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The Use and Abuse of Multifunctionality

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Abstract: In the next round of multilateral trade negotiations, some countries have indicated that they would like to create exemptions for certain production-related support. These countries argue that agricultural production creates additional joint or spillover benefits, such as open space, wildlife habitat, biodiversity, an assured supply of food, and viable rural communities. They maintain that supporting agricultural production using production-linked payments enhances the *multifunctional character* of their agriculture. Thus, they say, production-linked payments are necessary to obtain socially desired nonfood outputs.

However, a wide range of private actions and public policies can provide these nonfood outputs. Following the principle of targeting policies to their specific objectives, many nonfood products can be produced, probably with greater efficiency, without subsidized agricultural production. In addition, distorting domestic agricultural production imposes costs on other countries by distorting trade. Current World Trade Organization rules account for these costs by limiting countries' expenditures on trade-distorting domestic policies and by encouraging countries to use minimally distorting "green box" policies. Many of the targeted policies that can provide these nonfood outputs efficiently and with little or no cost to other countries are in the green box.

Keywords: World Trade Organization, multilateral trade negotiations, domestic support, multifunctionality, targeting.

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EXECUTIVE SUMMARY

In the next round of multilateral trade negotiations, some countries would like to create exemptions for certain production-related support on the grounds that such support enhances the multifunctional character of their agriculture. Frequently cited functions of agriculture, other than the primary functions of the production of food, fiber, hides, timber, and market-related activities such as trade, cover a broad range of objectives: preservation of rural landscapes, flood prevention, and cultural heritage. Some countries also consider food security--assuring available food supplies through domestic production--to be one of the functions that falls in this category.

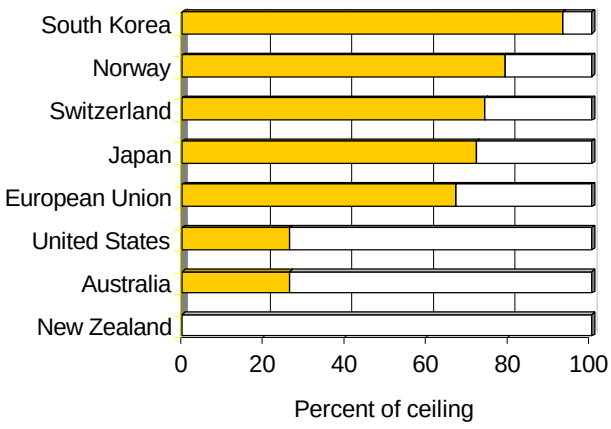
The re-emergence of concerns about the multifunctionality of agriculture coincides with the opening of negotiations to make further reductions in trade distortions, which countries agreed to limit in the Uruguay Round Agreement on Agriculture (URAA). In the URAA, countries agreed to resume agricultural trade negotiations by late 1999. Under this "built-in agenda," the next round of agricultural trade negotiations will continue the reform process with the long-term objective of achieving "substantial progressive reductions in support and protection resulting in fundamental reform." Countries agreed that the new negotiations would take into account "non-trade concerns," including food security and the need to protect the environment (Article 20).

WTO limits trade-distorting policies, not policy objectives. Rather than focusing on objectives, in the URAA countries agreed to disciplines on domestic agricultural policies based on whether the policies increase domestic production and create distortions in international markets. Policies are subject to different levels of discipline, familiarly referred to as "boxes," according to their degree of trade distortion.[2] Only domestic support that has no, or at most minimal, trade-distorting effects or effects on production can be provided without limits (the green box). At the same time, the Agreement recognized countries' right to pursue domestic agricultural policy objectives, including those that come under the broad rubric of "multifunctionality." The WTO does not make judgments about countries' objectives. Rather, the WTO restricts countries' agricultural and trade policies based on the instruments they use to achieve these objectives.

A country's support for the multifunctional agenda may be related to how tightly it is bound by its commitments to reduce the most distorting types of domestic policies. In the URAA, countries placed distorting policies in the amber box and agreed to reductions in those policies. Figure 1 shows that Australia, Canada, New Zealand, and the United States could substantially increase production-related support for agriculture from 1996 levels without violating their commitments. However, Switzerland, the European Union, Norway, Japan, and South Korea, which have been the biggest proponents of multifunctionality, have little room to

[2] See "Domestic Support Policies," World Trade Organization Issues for Economic Research, ERS WTO Briefing Room (http://www.econ.ag.gov/briefing/wto/issues/domestic.htm), for additional information.

Figure 1. How Full is the Amber Box?



Source: Country notifications to the WTO for 1996

do so. Countries whose URAA amber box commitments are a binding constraint see expanding the green box by taking policy objectives into account as a way of obtaining greater policy flexibility.

Minimally trade-distorting policies exist to address nontrade concerns. A range of policies can address each nonfood objective, but some policies may distort international trade more than others. Three principles guide design of minimally trade-distorting policies:

- those policies associated with minimal distortions target the specific objective associated with the nonfood output;
- the more distorting policy provides the nonfood objective indirectly through the market and thus creates other distortions;
- while not related to WTO issues related to trade distortions, the policies that have minimal trade distortions are also more efficient at meeting their objectives.

For three nonfood outputs, Table 1 provides examples of policy instruments that have no or small market effects along with ones that create large distortions to achieve their objective.

Multifunctionality has been misused to maintain distortionary domestic policies. Countries have argued that production of food and nonfood outputs are closely linked. These countries have used the economic term "joint products" to describe the fact that production of one output is linked to the other. Thus, proponents of this argument claim that, instead of a targeted policy, production-linked payments are necessary to obtain socially desired nonfood outputs.

Table 1—Comparison of policies according to their market effects

Nonfood output	Minimal market effects	Large distortion
Environmental:		
Rural landscape	Purchase or transfer of land development rights	Production subsidies that raise profitability of agriculture relative to other land uses
Rural development:		
Viable rural communities	Rural infrastructure to support creation of agriculture and non-agriculture jobs	Agricultural policies linked to production that raise output in both wealthy and marginal rural areas
Food security:		
Assure availability of food supply	Public food stocks	Production subsidies to achieve domestic self-sufficiency

The joint products argument undermines current criteria of minimally trade-distorting policies for the green box and also implies that further cuts cannot be made in the amber box. However, jointness is not a sufficient argument to counter gains from reducing trade-distorting policies. Jointness represents a range of relationships and the nonfood outputs associated with multifunctionality do not require agricultural production. Following the principle of targeting policies to their specific objectives, many nonfood products can be produced, perhaps with greater efficiency, without agricultural production.

As the multifunctionality debate has evolved over time, countries promoting the importance of the joint production relationship between agricultural production and nonfood outputs have responded to the critiques discussed in this paper. A common theme of their replies is that their countries face unique circumstances. For example, the geography of their countries makes it impossible to create nonagricultural jobs in rural areas. Thus, rural development and agricultural production are joint products. However, given modern transportation and telecommunications, one must be skeptical of this argument. Similar examples of unique or special circumstances do not hold up under close scrutiny.

Countries can make use of the green box to address nontrade concerns. The Uruguay Round Agreement encourages countries to provide support to meet their agricultural objectives using less-distorting green box type policies. The principal requirement for green box policies is that they have no, or minimal, effect on trade. The green box contains specific provisions for addressing nontrade concerns, including public stockholding for food security purposes and payments for environmental programs. Other nontrade concerns, such as support for rural communities and amenities, as well as other general environmental and biodiversity goals (such as resource retirement, pest and disease control, and environmental programs) are also provided for in the green box. In addition, some trade-distorting policies can be used within agreed, upon WTO limits. The mix of these policies can be redirected to provide additional scope for countries to achieve domestic policy multifunctional objectives through support that is linked to production.

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INTRODUCTION

The term "multifunctionality" entered agricultural policy discussions in the early 1990s and its use has spread to trade policy discussions in recent years. While the term is relatively new, the concept it represents is not. The basic idea is that agriculture is more than just producing and selling commodities; it also produces many intended and unintended by-products. Some by-products are "good," such as rural employment creation; some are "bad," such as erosion and pollution; and some are "intangible," such as the spiritual or symbolic value of preserving our farming heritage.

The re-emergence of concerns about the multifunctionality of agriculture coincides with the opening of negotiations to reduce trade distortions that countries agreed to limit in the Uruguay Round Agreement on Agriculture (URAA). In the URAA, countries agreed to resume agricultural trade negotiations by late 1999. Under this "built-in agenda," the next round of agricultural trade negotiations will continue the reform process with the long-term objective of achieving "substantial progressive reductions in support and protection resulting in fundamental reform." Countries agreed that the new negotiations would take into account "nontrade concerns," including food security and the need to protect the environment (Article 20).

Countries limited trade-distorting support in the Uruguay Round

In the Uruguay Round of the WTO, countries agreed to reduce the support that they provide to agriculture through price- and production-related support. Countries all agreed that there would be mutual benefits from reducing the distortions that result from production-related support.

The Agreement on Agriculture is unique in the scope of rules and commitments that the WTO establishes for domestic policies because domestic agricultural policies and international trade are closely linked. Under the Uruguay Round Agreement on Agriculture (URAA), different disciplines were adopted for different types of agricultural support policies. Policies are subject to different levels of discipline, familiarly referred to as "boxes," according to their degree of trade-distortion (see Box 1 for explanation of amber and green boxes.) Only domestic support that has no, or at most minimal, trade-distorting effects or effects on production can be provided without limits. At the same time, the Agreement recognized countries' right to pursue domestic agricultural policy objectives, including those that come under the broad rubric of "multifunctionality."

WTO rules do not address countries' objectives–they govern those policy instruments that countries use to achieve objectives that have an effect on trade. The WTO does not make judgments about countries' objectives. In fact, with few exceptions, the WTO is silent on the

Box 1: Domestic Support Disciplines in the Uruguay Round Agreement on Agriculture

Under the Uruguay Round Agreement on Agriculture, different disciplines were adopted for different types of agricultural support policies. Policies were assigned different levels of disciplines, familiarly referred to as "boxes," according to their degree of trade distortion. Support that is linked to production that distorts markets and trade is subject to reductions under the "amber box." The Aggregate Measure of Support (AMS) measures the value of policies in the amber box and countries have agreed to reduce the total value of the AMS by 20 percent under the URAA.

Direct payments under production-limiting programs (blue box policies) are exempted from reduction commitments under certain conditions. Blue box policies may reduce market surpluses and thereby limit their trade impact for selected commodities but do not promote market orientation. Support measures that are considered to be no more than minimally trade-distorting are exempt from reduction commitments. Specific criteria and conditions that these measures must meet are laid out in Annex 2 of the Agreement on Agriculture–the "green box."

issue of countries' objectives. Rather, the WTO disciplines countries' agricultural and trade policies based on the instruments they use to achieve these objectives. Current WTO rules preserve nations' sovereign right to target any objective they wish, as long as they do so in a way that does not distort trade or is within their amber box limits. WTO members have agreed to certain limitations on their use of agricultural policy instruments to reduce distortions because they realize that the efficiencies resulting from improved resource allocation are in their own interest.

Support for multifunctionality linked to amber box

In the next round, some countries would like to create exemptions for increased production-related support on the grounds that such support enhances the multifunctional character of their agriculture. Supporters of multifunctionality argue that the green box criteria requiring that policies be minimally trade distorting prevents them from meeting domestic objectives. In particular, some countries whose amber box commitments are a binding constraint see expanding the green box as a way of obtaining greater policy flexibility.

A country's support for the multifunctional agenda may be related to how tightly it is bound by its commitments to reduce the most distorting types of domestic policies. In the URAA, countries placed distorting policies in the amber box and agreed to reductions in those policies. Table 2 shows that Australia, Canada, New Zealand, and the United States could substantially increase production-related support for agriculture from 1996 levels without violating their commitments. However, Switzerland, the European Union, Norway, Japan, and South Korea, which have been the biggest proponents of multifunctionality, have little room to do so. See Box 2 for statements from countries using multifunctionality as a reason to maintain distortionary domestic policies.

Table 2--1996 "amber box" support as a percent of URAA commitment, selected industrialized countries from WTO notifications

Percent	Countries
0 to 19	Canada[1], Mexico[1], New Zealand, Poland
20 to 39	Australia, United States
40 to 59	Slovakia
60 to 79	European Union, Iceland, Japan, Norway, Switzerland
80 to 100	South Korea, Slovenia

[1]Based on 1995 notification.

Box 2: Multifunctionality Proponents State Their Case

What Countries Say	What It Means
General Concerns/Next Round Issues:	
"All nontrade concerns may be characterized as positive external effects of agricultural production for which economic theory generally recommends subsidies in order to correct the market failure and restore efficiency." (Norway Ministry of Agriculture web site.) "The monetary value of flood control by rice paddies in Korea far exceeds the total rice output. Since market prices of rice do not reflect or fully internalize [this] positive externality, the government can play an important role in correcting the failure." (Korea, "Non-Trade Concerns in Net Food Importing Countries," Ministry of Agriculture and Forestry web site.)	Multifunctionality requires subsidies because these functions are externalities.
"A … number of members … are applying multifunctional agricultural policies. Solutions should be found which enable all these concerns to be taken into account, in particular by extending the measures allowed under Annex 2 to the Agreement on Agriculture ("green box")." (Switzerland, Communication from Switzerland to WTO).	The green box should be expanded to allow countries greater policy flexibility for "multifunctional" agricultural policies.
"It should be in the interest of all [WTO] Members to have non-trade concerns appropriately reflected in national and multilateral policy design and reform without causing *unjustified* [emphasis added] protection and inefficiency." (Norway Ministry of Agriculture web site.)	Non-trade concerns should be taken into account in multilateral negotiations.
Environment:	
"The value of the agricultural landscape is related to its genuine farming origin. The agricultural landscape is by definition closely related to agriculture's primary function of producing food and fiber, from which it cannot be detached. Its aesthetic and recreational values are closely contingent upon the landscape's authenticity as a food producer. This public good is a joint product of agricultural production." (Norway Ministry of Agriculture web site.)	Agricultural production is required to maintain the rural landscape, and to preserve its aesthetic and recreational value.

Box 2: Multifunctionality Proponents State Their Case (continued)

Food Security:	
"In order to secure a stable food supply…with limited production resources, domestic agricultural production, imports, and stockpiling of food [must be] combined. Increasing dependence on imported food weakens the domestic food supply structure. Therefore…domestic production should be the basis for a stable food supply, and it should be maintained and increased as much as possible." (Japan, Ministry of Agriculture, Forestry, and Fisheries web site.) "It is indispensable to provide domestic agricultural production with the primary role of ensuring [the] food supply by increasing such production. Domestic production to ensure food security has the function … of a safety net against risk." (Japan, Communication from Japan to WTO).	Domestic food production is required for food security. Increased trade is not an acceptable alternative to domestic production.
"Food security may not be achieved if agricultural production is to be placed completely under the market mechanism. Policy intervention (domestic support) in this aspect cannot be completely dissociated from production as a certain level of intervention is required for the fulfillment of the multifunctionality of agriculture, including food security. (Japan, Communication from Japan to WTO.)	Support linked to production (generally disciplined by the WTO) is necessary to realize "multifunctional" objectives, including food security.
As food security is a joint product of the agricultural production, and due to the very high unit production costs in Norway, a substantial proportion of production-coupled support seems to be the most efficient way of ensuring the production of this public good. (Norway Ministry of Agriculture web site.)	High-cost countries tend to be promoters of multifunctionality. High costs are cited as a justification for production-linked support.
Rural Development:	
It is a national objective in most countries to ensure the viability of rural areas. As remote rural areas often have production costs above average, rural agriculture frequently requires substantial support, partly coupled to production. (Norway Ministry of Agriculture web site.)	High-cost countries (who tend to be promoters of multifunctionality) need high support to ensure the viability of rural areas.

The objective of this paper is to provide a conceptual framework to analyze multifunctionality and identify the implications for WTO negotiations and U.S. domestic policy. The framework starts by carefully defining the specific policy objectives that countries target under multifunctionality. In the debate on multifunctionality, economic rationales for government intervention based on market failures are central to the arguments. Therefore, the paper explains the economic arguments and how they apply to specific policies. Examples of alternative government policy instruments and private sector initiatives are given for environmental, food security, and rural development objectives. Having covered a range of policy objectives and alternative solutions, the paper returns to the implications for international trade policy.

MULTIFUNCTIONALITY AND TRADITIONAL AGRICULTURAL POLICY GOALS

The primary function of agriculture is the production of food and fiber. Box 3 lists the frequently cited functions of agriculture, other than the primary functions of the production of food, fiber, hides, timber, and market-related activities such as trade. These functions of agriculture, sometimes called nonfood products, represent a wide range of policy objectives.

Some of the nonfood objectives represent what economists call externalities. As with almost any production activity, agricultural production activities can cause both negative and positive side effects, or externalities, that are not accounted for in the market. Farmers do not bear all the costs associated with agricultural production, such as soil erosion, water depletion, surface and groundwater pollution, deforestation, loss of wildlife habitat, and chemical misuse and contamination. On the other hand, they do not reap all the benefits of recreational amenities, open space, and flood control that may be produced. (Box 4 defines externalities, public goods, club goods, and market failures and relates their importance to policy.)

Box 3. Some Nonfood By-Products of Agriculture

Environmental

Positive
- Open space
- Scenic vistas
- Isolation from congestion
- Watershed protection
- Flood control
- Groundwater recharge
- Soil conservation
- Biodiversity
- Wildlife habitat

Negative
- Odor
- Nutrient/pesticide runoff
- Watershed protection
- Flood control
- Soil erosion
- Biodiversity loss
- Wildlife habitat

Food Security
- Elimination of hunger
- Assure availability of food supply

Rural Development
- Rural income and employment
- Viable rural communities

Social
- Traditional country life
- Small farm structure
- Cultural Heritage

In the multifunctionality debate in international organizations, the existence of (primarily positive) externalities is frequently cited as justification for government intervention in agriculture. However, agriculture's negative externalities should also be considered in any complete analysis of the nonfood values of agriculture. Negative externalities can also be produced or exacerbated by government policies that raise or lower prices of inputs or outputs. For example, policies that limit acreage and subsidize output may encourage additional use of fertilizer to increase production. Similarly, the argument that some of these nonfood outputs are public goods is used to justify government support to ensure their supply. Examples of public goods in Box 3 include cultural heritage, and with some exceptions, scenic vistas.

However, multifunctional services do not necessarily require government provision. In some instances, club goods provide an alternative. Organizations like the Nature Conservancy and Ducks Unlimited, through admission and membership fees, finance the preservation of unique ecological niches.

Principles for domestic agricultural policies

In most countries public policies are subject to some economic scrutiny. In the United States, for example, Executive Order 12866 requires the Office of Management and Budget to assess the economic costs and benefits of all proposed regulations. For "major" rules, the costs and benefits of the proposed regulation as well as alternative regulations must be examined; to be implemented the proposed rule must dominate the alternatives. Such analysis is typically limited to domestic costs and benefits; a policy's influence on resource allocation in other countries is not explicitly included. Membership in the WTO makes member countries accountable and potentially liable for these international "spillover" effects. It constrains domestic policies to being targeted to domestic markets and to be "minimally trade distorting." However, because well-designed policies (from a benefit-cost standpoint) tend to be those that minimize market distortions, if a policy is well designed for domestic purposes, it will, in general, also be well designed for the WTO, especially if costs to international markets are included.

Good policy design requires a specific objective. The externality or public good must be carefully identified; moreover the objective must be measurable. Given a measurable objective, alternative means of achieving it must be devised and evaluated. The optimal level of provision of the public good or other externality is determined when its marginal benefit equals the marginal cost of providing it. To determine the optimal provision of an externality, the cost of changing its level and the benefits of doing so must be known. Economists have developed ways to measure the benefits and costs of nonmarket goods. For example, the contingent valuation method, a survey method in which respondents are asked to value a hypothetical good or service, has been accepted in U.S. courts as a way to estimate benefits of nonmarket goods. In practice, due to data limitations, nonmarket benefits or costs are usually not known, and less economically efficient alternatives to the optimality criterion above, such as cost effectiveness rankings, must be used to select the best policy.

Box 4: Externalities, Market Failure, and Public Goods

Economists use the term "**externality**" to describe a harmful or beneficial side effect that occurs in the production, consumption, or distribution of a particular good. Production of an agricultural good may generate an environmental externality, for instance. To produce the good, a producer chooses a technology and input mix (land, labor, machinery, and chemicals). In the production process, wastes or amenities may be produced as a byproduct. These are externalities if they affect the well-being of others in a way that is not transmitted by market prices; i.e., the producer does not bear the costs of the waste cleanup or receive compensation for the benefits of the amenity provided.

Externalities often arise when there is no market for a product. This can occur when there are ill-defined or poorly enforced property rights (for example, when resources such as ground and surface water or air over a city are owned by the community or by no one). Externalities also tend to occur when those affected are widely dispersed and difficult to identify. The cost to the community of water pollution or air pollution is not reflected in the market—economists refer to this as **market failure**.

Market failure occurs when the market price of a good does not include the costs or benefits of the externality. Producers or consumers may have little incentive to alter activities that contribute to pollution, for example, or to adopt environmentally beneficial technologies because these external costs do not enter their private costs of production. Often, government policies in the form of regulations (such as standards, bans, and restrictions on input use) and incentive-based mechanisms (such as taxes, subsidies, and marketable permits) are implemented as corrective measures. The basic idea behind these policies is to force people who create (or consume) externalities to take their costs (or benefits) into account. While these policies may meet environmental (or other) goals, they also affect production, trade, investment, technological change, and consumption.

Public goods are goods or, more commonly, services that are nonrival and nonexcludable. National defense is a good example. It is nonrival because one new citizen does not reduce the defense benefits enjoyed by all other citizens. It is nonexcludable because it is impossible to prevent someone from receiving the services. When a service is nonexcludable markets do not work well: there is no incentive to pay for the service, and it cannot be withheld for non-payment. No incentive to pay means that no private firm would be willing to supply the service. In such cases, governments provide the service and collect taxes to cover the cost.

Markets work well for **private goods** because they are rival and excludable: there is an incentive to pay and prices can be determined. But the world is not neatly divided into public and private goods. There is a spectrum of goods ranging between purely private and purely public goods. Some of these intermediate goods qualify as **club goods**: they are relatively nonrival but excludable. Many services routinely provided publicly and financed through taxes are excludable. Public libraries, for example, could be organized as private clubs and charge membership and rental fees just as video rental stores do. Clubs provide an alternative to government provision of some types of public goods.

A hallmark of a well-designed policy is that it is limited to a target group or activity. Multifunctional services are typically local in nature. In this context, one-size-fits-all policies set at the national level are almost certainly inefficient, and superior targeted or local level alternatives can generally be devised. Since many nonfood objectives are not agricultural commodities, well-designed policies would target their environmental or rural development aspects. For example, open space, scenic vistas, and wildlife habitat can be provided by recreational amenities such as national parkland, golf courses, and other recreational areas.

Similarly, agricultural price support programs are an inferior means to multifunctional ends because they distort production and trade. The trade distortions arise because the policies raise prices and domestic agricultural production. Increased production distorts trade and either lowers imports or raises exports. As a result, world prices fall and impact other countries' agricultural sectors. Thus, the requirement that domestic policies be minimally trade-distorting prevents one country's domestic policy from adversely affecting resource allocation in other countries.

Jointness of desirable outputs and agricultural production

In the political debate over multifunctionality, the economic term "joint products," or jointness, has been used to characterize a production relationship where two outputs can be produced only simultaneously. For example, hides and meat are joint products of cattle. Even when an output is joint, one should note that there are degrees of jointness. For example, chicken manure is a joint product of poultry production. But this relationship, while clearly joint, is not immutably fixed. Advances in feed rations and breeding have lowered both the volume and concentration of harmful characteristics of animal wastes. In addition, technology such as composting can reduce harmful environmental effects.

In various international forums, some countries have used the joint product concept to argue that production of a nonfood output is linked to production of the agricultural commodity. Proponents of this argument claim that production-linked payments are necessary to obtain socially desired nonfood outputs. The political debate on multifunctionality has also linked the concept of targeting with joint products. The argument is that because production of the agricultural commodity is required to create a by-product, then it is equally efficient to target policies toward production of either the agricultural commodity or the by-product. For example, if beautiful meadows are a by-product of dairy production, then production subsidies for milk are efficient policies to provide the meadows. The jointness argument falls apart, however, when agricultural production is not the only possible source of providing the amenity. For example, one could pay landowners to plant wildflowers. Moreover, the program could be limited to the most visible fields.

The joint products argument undermines current criteria of minimally trade-distorting policies for the green box and also implies that further cuts cannot be made in Aggregate Measure of Support (AMS). However, the economic principles presented in this paper and examples of policies will show that jointness is not a sufficient argument to counter gains from reducing trade-distorting policies. Jointness represents a range of relationships and the nonfood outputs associated with multifunctionality do not require agricultural production. Therefore, a wide

range of private actions and public policies can provide each of the nonfood outputs. Following the principle of targeting policies to their specific objectives, many nonfood outputs can be produced, perhaps with greater efficiency, without agricultural production.

As the multifunctionality debate has evolved over time, countries promoting the importance of the joint production relationship between agricultural production and nonfood outputs have responded to the critiques discussed in this paper. A theme of their replies is that their countries face unique circumstances. For example, the geography of their countries makes it impossible to create nonagricultural jobs in rural areas. Thus, rural development and agricultural production are joint products. However, given modern transportation and telecommunications, one must be skeptical of this argument. Similar examples of unique or special circumstances do not hold up under close scrutiny.

THREE MULTIFUNCTIONAL ASPECTS OF AGRICULTURE

Given this exploration of the economic rationale for domestic policy regarding the multifunctional aspects of agriculture, the nonfood functions of agriculture are discussed in more detail in the following section. We focus on the most frequently discussed functions of agriculture, namely, the environmental, food security, and rural development functions of agriculture. The social function, while undoubtedly important, is quite abstract, and is left to future analysis. For most of the functions discussed below, there are many instruments available to influence their supply.

As indicated in Box 3, agriculture can produce both positive and negative by-products. It must be noted that whether nonfood objectives are positive or negative is partially subjective. For example, one positive externality of agriculture is flood protection. Yet, while agriculture almost certainly provides higher levels of flood control than urban development, it may not provide as high a level as land in its wild state. Hence, if the WTO allowed objectives to form part of the criteria for acceptable policies, the flexibility allowed in choosing the baseline for comparison opens the door for abuse as countries try to justify protectionist policies.

ENVIRONMENT

Many countries cite positive environmental externalities, such as the creation or maintenance of scenic vistas, as a rationale for government support of their agricultural sectors. In general, markets do not exist for the environmental by-products of agriculture, which creates a rationale for government intervention. Countries that hold this view argue that the existence of scenic vistas require production subsidies or government supported prices in order to increase agricultural production. Two aspects of this proposition are addressed in this section: first, what targets for positive and negative externalities should governments set; second, what types of policies can effectively meet society's objectives.

Determining the appropriate amount of the positive or negative externality requires a trade-off between all benefits and all costs. For example, how many scenic agricultural vistas should be

preserved? The cost of preserving some vistas could be high. For example, agricultural land near cities has high alternative values and high levels of subsidies would have to be paid to prevent farmers from selling the land. Alternatively, maintaining agricultural production in remote areas could require very large subsidies. The cost of preserving every scenic vista may outweigh the benefits to society. The optimal amount of scenic vistas is the point where the benefits from an additional vista equal the costs of providing the view. Similar logic applies to negative externalities, where the benefits from decreasing pollution should equal the costs of doing so. For both positive and negative externalities, the costs of policies are generally easier to measure than the benefits. Measuring the benefits requires putting a value on amenities such as landscape. Economists have separated nonmarket benefits into different categories (see Appendix I) and developed a variety of methods to measure these benefits.

Environmental Policy Instruments

Many different instruments can be used to influence the supply of environmental amenities. Some of these are market-based incentive mechanisms, such as insurance, emission trading, and performance bonding. Others involve some form of government intervention, either regulatory, tax-based, or voluntary programs involving economic incentives. Government-based schemes may not be efficient. For example, government programs that provide cost-share payments to farmers who adopt best-management practices (BMPs) to reduce negative impacts on the environment may attract farmers who are willing to use the BMPs without the incentive payments. The government can end up paying too much to achieve adoption of these practices. A market-based approach that relies on private insurance to accomplish environmental goals, at no or minimal cost to the government, may be able to achieve the same level of adoption at less cost. For example, private insurance programs can be designed to compensate farmers who adopt environmentally friendly practices in the event that this causes lower yields than their traditional practices. However, it should be noted that market-based schemes might still require continuing government involvement to maintain environmental control.

Box 5 lists instruments that can be used to support provision of desirable agricultural by-products or to decrease negative by-products. For example, the Conservation Reserve Program (CRP) reduces soil erosion by providing incentives to producers to take environmentally sensitive lands out of production. The instruments are separated into those directly provided by public interventions and those provided by the private sector. In some cases, there may be overlap between the two categories. These instruments, by focusing on the inputs that cause externalities or by retiring environmentally sensitive agricultural land, are more directly targeted to achieving environmental objectives than production-linked instruments that have incidental environmental impacts.

Box 5. Instruments for Modifying Levels of the Environmental Functions

Public
Cost share (EQIP)
Regulation (pesticide use restrictions)
Land set aside payments (CRP)
Taxation of inputs
Tax reductions

Private
Land buyouts (National Preservation Trust, Ducks Unlimited, The Nature Conservancy)
Insurance
Emission trading
Performance bonding

Example: Preservation of rural landscapes

As an example of an environmental function and the instruments that can be used to affect the level of its provision, consider the preservation of rural landscapes. Many people find rural landscapes visually appealing, and would lose enjoyment if they could not occasionally view them. Since an individual generally cannot be excluded from viewing rural landscapes, nor does one person's viewing preclude another person from enjoying the same amenity, at least up to the point of congestion, the rural landscape is largely a public good. As such, it is generally not priced in the market, thereby motivating the use of public policy instruments.

Box 6 lists some of the public policies that seek to preserve agricultural lands as one source of rural landscapes. In addition to public policy instruments (Farmland Protection Program), private alternatives have arisen, including land buyouts by private entities (National Preservation Trust, The Nature Conservancy, Ducks Unlimited, and others). Conservation easements, where governments or private conservation organizations purchase the development rights to a piece of land, provide an example of how public policy can complement private actions. Public programs generally pay market value for conservation easements, while private programs generally seek donations or bargain sales. The former attract many offers, but have relatively high acquisition costs and limited funds; the latter have lower acquisition costs but tend to appeal primarily to wealthier or more conservation–minded donors. (See ERS report, "Partial Interests in Land" for more information.)

Box 6. Policy Instruments for Preserving Rural Landscapes

Purchase of Development Rights: Many state and local governments have programs that purchase conservation easements on agricultural land, which prevent agricultural lands from being converted to other commercial or residential uses (e.g., the Montgomery County Agricultural Easement Program in Maryland).

Farmland Protection Program (FPP): Created by the 1996 Farm Act, the FPP uses federal funds to match state and local funding designated for purchasing permanent easements.

Transfer of Development Rights: Some states allow a developer to purchase conservation easements in one location, where agricultural preservation is desired, in exchange for being allowed to increased development rights in a second location (e.g., the Montgomery County Transfer of Development Rights Program in Maryland).

Agricultural Zoning, Agricultural Districts, Urban Growth Boundaries: These policies place restrictions on the type of activity that can occur in a geographic area, essentially prohibiting agricultural land from being lost to urban sprawl.

Agricultural Use Taxation: Many states give various tax breaks to agricultural landowners in an effort to keep agricultural land from being converted to other uses that might have higher use values.

Characteristics of the specific nonfood objective are important in determining the appropriate policy. The value associated with the rural landscape amenity includes a use value component, and may also include a nonuse value component if, for example, the individual wishes to ensure that future generations can also experience rural landscapes (see Appendix I for definitions of "use" and "nonuse" values). The presence of nonuse value is important because it implies that benefits enjoyed by individuals who do not visit the landscape will not be met with a policy that relies on user fees. Therefore, a market-based solution is not likely to provide the desired amount of the rural landscape.

FOOD SECURITY

The multiple functions of agriculture are considered by some countries to include food security. While countries generally agree that food security is a legitimate objective, they do not agree on the public good aspect of food security, nor on how it is related to domestic agriculture. In the debate on multifunctionality, countries that consider food security to be a product of agriculture relate it to two primary objectives: 1) that a country has access to an adequate quantity of food (national food security), and 2) that the food is distributed to all citizens within the country (household food security). Countries' concerns regarding the first objective usually involve reducing the vulnerability of their food supply to external disputes, external economic factors

(like embargoes or price shocks), or natural disasters. Concerns related to the second objective involve health and nutrition, political stability, income levels and distribution, food prices, availability of transitional/emergency income assistance or food assistance, and equity issues. Many of the high-income, net food-importing countries express concerns that tend to be related to the first objective.

Food security and agricultural production

Some countries consider food security to necessarily be a by-product of domestic agricultural production; i.e. maintaining a domestic food production capacity provides an "insurance" against possible supply disruptions. Elements of this insurance include "having agricultural land available for production, enough persons with farming skills and expertise, sufficient amounts of machinery and equipment, productive animals, and agricultural buildings."[3] However, in addition to ensuring that the production potential is in place, many countries consider that some defined level of domestic agricultural production (frequently self-sufficiency) is necessary for food security.

According to this line of reasoning, a policy that provides support to domestic agricultural production is considered essential for providing food security. Their economic case for support

Box 7. Instruments for Targeting Food Security

Public
Stockholding
Domestic food aid
Research, extension, training (including job training and education)
Inspection services
Infrastructure services
Disaster relief payments (income transfers)
Trade liberalization to encourage imports

Private
Stockholding
Imports
Diversifying sources of imports
Maintain unused production potential

[3]"Non-Trade Concerns in the WTO Negotiations," N.K. Nersten and S.S. Prestegard, Norwegian Agricultural Economics Research Institute. Presented at IATRC meeting, St. Petersburg, Florida, December 1998.

to agriculture is based on one of two rationales: that food security is a (positive) externality associated with food production, or that food security is a public good, similar to national security. As a public good, food security would require public intervention to assure that it is provided in sufficient quantity.

Other countries disagree that food security should be considered a "non-food" product of agriculture in the same way that some environmental aspects are. Many argue that if domestic food production is required for food security, then food security is not a non-food output, and should not be considered part of multifunctionality. Food security involves the ability to purchase food, while self-sufficiency policies - policies aimed at supporting domestic production above market levels - often slow economic growth, reduce incomes, and fix resources in unproductive sectors of the economy. Other advocates of this view question whether food security meets the conditions for a public good, and point out that food security is a joint product with agricultural *trade*, not with agricultural production.

Appropriate policy instruments for addressing food security concerns

There is a range of policy instruments that are more appropriate to addressing food security concerns than reliance on domestic production through government support of agriculture. A policy of food self-sufficiency may not achieve food security. Domestic food production may not correspond to what is needed in crisis time, or may be heavily reliant on imported inputs that may also be disrupted during a crisis. Distortions to world markets arising from high support and protection may prevent alternative sources, needed to meet shortfalls in domestic production, from developing. Moreover, maintaining current production above market levels has costs for domestic taxpayers and consumers, and spillover effects on foreign markets.

Agricultural support programs primarily affect household food security through food prices. Household food security may be affected either positively or negatively, depending on the design of the programs. Programs that lower the price of food may increase the prevalence of food security among the nation's low-income households, but efficient targeting of these programs may be difficult, and a large proportion of these programs' benefits may accrue to high-income households. Support programs that rely on high food prices may impair household food security.

There are other policy instruments available to governments to counter the effects of natural disasters, resource depletion, and other threats to the food supply that have no or minimal impacts on other countries' trade interests (Box 7). Public stockholding can effectively address countries' food security concerns by providing supplies that can be drawn on in the event of a short crop or other supply disruption. Support for research, extension and training, and infrastructure services address some longer-term issues, such as developing drought-resistant varieties, improving producers' abilities to deal with adverse conditions, and providing irrigation infrastructure. Temporary or emergency income assistance (relief payments) or food aid can also improve food security without distorting trade by helping to prevent further loss or contributing to more rapid recovery following a natural disaster. Current agricultural production is not required to provide food security; countries can encourage unused production potential that can be activated in times of crisis. Countries can realize their food distribution objective through

domestic food aid. The United States has had success with the Food Stamp program, which supplies low-income citizens with vouchers that can be used only for food purchases.

The United States and like-minded countries maintain that a fundamental way for a country to have access to an adequate quantity of food is to liberalize trade, because trade increases purchasing power and ensures that countries have access to multiple sources of food at market prices. Under an open trade regime, a dispute with one country or a supply-reducing disaster at home would not prevent a country from obtaining adequate quantities of food. The continued existence of trade barriers and supply management policies, such as export taxes, can reduce global supplies available for trade, and in turn raise the prices faced by net-food importing countries.

RURAL DEVELOPMENT

The creation of jobs in rural areas and maintenance of viable rural towns constitute the primary objective of rural development. Agriculture's ability to directly sustain rural employment has declined over the last 5 decades, as agricultural producers have substituted physical capital for labor on the farm. In contrast, manufacturing has moved into rural areas, creating up to 1 million new jobs per decade in the U.S. during the years 1950-1980. During this period, the service sector has grown even faster. Only in the Great Plains and in counties in the Northwest east of the Cascades does agriculture represent a significant share of rural employment — representing on average 12 percent of total employment in this region, with farm-related employment adding an additional 6 percent. This region has been losing population while other rural areas with manufacturing and tourism have gained population.

Even as total rural employment continues to increase, agriculture's share has declined to where it now accounts for only 6 percent of total employment in predominantly rural regions within the U.S. For other advanced OECD countries this share of agricultural employment in predominantly rural regions ranges from 2 percent in Germany, 8 percent in Norway, 11 percent in France to 14 percent in Japan.

Within agriculture in the U.S., the structure of production has also been changing. Since 1950, farm size has doubled and the number of farms has fallen by 60 percent. Concentration of production is such that 10 percent of all farms produced 75 percent of total farm output in 1997. Two-thirds of all farm program payments as recently as 1994 went to 18 percent of farms — even though the average household income of these recipients was triple that of the average U.S. household. In contrast, about one-half million farms operate below a poverty threshold. Clearly, price supports and other agricultural policies do not adequately address the specific problems of rural job creation and poverty in and outside of agriculture. Consequently, these policies cannot address the problem of maintaining the economic viability of rural towns.

Agricultural policies and farm employment

Increased support for agriculture does not necessarily translate directly into more on-farm jobs. Agricultural policies affect rural employment in two ways. First, policies can influence whether

a household continues to farm and may change the number of farmers who leave agriculture. Policies may also encourage or discourage entry of new farmers. Second, policies can change the amount of labor on existing farms. The number of jobs created by agricultural production depends on the degree to which competing inputs can be substitutes for labor as wage rates (or other factor prices) rise or as technology changes. The trend in most developed countries over the last 50 years has been a significant decline in labor utilization in farming. Technological change has increased the share of capital, and labor inputs have declined as chemical and machinery inputs have increased.

Targeted rural development policies

In light of the changing structure of the farm and rural economic landscape, policies to maintain rural communities should foster both agricultural and nonagricultural employment. Box 8 lists policies targeted to rural development.

Box 8. Instruments for increasing rural employment and sustaining rural communities

Public
Structural adjustment programs—enable farmers to move into other rural activities

Provision of general services—education and training, infrastructure

Federal, state, or local tax incentives for investment tied to location

Private
Grants from private foundations

Rural development policies address primarily the provision of physical infrastructure, social infrastructure, rural poverty, and incentives to locate firms in rural areas. Policies aiding investment in the physical infrastructure lower transportation costs — reducing the commuting costs for rural households to off-farm employment sites, the costs of shipping agricultural output to food processors and world markets, as well as the costs of supplying rural areas with consumption goods and services. Policies fostering investment in upgrading the rural communications infrastructure reduce information costs for both agricultural and nonagricultural activities. Thus, lowering the information and transportation costs reduces the geographic barriers to development of rural economies.

Preserving economic well-being of the rural population can be better addressed through direct policy intervention. In addition to upgrading rural communications, policies subsidizing the rural adoption of innovations in information network technology can reduce the delivery costs of providing the array of public and private social and medical services available to rural areas.

With respect to farm poverty, designing an income safety net for threatened farm households appears to be a more efficient policy tool than direct intervention in commodity markets.

Finally, although policies improving rural education may induce recent graduates in rural areas to migrate to urban centers in search of employment, strong rural schools also serve to attract firms and their skilled labor force desiring to relocate to a more rural setting. All in all, these policies serve to upgrade the quality of life in rural areas and help make them attractive to urban oriented clusters.

In summary, the rural economy has been undergoing a transformation from an agriculture-based economy to a more diversified one. In much of the rural U.S., agriculture has become a small part of the rural economy. Agricultural policies that raise prices are very inefficient tools in addressing problems of rural job creation and poverty. Even in locations where agriculture has a significant presence, they represent an approach that is too indirect. Therefore, it is important to develop policies that focus specifically on the problems of economic development of rural areas. Seen in this light, agricultural production policies do not make rural places more viable; rather, they make them separate.

MULTIFUNCTIONAL OBJECTIVES AND TRADE DISTORTION

As shown previously, a range of policies can address each nonfood objective, but some policies may distort international trade more than others. For each of the three nonfood outputs already discussed, Table 3 provides examples of policy instruments that have no or small market effects along with ones that create large distortions to achieve their objective.

Table 3—Comparison of policies according to their market effects

Nonfood output	Minimal market effects	Large distortion
Environmental:		
Rural landscape	Purchase or transfer of land development rights	Production subsidies that raise profitability of agriculture relative to other land uses
Rural development:		
Viable rural communities	Rural infrastructure to support creation of agriculture and non-agriculture jobs	Agricultural policies linked to production that raise output in both wealthy and marginal rural areas
Food security:		
Assure availability of food supply	Public food stocks	Production subsidies to achieve domestic self-sufficiency

The examples given illustrate the principles discussed previously:

- those policies associated with minimal distortions target the specific objective associated with the nonfood output;

- the more distorting policy provides the nonfood objective indirectly through the market and thus creates other distortions;

- while not related to WTO trade-distortion issues, policies that have minimal trade distortions are also more efficient at meeting their objectives.

The Uruguay Round Agreement encourages countries to provide support to meet their agricultural objectives through the less-distorting green box policies. The principal requirement for green box policies is that they have no, or minimal, effect on trade. The green box contains specific provisions for addressing nonfood objectives with minimal market effects, including public stockholding for food security purposes and payments for environmental programs. Other nonfood objectives, such as support for rural communities and amenities, as well as other general environmental and biodiversity goals (such as resource retirement, pest and disease control, and environmental infrastructure services) are also provided for in the green box.

In addition, some trade-distorting (blue and amber box) policies provide additional scope, within agreed-upon WTO limits, for countries to achieve domestic policy objectives. The mix of these policies can be redirected to provide additional scope for countries to achieve domestic policy objectives through support that is linked to production. Redirection and targeting of amber box policies can potentially increase the effectiveness of domestic support policies to meet high priority multifunctional objectives. For example, per unit production subsidies combined with purchase of development rights for selected farms near the urban fringe can preserve scenic agricultural vistas.

SUMMARY AND CONCLUSIONS

The aspect of multifunctionality that describes both food and nonfood objectives of agriculture has a long tradition in both the U.S. and other countries. The nonfood outputs of agriculture represent legitimate domestic policy objectives. Recent use and misuse of the term in international forums reflects an agenda to weaken international commitments to reduce domestic agricultural policies that distort international markets. Economic arguments under multifunctionality hinge on the existence of an exclusively joint relationship between agricultural production and nonfood outputs. In reality, most nonfood outputs can be produced independently of agriculture and a range of policy instruments and private actions are available to achieve each objective related to nonfood outputs.

The WTO respects member country sovereignty and does not evaluate the merits of agricultural policy objectives. The WTO criteria relate to the effects of policies and allow unlimited use of minimally trade-distorting policies, but place disciplines on distorting policies. Countries that are constrained by disciplines on distorting policies have used multifunctionality to make a case

for not making any additional cuts in amber box support, and for changing criteria for the green box to include policy objectives.

The degree of international spillovers or distortions from domestic agricultural policies emerges as the critical question for international trade agreements. While some countries would like to expand the green box, other countries have expressed concern that policies currently in the green box may distort trade. For example, under certain conditions crop insurance fits in the green box, but no consensus exists on the degree to which it may distort production and trade. Further analysis is needed to identify the types and magnitudes of distortions from different types of domestic policies.

For additional information, see:

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"Agriculture in the WTO," USDA, ERS, International Agriculture and Trade Reports, WRS-98-4, 1998.

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APPENDIX I

Types of Values for Environmental Functions

Valuation of environmental amenities is based on the same principles of valuation of a good or service that is sold in the marketplace. The main difference is that environmental amenities often lack fully developed markets, hence they have no observable prices. The lack of observable prices forces economists to use nonmarket valuation techniques to measure the total economic value, or net benefit, of a change in an environmental amenity. Total economic value can be subdivided into two main categories:

(1) *use value* -- the value an individual derives from direct use of the resource. Use values are associated with activities such as swimming, fishing, hunting, and viewing nature, and with consumptive uses such as drinking water, where the individual comes into direct contact with the environment.

(2) *nonuse value* -- the value given to the existence of an environmental resource even though it is not currently used. Nonuse values are less tangible since they arise from environmental preferences rather than direct use. Three categories of nonuse values are:

(a) *existence value* -- the value derived from knowing that the resource is maintained;

(b) *bequest value* -- the value the current generation gains from knowing that the resource is preserved for future generations, and;

(c) *option value* -- the value of preserving the resource so that the option of using it at some future date is maintained.

Source: Adapted from AER 778.