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Agricultural Trade Reform and Tropical Forest Preservation

Clayton W. Ogg

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Deforestation is an important factor in global climate change—second only to fossil fuel consumption—as carbon dioxide is released into the atmosphere due to the cutting and burning of forests. A major driver of deforestation is the conversion of land to agricultural uses, particularly in tropical forests, to feed a growing world population. In addition to climate change impacts, rapid deforestation for agricultural uses undermines world prices for crops. For example, it is estimated that prevention of this forest loss could increase farm income by several billion dollars per year in the United States, alone (ADP, 2010). Designing forest protective farm programs offers a farm policy, trade policy, and environmental policy opportunity. Fortunately, recognition of shared interests between farmers and the environment has played a role for decades in many countries' farm policies and in trade negotiations. Most recently, preventing deforestation became a major focus of the 2015 Paris Climate Agreement—in which 195 countries adopted the first-ever legally binding global climate deal.

Economic and environmental gains potentially occur when countries modify farm program payment schemes to avoid encouraging use of chemicals, land, or other inputs. Cross-compliance programs are one traditional mechanism countries use by requiring farmers to adopt environmentally-friendly practices in order to be eligible for certain program benefits. Another, more recent, farm policy payment scheme that offers the opportunity to achieve gains is one based on the so-called "decoupling" of farm payments. Decoupled payments are fixed income transfers that do not depend on the farmer's production choices, output levels, or market conditions. Therefore, the direct effects of decoupled programs do not change per-unit net returns, so they are not expected to have a direct effect on production decisions including input use and practices. Farmers all over the world benefit from higher crop prices to the extent that decoupled payments in developed countries prevent farm programs from undermining their own commodity price stability and farm income support goals (Bhaskar and Beghin, 2007).

The Organization for Economic Cooperation and Development (OECD) is a group of 34 developed or emerging countries, including the United States, which cooperate to provide policy-related information to inform sound economic development policy choices. As part of that mission they track country agricultural support schemes and the degree that they distort trade or encourage environmental degradation for the 34 member and other countries (Table 1). Since 1980, OECD countries increased the share of producer support measures "decoupled" from commodity or production decisions from 2% to 25% (Tangermann, 2014). Furthermore, Europe recently advanced trade and environmental reforms in its 2013 Common Agricultural Policy (CAP) Agreement (Boere and van Kooten, 2015).

Farm subsidies in tropical countries historically were much smaller and therefore less of a trade reform and environmental opportunity. This changed dramatically as falling crop prices since 2007-2013 led these emerging agricultural countries to dramatically increase subsidies (Clay, 2013). Farm subsidies became major budget items, often comparable in size to those in Europe and in the United States. Much of the world's deforestation occurs in countries that undermine crop prices by heavily subsidizing farmers' use of fertilizer, water, or credit. In these countries experiencing rapid forest loss, conservation compliance offers an important forest preservation tool. In addition, decoupled payments can better support farmers and reduce pollution from fertilizer in nearly all tropical countries that subsidize agriculture.

Table 1. Producer Support Estimate, % of Gross Farm Receipts, 2014

Country/Group	Percent
Australia	2.2695
Brazil	4.3894
Canada	8.9776
Chile	3.094
China	20.207
Colombia	16.6372
European Union (28)	18.3642
Iceland	47.7035
Indonesia	23.3707
Israel	9.7652
Japan	49.201
Kazakhstan	6.4508
Korea	51.1391
Mexico	13.3049
New Zealand	0.9902
Norway	58.373
OECD	17.324
Russia	8.8759
South Africa	2.4166
Switzerland	56.5541
Turkey	22.5582
Ukraine	-8.2241
USA	9.796

Source: OECD, 2015.

Conservation Compliance Success in Brazil

Brazil operates a conservation compliance program as part of its $73 billion credit programs (Assuncao et al., 2013). To be eligible, farmers or livestock producers seeking heavily subsidized loans must submit paper work documenting their intentions to protect certain forests and savannas to avoid greenhouse gas emissions and protect wildlife. Although Brazil's compliance focuses on saving protected forests and savannas from conversion to agriculture, and not on preventing program related expansion in other input use, Brazil significantly benefits the world's crop farmers as saving forests from agricultural expansion avoids undermining crop prices.

Brazil's farm programs are not decoupling schemes. Although Brazil is not currently a member of the OECD, the organization evaluates the support schemes of Brazil and seven other agriculturally important countries. The OECD finds that "price support payments based on output and payments based on input use" account for 78% of subsidy payments in Brazil (OECD, 2015b).

Brazil's conservation compliance program mainly helps with price protection—but not economic efficiency—as it apparently offsets much or all of the production increases generated by the subsidy. Even during the high price years of the biofuel boom, Brazil's conservation compliance denied loans to many farmers, saving an estimated 2,700 square kilometers of forest from agricultural expansion (Assuncao et al., 2013). This success places Brazil's conservation compliance program among the most successful programs in the world for protecting ecosystems and reducing greenhouse gases. Brazil also implements other forest preservation programs which substantially reduce forest loss (Velasco-Bedoya, Juliao, and Siqueira, 2015). With crop prices now much lower than during the above study period, and farmer subsidies rising dramatically, the influence of Brazil's conservation compliance program could greatly increase (Clay, 2013).

Which Approach, or All of the Above?

While cross compliance integration of environmental and farm programs helps prevent programs from undermining crop prices and causing environmental damage, some analysts have pointed out that conservation compliance could become a rationale for continuing inefficient farm subsidies, such as those not decoupled (Tangermann, 2014).

The U.S. experience could be instructive. A coalition of environmental groups and farmers supported creation of the Conservation Reserve Program (CRP) in the United States in 1985, which in the final days of the farm bill process included Conservation Compliance programs (Ogg, 1992). The coalition continued to grow and decoupling became a focus, leading to partial decoupling in 1990 and more complete decoupling in 1996 (U.S. Congress, 1996). Scientists credit the compliance program's wetlands protections, called the "Swampbuster Program," with dramatically reducing wetland loss in the United States (Dahl, Johnson, and Frayer, 1991). The environmental group support for decoupling likely benefited from economic research, especially research by the United States Department of Agriculture (USDA), documenting benefits to farmers and the environment from the CRP and the Swampbuster Program (Heimlich et al., 1998; Ogg, 1992). Support for decoupling also benefited from economic research documenting benefits to farmers and to the environment from decoupling (Hertel, Tsigas, and Preckel, 1990). Environmental groups in the United States supported creation of economically efficient, decoupled programs favored by the OECD, just as they had supported conservation compliance.

OECD also encourages countries to move to separate conservation programs in order to better target environmental outcomes. Yet, publicly funded forest preservation programs face the targeting challenge of choosing which forests face the greatest risk of destruction for agricultural uses. In contrast, Brazil's conservation compliance program effectively targets those farmers actually interested in converting certain forests to cropland. The above challenge of creating targeting mechanisms for forest preservation adds to the immense, practical difficulty of finding major new funding or finding other, forest preservation incentives, such as payments for ecosystem services. Advancing new regulatory programs governing influential farmers' land use decisions also can be very difficult and unpopular. Exploiting shared interests between farmers and the environment, by advancing both, decoupling and conservation compliance, achieves the above targeting advantages as well as practical advantages.

Conservation Compliance for Southeast Asia and for Africa

Many emerging agricultural countries increased fertilizer subsidies in recent years, which can encourage agricultural production and undermine the world's commodity markets (Ricker-Gilbert, Jayne, and Shively, 2013). Seven African countries, including Nigeria, Ethiopia, Kenya, Zambia, Malawi, Tanzania, and Ghana, together spend $2 billion per year on fertilizer subsidies (Ricker-Gilbert, Jayne, and Shively, 2013). Indonesia spends up to 6% of its budget on fertilizer subsidies (Armas, Osario, and Moreno-Dodson, 2010), and both Malaysia and Cambodia subsidize fertilizer. The above African and Asian countries account for much of the rapid forest loss occurring across Africa (Hosomuma et al., 2012) and the great majority of rapid losses across Asia, as they are at the early, most rapid stage of forest loss, with vast areas remaining for further destruction.

Scientists blame loss of forests and other ecosystems for up to 20% of greenhouse gases (National Research Council, 1992), and these losses represent some of the world's most severe wildlife and ecosystem challenges. Agriculture accounts for about 80% of forest destruction (Hosomuma et al., 2012) with much of it occurring in Brazil, in the above African countries, in Cambodia, in Malaysia, and in Indonesia. Conservation compliance for fertilizer could work by denying fertilizer vouchers to farmers who are caught destroying protected forests or destroying other important ecosystems. Vouchers allow

farmers to purchase fertilizer in the market at a subsidized price. Malawi, Nigeria, Ghana, and Tanzania already use such a voucher system (Ricker -Gilbert, Jayne, and Shively, 2013; The World Bank, 2012), so adding conservation compliance measures is straightforward. Zambia, Ethiopia, and Kenya mainly implement government production and distribution systems for subsidizing fertilizer, as does Malaysia, Indonesia (Armas, Osario, and Moreno-Dodson, 2010), and India (Jha, Srinivasan, and Landis, 2007). In these latter countries that do not employ vouchers, a voucher system could replace the current systems for subsidizing fertilizer in order to create a conservation compliance program. Vouchers' more market-oriented approach also achieves efficiencies enjoyed domestically.

Where Conservation Compliance Would Not Work

Fertilizer subsidies encourage certain input use and increase crop production, but may not cause additional deforestation (Chibwanna, Jumbe, and Shivelly, 2013). Conservation compliance nevertheless can provide considerable leverage toward discouraging cropland expansion into forested areas, as compliance denies subsidies for the whole farm, not just for land newly brought under cultivation. Conservation compliance is only relevant where countries subsidize agriculture. Mozambique, Zimbabwe, Angola, Cameron, and Central African Republic experience some of the world's most rapid forest destruction, and risk of future forest destruction (Hosomuma et al., 2012), but provide few subsidies to farmers (Druilhe and Barreiro-Hurle, 2012). Because of the widespread existence of farm subsidies, conservation compliance provides an option for protecting the most at-risk forests throughout nearly all of Asia and Latin America, and in most of Africa, as well, but these five African countries that rarely subsidize farmers may need to find other remedies.

Decoupling Opportunities in India and China

Decoupling is especially relevant for larger crop-producing countries like India and China, where agricultural expansion into forested areas rarely occurs (Hosomuma et al., 2012). In addition to about a $10 billion/year input subsidy program (Jha, Srinivasan, and Landis, 2007) focusing on irrigation, fertilizer, and credit, India's government buys and stores rice and wheat at highly subsidized prices. India's fertilizer subsidies and other subsidies add to air and water pollution from fertilizer. Fertilizer in Asia is a major source of the world's nitrogen related pollutants (Galloway et al., 2004) that cause eutrophication, dead zones in the ocean, acid pollution in the ocean, and loss of habitat, as well as nitrous oxide emissions into the atmosphere.

Decoupling reforms offer substantial economic efficiency as well as reduced pollution from fertilizers. Fertilizer subsidies attempt to support both farmers and consumers to meet humanitarian needs, but fertilizer subsidies may accomplish this less efficiently compared to agricultural research, education, and rural roads (Fan, Gulati, and Thorat, 2008).

Chinese subsidies grew from about $3.6 billion/year to $28 billion/year between 2004 and 2014 (Patton, 2014). However, most provinces across China base payments on acreage historically devoted to grain (Gale, Lohmar, and Taun, 2005). Payments to farmers which are decoupled to this degree tend to reduce world market prices, but only slightly (Bhaskar and Beghin, 2007). From a trade and environment standpoint, China's farm subsidy design ranks among the more benign.

Pursuing conservation compliance, as well as decoupling, potentially could help preserve some of the few remaining ecosystems affected by India and China's agriculture. But saving those remaining forests would affect crop production in India and China only modestly. In contrast to decoupling, conservation compliance for forest preservation offers slight relief for any program related damage to world crop prices by either India or China.

Backsliding in the United States

Farm legislation in 1996 made the United States an early leader in decoupling farm program payments (U.S. Congress, 1996). Farmers could not increase their government subsidies by plowing up more land or applying more chemical inputs. Unfortunately, the periodic nature of farm legislation in the United States led to uncertainty about the extent of the 1996 decoupling effort over the long term. As programs evolved, farmers were allowed to update both the yields used in some payment formulas and the crop specific acreages used as the basis for payments. The "Sodsaver" in the most recent United States farm legislation (U.S. Congress, 2014) makes these weaknesses more explicit by allowing farmers to include newly plowed acres in payment formulas as soon as four years have elapsed, and only half of the payments are denied even during these initial four years. The United States has lost so much grassland in the prairie pothole, nesting region for birds, any further losses pose a serious wildlife issue.

In contrast, the 2013 CAP agreement commits the European Union (EU) countries to a single payment based on farm size, irrespective of crop or output (Boere and van Kooten, 2015). Under the CAP, 30% of EU payments support "green" practices, including crop rotations, preservation of grassed areas, and a 5% set-aside for buffer related practices. U.S. farmers benefit more than most from trade reforms, because the United States is one of the largest exporters of agricultural products in the world.

Exploiting Shared Farm, Trade Reform, and Environmental Interests

Reforming agricultural trade historically poses the greatest challenges compared to other trade reforms but offers by far the largest economic and environmental benefits to society (Laborde and Martin, 2013). Until recently, gains in protecting world crop prices occurred gradually as some developed countries moved toward decoupled, or at least, partially decoupled payment schemes, to avoid encouraging chemical use and land use. However, India, China, Brazil, and some other emerging agricultural powers now subsidize agriculture on a scale comparable to the developed countries. By working together to reform trade, both developed countries and tropical countries can better support farmers, reduce pollution, and protect forests.

Because of the immense size of the rainforests and savannas in Brazil and the large threat posed by agricultural expansion, Brazil's conservation compliance program has real potential for preserving ecosystems, reducing greenhouse gases, and supporting crop prices. In Malawi, fertilizer subsidies account for as much as 16% of the national budget (Dorward and Chirwa, 2011), and fertilizer subsidy programs constitute important programs for farmers in Indonesia, in several key African countries, and in other developing countries. Farmers in some areas of Central Africa experiencing the most rapid forest destruction receive virtually no farm subsidies, but most of the world's rapid forest destruction occurs in countries that rely on these input subsidy designs.

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Author Information
Clayton W. Ogg (clayo@starpower.net) is Economist, retired, the U.S. Environmental Protection Agency.