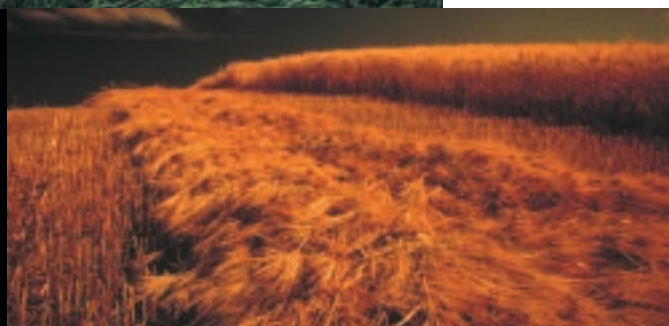




16

THE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURAL BIOLOGICAL DIVERSITY

Domestic support measures and their effects on agricultural biological diversity



CBD Technical Series No. 16

**THE IMPACT OF TRADE LIBERALIZATION ON
AGRICULTURAL BIOLOGICAL DIVERSITY**

**Domestic support measures and their effects on
agricultural biological diversity**

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Convention on Biological Diversity concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

This publication may be reproduced for educational or non-profit purpose without special permission from the copyright holders, provided acknowledgement of the source is made. The Secretariat of the Convention would appreciate receiving a copy of any publications that uses this document as a source.

© Secretariat of the Convention on Biological Diversity

Citation

Secretariat of the Convention on Biological Diversity (2005). THE IMPACT OF TRADE LIBERALIZATION ON AGRICULTURAL BIOLOGICAL DIVERSITY, Domestic support measures and their effects on agricultural biological diversity.

Montreal, SCBD, 47 p. (CBD Technical Series no. 16).

ISBN: 92-9225-014-0

Thanks to AlphaPresse and Still Pictures for the photos used on the cover of this publication

UNEP/Orjan Furubjelke - Fruit Market in Spain
Dahlquist/UNEP/Alphapresse - Agriculture, USA, Hawaii, burning sugercane

Cameron/UNEP/AlphaPresse - Wheat Field, Canada
Mitchell/UNEP/Alphapresse - Rice Fields, Indonesia

For further information or additional copies, please contact:

The Secretariat of the Convention
on Biological Diversity
World Trade Centre
413 St. Jacques Street, Suite 800
Montreal, Quebec, Canada H2Y 1N9
Tel: +1 (514) 288 2220
Fax: +1 (514) 288 6588
E-mail: secretariat@biodiv.org
Website: <http://www.biodiv.org>

FOREWORD

Agriculture has been identified both as a friend and a foe to biological diversity. On the one hand, conversion of natural habitats to agriculture, and the increased use of water, pesticides and fertilizers are significant causes of biodiversity loss. On the other hand, in some regions, many of the most valued areas for biodiversity tend to be semi-natural habitats where species have co-evolved with traditional agricultural practices over centuries. Moreover, it has to be recognized that agriculture would simply not be possible without biological diversity. It is essential for the development of crop varieties and the breeding of domesticated livestock. Biodiversity also supports agricultural production through pollinators, soil organisms and the natural enemies of crop pests.

Because of its essential importance for food production, in many countries agriculture is, among the economic sectors, one of the most heavily protected and subsidized. In OECD countries, almost one third of farmers' income on average is not actually earned in agricultural markets, but rather comes from a range of government subsidies and other support measures that restrict agricultural trade and distort markets. The recent efforts of the World Trade Organization to liberalize agricultural trade by improving market access and reducing support has raised considerable interest among Parties to the Convention on Biological Diversity because of the potential implications for biological diversity associated with agricultural activities. The Conference of the Parties to the Convention expressed this interest by requesting the Secretariat to undertake analytical work on the impact of trade liberalization on agricultural biodiversity.

This publication is the most recent product of this work. Initially distributed as an information document at the seventh meeting of the Conference of the Parties, held in Kuala Lumpur, Malaysia, in February 2004, this study provides an in-depth analysis of the potential implications for biodiversity of a reduction in and reform of agricultural support activities. It is my hope that this publication will provide useful information and help to broaden understanding of the complex relationship between trade liberalization, agricultural activities, and biological diversity.

Hamdallah Zedan

Executive Secretary

TABLE OF CONTENTS

FOREWORD		3
Chapter 1	INTRODUCTION	7
Chapter 2	AGRICULTURAL TRADE LIBERALIZATION: THE URUGUAY ROUND AGREEMENT ON AGRICULTURE	10
	A. Commitments on market access and export subsidies	10
	B. Commitments on domestic support	10
Chapter 3	DEVELOPMENTS AFTER THE URAA	14
	A. Market access	14
	B. Domestic support	14
Chapter 4	THE IMPACT OF DOMESTIC SUPPORT POLICIES ON AGRICULTURAL BIODIVERSITY: GENERAL ANALYTICAL FRAMEWORK	17
Chapter 5	THE REDUCTION OF AMBER BOX SUPPORT	19
	A. Impact of Amber Box support reductions in implementing countries	19
	B. Impact of Amber Box support reductions in other countries	21
	C. Impact of Amber Box support reductions - conclusions	23
Chapter 6	GREEN BOX SUPPORT	25
	A. The concept of decoupled measures	25
	B. Limitations	26
	C. The impacts of direct payments on biodiversity	27
Chapter 7	PAYMENTS UNDER ENVIRONMENTAL PROGRAMMES	28
	A. General considerations	28
	B. Limitations of decouplement under agri-environmental programmes	31
	C. The role of production-related conditions	34
	D. Minimizing indirect production effects	36
	E. Impacts of agri-environmental programmes on biodiversity	37
Chapter 8	BLUE BOX PAYMENTS	38
Chapter 9	SUMMARY AND CONCLUSIONS	40
REFERENCES		43

1. INTRODUCTION

1. The present study is an updated version of a note by the Executive Secretary of the Convention on Biological Diversity (CBD) that was prepared for consideration by the Conference of the Parties to the CBD at its seventh meeting, held in Kuala Lumpur, Malaysia, in February 2004.¹ This note was prepared pursuant to decision VI/5 of the Conference of the Parties, 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.”²

2. In decision VII/3, the Conference of the Parties at its seventh meeting took note of the note and requested further gathering and incorporation of data on this matter from all countries. Pertinent recent studies and other publications, in particular on country-specific data, were subsequently included to update the information contained in the document. The analytical content and the conclusions were kept unchanged.

3. An earlier note prepared by the Executive Secretary has already given a broad analysis of the different impacts trade liberalization may have on agricultural biological diversity, and drawn some general conclusions.³ It gave a brief description of the extent of trade restrictions and distortions in the agricultural sector and of the trade liberalization agenda in the WTO Agreement on Agriculture, with its disciplines on market access restrictions, on export subsidies and on trade-distorting domestic

support. This description served as a basis to extrapolate probable impacts of liberalization on changes in relative prices, and to further explore how changes in relative prices alter the allocation of resources within agricultural production. The impacts of altered allocations within agricultural production – in particular the alternations in land use and the level of production intensity – on biological diversity were then examined as a next step. This sequence allowed deducing the – largely indirect – impacts of trade liberalization on agricultural biodiversity. However, the higher occurrence of alien invasive species was also identified as an important direct trade effect on biodiversity. In addition, the profound restructuring of agricultural markets, leading to corresponding changes in product demand, production methods and transportation costs, was highlighted as an additional important impact factor for agricultural biodiversity, a factor which is independent from trade policy reform effects.

4. The present study addresses in more detail the role of one of the items of the WTO trade liberalization agenda, namely, the “*substantial reduction of trade-distorting domestic support.*” The further substantial 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 substantial improvements in market access and to reduce, with a view to phasing out, all forms of 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.⁴

1 See document UNEP/CBD/COP/7/INF/14.

2 National focal points for the Convention and the organizations enumerated above were invited, by notification 2003-026, to peer review the first draft of the note. Comments were subsequently provided by the following Parties: Argentina, Austria, Belgium, the European Community, Finland, Netherlands, New Zealand. In addition, comments were provided by the following organizations: the Food and Agriculture Organization of the United Nations (FAO), the Organisation for Economic Co-operation and Development (OECD), the United Nations Environment Programme, the World Trade Organization (WTO), as well as Earth Track and the International Center for Trade and Sustainable Development (ICTSD).

3 UNEP/CBD/COP/6/INF/2.

4 See below paragraph 26 for further discussion.

5. The earlier study had already underlined that the reduction of different support measures may have differing implications for agricultural biodiversity, but had not further elaborated this point.⁵ It is contentious in the ongoing agricultural negotiations at the WTO which types of domestic support measures are not (or only minimally) trade distorting and would therefore not fall under the reduction objective of the negotiations. It is therefore worthwhile to undertake an in-depth consideration of the impact of different types of domestic support measures, and of their removal or reform, on agricultural biodiversity.

6. To focus on domestic support measures is also useful for another reason. Even while they 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 types of support on output volumes and prices of a number of crops. As a result, trade-distorting agricultural support is frequently referred to as a major development obstacle in relevant international forums.⁶

7. 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).⁷ Domestic support measures usually rely on transfers to the farm sector, either explicitly (when coming in from of direct payments) or implicitly (when coming in form of market price support). Hence, such measures may fall, in principle, under the perverse or the positive incentive category, or they may be neutral. The present note seeks to further elucidate this incentive aspect of domestic support measures.

8. In choosing this particular topic for in-depth consideration, it is necessary to raise a number of important *caveats*:

- (a) In focusing on domestic support, the present note does not intend to present a complete picture of *all* impacts of *all* trade liberalization measures on agricultural biodiversity.
- (b) In particular, it is very difficult, if not impossible, to draw clear-cut conclusions on a global level with regard to the impact of trade liberalization on agro-biodiversity.⁸ A major reason for this *caveat* is that the analysis frequently leads to the identification of both beneficial and detrimental effects, with an overall ambiguous outcome. Data gaps and methodological problems make it very difficult to give robust *empirical* assessments of the direction of such overall outcomes. This observation will also apply to the present note. Although empirical information will also be given when appropriate, the focus of the note will be on a conceptual analysis.

5 See UNEP/CBD/COP/6/INF/2, paragraphs 47 – 48.

6 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. In WTO (2004), the WTO explains that the ongoing negotiations on agriculture "*aim to contribute to further liberalization of agricultural trade. This will benefit those countries which can compete on quality and price rather than on the size of their subsidies. That is particularly the case for many developing countries whose economies depend on an increasingly diverse range of primary and processed agricultural products, exported to an increasing variety of markets, including to other developing countries.*" Note that, in focussing on domestic support, the present note will not address export subsidies.

7 *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.

8 See section IV of document UNEP/CBD/COP/6/INF/2, and in particular paragraphs 89, 93, 99, 105 and 109.

(c) In addressing the topic of domestic support as a distinct item for the analytical purposes, the present note does *not* intend to suggest that this topic could or should be addressed as a separated, isolated item during the ongoing agricultural negotiations at the WTO. Market access restrictions, export subsidies and trade-distorting domestic support all form part of a well-coordinated package of agricultural policies in many countries and are therefore linked.⁹ Accordingly, the mandate for the agricultural negotiations puts all three elements on an equal footing.

9. The present document focuses on the farm sector, and the relationship between crop and live-stock production and biodiversity. Moreover, it adopts the definition of agricultural biodiversity as provided in the appendix of decision V/5 of the Conference of the Parties. According to this appendix, agricultural biodiversity includes crops and domesticated livestock, their wild relatives as well as wild flora and fauna ecosystems, as well as numerous interacting species such as pollinators, symbionts, pests, parasites, predators and competitors. As the distribution of these components as well as possible impacts on them are different and uneven among regions, they may need different and mutually supportive policy approaches.¹⁰

10. Chapter 2 of the present document 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. Chapter 3 summarizes the main developments after the URAA, again giving special focus to domestic support. Chapter 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”. Chapter 5 addresses trade-distorting, Amber Box policies. Chapter 6 deals with Green Box support, which is considered, in the Agreement on Agriculture, as being not or minimally trade-distorting. Chapter 7 analyses payments under agri-environmental programmes. Such payments are part of the Green Box, but are of special interest for the purpose of this study and therefore merit a prominent treatment in an own section. Chapter 8 considers the special case of payments under the Blue Box. Chapter 9 summarizes and concludes.

9 For instance, Burfisher (2003) points to an important linkage by noting that an effective market price support programme requires trade policies to restrict imports and may require export policies, because “*in the absence of such a programme, domestic price support and storage programs would become too costly.*” She concludes by noting that “*administered prices may create a strong incentive for governments to maintain effective trade barriers, and there can also be greater flexibility to lower trade barriers when administered price supports are constrained.*” See Burfisher (ed.) (2003), 16.

10 See UNEP/CBD/COP/6/INF/2, paragraphs 6 – 9.

2.

AGRICULTURAL TRADE LIBERALIZATION: THE URUGUAY ROUND AGREEMENT ON AGRICULTURE

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

A. COMMITMENTS ON MARKET ACCESS AND EXPORT SUBSIDIES

12. 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.¹¹ Furthermore, member governments commit to grant minimum access to domestic markets of 3%, later 5% of the base period domestic consumption.

13. With 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.

B. COMMITMENTS ON DOMESTIC SUPPORT

AMS Reduction commitments

14. The discipline on domestic support is sometimes characterized as being the single most innovative element of the URAA.¹² Member Governments committed themselves to a reduction in domestic support that encourages agricultural production and is therefore considered to distort potential trade flows (e.g., direct market price support, payments that are tied to output or inputs).¹³ 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 1986-1988 being the base period. 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.

15. 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

11 See WTO (2002), p. 12, for the following figures.

12 OECD (2001b), p. 3

13 For a concise summary of domestic support commitments see, e.g., IATRC (2001), p. 1-3.

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.

16. 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**

17. 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

18. 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

19. 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

20. 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.

21. 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.

22. 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).

23. 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 live-stock 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.

24. 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 fulfilment 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

25. The URAA, in its Article 13, stipulates that measures fully conforming to Green Box provisions are non-actionable under rules that apply to non-agricultural subsidies; specifically, they are exempt from the imposition of countervailing duties. Other types of domestic support as well as export subsidies can be subject to countervailing duties only under some conditions, and “due restraint” shall be shown in initiating related investigations. This so-called Peace Clause expired at the end of 2003.

Built-in negotiations

26. 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.¹⁴ These negotiations were initiated early 2000.¹⁵ 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 agreed that special and differentiated treatment shall be an integral part of all elements of the negotiations, and confirmed that non-trade concerns will be taken into account in the negotiations.¹⁶

27. Further to the breakdown of negotiations at the Ministerial Conference in Cancun, Mexico, in September 2003, WTO Members on 31 July 2004 agreed on a framework package to keep the Doha negotiating round alive. This package includes a framework for the establishment of modalities for the negotiations on agriculture.¹⁷ It addresses the three pillars of the negotiations (domestic support, export subsidies/competition, and market access), noting that the reforms in all pillars form an interconnected whole and must be approached in a balanced and equitable manner. It also foresees flexibility for least-developed countries and recently acceded members, as well as improved monitoring and surveillance.

28. The provision on the Green Box is of special interest in the present context. According to the framework, “*Green Box criteria will be reviewed and clarified with a view to ensuring that Green Box measures have no, or at most minimal, trade-distorting effects or effects on production. Such a review and clarification will need to ensure that the basic concepts, principles and effectiveness of the Green Box remain and take due account of non-trade concerns.*”¹⁸

14 URAA, Article 20.

15 An overview of the negotiating positions of WTO members as per end-2004 is given in WTO (2004).

16 Doha Ministerial Declaration, paragraph 13.

17 WT/L/579, Annex A.

18 *ibid*, paragraph 16.

3. DEVELOPMENTS AFTER THE URAA

A. MARKET ACCESS

29. 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.¹⁹ 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.*”²⁰

B. DOMESTIC SUPPORT

30. 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 or PSE) as a share of total farm receipts fell from 38% on average in 1986-88 to 32% in 2003.²¹ In absolute numbers, the Producer Support Estimate for OECD countries amounted to USD 257 billion in 2003. Furthermore, support 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.

31. 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, falling into the base period of 1986-88 for the reduction commitments.²² For selected countries, the proportions of used to permitted Total AMS levels (in percentages) in 1997 are given below.²³

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

32. 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.²⁴

¹⁹ OECD (2001b), 2.

²⁰ *ibid.*, 3.

²¹ For the numbers that follow, see OECD statistical database, at www.oecd.org, if not indicated otherwise.

²² OECD (2001b), 4.

²³ See IATRC (2001), 31; WTO (2000), document G/AG/NG/S/1.

²⁴ IATRC (2001), 32; WTO (2000) documents G/AG/NG/S/1 and G/AG/NG/S/1/Corr.1.

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

33. 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. The gap between the PSE and the AMS is increasing over time.²⁵ In 2001-2003, 68% of support measures in OECD countries as measured by the PSE were in the form of market price support or output-based payments, down from 82% in 1986-88. Payments based on area planted or livestock numbers (under the Blue Box) represent 15% of total support to farmers (up from 7% in 1986-88), and payments based on input use represents 8% of support in 2001-2003 (down from 9% in 1986-88).

34. 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 new Farm Security and Investment Act of 2002 foresees an 80% increase on spending for environmental programmes.²⁶ However, the new Farm Act is also 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 1996.²⁷

35. In Europe, 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 for fostering rural development and agri-environmental programmes, under the so-called "second pillar" of the CAP. In June 2003, European farm ministers agreed to a compromise, in accordance with the overall budgetary framework for the enlarged Union set until 2013, that foresees, *inter alia*: the introduction of a single farm payment for farmers that is independent from production (limited coupled elements may be maintained to avoid abandonment of production); the linkage of this payment to compliance with environmental, food safety, animal and health and animal welfare standards, ("cross-compliance"); a reduction in direct payments ("modulation") for bigger farms to finance the new rural development policy; and some revisions to the market policy of the CAP. Most payments under the Blue Box will also be converted to the decoupled single farm payment.

25 OECD (2001c).

26 OECD (2003c).

27 OECD (2002), 18. It is noted that, to some extent, this increase may be caused by the inclusion into the Farm Act of extraordinary emergency payments (market loss assistance), which were already provided, on an ad hoc basis, since 1998 (see OECD 2002; Mayrand et al. 2003). However, calculations undertaken by the OECD for 1999-2001 show that hypothetical support payments under the 2002 Farm Act would still be somewhat higher than actual payments given for that period under the 1996 Farm Act and the market loss assistance programme. Corresponding PSE figures are 24.9% vs. 23.4%, respectively. See OECD (2003c), 62.

36. Recent legislation in Japan and the Republic of Korea also puts stronger emphasis on direct payments instead of price support.²⁸

37. Evidence from 23 developing country case studies, collected in a recent publication of the FAO, suggests that the WTO disciplines have not proved constraining to the domestic support policies that developing countries want to implement. Most countries simply reported that their domestic support outlays conformed to the exempted categories (green box, special and differentiated treatment, or *de minimis*). Furthermore, the AMS levels have been well below the committed or permitted levels for most countries for which more detailed data were available. Budgetary restrictions as well as previous commitments under structural adjustment programmes appear to be much more important in limiting these domestic support interventions.²⁹

38. Payments to farmers under environmental programmes still account for only a small share of total transfers to producers. However, overall payments in OECD countries have increased since the mid 1980s from 1% to 3% of OECD support to producers.³⁰ 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.³¹

39. Hence, the changes that were observed in the structure of domestic support policies pursuant to the implementation of the URAA, when compared with the 1986-1988 base period, can be summarized as follows:

- A slight overall reduction of support as measured by the OECD Producer Support Estimate (PSE);
- 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 substantial increase in payments under environmental programmes, as part of the Green Box.

This list will serve to structure the following sections. They will provide a conceptual analysis of the impact on agricultural biodiversity, in terms of direction and relative magnitude, of these different types of domestic support policies. The next section will first discuss the general analytical framework and will then proceed to address these different types in more detail.

28 See IATRC (2001), 6, for a summary.

29 See FAO (2003). The following countries were included in the case studies: Bangladesh, Botswana, Brazil, Costa Rica, Cote d'Ivoire, Egypt, Fiji, Guyana, Honduras, India, Indonesia, Jamaica, Kenya, Malawi, Morocco, Pakistan, Peru, Philippines, Senegal, Sri Lanka, Thailand, Uganda, Zimbabwe.

30 OECD (2003c).

31 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.

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

40. 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 overall environmental effects of trade restrictions and distortions are also likely to be indirect and not readily identifiable in general terms.³²

41. Several impact channels can be identified that lead from changes in domestic support policies, along the lines of paragraph 39, 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:³³

- a) Output substitution impacts could, for instance, imply a production shift from those crops particularly affected by a reduction of payments to crops which are less affected by such a reform, or to crops whose production is less subsidized from the outset.
- (b) 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 payments. 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.³⁴

- (c) 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.³⁵

42. The reduction of trade-distorting domestic support, 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 usually expected to fall in implementing countries as a result of such reduction.³⁶

43. In contrast, agricultural production in other, mainly developing countries is usually expected to increase pursuant to such reductions.³⁷ 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,³⁸ which would

32 See WTO (1997), 1-2; UNEP/CBD/COP/6/INF/2.

33 See Batie (1996).

34 Anderson (1991).

35 See OECD (2000b), 13.

36 Lankoski (1997), 13, 17; see also Anderson (1991); Lutz (1992); Anderson and Strutt (1996); Ervin (1997); UNEP/CBD/COP/6/INF/2, page 9. For instance, according to Ervin (1997), production would decrease by 15 – 50% in Japan and the European Union, while other regions would increase their production by 5 – 20%. 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.

37 *ibid*

38 Empirical assessments usually predict, on average, a price increase on world agricultural markets as an overall effect of comprehensive trade liberalization. For instance, according to Burfisher (ed., 2001), complete agricultural trade liberalization would increase world prices by about 12%. The full elimination of domestic support would increase prices by 3.6% (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. See also OECD (2003e), OECD (2004b) and OECD (forthcoming) for detailed empirical analysis of some agricultural sectors.

generate further production incentives for farmers in those countries that did not use, or to a far lesser extent, trade-distorting domestic support, and that have a comparative advantage in agriculture.

44. 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 agricultural production. By contrast, developing countries are expected to face negative environmental impacts due to the increased agricultural production in these countries.³⁹ The following sections take this “conventional wisdom” as a starting point and explore in more detail the potential impacts of different domestic support measures and their reform on agricultural biodiversity.

45. 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, for instance organic farming,⁴⁰ and underline the importance of low or medium-intensive production systems.⁴¹

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.⁴² For these reasons, the following sections will focus on a conceptual analysis, although empirical information will also be given when appropriate.

46. 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 change of agricultural output:

- (d) A change in land use patterns, that is, an expansion or contraction of land used for agricultural purposes;
- (e) A change of agricultural production on given acreage, through changes in cropping or live-stock regimes, pest management practices and mechanization.

47. These effects, in turn, will have specific impacts on agricultural biodiversity, discussed below.

39 See, e.g., Lankoski 1997, 17.

40 See paragraph 91.

41 Abler (2001), 20-22.

42 OECD (2000e), 32.

5. THE REDUCTION OF AMBER BOX SUPPORT

A. IMPACT OF AMBER BOX SUPPORT REDUCTIONS IN IMPLEMENTING COUNTRIES

48. 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 payments will induce a *direct* change in the chosen mix of inputs, to the disadvantage of formerly subsidized inputs (direct input substitution effect).

49. *The reduction of agricultural production on given acreage* through, for instance, a decline in application of fertilizers and other agricultural chemicals or a decline in irrigation,⁴³ is usually said to have positive effects for agricultural biodiversity. Positive effects include, *inter alia*,⁴⁴

- (a) A reduced eutrophication of water ecosystems through agricultural run-off resulting from fertilizer use, with a positive impact on inland waters biodiversity;
- (b) Reduced waterlogging and restored ground-watertables, with positive repercussions in particular for wetlands;
- (c) A positive impact on soil biodiversity through, *inter alia*, a reduced soil compression by heavy machinery, less erosion, decreased salinity, and less biocides in the soil;
- (d) A reduced intoxication or killing of pollinators and other non-target wildlife species through pesticide use;
- (e) The use of more crop varieties as a means to reduce risk of pests.

50. There may, however, be a countervailing impact, because of the output substitution effect and subsequent changes in agricultural land use. For instance, a reduction in payments may also induce a shift of the area to the production of even more input-intensive crops, with possible negative effects for agricultural biological diversity.⁴⁵ The extent of this effect clearly depends both on the design of domestic support policies as well as on the design of the overall policy reform package. Different levels of subsidization among crops or different levels in reducing crop-specific payments will exacerbate this output substitution effect.

51. A number of empirical studies confirm the prediction that the elimination of support relating to agricultural production and input use would lead to positive effects on the environment and agricultural biodiversity.⁴⁶ In the case of New Zealand, which virtually eliminated Amber Box support after 1984, substantial environmental

43 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.

44 See OECD (2003d).

45 OECD (2001a), p. 19.

46 See for example OECD (2000e) or, with a focus on Mexico, Unisfera International Centre/Centro Mexicano de Derecho Ambiental (2003) and, with a focus on Austria, WPR (2002). See also OECD (2004).

improvements were observed through decreases in the use of agricultural chemicals and in livestock as well as through the idling of marginal land.⁴⁷

52. It is noteworthy that there is empirically an intricate interplay between the genuine effects of specific trade liberalization policies and the impacts of other independent variables such as autonomous technological development, social change and other policy interventions. To isolate the impacts of domestic support policies from the broader policy and environment context is challenging, because of, for instance, inconsistencies in the level of aggregation between environmental and trade-related data sets.⁴⁸

53. Another challenge is to disentangle the short-term from long-term effects and to assess their direction and their relative magnitude. For instance, the positive effect of dropping prices and lower intensification could be counterbalanced, in the longer term, by technological changes that induce further specialization (like mono cropping) and concentration (like concentration of livestock).⁴⁹

54. *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).⁵⁰ 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 time-frame.⁵¹

55. The biodiversity effects of land contraction are sometimes said to be more ambiguous when the affected areas are located in extensive farming regions. It is argued that in many such areas, specific traditional farming practices have played an important role in creating site-specific biodiversity, soil properties and landscape amenities.⁵² Such high nature value farmlands 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 practices. Furthermore, such agricultural activities have also been associated with land conservation and related ecosystem services, like the avoidance of landslides and flooding.

56. In Europe, for instance, typical examples of high nature value farmland are extensively grazed uplands in the United Kingdom, alpine meadows and pasture, steppic areas in eastern and southern Europe and *dehesas* and *montados* in Spain and Portugal. Particularly important for biodiversity are small-scale agricultural farming systems in central and eastern Europe, responsible for creating and maintaining species-rich semi-natural grasslands.⁵³

47 See OECD (1996), Meiser (2001).⁴⁸ See UNEP/CBD/COP/6/INF/1 or Mayrand et al (2003) for further discussion and additional references.

49 For instance, in New Zealand, fertilizer and pesticide use increased again in recent years as farm incomes started to rise. See OECD (1996), Meiser (2001).

50 George and Kirkpatrick (2003).

51 See UNEP/CBD/COP/6/INF/2, paragraphs 61-64, for a discussion.

52 See EEA/UNEP (2004) and OECD (2003d), 12, for more information. 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.

53 EEA/UNEP (2004), 4.

57. Such farming systems embodying a high level of agricultural biodiversity may often be located on marginal land, that is, land 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.⁵⁴ The question is then, whether such biodiversity loss could be prevented by adequate mitigating measures even while accepting the loss of such traditional farming systems. This issue will be further explored below, in Chapter 7, sub-section C.

58. If, however, agricultural biodiversity is closely tied to the prevalence of such traditional farming techniques on marginal land, the policy challenge, from this perspective, appears to be to keep such marginal lands under production and to preserve such traditional farming practices 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.

59. It is noteworthy, however, that this observation does not lead to a strong argument in favour of Amber-Box support in general. 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 anyway.⁵⁵ However, if it is mainly poorer farmers on small farms that use traditional farming techniques on marginal land, such support will not be very efficient in preserving their production. Rather, it may actually give larger farms an unfair competitive advantage over small farms. In conse-

quence, other, more targeted agri-environmental policy measures may be warranted.⁵⁶

B. IMPACT OF AMBER BOX SUPPORT REDUCTIONS IN OTHER COUNTRIES

60. 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 developing countries). These production incentives, in turn, would translate into an incentive to use more of all production factors (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).

61. As discussed above, it is difficult to empirically disentangle the genuine effects of specific trade liberalization policies from the impact of other independent variables such as autonomous technological development and social change, (see paragraphs 52 and 53). Furthermore, the scope of further production incentives will differ among regions and among countries with different socio-economic status.

62. For instance, many low-income developing countries already receive preferential treatment through multilateral agreements such as, for instance, the Lomé and Cotonou Agreements.⁵⁷ However, the competitive advantages of such treatment would be lost under *general* trade liberalization. In general, it is said that countries with more diversified market structures and trad-

54 OECD (2000e), 28-29.

55 See OECD (2003a).

56 Such measures may possibly include payments under agri-environmental programmes. See section 7 for further discussion.

57 See Shapouri, S. and M. Trueblood (2001), 95.

ing partners are likely to adapt quickly to incentive signals, while countries with weak market infrastructures that rely on few export commodities will show only limited trade gains.⁵⁸

63. Bearing in mind these *caveats*, these other countries, due to agricultural expansion, are often expected to face negative impacts on the environment in general and on biodiversity in particular.⁵⁹ Such voices point both to the agricultural intensification on given areas (see paragraph 49 for a list of possible effects) 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. A further adverse effect may occur through the creation of new pathways for the introduction of exotic species that may become invasive.

64. For instance, recent case studies commissioned by UNEP confirmed that trade liberalization may sometimes lead to strong agricultural intensification and to the expansion of agricultural land for specific crops or sectors. An integrated assessment of the export crop sector in Nigeria suggested a sharp increase of importation of fertilizer and fungicides further to trade liberalization policies,⁶⁰ while trade liberalization policies in Ecuador led to an increase in banana production and exported volume that was primarily due to an increase in planted area.⁶¹ In contrast, in the case of the Cotton Sector in China, trade liberalization further to the accession of China to the WTO is expected to lead to a decline in domestic cotton production and a subsequent reduction in the use of fertilizers and pesticides.⁶²

65. On a conceptual level, higher market prices may sometimes induce a shift from food to export crops, with uncertain effects on agricultural biodiversity (output substitution effect). In this regard, it is often argued that the most likely groups to benefit from the reduction of trade barriers in foreign markets and the expansion of exports are large-scale commercial producers. Small farmers especially in developing countries may not be able to participate in growing export markets and may experience higher competition in accessing resources, marginalizing their position even further.⁶³ Negative effects on agricultural biodiversity are often expected further to such developments, for two reasons:

- (a) First, if large-scale commercial production methods reveal to be less environmentally friendly, negative effects for biodiversity would result without further policy intervention. For instance, the increased production of commercial crops cultivated in monoculture could accelerate soil nutrient depletion and erosion;⁶⁴
- (b) Second, the further marginalization of poor farmers may induce them to overuse agricultural resources, which may put further stress on biological diversity.

66. FAO points out that whether the position of the poor worsens or not under more open agricultural trade policies also depends on factors outside the agricultural sector, such as the availability of non-farm employment in rural areas and the functioning of rural labor markets. In consequence, the existence and scope of negative impacts on biodiversity stemming from further marginalization of poor farmers would also depend on such factors.⁶⁵

58 *ibid*
59 Lankoski (1997), 17; George and Kirkpatrick (2003).
60 UNEP (2002a).
61 UNEP (2002b).
62 UNEP (2002c).
63 See FAO (2003).
64 WTO (1997), 15; George and Kirkpatrick (2003).
65 See FAO (2003).

67. Moreover, it is sometimes said that negative impacts would be partially or totally offset by the income effect that results from improved production incentives in developing countries. In particular, increasing crop yields due to commercialisation may also reduce pressure for land conversion, deforestation and degradation of marginal land. However, George and Kirkpatrick (2003) point out that in practice, deforestation and other conversion have continued despite past increases in yields, and conclude that increasing yields may do little to slow the changes. Unless significant progress is achieved in reducing poverty, agricultural pressures on natural habitat are likely to remain. Indeed, the second argument given in paragraph 65 implies that, if small farmers are able to participate in growing export markets at least to some extent and gain additional income, they may actually have an *increased* incentive to use agricultural resources in a more sustainable way.

68. It is sometimes said that the higher revenue for agricultural products would also facilitate the introduction of domestic policies to foster production techniques that are more environmentally friendly, and would also increase the long-term return of conservation investments.⁶⁶

69. However, a sequencing problem may possibly arise because of time lags between the generation of revenue from developments harmful to biodiversity and the implementation of appropriate domestic policies to foster conservation and sustainable production techniques. When these policies kick in, a substantial amount of biodiversity may already be lost. However, the restoration of biodiversity is usually difficult. Sometimes, biodiversity loss is even irreversible.

70. Agricultural intensification is especially harmful when being based on over-mechanization and an inappropriate reliance on monoculture, 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 of mechanical and agro-chemical input may yield important productivity gains with only relatively minor negative impacts on biodiversity.⁶⁷ Such medium-level intensification would also reduce pressure on natural habitats for conversion into arable land.

71. 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.⁶⁸ Policies that ensure the effective participation in particular of small and subsistence farmers in developing countries may further contribute to such environmental-friendly intensification of agriculture.

C. IMPACT OF AMBER BOX SUPPORT REDUCTIONS – CONCLUSIONS

72. 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.

- (a) 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 could be expected because of possible output substitution effects (see paragraphs 49 to 50).

66 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. See also UNEP (2002b) for an example of a *'positive technology effect'*, whereby trade liberalization policies foster the use of improved technology for the more efficient use of natural resources and the subsequent adoption of Environmental Management Systems and certification schemes.

67 OECD (2000e), 21.

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

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 53). In those cases, it appears that the overall effects of removing *Amber Box support policies* for agricultural biodiversity would be positive in implementing countries. It can therefore be concluded that, in such cases, Amber Box support measures would fall under the category of *perverse incentives* for biodiversity conservation and sustainable use;⁶⁹

- (b) The contraction of agricultural land in implementing countries is expected by many 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 55 to 59). While this observation does not lead to a strong point in favour of Amber box support in general, well-designed and targeted additional policy measures may be warranted to preserve such traditional farming techniques in those cases in which they prove to be indispensable to maintain biodiversity and related ecosystem services;
- (c) The effects of the subsequent expansion of agriculture in other countries is sometimes expected to have rather negative impacts on

agricultural biodiversity. The scope of the overall effect depends: (i) on the level and type of induced intensification and land use change; (ii) on the role and extent of income effects and other socio-economic factors such as off-farm employment options; and (iii) on the design and implementation of additional policy measures, especially for poverty alleviation (see paragraphs 60 to 71). Case studies show that such effects may be substantial for some crops or regions. However, it is also said that, 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. Again, additional policy measures may be warranted to encourage such forms of intensification in these countries.

73. In the case of agriculture, the environmental effects of specific choices of agricultural inputs and production technologies are often external to the economic calculus of the individual farmer. The discussion of possible negative effects not only in extensive farming areas of implementing countries, but in particular in other countries made clear that unfettered market forces cannot be expected to automatically give rise to biodiversity-friendly agricultural production systems. Under the circumstances explained above, additional policy measures may be warranted.

⁶⁹ 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 an objective may be, for instance, to provide income support to poor farmers. 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. Recall in this context that Amber Box support seems to be rather inefficient in meeting the goal of supporting poor farmers. See OECD (2003) and paragraph 59 above for further discussion.

6. GREEN BOX SUPPORT

A. THE CONCEPT OF DECOUPLED MEASURES

74. 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).⁷⁰ This concept and its limitations has become a major issue in the international discussion on agricultural and trade policies.

75. More or less restrictive definitions of decoupled measures or policies are used in the literature. For instance, OECD work relies on a distinction initially suggested by Cahill:⁷¹

- (a) 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;
- (b) 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.⁷² Specifically, introduction of the policy may also lead to a lower level of production. Empirical studies usually use this less restrictive concept.⁷³

76. 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.⁷⁴

77. It is important to underline that the conceptualizations 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.⁷⁵ 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.⁷⁶

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

71 Cahill (1997), OECD (2000b), 12.

72 See OECD (2000b), 9.

73 OECD (2000b), 11.

74 OECD (2000b), 8-9.

75 OECD (2000b), 7, 12.

76 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*”.

B. LIMITATIONS

78. 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.⁷⁷ For instance, direct income support, whose level is not based on input (including land), production quantities or prices, would appear to fulfil the requirement to have “*no, or at most minimal, trade-distorting effects or effects on production*”. At first glance, decoupled payments would therefore appear to not increase the use of production inputs and, in accordance with the analysis given above, would appear to qualify as generally being neutral with regard to agricultural biodiversity.⁷⁸ In consequence, the process of decoupling, that is, the shifting of support from Amber Box to Green Box measures, would appear to have positive effects for agricultural biodiversity. Moreover, Green Box payments whose levels are based on biodiversity-related performance indicators may also have positive effects for agricultural biodiversity on their own. This latter aspect will be further discussed below, when addressing agri-environmental programmes.

79. 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.⁷⁹

(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;⁸⁰

- (b) When farmers are risk-averse, both a wealth and an insurance effect would arise pursuant to government payments.⁸¹ 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.⁸²

80. 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.⁸³ It is

77 OECD (2000b).

78 Note that this neutrality statement would refer to the decoupled payment alone, and not to the active process of decoupling, that is, the *shifting* of support from coupled to (more) decoupled payments.

79 See OECD (2000b) for a more extensive discussion.

80 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.

81 Hennessy (1998).

82 OECD (2001), 21-22.

83 OECD (2000b), 23.

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.⁸⁴ 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.

C. THE IMPACTS OF DIRECT PAYMENTS ON BIODIVERSITY

81. 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 on agricultural biodiversity could then be analyzed analogously to those arising under Amber Box support measures (see section IV B). In particular, analogous to the reasoning in paragraphs 48 to 54, negative impacts on agricultural biodiversity would then result from an increase in Green Box measures taken alone. The arguments forwarded in paragraphs 55 to 71, indicate that positive effects may also result, but also point to additional, well-designed and targeted policy measures as a possibly more effective means to achieve such positive effects.

82. However, compared with Amber Box policies that *directly* target market prices and/or quantities, the production effects given in paragraph 79 are more indirect. It could therefore be argued that, starting from the same baseline, the impact on production of a given amount of (formally decoupled) income support would be quantitatively less important than the impact of a similar amount of an amber box support payment. In consequence, any negative impact on biodiversity stemming from indirect production effects of such formally decoupled support would also be more restrained. Hence, the process of decoupling, that is, of *shifting* domestic support from Amber to Green Box categories has the potential to generate positive effects for agricultural biodiversity.⁸⁵ However, such support would still not be very targeted on biodiversity. For instance, with regard to the recent reform of the Common Agricultural Policy of the European Union, a recent study by the European Environmental Agency and the United Nations Environment Programme concludes that, despite cross-compliance, the current practice of providing support on the basis of historic production levels is not optimal in this respect.⁸⁶

84 See OECD (2000b), 19, for further discussion.

85 See OECD (2004) for a similar conclusion.

86 See EEA/UNEP (2004), 15.

7. PAYMENTS UNDER ENVIRONMENTAL PROGRAMMES

A. GENERAL CONSIDERATIONS

83. 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

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

84. It is often argued that biodiversity conservation and the services or amenities provided by specific agricultural ecosystems (e.g., flood and erosion control) represent positive external effects of agricultural production provided by the individual farmer to other farmers or 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.⁸⁷

85. Several aspects underlying this reasoning are worth highlighting.

- (a) First, the question arises whether such services or amenities can only be provided by farmers, or by farmers who implement specific agricultural production systems. This issue will be further discussed in sub-section VII C;
- (b) Second, 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. An ethical argument could be made in this context with regard to the right of the public to a diverse and non-polluted environment. In many countries, however, 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;
- (c) Third, 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 "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.

86. Under a system of strong land rights, the ecosystem services provided by agricultural practices would indeed qualify as positive externalities; therefore, payments to farmers under

⁸⁷ See, e.g., OECD (2001a), 30-32, 37; Curry Report (2002), 69-70. See also OECD (2004) for a discussion.

agri-environmental programmes, in principle, have economic rationale to internalize such externalities.⁸⁸ 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.⁸⁹

87. Conceptionally, this section distinguishes three different types of agri-environmental programmes, bearing in mind that they are often applied simultaneously:⁹⁰

- (a) 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);
- (b) 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);

- (c) Programmes that focus on *maintaining* specific performances or agricultural practices (payments for specific performance or 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 ecosystem services, payments for the use of endangered local breeds).

88. 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.⁹¹ Examples include

- (a) 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);
- (b) 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.⁹²

88 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.

89 See OECD (2000a), 12, and Latacz-Lohmann (2000).

90 See Claasen et al. (2001), 10, 32-33, for a discussion.

91 See Ferraro and Kiss (2002) for a more extensive discussion and examples.

92 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 recently finalized research project of the NAFTA Commission for Environmental Cooperation (CEC) on the effects of transgenic Maize in Mexico. See Carpentier and Herrmann (2002), and CEC (2004).

89. 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.⁹³ They provide therefore important entry points for international cooperation and finance.

90. Agri-environmental programmes entail a wide range of environmental objectives and an equally wide range of possible designs.⁹⁴ 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 and the general policy framework in place. 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.⁹⁴

91. For instance, the promotion of organic farming by agri-environmental payments, undertaken by a number of countries, is still surrounded by controversy. While recent literature reviews generally indicate that organically managed fields and farms have greater biological diversity than conventionally managed sites, and that organic farming generally shows superior environment performance,⁹⁶ critics argue that it may often be more cost-effective to provide relevant public goods by conventional agriculture plus agri-environmental measures, than by supporting organic farming. Furthermore, the reduced productivity of organic farming is also said to potentially contribute to further pressure for land conversion for agricultural purposes.⁹⁷ In consequence, the need for robust, scientifically-based indicators is frequently underlined to enable the assessment of impacts and the evaluation of tradeoffs between different kinds of production systems.⁹⁸

92. Some empirical studies note positive results for biodiversity of some environmental programmes,⁹⁹ while others express more skepticism. For example, Kleijn et al. (2001) note that management agree-

93 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.

94 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 management 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).

95 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, EEA/UNEP (2004). 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).

96 See Dabbert (2003), Bartram and Perkins (2003); Curry Report (2002), 88-89.

97 See Bruulsema (2003).

98 Vetterli et al (2003).

99 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).

ments were often not effective in protecting biodiversity or, in some instances, even led to unexpected adverse effects. With regard to high nature value farmland, a recent study by the European Environmental Agency and the United Nations Environment Programme concludes that, although no precise data are available on geographical spending patterns within countries, the targeting of agri-environment measures at a European level seems far from optimal from a biodiversity conservation perspective. The study points to recent research that shows that current agri-environment schemes aimed at biodiversity are not necessarily effective and that their monitoring is mostly insufficient, and recommends to improve the geographical targeting of subsidies with regard to high nature value farmland. It also recognizes a great need for updated and refined data as well as for sound comparative and analytical research into the effectiveness of individual agri-environment schemes (EEA/UNEP (2004).

93. 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, measurement and implementation problems, payment programmes, in principle, can directly target the conservation and/or improvement of agricultural biological diversity.¹⁰⁰ 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 for the conservation and sustainable use of biological diversity.

94. 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.

95. Furthermore, it will often not be sufficient to just idle the land. Nature management strategies that take the context of the specific ecosystem fully into account will be needed in order to restore the areas in a targeted and effective way and to avoid, e.g., weed and pest problems. 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.

96. The 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.

B. LIMITATIONS OF DECOUPLMENT UNDER AGRICULTURAL ENVIRONMENTAL PROGRAMMES

97. 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.

100

A Pan-European Conference on Agriculture and Biodiversity, convened by the Council of Europe, UNEP, and the French government, recommended that agri-environmental programmes be applied for high nature value areas, and also to dispersed biodiversity and landscape values. See Council of Europe (2002).

They may be not entirely decoupled and therefore have some positive effects on production once the real-world phenomena discussed in paragraph 78 are taken into consideration. These positive production effects, in turn, may have negative effects on agricultural biodiversity, which could again be analyzed analogously to those arising under Amber Box support measures (see section IV B above).

98. 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 would appear to also be restricted.¹⁰¹

99. It is noteworthy that such indirect effects will be less important if existing Amber Box support policies are simultaneously reduced, because keeping such policies unchanged will inflate the income losses that farmers incur pursuant to compliance with an agri-environmental programme, and will therefore require higher compensatory payments.¹⁰²

100. To ensure policy coherence in this regard is identified by the OECD as an important emerging policy issue. A recent OECD report notes that, in a number of OECD countries, agri-environmental policies and agricultural policies can be found to be

pulling in opposite directions.¹⁰³ Policies to redress environmental damage are sometimes implemented in the context of production and input-linked support measures that contribute to environmental damage. The report notes that “*the coexistence of such policies can make the attainment of environmental objectives less certain and more costly than would otherwise be the case*” and concludes that “*the reform of agricultural policies would assist the achievement of environmental objectives by correcting the government failures that can complicate agri-environmental management*”.¹⁰⁴

101. It is often argued that, in addition to compensating costs and income losses, it is necessary to give some additional, genuine incentive payment in order to encourage farmers to participate in a voluntary programme.¹⁰⁵ To set these compensatory payments too low would impede the effectiveness of the agri-environmental programme. Farmers would then rather prefer to forego the agri-environmental payments by not participating in the programme. A number of aspects are noteworthy in this regard.

- (a) First, insofar as such payments lead to a net increase of farmers’ incomes, agri-environmental payments may not be entirely decoupled. Subsequent effects would have to be taken into consideration, along the lines of the discussion in paragraph 79;
- (b) Second, in the light of the discussion above, incentives to participate in the programme can also be increased by lowering the reference income level through, for instance, the removal of other support measures. It therefore appears that the reference level of the “extra costs or loss of income involved in complying with the government programme” is of crucial importance;

101 Rude (2000), 18.

102 This observation refers to the more general problem to define the appropriate benchmark against which to decide on the eligibility for payments, which is further discussed below.

103 Indeed, the OECD notes that “*the effectiveness of payments has been compromised when they have been implemented together with more production-linked support policies associated with environmental problems.*” See OECD (2003c), 71. OECD (2003c), 76.

104 OECD (2003c), 76.

105 Such is the practice in the European Union.

- (c) Third, it is sometimes pointed out that incentives to participate in voluntary agri-environmental programmes may also be generated by a feeling of social responsibility or by the increased, market-driven demand for food produced under high safety and environmental performance standards. Examples may include not only voluntary certification schemes for organic food, but also private standards applied by large retail chains.

102. Some agri-environmental programmes may influence relative input prices and may therefore give rise to subsequent input substitution. As discussed 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.¹⁰⁶ 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, may 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.¹⁰⁷ If some agricultural land remains to be not covered by agri-environmental programmes, additional regu-

latory requirements on agricultural practices and production methods would have to be introduced in order to minimize such indirect negative impacts on remaining lands.

103. 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.

104. 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 this case from the cases in which farmers merely threaten to do so in order to receive payments.

105. A number of model analyses claim to show that payments based on such existing practices produce substantially less environmental performance per monetary unit paid than payments for improved performance. The reason is that much of the money

106 It is noteworthy in this regard that such payments under agri-environmental programmes, even while they are considered to have minimal trade distorting effects, may have a quite substantial (dampening) effect on production.

107 Claasen et al (2001), 33.

goes to “good actors” and very little of the programme funds actually leverage new conservation efforts.¹⁰⁸ The underlying problem of these analyses, 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 these practices under such a scenario (due to market pressure etc.), these analyses systematically under-estimate the environment performance of payments based on existing practices.

106. These difficulties are part of the more general problem to define the appropriate benchmark against which to gauge the eligibility for payments. In the scenario discussed in paragraph 102, the problem is again 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.¹⁰⁹ 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.

107. Agri-environmental performance or practice standards could serve as an alternative benchmark.¹¹⁰ Only agricultural practices that over-comply with these standards would be eligible for agri-environmental payments.¹¹¹ Compared with a benchmark based on 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.

108. Moreover, similar standards could also be implemented as mandatory minimum standards, in order to contribute to minimize any negative impacts on biodiversity. Even on areas that are not put under agri-environmental programmes, farmers would have to comply at least with these minimum standards. However, in some countries, the national system of land and property rights may limit the use of such a mandatory approach without compensation.¹¹² 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.

C. THE ROLE OF PRODUCTION-RELATED CONDITIONS

109. A related question is whether conditions pertaining to the use of specific production methods, or to agricultural production in general,

108 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.

109 Note that such strategic behavior may also result under Amber and Blue Box payments.

110 See Claasen et al (2001), 34-35; Latacz-Lohmann (2000), 346.

111 For instance, Buckwell et al (1997) proposed 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).

112 Under “cross-compliance” approaches used in the United States and the European Union, they may additionally be entitled to receive other payments when they meet these requirements, such as for instance the single farm payment envisaged by the June 2003 reform of the Common Agricultural Policy of the European Union. See paragraphs 82 and EEA/UNEP (2004) for a critical discussion of this approach.

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.”

110. Under current practice, agri-environmental payments are indeed often based on indicators relating to specific inputs, production methods or, in the case of certain energy crop schemes, production volumes, 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.¹¹³

111. As was explained before, traditional farming practices applied in extensive farming regions on marginal lands are often said to 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 practices. It was also said that, if agricultural biodiversity is indeed closely tied to the prevalence of such traditional farming techniques on marginal land, the policy challenge would be to preserve these traditional farming practices. Agri-environmental payments

may then appear to be useful to reward such practices in carefully selected regions; such practices, however, are often linked to specific production methods.

112. More generally, the idea that agriculture often generates a number of substantial benefits beyond the production of food and fibre is captured by the concept of multifunctionality. According to this concept, agriculture, beyond hosting biodiversity, also 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 are said to represent an important element of national cultural heritage. Importantly, such non-commodity output of agriculture is sometimes produced jointly with agricultural commodities, that is, there are technical interdependencies or shared production factors.¹¹⁴ 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.

113. Under the analytical framework developed by the OECD,¹¹⁵ three questions should be answered for any non-commodity output in order to assess the need for policy interventions:

- (a) 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?
- (b) 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?

113 Rougier (2002), 13.

114 OECD (2000a), 11.

115 OECD (2000c).

- (c) If there is a market failure, is government action required or are there non-governmental options?

114. From the viewpoint of environmental policy, specific agricultural production methods are, in principle, not more than *proxy criteria* for environmental performance and the related level and quality of ecosystem services. The question is then whether these proxy criteria are *good* ones. Unless there is a proven *inherent* jointness, basing policy instruments on such proxy criteria may have two shortcomings for the conservation and sustainable use of biodiversity:

- (a) First, it may be difficult to design a set of criteria, defining a specific agricultural production method, which covers all important biodiversity-related aspects. If, however, the set of criteria is incomplete, it may 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”);¹¹⁶
- (b) Second, other measures that are not covered by the agri-environmental programme may have similar or even more positive impacts for biodiversity conservation.

115. Payments that would be directly based on a comprehensive set of environmental performance indicators could contribute to avoid such problems. Note, however, that designing and monitoring such a comprehensive set may be very 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 level¹¹⁷ to develop indicators that could not only serve as a basis or better assess agricultural impacts on biodiversity while taking regional differences into account, but may also eventually serve as a basis for more targeted payments under agri-environment programmes.

D. MINIMIZING INDIRECT PRODUCTION EFFECTS

116. 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. Furthermore, the application of these proposals may contribute to minimize the negative effects on agricultural biodiversity stemming from the indirect production effects analyzed above. Such proposals include:¹¹⁸

- (a) Specifying clear environmental objectives for the programmes,¹¹⁹ based, to the extent possible, on quantitative environmental performance indicators and reliable information;
- (b) Clarifying property rights in environmental resources, including baseline standards as reference levels, to establish the applicability of payments, charges, and subsidies;

116 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.”

117 See OECD (2001d) for recent developments of the OECD work on agri-biodiversity indicators. Recent OECD meetings focused on soil erosion and soil biodiversity, on land conservation and on agricultural water use and water quality. For FAO’s work on indicators of agricultural genetic resources, see Collette (2001).

118 See Runge (1999); Ervin (1999), Rude (2000); OECD (2000a); Latacz-Lohmann (2000).

119 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.

- (c) 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;
- (d) Matching the geographical scope of the programme with the spatial dimension of agri-environmental problems;
- (e) Establishing scientific linkage between the environmental objective and the policy instrument, thus ensuring technical efficiency of the instrument in achieving the objective;
- (f) Using mechanisms of competitive bidding of agri-environmental contracts to increase cost-efficiency and reduce overcompensation. For instance, under the BushTender trial, conducted in Australia by the Victorian State Government, bids were sought from landholders for entering into contracts to undertake a range of vegetation management actions. The bids were evaluated using a 'biodiversity benefits index' and accepted on the basis of best value for money;¹²⁰
- (g) Monitoring and evaluating programmes, based on well-established research methodologies and their further development, to document policy/programme efficacy and to further ensure the transparency of agri-environmental measures;
- (h) 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.

E. IMPACTS OF AGRI-ENVIRONMENTAL PROGRAMMES ON BIODIVERSITY

117. In conclusion, payments under carefully designed, targeted and implemented agri-environmental programmes that are based, to the extent possible, on scientifically sound environmental performance indicators, seem to have the potential to effectively improve incentives for the conservation and sustainable use of agricultural biodiversity. Possible indirect negative effects of such agri-environmental programmes, resulting from an expansion in agricultural production because of deficiencies in decouplement, could be reduced if existing Amber Box support is reduced simultaneously. The application of a number of proposals for trade-proofing agri-environmental programmes, summarized above, may further contribute to minimize the negative effects on agricultural biodiversity stemming from such indirect production effects. Payments under carefully designed, targeted and implemented agri-environmental programmes could therefore qualify as generating positive incentives for the conservation and sustainable use of biodiversity.

120

The case was documented in a recent submission by Australia to the Secretariat of the Convention on Biological Diversity, which is accessible in the online incentive measures database on the webpage of the Convention on Biological Diversity, at www.biodiv.org. The submission states that the competitive conditions associated with the tender mechanisms help ensure that no unwarranted economic benefit is conferred on one production sector to the detriment of competing producers, either in Australia or overseas.

8. BLUE BOX PAYMENTS

118. 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. 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.¹²¹ 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.¹²²

119. If such payments increase the net income of farmers, indirect effects on agricultural production, along the now-familiar lines of the analysis given above, 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 the 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 imple-

mented with a requirement to plant, are less trade distorting than market price support, payments based on output, or payments based on input use.¹²³

120. 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 now-familiar indirect effects analyzed above, and the subsequent negative effect on agricultural biodiversity would seem to be higher under Blue Box payments than under agri-environment programmes of the Green Box.¹²⁴

121. 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: (i) the choice of the area for the set-aside, (ii) the timeframe, (iii) the ease of reversibility of the set-aside, and (iv) the extent of additional conservation management measures. With regard to their impacts on biodiversity, set-

121 Rude (2000b), 15.

122 Rude (2000b), 18.

123 OECD (2000d).

124 Note that the production effect that is actually observed will depend on the level of payment that government chose.

aside schemes under Blue Box payments appear therefore 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,¹²⁵ 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 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.

122. In the European Union such payments were introduced under the so-called McSharry reforms of the European Community 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.¹²⁶ However, under the agreement reached in June 2003, most of these payments will be converted to the more decoupled single farm payment, which will be based on a producer's historical payments, rather than tied to production of a specific product.

125 For instance, under EU regulation, land has to be set aside for a minimum of 20 years in order to be eligible for payments.

126 Other countries using or having used the Blue Box are: Iceland, Norway, Japan, the Slovakia, 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.

9. SUMMARY AND CONCLUSIONS

123. 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 substantial 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.

124. 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), 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 (although remaining at a relatively low overall level).

125. The study cautioned that the effects of trade restrictions and distortions are likely to be indirect and not readily identifiable in general terms. Both beneficial and detrimental effects can usually be identified. Data gaps and methodological problems make it very difficult to give robust *empirical* assessments of the direction of the overall outcome. Furthermore, it is difficult to empirically disentangle the genuine effects of specific trade liberalization policies and the impacts of other independent variables such as autonomous technological development, social change, or other policy interventions. For these reasons, the study focused on a conceptual analysis of the impact on agricultural biodiversity, while referring to existing empirical information when appropriate.

126. With regard to a *reduction of trade-distorting 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.

- (a) 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 49 to 50). 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 54). In those cases, it appears that the overall effects of removing *Amber Box support policies* for agricultural biodiversity would be positive in implementing countries. It can therefore be concluded that, in such cases, Amber Box support measures would 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.¹²⁷ 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;
- (b) The contraction of agricultural land in implementing countries is often 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-

127

In the case of agricultural support, such another objective is, for instance, to provide income support in the farming sector to poor farmers. Recall, however, that Amber Box support seems to be rather inefficient in meeting this goal. See OECD (2003) and paragraph 59 for further discussion.

natural areas with high levels of biodiversity (see paragraphs 55 to 59). While this observation does not lead to a strong point in favour of Amber Box support in general, well-targeted additional policy measures may be warranted, in addition to the removal of Amber Box support, to preserve such traditional farming practices if agricultural biodiversity is indeed closely tied to their prevalence;

- (c) The effects of the subsequent expansion of agriculture in other countries is expected by many to have rather negative impacts on agricultural biodiversity. The scope of the overall effect depends (a) on the level and type of induced intensification and land use change; (b) on the role and extent of income effects and other socio-economic factors; and (c) on the design and implementation of additional policy measures, especially with regard to poverty alleviation (see paragraphs 60 to 71). Case studies show that such effects may be substantial for some crops or regions. However, it is also said that, 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. Again, additional policy measures may be warranted to encourage such forms of intensification in these countries.

127. In the case of agriculture, the environmental effects of specific choices of agricultural inputs and production technologies are often external to the economic calculus of the individual farmer. The discussion of possible negative effects not only in extensive farming areas of implementing countries, but in particular in other countries made clear that unfettered market forces cannot be expected to automatically give rise to biodiversity-friendly agricultural production systems. Under the circumstances explained above, additional policy measures may be warranted.

128. 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 decoupling 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 Green Box measures as well as from (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 summarized above.

129. 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 than under Amber Box measures. As discussed in paragraph 119, quantitative assessments undertaken with the OECD policy evaluation matrix (PEM) with regard to Blue Box measures confirm this expectation. Moreover, as such effects would be smaller the more decoupled the measures under consideration, a given amount paid under the Green Box could be expected to lead to smaller indirect repercussions than a similar amount paid under (partially decoupled) Blue Box measures. Furthermore, in the case of payments under agri-environmental programmes, it was argued that 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.

130. Despite a number of 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 and to the problem of choosing appropriate benchmarks,

it seems that well-targeted, designed and implemented programmes that are based, to the extent possible, on scientifically sound environmental performance indicators, are able to contribute to internalize 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. They have therefore the potential to qualify as *positive incentives* for the conservation and sustainable use of agricultural biodiversity.

131. 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; ensuring transparency in designing and implementing agri-environmental programmes; ensuring technical efficiency of the instrument in achieving the objective; monitoring and evaluating programmes based on valid scientific research, 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.

132. It can be concluded that the process of reducing trade-distorting domestic support policies has the potential to generate 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 can contribute to easing the pressure on agricultural biodiversity stemming from agricultural expansion and intensification, especially if complemented with well-designed “flanking” policies both in implementing and in other countries. Synergies may also exist when re-instrumenting domestic support towards carefully crafted and targeted agri-environmental programmes under the Green Box. However, more analytical and conceptual work is necessary on the appropriate design and implementation of such agri-environmental policies and programmes and their interplay with the reduction of trade-distorting domestic support measures.

REFERENCES

- Abler, D. (2001): *A Synthesis of Country Reports on Jointness between Commodity and Non-commodity Outputs in OECD Agriculture*. OECD Workshop on Multifunctionality, Paris, 2-3 July 2001, OECD, Paris.
- Anderson, K. (1991): "Agricultural Trade Liberalization and the Environment: A Global Perspective", *The World Economy* **15**, 153-71.
- Anderson, K.; A. Strutt (1996): "On measuring the environmental impact of agricultural trade liberalization" in: Bredahl, M.E.; N. Ballenger; J.C. Dunmore and T. Roe (eds.): *Agricultural Trade and the Environment: Discovering and Measuring the Critical Linkages*. Boulder, CO: Westview Press.
- Australia (2004): *Biodiversity stewardship payments*. Submission of the government of Australia to the Secretariat of the Convention on Biological Diversity. <http://www.biodiv.org/programmes/socio-eco/incentives/case-studies.aspx>.
- Bartram, H.; A. Perkins (2003): "The Biodiversity Benefits of Organic Farming". In: OECD (2003b), *ibid*
- Batie, S. (1996): *Environmental benefits resulting from agricultural activities: The case of non-European OECD countries*. OECD, Paris.
- Beard, N. and A. Swinbank (2001): "Decoupled Payments to facilitate CAP reform" *Food Policy* **26**, 121-145.
- Bruuselma, T. (2003): "Productivity of Organic and Conventional Cropping Systems". In: OECD (2003b), *ibid*.
- Buckwell, A. et al (1997): *Towards a Common Agricultural and Rural Policy for Europe*. Report of an Expert Group. European Commission, Brussels.
- Burfisher, M. W. (ed.) (2001): *Agricultural Policy Reform in the WTO – The Road Ahead*. Agricultural Economic Report 802, U.S. Department of Agriculture, Washington, D.C.
- Cahill, S. A. (1997): "Calculating the rate of decoupling for crops under CAP/oilseed reform". *Journal of Agricultural Economics* **48(3)**, 349-78.
- Carpentier, C.; H. Herrmann (2002): *Maize and Biodiversity: The Effects of Transgenic Maize in Mexico. Issues Summary*. Secretariat of the Commission for Environmental Cooperation in North America (CEC). Montreal.
- Claasen, R. et al. (2001): *Agri-environmental Policy at the Crossroads: Guideposts on a Changing Landscape*. Agricultural Economic Report 794, USDA Economic Research Service, Washington, D.C.
- CEC (2002): *Free Trade and the Environment. The Picture Becomes Clearer*. Secretariat of the Commission for Environment Cooperation in North America, Montreal.
- CEC (2004): *Maize and Biodiversity: The Effects of Transgenic Maize in Mexico: Key Findings and Recommendations. Article 13 Secretariat Report*. Secretariat of the Commission for Environment Cooperation in North America, Montreal.
- Collette, L. (2001): *Indicators of Agricultural Genetic Resources: FAO's contribution to Monitoring Agricultural Biodiversity*. Paper presented to the OECD Expert Meeting on Agri-Biodiversity Indicators, 5-8 November 2001, Zurich, Switzerland.
- Curry Report (2002): *Farming and Food. A Sustainable Future*. Report of the Policy Commission on the Future of Farming and Food, chaired by Sir Donald Curry. United Kingdom.
- EC (1998), European Commission, DGVI Commission Working Document (VI/7655/98): *State of Application of Regulation (EEC) NO. 2078/92: Evaluation of Agri-Environmental Programmes*. Brussels.

Council of Europe (2002): *Final Declaration on the conservation and sustainable use of biological and landscape diversity in the framework of agricultural policies and practices*. Pan European Biological and Landscape Diversity Strategy. High-level Pan-European Conference on Agriculture and Biodiversity: toward integrating biological and landscape diversity for sustainable agriculture in Europe, organized by the Council of Europe in cooperation with the French government and UNEP. Strasbourg.

Dabbert, S. (2003): "Organic Agriculture and Sustainability: Environment Aspects" In: OECD (2003b), *ibid*.

Ervin, D. E. (1997): *Agriculture, trade and the environment: Anticipating the policy challenges*. OECD, Paris.

Ervin, D. E. (1999): "Towards GATT-proofing Environmental Programmes for Agriculture". *Journal of World Trade* **33**(2), 63-82.

FAO (2003): *WTO Agreement on Agriculture: The Implementation Experience – Developing Country Case Studies*. Food and Agriculture Organization of the United Nations, Rome.

Ferraro, P.J.; A. Kiss (2002): "Direct Payments to Conserve Biodiversity". *Science* **298**, 1718-1719.

George C and Kirkpatrick C (2003): *Sustainability Impact Assessment of Proposed WTO Negotiations: Preliminary Overview of Potential Impacts of the Doha Agenda, Final Report*. Institute for Development Policy and Management, University of Manchester.

IATRC (2001): *Domestic Support: Issues and Options in the Agricultural Negotiations*. The International Agricultural Trade Research Consortium (IATRC), Commissioned Paper Number 16, May 2001.

Hennessey, D. A. (1998): "The production effects of agricultural income support policies under uncertainty". *American Journal of Agricultural Economics* **80**, 46-57.

Lankoski, J. (1997): *Environmental Effects of Agricultural Trade Liberalization and Domestic Agricultural Policy Reforms*, UNCTAD Discussion Paper 126, UNCTAD, Geneva.

Latacz-Lohmann (2000): "Beyond the Green Box: the Economics of Agri-Environmental Policy and Free Trade" in: *Agrarwirtschaft* **49**, H. 9/10, p. 343-348.

Lutz, E. (1992): "Agricultural trade liberalization, price changes and environment effects". *Environment and Resource Economics* **2**, 79-89.

Kleijn, D.; F. Berendse; R. Smit; N. Gilissen (2001): "Agri-environmental schemes do not effectively protect biodiversity in Dutch agricultural landscapes" in: *Nature* **413**, 723-25.

Mayrand, K.; S. Dionne; M. Paquin; I. Pageot-LeBel (2003): *The Economic and Environmental Impacts of Agricultural Subsidies: An Assessment of the 2002 US Farm Bill and Doha Round*. Unisfera International Centre, Montreal.

Meister, A.Q. D. (2001): "Public Concerns and the Regulation of Agricultural Production: New Zealand" Brouwer, F.; D. Ervin (eds.): *Public Concerns, Environmental Standards and Agricultural Trade*. Wallingford: CAB International.

Munasinghe, M.; W. Cruz (1995): *Economywide Policies and the Environment*. World Bank Environment Paper 10, World Bank, Washington, D.C.

OECD (1996): *The Environmental Effects of Removing Agricultural Subsidies: Case Study New Zealand*.

- OECD, Paris. OECD (2000a): *Production Effects of Agri-Environmental Policy Measures: Reconciling Trade and Environmental Objectives*. OECD, Paris.
- OECD (2000b): *Decoupling: A Conceptual Overview*. OECD, Paris.
- OECD (2000c): *Multifunctionality: Towards an Analytical Framework*. OECD, Paris.
- OECD (2000d): *A matrix approach to evaluating policy: preliminary findings from the Policy Evaluation Matrix (PEM) pilot studies of crop policy in the EU, the US, Canada and Mexico*. OECD, Paris.
- OECD (2000e): *Domestic and International Environmental Impacts of Agricultural Trade Liberalization*. OECD, Paris.
- OECD (2001a): *Improving the Environmental Performance of Agriculture: Policy Options and Market Approaches*. OECD, Paris.
- OECD (2001b): *Towards more liberal agricultural trade*. OECD Policy Brief, November 2001. OECD, Paris.
- OECD (2001c): *The Uruguay Round Agreement on Agriculture. An Evaluation of its Implementation in OECD Countries*. OECD, Paris.
- OECD (2001d): *OECD Expert Meeting on Agri-Biodiversity Indicators. 5-8 November 2001, Zurich, Switzerland. Summary and Recommendations*. OECD, Paris.
- OECD (2002): *OECD Agricultural Outlook 2002-2007*. OECD, Paris.
- OECD (2003a): *Farm Household Incomes in OECD Countries*. OECD, Paris.
- OECD (2003b): *Organic Agriculture: Sustainability, Markets and Policies*. Proceedings of the OECD Workshop on Organic Agriculture. OECD, Paris.
- OECD (2003c): *Agricultural Policies in OECD Countries. Monitoring and Evaluation*. OECD, Paris.
- OECD (2003d): *Perverse Incentives in Biodiversity Loss*. UNEP/CBD/SBSTTA/9/INF/34.
- OECD (2003e): *Agriculture, Trade and the Environment: The Pig Sector*. OECD, Paris.
- OECD (2004): *Agriculture and the Environment. Lessons learnt from a Decade of OECD Work*. OECD, Paris.
- OECD (2004b): *Agriculture, Trade and the Environment: The Dairy Sector*. OECD, Paris.
- OECD (forthcoming): *Agriculture, Trade and the Environment: The Arable Crop Sector*. OECD, Paris.
- Perrings, Ch. (2001): "The Economic of Biodiversity Loss and Agricultural Development in Low Income Countries". Lee, D. R.; C. B. Barrett (eds): *Tradeoffs or Synergies? Agricultural Intensification, Economic Development and the Environment*. Wallingford, CAB International, 57-72.
- Shapouri, S. and M. Trueblood (2001): "Impacts of Agricultural Policy Reform on Low-Income Countries" In: Burfisher, M. W. (ed.), *ibid*
- Rougier, N. (2002): *Agri-environmental programmes: Community framework and French practice*. High-level Pan-European Conference on Agriculture and Biodiversity: towards integrating biological and landscape diversity for sustainable agriculture in Europe. Strasbourg, France.
- Rude, J. (2000a): *Green Box Criteria: A Theoretical Assessment*. Trade Research Series, Agriculture and Agri-Food Canada, Ottawa.

Rude, J. (2000b): *An Examination of Nearly Green Programs: Case Studies for Canada, the United States and the European Union*. Economic and Policy Analysis Directorate Policy Branch. Agriculture and Agri-Food Canada, Ottawa.

Runge, C.F. (1999): "A Conceptual Framework for Agricultural Trade and the Environment: Beyond the 'Green Box'". *Journal of World Trade* 33(6).

Swinnen, J. F. (2001): A Fischler Reform of the Common Agricultural Policy? CEPS Working Document Nr. 173, Centre for European Policy Studies (CEPS), Brussels.

UNEP (2002a): *Integrated Assessment of Trade Liberalization and Trade-Related Policies. A Country Study of the Export Crop Sector in Nigeria*. United Nations Environment Programme (UNEP), Geneva.

UNEP (2002b): *Integrated Assessment of Trade Liberalization and Trade-Related Policies. A Country Study of the Ecuador Banana Sector*. United Nations Environment Programme (UNEP), Geneva.

UNEP (2002c): *Integrated Assessment of Trade Liberalization and Trade-Related Policies. A Country Study of the Cotton Sector in China*. United Nations Environment Programme (UNEP), Geneva.

Unisfera International Centre (K. Mayrand, St. Dion, M. Paquin) and Centro Mexicano de Derecho Ambiental (G. Ortega, L. Marrón) (2003): *The Economic and Environmental Impacts of Agricultural Subsidies: A Look at Mexico and Other OECD Countries*. Montreal and Mexico City.

Van Dijk, G. (2001): "Biodiversity and multifunctionality in European agriculture: priorities, current initiatives and possible new directions". In: Hoffmann, L. B. (ed.): *Agricultural Functions and Biodiversity: A European stakeholder approach to the CBD agricultural biodiversity work programme*. ECNC Technical report series, European Centre for Nature Conservation, Tilburg.

Vasavada, U.; S. Warmerdam (1998): "Environmental Policy and the WTO: Unresolved Questions". *Agricultural Outlook*, November 1998, Economic Research Services, USDA, Washington, D.C, 12-14.

Vetterli, W. et al. (2003): "Organic Farming and Nature Conservation". In: OECD (2003b), *ibid*.

WPR (2002): *Environmentally counterproductive support measures in Austria: Agriculture*. Research Report for the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Institut für Wirtschaft, Politik und Recht (WPR), Universität für Bodenkultur Wien.

WTO (1997): *Environment Benefits of Removing Trade Restrictions and Distortions*. Document WT/CTE/W/67, World Trade Organization, Geneva.

WTO (2004): *WTO Agriculture Negotiations. The issues, and where we are now. Updated 1 December 2004*. World Trade Organization (WTO), Geneva.

WTO (2002b): *Negotiations on Agriculture. Overview*. Document TN/AG/6, World Trade Organization (WTO), Geneva.

ALSO AVAILABLE

- Issue 1: Assessment and Management of Alien Species that Threaten Ecosystems, Habitats and Species
- Issue 2: Review of The Efficiency and Efficacy of Existing Legal Instruments Applicable to Invasive Alien Species
- Issue 3: Assessment, Conservation and Sustainable Use of Forest Biodiversity
- Issue 4: The Value of Forest Ecosystems
- Issue 5: Impacts of Human-Caused Fires on Biodiversity and Ecosystem Functioning, and Their Causes in Tropical, Temperate and Boreal Forest Biomes
- Issue 6: Sustainable Management of Non-Timber Forest Resources
- Issue 7: Review of the Status and Trends of, and Major Threats to, Forest Biological Diversity
- Issue 8: Status and trends of, and threats to, mountain biodiversity, marine, coastal and inland water ecosystems
- Issue 9: Facilitating Conservation and Sustainable Use of Biodiversity
- Issue 10: Interlinkages between Biological Diversity and Climate Change
- Issue 11: Status and Trends of Biodiversity of Inland Water Ecosystems
- Issue 12: Solutions for Sustainable Mariculture
- Issue 13: Technical Advice on the Establishment and Management of a National System of Marine and Coastal Protected Areas
- Issue 14: Integrated Marine And Coastal Area Management (Imcam) Approaches For Implementing The Convention On Biological Diversity
- Issue 15: Biodiversity Issues For Consideration In The Planning, Establishment And Management Of Protected Area Sites And Networks