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4 March 2003

**NOTIFICATION**

Dear Sir/Madam,

**Subject: Peer review of a document on the impact of trade liberalization on agricultural biological diversity**

I wish to draw your attention to decision VI/5 of the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity, on agricultural biological diversity.

In paragraph 17 of this decision, the Conference of the Parties “*requested the Executive Secretary to further study the impact of trade liberalization on agricultural biodiversity, in collaboration with the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, the World Trade Organization and other relevant organizations*”.

Pursuant to that request, the Secretariat has prepared a research plan in collaboration with the international organizations enumerated above, as well as with the International Center for Trade and Sustainable Development (ICTSD), the Institute for European Environmental Policy (IEEP), IUCN – The World Conservation Union, the NAFTA Commission for Environmental Cooperation (CEC) and the Organization for Economic Cooperation and Development (OECD).

Further to this research plan, the Secretariat has prepared a first study, entitled “**The Impact of Trade Liberalization on Agricultural Biological Diversity: Domestic Support Measures and Their Incentive Effects for the Conservation and Sustainable Use of Biological Diversity**”. The document is now open to peer review by the Scientific Community.

cc: CBD National Focal Points;  
above-listed international organizations

Attachment: The Impact of Trade Liberalization on Agricultural Biological Diversity: Domestic Support Measures and Their Incentive Effects for the Conservation and Sustainable Use of Biological Diversity



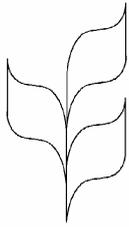
The purpose of the peer review process is to receive comments on the overall balance and soundness of the arguments covered by the document, as well as on the identification of opportunities for further research.

I have the pleasure to invite you to take part in the peer review of the attached document. I would be grateful to receive your comments as soon as possible but not later than **1 May 2003**.

I wish to thank you in advance for your cooperation in this matter and for your continued support of the work of the Convention.

Yours sincerely,

Hamdallah Zedan  
Executive Secretary

**CONVENTION ON  
BIOLOGICAL  
DIVERSITY**

Distr.

GENERAL

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DRAFT

FOR PEER REVIEW

ORIGINAL: ENGLISH

**THE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURAL BIOLOGICAL  
DIVERSITY****DOMESTIC SUPPORT MEASURES AND THEIR INCENTIVE EFFECTS FOR THE  
CONSERVATION AND SUSTAINABLE USE OF BIOLOGICAL DIVERSITY***Note by the Executive Secretary**Draft – for peer review***1. INTRODUCTION**

1. The present note was prepared pursuant to decision VI/5, on agricultural biological diversity, of the Conference of the Parties to the Convention on Biological Diversity. In paragraph 17 of this decision, the Conference of the Parties requested “*the Executive Secretary to further study the impact of trade liberalization on agricultural biodiversity, in collaboration with the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations, the World Trade Organization and other relevant organizations.*” Following this request, the Executive Secretary prepared a research outline in collaboration with relevant international organizations. Comments on the research outline were provided by the United Nations Environment Programme, the Food and Agriculture Organization of the United Nations and the World Bank, as well as by the International Center for Trade and Sustainable Development (ICTSD), the Institute for European Environmental Policy (IEEP), IUCN – The World Conservation Union, the NAFTA Commission for Environmental Cooperation (CEC), the Organization for Economic Cooperation and Development (OECD) and the World Trade Organization (WTO).

2. The request of the Conference of the Parties came further to a note prepared by the Executive Secretary, entitled “Assessing the impact of trade liberalization on the conservation and sustainable use of agricultural biodiversity”, that was prepared pursuant to decision IV/6, on agricultural biodiversity. This earlier note gave a general overview on such impacts, linked to land use and land use change, production intensification, and the occurrence of alien invasive species.

3. The present note complements this overview and therefore adopts its general approach. Like the earlier study, the present note focuses on the farm sector, and the relationship between crop and livestock

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production and biodiversity. It addresses in more detail the role of domestic support measures and their removal or reform pursuant to recent international efforts to liberalize agricultural trade. Even while domestic support measures are mainly applied by several major countries in the OECD area, its importance extends beyond these countries because of their magnitude and the subsequent trade distortions stemming from the impact of some subsidies on output volumes and prices. As a result, trade-distorting agricultural subsidies are frequently referred to as a major development obstacle in relevant international fora.<sup>1</sup>

4. The impact of any domestic support measure on biodiversity can be pictured as generating a specific incentive or disincentive for the conservation and sustainable use of biodiversity. The present study has therefore important linkages with the Convention's programme of work on incentive measures (see decision V/15 of the Conference of the Parties). Specifically, the Conference of the Parties has recognized that "*further work has to be undertaken on positive incentives and their performance, as well as on perverse incentives and ways and means for their removal or mitigation*" (decision VI/15, paragraph 4).<sup>2</sup> As domestic support measures usually rely on transfers to the farm sector, such measures would fall under either the perverse or the positive incentive category. The present note seeks to further elucidate this incentive aspect of domestic support measures.

5. The note proceeds as follows. Section 2 gives an overview of the key international agreement to liberalize agricultural markets, the Uruguay Round Agreement on Agriculture (URAA), giving special attention to the disciplines on domestic support. Section 3 summarizes the main development after the URAA, again giving special focus to domestic support. Section 4 sets out the general framework to analyze the impact of domestic support policies on agricultural biodiversity. Subsequent sections adopt the usual WTO approach to categorize specific support measures into "boxes". Section 5 addresses the reduction of trade-distorting, Amber Box policies. Section 6 deals with the increase of (no or minimally trade-distorting) Green Box support. Section 7 analyzes payments under agri-environmental programmes. Such payments are part of the Green Box, but are of special interest for the purpose of this note and therefore merit a prominent treatment in an own section. Section 8 considers the special case of payments under the Blue box. Section 9 summarizes and concludes.

## **2. AGRICULTURAL TRADE LIBERALIZATION: THE URUGUAY ROUND AGREEMENT ON AGRICULTURE**

6. The 1986-1994 Uruguay Round and its Agreement on Agriculture (URAA) established new international rules on key aspects of agricultural trade. It imposed constraints on market access restrictions, on export subsidies and on trade-distorting domestic support. As agricultural protection had previously either been accorded "special treatment" under GATT rules or had not been explicitly covered

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<sup>1</sup> For instance, during the roundtables and partnership events of the World Summit on Sustainable Development. See the respective chairperson's summaries, p. 11-12 and p. 6. The further reduction of trade-distorting domestic support is an important item addressed by the current negotiations in the Special Session of the WTO Committee on Agriculture. These negotiations, which also aim to achieve further substantial reductions in tariffs (corresponding to improvement in market access) and in export subsidies, started in 2000 pursuant to the built-in negotiation provision of the Uruguay Round Agreement on Agriculture, and were further mandated by the Doha Ministerial Declaration.

<sup>2</sup> *Perverse incentives* induce unsustainable behavior that reduces biodiversity, often as unanticipated side effects of policies designed to attain other objectives. They can include government subsidies or other measures, which fail to take into account the existence of environmental externalities, as well as laws or customary practice governing resource use. A *positive incentive* is an economic, legal or institutional measure designed to encourage beneficial activities.

under GATT provisions, these new disciplines are usually said to be a major achievement of the Agreement.

## 2.1 Commitment on market access and export subsidies

7. On market access, member governments committed to the conversion of all existing non-tariff barriers into a tariff equivalent (the so-called *tariffication*) and to a subsequent reduction of tariffs. Developed countries were to cut tariffs by 36 % on average for all agricultural products between 1995 and 2000, with a minimum cut of 15 % per product, when compared with the base period (1986-88) level of protection. Developing countries are to cut tariffs by 24 % on average over the period 1995-2004, with a minimum cut of 10 % per product. These figures were targets used to calculate countries' legally binding schedules of commitments, meaning that each country's specific commitment level vary according to the outcome of the negotiations.<sup>3</sup> Furthermore, member governments commit to grant minimum access to domestic markets of 3 %, later 5 % of the base period domestic consumption.

8. In regard to export subsidies, developed countries committed to a reduction of subsidized export expenditure ("outlays") by 36 %, and of subsidized quantities by 21 % between 1995 and 2000, where reduction quota refer to the base-period 1986-1990 average. The corresponding reduction quotas of developing countries are of 24 % for outlays and of 14 % for export volumes, over the period 1995-2004.

## 2.2 Commitments on domestic support

### *AMS reduction commitments*

9. The discipline on domestic support is sometimes characterized as being the single most innovative element of the URAA.<sup>4</sup> Member governments committed to a reduction in domestic support that encourages agricultural production and is therefore considered to distort potential trade flows (e.g., direct price support or input subsidies).<sup>5</sup> General reduction quota are of 20 % over the period 1995-2000 for developed countries, and of 13 % over the period 2005 to 2004 for developing countries, with 1986 being the base year. Again, these figures are targets used to calculate the legally binding schedules of commitments of individual countries. Individual bindings are established through the limits placed on the Total Aggregate Measurement of Support (AMS). Hence, a member is in compliance when its current AMS does not exceed the corresponding annual and final bound level specified in its schedule of commitments.

10. The AMS expresses the annual level of support, in monetary terms, provided for an agricultural product in favour of the producers of the basic agricultural products or non-product specific support provided in favour of agricultural producers in general. Its calculation includes product-specific market price support and non-exempt payments (see below on exemptions), as well as any other non-exempted and non-product-related support provided in favour of farmers, both at national and sub-national levels. Agricultural fees and levies are deducted from the AMS. Domestic support measures that are to be included in the calculation of Total AMS and, hence, are subject to reduction commitments are categorized under the so-called Amber Box of the URAA.

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<sup>3</sup> See WTO (2002), p. 12, for the following figures.

<sup>4</sup> OECD (2001b), p. 3

<sup>5</sup> For a concise summary of domestic support commitments see, e.g., IATRC (2001), p. 1-3.

11. The URAA specifies a number of measures that need not be included in the calculation of Total AMS and are therefore not subject to reduction commitments.

***De minimis percentages***

12. For developed countries, product-specific support up to 5 % of a member's total value of production of a basic agricultural product during the relevant year is excluded reduction commitments, as well as non-product-specific support of to 5 % of the value of the member's total agricultural production. For developing countries, this *de minimis* percentage is 10 % (URAA, Art. 6.4).

***Developing countries' exemptions under Article 6.2***

13. Recognizing that government measures of assistance to encourage agricultural and rural development are an integral part of the development programmes of developing countries, investment subsidies that are generally available to agriculture in developing country members and agricultural input subsidies generally available to low-income or resource-poor producers in developing country members are exempt from domestic support reduction commitments. Furthermore, domestic support measures to producers in developing country members aimed to encourage diversification from growing illicit narcotic crops are also exempt (URAA, Art. 6.2).

***Blue Box***

14. Furthermore, direct payments under production-limiting programmes are not subject to the reduction commitments if such payments are based on fixed area and yields, or such payments are made on 85 % or less of the base level of production, or livestock payments are made on a fixed number of head (URAA, Art. 6.5). Domestic support measures meeting these requirements fall under the so-called Blue Box of the URAA.

***Green Box***

15. Support measures that meet a number of criteria set out in Annex 2 of the URAA are considered to have no, or at most, minimally trade distorting effects or effects on production and are therefore exempt from reduction commitments. They are supposed to be “decoupled” from output quantities and prices. These provisions constitute the so-called Green Box of the URAA. It is especially by these provisions that the URAA strikes a balance between agricultural trade liberalization and governments' desires to pursue legitimate agricultural policy goals, including non-trade concerns.

16. All measures for which exemption is claimed under the Green Box provisions have to conform to two basic criteria (URAA, Annex 2, para. 1):

- The support in question shall be provided through a publicly-funded government programme (including government revenue foregone) not involving transfers from consumers; and,
- The support in question shall not have the effect of providing price support to producers.

17. In addition, exempt support must meet the policy-specific criteria and conditions applying to the following categories of government programmes:

- General services (URAA, Annex 2, para. 2);

- Public stockholding for food security purposes (ibid, para 3);
- Domestic food aid (ibid, para. 4);
- Direct payments to producers (ibid, para 5);
- Decoupled income support (ibid, para 6);
- Government financial participation in income insurance and income safety-net programmes (ibid, para. 7);
- Payments for relief from natural disasters (ibid, para. 8);
- Structural adjustment assistance provided through producer retirement programmes, resource retirement programmes and investment aids (ibid, paras. 9-11);
- Payments under environmental programmes (ibid, para. 12);
- Payments under regional assistance programs (ibid, para 13).

18. Criteria for direct payments to producers, in addition to the general requirements set out in paragraph 1, are specified in paragraphs 6 through 13 when applicable; minimum criteria to be met are given in paragraph 6, on decoupled income support, when those other paragraphs are not applicable (see URAA, Annex 2, paragraph 5):

- The amount of such payments in any given year shall not be related to, or based on, the type or volume of production (including livestock units) undertaken by the producer in any year after the base period;
- The amount of such payments in any given year shall not be related to, or based on, the prices, domestic or international, applying to any production undertaken in any year after the base period;
- The amount of such payments in any given year shall not be related to, or based on, the factors of production employed in any year after the base period.
- No production shall be required in order to receive such payments.

19. Given the focus of this note, the criteria to be met by environmental programmes are of special interest (see URAA, Annex 2, paragraph 12):

- Eligibility for such payments shall be determined as part of a clearly defined government environmental or conservation programme and be dependent on the fulfillment of specific conditions under the government programme, including conditions related to production methods or inputs;
- The amount of payment shall be limited to the extra costs or loss of income involved in complying with the government programme.

*Peace Clause*

20. The URAA, in its Article 13, provides for “due restraint” by Member countries in taking action against Green Box policies under rules that apply to non-agricultural subsidies. This so-called Peace Clause stipulates that measures fully conforming to Green Box provisions are non-actionable; specifically, they are exempt from the imposition of countervailing duties. This Clause expires at the end of 2003.

*Built-in negotiations*

21. Article 20 of the URAA committed members to start negotiations on continuing the reform one year before the end of the implementation period, under the long-term objective of “*substantial progressive reductions in support and protection resulting in fundamental reform.*” In the negotiations, non-trade concerns (like environmental protection, food security, rural development etc) and special and differential treatment of developing country members are to be taken into consideration.<sup>6</sup> These negotiations were initiated early 2000 and are now well underway.<sup>7</sup> In the Doha Ministerial Declaration, WTO Members further committed to these negotiations and their objectives: “*substantial improvements in market access; reductions of, with a view of phasing out, all forms of export subsidies; and substantial reductions in trade-distorting domestic support.*” Ministers again underlined the importance of non-trade concerns and special and differential treatment for developing countries.<sup>8</sup>

### 3. DEVELOPMENTS AFTER THE URAA

#### 3.1 Market access

22. Compared with the pre-URAA period, the Agreement introduced important systemic changes to the GATT/WTO rules for agricultural trade. However, it achieved only a limited reduction in effective protection. Distortions to agricultural production and trade remain high, with average agricultural tariffs around 60 % as compared to 10 % or less for industrial tariffs<sup>9</sup>. The flexibility that was given to countries by the aggregate nature of the formula for reducing tariffs reduced their real impact on reduction commitments. The bound rates as agreed on in the URAA often afforded higher protection levels than those of the base period. As a result, protection actually increased for a number of agricultural products. Tariff rates have also become more complex. The OECD concludes that “*much deeper cuts in tariffs, or larger increases in volumes admitted at lower tariffs, would be needed to improve market access significantly.*”<sup>10</sup>

#### 3.2 Domestic support

23. Overall levels of domestic support have been somewhat reduced in the relevant period, although this process stalled or was even temporarily reversed when market pressures in 1998 and 1999 led again to an increase in support. In the OECD, support to farmers (measured by the Producer Support Estimate

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<sup>6</sup> URAA, Article 20.

<sup>7</sup> An overview of the negotiating positions of WTO members as per end-2002 is given in WTO (2002).

<sup>8</sup> Doha Ministerial Declaration, paragraph 13.

<sup>9</sup> OECD (2001b), 2.

<sup>10</sup> *ibid*, 3.

or PSE) as a share of total farm receipts fell from 38% on average in 1986-88 to 31% in 2001.<sup>11</sup> In absolute numbers, the total support estimate for OECD countries amounted to USD 311 billion in 2001. Furthermore, domestic supports remains highly concentrated. In 2001, the European Union, Japan and the United States account for 82 % of total domestic support of the whole OECD area.

24. Many countries have been reporting current Total AMS levels that are small relative to their permitted levels. It can be concluded that WTO members, with a few exceptions, have been able to adjust their domestic support policies in order to comply with the URAA. However, it has also borne in mind that non-exempt domestic support measures were on a historic high for many countries in 1986, the base year for the reduction commitments.<sup>12</sup> For selected countries, the proportions of used to permitted Total AMS levels (in percentages) in 1997 are given below.<sup>13</sup>

Australia	25	Korea	95
Brazil	30	New Zealand	0
Colombia	4	Slovak Rep.	73
Costa Rica	0	South Africa	97
Czech Rep.	7	Thailand	79
EC	68	Tunisia	81
Japan	71	US	29

25. The URAA has reinforced the shift from non-exempt to exempt domestic support measures, which was under way in some countries even prior to the implementation of the Agreement. For selected countries, the development of domestic support by category is given below.<sup>14</sup>

	Green Box		Blue Box		Amber Box		Article 6.2	
	Base	1997	Base	1997	Base	1997	Base	1997
Australia	60.85	91.18	0	0	39.15	8.82	0	0
Brazil	73.36	85.47	0	0	18.05	7.85	8.6	6.95
EC	11.14	18.17	0	20.44	88.86	50.19	0	0
Japan	30.78	45.23	0	0	69.23	54.77	0	0
Korea	42.74	68.89	0	0	56.96	30.66	0.3	0.45
New Zealand	25.5	100	0	0	74.5	0	0	0
US	48.62	87.92	0	0	51.38	12.08	0	0

26. As an important means to reduce AMS levels and meet reduction commitments, countries have re-designed domestic support policies with a view to shift them from the non-exempt Amber Box to the exempt Green and Blue Boxes. For instance, the United States Federal Agriculture and Improvement and Reform (FAIR) Act of 1996 reduced direct market intervention while preserving support to domestic farm income. The so-called Agenda 2000 for reform of the European Union's Common Agricultural Policy (CAP) foresees gradual reductions in market price support and an increasing reliance on direct payments

<sup>11</sup> For the numbers that follow, see OECD statistical database, at [www.oecd.org](http://www.oecd.org), if not indicated otherwise.

<sup>12</sup> OECD (2001b), 4.

<sup>13</sup> See IATRC (2001), 31; WTO (2000), document G/AG/NG/S/1.

<sup>14</sup> IATRC (2001), 32; WTO (2000) documents G/AG/NG/S/1 and G/AG/NG/S/1/Corr.1.

for fostering rural development and agri-environmental programmes, under the so-called “second pillar” of the CAP.<sup>15</sup> Recent legislation in Japan and Korea also puts stronger emphasis on direct payments instead of price support.<sup>16</sup>

27. Recent developments in the US and in Europe indicate a slower pace of reducing and “re-instrumenting” support policies. In the US, the new Farm Security and Investment Act of 2002 is expected to provide US\$ 73.5 billion in additional support to agriculture over the next decade, over and above the expenditure baseline of the FAIR Act of 1996. The nature and magnitude of the support contemplated is expected to have significant consequences for the outlook for agricultural production and trade.<sup>17</sup> In the EU, some members have indicated a desire for further re-orientation of support to the second pillar of CAP; however, it is not yet clear at what pace these steps for further decoupling will be undertaken and whether they will also involve a reduction in overall support to EU agriculture.<sup>18</sup>

28. Despite these reforms of agricultural policies, the level of agricultural support as measured by the OECD Producer Support Estimate (PSE) remains high. Furthermore, the gap between the PSE and the AMS is increasing over time.<sup>19</sup> In 2001, 69 % of support measures in OECD countries as measured by the PSE were still in the form of market price support or output-based payments. The corresponding figure is of 82 % in 1986-88. Payments based on area planted or livestock numbers (under the Blue Box) represent 13 % of total support to farmers (up from 7 % in 1986-88), and payments based on input use represents 8% of support in 2001 (down from 9 % in 1986-88).

29. Payments to farmers under environmental programmes still account for only a small share of total transfers to producers. However, for a large number of OECD countries there has been an overall rapid increase in public agri-environmental expenditure during the 1990s. This expenditure varies widely across countries, reflecting differences in agri-environmental concerns and priorities.<sup>20</sup>

30. Hence, the changes that were observed in the structure of domestic support policies pursuant to the implementation of the URAA can be summarized as follows:

- A *reduction* in trade-distorting Amber Box support;
- An *increase* in “decoupled” Green Box support considered to have no, or at most, minimally trade distorting effects or effects on production (direct payments to farmers); and in particular
- An important *increase* in payments under environmental programmes, as part of the Green Box;
- An important *increase* in Blue Box measures.

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<sup>15</sup> Agenda 2000 also endorses the concept of multifunctionality. This concept relies on the multifunctional role of agriculture, meaning that agriculture generates benefits beyond the production of food and fodder. Under this concept, agricultural policies should be used to promote the provision of such external benefits. Multifunctionality will be discussed in more detail in Section 6.

<sup>16</sup> See IATRC (2001), 6, for a summary.

<sup>17</sup> OECD (2002), 18.

<sup>18</sup> *ibid*

<sup>19</sup> OECD (2001c).

<sup>20</sup> For illustration, the percentage change in payments under environmental programmes between 1993 and 1998 is +2857 for Italy, +1149 for Spain, +665 for Switzerland, +150 for France, +10 for the US, -35 for Portugal (base year 1994). See OECD (2001a), 20, for details.

This list will serve to structure the following sections, which will examine the impact on agricultural biodiversity of the changes in domestic support policies subsequent to the URAA.

#### 4. THE IMPACT OF DOMESTIC SUPPORT POLICIES ON AGRICULTURAL BIODIVERSITY: GENERAL ANALYTICAL FRAMEWORK

31. It is generally accepted that the most significant part of the relationship between trade liberalization and the environment passes indirectly through effects and pattern of production and consumption. In consequence, the environment benefits of trade restrictions and distortions are also likely to be indirect and not readily identifiable in general terms.<sup>21</sup>

32. Several impact channels can be identified that lead from changes in domestic support policies, along the lines of paragraph 30, to changes in the level and mix of agricultural production and the mix and level of agricultural inputs. Specifically, any reform can have three basic types of impacts.<sup>22</sup>

- (i) *Output substitution impacts* could, for instance, imply a production shift from those crops particularly affected by a reduction of subsidies to crops which are less affected by such a reform, or to crops whose production is less subsidized from the outset.
- (ii) *Input substitution impacts* would be most directly observed when input subsidies like fertilizer or pesticide subsidies were reduced or removed. However, input substitution might also result from a reduction in output-oriented subsidies. While it can be expected that farmers use all inputs less intensively as a result of such a reduction, the optimal mix of inputs might also change. Studies indicate that chemical fertilizer and pesticide applications are strongly correlated with producer price incentives, while the primary factors of production (land, capital, labor) are less responsive to such reductions.<sup>23</sup>
- (iii) *Output price impacts* are based on the wedge between the market price and the so-called producer price that is driven by any trade-distorting subsidy. The market price is the price that consumers pay for an agricultural product, while the producer price is the payment a domestic farmer actually receives per output unit. Without such a subsidy or another market intervention, producer and market prices would coincide, and this differentiation would be meaningless.<sup>24</sup>

33. The reduction of output-oriented subsidies, mostly used by developed countries, would directly reduce producer prices for domestic farmers in those countries that implement such reductions. Lower producer prices, in turn, lead to lower incentives for production. In consequence, agricultural output is expected to fall in implementing countries as a result of subsidy reduction.<sup>25</sup>

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<sup>21</sup> See WTO (1997), 1-2; UNEP/CBD/COP/6/INF/2.

<sup>22</sup> See Batie (1996).

<sup>23</sup> Anderson (1991).

<sup>24</sup> See OECD (2000b), 13.

<sup>25</sup> Lankoski (1997), 13, 17; see also Anderson (1991); Lutz (1992); Anderson and Strutt (1996); Ervin (1996); UNEP/CBD/COP/6/INF/2, 9. Note that the *overall* effect of trade liberalization measures would depend on the national policy package in place prior to liberalization efforts, and on the specific design of liberalization policies.

34. In contrast, agricultural production in other, mainly developing countries is usually expected to increase pursuant to trade liberalization measures.<sup>26</sup> The reduction of domestic support given to farmers in developed countries, while reducing production incentives for domestic producers because of lower producer prices, would increase market prices for the relevant agricultural products,<sup>27</sup> which would generate further production incentives for farmers in those countries that did not use, or to a far lesser extent, trade-distorting domestic support.

35. As a result of these changes in locational patterns of agricultural production, it is often said that the environment in developed countries, on average, would benefit from trade liberalization policies because of the reduced intensification of agriculture. By contrast, developing countries are expected to face negative environmental impacts due to the intensification of agriculture in these countries.<sup>28</sup>

36. A recent analysis of OECD country studies suggests that most of the linkages identified between agriculture and biodiversity derive from agriculture's role as a habitat for flora and fauna. A number of country studies present evidence that species may benefit from the existence of specific agricultural production systems, and underline the importance of low or medium-intensive production systems.<sup>29</sup> However, as regards aggregated, quantitative information, it is also pointed out that the impact of agricultural trade liberalization on environmental amenities like wildlife habitats and biodiversity is site-specific, and that the development of agri-environmental indicators and underlying datasets is not sufficiently advanced to allow for appropriate impact evaluations and cross-country comparisons.<sup>30</sup> For these reasons, the following sections will focus on a conceptual analysis. They take the general analysis, given above, as a starting point and will explore in more detail the impacts of different domestic support measures and their reform on agricultural biodiversity.

37. It was indicated above that a reduction of trade-distorting domestic support would change the geographical pattern of agricultural production. More generally, one or both of the following events will reflect the expansion of agricultural output:

- A change in land use patterns, that is, an expansion land used for agricultural purposes;
- An intensification of agricultural production on given acreage, through changes in cropping or livestock regimes, pest management practices and mechanization.

These effects, in turn, will have specific impacts on biological diversity in general and agricultural biodiversity in particular.

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<sup>26</sup> *ibid*

<sup>27</sup> In contrast to producer prices, *market* prices can be expected to increase due to a reduction of output subsidies. As market prices are expected to decrease pursuant to reductions in tariffs and other market access restrictions, the overall effect of trade liberalization on market prices is theoretically ambiguous. Empirical assessments usually predict, on average, a price increase on world agricultural markets (see UNEP/CBD/COP/6/INF/2, pages 8-9, for a discussion of this issue). However, OECD *aglink* projections indicate that production changes due to technical progress and general economic development are in general much more pronounced than those brought about by an extension of the URAA commitments on agricultural trade liberalization. See OECD (2000e), 35.

<sup>28</sup> Lankoski 1997, 17.

<sup>29</sup> Abler (2001), 20-22.

<sup>30</sup> OECD (2000e), 32.

## 5. THE REDUCTION OF AMBER BOX SUPPORT

### 5.1 Impact of Amber Box support reductions in implementing countries

38. As explained above, it is mainly developed countries that use trade-distorting domestic support measures. The reduction of such support is usually expected to lead to a reduction of agricultural production in countries that implement such reduction, which affects the use of production inputs in several ways.

- (a) First, because of lower producer prices, all factors of production will be used less intensively. This is the output price effect. This effect will imply, in varying shares, a contraction of agricultural land as well as a less intensive utilization of other inputs (e.g., fertilizer, pesticides, machinery) per acreage.
- (b) Second, lower producer prices will also lead to a change in the input mix chosen by individual farmers. As explained above, inputs like pesticides and fertilizer are most responsive to price changes. It can therefore be expected that their share in the input mix will decline pursuant to a decline in producer prices. This is the (indirect) input substitution effect.
- (c) Third, a reduction of input subsidies will induce a *direct* change in the chosen mix of inputs, to the disadvantage of formerly subsidized inputs (direct input substitution effect).

39. The *reduction of agricultural production on given acreage* and specifically, the decline in application of fertilizers and other agricultural chemicals<sup>31</sup> is usually said to have positive effects for agricultural biodiversity. Positive effects include, *inter alia*,

- a reduced eutrophication of water ecosystems through agricultural run-off resulting from fertilizer use, with positive impact on inland waters biodiversity;
- a positive impact on soil biodiversity through, *inter alia*, a reduced soil compression by heavy machinery;
- a reduced intoxication or killing of pollinators and other non-target wildlife species through pesticide use;
- the use of more crop varieties as a means to reduce risk of pests.

40. There is, however, a countervailing impact, because of the output substitution effect and subsequent changes in agricultural land use. A reduction in subsidies, while leading to an reduction of crop production and to reduced livestock numbers on given areas of agricultural land, may also induce a shift of the area to the production of fruit and vegetables, which are sometime produced in input-intensive ways, as well as to other input-intensive crops.<sup>32</sup> The extent of this effects clearly depends both on the design of domestic support policies as well as on the design of the policy reform package. Differences in the level of subsidization among crops or differences in the reduction of crop-specific subsidies will exacerbate this output substitution effect.

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<sup>31</sup> See UNEP/CBD/COP/6/INF/2, paragraphs 72-80, and included references, for a more extensive analysis of the effects of the use of agro-chemicals.

<sup>32</sup> OECD (2001a), p. 19.

41. Empirical studies confirm both the prediction that the elimination of subsidies relating to agricultural production and input use would lead to a decrease in the use of agricultural chemicals, as well as the positive effects on the environment and agricultural biodiversity.<sup>33</sup>

42. The *contraction of agricultural land*, by converting or idling specific areas, is often said to have positive biodiversity impacts, especially when agricultural production on these areas was highly technified and specialized, and when effective environmental and conservation policies are in place to restore the initial, non-agricultural habitats (e.g., wetlands). A crucial precondition of a successful long-term restoration is that the conversion has to be irreversible, which may warrant the use of specific legal or economic tools within such conservation policies. However, a complete restoration may prove impossible within a reasonable timeframe.<sup>34</sup> Moreover, while such land conversion may have positive impacts on biodiversity, it might not necessarily contribute to improving *agricultural* biodiversity.

43. The biodiversity effects of land contraction are more ambiguous when the affected areas are located in extensive farming regions. In many such areas, specific traditional farming practices have played an important role in creating site-specific biodiversity, soil properties and landscape amenities.<sup>35</sup> They often include semi-natural areas and features such as hedges, walls, trees and buffer zones, which were created as an integral part of the management of agricultural production. Hence, in such regions, a rich agricultural biodiversity may actually depend on the continued application of these traditional farming techniques. Furthermore, such agricultural activities have also been associated with land conservation and related ecosystem services, like the avoidance of landslides and flooding.

44. However, such extensive farming systems may often be located on marginal lands, which would be taken out of production first when producer prices decrease. In such cases, negative effects on agricultural biodiversity would result, with subsequent losses of related ecosystem services.<sup>36</sup> The policy challenge appears to be to keep such marginal lands under production and to preserve traditional farming techniques while taking out of production those *infra-marginal* lands whose conversion into natural habitats might yield important positive impacts on biodiversity. Under this viewpoint, a reduction in Amber Box support alone might appear to not be specific enough to meet this challenge.<sup>37</sup>

## 5.2 Impact of Amber Box support reductions in other countries

45. As explained above, the reduction of output-oriented subsidies, mostly used by developed countries, would increase market prices of relevant products, thus generating further production incentives for farmers in those countries that do not apply such support measures (mainly, but not exclusively

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<sup>33</sup> See OECD (2000e). In the case of New Zealand, which virtually eliminated Amber Box support after 1984, substantial environmental improvements were observed through decreases in the use of agricultural chemicals and in livestock as well as through the idling of marginal land. In recent years, fertilizer and pesticide use increased again as farm incomes started to rise. See OECD (1996), Meiser (2001).

<sup>34</sup> See UNEP/CBD/COP/6/INF/2, paragraphs 61-64, for a discussion.

<sup>35</sup> Preliminary projections in OECD (2000e) do not suggest substantial changes in agricultural land pursuant to further agricultural trade liberalization. However, the analysis does not allow to draw firm conclusion with regard to biodiversity, because the projections did not consider environmentally sensitive areas like pastures and marginal agricultural land.

<sup>36</sup> OECD (2000e), 28-29.

<sup>37</sup> This, however, is not a strong argument in favor of Amber-Box support. If it is mainly poor farmers on small farms that hold marginal land, such support will not be very effective in preserving their production. A recent OECD study shows that most of production-based support goes to the larger farms, which are often the richer farms; and that only 25% of market-price support ends up as a net income gain for the farmers. See OECD (2003).

developing countries). These production incentives, in turn, would translate into an incentive to use all production factors more intensively (output price effect) as well as in a change in the input mix in favour of those inputs which are most responsive to changes in output prices (input substitution effect).

46. Furthermore, higher market prices may also induce a shift from food to export crops, with uncertain effects on agricultural biodiversity (output substitution effect). If such export crops are typically cultivated in a less environmentally friendly way, negative effects for biodiversity may be expected without further policy intervention. For instance, the increased production of commercial crops cultivated in monoculture could accelerate soil nutrient depletion and erosion.<sup>38</sup>

47. While most developing countries do not apply measures to support output prices, some of them use subsidies that qualify as trade distorting, most notably input subsidies like fertilizer and pesticide subsidies. The reduction of such input subsidies would appear to have a dampening effect on the domestic agricultural production of those countries. However, as the volume of these subsidies is comparatively minor, their reduction may often rather not offset the overall expansive effect on production stemming from the trade liberalization measures of developed countries.<sup>39</sup> Furthermore, it is also pointed out that especially for poor farmers, the reduction of the real income stemming from the subsidy removal may be felt so strong that they might actually wish to expand production.<sup>40</sup>

48. Due to this agricultural expansion, developing countries are often expected to face negative impacts on the environment in general and on biodiversity in particular.<sup>41</sup> Such voices point both to the agricultural intensification on given areas and to the expansion of agricultural land into natural ecosystems, leading to habitat degradation and fragmentation especially in frontier areas like forests, savannahs, wetlands, mountains and arid areas.<sup>42</sup>

49. However, it is also said that these negative impacts would partially or totally offset by the income effect that results from improved production incentives in developing countries. The higher revenue for agricultural products would facilitate the introduction of production techniques that are more environmentally friendly, and would also increase the long-term return of conservation investments.<sup>43</sup> It would also create political leeway to reduce input subsidies while preserving the goal of rural development.

50. Moreover, agricultural intensification is especially harmful when being based on over-mechanization and an inappropriate reliance on monoculture, leading, *inter alia*, to the disappearance of local landraces, and when being accompanied by excessive dependence on agro-chemicals and external energy and water inputs. However, especially when starting from low productivity levels, a moderate use

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<sup>38</sup> WTO (1997), 15.

<sup>39</sup> In many developing countries, input subsidies serve as a partial compensation for policies that usually tax agricultural production (Lankoski 1997, 8). The reform of such policies may then lead to overall enhanced incentives for production even while input subsidies are reduced or abolished.

<sup>40</sup> Perrings (2001). Removing an input subsidy has two effects. It gives rise to a change in relative prices, which would lead farmers, under a given real budget, to replace, to some extent, the now more expensive input for the relatively cheaper ones. This is the substitution effect. However, removing the subsidy would also reduce the farmers' real income and, hence, their budget. This income effect may reinforce or offset the substitution effect. In the latter case, incentives will be generated *ceteris paribus* to expand production and, hence, the use of all inputs.

<sup>41</sup> Lankoski (1997), 17.

<sup>42</sup> See UNEP/CBD/COP/6/INF/2, paragraphs 52-60.

<sup>43</sup> Lankoski (1997), 17; Munasinghe and Cruz (1995). Note that secure property rights are necessary to ensure that farmers have an incentive to make long term investments in sustainable land use.

of mechanical and agro-chemical input may yield important productivity gains with only relatively minor negative impacts on biodiversity.<sup>44</sup> Such medium-level intensification would also reduce pressure on natural habitats for conversion into arable land. Furthermore, agro-ecological forms of intensification (intercropping, use of diverse species, integrated pest management) and beneficial mixes of land use can also raise resource efficiency while keeping existing biodiversity intact and even raising its overall level in agricultural landscapes.<sup>45</sup> The removal of input subsidies would further accommodate such environmental-friendly intensification of agriculture.

### 5.3 Impact of Amber Box support reductions – preliminary conclusion

51. It appears that the effects of removing amber box support policies for agricultural biodiversity would be mostly positive, and that possibly arising negative effects could be mitigated by well-designed and targeted agri-environmental policies. It can therefore be concluded that amber box support measures often fall under the category of *perverse incentives* for biodiversity conservation and sustainable use. As per established terminology, perverse incentives induce unsustainable behaviour that reduces biodiversity, often as unanticipated side effects of policies designed to attain other objectives. In the case of agricultural support, such other objectives are, for instance, to increase national food security or to provide income support in the farming sector to poor farmers.<sup>46</sup>

52. The abandonment of perverse incentives or the mitigation of their negative impacts through appropriate means is needed to ensure the conservation of biodiversity and the sustainable use of its components. In the case of agriculture, however, the environmental effects of specific choices of agricultural inputs and production technologies are often external to the economic calculus of the individual farmer. Therefore, unfettered market forces cannot be expected to automatically give rise to biodiversity-friendly agricultural production systems. Additional policy measures may be warranted.

## 6. THE INCREASE OF GREEN BOX SUPPORT

### 6.1 The concept of decoupling

53. Under the Green Box of the URAA, support measures that meet a number of criteria are supposed to be “decoupled” from output quantities and prices, and are therefore considered to have no, or at most, minimally trade distorting effects or effects on production. As minimum requirements, the amount of direct payments shall not relate to or be based on type or volume of production, domestic or international prices, or factors of production. Furthermore, no production shall be required in order to receive such payments (see URAA, Annex 2, paragraph 5).<sup>47</sup> The concept of decoupling and its limitations has become a major issue in the international discussion on agricultural and trade policies.

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<sup>44</sup> OECD (2000e), 21.

<sup>45</sup> See Decision III/11, on conservation and sustainable use of agricultural biological diversity, Annex 1, Section A.

<sup>46</sup> Recall, however, that Amber Box support seems to be rather inefficient in meeting this goal. See OECD (2003) and footnote 37 for further discussion.

<sup>47</sup> In the URAA, the term decoupled is applied to only one specific policy category, namely “*decoupled income support*”. However, decoupling is clearly embodied in the idea of having “*no, or at most minimal, trade-distorting effects or effects on production.*” See OECD (2000b), 6.

54. More or less restrictive definitions of decoupling are used in the literature. OECD work relies on a distinction initially suggested by Cahill:<sup>48</sup>

- A policy is *fully decoupled* if production decisions of farmers are not influenced by that policy, thus not interfering with the free market determination of prices and quantities. Neither the equilibrium values nor the adjustment process are influenced by the policy.
- A policy is *effectively fully decoupled* if it results in production and trade that does not exceed the level that would exist in the absence of the policy. This concept is exclusively centered on the equilibrium values. Readjustment after an external shock would lead to different equilibrium values than would result under a fully decoupled policy.<sup>49</sup> Specifically, introduction of the policy may also lead to a lower level of production. Empirical studies usually use this less restrictive concept.<sup>50</sup>

55. It is noteworthy that a set of tightly coupled policy measures could have a zero effect on production and trade even if individual policy measures have a significant impact. Hence, it is the policy package that matters. Any assertion on coupling or decoupling requires a detailed analysis of all elements included. Abstract statements on general types of measures needs to be interpreted with care. For instance, in the case of a coupled payment, its production effect may be offset by a quantity restriction. Furthermore, programmes covering a wide variety of agricultural commodities tend to have smaller effects. For instance, area payments that are equal across different land uses would have no production effect if total land supply is fixed and land is perfectly substitutable between commodities.<sup>51</sup>

56. It is important to underline that the conceptualizations of decoupling given above focus on policies that have “*no, or at most minimal, trade-distorting effects or effects on production*” (emphasis added). They therefore do not focus on the consumption side and, more generally, do *not* address possible impacts on welfare efficiency.<sup>52</sup> It is therefore conceivable that a fully decoupled policy fails to realize efficiency gains or, conversely, that a policy that achieves efficiency gains is not fully decoupled or effectively fully decoupled from production in the sense above.<sup>53</sup>

## 6.2 Limitations of decoupling

57. It would appear that measures or policy packages that fulfill the requirements of Annex 2 of the URAA at least meet the less restrictive definition of an effectively fully decoupled policy.<sup>54</sup> For instance, direct income support, whose level is not based on input (including land), production quantities or prices, would appear to fulfill the requirement to have “*no, or at most minimal, trade-distorting effects or effects on production*”. Such payments would therefore appear to not increase the use of production inputs and, consequently, would qualify as generally being neutral with regard to the level of agricultural biodiversity. Moreover, payments whose levels are based on biodiversity-related performance indicators

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<sup>48</sup> Cahill (1997), OECD (2000b), 12.

<sup>49</sup> See OECD (2000b), 9.

<sup>50</sup> OECD (2000b), 11.

<sup>51</sup> OECD (2000b), 8-9.

<sup>52</sup> OECD (2000b), 7, 12.

<sup>53</sup> See IATRC (2001), 19, for a discussion. See also OECD 2000a, 10; and OECD (2000b), 7-8, for related discussions of the concept of “*trade distortion*”.

<sup>54</sup> OECD (2000b).

may also have positive effects for agricultural biodiversity. This latter aspect will be further discussed below, when addressing agri-environmental programmes.

58. However, it is recognized now that even lump-sum payments (in the sense given in the previous paragraph) are not entirely decoupled once real-world phenomena like market imperfections, risk and political dynamics are taken into consideration.<sup>55</sup>

- (a) When farmers face debt or labor constraints due to imperfections on capital and labor markets, even lumps sum payments with no requirements to farm have an impact on their production decisions and may also affect their decision whether to stay in the agricultural sector or (the so-called entry/exit decision). For instance, under imperfect capital markets, any kind of income support would be partially reinvested in agriculture, generating additional production in the years to come.<sup>56</sup>
- (b) When farmers are risk-averse, both a wealth and an insurance effect would arise pursuant to government payments.<sup>57</sup> First, the payments affect the wealth of farmers. However, if wealthier farmers are ready to assume more risks (assuming decreasing absolute risk aversion) and, hence produce more, the payments affect the farmers' production decisions. Second, government policies that aim to reduce the risks faced by farmers through insurance schemes (e.g., price stabilization programmes) would also lead to an increased production.
- (c) Expectations about future policies may also affect present production decisions, even under formally decoupled policies. Farmers may perceive that the probability of receiving future payments depends on present production, and may therefore decide to strategically hold current production levels or even opt for production increases, even while economic circumstances would dictate otherwise.<sup>58</sup>

59. The OECD points out that all these effects are cumulative and can occur simultaneously in response to specific policy measures, and concludes that “*it seems difficult to design a policy measure not having some production or trade effects*” under the broader analytical framework presented here.<sup>59</sup> It is an empirical question whether such effects go beyond the requirement of the URAA of being “*at most minimal trade-distorting.*” Existing empirical contributions estimate modest production effects through the risk mechanism.<sup>60</sup> However, it is also often stressed that policy measures that each have only a small impact may add up to a large aggregate trade-distortion if there is, for specific agricultural commodities, a large number of such policies. Again, it would be the whole policy package that matters.

### 6.3 The impacts of direct payments on biodiversity

60. Hence, even support measures that qualify as being decoupled under the Green Box appear to increase, to more or less extent, the use of production inputs. The magnitude of such increase would have to be assessed empirically. *Conceptually*, the different impact channels of Green Box support measures

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<sup>55</sup> See OECD (2000b) for a more extensive discussion.

<sup>56</sup> Rude (1999). In the case of labour constraints, the OECD finds, however, that the effect of lump sum payments on production would be negative under standard assumptions. See OECD (2000b), 17, 20-21, for further discussion.

<sup>57</sup> Hennessy (1998).

<sup>58</sup> OECD (2001), 21-22.

<sup>59</sup> OECD (2000b), 23.

<sup>60</sup> See OECD (2000b), 19, for further discussion.

on agricultural biodiversity could then be analyzed analogously to those arising under Amber Box support measures (see Section 4.2). However, compared with Amber Box policies that *directly* target market prices and/or quantities, the production effects analyzed here are more indirect. It could therefore be argued that the impact on production of a given level of (formally decoupled) income support would be quantitatively less important than the impact of an similar level of an amber box support payment. In consequence, the negative impact on biodiversity would also be more restrained.

## 7. PAYMENTS UNDER ENVIRONMENTAL PROGRAMMES

### 7.1 General considerations

61. Payments under environmental programmes are a specific part of the Green Box exemptions of the URAA. According to paragraph 12 of Annex 2 of the URAA, payments under environmental programmes are considered to have no, or at most, minimally trade distorting effects or effects on production, and are therefore exempt from reduction commitments, provided that

- the eligibility for such payments shall be determined as part of a clearly defined government environmental or conservation programme and be dependent on the fulfillment of specific conditions under the government programme, including conditions related to production methods or inputs; and that
- the amount of payment shall be limited to the extra costs or loss of income involved in complying with the government programme.

62. It is often argued that biodiversity conservation and the services or amenities provided by agricultural ecosystems (e.g., flood and erosion control) represent positive external effects of agricultural production provided to the public at large. In most cases, it is neither possible to exclude individuals from the consumption of the service, nor would it be appropriate to do so, because they do not rival in the consumption of the service. In consequence, such services or amenities often bear characteristics of public goods. In the absence of additional policy interventions, farmers are not remunerated appropriately for their provision, and these services are typically underprovided. Payments under agri-environmental programmes would ensure appropriate remuneration and would therefore contribute to internalize the positive externalities into farmers' decision-making.<sup>61</sup>

63. Two aspects underlying this approach are worth highlighting.

- First, to identify these eco-system services as positive externalities that merit remuneration presupposes a specific design and distribution of property and land rights. Specifically, such an approach assumes that farmers would have legal latitude to switch to the cultivation of crops or to production methods that would no longer provide the amenities or eco-system services, or only to a far lesser extent. In many countries, farmers indeed hold strong land rights that legally empower them to take such a decision. Payments for the amenity or eco-system service would then prevent them from doing so.
- Second, external effects are a well-defined concept in micro-economic theory and refer to unremunerated by-products of consumption or production decisions that provide utility to other individuals (or, in the case of negative externalities, to the provision of “bads” which provide

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<sup>61</sup> See, e.g., OECD (2001a), 30-32, 37.

“disutility”). Hence, not every side-effect qualifies as an external effect; specifically, effects stemming from changes in relative prices or changes in the income distribution would not qualify as economically relevant external effects.

64. Under a system of strong land rights, the eco-system services provided by agricultural practices would indeed qualify as positive externalities; therefore, payments to farmers under agri-environmental programmes, in principle, have economic rationale to internalize such externalities.<sup>62</sup> Trade patterns can be expected to change pursuant to such internalization. The problem for policy-makers is to find an *optimal level* of such payments, that is, a level that minimizes overall costs to society, including possible environment costs, but also the cost of trade distortions and subsequent specialization losses. Because of the negative trade impacts for the trade partners of the implementing country, this optimal level can be generally expected to be smaller in an open economy than in a closed economy reference scenario. Hence, the asymmetry between domestic benefits in terms of environmental quality and international costs in the form of reduced production efficiency may lead national governments that primarily aim for domestic welfare maximization to “over pursue” agri-environmental policies.<sup>63</sup>

65. Conceptionally, this section distinguishes three different types of agri-environmental programmes<sup>64</sup>

- Programmes that focus on the *retirement* of land from agricultural uses for conservation purposes (payments pertaining to conservation easements or long-term land set-aside schemes);
- Programmes that focus on *improving* the environmental performance and production practices on current agricultural land through incentive payments (e.g., payments for input reductions, land conversion from arable land to extensive grassland, reducing livestock density, conversion to organic farming);
- Programmes that focus on *maintaining* specific performances or agricultural practices (payments for “good performance” or “good practices”, e.g., payments use of conservation tillage or low rainfall erosion production systems, payments for the maintenance of traditional farming practices that are recognized to contribute to biodiversity and specific eco-system services, payments for the use of endangered local breeds).

66. Payments under agri-environment programmes are mainly used by developed countries. As explained in Section 3, there has been an important increase in agri-environmental expenditure during the 1990s for a large number of OECD countries. Notwithstanding this dominance of developed countries, it is noteworthy that some types of agri-environmental payments can also be used to address biodiversity-related problems of a number of developing countries.<sup>65</sup> Examples include

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<sup>62</sup> Note that a long history of support measures and related income levels may lead farmers to perceive such subsidies as *de-facto* entitlements, whose removal allegedly merit compensation. It is important to distinguish such claims from payments to incite farmers to not use agricultural land in a specific way, even while they have the legal right to do so.

<sup>63</sup> See OECD (2000a), 12, and, for a related discussion, Latacz-Lohmann (2000).

<sup>64</sup> See Claasen et al. (2001), 10, 32-33, for a discussion.

<sup>65</sup> See Ferraro and Kiss (2002) for a more extensive discussion and examples.

- Payments for wildlife and wildlife habitat conservation (compensation of crop losses due to foraging wildlife, conservation concessions, conservation leases for wildlife migration corridors, performance payments for endangered species);
- Payments for the use of endangered local landraces. A number of developing countries host a large number of local varieties of domesticated crops and therefore hold a large part of the global pool of agricultural biodiversity at the genetic level. As farmers in these countries increasingly choose to rely on high-yield modern crop varieties, such local landraces are often endangered, thus giving rise to genetic erosion.<sup>66</sup>

Importantly, the global benefits of successful conservation policies would be substantial under these examples. Put otherwise, agri-environmental programmes implemented by developing countries often generate substantial positive external effects on the international level.<sup>67</sup> They provide therefore important entry points for international cooperation and finance.

<sup>67.</sup> Agri-environmental programmes entail a wide range of environmental objectives and an equally wide range of possible designs.<sup>68</sup> The performance of an agri-environmental policy instrument, that is, the extent of the gains for biodiversity, the cost to achieve those gains, and the distribution of such costs, largely depends of the programme design and implementation as well as on the peculiarities of the agricultural regions targeted by the programme. It is often difficult to exactly assess the performance of agri-environmental programmes for the conservation and improvement of biological diversity. Such difficulties are mainly caused by methodological problems related to deficiencies of agri-environmental indicators.<sup>69</sup>

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<sup>66</sup> See Perrings (2001) for a discussion. Note that this problem is related to, but different from the issue of transgenic crops. With regard to this issue, see, e.g., the recent research project of the NAFTA Commission for Environmental Cooperation (CEC) on the effects of transgenic Maize in Mexico. See Carpentier and Herrmann (2002).

<sup>67</sup> Under the first example, benefits include the existence value attributed, by the population in developed countries, to many species in developing countries. Under the second example, benefits include the contribution of genetic information incorporated in traditional landraces to the breeding of modern crop varieties.

<sup>68</sup> Claasen et al. (2001), 1. In the case of agri-environmental programmes under the common agri-cultural policy of the European Union, the variety of agri-environment programmes is further increased by the fact that such programmes are administered on the national or even sub-national level. Hence, while it is known that approximately 20 % of the EU's farmland is under some form of agri-environment agreement (contracts with farmers), the share of agreements on biodiversity has not been calculated (van Dijk 2000, 11). In France, biodiversity-related specifications figure prominently among the agri-environmental specifications in land managements contracts with farmers. These include extensive grassland management by mowing (figuring in 63 % of all contracts), hedgerow maintenance (30 %), establishment of intermediate crops (20 %), hedgerow planting (11 %), extensive grassland management by compulsory grazing (11 %), establishment of grassy areas through set-asides (10 %) and ditch rehabilitation (10 %). See Rougier (2002), 18. In the US, a number of agri-environmental programmes also relate to biodiversity (e.g., the wetland reserve programme, the wildlife habitat incentive programme); see Vasavada and Warmerdam (1998); Claasen et al (2001).

<sup>69</sup> Such methodological problems include: ill-defined biological goals, lack of scientific reference material on the relationship between biological processes and farming practices, the complexity of ecological workings and their resistance to change, the only partial influence of agriculture on these workings, and the difficulty of correlating agricultural and biological data on different scales. See Rougier (2002), 8, 15. In a recent overview, the NAFTA Commission for Environment Cooperation (CEC) concludes that "progress in honing non-pollution indicators capable of showing changes in biodiversity, forest cover, habitats and ecosystems remains less developed and certainly less quantitative than pollution-related indicators" (CEC 2002).

68. However, empirical studies note highly positive results for biodiversity of some environmental programmes.<sup>70</sup> In general, it is important to note that to improve the environmental performance of agriculture is the very purpose of agri-environment programmes. Notwithstanding existing design and measurement problems, payment programmes, in principle, can directly target the conservation and/or improvement of agricultural biological diversity.<sup>71</sup> Compared with other types of domestic support measures, the ability for such targeting would give payments under such agri-environmental programmes an immediate relative advantage.

69. The biodiversity-related benefits of *land retirement programmes* clearly increase with the length of time land is removed from crop production. For example, many wetland services and other wildlife habitat functions arise only when the ecosystem is fully established, a process that may take years if not decades. Some of the previous biodiversity losses may even be irreversible. It is therefore under discussion whether the period envisaged for long-term land set-asides under the European Common Agricultural Policy (20 years) is sufficient to generate substantial environmental benefits. Furthermore, it will often not be sufficient to just idle the land. Nature management will be needed to restore the areas in a targeted and effective way. Moreover, a careful selection of eligible areas in target regions will often be necessary to avoid the designation of tiny, fragmented land set-asides scattered among highly intensified agricultural lands.

70. This remainder of this section mainly focuses on the possible *indirect* effects of agri-environmental programmes. Several issues are of special interest: the question to what extent the limitations of decoupling discussed above also apply to agri-environmental programmes, the role of production-related conditions attached to agri-environmental programmes and, more generally, the discussion on how to trade-proof agri-environment programmes, in order to minimize the expansive production effects of limited decoupling.

## 7.2 Limitations of decoupling under agri-environmental programmes

71. As agri-environmental programmes are part of the formally decoupled policies under the Green Box, they would appear to face the same criticism with regard to the limitations of decoupling. They may be not entirely decoupled and therefore have some positive effects on production once real-world phenomena like market imperfections, risk and political dynamics are taken into consideration. These positive production effects, in turn, may have negative effects on agricultural biodiversity, along the lines of paragraphs 57 to 59.

72. However, it has to be borne in mind that the URAA provides that payments under agri-environmental programmes “*shall be limited to the extra costs or loss of income involved in complying with the government programme.*” Hence, such payments shall not give effect to a *net* increase of farmers’ incomes. For instance, if a farmer is receiving payments for planting environmentally beneficial hedges on his land, such payments shall be limited to compensating the related income losses due to lower harvests, and the actual cost of planting the hedges. In consequence, indirect effects from increased income on production (and, hence, on biodiversity) along the lines given above should rather be

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<sup>70</sup> The European Commission’s Evaluation of Agri-Environmental Programmes records highly positive results for reduced input measures, especially organic farming, nature protection measures and maintenance of landscapes, but some difficulties with extensification, set-aside for 20 years, and public access, resulting in low take up (EC 1998).

<sup>71</sup> A Pan-European Conference on Agriculture and biodiversity, recently convened by the Council of Europe, UNEP, and the French government, recommends that agri-environmental programmes be applied for dispersed biodiversity and landscape values. See Council of Europe (2002).

minor or absent under this provision.<sup>72</sup> Importantly, such indirect effects will be less important if existing Amber Box support policies are simultaneously reduced, because such policies will inflate the income losses that farmers incur pursuant to compliance with an agri-environmental programme.

73. In reality, it will often be necessary to give some additional, genuine incentive payment in order to encourage farmers to participate in a voluntary programme. Insofar as such payments lead to a net increase of farmers' incomes, agri-environmental payments may not be entirely decoupled. Subsequent costs would have to be taken into consideration, along the lines of the discussion in paragraph 64.

74. Some agri-environmental programmes may influence relative input prices and may therefore give rise to subsequent input substitution. As said above, some agri-environmental policies aim to induce changes in the use of agricultural land in target areas or even focus on taking land out of agricultural production. For such a programme being successful, the opportunity costs of keeping land in "conventional" agricultural production would have to rise in order to incite farmers to change their production methods on (part of) their land according to the agri-environmental programme. In the case of conservation easements or land set-aside schemes, the opportunity cost of agricultural land in general would have to rise in order to incite farmers to re-allocate part of their land to conservation purposes. However, raising the opportunity costs of "conventional" agricultural land use also implies that the cost of other inputs would relatively decline. In consequence, the remaining agricultural land, not covered by the agri-environment programme, could be expected to be used more intensively. If such intensification were based on the increased use of agrochemicals and heavy machinery, negative impacts on agricultural biodiversity would have to be expected. If land supply is elastic, farmers may also choose to take additional land under production.<sup>73</sup> If some agricultural land remains to be not covered by agri-environmental programmes, additional regulatory requirements on agricultural practices and production methods would have to be introduced in order to minimize such indirect negative impacts on remaining lands.

75. It might, however, again be argued that such expansive production effects are more indirect and would therefore rather not offset the direct positive effects of such programmes, especially as they are able to address the conservation and sustainable use of agricultural biodiversity in a more targeted way than other measures.

76. The requirement that payments under agri-environmental programmes "*shall be limited to the extra costs or loss of income involved in complying with the government programme*" is sometimes said to favor intensive farmers who are ready to give up some environmentally harmful practices in exchange for a compensatory payment. Under this provision, governments appear to have more limited leeway to reward farmers for agricultural practices which are already environmentally friendly *prior* to the introduction of any governmental programme. Clearly, such farmers may have the intention to intensify their production in the future in an environmentally harmful way. In such a case, the "*extra costs or loss of income involved in complying*" could also refer to the intensification benefits forgone if current environmentally friendly practices are maintained. The difficulty, however, is to identify the case in which farmers indeed plan to intensify, that is, to distinguish them from the cases in which farmers merely threaten to do so in order to receive payments.

77. This difficulty is part of the more general problem to define the appropriate benchmark against which to gauge the eligibility for subsidy payments. In the scenario discussed in paragraph 76, the problem

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<sup>72</sup> Rude (2000), 18.

<sup>73</sup> Claasen et al (2001), 33.

is to define a benchmark income level, based on which “*extra costs or loss of income*” could be calculated. Depending on the procedure on how to determine this benchmark income level, distorted production outcomes may result from strategic behavior of farmers. Assume for instance that current production levels would serve as a benchmark. If farmers suspect that a payment programme based on such a benchmark will be introduced in the future, they have an incentive to temporarily raise production levels beyond market needs in order to increase their eligibility for payments under the programme. In such a situation, an empirical assessment of the efficacy of the payment programme will overstate its environmental benefit unless being corrected for such distortions stemming from strategic behavior.

78. Agri-environmental performance or practice standards, serving as minimum requirements, could serve as an alternative benchmark.<sup>74</sup> Only agricultural practices that over-comply with these standards would be eligible for agri-environmental payments.<sup>75</sup> Compared with current production levels, such a benchmark would have the advantage that the individual farmer cannot easily influence it. Furthermore, they would also increase the effectiveness (measured in terms of environment performance per monetary unit spent) of payments for good practices.

79. Moreover, if such standards are mandatory, they could also contribute to minimize the negative impacts on biodiversity stemming from the price effect discussed in paragraph 74. Even on areas that are not put under agri-environmental programmes, farmers would have to comply at least with these minimum standards. However, the national system of land and property rights may limit the use of such a mandatory approach. For instance, if farmers’ property rights are strong and well protected, the regulatory leeway for the government may be restricted to major threats to human health and occupational safety of farm workers.

### 7.3 The role of production-related conditions

80. A related question is whether conditions pertaining to the use of specific production methods, or to agricultural production in general, should be part of the eligibility criteria under agri-environmental programmes. Note that the URAA allows that “*conditions related to production methods or inputs*” are part of the necessary conditions attached to the governmental programme (URAA Annex 2, paragraph 12). This seems to be an important exception to the general requirements for direct payments to producers as given in paragraph 6 of Annex 2, which state, *inter alia*, that “*the amount of such payments in any given year shall not be related to, or based on, the factors of production employed in any year after the base period*” and that “*no production shall be required in order to receive such payments.*”

81. Under current practice, agri-environmental payments are indeed often based on indicators relating to specific inputs or production methods, an important reason being the methodological difficulties in using performance indicators that directly measure the status of agricultural ecosystems and related biodiversity. Furthermore, it is also said that, for reasons of practicability, criteria need to be meaningful to farmers and should therefore not dissociate environment aims from everyday farming concerns.<sup>76</sup>

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<sup>74</sup> See Claasen et al (2001), 34-35; Latacz-Lohmann (2000), 346.

<sup>75</sup> For instance, Buckwell et al (1997) propose to move the European Unions Common Agricultural Policy towards environmental and cultural landscape payments (ECLP). Eligibility for such payments would be determined according to three tiers of environmental standards. Tier zero would cover all standards farmers must respect without payments. Tiers 1 and 2 refer to higher-level services provided on the basis of contracts with regional authorities and would be directed to high nature value farming systems (tier 1) and specific management practices in selected areas (tier 2).

<sup>76</sup> Rougier (2002), 13.

82. As was explained before, traditional farming methods practiced in extensive farming regions on marginal lands often play a crucial role in creating and maintaining site-specific biodiversity. In such regions, agricultural biodiversity as well as land conservation and related ecosystem services may actually depend on the continued application of these traditional farming techniques. It was also said that the policy challenge is to keep such marginal lands under production by preserving traditional farming techniques. Agri-environmental payments may be warranted to reward such “good practices” in carefully selected regions; such “good practices”, however, are often linked to specific production methods.

83. Model analyses show that payments based on such good practices produce substantially less environmental performance per monetary unit paid than payments for improved performance. The reason is that much of the money goes to “good actors” and very little of the programme funds actually leverage new conservation efforts.<sup>77</sup> The underlying problem, however, is again that it is very difficult if not impossible to assess what farmers would have done in the absence of the programme. If they would have increasingly given up their good practices under such a scenario (due to market pressure etc), these analyses systematically under-estimate the environment performance of payments based on good practices.

84. More generally, the idea that agriculture often generates a number of substantial benefits beyond the production of food and fiber is captured by the concept of multifunctionality. Beyond hosting biodiversity, agriculture provides countryside amenities to rural and urban populations, contributes to the economic viability of many rural areas and to food security. Furthermore, century-old traditional farming landscapes may represent an important element of national cultural heritage. Importantly, such non-commodity output of agriculture is often produced jointly with agricultural commodities, that is, there are technical interdependencies or shared production factors.<sup>78</sup> Whether and how to take such non-commodity outputs into account in agricultural and trade policies are important and contentious issues in the ongoing WTO agricultural negotiations. Under the analytical framework developed by the OECD,<sup>79</sup> three questions should be answered for any non-commodity output in order to assess the need for policy interventions:

- (i) Is there a strong degree of jointness between agricultural commodity output and the non-commodity output? If so, is the jointness *inherent* or can it be altered through farming practices, technologies or non-agricultural provision of the non-commodity output?
- (ii) Assuming that there is a strong degree of jointness, is there a market failure associated with the production of the non-commodity output, or do markets exist and function well?
- (iii) If there is a market failure, is government action required or are there non-governmental options?

85. From the viewpoint of environmental policy, specific agricultural production methods are, in principle, only *proxy criteria* for environmental performance and the related level and quality of

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<sup>77</sup> Claasen et al compare payments for reducing sediment damage to water quality and find that payments for improved performance generate substantially larger erosion reductions than payments based on good practices (conservation tillage production systems). See Claasen et al (2001), 40-41.

<sup>78</sup> OECD (2000a), 11.

<sup>79</sup> OECD (2000c).

ecosystem services. Unless there is a proven *inherent* jointness, basing policy instruments on such proxy criteria may have two shortcomings for the conservation of biodiversity:

- First, the set of criteria may be incomplete and thus give rise to unexpected reactions by farmers. While farmers do formally comply with the programme, such unexpected reactions may have adverse consequences for biodiversity (“you get what you pay for”).<sup>80</sup>
- Second, other measures that are not covered by the agri-environmental programme may have similar or even more positive impacts for biodiversity conservation.

86. Such problems could be avoided if payments would be directly based on environmental performance indicators. Note, however, that designing and monitoring a comprehensive set of such criteria may be prohibitively costly. Furthermore, current agri-environmental indicators are often characterized to be deficient with regard to agricultural biodiversity. There are, however, recent efforts at the international level<sup>81</sup> to develop indicators that could not only serve as a basis or better assess agricultural impacts on biodiversity, but may also eventually serve as a basis for more targeted payments under agri-environment programmes.

#### 7.4 Minimizing indirect production effects

87. A key concern in policy analysis is to distinguish between agri-environmental measures that are shown to address market failures by internalizing environmental externalities or ensuring the provision of public goods associated with agriculture, from policies that appear to be merely labelled to serve environmental purposes, while being used as means to support domestic farmers and protect them from international competition. In the international discussion, a number of proposals were submitted on how to design agri-environmental programmes in a way to avoid such suspicions. The application of these proposals may contribute to minimize the negative effects on agricultural biodiversity stemming from indirect production effects. Such proposals include<sup>82</sup>

- Specifying clear environmental objectives for the programmes<sup>83</sup> based, to the extent possible, on quantitative environmental performance indicators;
- Clarifying property rights in environmental resources, including baseline standards as reference levels, to establish the applicability of payments, charges, and subsidies;
- Ensure transparency in designing and implementing agri-environmental programmes to bridge the cultures of environmental and trade interests, to build trust, and to facilitate open trade-environmental negotiations and decisions;

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<sup>80</sup> Claasen et al (2001), at 27, summarize that “*targeting a specific environment problem will not necessarily address other environment problems and may make some worse*”

<sup>81</sup> See OECD (2001d) for recent developments of the OECD work on agri-biodiversity indicators. Upcoming 2003 OECD expert meetings will focus on land conservation as well as soil erosion and soil biodiversity. For FAO’s work on indicators of agricultural genetic resource, see Collette (2001).

<sup>82</sup> See Runge (1999); Ervin (1999), Rude (2000); OECD (2000a); Latacz-Lohmann (2000).

<sup>83</sup> It is pointed out by Claasen et al (2001, 27) that targeting payments to producers in need of income support is unlikely to fully address any specific agri-environment problem. Conversely, targeting multiple environment problems also means that significant funding would be directed toward farms that are not targeted for income support. Farmers’ incomes and environmental problems are distinct policy problems, which may therefore merit the use of separate policy tools.

- Matching the geographical scope of the programme with the spatial dimension of agri-environmental problems;
- Establishing scientific linkage between the environmental objective and the policy instrument, thus ensuring technical efficiency of the instrument in achieving the objective;
- Using mechanisms of competitive bidding of agri-environmental contracts to increase cost-efficiency and reduce overcompensation;
- Monitoring and evaluating programmes to document policy/programme efficacy and to further ensure the transparency of agri-environmental measures;
- Probing for less trade-distorting alternatives, based on an assessment of size and distribution of costs and benefits of agri-environmental programmes, as an integral part of the process to design and implement agri-environmental measures, bearing in mind that locally higher costs may possibly be offset by cost savings because of reduced trade distortions.

#### 7.5 Impacts of agri-environmental programmes on biodiversity

88. In conclusion, payments under carefully designed agri-environmental programmes seem to be able to effectively improve incentives for the conservation and sustainable use of agricultural biodiversity. The discussion of possible indirect negative effects, resulting from an expansion in agricultural production because of deficiencies in decouplement, shows that these tend to be minor, especially if existing Amber Box support is reduced simultaneously. The application of some proposals for trade-proofing agri-environmental programmes, summarized above, may further contribute to minimize the negative effects on agricultural biodiversity stemming from indirect production effects. Payments under carefully designed agri-environment programmes could therefore qualify as being positive incentives for the conservation and sustainable use of biodiversity.

### 8. THE INCREASE IN BLUE BOX PAYMENTS

89. Under Article 6.5 of the URAA, direct payments under production-limiting programmes are not subject to the reduction commitments if such payments are based on fixed area and yields, or such payments are made on 85 % or less of the base level of production, or livestock payments are made on a fixed number of head. Domestic support measures meeting these requirements fall under the so-called Blue Box of the URAA. As such direct payments refer to land use or stock, they are not truly decoupled from agricultural production; however, even while they are linked to factors of production, they are not linked to price and volume of output.

90. In the past, such payments were largely used by the European Union (see the table presented in paragraph 25).<sup>84</sup> They were introduced under the so-called McSharry reforms of the EU's Common Agricultural Policy (CAP) in 1992 to compensate farmers for significantly reduced market intervention prices, and were further strengthened under the Agenda 2000 reform of the CAP. For most of the main arable crops, farmers receive direct income support in the form of area payments under the Arable Area Payments Scheme (AAPS). To qualify for area payments, producers must set aside a certain proportion

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<sup>84</sup> Other countries using or having used the blue box are: Iceland, Norway, Japan, the Slovak Republic, Slovenia, and the US. Since 1996, the US has not made use of the Blue Box. However, some support under the 2002 US farm bill is sometimes suspected to possibly fall under the Blue Box.

of their arable land (small producers are exempt up to a certain production limit). Although the set aside rate was initially at 15 per cent, it has been varied from year to year following decisions by the Council of Ministers. Farmers can, under certain conditions, opt to put additional land into voluntary set aside. In some countries, farmers can, subject to specific conditions, also grow crops for industrial purposes on set aside land and still receive the annual set aside payment (industrial oilseeds and energy crops).

91. Because of the specific design of Blue Box payments, and because of the additional requirement to take measures that limit agricultural production, no direct expansive effects on production are to be expected.<sup>85</sup> However, as agricultural production is required in order to receive payments, it might also be suspected that production would decline in the absence of such support. This presupposes that the next best alternative land use is non-agricultural or fallow. If the next best alternative is agriculture based and the land changes ownership to a more efficient producer, output could actually increase.<sup>86</sup>

92. If such payments increase the net income of farmers, indirect effects on agricultural production, along the now-familiar lines of the analysis of paragraphs 58 to 59, and on agricultural biodiversity may result. However, compared with Amber Box policies that *directly* focus on market prices and/or quantities, the effects analyzed here are again more indirect, and subsequent negative impacts on biodiversity would therefore also be more restricted. Indeed, quantitative assessments undertaken with the OECD policy evaluation matrix (PEM) confirm that area payments, even when assumed to be implemented with a requirement to plant, are less trade distorting than market price support, payments based on output, or payments based on input use.<sup>87</sup>

93. With regard to the scope of such indirect effects on agricultural production, it is instructive to compare a hypothetical Blue Box payment on 85 % of the base level of production, coupled with a set aside of 15 %, with a hypothetical payment under an Green Box, agri-environmental set-aside programme of an equal amount of arable land. The permitted *amount* of the Blue Box area payment is not restricted beyond the 85 % rule. For instance, the area payments of the EU apply to all remaining arable land. In contrast, payments under the agri-environment set-aside scheme would be “*limited to the extra costs or loss of income involved in complying with the government programme.*” Hence, governments are more restricted in granting payments under agri-environmental programmes of the Green Box. Therefore, the *potential* for the expansion of agricultural production, arising from the indirect effects analyzed above, is higher under Blue Box payments than under agri-environment programmes of the Green Box.<sup>88</sup>

94. Several aspects deserve to be addressed with regard to possible *direct* effects on biodiversity of such Blue Box, production-limiting programmes. As explained above, land-set asides can have positive repercussions for biodiversity, the extent of which depends on (a) the choice of the area for the set-aside, (b) the timeframe, (c) the ease of reversibility of the set-aside, and (d) the extent of additional conservation management measures. In this regard, set-aside schemes under Blue Box payments appear to be assessed more critically than set-asides under agri-environmental programmes. Under agri-environmental programmes, set-asides have to be implemented at least for a minimum period of time<sup>89</sup>; moreover, eligibility of land for set-aside can be granted in accordance to the environmental value of the land. In contrast, set-asides that focus on production limitations under the Blue box provisions usually grant

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<sup>85</sup> Rude (2000b), 15.

<sup>86</sup> Rude (2000b), 18.

<sup>87</sup> OECD (2000d).

<sup>88</sup> Note that the production effect that is actually observed will depend on the level of payment government chose.

<sup>89</sup> For instance, under EU regulation, land has to be set aside for a minimum of 20 years in order to be eligible for payments.

more flexibility to farmers. They can be freely chosen by farmers and can be reverted to crop production within a short timeframe. Both features limit their value for biodiversity conservation.

95. The eligibility for payments under production-limiting Blue-box programmes can additionally be conditioned on compliance with agri-environment environmental standards, as is for instance the case under the “cross-compliance” approach of the EU. Under such additional requirements, payments under the Blue Box would move closer to exempt Green Box payments. It is under debate whether, and if so, under what particular provisions, they could be accepted as Green Box payments.<sup>90</sup>

## 9. SUMMARY AND CONCLUSIONS

96. Reducing trade-distorting domestic support is an important element in liberalizing agricultural trade. Corresponding disciplines are sometimes characterized to be the single most innovative element of the Uruguay Round Agreement on Agriculture. The further reduction of trade-distorting domestic support remains an important item in the ongoing WTO agricultural negotiations that were initiated in 2000 and further mandated in the Doha Ministerial Declaration.

97. Even while the overall level of domestic support decreased only moderately, important changes in the composition of related measures could be observed pursuant to the implementation of the URAA: a *reduction* in trade-distorting Amber Box support (e.g., direct price support or input subsidies), an *increase* in “decoupled” Green Box support considered to have no, or at most, minimally trade distorting effects or effects on production (direct payments to farmers), in particular an important *increase* in payments under environmental programmes (although remaining at a relatively low overall level), and an *increase* in partially decoupled Blue Box measures (payments under production-limiting programmes). This “re-instrumentation” of domestic support from Amber to Green and Blue Boxes lead to changes in the level and type of agricultural production as well as the use of agricultural inputs, and to subsequent impacts on agricultural biodiversity.

98. With regard to a *reduction of Amber Box support measures*, a number of repercussions on agricultural biodiversity were identified pursuant to subsequent changes in land use and the level of intensification.

- In countries implementing reductions in Amber Box support, the subsequent decrease of agricultural production on given acreage is expected to have positive effects on biological diversity, although some adverse impact can be expected because of output substitution effects (see paragraphs 39 to 40);
- The subsequent contraction of agricultural land in implementing countries is expected to have positive impacts on biological diversity if previous agricultural production was highly technified and specialized (see paragraph 42);
- The contraction of agricultural land in implementing countries is expected to have rather negative impacts if previous production relied on traditional, extensive farming practices on marginal land, that are important for creating and maintaining semi-natural areas with high levels of biodiversity (see paragraphs 43 to 45). Additional policy measures may be warranted to keep such marginal lands under production and to preserve traditional farming techniques

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<sup>90</sup> See e.g. Swinnen (2001), 29; Beard and Swinbank (2001).

while taking out of production those *infra-marginal* lands whose conversion into natural habitats might yield important positive impacts on biodiversity.

- The effects of the subsequent expansion of agriculture in other countries are ambiguous and depend (a) on the extent of national subsidy reform, especially with regard to input subsidies; (b) on the role and extent of income effects; and (c) on the level and type of induced intensification and land use change (see paragraphs 45 to 50). Starting from low productivity levels, moderate, agro-ecological forms of intensification may be expected to have no or only minor negative effects while reducing incentives for habitat conversion.

99. It appears that the effects of removing *Amber Box support policies* for agricultural biodiversity would be mostly positive, and that possibly arising negative effects could be mitigated by well-designed and targeted agri-environmental policies. It can therefore be concluded that Amber Box support measures often fall under the category of *perverse incentives* for biodiversity conservation and sustainable use, whose further reduction may be warranted.

100. Despite some methodological problems in designing *agri-environmental programmes* for the conservation and sustainable use of agricultural biodiversity, mainly related to the lack of reliable and practicable agri-biodiversity indicators, it seems that payments under such programmes are able to contribute to internalize the positive external effects of agricultural production on biodiversity. Such ability gives agri-environmental programmes an immediate relative advantage when being compared with other types of domestic support measures. Specifically, agri-environmental payments can be designed to address the problem of keeping marginal lands under production by preserving traditional farming techniques with high value for local agri-biodiversity. They have therefore the potential to qualify as *positive incentives* for the conservation and sustainable use of agricultural biodiversity.

101. In the discussion on agri-environmental programmes, a number of proposals were submitted on how to design them in a way to avoid suspicions that they are merely labelled to serve environmental purposes, while being used as means to support domestic farmers and protect them from international competition. Such proposals include, *inter alia*, specifying clear environmental objectives for the programmes; clarifying underlying property rights; ensure transparency in designing and implementing agri-environmental programmes; ensuring technical efficiency of the instrument in achieving the objective; and probing for less trade-distorting alternatives as an integral part of the process to design and implement agri-environmental measures. The implementation of such proposals may also contribute to restrain indirect expansive production effects and subsequent negative impacts on agricultural biodiversity.

102. Green Box measures are supposed to be decoupled from agricultural production and inputs and, hence, to be not or only minimally trade-distorting. It was shown that decouplement could never be complete if market imperfection, risk-averseness and political dynamics are taken into consideration. Some expansive effect on agricultural production is therefore to be expected both from an *increase of Green Box measures* as well as from an *increase in (partially decoupled) Blue Box measures*, whose impact on biodiversity in implementing and other countries can be addressed along the lines of the analysis of Amber Box support measures.

103. However, such effects are more indirect than under Amber Box measures. It can therefore be expected that a trade-distorting expansion of agricultural production and subsequent negative impacts on agro-biodiversity are less important under such measures. Quantitative data with regard to Blue Box measures confirm this expectation. Moreover, as such effects would smaller the more decoupled the measures under consideration, payments under agri-environmental programmes of the Green Box could be

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expected to lead to even smaller repercussions than similar payments under (partially decoupled) Blue Box measures. Furthermore, in the case of payments under agri-environmental programmes, such indirect effects will be less important if existing other support policies are simultaneously reduced, because such policies will inflate the compensation claims for the losses that farmers incur pursuant to compliance with an agri-environmental programme.

104. Both Blue box measures and payments under agri-environmental programmes preview the option of idling agricultural land. Such land-set aside schemes can have positive repercussions for biodiversity, the extent of which depends on (a) the choice of the area for the set-aside, (b) the timeframe, (c) the ease of reversibility of the set-aside, and (d) the extent of additional conservation management measures. With regard to these preconditions, set-asides that focus on production limitations under the Blue box provisions usually grant more flexibility to farmers. Notwithstanding cross-compliance efforts, their positive impact for biodiversity appears therefore to be more limited than the impact of set-asides under agri-environmental programmes.

105. It can be concluded that the process of reducing domestic support policies and re-instrumenting them towards less-trade distorting measures generates important synergies with the objectives of the Convention on Biological Diversity to conserve and sustainably use biological diversity. Specifically, a reduction of Amber Box support policies, together with the use of carefully crafted and targeted agri-environmental programmes under the Green Box, can play an important role in easing the pressure on agricultural biodiversity stemming from agricultural expansion and intensification. Further progress in the WTO agricultural trade negotiations along such lines would therefore contribute to advance the objectives of the Convention on Biological Diversity.

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