

WRI WHITE PAPER

REFORMING AGRICULTURAL SUBSIDIES

“No Regrets” Policies for Livelihoods and the Environment



ANTONIO LA VINA

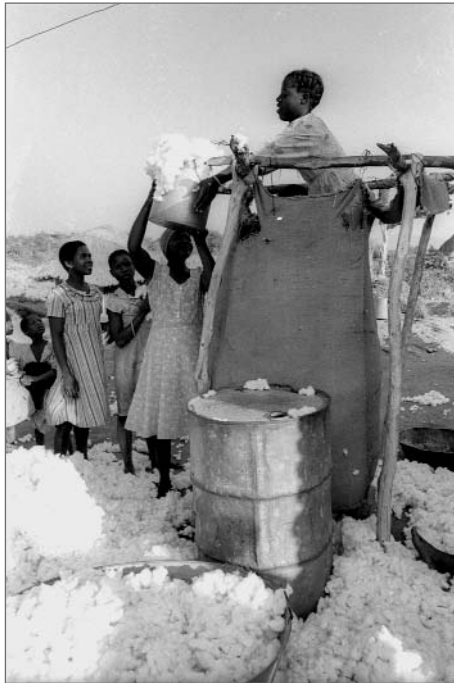
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EXECUTIVE SUMMARY

Agricultural subsidies are among a number of factors determining whether and how agriculture can help the poor and protect ecosystems. Reforming the current agricultural subsidies system in developed countries, a central goal of the Doha Round¹ negotiations of the World Trade Organization, provides an opportunity to generate a number of positive impacts: for poor farmers in developing countries whose ability to compete is hampered by subsidy-driven overproduction in rich countries; for taxpayers and consumers in developed countries faced with rising deficits; for the environment in developed countries where subsidies contribute to ecosystem degradation; and, possibly, for the environment in developing countries where poverty is one driver of environmental degradation. But an agreement to reduce subsidies at the international level does not guarantee that the poor and the environment will benefit; the realization of benefits will require the implementation of strategic domestic policies in developing nations.

Even in the absence of subsidy reduction through the Doha Round, countries can take steps to make agriculture work for the poor and for the environment. Without a WTO agreement, there will still be immense pressure on developed countries to reduce their agricultural subsidies: from developing countries, which are expected to file more cases in the WTO challenging these subsidies, and from within developed countries because of domestic or regional (in the case of the European Union) competition for scarce budgetary resources. Moreover, without a new WTO Agreement, trade-induced changes that affect agriculture are inevitable, whether they come in the context of global, regional, or bilateral trade agreements or through sheer market changes. Domestic policies that make agriculture pro-poor and pro-environment are ‘no regrets’ policies, and countries that adopt them are not only likely to be more prepared for the changes that will come with a new trade agreement, but will be better able to position their agricultural sectors to be effective agents for poverty alleviation and environmental sustainability.

Trade can be an effective vehicle for poverty reduction (Cline 2004), but good governance, at both international and national levels, is necessary so that increased trade benefits the poor, and prevents or minimizes ecosystem degradation (WRI 2005). This White Paper examines what reforms developing countries need to implement so that they can capitalize on reductions in developed country subsidies. It recommends that countries adopt and implement a domestic policy reform agenda that is based on a national assessment of the potential impacts of global trade decisions on ecosystem health and human well-being. The paper also recognizes the necessity of cooperation and support from development agencies and other international organizations in order to overcome the resource constraints that will be faced by many developing countries in the implementation of such reforms. While every country will have to develop its own package of reforms based on its unique physical, socio-economic, and political circumstances, the paper identifies four areas to be addressed by policy-makers and supported by donors.

These include policies designed to:

- Empower small-scale farmers to use natural resources sustainably and strengthen their ability to negotiate with other actors in the market with respect to the use of land and other inputs to agricultural production;
- Mainstream poverty alleviation and environmental considerations into sectoral plans focused on agriculture;
- Promote ecosystem health for human well-being, in particular ecosystems’ ability to provide essential services; and
- Promote best practices in governance.

The paper concludes with a set of policy recommendations under each of these categories.

Policy Recommendations

Laws, policies, and programs to empower poor farmers should:

- Provide for rights-based land tenure policies, including agrarian reform laws and recognition of indigenous peoples' territories;
- Provide a supportive environment for community enterprises, such as production and marketing cooperatives;
- Establish economic incentives for poor farmers to use land and other resources sustainably, including direct compensation for conservation activities, public goods, and ecosystem services; and
- Allow for payments to landowners in return for land management that protects ecosystem services, such as water quality and carbon storage.

Macroeconomic policies and measures that integrate poverty alleviation and environmental goals should include policies that regulate:

- Pricing and trading of farm products;
- Property or access rights over land and water;
- Taxation of land and agricultural assets;
- Rural credit and insurance;
- Use of agrochemical inputs;

- Introduction of new technologies; and
- Transport services in rural areas.

Laws, rules, and regulations related to agriculture that protect ecosystems and their ability to provide for essential ecosystem services include:

- Support for soil conservation practices that address land degradation and are designed for the benefit of poor farmers;
- Facilitation of crop diversification, recycling and conservation of soil nutrients and organic matter, and ecologically-based integrated pest and disease management;
- Flexibility and diversity in marketing standards to enable retail food stores and distributors to diversify varieties of produce and reduce wasteful cosmetic standards for foods in markets.

Reforms to promote better governance of the agricultural sector include:

- Accountable decentralization;
- Establishment of inter-agency and multi-stakeholder processes in agriculture; and
- Strengthened enforcement of environmental laws, rules, and regulations.

This reform agenda, outlined in the following pages, is relevant to development organizations such as bilateral assistance agencies, multilateral cooperation institutions, private foundations, and development NGOs. It can serve as a guide for these organizations' financial and technical support for development—particularly for their agriculture and environment portfolios. By supporting the adoption and implementation of a reform agenda, development organizations can help developing countries take advantage of a change in developed countries' subsidies, helping make agriculture a vehicle for poverty alleviation while protecting the ecosystems on which poor farmers and society in general depend.

INTRODUCTION

In December 2005, trade ministers and other officials from all over the world assembled in Hong Kong to attend the Sixth Ministerial Conference of the World Trade Organization (WTO). For six days, they reviewed the progress since the Fifth Ministerial in 2003 and made decisions leading toward the culmination of the trade negotiations launched in 2001, which have been dubbed the 'Doha Development Round' after the location of the Fourth Ministerial Conference in Doha, Qatar.

At the center of the Doha round are the agriculture negotiations, where agreement is a must if progress is to be made in other trade areas. While international trade in agricultural commodities has the potential

to provide economic benefits to small-scale farmers in developing countries, some elements of this trading system can also perpetuate poverty. In particular, a number of academics, organizations, and developing country governments argue that agricultural subsidies in developed countries² contribute to poverty in developing countries and should therefore be reduced (WTO 2003a; Diao et al. 2005; Stuart and Fanjul 2005; Vitalis 2004; Cline 2004). In fact, several cases have been filed by developing countries claiming that certain developed countries' subsidies actually violate WTO rules. In addition, some subsidies are believed to exacerbate environmental degradation in countries where they are provided (EWG 2006a), increasing pressure for subsidy reduction. Table 1 summarizes the environmental and livelihood issues that arise in both developed and developing countries with respect to agricultural subsidies.

Table 1: Framing the Agricultural Subsidies Debate: Issues at a Glance

	Developed Countries	Developing Countries
Environment	<ul style="list-style-type: none"> • Land degradation • Water pollution • Decreased agrobiodiversity 	<ul style="list-style-type: none"> • Expansion of area under production to marginal lands to compensate for low prices • Difficulty investing in sustainable practices • Poverty exacerbated by low producer prices driving exploitation of natural resources
Poverty/Livelihoods	<ul style="list-style-type: none"> • Majority of government subsidies to biggest farms rather than small family farms • Higher consumer prices for 'protected' commodities • Government payments strain budget 	<ul style="list-style-type: none"> • Low farmer incomes due to low world prices for agricultural goods • Reduced national export earnings • Minimal investment in rural infrastructure • Cheaper food for consumers due to subsidized imports

Reforming the agricultural subsidy system has the potential to generate a number of positive impacts: for poor farmers in developing countries whose ability to compete is hampered by subsidy-driven overproduction in rich countries; for the environment in developed countries where subsidies encourage

unsustainable practices; for taxpayers and consumers in developed countries; and, depending on domestic policies, for the environment in developing countries. However, these benefits are not guaranteed, and in fact subsidy reform, if carried out carelessly, could also have some negative effects, including placing increased pressure on the environment in developing countries. Strategic domestic policy reforms in developing countries, supported by international cooperation, are necessary to ensure that subsidy reductions through the WTO indeed result in pro-poor and pro-environment outcomes.

The stated purpose of the agriculture negotiations under the WTO is to "correct and prevent restrictions and distortions in world agricultural markets" (WTO 2001). Specifically, parties have committed to addressing three issues: export subsidies, market access, and domestic support (see Box 1). In the literature, these issues are often lumped under the single term 'subsidies.' In this paper, we use this term as well as 'protection' and 'support' to refer to these three types of interventions in agricultural markets.

In Hong Kong, negotiators made tentative progress toward agreement on the agricultural agenda items, including an agreement to end export subsidies by 2013, and in the case of cotton, by the end of 2006. For other commodities, actual amounts of domestic farm subsidy cuts were not determined, but Members set parameters such as 'bands' dividing countries into groups that will face differing degrees of subsidy and tariff reductions. Least Developed Countries (LDCs) were also given increased market access in developed countries, with 97 percent of imports able to enter developed countries free of duties and quotas. However, the three percent of excludable imports could consist of the goods most important to LDC economies, meaning that the duty- and quota-free access may not have the desired poverty reduction effects (Khor 2005). In Hong Kong, negotiators set an April 30, 2006, deadline to establish full modalities—such as formulas for tariff and subsidy reductions—and agreed that comprehensive draft lists of commitments based on these modalities should be submitted no later than July 31, 2006

*Box 1***Agricultural Support and Subsidies**

Agricultural support takes many forms. The following are under negotiation in the Doha Round:

Export subsidies are benefits conferred on a firm by the government, contingent on exports.

Market access includes measures that protect domestic agriculture by limiting or otherwise restricting imports. Market access issues refer to **tariffs**—customs duties on merchandise imports which give a price advantage to similar locally-produced goods and raise revenues for the government; **quotas**—limitations on imports for a particular good from a given country; and **special safeguards**—actions taken to protect a specific industry from an unexpected build-up of imports.

Domestic support—sometimes called ‘internal support’—is any domestic subsidy or other measure that acts to maintain producer prices at levels above those prevailing in international trade. Types of domestic support include direct payments to producers (including deficiency payments to make up the difference between a target price and the market price), and input and marketing cost reduction measures available only for agricultural production. The WTO classifies domestic support into three categories according to the degree of distorting effects on agricultural production and trade:

- **Amber Box:** Refers to the most trade-distorting subsidy payments, including product-specific support, such as direct support and administrative prices, and non-specific support, such as insurance and support for capital and factor use. Subsidies in this category are mandated to be reduced and eventually eliminated under the present WTO regime.
- **Blue Box:** Consists of subsidy payments directly linked to historical production, rather than current price and volume of output. These payments are implemented under schemes such as deficiency payments and acreage support that limit production by imposing production quotas or requiring farmers to set aside part of their land. Blue Box support is deemed to be partially decoupled from production and is not subject to WTO reduction commitments.
- **Green Box:** Refers to decoupled support paid directly to producers regardless of current production levels or prices. Green Box support is expected to cause little or no trade distortion and is not subject to WTO reduction commitments. The Green Box includes support for environmental programs, government service programs (e.g., research, pest control, extension, and infrastructure provisions), public stocking for food security purposes, domestic food aid, relief from natural disasters, and government income insurance and income safety-net programs.

Source: Adapted from UNDP 2003

(ICTSD 2005; WTO 2005). WTO Members failed to meet the April deadline, however (ICTSD 2006), and as of May 2006 negotiations on modalities were still underway.

This White Paper looks beyond these particular decisions and the Doha Round to examine the question of how developing countries can capitalize on reductions in developed country subsidies to make agriculture a vehicle for poverty alleviation while protecting the ecosystems on which farmers and society in general depend. The policy recommendations in this White Paper are a starting point for more detailed analysis; given the heterogeneity of developing countries’ agricultural sectors and related socio-economic circumstances, each country will be affected differ-

ently by changes in the subsidy system and thus will need to implement different approaches to adjustment.

Section I describes the importance of agriculture to poverty alleviation and the role that trade plays in that relationship. It also discusses the bidirectional links between agriculture and the environment that can result in both positive and negative outcomes. Section II presents the case for subsidy reform from both a developed-country and developing-country perspective, describing both economic and environmental effects of the subsidy system. Section III explores the potential poverty and environment impacts of subsidy reduction. In Section IV, we propose a domestic policy reform agenda that developing coun-

tries can implement to ensure that subsidy reductions benefit poor farmers and do not place additional pressure on ecosystems. This agenda can be supported by bilateral and multilateral development organizations and NGOs.

Many of the policies and measures recommended in this paper would be beneficial even in the absence of significant change in the WTO. A new international agreement could, however, provide new opportunities and incentives for domestic policy reform that eliminates biases against the agricultural sector and against the environment, unfortunate characteristics of the policy framework of many developing countries. In order for such reforms to be implemented, a new WTO agreement must maintain adequate policy space and flexibility for developing countries (Gallagher 2005). Nothing in the current WTO agreements, and in the anticipated potential Doha decisions, should prevent countries from increasing investments in human capital, land tenure, water access, technology, infrastructure, nonagricultural rural enterprises, organizations of small farmers, and other forms of social and political capital for poor and small scale farmers and their communities (Diaz-Bonilla and Gulati 2002-2003). These investments will help protect a healthy natural resource base, essential to the long-term viability of agriculture, and will benefit poor farmers, rural communities, and society as a whole.

I. SETTING THE STAGE: AGRICULTURE, POVERTY, TRADE AND THE ENVIRONMENT

Poverty, agriculture, environment, and trade are fundamentally linked—physically, ecologically, socio-economically, and ultimately at the policy level. While these linkages exist in all countries, the connections are most obvious in developing countries and countries with economies in transition, where poverty frequently coincides with the predominance of agriculture in the economy (La Vina and Fransen 2006).

Nearly three billion people live on less than US\$2 a day, most of them in the developing world. Among them, over one billion people live in extreme poverty,

surviving on less than US\$1 a day (World Bank 2001). The Food and Agriculture Organization (FAO) estimates that there were 842 million undernourished people in the world in 1999-2001, with 798 million living in developing countries and 34 million in countries with economies in transition (FAO 2004). Worldwide, almost 80 percent of the hungry live in rural areas and depend on agriculture as their source of livelihood (Clay 2004). The Millennium Project's Task Force on Hunger breaks down this figure, stating that about half of the world's undernourished are small farmers, 20 percent are landless rural dwellers, 10 percent are pastoralists and fishermen, and the remaining 20 percent are urban dwellers (Mayrand et al. 2005).

Substantial reductions in poverty and hunger among the farming population would have implications for developing countries' national economies. In fact, historically, "[a]ll reported rapid reductions in widespread poverty started with livelihoods being enhanced through agricultural transformation" (DFID 2002). Additionally, in many developing countries agriculture is a primary source of foreign exchange earnings (UNDP 2003). While increased agricultural production is an important component of poverty alleviation, it also has implications for the environment. Agriculture is "probably the single most powerful influence on environmental quality in most developing countries" (Scherr 1999), where it accounts for most land use and affects many environmental variables such as water quality and flow, soil quality and movement, natural vegetative cover, and biodiversity. In countries of the Organisation for Economic Co-operation and Development (OECD), agriculture is the single largest user of water and source of pollution (Clay 2004).

While farming inevitably has an impact on ecosystems, not all agricultural systems are equally destructive and some can help maintain, or—in the case of degraded landscapes—restore environmental quality. Agroforestry, for example, is an integrated farming system that attempts to mimic a natural ecosystem and can provide a number of ecosystem services such as soil and water conservation and soil nutrient

Box 2

Principles for Sustainable Trade Policy

1. Whenever trade and environmental policy issues intersect, both sets of policies should be adjusted so as to maximize the complementarity of trade reform and environmental sustainability.
2. Sustainable economic growth will require environmental damages (externalities) to be explicitly recognized and, where possible, reduced or eliminated (internalized) through the application of the polluter-pays principle or other environmental policy reforms that emphasize pollution prevention.
3. The uncertainty and rapid change of economic and environmental indicators demands a no-regrets, proactive set of trade and environmental policies that will prove beneficial regardless of what happens internationally.
4. Implementing both trade and environmental reforms will require much clearer definitions of property rights respecting goods and services as well as infringements of those rights by bads and disservices, including environmental pollution.

(Faeth and McGinnis 1997)

cycling. In more intensively cropped systems, planting hedgerows along contours can minimize erosion on hillsides (McNeely and Scherr 2003). Some agricultural lands, if managed properly, can help sequester greenhouse gases from the atmosphere (Clay 2004).

The relationship between agriculture and the environment is complex and bidirectional: while agriculture can degrade ecosystems, degraded ecosystems also erode the viability of agriculture, with important implications for poverty. More than half of the world's poorest people live in ecologically vulnerable areas (Vitalis 2004). Desertification, drought, and declining agricultural yields are major drivers of poverty and hunger among these populations, and poverty can in turn be a contributing factor to environmentally unsustainable livelihood practices (Mayrand et al. 2005).

For agricultural growth to play a positive role in poverty reduction, and for that growth to be environ-

mentally sustainable, special attention must be given to how trade, both domestic and global, interacts with the sector. Barriers to markets (physical, economic, and legal) and unfair competition resulting from trade-distorting policies are principal obstacles to maximizing agriculture's role in poverty alleviation. Trade can have both positive and negative effects for the environment. A 1997 report examining the environmental impacts of trade expansion in Latin America and the Caribbean, for example, concluded that trade-led growth creates both challenges and opportunities for environmental quality and natural resource conservation (Faeth and McGinnis 1997). Challenges arise from the rate and manner of resource extraction in sectors including agriculture, forestry, and fisheries, and in industries including mining, petroleum, and food processing. But there are also opportunities, enhanced by the income that trade creates, to respond to environmental challenges in these sectors. In addition, the removal of trade-distorting policies may in itself have some environmental benefits. The 1997 report developed four principles for sustainable trade policy, described in Box 2.

At the national level, reforms are needed in developing countries to accelerate removal of the physical and economic isolation of poor farmers, which prevents direct involvement in trade and markets at local, national, and global levels. Without such reforms, success in making international trade rules more equitable would have minimal impact on the ground. For farmers' engagement with markets to be sustainable, attention must also be paid to the indirect effects of trade on the environment through changes in agricultural patterns and practices that accompany evolving market opportunities.

II. WHAT ARE THE IMPACTS OF AGRICULTURAL SUBSIDIES ON THE POOR AND THE ENVIRONMENT?

The United States (U.S.), the European Union (EU), Japan, and other OECD countries provide about US\$300 billion annually in support to their farmers (Chigunta et al. 2004; OECD 2004). This amount is equivalent to 1.3 percent of GDP in OECD countries

and roughly six times the value of all official development assistance provided by these countries to developing nations (Greig-Gran 2003). The US\$300 billion figure refers to total agricultural support, including direct payments to farmers as well as import restrictions and other government interventions such as research and development (Elliott 2004). Of support that is considered most trade-distorting, OECD countries are estimated to have spent approximately US\$180 billion a year between 2001 and 2003 (Elliott 2004). Agricultural subsidies in OECD countries have remained high and have not been substantially modified for the past two decades (Anderson and Martin 2006), despite the facts that agriculture represents a small share of national income for these countries and that farmers represent a relatively small percentage of these countries' populations—about 2.6 percent of the labor force in the United States and 4.4 percent in Europe (IFPRI 2003).

WHAT ARE THE IMPACTS IN DEVELOPED COUNTRIES?

While the original goals of subsidizing agriculture were to facilitate the economic viability of small family farms and to ensure national food security, the current subsidy system is far removed from this vision. The distribution of support is uneven and is significantly skewed in favor of larger farmers and agribusiness with capital-intensive, highly mechanized operations on vast commercial estates rather than small farmers considered poor by developed-country standards (Cline 2003). The WTO Annual Report of 2003 estimates that in the EU, United States, Canada, and Japan, the largest 25 percent of farms³ receive 70 percent, 89 percent, 75 percent, and 68 percent of total agricultural subsidies, respectively (WTO 2003b). In the United States, 60 percent of farmers are provided no support at all, while the largest 7 percent account for 50 percent of government payments (Diao et al. 2003)⁴. In the face of falling prices, many farmers—particularly smaller ones—have been unable to make ends meet and have left the sector, contributing to a trend of consolidation of land in larger, less diverse farms across the country (Ray et al. 2003). Along with farmers, consumers in developed countries also experience negative impacts of some agricultural

policies. For example, it is estimated that support for U.S. sugar producers cost consumers nearly US\$2 billion in 1998 alone (GAO 2000).

Many agricultural subsidies also exacerbate environmental damage resulting from agriculture in developed countries (Vitalis 2004), as the quantity and types of crops that farmers grow is influenced by government support. The Commodity Program of the 2002 U.S. Farm Bill, for example (see Box 3), provides payments for certain crops—primarily wheat, feed grains, cotton, rice, and oilseeds (USDA 2002). This focused support gives farmers greater incentive to grow 'program' crops over others, leading to "intensive row crop production with its attendant loss of biodiversity and damage to soil and water quality"

Box 3 U.S. Farm Bill

The United States 2002 Farm Security and Rural Investment Act, more commonly known as the 2002 Farm Bill, is perhaps the most generous farm subsidy package in U.S. history, encouraging overproduction and depressing international agricultural prices (WTO 2003a). The 2002 Farm Bill marks a complete reversal of the previous trend toward lower farm subsidies and smaller production stimuli promoted by the U.S. Congress through the former Farm Bill, the 1996 'Freedom to Farm' Act. It provides nearly US\$180 billion, an increase of US\$83 billion over the 1996 Farm Bill, to domestic farmers over 10 years in the form of subsidies, farmland conservation, rural development, and food security support (ICTSD 2002; Sumner 2003a; Commission for Africa 2005).

The 2002 Farm Bill is scheduled to be reviewed by Congress in 2007. The House Agricultural Committee and a number of other stakeholder groups started preliminary discussions and field hearings for the 2007 Farm Bill in 2005. Opportunities have arisen to reform the bill to provide lower government payments, fairer trade practices, and higher funding for conservation and improvements in nutrition programs. The current U.S. budget deficit is likely to have significant ramifications for the new Farm Bill deliberations. In addition to internal budget issues, external pressures through the WTO—particularly the WTO ruling on U.S. cotton protection and the potential for other cases to be filed by developing countries—could influence the review of the Farm Bill.

(Keeney and Kemp 2004). In the Farm Bill, some payments are also tied to yields, encouraging farmers to produce more of a certain crop than they otherwise would or to bring marginal land into production, increasing pressure on the environment (Mayrand et al. 2003). As early as 1991, U.S. farm policy was shown to inhibit the use of resource-conserving agricultural practices by making such practices appear less profitable (Faeth et al. 1991). Subsidies can also encourage the use of large amounts of chemical inputs in farming. This is illustrated in a 2006 report that linked the ‘dead zone’—an area in the Gulf of Mexico where annual algae blooms cause a lack of oxygen in the water that kills marine life—with excess fertilizer use in heavily subsidized cropland in the U.S.’s Mississippi Basin (EWG 2006a). Subsidies on inputs, particularly irrigation water, can lead to cropping decisions that “would not take place in a purely competitive market,” and subsidized water tends to be inefficiently used (Mayrand et al. 2003).

At the same time, some subsidies are designed to produce positive environmental outcomes and are generally not thought to be trade-distorting. These include conservation or land retirement programs under the U.S. Farm Bill and rural development programs in the EU Common Agricultural Policy (CAP). These types of subsidies are important because they provide incentives to improve the sustainability of agricultural practices, but they make up a relatively small percentage of agricultural support. The EU CAP, for example, despite placing ever greater emphasis on rural development and environmental objectives, allocated only 10 percent of its budget to these measures from 2000–2006 (European Commission 2004; Bendz 2004).

WHAT ARE THE IMPACTS IN DEVELOPING COUNTRIES?

Overproduction of certain crops in developed countries, encouraged by subsidies, has led to the dumping of excess agricultural commodities on the world market—that is, selling at prices below those that would prevail in undistorted markets and, in many cases, at prices below the cost of production (Diao et al. 2003). This has contributed to the general down-

ward trend of world market prices for agricultural commodities over the past several decades. This trend has had some positive effects in that consumers may enjoy lower prices for subsidized commodities. However, it also means that unsubsidized producers receive lower prices for their goods than they would in the absence of dumping, which “constrain(s) agricultural growth and development opportunities in non-OECD countries” (WTO 2003a). Among developing countries, smaller countries in South and Central America, the Caribbean, and Sub-Saharan Africa suffer the most, losing about 10 to 15 percent of total agricultural and agro-industrial incomes due to developed country subsidies (Diao et al. 2003).

Developed country subsidies have a particularly strong poverty impact when they are provided for crops that are also grown in developing countries, since developing-country farmers must then compete directly with the subsidized developed-country farmers. Cotton, which is heavily subsidized in the U.S. and several other countries, is one such crop that has received substantial attention. As the studies summarized below show, subsidies provided to cotton farmers in developed countries reduce world cotton prices, generating losses for lower-income cotton-producing countries.

Research indicates that cotton subsidies in developed countries cause the loss of up to US\$250 million every year in West and Central African countries, where an estimated 10 million people rely on cotton for their livelihood (Oxfam 2004). A study by the International Food Policy Research Institute (IFPRI) indicated that in Benin a 40 percent reduction in farm-level cotton prices leads to a 21 percent reduction in income for cotton farmers and a six to seven percent increase in rural poverty (Minot and Daniels 2002). In 2003, this situation prompted trade ministers from several African countries in the WTO to present the ‘Cotton Initiative,’ urging Members to address cotton subsidies as a matter of priority (WTO 2003b). Brazil has also taken action to reduce U.S. cotton subsidies, filing a case with the WTO Dispute Settlement Body in 2003⁵ claiming that some U.S.

cotton programs were illegal. In research gathered for this case, Brazil documented a loss of US\$638.5 million in a one-year period in income, trade balance, related services (transportation and ginning), federal and state revenues, employment, and the federal budget as a result of low prices caused by U.S. cotton subsidies (ICAC 2002).

Sugar is another protected or subsidized crop that is grown in both developed and developing countries. From 1999 to 2001, support to OECD countries' sugar producers averaged US\$6.35 billion dollars, just slightly less than the combined value of developing country sugar exports, which total about US\$6.5 billion annually (Mitchell 2004). Due in part to this support, the share of developed countries' exports in the world sugar market has risen, while the share of sugar exports from developing countries declined from 71 percent during 1980–85 to 54 percent in 1995–2000 (Mitchell 2004).

In addition to their poverty impacts, developed country subsidies may have indirect environmental effects in developing countries through their effects on producer prices, which could influence farming practices and overall poverty in rural areas. Responses to low prices include shifting production from unprofitable crop(s) to other commodities, decreasing production, or ceasing farming altogether. In West Africa, for example, some farmers shifted to livestock production or subsistence farming to feed their families when cotton prices dropped (Pfeifer et al. 2004). Depending on which farm commodities experience decreased production and which ones see an increase, these changes in farmer choices could have negative, positive, or neutral environmental impacts.

In some cases, farmers cannot or do not decrease production of a particular crop in response to falling prices. This is due to a variety of factors, such as a lack of jobs in alternative sectors or unsuitability of land for other crops. Cultural ties to land or a particular crop, such as maize in Mexico, could also prompt farmers to continue growing crops even when it is not economically optimal (Polaski 2005; Audley et al. 2004). Instead of shifting out of production of the

unprofitable crop, such farmers may actually increase production in the hopes that this will compensate, at least partially, for lower prices (Audley et al. 2004). The environmental effects of greater production include bringing marginal and previously uncultivated land into production, increasing the use of agrochemicals, and reducing fallows (Mayrand et al. 2005).

Poverty itself affects the environment by increasing people's direct reliance on the natural resource base. It can also prevent farmers from investing in more sustainable practices, either because they do not have funds for investment, or because the returns on the investment may not be sufficient to justify the expense. For example, WWF predicts that by 2025 more than 60 percent of total water supply in Zambia, Zimbabwe, Mozambique, and Malawi will be used to irrigate sugarcane. The region could benefit from investing in more efficient and sustainable irrigation practices, but it will only be able to do so if it earns more from sugar (WWF 2004), the price of which is currently kept low by EU subsidies. Higher profits would not only generate funds that could be used for irrigation, but could also provide an incentive to improve infrastructure. While higher market prices are not the only conditions necessary to ensure more sustainable practices, they are nonetheless an important factor influencing practices and investments within the sector.

III. REFORMING DEVELOPED COUNTRY SUBSIDIES: POTENTIAL CONSEQUENCES FOR LIVELIHOODS AND ENVIRONMENT

Developed countries are being pressured to reduce their trade-distorting agricultural subsidies by both domestic and international interests. Within countries where agriculture is highly subsidized, civil society has highlighted the inequitable distribution of government support among farmers (EWG 2006b) as well as farming-related environmental problems exacerbated by subsidies (Keeney and Kemp 2004; Vitalis 2004). Internationally, within and outside of the WTO negotiations, NGOs and developing country governments are calling for the reduction of subsi-

dies that distort trade and place developing-country farmers at an unfair disadvantage on the world market (Pfeifer et al. 2004; Oxfam 2002; WTO 2003b).

IMPACTS IN SUBSIDIZING COUNTRIES

Within developed countries, subsidy reform has the potential to bring economic benefits to taxpayers, consumers, and, if implemented carefully, to small-scale farmers. In the case of the U.S., subsidy reform could play a role in addressing a growing national deficit (Thompson 2005). Reforming agricultural support could save domestic consumers money—for example, U.S. sugar costs more to produce than in many developing countries (Mitchell 2004), but current policies protect it from competition and keep consumer prices high. Strategic policy changes could lead to fair commodity prices from the marketplace that contribute less to concentration than the current system of government support, and create more opportunities for small family farmers (Ray et al. 2003).

Subsidy reform is also an opportunity to generate environmental benefits: reducing payments for a set group of commodities, for example, could result in declining production of ‘program crops’ and encourage farmers to diversify their production. Shifting support into conservation programs would also increase opportunities for farmers to implement more sustainable practices on land currently in production, or to set aside land for wildlife habitat or other environmentally beneficial purposes.

IMPACTS IN DEVELOPING COUNTRIES

Developing countries also stand to gain from developed-country subsidy reductions, but while reductions could be an important element in reducing rural poverty in developing countries, there is no guarantee that they would automatically benefit the poorest farmers. Domestic policies in developing countries will play a key role in translating subsidy reduction into actual poverty alleviation. Strategic policies may also be necessary to mitigate effects on poor consumers if food prices go up as a result of a

decline in the availability of cheap, subsidized imports. The environmental effects of subsidy reduction for developing countries are also mixed and depend heavily on the policy context. The potential exists for environmental degradation to increase, requiring interventions at the domestic level to mediate the way in which farmers respond to new market opportunities. At the same time, subsidy reform could create enabling conditions for improved environmental protection, or the effects could be neutral.

What are the poverty impacts of reducing subsidies?

Over the past several years, a number of modeling exercises have attempted to predict the effects of agricultural trade liberalization on poverty in the developing world. Estimates of the total potential annual gain for developing countries in agricultural trade associated with the full elimination of protectionism and subsidies in industrialized countries’ agriculture are clustered close to US\$10 billion (Anderson et al. 2000; Diao et al. 2005; Hertel and Keeney 2006). This figure includes elimination of all three forms of agricultural protection: domestic support, export subsidies, and market access. Many studies show that reductions in barriers to market access generate the majority of gains to developing countries, while benefits from reductions in domestic support are significantly smaller (Anderson et al. 2006). Lowering agricultural protection in developing countries can also bring benefits to farmers (Ackerman 2005; Diao et al. 2005).

In addition to modeling the global effects of trade liberalization throughout the agricultural sector, more focused research has been carried out on single commodities of particular importance to developing countries, such as cotton and sugar. According to the analysis carried out for Brazil’s case against the U.S. in the WTO, eliminating all U.S. cotton programs would cause U.S. cotton production to drop 25 to 30 percent and exports to fall 40 percent. This decrease is expected to result in an increase in world cotton prices of approximately 10 percent (Sumner 2003b). Such a price increase is expected to translate into significant gains for developing-country cotton produc-

ers, which could stimulate a rise in production in these countries and contribute to poverty alleviation. According to analysis by the Department of Agricultural and Applied Economics and Cotton Economics Research Institute at Texas Tech University, the majority of gains from a reduction in U.S. subsidies and subsequent price increases would accrue to Brazil, followed by Australia and countries in Africa (Pan et al. 2004). Analysis for Brazil indicates that both production and exports would rise in response (Pan et al. 2004). In the Cotton Initiative submitted to the WTO in 2003, the delegations from Benin, Burkina Faso, Chad, and Mali state that “[i]f [U.S. cotton] subsidies were eliminated, cotton production in West and Central African countries would be highly profitable and could act as an important catalyst for poverty reduction in the countries concerned” (WTO 2003b).

While subsidy reduction in developed countries may lead to economic gains at the national level in developing countries, these benefits may not necessarily be enjoyed by poor farmers. Rural smallholders and landless farm laborers, usually the poorest members of society, are often marginalized in terms of their access to land and water resources, information, marketing infrastructure, farm credits and inputs, and other government supports (Watkins 2003). Thus, even if producer prices do increase, small farmers may not see their own earnings rise in proportion: “Lack of competition among traders, remote geography, poor infrastructure, and high transport costs can all prevent the transmission of border price changes to intended ... beneficiaries” (World Bank 2005). Additionally, if a crop affected by subsidy reduction is grown predominately by large, relatively well-off farmers, then the effect of changes in producer prices on rural poverty may in fact be modest (Minot and Daniels 2002).

Just as certain groups within developing countries may be more likely than other groups to benefit from subsidy reduction, entire countries’ agricultural sectors may be better-positioned to capitalize on price increases, and the gains from agricultural subsidy reforms in developed countries may accrue dispro-

portionately to farmers in these developing countries (Mayrand et al. 2005). See Box 4 for examples of how a reduction in U.S. cotton subsidies might affect poverty in Brazil and West and Central Africa.

Like cotton, sugar is important to many developing-country economies and is heavily protected in developed countries where it is produced. Studies of the sugar market indicate that reducing subsidy payments to OECD producers and lowering import restrictions would affect the world sugar market through changes in market prices, increased overall sugar consumption, reduction of sugar production in developed countries, and creation of employment for 0.8 to 2.0 million workers in developing countries (WWF 2004). Low-cost, highly competitive sugar-producing and exporting countries such as Brazil, Australia, and Thailand are expected to benefit the most, with Brazilian exports increasing by 23 percent (Sheales et al. 1999). Consumers in countries where the sugar sector is heavily protected would also benefit: while prices paid to producers would increase, sugar prices for consumers are expected to decline 65 percent in Japan, 40 percent in the EU, and 25 percent in the United States (Sheales et al. 1999).

However, removal of protection for sugar could create ‘losers’ along with ‘winners’ in the developing world. Small-scale sugar producing countries with high production costs such as Cuba, Belize, Mauritius, Kenya, and Fiji would be hit particularly hard (Clay 2004; Elliott 2005). These countries, where sugar accounts for a significant share of total export revenues, often lack the political, legal, socio-economic, and institutional conditions necessary to exploit new market opportunities effectively. Countries that currently enjoy preferential access to European and U.S. sugar markets would also face losses from liberalization. Borrell (1999) estimates net loss to these producers from full liberalization at US\$450 billion, accounting for the loss of preferential markets as well as offsets from higher world prices. According to research carried out by the Australian Bureau of Agricultural and Resource Economics (ABARE), about one-third of the countries considered in ABARE’s model would suffer losses as a result of liberalizing trade in sugar (Diao

Box 4

The Case of Cotton in Brazil and West and Central Africa

Cotton production in Brazil, along with a number of other agricultural commodities such as soy and livestock, is primarily carried out by large-scale, mechanized farming operations (ICAC 2002). The success of agribusiness has contributed to overall economic growth in Brazil, but outcomes for the poor and for the environment have been mixed. Structural changes in the agricultural sector favoring large farms have increased production and export earnings, but they have placed smaller, poor farmers under increased competitive pressure (OECD 2005). Not only can this increase rural poverty, but the expansion of large farms can have the effect of pushing small-scale farmers off agricultural land and into ecologically vulnerable areas such as the Cerrado (savannahs) and Amazon (WWF 2003). Thus, if subsidy reductions in the U.S. create incentives for increasing cotton production in Brazil, special safeguards may be necessary to ensure that the reforms indeed allow small-scale farmers to benefit along with larger operations, and that the environment is protected.

Unlike in Brazil, the majority of cotton produced in Africa is grown by small-scale family farmers, meaning that an improvement in the cotton market is more likely to have a direct impact on poverty by

raising the incomes of the rural poor (Pfeifer et al. 2004; Minot and Daniels 2002). However, if markets are difficult to access due to inefficient bureaucracies or inadequate infrastructure, farmers—particularly resource-poor ones—may be unable to take full advantage of increased world prices. If farmers in Africa are able to capitalize on higher prices and increase their production, adverse environmental impacts could also occur along with benefits to livelihoods. While cotton is responsible for huge amounts of chemical and water use in many countries where it is produced (Clay 2004), its environmental impacts in Africa are generally less severe, as production in this region is currently carried out with minimal chemical inputs, irrigation, or machinery. However, anecdotal evidence points to cotton as a driver of deforestation in areas where it is widely grown (Brottem 2005). Furthermore, if cotton production becomes more profitable, it is possible that it will also become more intensive or result in unsustainable additional habitat conversion. In order to minimize impact on the environment on which many rural dwellers—including cotton farmers—depend, special domestic measures may be required. Examples of measures to reduce negative environmental and poverty impacts are discussed in Section IV.

et al. 2005). Other potential losers include net importers of sugar, as removal of sugar subsidies is anticipated to result in an increase of world sugar prices of 30 to 70 percent⁶ (Garside et al. 2005; Mitchell 2004). Where preferential access is an issue, governments and producers will need to prepare for the new conditions that could arise through liberalization.

The removal of agricultural subsidies could have an adverse impact on poor net food-importing countries, as well as on poor net consumers, typically urban dwellers. This is because food prices may go up in reflection of higher producer prices. According to Cline (2004), among the poor one person would ‘lose’ for every five people who ‘win’ from subsidy reductions. Thus, while agricultural liberalization should result in net poverty reduction, the potential exists for poverty to increase among some populations—particularly the urban poor—and countries should consider mechanisms such as food stamps to assist these groups. In terms of reducing rural pover-

ty overall, it is likely that “...if industrialized countries were to substantially reduce their protection and subsidies, most Third World farmers would produce more food and agricultural goods domestically, leading to expanded incomes not only in the agricultural sector but in the rest of the economy as well” (Diao et al. 2005).

What are the environmental impacts of subsidy reduction?

The effects of developed-country subsidy reduction on ecosystems in developing countries are difficult to predict and have not been thoroughly studied. If subsidy reduction results in rising world prices for currently subsidized commodities, as expected, farmers in developing countries could respond in a number of ways, with the potential for negative, positive, and neutral environmental impacts. These impacts will be significantly influenced by domestic policies in developing countries.

As world agricultural commodity prices rise as a result of developed-country subsidy reduction, farmers in developing countries may choose to further increase their incomes by producing more of the commodity in question. A corresponding rise in ecosystem degradation related to agriculture—such as pollution from fertilizer and pesticide use—could be expected, as well as conversion of nonagricultural land such as currently forested areas (OECD 2000). In an alternative scenario, farmers may respond by switching production to crops made more profitable by subsidy reduction. Depending on the relative environmental effects of crops being abandoned versus crops for which production increases, net impact on the environment could increase or decrease, or even remain the same while environmental effects simply shift from one type to another. This was the case when Costa Rica carried out structural adjustment programs during the 1980s and 1990s, and the country shifted away from livestock and grain production toward the production of export crops such as fruits. While soil erosion and compaction declined, the use of agrochemicals and loss of biodiversity increased, thus reallocating environmental degradation from one set of issues to another (Lojenga 1995).

While subsidy reduction could adversely affect ecosystems in developing countries by encouraging increased production, it could also indirectly benefit the environment in developing countries through its contribution to poverty reduction. If farmers' incomes go up, they will have a greater capacity "...to use more environmentally friendly production techniques and to make conservation-type investments that increase long-term productivity" (Lutz 1992). Other positive trade-related impacts could include improved infrastructure, sharing of new management techniques, and access to new and adapted technologies. As Mayrand et al. point out (2005), "[t]rade can also open new market opportunities for certified products, thereby improving agricultural practices." Such positive outcomes are not guaranteed and require explicit domestic policies that encourage sustainable practices.

In addition to the effects on ecosystems in developing countries, changes in agricultural production and trade patterns will influence the aggregate, or global, environmental effects of trade liberalization. If some production shifts from developed to developing countries, for example, agricultural practices in developing countries—which tend on average to be less intensive—would become more prevalent overall, while the more environmentally damaging practices of developed countries would decrease, resulting in environmental improvements on a global scale (Anderson 1991). At the same time, since developing countries overall tend to have more intact and fragile ecosystems, the environmental effects of agriculture could be proportionately more damaging in these countries than in developed countries, where land conversion has already occurred to a greater extent.

The actual impact of subsidy reduction on ecosystems that can be expected—at a global and country scale—is far from clear, and much more detailed research is necessary in order to predict and adjust to these changes. For developing countries, the challenge is to find a balanced approach that allows farmers to improve their livelihoods while minimizing agriculture's environmental impacts. The next section proposes a domestic policy reform agenda to assist developing countries in responding to subsidy reduction and making agriculture work in the favor of both livelihoods and ecosystems.

IV. THE ROLE OF A DOMESTIC POLICY REFORM AGENDA

International agricultural policy reform, such as globally mandated subsidy reductions in developed countries, can contribute significantly to sustainable development in agriculture. However, in order for reductions in agricultural subsidies to benefit the poor and protect the environment, domestic policy reforms must also be implemented in developing countries. According to the World Bank's 2006 *World Development Report*, "...there will be winners and losers. Outcomes depend on the ability and willingness of governments to mitigate losses to particularly hard-hit sectors, possibly by redistributing some of

the gains accruing to winners” (World Bank 2005). Because subsidy reductions could lead to the expansion of agriculture and increased production in a number of countries where there is a concentration of both poverty and biological diversity, it is important to anticipate the poverty and environmental impacts in those areas. The possibility that there could be adverse poverty and environment effects in some countries, however, is not a justification for continuing the status quo on subsidies in developed countries, given the potential for subsidy reduction to bring substantial livelihood benefits to many developing countries as well as positive economic and environment impacts to developed countries.

To enhance the benefits of agricultural subsidy reductions for the poor and for the environment, and to eliminate or mitigate potential negative impacts, developing countries would be wise to implement a domestic policy reform agenda based on an integrated assessment of the potential impacts of global trade decisions on ecosystem health and human well-being. A framework for such an assessment can be developed using the experience of the Millennium Ecosystem Assessment (MA)⁷ and should include the following elements:

- A central focus on human well-being;
- Recognition of the intrinsic value of biodiversity and ecosystems;
- Particular attention to the linkages between ecosystem services and human well-being;
- Acknowledgement of the dynamic interaction between people and ecosystems, wherein each directly and indirectly drives change in the other. (MA 2005)

Concretely, with regard to agricultural subsidies, an integrated assessment would ask questions such as:

- Which particular group of farmers in which country/region might benefit from specific subsidy reductions in developed countries? Are they poor farmers? Are they large-scale corporate agro-indus-

trial firms? In the case of the latter, will their workers benefit?

- In those countries and regions where farmers will benefit, agriculture will presumably expand. Where will expansion occur, and at what rate? Will it occur through intensification, extensification, or both? How will forests and other critical ecosystems be affected by expansion?
- What are the direct and indirect impacts of agricultural expansion on ecosystem services? If there are negative impacts, who will bear the costs? For example, if water supply is affected, will poor communities be the ones who lose access to water?
- What policies are needed to avoid or mitigate adverse poverty and environment impacts, and what sorts of trade-offs between the two issues will be required? What are the incentives for governments to adopt and implement these policies?

While each country will need to develop its own package of policy reforms to address the above questions based on its unique physical, socio-economic, and political circumstances, this paper identifies four common areas to be addressed by policy-makers and supported by donors in order to ensure that subsidy reforms generate pro-poor and pro-environment impacts. These include policies intended to:

- Empower small-scale farmers to use natural resources sustainably and strengthen their ability to negotiate with other actors in the market with respect to the use of land and other inputs to agricultural production;
- Mainstream poverty alleviation and environmental considerations into sectoral plans focused on agriculture;
- Promote ecosystem health for human well-being, in particular, ecosystems’ ability to provide essential services; and,
- Promote best practices in governance.

Table 2 provides examples of how policies in the first three categories above could help countries capitalize on subsidy changes to benefit poor farmers and pro-

Table 2. Possible Effects of Subsidy Reduction and Policy Responses

Possible Effect of Subsidy Reduction	Policy Recommendation	Environmental Benefits of Policy Reforms	Poverty Benefits of Policy Reforms
Large-scale or higher-income farmers may be able to take advantage of new opportunities and higher prices, at the expense of small-scale and poor farmers	<i>Empower Small-Scale Farmers</i> <ul style="list-style-type: none"> ● Secure land tenure ● Support community enterprises and organizations 	Farmers are more likely to conserve their land and practice sustainable techniques if they know the land will not be taken from them Community organizations can be effective means for teaching and promoting sustainable agriculture techniques	Greater security encourages farmers to invest in more productive crops and practices Organizing for beneficial marketing mechanisms allows small-scale farmers to compete with larger producers by streamlining transport and lowering costs
Higher international prices may not mean that small farmers will receive higher prices	<i>Mainstream poverty and environment into planning in the agriculture sector</i> <ul style="list-style-type: none"> ● Invest in infrastructure (e.g., roads) to ease market access; technology and tools necessary for sustainable practices; and information systems to help farmers get fair prices 	Investment in new technology and tools can help farmers use resources more efficiently and protect their land	Decreasing isolation and empowering farmers with technology and information will help them increase production and receive prices for their products that are closer to actual world prices
Land conversion (extensification) may result as a consequence of increased production	<i>Promote ecosystem health for human well-being</i> <ul style="list-style-type: none"> ● Enforce land use laws and protected areas within a national strategy to support small farmers 	Land use laws and enforcement should prevent or at least minimize ad hoc agricultural expansion into environmentally sensitive areas	Where possible, land use strategies should provide opportunities for poor farmers to maintain production in certain areas—this will require planning carefully around sensitive ecosystems and engaging stakeholders in determining land use laws
Intensification/increased chemical use could occur with greater production	<ul style="list-style-type: none"> ● Provide incentives for — and invest in — sustainable agriculture; pay farmers for provision of ecosystem services and soil conservation (seek donor support, e.g., under multilateral environmental agreements) 	Economic incentives should result in more environmentally friendly practices even while increasing production	Payments for ecosystem services could increase farmer incomes

tect the environment. The fourth type of reform, following best practices in environmental governance, is an enabling step that is necessary for the effective development and implementation of the other three recommendations.

Without the policy reforms introduced above and described in greater detail in this section, changes in the subsidy regime will neither automatically benefit poor farmers, nor protect the environment. In fact, without the adoption of strategies and policies that are explicitly pro-poor and pro-environment, the opposite could occur. The expansion of soy production in South America, an outcome of global trade trends

and decisions, illustrates the potential negative social and environmental outcomes of well-intentioned trade reforms (see Box 5).

EMPOWERING SMALL-SCALE FARMERS TO USE AND PROTECT NATURAL RESOURCES

As discussed in earlier sections, an anticipated outcome of subsidy reductions in developed countries is potential growth in markets for developing country agriculture. But who will benefit from these new opportunities in most developing countries? Large-scale or higher-income farmers are likely to take advantage of these new opportunities and higher

Box 5

Soy Expansion in Brazil

Soy is a major source of income for a number of countries in South America, namely Brazil, Argentina, and Paraguay. It is not surprising that these countries have encouraged the expansion of soy, due to its economic benefits. For example, driven by export demands from Europe and government credit programs such as Moderfrota that facilitated access to agricultural machinery (Brandão et al. 2005), Brazil increased its production of soy by 85 percent between 1993 and 2002. In 1940 there were only 704 hectares of soy fields; by 2003 there were 18 million hectares. Predicting continued expansion, Brazil's Minister of Agriculture has estimated that Brazil will overtake the U.S. in soy production in the next 10 to 20 years (WWF 2003).

The expansion of soy production has ecological and social costs, as it sometimes contributes to the destruction of forests and savannahs of high conservation value. Half of Brazil's soy production takes place in the Cerrado, a savannah area of 200 million hectares covering 23 percent of Brazil. It has the greatest biodiversity of any savannah in the world, providing habitat to approximately 90,000 insect species, 40,000 fungi, 550 kinds of birds and 150 mammal species. Much of this rich habitat has been transformed into soy fields (WWF 2003). In 2002, 16 percent of the Amazon forest had dis-

appeared, and was being cut down at a rate of 7,000 hectares per day, mostly to make room for cattle and crops, especially soy (WWF 2003). Some of these soy fields are in fact replacing former pastures rather than virgin Cerrado or Amazon forest, thus are not directly driving land conversion (Brandão et al. 2005). However, the expansion of soy into these former pastures may in fact be pushing ranchers and small-scale farmers out of production or further into natural habitats and thus still contributing to deforestation.

A number of organizations have established initiatives to find practical solutions to the social and environmental impacts of soy expansion. For example, in March 2005, at the first Conference of the Roundtable on Sustainable Soy in Foz do Iguaçu, Brazil, participants agreed to work toward solutions to reduce the impacts of soy expansion, including developing and promoting responsible soy production. They also agreed on an open, transparent, multi-sectoral, and participatory process to deal with the challenges posed by soy expansion. The conference attracted more than 200 people representing the soy business—from small to big producers, feed mill operators, meat producers, and retailers—and social and environmental organizations (WWF 2005).

prices at the expense of small-scale and poor farmers, unless specific policies are adopted that position the latter to benefit from the changes. It would indeed be ironic if globally mandated subsidy changes, undertaken in the name of development, resulted in even greater marginalization of poor farmers.

Agriculture is often one of the few livelihood strategies available to the rural poor, providing small farmers with food and income as well as safety nets during economic downturns. Rural poverty cannot be reduced unless poor farmers are in fact empowered to make use of, profit from, and protect the natural resources upon which they depend. These farmers can be effective stewards of the land: under the right circumstances, small farming incorporates and preserves significant biodiversity within the farm. Through their preservation of biodiversity, open space and trees, and by reducing land degradation,

small farms provide essential ecosystem services to society (Rossett 1999).

Examples of pro-poor policies that could be adopted include those which implement rights-based land tenure; agrarian reform policies; and policies that support community enterprises and provide economic incentives for poor farmers.

Access to land and security of tenure are critical elements in poverty alleviation and sustainable development. Secure land tenure can help poor farmers to prosper and provides an incentive to use land sustainably. The certainty that a person's rights to continuous use of land or resources will be recognized and protected against challenges from individuals or the state is an incentive to make long-term investments in maintaining or enhancing the productivity of that property. Policies on allocation, distribution, titling, and use of land are all elements of land tenure;

reforms of this nature directed at strengthening the tenure of poor farmers are needed in many countries (WRI 2005).

Agrarian reform laws that redistribute land according to equity principles, such as ‘land to the tiller,’ and the recognition of ancestral domains of indigenous peoples are also examples of policy reforms that could be adopted to give small farmers more secure land tenure (La Vina and Fransen 2006). In most developing countries, the poorest peoples are the landless in rural areas. Together with the “land-poor” (those whose poor-quality plots are too small to support a family), they make up the majority of the rural poor and hungry. Addressing the lack of access to land and to tenure security is critical for both equity and sustainability, and research has illustrated the sustainable development potential of agrarian land reform that empowers small farmers: “Small farmers are more productive, more efficient, and contribute more to broad-based regional development than do the larger corporate farmers who hold the best land” (Rossett 2001).

Another means of empowering poor farmers is to support community efforts to organize economically and politically. Community enterprises, such as production and marketing cooperatives, can be strengthened so that poor farming communities can better compete with wealthier producers (WRI 2005). In some cases, it might be appropriate to implement policies that provide economic incentives to poor farmers so that they manage and conserve land and natural resources used for agriculture. An example is a law that allows for direct payments to landowners in return for land management that protects ecosystem services, such as water quality and carbon storage, which are of value to society (MA Board 2005). Such programs—for example, where landowners receive payments from downstream users or the government to implement practices that will conserve the watersheds in which they operate—have been implemented on a small scale in Mexico, Costa Rica, Colombia, and several other countries in both the developing and developed world (Bayon 2004; Johnson et al. 2001; Pagiola et al. 2005).

Current attempts to reform agrarian policy in Brazil provide an example of what could be done so that the ability of small scale farmers—usually operating family farms—to profit is strengthened. In Brazil, family farming accounts for 38 percent of the gross value of agricultural and livestock production as well as for 84 percent of rural establishments and 77 percent of the rural labor force. Approximately 80 percent of Brazilian municipalities, comprising 50 million people, are rural. Public policy in Brazil has historically favored large farmers over small farmers—for example, although landlord farming accounts for 61 percent of the agricultural GDP, it consumes 73 percent of public rural credit. In contrast, family farms have access to only 25 percent of the available credit but produce 40 percent of farm income (Graziano 2005).

Agrarian reform efforts to address this imbalance are occurring hand in hand with the *Fome Zero* (Zero Hunger) program implemented by the Government. The *Fome Zero* program is intended to provide 44 million people with a minimum income to buy food over the next four years in order to eradicate hunger. It is supported by a series of initiatives to encourage production and guarantee income, such as expanding farming and agrarian credit, renegotiating the debts of small producers, introducing crop insurance, establishing a national system of technical assistance and rural extension, and investing in infrastructure and marketing support. It also has created mechanisms to guarantee an income to producers, such as government food procurement, minimum prices, and regulatory stocks. *Fome Zero* complements other reforms designed to benefit poor farmers, helping them produce food to meet the demand fueled by the program (Graziano 2005).

MAINSTREAMING POVERTY ALLEVIATION AND ENVIRONMENT

With the possibility that subsidy reductions in developed countries may result in increased agricultural production in developing countries, these countries will have to make tough decisions on land use and land conversion. In mainstreaming environmental strategies and poverty alleviation into national agricultural strategies, the challenge lies in facilitating an

appropriate mix of ‘intensification’—that is, increasing production without expanding cultivated area—and ‘extensification’—increasing the land area on which crops are grown. Intensification is usually characterized by an increase in inputs such as irrigation, fertilizer, and pesticides, making water pollution a typical environmental impact of intensification (Mellor 2002). Intensification can also involve the mechanization of agricultural activities, which increases energy use and emissions of greenhouse gases. Extensification is less reliant on agrochemicals and other inputs than is intensive agriculture, but it involves converting land—usually natural ecosystems—into cropland, with negative environmental impacts such as habitat destruction.

Finding a balance between intensification and extensification that enables farmers to increase their profits while minimizing their environmental impact can be made easier by macro-economic policies that facilitate access for the rural poor to key inputs such as credit, insurance, improved crop varieties, agrochemicals, water, technology, and transport and marketing services (OECD 2002). Such policies could help small-scale farmers increase their profits per hectare, which could decrease the need for extensification. The private sector can play an important role in making inputs available to poor farmers, and governments may need to review regulations that hinder private sector investment. More importantly, these regulations need to strategically direct and support private-sector investment toward providing agricultural inputs at reasonable cost for crops that farmers have identified as needing support. Caution must be taken to ensure that an expanded private-sector role in rural development does not occur at the expense of the environment or the rights of small-scale farmers who might not be well-positioned to negotiate with respect to business and industry. In this regard, policies should also be supportive of the role of non-governmental organizations that provide technical support and advice to small-scale farmers.

Appropriate regulations for agro-chemicals and irrigation are also necessary to mitigate the environmental impacts of intensive farming that would likely

increase under the policies described above. Policies should also foster the adoption of environmentally sustainable crops and farming techniques such as contour plowing, integrated pest management, green manure, improved irrigation and water management techniques, and low-till farming. The adoption of sustainable crops and techniques requires research, development, and dissemination through means such as agricultural extension, community-based organizations, co-operatives or farmer exchange, and site visits (OECD 2002).

To control extensification, zoning can be used to determine how different land areas are used. In the case of the most sensitive or vulnerable ecosystems—for example, those with particularly high biodiversity, or containing critical watersheds—human activity may be excluded altogether. Outside of these areas, one option for balancing livelihood needs with conservation is to establish buffer zones where certain, low-impact activities such as the collection of non-timber forest products (NTFPs) for household use or for sale are allowed, or where sustainable agriculture may be practiced. However, enforcement of zoning laws is a serious challenge in many developing countries.

Other policies that mainstream poverty alleviation and environmental protection could encourage regions to concentrate on high-value market crops where they have a comparative advantage in the market (locally, nationally, or worldwide). One such crop that has generated significant earnings for a number of developing countries is cut flowers. In Kenya, for example, the cut flower market contributes as much to the economy as coffee export and tourism (Dolan et al. 2003), bringing jobs and much-needed income to frequently marginalized members of the labor force, such as women and unskilled workers. However, the cut-flower industry, along with that of a number of other high-value market crops in developing countries, has been accused of using environmentally damaging production processes and poor labor practices (Dolan et al. 2003; Thrupp 1995). Where crops such as these are encouraged, policies need to ensure that export earnings are not pursued

at the expense of local populations and the environment. Some crops that are geared specifically toward creating social and environmental benefits along with profits include organic fruits and vegetables, and fair trade, shade-grown coffee, both of which fit into a high-value, niche market.

PROTECTING ECOSYSTEMS FOR HUMAN WELL-BEING

The recently issued Millennium Ecosystem Assessment (MA) report concludes that progress has been made in providing more food for the world, but that this has come at a high price to ecosystems and in the long run will undermine the world's capacity for food production (MA 2005). The MA suggests ways to reduce ecosystem degradation, including within the agricultural sector (see Box 6).

Land degradation is not just an environmental problem. Its impacts on development are considerable, as it undermines food production and exacerbates poverty, and is a huge drain on economic resources overall (OECD 2002). Agriculture is both a driver of and a solution to this problem: overtilting and poor irrigation practices are causes of land degradation, while soil conservation and other sustainable agricultural practices can help prevent further degradation, mitigate that which has already occurred, and contribute to restoration. Over the long term, resource-conserving agricultural systems are environmentally and economically superior to conventional systems (Faeth et al. 1991). Encouraging the establishment and maintenance of such agricultural systems requires policy reforms that address land degradation and promote conservation of biological diversity.

Soil conservation practices and technologies that address land degradation are available but have not been widely adopted due to the lack of appropriate enabling policies and institutional environments (Pandey 2001). In order to encourage the widespread adoption of these practices and technologies, domestic policies need to make them affordable and suitable to the local labor supply. As adoption is determined by factors that vary across locations and among farmers, a thorough understanding of farm-

Box 6

Recommendations from the Millennium Ecosystem Assessment

- Remove subsidies to agriculture, fisheries, and energy that cause harm to people and the environment.
- Introduce payments to landowners in return for managing their lands in ways that protect ecosystem services, such as water quality and carbon storage, which are of value to society.
- Establish market mechanisms to reduce nutrient releases and carbon emissions in the most cost-effective way.
- Include sound management of ecosystem services in all regional planning decisions and in the poverty reduction strategies being prepared by many developing countries.
- Empower marginalized groups to influence decisions affecting ecosystem services, and recognize in law local communities' ownership of natural resources.
- Use all relevant forms of knowledge and information about ecosystems in decision-making, including the knowledge of local and indigenous groups.
- Establish reliable certification systems to give people the choice to buy sustainably harvested products.
- Invest in agricultural science and technology aimed at increasing food production with minimal harmful trade-offs.
- Restore degraded ecosystems.

Source: MA Board Statement 2005

ers' objectives and their production constraints is necessary for designing suitable interventions (Pandey 2001).

Policies to reduce land degradation are unlikely to succeed if they fail to address livelihood needs of local populations (ASB 2003). One approach that is consistent with both poverty alleviation and environmental sustainability objectives is ecologically-based agriculture. 'Eco-agriculture' includes:

- Promoting crop diversification, recycling and conservation of soil nutrients and organic matter, and

ecologically-based integrated pest and disease management;

- Reforming trade and market policies that are inconsistent with ecological agriculture, such as subsidies, taxes, and credit policies that promote monocultures and excessive use of chemical inputs; and
- Establishing flexibility and diversity in marketing standards to enable retail food stores and distributors to diversify varieties of produce and reduce wasteful cosmetic standards for foods in markets. (Thrupp 1998)

Agroforestry is another way to use land which, while generating a greater impact on ecosystems than natural forests, nonetheless tends to provide greater ecosystem services than typical agricultural activities such as pasture or row crops. However, while research has shown agroforestry to be as profitable as other types of land use, such as livestock production in the case of Brazil, start-up costs can be prohibitively high (Vosti et al. 2002). Widespread adoption of agroforestry may therefore require financial support from the government or from other entities such as NGOs.

BEST PRACTICES IN GOVERNANCE

Finally, the policy reforms discussed in the previous sections are not in themselves sufficient to ensure that subsidy reductions actually benefit livelihoods and ecosystems. Reforms are also needed in governance processes and institutions, both at large and in those specific to agriculture. Such reforms could include:

- Accountable decentralization of authority over land and agriculture decisions;
- Establishment of inter-agency and multi-stakeholder processes in agriculture; and
- Strengthened legal enforcement of environmental laws, rules, and regulations.

Decentralization of land and agriculture decision-making, accompanied by vigorous accountability mechanisms (Ribot 2004), can result in local ownership over plans and programs that affect agriculture. Because most of the economic and environmental impacts of agriculture decisions are local in nature, empowering local authorities can be an important step toward making agriculture sustainable.

Mechanisms that allow and promote an enabling environment for an inter-agency and multi-stakeholder approach to agriculture decisions, including trade-related ones, are essential to a reform agenda (La Vina and Fransen 2006). Lead institutions that are sector-focused, such as departments of ministries of agriculture, are probably necessary so that accountabilities for decisions are clear. But these institutions, because of their narrow and limited focus, need to be continually engaged with other agencies (such as environmental offices) and all relevant stakeholders. These include farmers of all scales, from the subsistence level to large agribusiness, as well as other rural dwellers and agricultural workers.

The agricultural sector serves multiple objectives. Therefore, the establishment of inter-agency and multi-stakeholder decision-making processes, supported by appropriate political and legal authority and adequate budgets, is critical for ensuring ownership by stakeholders of decisions that affect them. Such processes, to be credible, would have to be transparent and allow for meaningful participation by all affected stakeholders, particularly poor farmers and their families (WRI 2005). This principle also applies to extension programs, which are important means of capacity-building and information-sharing for poor farmers and need to be strengthened and broadened to include sustainable practices.

Strengthened enforcement of environmental laws is necessary for agricultural development to become sustainable (La Vina and Fransen 2006). For example, land conversion laws—such as the criteria and process by which forest lands are converted for agricultural use—need to be strictly followed. Decisions on whether new areas should be opened up to agri-

culture or maintained as protected areas should be made scientifically, transparently, and in a participatory manner. Rigorous scientific criteria and recognition of rights are instrumental to making these decisions, and all relevant stakeholders (especially affected indigenous peoples and poor farmers) must be consulted and allowed to participate in the decisions. This is especially important where protected areas conflict with local people's livelihoods. Schemes such as sharing park revenues or employing local people as guards or guides can provide an economic incentive to participate in protecting the area (Mellor 2002). Other environmental laws include the establishment of buffer zones that allow for only certain types of agriculture around the perimeter of protected areas, and 'environmental corridors' in agricultural landscapes to mitigate fragmentation of natural habitats (OECD 2002).

Finally, the rigorous enforcement of pollution laws within the agricultural sector is necessary. This could involve the modification of existing pollution laws, which are usually designed to regulate industrial waste and by-products. In addition, countries may wish to modify existing policies to comply with the Stockholm Convention on Persistent Organic Pollutants (POPs), a global treaty to protect human health and the environment from persistent organic pollutants. The Millennium Assessment Board also recommends the establishment of market mechanisms as a potentially cost-effective means of reducing agricultural pollution, particularly nutrient releases and carbon emissions (MA Board 2005).

Developing country governments must take the lead in implementing the policy reforms outlined above. However, international cooperation and support—such as increased official development assistance and facilitated transfers of environmentally sustainable agricultural technology—is essential, particularly for the least developed countries, in order to put these reforms in place and harvest their development benefits.

V. CONCLUSION

Agricultural subsidies and their impacts on the poor and the environment are part of a complex web that determines whether agriculture can serve as an effective vehicle for poverty alleviation and sustainability in all countries. Even if meaningful reductions were agreed to in the Doha negotiations of the WTO, there is no certainty that the purported development goals of this trade round will be achieved. Poor farmers in developing countries may not receive benefits unless these international decisions are accompanied by domestic policy reforms (summarized in Box 7) directed at making agriculture pro-poor and pro-environment.

This reform agenda is relevant to developing country governments, and also to development organizations such as bilateral assistance agencies, multilateral cooperation institutions, private foundations, and development NGOs. It can serve as a guide for their financial and technical support for development—particularly their agriculture and environment portfolios. Rather than making these policy reforms conditionalities in the context of a WTO agreement, which would be strongly resisted by developing countries, development cooperation agencies should seek to influence developing country agriculture through programs that support the reforms outlined in this paper.

By supporting the adoption and implementation of this domestic reform agenda, development organizations can assist poor countries in making agriculture a vehicle for poverty alleviation while protecting the ecosystems on which poor farmers and society in general depend. Among other considerations, development advocates should pay attention to the obstacles that have prevented countries from adopting many of the policy reforms discussed in the previous section.

The primary incentive for developing-country governments to adopt this reform agenda is the environmental and economic benefit to the poor in rural communities. However, the benefits of reduced poverty and healthy ecosystems will be felt by the

Box 7

Summary of Policy Recommendations for National Governments

Adopt and implement policies that empower poor farmers to use natural resources sustainably and strengthen their ability to negotiate with other actors in the market with respect to the use of land and other inputs into agricultural production. Examples of measures that could be enacted include:

- Laws that provide for rights-based land tenure policies, including agrarian reform laws and recognition of indigenous peoples' territories;
- Laws that provide a supportive environment for community enterprises, such as production and marketing cooperatives;
- Laws that establish economic incentives for poor farmers to use land and other resources sustainably, including direct compensation for conservation activities, public goods, and ecosystem services; and
- Laws that allow for payments to landowners in return for land management that protects ecosystem services, such as water quality and carbon storage.

Put into place macroeconomic policies and measures that integrate poverty alleviation and environmental goals into sectoral plans focused on agriculture, including policies that regulate:

- Pricing and trading of farm products;
- Rural credit and insurance;
- Use of agrochemical inputs;
- Introduction of new and sustainable technologies and practices; and
- Transport services in rural areas.

Enact and implement laws, rules, and regulations which, in the context of agriculture, protect ecosystems and their ability to provide for essential ecosystem services. Examples of critical areas where appropriate policies and measures can help in making agriculture sustainable include:

- Soil conservation practices that address land degradation and are designed for the benefit of poor farmers;
- Crop diversification, recycling and conservation of soil nutrients and organic matter, and ecologically-based integrated pest and disease management;
- Flexibility and diversity in marketing standards to enable retail food stores and distributors to diversify varieties of produce and reduce wasteful cosmetic standards for foods in markets.

Implement reforms directed at better governance of the agricultural sector, including:

- Accountable decentralization;
- Establishment of inter-agency and multi-stakeholder processes in agriculture; and
- Strengthened enforcement of environmental laws, rules, and regulations.

country as a whole. By promoting agricultural production, food security in both rural and urban areas can be achieved. This agenda is in the interest of finance and budget policy-makers as well, as it can lead to economic growth through increased export earnings and an infusion of new development funds from bilateral and multilateral development cooperation agencies. Improved provision of ecosystem services also has broad implications, such as improving water availability and quality in urban areas. Thriving rural economies can help stem migration to urban

areas, easing the burden for urban planners and slowing the growth in slum areas surrounding many developing country cities.

Domestic policy reforms can be adopted and implemented by developing countries, and supported by development cooperation agencies of developed countries, even while the Doha negotiations are taking place. Indeed, such reforms should be put into place regardless of the outcomes of the Doha trade round. Without a WTO agreement, there will still be

immense pressure on developed countries to reduce their agriculture subsidies. The pressure will come from developing countries, which are expected to file more cases in the WTO challenging these subsidies. It will result from domestic competition for scarce national or regional (in the case of the EU) budgetary resources. Moreover, even without a new WTO agreement, trade-induced changes that affect agriculture are inevitable. These changes will come in the context of global, regional, and/or bilateral trade agreements or through sheer market changes, and they will have an impact on the poor and on ecosystems.

The domestic policies needed to make agriculture pro-poor and pro-environment are 'no regrets' policies, and countries that adopt them are not only likely to be more prepared for the changes that will come with a new trade agreement, but will be able to position their agricultural sector to be an effective agent for poverty alleviation and environmental sustainability. These policies are 'no regrets' because their adoption is good for poverty alleviation and environmental sustainability regardless of the final outcomes of the Doha trade round. Even without globally mandated trade liberalization, these policy reforms will benefit the poor and the environment.⁸

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Notes

1. The Doha Round of negotiations is thus named because it was launched at a Ministerial meeting in Doha, Qatar.
2. In addition to subsidies in developed countries, various forms of agricultural subsidies also exist in developing countries. Some studies predict that developing countries will gain more from liberalizing their own agricultural trade policies than from a reduction in developed country subsidies (Diao et al. 2005), while others show that the benefits from liberalizing agriculture in developed countries are greater (Ackerman 2005). This paper focuses on agricultural subsidies in developed countries, given their extent in terms of the amount of money actually spent, their impact on the world's poor and the environment, and the mounting pressure on developed countries, through the WTO and otherwise, to reduce their subsidies.
3. Classified by gross sales (WTO 2003a).
4. Under the US Farm Bill of 2002, farmers in just six states—Illinois, Iowa, Kansas, Minnesota, Nebraska, and Texas—are estimated to receive almost half of the subsidy payments. Most of these subsidies go towards corn, wheat, cotton, rice, soybeans, and protected specialty products like milk, sugar, and peanuts. In states where these products are not grown, most farmers receive little or no benefit. For example, in California only 9 percent of farmers receive subsidies; in Florida, only 8 percent; and in New Jersey, only 7 percent (Luger 2002).
5. Argentina, Australia, Benin, Canada, Chad, China, the European Community, India, New Zealand, Pakistan, Paraguay, Taiwan and Venezuela are third parties to the case.
6. Although average world prices would go up, consumers in countries where domestic production is protected can still expect to see lower prices as they are currently paying well above world prices.
7. The Millennium Ecosystem Assessment (MA) was carried out between 2001 and 2005 to assess the consequences of ecosystem change for human well-being, and to establish the scientific bases for actions needed to enhance the conservation and sustainable use of ecosystems. The MA focuses on 'ecosystem services', the benefits people obtain from ecosystems.
8. From a research point of view, it probably makes sense to monitor the additional benefits to be derived from trade liberalization once domestic policy reforms are enacted. This research would be useful because the distinction between the benefits arising from one (domestic policy reform) versus the other (trade liberalization) is unclear.

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In all of our policy research and work with institutions, WRI tries to build bridges between ideas and actions, meshing the insights of scientific research, economic and institutional analyses, and practical experience with the need for open and participatory decision-making.



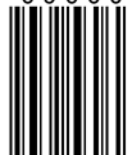
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