives from Unilever, WWF-Switzerland, WWF-Indonesia, the Indonesian Palm Oil Producers Association (GAPKI), the Malaysian Palm

Oil Association, New Britain Palm Oil Ltd, and Cadbury Schweppes, among others.³⁵ This initiative offers the potential for shifting palm oil production towards more environmentally sound practices, but it is not yet evident that this will have a broad or rapid enough impact on the industry.

Global markets and the rise of the South

As mentioned, the EU, largely thanks to Germany, is currently the world's leading biodiesel producer. EU countries are responsible for 80% of the world's biodiesel consumption and production.³⁶ However, Indonesia, by developing its oil palm sector, could assume a significant position in this global market. Indonesia is in a similar place to Brazil in relation to a major Northern producer of biofuels, with the USA as Brazil's competitor (and now partner) and the EU as Indonesia's competitor.

The current scale of production and potential market for biofuels provides a strong incentive for a country like Indonesia to expand its biofuel industry. Some analysts project that by 2014 annual bioethanol production could reach 27 000 million gallons and biodiesel could reach 3900 million gallons.³⁷ In terms of domestic financing, support for biofuels in the USA has been estimated at between \$6.3 and \$7.7 billion in 2007, and in OECD countries economic expenditures on biofuel subsidies were estimated to be at least \$11 billion in 2006.³⁸

In 2000 3.2 million hectares were planted with palm oil, mainly in Sumatra, and predominantly (although not exclusively) operated by Indonesian companies; by 2002 oil palm had expanded to just over 3.5 million hectares, with foreign companies—mainly Malaysian—owning over 600 000 hectares.³⁹ By 2004 the major buyers of palm products came from the developed world, including the US companies Cargill (which both owns a plantation in Sumatra and buys from several plantations) and Archer Daniels Midland, the British company Cadbury Schweppes, and the Australian company Gardner Smith.⁴⁰ An increasing number of Malaysian companies, however, were also operating plantations. Moreover, with investment chains and ownership increasingly interlinked, the origins of corporations are becoming increasingly difficult to distinguish.

The destinations of palm oil exports also illustrate the increasing prominence of developing country markets. By 2000 India and China had become major export markets and in 2003 and 2004 had taken the lead spots as importers of palm oil.⁴¹ Even though, as noted, palm oil is not yet a major contributor to biodiesel production, its potential to enter the biofuel market is high.

Rising demand for biofuel in Brazil, China and India could therefore reinforce the already-existing markets for Indonesia's palm oil. Nevertheless, Indonesia's oil palm sector remains plagued by uncertainty. The prices of palm oil have been highly variable: for example, in July 2008 Malaysian palm oil prices fell more than 19% over a three-week period. Lower prices for biofuels and uncertainty in biofuel markets led Indonesia's state oil firm, Pertamina, to reduce the biofuel component in its diesel blends from 5% in 2006, to 2.5% in 2007, to 1% in April 2008. Such uncertainty means that predicting the environmental and political relationships that will emerge is a difficult task. Overall, however, given the patterns to date in the demand for palm oil and the projected increased demand for energy from rapidly growing and powerful developing countries, we anticipate that the total demand for oil palm is likely to increase and its production is likely to continue along observed lines.

The next section draws together the arguments about North–South partnerships, increasing South–South co-operation and trade and the projected environmental impact of an increased demand for biofuel feedstocks like palm oil. We contend that, despite sustainability requirements from EU consumers, biofuels look set to threaten vulnerable ecosystems like tropical forests in Indonesia as Northern biofuel producers like the USA lend support to developing country producers, and growing energy demands in the global South provide a market for these biofuels.

The false divide: repeated patterns in new language

While biofuels are integrating agricultural and energy industries and opening new roles for some countries in the global economy, the global political dynamics that they reveal are less novel. As a leader in biofuel technology, Brazil is championing the continued development and promotion of biofuels as a way to mitigate greenhouse gas emissions, provide sustainable options for farmers and ensure energy security. However, Brazil's partnership with the USA and its investments in biofuels in Mozambique, Angola and Senegal indicate more than just commitment to biofuels themselves: they reveal the new dynamics of profit-driven investments of the emerging economies of the global South.

The dynamics that we see with biofuels appear likely to mimic the patterns that others have observed in the palm oil industry, with the emerging economies of the South integrating their economies with Northern countries and MNCs, in complex relationships that blur the lines between donors and recipients of aid, and producers and consumers of goods. Promoting these unsustainable resource-based industries casts environmental costs onto lower-income developing countries, and undermines the potential for renewable energy to promote both their economic and environmental well-being.

Although the evidence in biofuel development to date is anecdotal and globally dispersed, in light of established patterns of growth of South–South trade and of the past trends of environmentally destructive resource exploitation by developing countries for both First and Third World consumers, there is reason to anticipate that future development of biofuels will look similar to these past patterns. We look, with concerned interest, at the emerging investment by powerful developing country biofuel leaders— like India and Brazil—in developing country producers.

Global integration of markets and MNCs

The mix of players investing in biofuels ranges from governments to Northern-based MNCs to Southern domestic companies; as a result, the ownership and investment chains can become difficult to track. Emerging relations span the globe, with partnerships and markets integrating the North and South. Evidence of these criss-crossing partnerships and trade relationships include announcements of biofuel initiatives in 2008 in Mozambique, of a \$280 million project funded by domestic and Mauritian companies, and in the Philippines, of the contracting of an Indian engineering firm, KBK Chem-Engineering, by the domestic bioenergy company Roxol Bioenergy Corp, to build a bioethanol plant.⁴² Furthermore, the State Trading Corporation of India has expressed interest in land purchases in Indonesia and Suriname for feedstock production and is seeking funding from a UK private equity firm; investors from South Korea are interested in palm oil plantations in Indonesia; and a Singaporean company is also looking to other Asian countries for feedstock supplies. Some of these examples involve developed country partners, but many involve investment by emerging economies in other developing countries.

African biofuel development is also surging ahead, marked by similar dynamics. A consortium of partners, including several Nigerian banks, the African Development Bank, and a state university of the Philippines, has developed a biofuel refinery project in Nigeria (approved by the Nigerian National Petroleum Corporation). Mozambique, a current hotspot of biofuel interest, has also become global in its biofuel partnerships, with collaborators and investors that include the Brazilian Petrobras, the Italian ENI, the Central African Mining and Exploration Company, South Africa, and Canada's Energem Resources.

MNCs are active not only in trade relations with developing countries but also in policy advocacy in developed countries. In July 2008 Archer Daniels Midland, DuPont, Deere & Co and Monsanto established the Alliance for Abundant Food and Energy to lobby the US government to promote biofuels. These four companies span the production chain of agriculture, representing interests in agrochemical, farm equipment and seed supplies, as well as purchasing

and processing of agricultural outputs, and thereby highlight the integration of the shifting of environmental costs by energy, industrial and agricultural firms.⁴³

Changing South–South political economy of the environment

The development of biofuels, then, is shifting from Northern versus Southern producers to more complicated relationships involving partnerships of developed and emerging developing countries focused on assisting poorer developing countries. Ecological costs are not solely imposed by developed countries onto developing countries, but instead criss-cross the globe as Southern economies integrate more and more into the global economy. In short, the global biofuel industry vividly illustrates the nature of the global economy, involving a changing South–South political economy of the environment, in which states and firms in the South are major consumers as well as producers. Despite some benefits, these South–South relations are interacting with North–South ones in ways that are not necessarily positive for alleviating poverty or promoting environmentally-sound activities.

Conclusion: the ecology of South–South economics

Shifting patterns of trade and economic growth are creating opportunities for more powerful developing countries to invest in less powerful ones and share in the economic influence that developed countries have in the South. This is seen in the increasing influence wielded by developing countries over the direction of agricultural and energy production, a trend reinforced by their rapidly growing populations and energy demands.

This is particularly the case for biofuels. Europe's more precautionary approach following the controversy and uncertainty after the food crisis beginning in 2007 has opened up space for biofuel partnerships between countries like the USA and Brazil, which are surging ahead with investment in the global South. It is tempting to hope the participation of developing countries as sponsors and promoters will allow other developing countries to pursue more ecologically sound development: reducing greenhouse gas emissions, supporting small-scale farmers, and using marginal and degraded lands for productive purposes. It is equally tempting to hope both North–South and South–South investments in biofuels could help the Third World—in the language of economists—to tunnel through the Environmental Kuznets Curve and fuel development with carbon-neutral fuels instead of oil, coal and natural gas. The role of emerging second generation biofuels from non-food crops could mitigate some of the concerns about food being diverted to fuel, and could relieve some of the land-use conversion pressures.

Yet this seems unlikely. The technologies for large-scale production and use of second-generation fuels are still in development, and so these feedstocks are not yet integrated into the major biofuel markets. Moreover, although using crop waste, non-food crops and marginal lands for biofuel feedstock production can skirt some of the concerns about land conversion and food security, there may still be unintended negative effects of their production—for example, the designation of marginal lands in such a way that threatens small-scale food production by families with uncertain or unrecognised land tenure rights, or the loss of cover crops and crop residue that provide nutrients to the soil and reduce the need for fertiliser inputs.

Some potential does exist for South–South co-operation to support research and develop second-generation biofuels (for example, algae-based fuels), which in turn could open new markets and economic opportunities, as well as enhance energy security. Some potential also exists for more profits to remain in the Third World. Yet, overall, our analysis of current trends suggests that this potential is largely lost as the South–South political economy of biofuels repeats and reinforces existing environmentally exploitative and destructive patterns observed with other resources (like timber and oil palm). With new consumer countries willing to accept products without sustainability guarantees, governments unable or unwilling to enforce environmental regulations, and corporate interests becoming further entrenched, biofuels seem poised to lead to even more degradation of vulnerable ecosystems in some of the world’s poorest places.

Notes

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