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Multifunctional Agriculture and Domestic/International Policy Choice

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The concept of multifunctionality, in which agriculture is viewed as a source of both commodity and non-commodity outputs, has stimulated debate on the desirability of further trade liberalization. We explore the economics of multifunctionality and its policy implications. We argue for a new policy approach in which land and natural resource managers are remunerated for positive non-commodity outputs and penalized for negative outputs. This would require devolution in policy implementation from the centre to the local level. Such an approach would permit countries to achieve broader social objectives, while at the same time continuing to pursue trade liberalization.

Keywords: agriculture, domestic policy, multifunctionality, trade policy, WTO.

Introduction

The concept of “multifunctionality” refers to agriculture as a multi-output activity involving not only commodities, but also non-commodity outputs, such as environmental benefits, landscape amenities and cultural heritage, which are not traded in organized markets. These have no price, because an individual’s enjoyment (consumption) of them does not reduce the quantity available to others, and it is not possible to prevent someone’s consumption once the good is available. The existence of unpriced agricultural outputs has led to a debate on how to reconcile multifunctionality with freer trade. Some argue that free trade will jeopardize public-good benefits unless appropriate domestic policies are in place. Others believe that such policies would simply create trade distortions.

We argue that attempts to address public-good issues in agriculture within the traditional domestic/international trade policy paradigm are doomed to failure. We argue for a new approach to domestic policy, which focuses on agriculture’s importance as a user of highly valued natural and environmental resources. Such an approach can be reconciled with freer trade.

To accomplish our purpose, we review briefly current multilateral trade policy and how it relates to the debate over multifunctionality. We then delve in greater depth into the economics of “multifunctionality” and its implications for domestic policy. We discuss the relationship between the new policy paradigm and international obligations.

The GATT Agreements and Multifunctionality

The General Agreement on Tariffs and Trade included a limited set of exceptions to the terms of the treaty (Article XX), including measures to protect public morals; human, animal or plant life or health; patents, trademarks and copyrights; and national treasures of artistic, historic or archaeological value. The Agreement on Agriculture (AoA) goes further by including an explicit reference to “non-trade concerns”. Article 13 provides an exemption for domestic support measures that have no or minimal trade-distorting effects or effects on production—the so-called “green-box” categories of support. The Agreement on Technical Barriers to Trade also contains provisions relating to non-trade concerns, specifying a list of objectives for which technical regulations are permissible, provided that these are not unduly trade restrictive (Article 2). The list includes: national security requirements; the prevention of deceptive practices; and protection of human health or safety, animal or plant life or health, and the environment.

A central issue is the extent to which these provisions permit countries to satisfy objectives with respect to multifunctionality, and whether such objectives would be undermined by further reductions in tariffs, export subsidies, and domestic support.

The Economics of Multifunctionality

The acceptance of multifunctionality places greater weight on the non-market value of agriculture. We need not agree on every non-commodity output to include, but must recognize that there may be some that impose social costs in addition to those that provide social benefits. It matters little whether such benefits or costs derive from externalities or the public-good nature of the outputs.

The simplest view of multifunctionality is one in which two or more outputs are technically interdependent (Shumway et al., 1984). Originally, the definition of joint production focused only on commodities—the classic definition refers to things that cannot be produced separately, but are joined by common origin or non-allocable input (e.g., wool and mutton from sheep, wheat and straw, or soybean meal and oil).

This simple view of joint production in fixed proportions is unlikely to apply to multifunctionality. Where outputs occur in other than fixed proportions, changes in the relative prices of both inputs and outputs will affect the supply of both commodity and non-commodity outputs.

Boisvert has captured the critical aspects of joint production in a simple model with two commodity outputs and two non-commodity outputs—(e.g., a landscape amenity) and a negative externality (e.g., pollution). Each commodity is produced with only two inputs, land and a purchased input—fertilizer. The environmental residual might be nitrate leaching. As one applies more fertilizer to a fixed amount of land, leaching would increase, as would output. However, if a fixed amount of fertilizer were applied to more land, output would rise, but leaching would fall because the fertilizer intensity of production would fall. In this case, pollution is not generated in fixed proportion with commodity output, but production is joint nonetheless. There is no way to disentangle or isolate the separate contribution of the purchased input to the production of the commodity and its effect on the resulting level of pollution.

There is substantial evidence that society values landscape amenities, which we assume to increase with land in agriculture. However, as land in agriculture increases, the smaller is the amenity value placed on an additional unit. Thus, as more land is used to expand commodity output, landscape amenity value increases, but again not in proportion to commodity output.

To summarize, commodity output and pollution increase together and are *technical complements*, but because the environment deteriorates with production of pollution, commodity production and environmental quality are *technically competitive*—as one rises the other falls. Since the supply of the amenity increases with agricultural output, they are *technical complements*.

A Policy Interpretation

Although this discussion establishes technical interdependence between joint commodity and non-commodity outputs, it is only through economic interdependence that the policy implications can be addressed. This would require “pricing” non-commodity outputs through subsidies or taxes. To do so reveals the various commodity and non-commodity joint products, technically interrelated for one or more reasons, to be *economically interdependent*. We can also compare direct policy intervention to influence the levels of these non-commodity outputs with the indirect effects that come through traditional commodity policies.

Viewed in this way, landscape amenity is an *economic complement* with commodity output: as the price or value of either the commodity or the amenity rises (falls), outputs of both rise (fall). Pollution and commodity output are *economic complements* in this sense as well. To reflect the fact that pollution increases with the level of leaching, the tax acts as a negative price. Thus, the cross price effects are really negative, rather than positive, for these “complements”. Since environmental quality improves as leaching is reduced, the commodity and the environment are *economically competitive*. Put differently, as commodity prices increase, agricultural output expands, but environmental quality declines. As the tax on pollution increases, agricultural output contracts, but there is an improvement in environmental quality.

If we can set the subsidy on amenities and the tax on pollution at their marginal social values, we will obtain the welfare-maximizing Pigouvian outcome for internalizing the external benefits and costs of the non-commodity outputs (Spulber, 1985). The solution aligns with Tinbergen’s time-honored principle: we need at least as many policy instruments as there are policy objectives.

It follows that the equivalent commodity output subsidy to achieve this Pigouvian outcome can be identified only if there are no negative externalities jointly produced and all positive externalities are produced in proportion only to that particular commodity. In reality, these conditions are unlikely to apply. Our analysis underscores another conclusion. Unless all multifunctional attributes occur in fixed proportions, it is not sufficient to focus only on the most pervasive externality or to combine all

external values into a single index or “net” measure (Ollikainen, 1999), especially if the index includes items contributing to widely different social objectives.

In the political debate on multifunctionality, it is often assumed that the multifunctional attributes of agriculture are supplied in fixed proportions with commodity outputs. By extension, a reduction in commodity output resulting from freer trade would lower social welfare once the value of the non-commodity outputs are taken into account. The discussion above demonstrates that the existence of such a fixed proportional relationship is extremely unlikely and that a simplistic policy interpretation is likely to be flawed. A more likely situation is one in which the public-good attributes of agriculture can be supplied through a range of input combinations and outputs and at a range of relative prices. Perhaps of equal significance, to the extent that public-good attributes are primarily associated with land use, they may not be linked strictly to agricultural activities, and, consequently, ensuring their supply may not be linked exclusively to agricultural policy.

A New Policy Paradigm for Domestic Agriculture

Traditional agricultural policies, with their focus on price and income support and on commodity production, have only loosely, if at all, contributed to achieving environmental goals and satisfying public preferences for non-commodity attributes. Sometimes non-commodity aims have been grafted onto traditional commodity policies. A case in point is the Conservation Reserve Program (CRP) in the United States, which has had as much to do with income support and the costs of government price support programs as it has had to do with any strictly conservation aims.

If multifunctionality is a key aspect of agriculture, it is no longer sufficient for national governments to set commodity price supports, hoping for acceptable levels of jointly produced non-commodity outputs. Nor is it sufficient to ignore negative outputs or to mitigate their effects either through supplementary payments that encourage “good practices” or through regulation. With agriculture as the major user of natural resources, a policy approach is required that explicitly recognizes the industry’s role in the supply of highly valued non-commodity outputs.

Essential Features of the New Policy Focus

To realize the desired supply of non-commodity outputs, policy would need to be reoriented from an agricultural focus to a natural resource focus. Many countries face growing pressures on their natural resources (land, water, and air). The future policy agenda for agriculture is likely to be driven by such pressures. The interaction

between rural, urban, and suburban economies and populations is critical in shaping how natural resources are used. A classic example is the phenomenon of urban sprawl. Growth management has been a major issue in Europe since the end of the Second World War. Major urban areas in the United States have wrestled with the issue for at least the past three decades, and it is of growing concern in smaller population centres. The management of natural resources involves the well being of the population as a whole, regardless of location. The urban/rural distinction is increasingly blurred in addressing this set of policy concerns.

The new policies must, however, bring into much sharper focus the spatial diversity of various non-commodity outputs, be they site-specific, local, area-specific, regional, or nationally differentiated. Some areas are less vulnerable to erosion; others are better suited for wildlife habitat, the promotion of bio-diversity, or the provision of ecological services. The demand for amenities may be stronger around urban areas. It would also be rare indeed that one technology or production technique would dominate others in all social value dimensions.

To accommodate such diversity, the new policy approach would require devolution in policymaking from higher to lower levels of government.¹ Because of geographical specificity, the reorientation of the policy agenda towards resource management would tend to shift the focus of policymaking to the local or community level. We already see this trend in richer countries. In the European Union, it is reflected in the debate over the “renationalization” of policy—the devolution of policymaking authority from Brussels to national capitals or regions.² In both Europe and the United States, environmental policies and programs that involve agriculture or farmland retention are legislated and administered at sub-national levels. In the United States, the first legislation to promote farmland retention was passed in New York in 1971. In the intervening years, the other 49 states have followed suit. Many localities have policies to provide open space or control the quality of the environment. State and local regulations that provide safe drinking water or relate to environmental quality are often more stringent than their national counterparts.

While local considerations may dominate the majority of issues in open space, environmental quality, and other natural resource management, some issues transcend local boundaries. These range from those that demand regional treatment, for example, watershed protection, to trans-border issues, such as global warming, that require involvement at the highest levels of government. Higher levels of government involvement may also be required for the protection of natural resources that have particularly high existence values, such as areas of outstanding natural beauty or

national parks, primarily to spread the financial burden of maintaining and protecting existing uses. Higher levels of government have an important role to play in the financing of policy where public goods are involved, although there would need to be some degree of cost sharing in order to avoid “free rider” problems. Furthermore, the central government would need to ensure that international commitments were not violated by policies implemented at the local level.

In the new policy paradigm, farmers would be part of a broader class of “land and natural resource managers”, toward which policies would be aimed. They would be remunerated for their contributions to positive non-commodity outputs or penalized for negative outputs. Short of being able to quantify some non-commodity outputs such as landscape amenities or identify the source of production as in the case of non-point source pollution, so that the Pigouvian policies could be applied directly, payments would be tied to resource use.³ Thus, for example, if land were to be kept as open space, a payment would be made with no commodity production conditions attached, except where use involved negative outputs (e.g., pollution). Resource owners would be able to choose how to use the land, within the conditions attached to the payment (e.g., land could not be diverted to a housing development or shopping centre but could be used for agriculture, as a golf course, parkland, or woodland providing that public access were maintained). In the new policy paradigm, commodity policy instruments would only be needed where the production of a particular commodity resulted in a high social benefit (e.g., paying for the planting of trees because of their contribution as a carbon sink). In that case, payments could be linked to establishment (investment) costs or use of desirable inputs, or directly to the desirable output.

It has long been known that the transfers provided by commodity policies are eventually capitalized into land values (Floyd, 1965). Barnard et al. (2001) estimate that roughly 20 percent of the value of U.S. cropland used in the production of supported commodities in 2000 was attributable to commodity program payments. Analysis of the impact of U.S. commodity programs suggests that landowners capture the benefits of payments rapidly by adjusting farmland rental rates (Ryan et al., 2001). If the social benefit is directly related to keeping land in agricultural use, it would seem preferable to pay the owners of that land directly for such services, rather than indirectly through commodity programs, particularly since some of these programs encourage the intensification of production. Thus, payments could be targeted directly to the desired outcome and production distortions could be reduced.

Diversity in Policy Instruments

Payments based on land may be a relatively efficient means of keeping land in agriculture and thus realizing the benefits of the non-commodity outputs of that usage. Some degree of conditionality could be attached to ensure appropriate resource management. To the extent that this imposes additional costs, these will be reflected in a lower net payment to land owners or in the rental rates charged to land operators. Payment rates could be adjusted to reflect these additional costs.

Elsewhere, we may want to borrow policy prescriptions from other venues in order to tie payments as closely as possible to specific non-commodity outputs. If amenities and cultural heritage are, for example, tied closely to certain types of small-scale animal agriculture, then payments should be conditioned on maintenance of the farming system in much the same way incentives are provided to restore buildings of historical significance. If paid commensurate with their social value, these farms may benefit more than they would through increases in commodity support and could continue to coexist with larger operations.

The current rethinking of the eligibility rules for the CRP in the United States can be interpreted in terms of joint production. If payments capture the net public and private benefits of moving land out of agriculture and into sound conservation practices, then by Leathers' characterization (1991), one has successfully severed the joint relationship between commodity production and the supply of conservation and other environmental benefits. It is now more profitable, or less costly, to produce them separately.

In other cases, net benefits may not be sufficient to sever the joint production relationship altogether. Thus, the optimal level of water quality might be sought through a tax on the inputs, or through incentives to adopt voluntarily environmentally friendly production practices (e.g., Wu and Babcock, 1995; Peterson and Boisvert, 2000). To deal specifically with not being able to trace the source of groundwater pollution, Segerson (1988) describes an economic incentive and monitoring scheme in the presence of this uncertainty that eliminates free rider problems.

Other Issues

Administrative costs are likely to rise with this redirection in policy. In the United States, for example, the need for local involvement might reverse the trend in consolidation of county agricultural services. In this new policy arena, there would be incentive for coordination with other local efforts to deliver similar services. We also know that only part of the knowledge base required to design appropriate policies

currently exists. Antle and Wagenet (1995), for example, argue persuasively for the need for collaboration across the full spectrum of biological, physical and social sciences in setting research priorities and addressing the impacts of agricultural technology. The public now demands greater accountability for public objectives and the assessment of tradeoffs among economic, environmental, and health outcomes associated with agricultural technology. These same tradeoffs are at the heart of assessing the contribution of a multifunctional agriculture to a broad spectrum of social priorities.

It may also be that the costs of a change in policy direction will be registered more in political terms than in program costs. The debate surrounding the current U.S. farm bill is clearly moving legislation in the direction of targeting payments based on contributions to conservation and environmental stewardship. With pressures to constrain total expenditures, there is concern about the redistribution of program benefits away from the most productive agricultural regions toward those with a comparative advantage in valued non-commodity outputs.⁴ If the redistribution proves substantial, the legislators with the courage to embrace this new approach may be victims of political fallout. Such fallout could be reduced by paying lump-sum compensation for reductions in asset values, particularly land values, resulting from the redistribution of program benefits.

Implications for International Obligations

A key international issue is the degree to which policy objectives with respect to multifunctionality would be undermined by freer agricultural trade. By extension, if the pursuit of domestic objectives requires some form of government support, what form should that take and can it be reconciled with international obligations?

Currently, four major types of exemption from reductions in domestic support are permitted in the AoA. These are: (1) exemptions for blue-box payments (payments made under production-limiting programs; exempt from reduction until 2003); (2) exemptions for green-box payments, which are judged to be minimally production- or trade-distorting; (3) exemptions for payments that are sufficiently small that they fall under a *de minimis* provision; and (4) special exemptions for payments made by developing countries. Trade-distorting payments (those that fall in the amber box) are subject to reduction.

If significant reductions were to be agreed in amber-box payments, and in tariffs and export subsidies, the ability of countries to pursue domestic objectives by

maintaining domestic market prices for agricultural commodities above border prices would be substantially reduced. Such policies, which tax consumers in order to subsidize agricultural production, have been the mainstay of agricultural policies in industrial countries, and the desire to continue such policies could be a major reason some countries are arguing strongly for the consideration of non-trade concerns in the current negotiations. If such arguments are ineffective, incentives to maintain output would have to be provided through other means—in particular, through measures that reduce input costs (input subsidies) or subsidize output directly (output subsidies).

From the perspective of reducing trade distortions, the switch to these alternative policy measures has much to recommend it. Since input or output subsidies affect supply directly, rather than indirectly through market prices, distortions in consumption are reduced (Blandford, 2001).⁵ The problem is that under current international law, these measures would not necessarily be exempt from reductions. In particular, it is likely that output price supports would be classified as amber-box measures, since their effect on production and trade would not be minimal. Where there are non-priced outputs, such as the public-good components of multifunctional agriculture, and these are linked to production, the minimal effect requirement creates a serious problem, since some linkage between support and output is necessary to correct the distortion that results from incomplete markets. In this sense, there is a clear conflict between the domestic objective of correcting a market distortion and current international law, which equates policy measures linked to output with trade distortions.

We would argue that when agriculture produces positive externalities or public goods, the issue should not be viewed as one of providing “subsidies” to producers, but rather of providing the remuneration necessary to bring forth a socially optimal supply. The term “subsidy” has often been interpreted in a pejorative manner and used as a proxy for “distortion”. The term “producer subsidy equivalent”, popularized by the OECD, is an example of such terminology. The newer term—“producer support estimate”—while an improvement, does not capture what we are proposing since it does not reflect that certain payments are not forms of support, but rather payment for services rendered. Neither the term “subsidy” nor the term “support” reflects the fact that a payment is being made (remuneration provided) for an unpriced output that has social value.

Terminology is important. If the logic of payment for services were to be applied, some of the traditional stigma felt by farmers, such as that associated with being paid not to use land for agricultural purposes, might be removed. If such payments were

associated with the aim of generating positive outputs, e.g., creation of wildlife habitat, farmers might not view them with such disfavour. The problem is that farmers have often been expected to supply non-commodity outputs without being paid for them, e.g., access to footpaths in the United Kingdom.

The use of payments tied directly to land rather than to commodity production should be more acceptable internationally, even if they are unlikely to be totally production or trade neutral. To the extent that the income of farm operators is increased by such payments, they may choose to invest more in production activities and this will affect output. However, a given level of expenditure on a land-based payment is likely to have a smaller impact on the production and trade of a particular commodity than the same expenditure on a commodity-based payment.

In summary, therefore, how would this new policy paradigm relate to international obligations and international trade? The shift away from commodity policy would be consistent with the move towards freer trade through the WTO. The use of payments linked to land use and resulting multiple outputs, rather than to commodity production, would eliminate the need for price supports and the trade barriers that make these possible. The use of input and output subsidies would affect production, but this would be a small price to pay for eliminating major sources of distortion in international trade. In order to safeguard the interests of other countries, the criteria to be used for resource-based payments, or for input and output subsidies could be elaborated and included in an expanded green-box category. It might also be desirable to replace the current requirement for notification of such payments to the WTO with a formal review requirement for proposed policies and programs (Blandford, 2001). This is not without precedent in current international law—the WTO agreement on subsidies and countervailing measures contains such a procedure for certain types of subsidies.

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Endnotes

1. Gundersen et al. (2001) have made this argument for U.S. agricultural policy. They argue that the role of the federal government should be limited to food safety, environmental issues that involve several states (e.g., watershed quality), and international trade issues.
2. In a recent report prepared for the European Commission, a group of experts argued for the decentralization of policy making oriented to agriculture in the Union, primarily to deal with the diversity of natural resource policy needs in rural areas (Buckwell, 1997).
3. Peterson et al. (1999) caution that if land is subsidized and the polluting input is taxed, an optimal subsidy on agricultural land does not equal the net value of land amenities. Thus, results from non-market valuation surveys or other techniques to elicit amenity values may not be appropriate for setting the farmland subsidy, even if the values are “corrected” to account for the value of pollution generated per acre.
4. In addition to changing the distribution of payments across types of farm (in particular, reducing the amount that goes to large farms), the geographic distribution would change from favouring the Midwest, where much of the commodity output and commodity support is concentrated, to favouring other parts of the United States.
5. To the extent that consumption is highly price inelastic and does not respond to changes in price, for example, for certain “basic” commodities in industrial countries, these distortions may not be large.

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