

**Multifunctionality:
Concepts and Applications
to the WTO Negotiations on Agriculture**

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Abstract

The ongoing negotiations in the WTO will most certainly lead to a further liberalization of the global agricultural trade. Related to this, many national governments, including Norway, Switzerland and Japan have placed substantial emphasis on the so-called non-trade concerns. In addition to the production of food and fiber, agriculture also provides or may provide national food security, environmental benefits, and viable rural areas. The term “Multifunctional Agriculture” has been applied to describe these additional functions.

In this paper, we will show how the economic concepts of “positive and negative externalities” and “public goods” can be used to analyse non-trade concerns and multifunctionality, especially with reference to agriculture’s impact on the environment. We conclude the paper with suggestions for international trade rules that can allow countries to meet domestic environmental policy objectives in a minimally trade-distorting manner.

Keywords: Non-trade concerns, multifunctionality, externalities, public goods, cultural landscape, optimum subsidy, WTO

Introduction

The currently ongoing negotiations in the World Trade Organization (WTO) will most certainly lead to a further liberalization of the global agricultural trade. These negotiations are based on Article 20 of the Uruguay Round’s Agreement on Agriculture, which states, *inter alia*, that the reform process is to be continued with the long-term objective of substantial and progressive reductions in the support and protection of the agricultural sector. A number of issues are to be taken into consideration in these negotiations, including the so-called non-trade concerns. The preamble of the Agreement defines non-trade concerns as; *inter alia*, *food security* and *environmental protection*. During the Uruguay Round, some countries also stressed the *viability of rural areas* as an important non-trade concern to be addressed in the reform process.

Many national governments, including Norway, Switzerland and Japan, place substantial emphasis on these non-trade concerns, and have produced studies to support their arguments, and these studies have also been debated in the WTO. In particular, 38 countries submitted a note for the September 2000 meeting in the Agricultural Committee that includes their papers for a conference on non-trade concerns (WTO 2000). Non-trade concerns are also reflected in the negotiating proposals submitted by several WTO members. Lately, the fourth WTO Ministerial Conference in Doha, Qatar from 9 - 14 November 2001, confirmed “...that non-trade concerns

will be taken into account in the negotiations as provided for in the Agreement on Agriculture” (WTO 2001).

Agriculture provides or may provide more than just food and fiber – such as national food security, food safety, environmental benefits (cultural landscape, land conservation, biological diversity, recreation), cultural heritage, and viable rural areas. The terms “Multifunctional Agriculture” or “The European Model of Agriculture” are increasingly applied to describe these additional functions; especially the European Union, Japan, Norway, Switzerland and Korea have put a lot of emphasis in this. This concept focuses on the fact that there are important links (jointness or complementary) between agricultural production (of the production of the private goods food and fiber) and the provision of these additional goods or services, and that functioning markets are lacking for these goods and services. The concept of multifunctionality has lately also become an important subject matter within the OECD (OECD 1998; OECD 2001).

Although most countries in the WTO can accept the notion that agriculture in addition to the production of food and fiber may provide some other benefits to society, there are clear differences between countries in their opinion on what this should imply for the actual agricultural negotiations on further trade liberalisation within the WTO. One of the main questions debated in the WTO is whether “trade-distorting” subsidies, or subsidies outside the “green box”, are needed in order to help agriculture perform its many roles (i.e. to provide governments significant scope to pursue important “non-trade” concerns). The proponents of multifunctionality argue that there is a need for production-linked subsidies and that measures allowed within the “green box” will not be sufficient.

In our view, the economic concepts of “positive and negative externalities” and “public goods” should be used to analyse non-trade concerns and the multifunctionality of agriculture and to arrive at minimally trade-distorting policy in accordance with the prescriptions laid down in Article 20 of The Agreement on Agricultural.

In this paper we will develop that conceptual framework, especially with reference to agriculture’s impact on the environment, after first having looked briefly into the concepts of externalities and public goods and some conflicting views between economists on agriculture’s environmental impacts. The paper concludes with suggestions for international trade rules that allow countries to meet domestic environmental policy objectives in a minimally trade-distorting manner.

The concepts of externalities and public goods and some conflicting views on agriculture's environmental impacts

Agricultural production activities can have both positive and negative impacts on the environment, i.e. can “produce” both positive and negative externalities. Many look upon the cultural landscape as a positive production externality, while pollution from agricultural production is seen as a negative external effect. Externalities often have the character of public goods defined by two characteristics: undepleability (consumption of a good by one person does not reduce the consumption available to anyone else) and non-excludability (once the good has been provided for one consumer, it is not possible to prevent other people from consuming it) (Baumol and Oates 1988, p. 18-19). The cultural landscape, for instance, confers benefits on all viewers of the landscape. At the same time, it is generally not possible to prevent people from appreciating an existing landscape (Hodge 1991, p. 180-181). Consequently, in a free market situation a positive externality/public good, as the cultural landscape, will be provided for below its optimum level; i.e. we will have a domestic distortion/a market failure¹.

What do we mean by the phrase *cultural landscape*. According to Olsson and Rønningen (1999, p. 3), “The concept of cultural landscape goes back to the German *Kulturlandschaft*, meaning ‘landscape formed or influenced by human activity’”. Olsson and Rønningen (1999, p. 3) continue by stating that: “Within English speaking countries, ‘countryside’ is the term normally used for the agricultural landscape. However, recently it seems that the term ‘cultural landscape’ has also become more frequently used within Britain.”

Hovorka (1997) quotes a definition of *cultural landscape* as applied in Austrian research: “The cultural landscape is a perceived unity of the spatially effective fabric of natural conditions and human influences. Cultural landscapes develop and change over time as a result of the interplay of socio-economic, cultural and natural factors.” Hovorka continues: “The cultural landscape can thus in no way be conceived as a static entity but rather as an expression of ecological, cultural and socio-economic development and change in living and working space. ... [It] can only be understood as a process.” According to the Norwegian Ministry of Agriculture (1992) the agrarian cultural landscape includes “...areas under the influence of past and present farming activities – arable and surface cultivated land, pastures and grazing land with associated forest and field edges and residual areas. This includes intensively farmed areas, both small and large-scale, extensively cultivated areas, as well as abandoned and overgrown areas.” Other definitions also emphasise that the cultural landscape includes productive farming areas, associated semi-natural areas, remnants of natural habitats, cultural monuments, and areas that used to be farmland, but are now starting to become overgrown (Daugstad & Jones 1994).

As an example hereof, the Norwegian cultural landscape, reflecting topographical and climatic conditions and closely related production structures, is remarkably varied (Nersten et al. 1999, p.

¹ Gravelle and Rees (1986, p. 13) put forward that many economists have seen cases of market failure as a legitimate basis for governmental policy (for interventions), which goes beyond that of providing the legal infrastructure for the economy. The literature on market failure can be cast in the rigorous tradition of Arrow and Debreu, and include propositions suggesting that policy can be Pareto enhancing (Alves et al. 1991, p. 197). In the tradition of Pigou the government is seen as an omniscient, benevolent dictator, which intervenes in the economy to correct market failures (McCormick and Tollison 1981).

66). It varies from small-scale coastal farms squeezed between the sea and the rocky coastal terrain with shapes and sizes of fields dictated by the natural conditions to larger-scale farms, varying from open plains to low-lying valleys. In other areas, the cultural landscape includes small, scattered fields in rugged, hilly forests in the fjord districts and the peaceful, pastoral landscapes of the inland valleys. Despite the legacy of several thousand years of farming and a much shorter period of generous subsidies, only three percent of the area of Norway is used for agricultural production.

The need to preserve cultural landscapes is widely recognized in Norway, Europe, and many other countries; in contrast, it is not an important element of agricultural and rural policy in countries with large areas of arable land. Ian Hodge provides a useful interpretation to reconcile the contrasting views and policy prescriptions of agricultural economists. To do so, he contrasts two alternative models or perspectives of the way “in which the issue of rural environmental values is assumed to enter into agricultural policy analysis” (Hodge 2000, p. 264). The first alternative, which he terms the “input model”, is favoured by North American and Australian agricultural economists. The second alternative, which he called the “output model”, is favoured by many European and Japanese economists.

The first, “input model” postulates an “inevitable and clear relationship between output prices and environmental quality” and that “a reduction in the level of price support inevitably leads to a reduced intensity of production and thus to an improvement in environmental quality” (Hodge 2000, p. 264). The second although not necessarily conflicting model, “emphasises marketed food and environmental quality as separate *products* of the land (...). These are often seen as joint products that can be produced in varying combinations” (Hodge 2000, p. 264). Agricultural economists in large, predominately exporting countries, often point to increased level of fertilizer and pesticide use that accompanies increased agricultural production and argue that a rationalization of price policies leads to an improvement in the environment. In contrast, agricultural economists in small, often importing countries point to the provision of a cultural, landscape, and other amenities arising from agricultural production. These two views of the world and the conflicting policy prescriptions are reconciled, to some extent, by the discussion below.

A version of the diagram offered by Hodge to show the compatibility of the two models is shown in Figure 1. The vertical axis measures the level of broadly defined countryside services, that is meant to capture such services as environmental quality and cultural landscape; the horizontal axis measures the level of agricultural output. Hodge

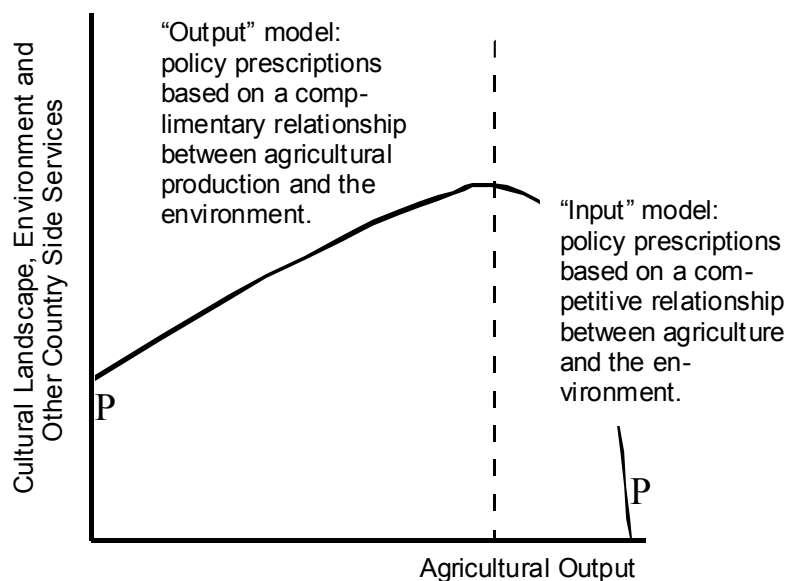


Figure 1. Production possibilities illustrating the “input” and “output” models

(2000, p. 267) argues that at lower, less intensive levels of agricultural output countryside services and agricultural output are complementary; while at higher, more intense levels, they are competitive. The production possibilities frontier (PP) illustrates such a relationship. Hodge argues that the “input model” captures the production and environmental trade-off on the segment of the curve with a competitive relationship. Increases in output are associated with increased environmental costs or a decrease in the services provided by the countryside. In turn, increases in agricultural output at lower levels of output increase the flow of countryside services. Economists following the “input model” predict degradation in the environment if agricultural policies lead to increased prices and production. Conversely, economists favouring the “output model” can rationalize an increase in environmental quality arising from policies leading to increased agricultural output. So, the same policy prescription leads to markedly different outcomes.

The conflicting predictions are illustrated in Figure 2 (Figure 2 is based on Romstad (1999, p. 15), but is slightly modified). The central panel shows the perfectly competitive market equilibrium and the corresponding level of environmental quality (countryside services) in the upper panel, the “output model”, and the lower panel, the “input model”. A price subsidy leading to an increase in agricultural production also leads to an increase in environmental quality in the “output model”. In contrast, it leads to a decline in countryside services or environmental quality in the lower panel depicting the “input model”. In the next section we translate these outcomes into a partial equilibrium trade model that allows us to identify agricultural policies, which allow nations to preserve the cultural landscape while minimising trade impacts.

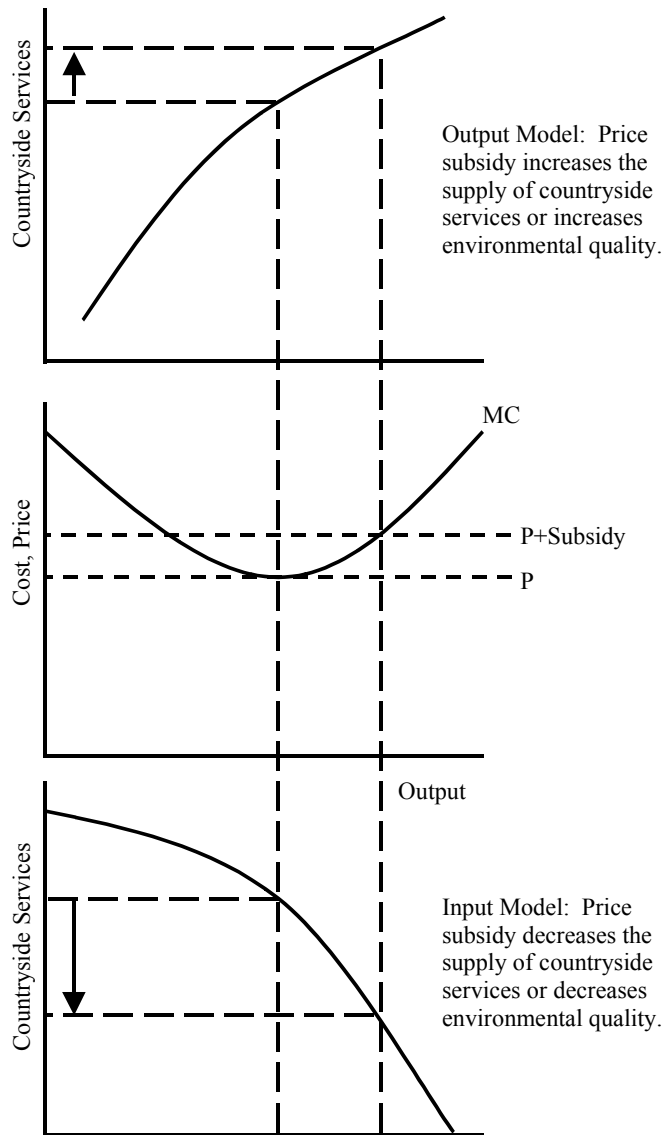


Figure 2. Illustration of the environmental outcomes in the “input” and “output models”.

Conceptual Framework

We treat this issue in the partial equilibrium supply-demand framework often used in analysing trade impacts of domestic policies as illustrated in Figure 3 (and in Figure 4). At low levels of output (intensity) agricultural output and environmental services are complementary, which is shown as a positive externality. The marginal, social cost of agricultural production lies below the marginal, private cost of agricultural production. Beyond some price level of agricultural output, the intensity of agricultural production increases until further output reduces the level of countryside services or the quality of the environment.

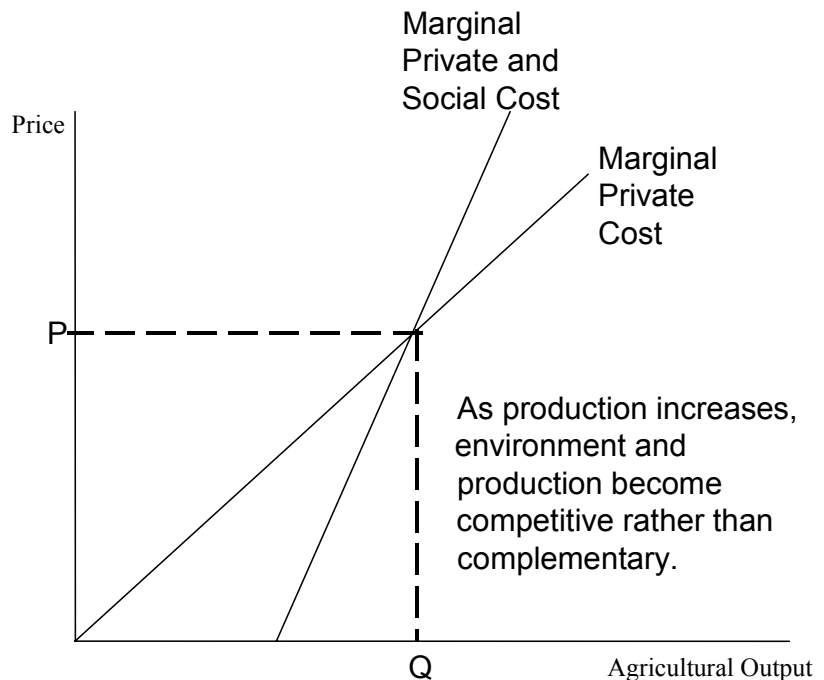


Figure 3. Representation of the “input” and “output” models as positive and negative externalities

Beyond this reference level,

agricultural production creates a negative externality that considered when determining the optimum policy and level of agricultural production. Agricultural economists in North America, Australia and New Zealand promote the “polluter pays” principle and the levying of taxes to correct for negative externalities and environmental pollution. The agricultural economists have been less keen when proposing policies to produce the optimum level of a positive externality, and for a good reason; agricultural activities in those countries are not perceived to produce a positive externality, such as a cultural landscape. However, in the case of externalities/public goods there will be a domestic distortion/market failure. Pigou suggested already in the 1920s the use of taxes on negative external effects and subsidies on positive external effects to correct allocative distortions.

Bhagwati (1971, p. 76-80) and Bhagwati and Ramaswami (1998, p. 86-87) “confirms” Pigou’s view that in case of a domestic market distortion caused by a pure production externality the first best policy will be an optimum production subsidy (or an equivalent tax-cum-subsidy). The second best policy will be either tariff (trade subsidy) or factor tax-cum-subsidies (both are superior to laissez-faire but can not be ranked uniquely vis-à-vis each other). Corden (1997, p. 7-9) also argue that a price subsidy will be an optimum policy in case of a domestic distortion/divergence caused by a positive production externality. However, Corden (1997, p. 33) argues that this result is based on the four assumptions of the theory of domestic divergence. (1) Subsidies can be financed by “nondistorting” taxes. (2) Taxation involves no collection costs.

(3) There are no costs of disbursement of subsidies. (4) The income distribution effects of various policies (such as the redistribution from taxpayers to subsidy recipients) can be neglected. In Corden (1997) each of these assumptions is considered. The conclusions are that though the analysis has to be modified, the central argument is unshaken by the removal of assumptions (1) and (4). Removal of assumption (2) will slightly dent it, while removal of assumption (3) will affect it (a tariff may be first-best policy) (Corden 1997, p. 33). However, Corden (1997, p. 39) also concludes that in developed countries subsidy disbursement costs are unlikely to be high.

It follows from Bhagwati (1971), Bhagwati and Ramaswami (1998) and Corden (1997) that a simple rejection of the possible use of a production subsidy as a corrective measure in case of a domestic market distortion caused by positive agricultural production externalities (which in principle is done in the WTO since a price subsidy is not allowed within the existing “green box”), is not consistent with economic (trade) theory. It is also worth noting that the question of possible trade-distortion of such price interventions in domestic markets is not mentioned at all by Bhagwati (1971), Bhagwati and Ramaswami (1998) or Corden (1997), while it is a major issue within the WTO. Presumably, that reflects that this issue has more to do with political economy (and international politics) than with trade theory in itself. However, Burrell (2001, p. 13) writes: “On the question of whether it actually make sense for corrective policies to be minimally distorting, Blandford (2001, p.52) observes that in the presence of an unmarketable externality, the market is already distorted. If direct payments are made to farmers to correct for market failure and to remunerate externalities, it is hardly logical to require that they should have no effect on production and trade. This discussion highlights the need for a better definition of a minimally distorting policy. If the distortion is measured against a “first-best” situation, it generally involves reference to market supply and demand functions that can only be discovered econometrically, and hence can always be disputed. Alternatively, if the change in production is measured against the current (distorted) level, why should it be zero?” We agree with Burrell in this view, and will come back to this issue in our concluding remarks.

In the standard, normative trade theory the neo-classical economic theory of a society is expanded to the international world. Corden (1984, p. 69) writes: “The central proposition of normative trade theory is that there are gains from trade and, more specifically, that given certain assumptions not only is free trade Pareto-superior to autarky but it is also Pareto-efficient, being superior to various degrees of trade restriction”. According to MacLaren (1991) this proposition provides the intellectual basis for the case in favour of moves towards freer trade and against that of protectionism in agriculture. But, he emphasises that this theory applies only to the “small” country, which cannot influence its external terms of trade².

In Figure 4, we illustrate the opening of an economy to free trade while simultaneously adopting an optimum environmental policy to correct for externalities. The diagram depicts the “output model”, that is countryside services, or the cultural landscape, as a joint product of agricultural production. In the domestic market, the marginal private cost of agricultural production is shown as the S(MPC) curve, while that adjusted for the positive externality is shown as the marginal

² For “large” countries free trade is not the optimal policy: the restriction of imports or exports by a border tax is the optimal trade policy to pursue in the presence of perfect competition domestically and in the absence of foreign retaliation (MacLaren 1991).

social cost curve $S(MSC)$. Because we are dealing with a positive externality, the marginal social cost lies below the marginal, private cost. The autarky, no trade, equilibrium quantity is indicated by Q_a , and the equilibrium supply-and-demand price is P_a .

The relevant excess demand curve is that derived as the difference between the demand curve and the marginal social cost curve (MSC) and is indicated in the trade sector by the curve labelled $ED(MSC)$. (The excess demand curve without the subsidy policy is shown for reference only as $ED(MPC)$.) The export supply of this product is indicated by the ES curve. Opening the economy to trade, results in the equilibrium world market price shown as P_w , which is found where excess supply intersects the excess demand with the optimum subsidy policy.

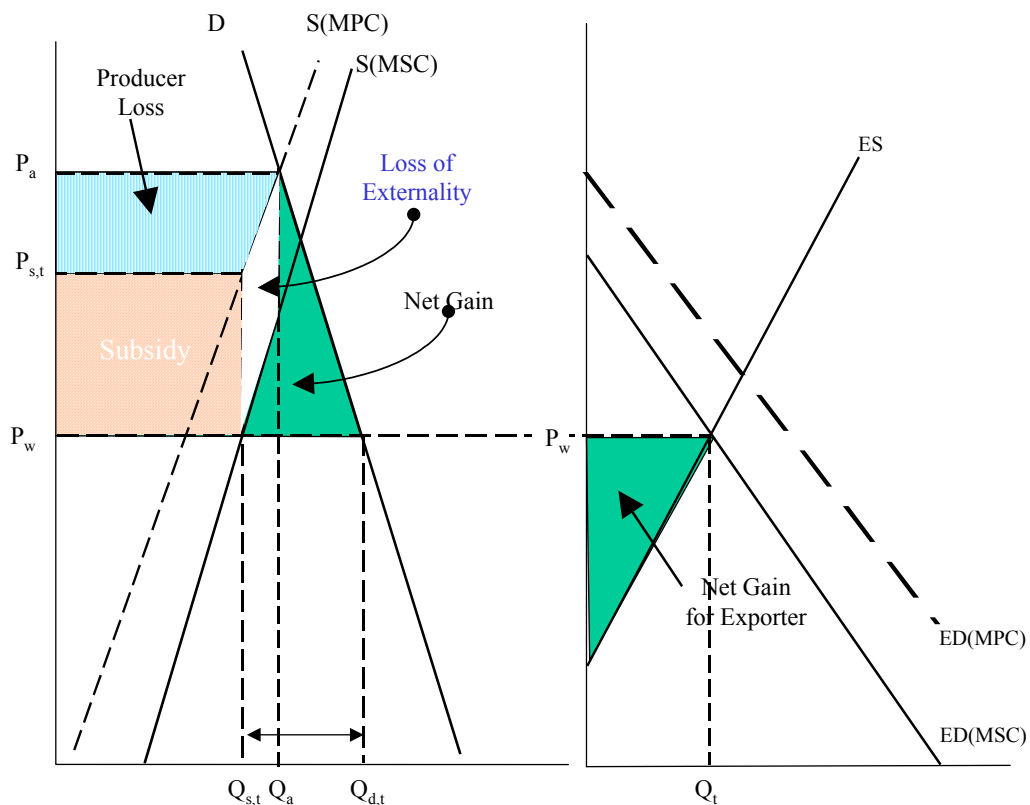


Figure 4. Illustration of trade liberalization and adoption of any optimum environmental policy.

Demand expands to $Q_{d,t}$ with the fall in the demand price to P_w . The optimum subsidy policy equates net social cost ($S(MSC)$) with the marginal benefit (the world price), which occurs at a level of output of $Q_{s,t}$ and a supply price of $P_{s,t}$. The optimum (per unit) subsidy is the difference between the world market price and the supply price.

The analysis of welfare losses is similar to that from trade liberalization without an externality. The gain to consumers is the trapezoid lying below the autarky price and above the free trade

price, and bounded by the demand curve and the vertical axis. The producer loss is indicated by the trapezoid lying between the autarky price and the new supply price and bounded by the price axis and the private supply curve. The subsidy is indicated by the rectangle identified above. The additional loss that must be considered is the reduction in the positive externality, measured by the trapezoid lying between the two supply curves and bounded by the autarky level of supply and that obtained with free trade. The nation is better off with this subsidy policy than simply opening its markets to trade and ignoring the potential benefits of the positive externality/public good.

The exporting country gains from the liberalization of trade, but not as much as it would gain if the importing country did not subsidize production. Clearly, however, world welfare is maximised when the importing country employs the optimum subsidy policy.

Farmers in the importing country, however, may lobby for additional income support. The reason is that opening the economy to trade eliminates the economic rents received through market price support. This is the area bounded by the pre-trade consumer price, $P_{d,a}$, the world market price, P_w , and the pre-trade consumption and production quantity. Rules to prevent this unwarranted rent seeking are discussed in the final section of this paper.

Policymakers in many nations have considered optimum subsidy policies for environmental reasons only in passing because large income transfers were made to farmers through market price support. The issue within the WTO context should be the reinstrumentation of that market price support to optimum environmental subsidies. If national governments still want to give farmers income support for some income redistribute reasons or otherwise, such support should be given as direct pure income support/or tax reduction, as decoupled support, and not linked to agricultural production activities at all. However, surely the environmental subsidies (in addition to world agricultural market prices) must be high enough to give farmers an economic incentive to provide the external benefits/public goods (i.e. to give farmers some income opportunities).

In the analysis above we have referred to the optimum subsidy as a production subsidy (linked to agricultural output). Depending on the actual degree of jointness (or complementary) between agricultural production and the positive externality/the public good in question, the optimum subsidy may be a subsidy on output (possibly also a regionalized price subsidy), but it may also be a subsidy linked to factors of production or otherwise linked to agricultural production processes. However, a central part in our analysis is that the optimum environmental subsidy (in case of jointness) will have to be a production related subsidy, and that so-called decoupled support within the “green box” will not be sufficient. In relation to the provision of the cultural landscape, the optimum subsidy may then be budget price support for agricultural production, or some kind of acreage support or a combination of budget price support and acreage support. Possibly, it may also be optimal to support directly special features in the agricultural landscape that are valued (for example headage support for grazing animals). In deciding which policies (measures) to use, we have to keep in mind that there will always be a trade-off between precision and transaction costs regarding any policy (i.e. costs of information gathering, decision making, contract formulation, controlling, etc.). The problem encountered here is to find a balance between precision and transaction costs (Vatn 1998). Taking this into consideration, in some cases the simple solution from an administrative perspective – production support – may be targeted enough. The loss in precision is less than the gain in (reduced) transaction costs compared to alternatives (Vatn 1999, p. 12).

A pragmatic approach to trade rules

Clearly, policies to obtain the production of the optimum quantity of cultural landscape or other countryside services must distort trade to some degree. In many cases these subsidies are tied to participation in production activities and production of agricultural products. We argue, however, that just as a pollution tax is widely accepted as the optimum policy for a negative externality, so should the use of a production-tied subsidy be accepted as optimum policy for a positive externality. The rub is, of course, that while pollution taxes decrease production and either increase imports or decrease exports, either outcome could be pleasing to the nation's trading partners; a subsidy to obtain the optimal amount of a positive externality will likely have the opposite effect.

Providing subsidies for production of positive externalities, moreover, is complicated and may be costly. In our view, sovereign nations have a right to undertake those policies, however costly to national budgets. From another perspective, it is foolish to undertake those policies that secure the production of positive externalities free of trade reprisals. Of course to do so requires the development of carefully specified international rules to prevent such policies from becoming a form of protectionism. An essential element of our approach, and the first of our proposed rules, is that nations cannot subsidize exports or place import tariffs on any agricultural and food products. As shown in Figure 4, this results in an expansion of consumption and imports for trading partners.

But, the level of optimum subsidy and associated level of output after trade are not known. A nation could respond to producer pressure and introduce subsidies giving rise to a level of output equal to the level of consumption at the free trade price. However, limiting the quantity supported to the current level of output, or to some proportion of the current level, would allow the nation to meet its objectives for positive externalities like the cultural landscape, and would mean that the increase in consumption must necessarily result in increased imports.

The second condition, in addition to the elimination of border measures, requires a reformulation of "green" and "blue box" criteria. "Green box" criteria would need to explicitly include production-tied supports that meet certain carefully prescribed requirements. The proposed changes would simply mean a transfer of some support from the "blue" to the "green box". Nations will probably reinstate some of the "amber box" support that vanishes with the elimination of border measures, to "green box" support to continue the provision of cultural landscape and other countryside services.

The position of the Cairns Group, and of the United States in the previous rounds, to treat agriculture no differently than any other sector, and so subject to general WTO rules, will simply result in a protracted negotiation that arrives at a minimal agreement with a maximum amount of acrimony. Our proposal to eliminate export subsidies and border measures and to change the "green box" criteria to allow tightly prescribed, but production related and so trade distorting, subsidies provides a way forward.

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