50*th* Anniversary
1961-2011

ECONOMIC POLICY / BRIEFING PAPER

Hudson Institute

Emission Controls, Economic Growth, and Palm Oil Production

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October 2011

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Summary

Palm oil has been a source of economic growth for many parts of the world. But the growth in palm oil production has sparked a number of environmental concerns. Of these concerns, greenhouse gas (GHG) emissions are probably of the greatest economic moment, and this paper focuses solely on that aspect of the issue. It finds that, despite the concerns, palm oil appears to be a rather minor factor in climate change.

In any case, the realities of global political economy imply that for the foreseeable future, GHG control efforts are likely to remain ineffectual. For many countries, economic development may offer a better means of coping with climate change. From this standpoint palm oil may confer benefits on exporters and importers alike.

U.S. climate policy should take account of these considerations. It should eschew and oppose trade protectionism masked as climate protection. It should reassess the relative importance of GHG control within its own renewable fuel program. It should also urge the World Bank to increase its focus on development as a response to climate change. In general, in responding to climate change, the United States should weigh the costs of the market failures against the costs of the policy failures that result inexorably from rent seeking and high transaction costs within political processes.

1. From success to controversy

The oil palm has been a useful tool for economic development. Palm oil production and processing has become a growth industry and a valued source of export earnings for some developing countries. For other nations, it provides a source of economical food imports. Yet the oil palm tree has also become a flashpoint of global controversy. Although non-climate issues are also involved, much of this debate centers on claims about oil palm plantations and climate change. But when more closely examined, the claims about climate are, at the least, exaggerated.

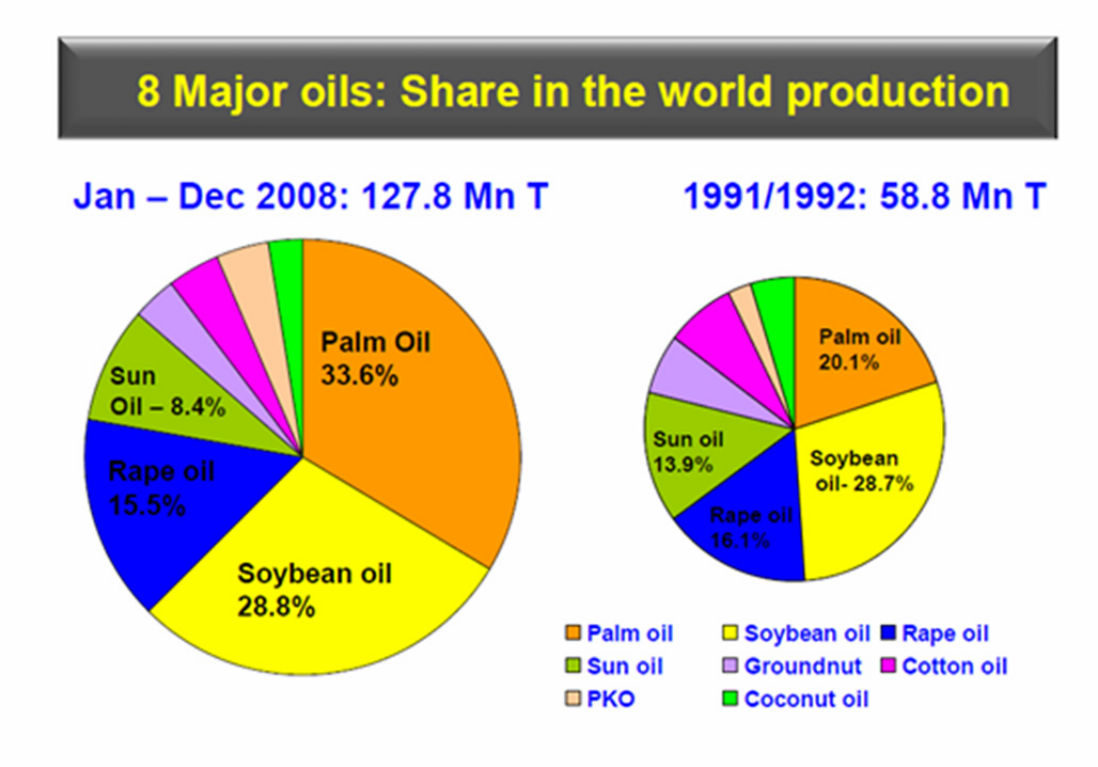
1.1. The oil palm as a development success

The debate over palm oil is anchored in larger global trends. Growing world population and wealth have caused the global demand for food to boom. As part of this broader trend, demand for edible oils and fats has risen. In response, between 2003 and 2008, palm oil production grew at a rate of 11.1 percent per year.

Indeed, palm oil has now supplanted soybeans as the world's single biggest source of edible oils and fats (see Figure 1). Globally, palm oil output is spreading, but it remains quite concentrated. Malaysia and Indonesia are the two main producers. Between them, these two countries accounted for over 85 percent of global output in 2008.[1]

[1] Luc Pelkmans, Kris Kessels, and Tjasa Bole, "Induced market disturbances related to biofuels," Report D2.2 of ELOBIO subtask 2.3, *Elobio, Biofuel Policies for Dynamic Markets* (July 2009): 50.

Figure 1



Source: MPOC & APOC, "Palm Oil Development and Performance in Malaysia" (February 2010)

Factors beyond rising wealth and population have added impetus to the growth in palm oil output. The palm oil sector has conducted a vigorous R&D effort. Partly as a result, during the last two decades, new uses have appeared for both palm oil and its by-products. Uses now include many food and grocery products, cosmetics, surfactants, diverse industrial products, and biofuels. In fact, 50 percent of all packaged grocery products sold today contain palm oil.[2]

Output is likely to continue to rise. On the demand side, global population and wealth will climb. On the supply side, output per hectare also seems likely to go on climbing. Therefore, by about 2050, total production may be roughly double that of today. In the future, other equatorial regions, such as Latin America and Africa, may also become more important growers.

[2] Cheng Hai Teoh, "Key Sustainability Issues in the Palm Oil Sector: A Discussion Paper for Multi-Stakeholders Consultations," The World Bank Group (April 2010): 6.

Table 1

World Demand for Oils & Fats (excluding bio-energy)

Year	Population (billion)	Avg. per capita intake (kg)	Production (mil mt)	Increment (%)
2005	6.54	21.4	149	-
2010	7.00	25.0	175	18
2015	7.40	27.0	200	15
2020	7.80	30.0	234	17
2050	9.00	?	?	?

Source: MPOC & APOC, "Palm Oil Development and Performance in Malaysia" (February 2010)

These trends have already provided a substantial boost to the Malaysian and Indonesian economies. The sector as a whole accounts for about 7–8 percent of Malaysia's total GDP.[3] In Indonesia, palm oil plantations contribute about 1.6 percent of GDP.[4]

For both of these countries, the sector is a major source of export earnings:

> The palm oil sector has been a major contributor to the export earnings of the producer countries. In Malaysia, the export value of palm oil and its derivatives rose from RM2.98 billion (USD 903 million) or 6.1 percent of national total in 1980 to RM45.61 billion (USD 13.8 billion) in 2007. During the Asian financial crisis during 1997/98, palm oil was the top foreign exchange earner, exceeding the revenue derived from crude petroleum and petroleum products and forestry by a wide margin. According to Prof. K.S. Jomo (Jakiah Koya 2009) of the UN Department of Economic and Social Affairs, "it was the palm oil industry that saved" Malaysia during the

[3] MPOC & APOC, "Palm Oil Development and Performance in Malaysia," Presentation to USITC, Washington, DC (February 2010): slide show slide 22; correspondence with Dr. Kalyana Sundram, Deputy Chief CEO & Director, Science and Environment, Malaysian Palm Oil Council, Selangor Darul Ehsan; data from Ministry of Plantation Industries & Commodities and Treasury report, Ministry of Finance.
[4] Tulus Tambunan, "Indonesian Crude Palm Oil: Production, Export, Performance, and Competitiveness" (September 2006): 4, http://www.kadin-indonesia.or.id.

> economic crisis by spurring economic growth. The palm oil sector is also a major export earner in Indonesia, contributing about USD 7.9 billion in 2007.[5]

China, India, Pakistan, and Bangladesh have become major importers. The market is, though, world-wide. The EU, the United States, Japan, and the rest of the world are all large importers.

In both of the major producing countries, palm oil provides employment. In Malaysia in 2009, total sectoral employment amounted to 860,000; in Indonesia the sector employed roughly 3,000,000.[6] In both countries, the oil palm sector has been a boon to many small-holders. The fact that some other plantation crops, notably rubber, have been in decline, has made the rise of palm oil all the more welcome.

1.2. Land-use change and forest loss as climate concerns

Notwithstanding its bounties, the palm oil sector has become the target of criticism. A main rationale for this censure is the putative link between palm oil and climate change. In this regard, though, the disputes about palm oil are merely part of a debate about the larger issue of tropical forest loss.

Tropical ecosystems store some 340 billion metric tonnes of carbon; this amount is more than 40 times the current annual emissions from the use of fossil fuels.[7] Much of this stock of carbon is stored in tropical forests or in the soils beneath them. When these forests are felled or burned, carbon dioxide (CO_2), the most important anthropogenic GHG, escapes into the atmosphere.

Tropical forests are shrinking. The Amazon and Southeast Asia are cases in point; land-use change and forestry play an important role in these countries' emissions.[8] Already by 2010, though, new studies had found that forest loss and land-use change account for a markedly smaller share of world GHG emissions than had once been thought. These findings show that this source represents about 12.4 percent of total emissions.[9] Part of the reason for the adjustment is that other sources have continued to grow, but part is that land-use change estimates have been revised downward. Even after the correction, land-use change remains a valid climate concern. Still, the revision raises questions about the priority that should be accorded forest loss. At the same time, it highlights the large uncertainties that still surround estimates of land-use emissions.

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[5] Teoh, "Key Sustainability Issues in the Palm Oil Sector," 8.
[6] Teoh, 9.
[7] Holly K. Gibbs et al., "Carbon Payback Times for Crop-Based Biofuel Expansion in the Tropics: The Effects of Changing Yield and Technology," *Environmental Research Letters* no. 3 (2008): 2.
[8] Erin C. Meyers Madeira, *Policies to Reduce Emissions from Deforestation and Degradation (REDD) in Developing Countries: An Examination of the Issues Facing the Incorporation of REDD into Market-Based Climate Policies*, Resources for the Future, Washington, DC (December 2008), 52.
[9] Carlos A. Nobre, "Tropical Land-Use Change Emissions—Smaller, but Still Very Significant," in *Climate Change Blog,* The World Bank Group, February 18, 2010.

1.3. Palm oil and greenhouse emissions

These broader problems set the backdrop for the claims about palm oil and climate. The greatest concern is that oil palm plantations can encroach on peat swamps. The soils of such swamps are sinks for CO_2. To put land of this type to work as a plantation, the swamps must be drained. In the process, some of the stored CO_2 is released into the atmosphere, where it adds to climate change.

The amount of CO_2 that is released in this process is variable and uncertain. Among four recent studies, the largest estimate exceeded the smallest by almost a factor of seven.[10] Peat soils, it turns out, are diverse, and so is their CO_2 content.

Fortunately, planters have sound economic reasons for avoiding peat swamps. Placing plantations on such land entails extra costs for drainage.[11] Peat soils also often show nutrient deficiencies.[12]

A new study of land use in Malaysia and Indonesia shows that, to paraphrase Ronald Reagan, what works in theory seems also to work in practice. The study finds that, so far, oil palm is not the dominant factor in either deforestation or the loss of peat swamps:

> Our results suggest that almost 90% of oil-palm development, before the early 2000s, had occurred on nonpeat areas, and that only 6% of total peatlands within our study region had been planted with oil palm... These findings imply that, from a regional perspective, the oil-palm industry was not the main perpetrator of peatland deforestation.[13]

The result makes sense given the higher costs of planting on peat swamps. This factor may help to explain why palm oil plantations on peat soils appear to be fairly minor sources of global emissions. An industry study found that, in 2010, Malaysian and Indonesian oil palm plantations on peat soils generated 62.7 million tonnes of CO_2 a year.[14] A recent study of global emissions found that total emissions of greenhouse gases, across all sectors, were 42.4 billion tonnes of CO_2-eq in 2005.[15] Such emissions would then amount to about .1 percent of the global total. While this amount is not totally

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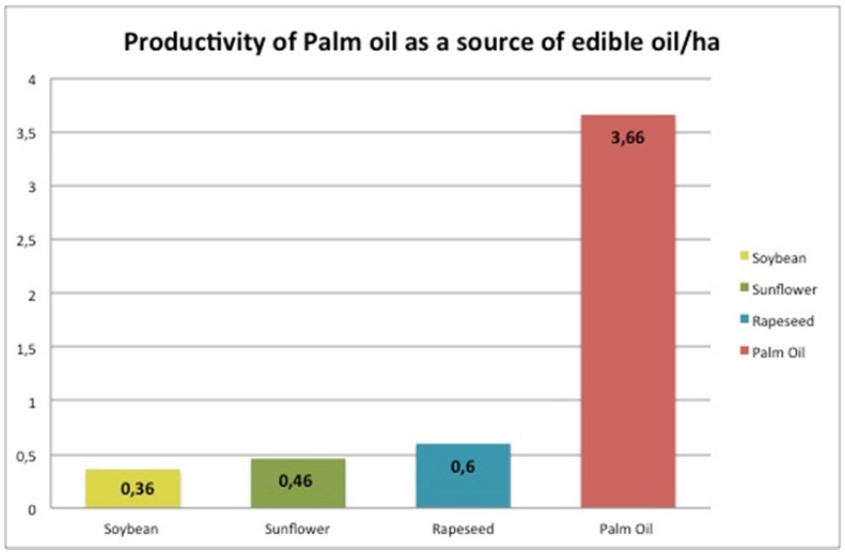
[10] Foong Kheong Yew, Kalyana Sundram, and Yusof Basiron, "Estimation of GHG emissions from peat used for agriculture with special reference to oil palm," *Journal of Oil Palm & the Environment* 1 (February 2010): 18.
[11] Lian Pin Koh et al., "Remotely sensed evidence of tropical peatland conversion to oil palm," ed. Paul R. Ehrlich, Stanford University, *Proc. Natl. Acad. Sci. USA* 108, no. 12 (March 2011): 5129.
[12] Yew, Sundram, and Basiron, "Estimation of GHG emissions," 17.
[13] Lian Pin Koh et al., "Remotely sensed evidence of tropical peatland conversion," 5129.
[14] Yew, Sundram, and Basiron, "Estimation of GHG emissions," 23.
[15] P. Mondal et al., "Critical Review of Trends in GHG Emissions from Global Automotive Sector," *British Journal of Environment & Climate Change* 1, no. 1 (2011): 4.

negligible, neither does it justify allocating a lot of scarce resources to efforts to rein in emissions from palm oil.

Other studies might yield different emission results. But the direction of the likely change is not obvious. Some oil palm plantations, for instance, are located on peat lands that would have been logged over in any case. In those instances, the planting of oil palms may actually avoid some emissions that would otherwise occur.[16] The geographic pattern of palm oil production will inevitably change. As it does so, there is no infallible way to predict the impact on emissions.

Then too, a full assessment of palm oil production's impact on emissions must account for indirect land-use change. If palm oil output were restricted, other oil seed crops would likely expand. Average palm oil yield is six to nine times greater than that of other oil seeds.[17] This high productivity implies that one hectare of forest cleared to plant oil palm might spare nine hectares that would have to be felled to produce the same output by planting soybeans. Omitting this effect from the analysis overstates oil palm's estimated share of emissions. Figure 2 displays the relevant comparisons of land-use efficiency.

Figure 2



Source: MPOC & APOC, "Palm Oil Development and Performance in Malaysia" (February 2010)

However these factors balance out, it is hard to avoid one conclusion: palm oil production is not currently a major cause of global climate change. Oil palm-related encroachment on peat swamps might rise in the future; the concern is that the stock of more suitable

[16] Yew, Sundram, and Basiron, "Estimation of GHG emissions," 23.
[17] Teoh, "Key Sustainability Issues in the Palm Oil Sector," 7.

sites may come to be exhausted.[18] Taken by itself, however, blocking this threat could have only a miniscule impact on climate. The question is whether it is likely to be a part of a larger, successful GHG control strategy.

2. World climate policy: Triumph of the trivial

A striking feature of climate policy debate is the weakness of the links between the steps taken and any plausible prospect for a major reduction of the harm from climate change. Plans to lower GHG emissions on a large scale, for instance, depend on all of the major powers acting altruistically. The prospects for that seem dim.

Hence, for over twenty years, all such schemes to lower GHG emissions have foundered. When GHG controls have gained some small toehold, they have had little impact on emissions. Hopes to curb emissions from forest loss appear likely to become merely the latest iteration of this pattern.

2.1. The global impasse

At the 2009 UN climate summit in Copenhagen, the history of climate diplomacy reached a turning point—and failed to turn. Coming as it did soon after the end of President Bush's eight years in the White House, Copenhagen was supposed to produce a breakthrough. It did not. Instead, many countries made vague pledges as part of what came to be called the Copenhagen Accord. These pledges often merely restated already announced goals. The Accord does not provide for enforcement.

Even the secondary agreements are likely to prove to be chimerical. For instance, at Copenhagen, the developed countries pledged to aid less well-off countries' efforts to adapt to climate change and to curb emissions. Reality is different. According to a *Bloomberg New Energy Finance* White Paper, by August 2011, the developed countries had delivered only 61 percent of the promised sum.[19] Further, much of this money is merely old commitments relabeled, and very little of it helps developing countries to adapt to climate change.

The failure at Copenhagen was structural.[20] There is a global mismatch between capacity and interest. Action by the wealthier and middle-income states could affect emissions, but these states also have higher capacity to adapt to climate change; so GHG limits remain, for them, a secondary option. They have not found its benefits to be worth its costs plus those of striking and enforcing the global bargains required to make controls effective.

Very poor, slow-growing states have a stronger motive to hope for effective GHG control. Such states, for instance, may lack the growth option. At the same time, they also

[18] Lian Pin Koh et al., "Remotely sensed evidence of tropical peatland conversion," 5129.
[19] *Bloomberg New Energy Finance* White Paper, September 5, 2011.
[20] Lee Lane and David Montgomery, "Organized Hypocrisy as a Tool of Climate Diplomacy," AEI Energy and Environment Outlook (2009), http://www.aei.org/docLib/05-EEO-Lane-g.pdf.

lack much ability to curb world GHG emissions; hence, they have little influence over climate change. These states, in effect, can only appeal to the altruism of more affluent countries. As to the prospects of such appeals, history does not lend much ground for hope.[21]

Then too, in most countries most statesmen find GHG control to be rather stony ground on which to cultivate power and popularity. Current generations do not perceive much benefit from success, and most of the future benefits take place abroad rather than at home.

2.2. REDD: disappointment in the making

Confronted with failure at Copenhagen, the parties to the United Nations Framework Convention on Climate Change (UNFCCC) drastically lowered their sights. At the 2010 Cancun conference, the parties shifted focus to reducing emissions from deforestation and degradation (REDD). The Cancun conference reached a sketchy agreement on REDD. The result was quickly hailed as a great step forward.

Again, reality is something else. REDD envisions the developed world paying developing countries to preserve tropical forests. REDD is supposed to be inexpensive.[22] It is also supposed to be a first step back toward the long hoped-for global, comprehensive, binding agreement that will set the world on a path toward deep emission cuts.

Unfortunately, at least four problems cause one to suspect that REDD will be far more difficult than its promoters now believe.

First, REDD projects plus biofuels programs trigger forest/fuel/food trade-offs that work against hopes for lowering emissions. REDD programs, if they work, will boost the price of cropland. As cropland becomes more expensive, commodity prices will also rise. And if the affected crops are linked to global markets, higher commodity prices will ripple through those markets. Meta-studies show that high and rising prices of agricultural commodities are a major driver of tropical forest loss.[23] In other words, a risk of market leakage is built into any REDD program.

The scale of EU and U.S. biofuels programs exacerbates the problem of market leakage. These programs are already likely to increase pressures worldwide to expand crop cover:

> Our prospective analysis of the impacts of the biofuels boom on commodity markets focused on the 2006–2015 time period, during which existing investments and new

[21] J. R. McNeill, "Can History Help with Global Warming?" in *Climate Cataclysm: The Foreign Policy and National Security Implications of Climate Change*, ed. Kurt M. Campbell (Washington, DC: The Brookings Institution Press, 2008).
[22] Meyers Madeira, *Policies to Reduce Emissions from Deforestation and Degradation*, 24.
[23] Helmut J. Geist and Eric F. Lambin, "Proximate causes and underlying driving forces of tropical deforestation," *Bioscience* 52, no. 2 (February 2002): 146.

> mandates in the US and EU are expected to substantially increase the share of agricultural products (e.g., corn in the US, oilseeds in the EU, and sugar in Brazil) utilized by the biofuels sector. In the US, this share could more than double from 2006 levels, while the share of oilseeds going to biodiesel in the EU could triple… When it comes to assessing the impacts of these mandates on other economies, the combined policies have a much greater impact than just the US or just the EU policies alone, with crop cover rising sharply in Latin America, Africa and Oceania as a result of the biofuel mandates.[24]

Some factors, it is true, could constrain the extent of leakage. Currently, tropical forest loss is largely centered in a few countries. In the recent past, Indonesia, Brazil, and Malaysia have accounted for over 60 percent of global tropical forest loss.[25] The degree to which curtailing forest loss in these hotspots would shift action to other countries remains unclear. The investment environment elsewhere may be too poor to support forest loss.

Second, weak land tenure will complicate efforts to implement REDD, but it is hard to cure. The details differ from country to country, but tenure problems are pervasive. In Brazil, for example, fear of expropriation discourages owners from renting their land; with fewer options to rent, landless peasants may be more tempted to clear forests.[26] In Indonesia, steering growth in oil palm production toward land that is already at least partly deforested might lower pressure to clear virgin forest, but much of the most suitable land is encumbered by contested property rights. Further, in much of the world, definitions of land tenure rights clash with one another, creating risks of protracted conflict.[27] Resolving such disputes takes both time and money, adding to the appeal of clearing virgin forest.

Governments could, in principle, clarify tenure and law, yet doing so would create losers as well as winners. In Brazil, the leaders of the Movement of Landless Peasants block reform.[28] In Indonesia, which is currently making just such an effort, clarifying tenure and law will require reconciling clashing property rights systems, deciding the claims of rival ministries, and resolving disputes between local and regional governments and

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[24] Thomas W. Hertel, Wallace E. Tyner, and Dileep K. Bir, "The Global Impacts of Biofuel Mandates," *The Energy Journal* 31, no. 1 (2010): 98.
[25] Meyers Madeira, *Policies to Reduce Emissions from Deforestation and Degradation*, based on Table 2-2, p. 21.
[26] Lee J. Alston, and Bernardo Mueller, "Property Rights, Land Conflict and Tenancy in Brazil," National Bureau of Economic Research, Working Paper no. 15771 (February 2010): 2, http://www.nber.org/papers/w15771.
[27] Lorenzo Cotula and James Mayers, *Tenure in REDD: Start-Point or Afterthought?* (London: International Institute for Environment and Development, 2009), 16.
[28] Lee J. Alston and Bernardo Mueller, "Property Rights and the State" in *Handbook of New Institutional Economics*, ed. Claude Menard and Mary M. Shirley (Dordrecht: Springer, 2008), 582.

Jakarta—disputes that stretch back, literally, to colonial days.[29] The political costs of persevering with such an effort are likely to be high.

Third, REDD plans are caught in a dilemma between goals that are too stringent and those that are too generous. REDD projects offer positive rewards for emissions cuts rather than penalties for emissions. Therefore, REDD projects must define a baseline emissions path against which to measure progress. All such efforts, though, are fraught with the problem of defining a baseline. Setting the hurdle too high wastes resources as risk-averse agents shun viable projects. Setting the hurdle too low wastes resources as investors pay to preserve forests that were never at risk.

Projects in which REDD is used as a source of emission permits are especially prone to fraud. In such projects, those selling REDD-based permits have an incentive to overstate emission reductions. Those buying the permits have reason to not probe too deeply into the validity of the baselines or the actual emissions. Third-party monitoring and detailed rules may limit abuses, but they lower projects' appeal by boosting their transaction costs. All these problems have been much on display in the UN Clean Development Mechanism.[30] REDD projects, too, will be flawed. Some corruption is inevitable. When it is disclosed, public outrage will ensue. Those who have paid for the projects, be they governments or firms, will share in the obloquy.

Fourth, even were it successful, REDD programs cannot serve as a model for a larger GHG control system. REDD would work by developed countries paying less developed ones to reduce emissions. Many developed countries, though, are in tight fiscal straits, and their economic growth rates are anemic. Their demographics suggest that things may improve only slowly. Before the recent economic downturn it was already clear that developed countries refuse to pay anything like the full costs of global GHG control. Since that downturn, their rejection of that idea is likely to be firmer still. The post-Copenhagen record on aid confirms this judgment.

3. Policies without a guiding strategy

REDD becomes even more problematic when viewed in a larger climate-policy context. Thus, EU policies are couched in terms of promoting renewable fuel use; yet their discrimination against palm oil-based biodiesel raises the cost of reaching that goal. More troubling still, the effort to build a global regime to restrain GHG emissions is threatening the global trade regime.

[29] Dan Slater, *Ordering Power: Contentious Politics and Authoritarian Leviathans in Southeast Asia* (New York: Cambridge University Press, 2010), 63.
[30] Michael Wara, "Measuring the Clean Development Mechanism's Performance and Potential," *UCLA Law Review* 55 (2008): 1759-1803.

3.1. Eco-protectionism

EU biofuels policy heavily discriminates against palm oil-based biodiesel. In fact, were it not for this discrimination, Southeast Asian palm oil-based biodiesel would dominate the European market:

> There is general consensus that—in the absence of subsidies—palm oil is by far the most competitive vegetable oil for the production of biodiesel... The reason for the dominant role of rapeseed oil—a relatively high priced feedstock—is to be found in the high level of public support provided in EU countries where rapeseed oil from domestic sources represents the main feedstock for biofuel production. In fact, in the absence of public support, rapeseed based biodiesel should not be competitive, even on a long term basis.[31]

EU discrimination rests on a complex of policies. Europe subsidizes domestic rapeseed production. Also, domestic rapeseed-based biodiesel is exempt from the high motor fuel excise taxes common in Europe. Domestic biodiesel qualifies against the EU-imposed mandate that requires member countries to derive 10 percent of their motor fuel from renewable sources.

Palm oil, of course, does not receive the EU production subsidies. Further, palm oil, unlike EU rapeseed, is denied the excise tax exemption, and it does not count toward the 10 percent renewable fuel quota.[32] Palm oil is excluded from these last two benefits because it fails to meet the standards established under the EU Renewable Energy Directive (RED).

This motive behind the EU regulatory process seems tainted with protectionism. EU documents have stated that the EU's biofuels policy was intended in part to prop up its chronically costly and troubled agricultural sector.[33] This protectionism works through manipulation of regulatory standards. Beginning in 2013, for an excise tax exemption or to count against the 10 percent target, an EU biofuel must lower GHG emissions by 35 percent or more, compared to the use of fossil fuel. The standard is scheduled to rise to a 50 percent saving by 2017.

The EU claims that palm oil fails to clear this hurdle. Measuring the GHG emissions of a biofuel feedstock is, though, highly uncertain. The GHG impacts of biofuels depend on prior land use, production practices, and local circumstances. Thus, one recent study

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[31] P. Thoenes, *"Biofuels and Commodity Markets – Palm Oil Focus,"* FAO, Commodities and Trade Division, 5, http://www.fao.org/es/ESC/common/ecg/122/en/full_paper_English.pdf.
[32] Fredrik Erixon, "Green Protectionism in the European Union: How Europe's Biofuels Policy and the Renewable Energy Directive Violate WTO Commitments," *ECIPE* paper no. 1 (2009): 13.
[33] Ibid.

showed that, depending on prior land use, palm oil-based biodiesel can either produce net GHG reductions almost immediately, or take hundreds of years to do so.[34]

Indirect land-use change (ILUC) also matters. Producing biofuel can cause emissions as new land is opened to replace the crops diverted from food to fuel. Palm oil's high yield per hectare means that it is likely to have a smaller ILUC effect than other oil seed feedstocks. Also, the oil palm is often grown on soils unsuited to other crops.[35] This feature too is a plus in comparing its ILUC effects. But the models used by the European Commission take no account of ILUC.[36] The European Commission has proclaimed that it intends eventually to account for ILUC effects in its standards, but it recently decided to postpone any move toward doing so until 2016.

The U.S. Environmental Protection Agency (EPA) noted that it could not validly certify that a biofuel meets the emission standards without calculating the indirect land use impacts. That the effects are uncertain, it rightly noted, did not imply that they were unimportant.[37] In effect, the EPA is implicitly asserting that the EU analysis is simply not trustworthy.

The fact is, comparisons of the GHG efficiency of the various feedstocks produce wildly divergent results. For palm oil-based biodiesel, recent studies have found savings compared to fossil fuel that range from 19 percent to 71 percent. The EU found soy-based biodiesel achieved a saving of 31 percent. The U.S. government reportedly initially found that it was 22 percent. Then it revised its results to 57 percent.

Relative standings are no clearer than are absolute numbers. One recent study found that palm oil surpasses the saving from European rapeseed.[38] Another study, one commissioned by the European Commission, found that "for biodiesel, palm oil remains as efficient as rapeseed oil, even if peatland emissions are taken into account."[39] Claims like those of the U.S. Environmental Protection Agency (EPA), that its standards are "science based," miss the point: the "science" in question may not yet warrant trust.

Finally, and perhaps most obvious, the EU's choice of the standard itself is arbitrary:

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[34] Gibbs et al., "Carbon Payback Times," 4.
[35] The World Bank, International Finance Corporation, "The World Bank Framework and IFC Strategy for Engagement in the Palm Oil Sector" (March 31, 2011): 4.
[36] European Commission, Report from the Commission on Indirect Land Use Change Related to Biofuels and Bioliquids, Brussels, 22.12.2010 COM (2010) 811 final, 11.
[37] U.S. Environmental Protection Agency, 40 CFR Part 80, "Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program; Final Rule," *Federal Register* 75, no. 58 (March 26, 2010): 14679.
[38] J.M. van Zutphen, R.A. Wijbrans, and Foo-Yuen Ng, "LCI Comparisons of Five Vegetable Oils as Feedstock for Biodiesel," *Journal of Oil Palm & the Environment* 2 (April 2011): 37.
[39] Perrihan Al-Riffai, Betina Dimaranan, and David Laborde, "Global Trade and Environmental Impact Study of the EU Biofuels Mandate," International Food Policy Institute (2010), 11, http://www.ifpri.org/sites/default/files/publications/biofuelsreportec.pdf.

> From a legal point of view, the 35% criterion is chosen arbitrarily. There is no specific scientific consensus saying it should be 35% rather than 30% or 40%. The 35% threshold, however, ensures that domestic rapeseed oil will qualify with a small margin but that the default greenhouse gas saving of palm oil biodiesel and soybean biodiesel—the main foreign competitors to domestic rapeseed biodiesel—will not. This is one principal effect of the directive: it effectively closes future market expansion for the main biodiesel competitors.[40]

The same point can be made about the 50 percent standard for 2017. Indeed the point applies just as well to the new U.S. standard, which is also 50 percent. The result is a great deal of convoluted analysis. Yet the results rest on flimsy data and highly stylized models used to determine if various fuels meet a standard that is itself entirely arbitrary. Hence, even benefit-cost analysis is of very limited value.

3.2. Certifying sustainability

Under the EU biofuel rules, a supplier can claim that a given feedstock outperforms the default values assigned by the regulations. In effect, however, that procedure places the burden of proof on the supplier. Meeting that burden, even if the assessment were a fair one, is likely to be costly. The European Commission has, so far, approved seven schemes by which suppliers can certify that a given biofuel or feedstock is "sustainable."

The palm oil sector has set up its own system for certifying sustainability. It is called the Roundtable for Sustainable Palm Oil (RSPO). RSPO standards do not currently specify an acceptable standard for total GHG emissions. They do, though, set standards for use of best practices with regard to both emissions and equitable treatment of all stakeholders. This system is gaining ground. Today, RSPO-certified palm oil accounts for around 10 percent of total output.

These efforts, though, have not silenced criticism. Some green non-governmental organizations (NGOs) question the validity of RSPO's standards. Of these groups, some in the EU demand that mandatory schemes be expanded to cover non-fuel imports of palm oil and its products. Others apparently wish simply to ban such imports.

Certification will require measurement and enforcement costs. In the economy at large, these kinds of costs are often high enough to determine which transactions do take place and which do not.[41] The multiple uncertainties surrounding biofuels imply that for certification of sustainability, measurement and enforcement costs are likely to be steep.

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[40] Erixon, "Green Protectionism in the European Union," 29.

[41] Douglass C. North, *Institutions, Institutional Change, and Economic Performance* (New York: Cambridge University Press, 1990), 31.

3.3. Using monopsony power to achieve REDD goals

The EU debate about biofuels can be viewed as part of a larger effort to use buyers' market power (monopsony power) to force sellers to adopt more eco-friendly production processes. Green NGOs call consumer boycotts and publicize attacks on allegedly non-sustainable practices. The goal is to force palm oil importers to pressure upstream suppliers to change their practices. The NGO is self-appointed as both prosecutor and judge. Downstream firms have no wish to spend money defending the production processes of suppliers in faraway lands. Nor do they wish to incur harm to their public reputations; hence the pressure to give in to the NGO threats is great.

In the long run, though, the structure of the market may work against these efforts to mobilize monopsony power in support of green goals. As noted above, palm oil emissions differ greatly from case to case. Buyers, too, are disparate in their degree of concern about the issue. Some consumers in some countries, like those of the EU, may be eco-sensitive. In other parts of the world, like those of east and south Asia, buyers may be more price-sensitive. The heterogeneity of both the supply side of the market and its demand side brings two problems in their wake.

First, suppliers' logical response is simply to ship their greener output to the eco-sensitive consumers. They can then ship the rest to the less fussy markets. The effect on the environment would be slight. All buyers and all sellers, though, would bear added costs of measuring and certifying greenness. Only if the would-be monopsonists had enough market power to compel all producers to adopt uniform practices might the system be made actually to affect emissions.

Second, even in developed countries, not all consumers are eco-sensitive. Therefore, the more zealous buyers can be tempted to resort to the political process to amplify their market power. Resort to this expedient, though, invites domestic suppliers to try to capture the process. By doing so, such suppliers can raise legal barriers against their rivals' entry into the market. The biofuels programs in the European Union and the United States show that the farm sectors are quick to seize this opportunity. And the large unknowns surrounding the emissions of various biofuels allow free play to their machinations. Thus, an attempt to deploy monopsony power to protect forests can become a source of monopoly power for other suppliers.

3.4. Building a climate regime—eroding a trade regime

Effective GHG controls would require the major powers to construct a global regime on GHG control. Regimes consist of "implicit or explicit principles, norms, rules, and decision-making procedures around which actors' expectations converge in a given area

of international relations."[42] The current climate regime, the UNFCCC, as noted above, is largely ineffectual.

Yet efforts to build such a GHG control regime are subjecting the global trade regime, the World Trade Organization, to wrenching stresses. The EU's policy toward palm oil is a case in point. WTO rules prohibit trade barriers that are based not on the features of the traded product but on the processes by which it is produced. Exceptions are allowed. They are, though, banned when they clearly reflect efforts to confer competitive advantage on domestic products. WTO dispute adjudication is an uncertain process, and opinions differ among the cognoscenti on how to interpret its rules. But at least some experts think that on palm oil the EU is violating WTO rules.[43]

The larger point relates to the deeper conflict between the goals of GHG control and trade liberalization. Schemes for strengthening the GHG control regime often propose that states backing controls impose trade penalties on those that do not.[44] It is, though, worth recalling that previous liberal trade regimes have collapsed as major powers defected from them.[45] The benefits of liberal trade are great, but they are not a free good.

4. U.S. policy and palm oil

Given the poor prospects for GHG control, economic development may be the best way for many countries to cope with climate change, and palm oil production can sometimes power the needed growth. Eco-protectionist policies impede development. For that and other reasons, the United States should eschew and oppose them. World Bank palm oil policies spring from more benign motives, but they may cast that body into a role for which it is poorly suited. Domestically, the U.S. renewable fuel program would be likely to gain from placing less stress on GHG goals and more on lowering the costs of fuel supply. Broadly, U.S. climate policy must balance concerns about the market failure implied by excess GHG emissions against equally valid concerns about policy failures produced by government policy.

4.1. A new vision for climate policy

The notion of emission control has dominated climate policy. Surely, at some point, emissions must fall, but they do not seem likely to do so anytime soon. U.S. climate policy needs another view of the problem. The work of Nobel laureate Ronald Coase suggests one alternative.

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[42] Stephen D. Krasner, "Structural Causes and Regime Consequences: Regimes as Intervening Variables," in *Power, the State, and Sovereignty: Essays on International Relations*, ed. Stephen D. Krasner (New York: Routledge, 2009), 113.
[43] Erixon, "Green Protectionism in the European Union," 11.
[44] Paul Collier, The Plundered Planet: Why We Must – and How We Can – Manage Nature for Global Prosperity (New York: Oxford University Press, 2010), 193.
[45] Ronald Findlay and Kevin H. O'Rourke, *Power and Plenty: Trade, War, and the World Economy in the Second Millennium* (Princeton: Princeton University Press, 2007), 535.

Many environmental problems arise when two valued activities interact in ways that raise costs to one or both of them. Often the costs of these interactions can be lowered by changing either activity. Thus, the costs of airport noise can be lowered by curbing airport operations, but adding sound insulation to nearby buildings can have the same effect. Good policy would seek to maximize total welfare; and in doing so it would use the same scale to weigh the costs to the "source" of the nuisance, and those at the point of harm.[46]

Climate change exhibits this same logic. GHG emissions, by altering the climate, will impose costs on some activities. Yet rationing the use of fossil fuels, halting the felling of tropical forests, and shrinking livestock herds are themselves all costly. And, whatever their merits, they seem unlikely to occur on a large scale in the near future.

The alternative is to "harden" the societies most exposed to harm from climate change against its ill effects. Hardening involves building infrastructure, economic diversification, and accumulating both human and physical capital with which to cope with future climate change shocks and surprises.[47] This approach is a climate policy analogue to adding sound insulation to the buildings near airports.

Palm oil is a potent source of growth and development. Earnings derived from the palm oil sector can provide countries with capital. That capital can be used to build protection against future climate change. Insofar as palm oil also augments food supply in other developing countries, that too should foster growth and thereby add to future safety margins. These defensive benefits depend, of course, on some of palm oil's earnings being saved and invested, and they may not be. Nonetheless, climate policy should weigh the potential defensive benefits against the harm from emissions.

4.2. The United States and World Bank policy

From this viewpoint, the new World Bank policy framework on palm oil is somewhat worrisome. To be sure, there is in theory a basis for the Bank's concern. Climate change, after all, poses a long-term threat to development. Further, some of the Bank's stated goals seem reasonable. There are good grounds for wishing to enhance the productivity of existing plantations and to steer development away from peat lands.

Yet in practice, one can doubt that the Bank is suited to a role in GHG control—at least in the case of palm oil. There, the Bank seems to be heading toward using its control over access to below-market price capital to induce producers to adopt more sustainable practices. This approach may augment the efforts of the green NGOs' monopsony power. The NGOs attempt to deprive the producers of whom they disapprove, of access to markets. The Bank seeks to deprive those of whom it disapproves, of access to capital.

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[46] Ronald Coase, "The Problem of Social Cost," in *The Firm, the Market, and the Law* (Chicago: The University of Chicago Press, 1988), 96.
[47] Thomas C. Schelling, "What Makes Greenhouse Sense? Time to Rethink the Kyoto Protocol," *Foreign Affairs* 81, no. 3 (2002): 3.

The Bank, of course, is likely to have a somewhat fairer decision process than the NGOs. Even the Bank, though, cannot escape the dilemma between high transaction costs on the one hand and weak controls on the other.

Further, subjecting one kind of oil seed or one region to controls, while exempting others, risks substituting high-emission outcomes that are exempt from controls for low-emission ones that are subject to them. The World Bank, though, is not in a position to impose uniform incentives on world oil seed production. Even if it were, aid agencies have often found it difficult to control the behavior of their donees, and there is no reason for thinking that they will have more luck with GHG control than they have had with market and political reforms.

4.3. The new renewable fuels standard and palm oil

In addition to using its influence with the Bank and with its trading partners, the United States should carefully reassess its own biofuel program (RFS2). In the Energy Independence and Security Act of 2007 (EISA 2007), Congress has prescribed a schedule of targets for many different classes of biofuels. EPA has only limited ability to relax this schedule, and it has so far shown little inclination to do so.

Yet economists have long known that the future pace and path of technologic change is highly uncertain: "Different people and different organizations will disagree as to where to place their R&D chips, and on when to make their bets. Some will be proved right and some wrong."[48] If technology fails to progress at the rate foreseen by Congress, these rigid mandates can require use of fuels that are very costly compared to available alternatives.

One remedy might be to relax the very stringent emission standards built into this program. The EPA estimated that increased biofuel volume could bring a wide range of benefits. Relaxing EISA's harsh emission standards would lower the costs of reaching its mandates for raising biofuel volumes. Less aggressive standards do not appear to risk large increases in harm from climate change. The EPA analysis cites benefits from GHG emission abatement that range from $.6 to $12 billion yearly.[49] One should note that the study warns that the analysis is preliminary and that estimates may change.

Still, while damage from climate change is very much an open question, there is a good chance that EPA's GHG high-end benefit estimate is already inflated. The analysis is opaque on this point, but EPA used an estimate of global damage per tonne of GHG emission in some of its calculations of U.S. damages.[50] Many experts, including Cass

[48] Richard R. Nelson and Sidney G. Winter, "In Search of Useful Theory of Innovation," *Research Policy* 6, no. 1 (1977): 47.
[49] Assessment and Standards Division, Office of Transportation and Air Quality, U.S. Environmental Protection Agency, EPA-420-R-10-006 Renewable Fuel Standard Program (RFS2) Regulatory Impact Analysis (February 2010): 955.
[50] Ibid., 910.

Sunstein, now a senior official in the Office of Management and Budget, have pointed out that the United States gains less than most other countries by abating a tonne of GHG emission.[51] Therefore, EPA's decision to use global damages instead of a U.S. specific one, is likely, all else being equal, to overstate benefits.

Further the EPA analysis of GHG emission pathways remains plagued with large uncertainties. Not the least of these is the ILUC problem. The problems pointed out in Section 3.1 apply to the United States as well as to the EU. Thus, while the EPA is right that emission measurements that ignore ILUC are of little value, the European Commission is also right that ILUC is as yet too poorly understood for measurements of it to be given much weight. The net effect is that policy makers need to wait for better data and analysis before basing decisions on such estimates.

4.4. Policy conclusions

A vibrant and growing palm oil sector is in U.S. national interests. It would foster the kind of global economic development that has been a major goal of U.S. foreign policy since World War II. Further, growth in the palm oil sector relies heavily on the private sector and on growing international trade. It is, therefore, in line with the liberal model of development toward which U.S. policy has gravitated.

This approach is needed now more than ever. Straitened circumstances of many developed countries seem to cast doubts on the prospects for large increases in aid from them, and the performance of such aid programs has been disappointing in any case.[52]

Development aid, though, merely exemplifies a much broader problem; government policy often fails to achieve its stated ends; indeed action often leads to net costs. Without doubt, GHG emissions represent a market failure. In principle, such a failure may call for action by the public sector. Yet policy is often marred by the effects of high transaction costs and rampant rent seeking.

Far from being exempt from such tendencies, climate policy is a classic case of their effects. Hence, before concluding that government should act to correct this failure, one must consider the nature of government decision-making. Both palm oil's small and ambiguous role in the global GHG picture, and its positive effects on development, suggest that legislators would be well advised to stick to laissez-faire policies until there is clear evidence that intervention will do more good than harm.

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[51] Eric A. Posner and Cass R. Sunstein, "Climate Change Justice," *Georgetown Law Journal* 96 (2008): 1565-6.

[52] William Easterly, *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good* (New York: Penguin Press, 2006), 11.

About the Author

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He is the author of *Strategic Options for the Bush Administration Climate Policy*, and he has authored or co-authored numerous policy briefing papers, articles, and book chapters. NASA selected Lane to be the lead author of a report on geoengineering as a tool of climate policy. He has testified before the U.S. House of Representatives Committee on Science and Technology and has frequently been an invited expert at policy conferences.

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