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WORKSHOP ON INCENTIVE MEASURES FOR
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PERVERSE INCENTIVES IN SELECTED ECONOMIC SECTORS*Note by the Executive Secretary***I. INTRODUCTION**

1. The present information document complements the note by the Executive Secretary (UNEP/CBD/WS-Incentives/2/2) on the elaboration of proposals for the application of ways and means to remove or mitigate perverse incentives. It provides a more extensive analysis of the perverse incentives emanating from policies and practices in selected economic sectors.

2. A perverse incentive is a policy or practice that encourages, either directly or indirectly, resource uses leading to the degradation of biological diversity. Hence, such policies or practices induce unsustainable behaviour that reduces biodiversity, often as unanticipated side-effects as they were initially designed to attain other objectives. The above-mentioned note by the Executive Secretary identifies two types of policies or practices of relevance for the development of proposals for the application of ways and means to remove or mitigate perverse incentives:

- (a) Environmentally harmful government subsidies; and
- (b) Laws or customary practices governing resource use.

3. The economic sectors considered in the present note were selected with a view to providing practical examples for both types of policies and practices that generate perverse incentives, and to focus on those sectors that gained special prominence in international discussions and processes. Sections II and III address the role of perverse subsidies in the fisheries and agriculture sectors, respectively, while section IV focuses on the role of laws and customary practices generating perverse incentives for the conservation and sustainable use of biodiversity in the forest sector. Each section provides a short review of the discussion and identifies key lessons for the development of proposals for the application of ways and means to remove or mitigate the perverse incentives for the conservation and sustainable use of biological diversity.

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II. FISHERIES

A. *Review of the discussion*

4. The situation of worldwide fisheries is a source of increasing concern. According to the Food and Agriculture Organization of the United Nations (FAO), 18 per cent of fish stocks were over-exploited in 1999 (up from 15 per cent in 1992), 9 per cent were depleted (up from 7 per cent) and 1 per cent was recovering (down from 3 per cent). At the same time, 47 per cent were fully exploited (up from 46 per cent), and only 25 per cent were under-exploited or moderately exploited (down from 30 per cent in 1990). ^{1/} This trend to move towards full exploitation or over-exploitation of fish stocks is reflected in declining growth rates. While the world marine and inland waters capture fisheries increased on average by 6 per cent per year for the two decades following 1950, the growth rate fell to 2 per cent in the 1970s and 1980s and to almost zero in the 1990s. Overfishing is widely recognized as an increasing threat to the sustainability of global fisheries. ^{2/}

5. Excessive capacity or catching power of global fishing fleets has been identified as a main cause of unsustainable fishing levels. ^{3/} Many experts argue that governmental subsidies are the most important reason for excessive fleet capacities. However, other voices point out that not all subsidies aim to support investment into fishing vessels and gear. Furthermore, these voices also argue that the design and implementation of adequate fishery management systems could effectively mitigate any negative impact of subsidies on fish stocks. According to these voices, it is the persistence of open access, common pool fisheries, that is, the absence of appropriate management regimes, which generates the single most important perverse incentive to overuse the resource. ^{4/}

6. The interplay between subsidies, management regimes and resource overuse has figured prominently in the international debate. Four major questions have been identified as lying at the heart of the controversy. ^{5/}

- (a) Are fisheries subsidies the main cause of fishing-fleet overcapacity?
- (b) Do some fisheries subsidies contribute to fishing-fleet overcapacity?
- (c) Can well-managed fisheries avoid or minimize the overfishing problem, even if the fishing fleets are subsidized?
- (d) Do some fishery subsidies contribute to reducing overcapacity?

7. In order to analyse the interplay between subsidies and management regimes, three different management regimes can be conceptually distinguished. Under *pure open access*, property rights are absent or not enforced, and no official regulation governs resource use. Under a (rather hypothetical) *private property* regime, the private owner of the resource effectively controls both the use of relevant inputs and the total harvest. It should, however, be noted that in the case of fisheries, the owner could also

^{1/} FAO (2000).

^{2/} Porter (2001), vii.

^{3/} Porter (2001), 9. Correspondingly, the FAO Code of Conduct for Responsible Fisheries foresees that "States should take measures to prevent or eliminate excess fishing capacity and should ensure that levels of fishing effort are commensurate with the sustainable use of fishery resources as a means of ensuring the effectiveness of conservation and management measures." (paragraph 7.8.1; see also paragraph 7.6.3).

^{4/} Porter (2001), 4-5.

^{5/} See Porter (2001), 10.

be a well-defined and closed group of fishermen that effectively coordinate, under a common property regime, their individual inputs and harvest levels. Under *regulated open access*, the resource manager controls the total season-to-season harvest, but does not restrict the use of inputs for resource extraction. In the case of fisheries, fleet capacity is the key input.

8. Under *pure open access*, standard economic analysis shows that over-exploitation of the resource results even without subsidies. However, it is generally agreed that the introduction of some subsidies would make a “bad situation worse” by further increasing exploitation of the resource. ^{6/} Such further over-exploitation of the resource will happen for any subsidy that:

- (a) Increases the producer price of the resource (that is, the price for fish as perceived by the fishers);
- (b) Reduces the operating costs per unit (that is, per fishing vessel); or
- (c) Reduces the purchase price of vessel capital. ^{7/}

9. Under *private property*, the resource base would be exploited at a level that maximizes the profits of the resource owner. This exploitation level will be socially optimal even without governmental intervention if resource exploitation does not inhibit external effects, and if the private discount rate corresponds to the social rate. However, any subsidy that meets the conditions enumerated above would increase the level of resource exploitation. It would therefore “undermine what would otherwise be a socially optimal resource management programme, by introducing a new set of perverse incentives”. ^{8/}

10. Under *regulated open access*, subsidies should have very limited consequences on fish stocks and, in many cases, would prove to be neutral if the authorities could retain “iron control” over the total catch and, hence, over the management of the resource itself.^{9/} In such a case, economic waste may still result from excess capacity. Moreover, a subsidy for specific inputs may induce further inefficiencies because fishers would substitute unsubsidized inputs for the subsidized one, to the extent possible. However, under “iron control” by the authorities, excess capacity would not translate into unsustainable catch levels.

11. The entry into force of the United Nations Convention on the Law of the Sea (UNCLOS), in 1994, has alleviated the problem of open access at the international level. The Food and Agriculture Organization of the United Nations (FAO) estimates that 90 per cent of global fish production comes from within the 200-nautical-mile exclusive economic zones (EEZ) of the coastal States that were recognized by UNCLOS, and are therefore found within national jurisdictions. Coastal States have both an exclusive right and an obligation to ensure that the fishery resources within their EEZ are exploited in a sustainable manner. States have to set and implement the total allowable catch based on best available scientific evidence. Under UNCLOS, States can gain access to other States’ EEZ if those other States do not have the capacity to fully harvest the total allowable catch, in return for fishery-related economic benefits. Finally, UNCLOS requires States to cooperate in the management of fish stocks that are not found within EEZs, or that are not limited to an EEZ (straddling stocks, highly migratory stocks). ^{10/}

^{6/} See OECD (2000), WTO (2000), Porter (2001), 11; Munro and Sumaila (2002), 15.

^{7/} Munro and Sumaila (2002), 15.

^{8/} Munro and Sumaila (2002), 16.

^{9/} Munro and Sumaila (2002), 18; Porter (2001), 15.

^{10/} See WTO (2000) for a summary.

12. If coastal States put adequate systems into place in order to set and enforce limitations of total allowable catch within their EEZ, the management regime would qualify as regulated open access, under which the negative impacts of subsidies and subsequent excess capacity may appear to be limited. However, several arguments are forwarded in the discussion that point to the limitations of implementing “iron control” of total allowable catch:

(a) Conditions underlying fishery management are characterized by a significant degree of resource and environmental uncertainty, such as stochastic variations in fish stocks that are inherently unpredictable. ^{11/} As a result, determining the total allowable catch based on a concept of optimal harvesting capacity is a complex issue involving important definitional and measurement problems; ^{12/}

(b) Technical restrictions of catching methods in order to control overfishing of target species and/or by-catch have often failed to prevent expansion of overall fishing effort because fishers were able to compensate for restrictions on some variables by increasing reliance on variables that were not subject to such restrictions; ^{13/}

(c) Fisheries with excessive capacity are characterized by a “race for fish”, which puts strong pressure on the individual fisher’s profits. Fishers have therefore especially strong incentives to exceed catch limits and underreport their catch, which aggravates the monitoring and enforcement problems of coastal states; ^{14/}

(d) The existence of fleet overcapacity may generate political pressure on fishery authorities to set catch limits beyond sustainable levels. ^{15/}

13. A number of subsidies were identified in the literature to have an expansive effect on fleet capacity, as they meet the conditions given in paragraph 9 above. These include:

(a) Subsidies for fleet expansion and modernization (grants, low-interest loans, loan guarantees), as they reduce the purchase price of vessel capital;

(b) Payments to foreign countries for the exploitation of fish stocks in their exclusive economic zones by the national fishing fleet. Such payments constitute subsidies to the national fishing industry if they are not recuperated fully from the relevant fishing companies;

(c) Tax preferences for intermediate inputs, because they reduce the operating costs per vessel. Empirical studies confirm that tax preferences for fuel encourage the purchase of vessel with larger, fuel-intensive engines that, in turn, increase fishing ranges and hence allow larger catches. ^{16/}

14. Empirical evidence on the impact of subsidies on fleet capacity and overfishing mainly relies on case-studies on programmes involving loans, grants and risk-reduction for vessel construction and modernization ^{17/} Each of these cases-studies involved fisheries that were in a transition phase from not yet being fully exploited to being fully exploited or over exploited. The studies show that subsidies speed up

^{11/} WTO (2000), 6-7; OECD (2000).

^{12/} *ibid*

^{13/} See Porter (2001), 10, including additional references.

^{14/} *ibid*, 14 (including additional references).

^{15/} *Ibid*; WTO (2000), 12.

^{16/} See Porter (2001), 15, with further references.

^{17/} See Milazzo (1998), Porter (1998), OECD (2000). For a summary, see Porter (2001), 12-13.

the process of moving to over exploitation. However, assessing the impact of *ongoing* subsidization on fleet capacity under the present circumstances of fisheries appears to be more complex. In OECD countries, subsidies provided in recent years could not be directly linked in most cases to the continued deterioration of fishery resources.

15. Given that the national fishing fleets of most major national fishing countries already suffer from over capacity, 18/ it is important to note that subsidies described in paragraph 13, when granted on an ongoing basis, may not necessarily lead to further increases in capacity. They may, however, contribute to keeping overall capacity at unsustainable levels and work against policy efforts to reduce capacity.

16. Policy efforts to reduce fleet capacity usually rely on buyback or decommissioning schemes. Funding for withdrawal of fishing vessels or licenses, or both, and for vessel construction and modernization linked with fleet adjustment represent approximately 40 per cent of all OECD direct payments and cost-reducing subsidies for fisheries. 19/ Payments under such schemes, if they effectively contribute to reduce catch capacities, would qualify as “conservationist” subsidies that do not generate perverse incentives. 20/ Recent work undertaken by the OECD confirms that transfers aimed at capacity reduction can reduce pressures on fish stocks if accompanied by appropriate management measures. 21/

17. However, a number of arguments have been put forward to explain why such commissioning schemes may often not be very effective, at least not in the long run.

(a) Decommissioning schemes may not be effective when the overall incentive structure generated by fishery policies still encourages investment in fishing vessels or gear. Vessel capacity, while temporarily reduced pursuant to the introduction of such schemes, tends then to seep back over time; 22/

(b) Such effects may be further exacerbated if payments under decommissioning schemes are designed as fixed-rate premiums based on tonnage and engine power instead of catch records or other productivity-related indicators. Studies show that such a design encourages the withdrawal of vessels with the least economic values; 23/

(c) Lack of clear conditions attached to vessel retirement may also impede effectiveness of decommissioning schemes. Observed deficiencies include: no withdrawal of licenses together with vessel withdrawal, no scrapping requirements, no prohibition of reinvesting received funds, no prohibition to absorb excess labour force. If decommissioning schemes are not based on productivity-oriented indicators and additionally suffer from such deficiencies, they may actually contribute rather to fleet modernization than to a reduction of catch capacity;

(d) A very important mechanism that will impede the long-term effectiveness of decommissioning schemes is that rational fishers will eventually anticipate the existence of such schemes when making their initial investment decisions. If fishers are not caught by surprise by the introduction of the scheme, investment in fishing vessels and gear will be higher than without the scheme. In consequence, decommissioning schemes will be most effective if implemented only once and for a limited, short period

18/ Porter (1998).

19/ OECD (2000).

20/ Milazzo (1998).

21/ OECD (2000).

22/ See Munro and Sumaila (2002), 18, with additional references.

23/ See Porter (2001), 16-22, for an extensive summary of the discussion, including further references.

of time. If offered continually, payments under such schemes will lose effectiveness in reducing fleet capacity. ^{24/}

18. In conclusion, a number of subsidy types can be identified that generate incentives to expand fleet capacity. Several arguments forwarded in the discussion seem to indicate that governmental authorities have only limited control over total allowable catch. In consequence, excessive fleet capacity often leads to unsustainable catch levels. Furthermore, an analysis of decommissioning schemes reveals that these, unlike their stated objective, do often not contribute to reduce catch capacities.

19. On the international level, the issue of fisheries subsidies is addressed by several organizations and multilateral fora, including, *inter alia*, the FAO and its Committee on Fisheries, the OECD and its Fisheries Committee, and UNEP. A substantial amount of work is undertaken on definitional matters and on how to learn more about the exact impacts of different types of subsidies under the different possible combinations of management systems and bio-economic parameters. Work on this latter issue has now been initiated by the UNEP/Economic and Trade Branch in collaboration with OECD, which shall eventually lead to the development of recommendations, for both the trade and environment communities, on which subsidies should be restricted or prohibited under what circumstances. Furthermore, pursuant to the mandate given in Article 28 of the Doha Ministerial Declaration, fisheries subsidies and the clarification and improvement of related disciplines are also addressed at the World Trade Organization (WTO), as part of the negotiations on rules and on subsidies and countervailing measures. ^{25/}

B. Key lessons for the elaboration of proposals to remove or mitigate perverse incentives

20. Several fisheries subsidies can be identified that have an expansive effect on fishing-fleet capacity. In the absence of further governmental interventions, such subsidies, through the expansive effect on catch capacity, generate incentives to over exploit the resource. This pressure of the resource base results under both private property and unregulated open access.

21. Two mechanisms played a major role in the discussion on how to mitigate the perverse impacts of fisheries subsidies:

(a) First, additional regulation could be introduced, that is, a fishery management system based on total allowable catch (TAC) could be implemented.

(b) Second, subsidies could be granted to remove the adverse impacts of some subsidies on catch capacity and subsequent resource overuse (decommissioning schemes).

22. Several limitations were identified to the approach to mitigate the perverse impact of subsidies through additional regulation. They include:

(a) Indicator and measurement problems;

(b) Monitoring and enforcement problems (these are especially serious in the case of fisheries given the number of fishing vessels in a typical fishery and the nature of the resource);

(c) Adaptive behavior of fishermen;

(d) Political economy considerations.

^{24/} See Munro and Somaila (2002), Porter (2001), 20.

^{25/} See Steenblick (1999), Section IV, for further information.

23. With regard to subsidies intended to incite the removal of excess fleet capacity, a number of key preconditions have been identified which may limit their use:

(a) The role of the overall subsidy framework is crucial. Unless perverse subsidies are simultaneously removed, the effectiveness of decommissioning schemes will be impaired;

(b) Careful design of the decommissioning scheme, including the proper specification of eligibility conditions, is also important to avoid the generation of further adverse incentives;

(c) The strategic behavior of rational fishermen seriously impedes the long-term effectiveness of decommissioning schemes. Their use should therefore be restricted to a transitional period of time.

III. AGRICULTURE

A. *Review of the discussion*

24. Agricultural subsidies are mainly, but not exclusively used by developed countries, aiming *inter alia* to provide income support and risk insurance for farmers, to support rural development and to increase food security. In absolute numbers, the total support estimate for OECD countries amounted to \$311 billion in 2001. Even while such subsidization is mainly used by several major OECD countries,^{26/} its importance extends beyond these countries because of its magnitude and the subsequent trade distortions stemming from the impact of some subsidies on output volumes and prices. As a result, trade-distorting agricultural subsidies are frequently referred to as a major development obstacle in relevant international forums.^{27/}

25. Agricultural subsidies are an important item addressed by the current WTO negotiations on the further liberalization of agricultural trade. Article 20 of the Uruguay Round Agreement on Agriculture committed members to start negotiations on continuing the reform, under the long-term objective of “substantial progressive reductions in support and protection resulting in fundamental reform”.^{28/} These negotiations were initiated early 2000 and are now well underway.^{29/} In the Doha Ministerial Declaration, WTO members further committed themselves 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 underlined the importance of non-trade concerns and special and differential treatment for developing countries.^{30/}

26. Beyond export subsidies and tariffs that shield domestic producers from international competition, an important part of agricultural subsidies comes in the form of domestic support measures. In line with established practice at the WTO, agricultural domestic support measures are categorized as follows:

(a) Measures that encourage domestic agricultural production and therefore distort international trade patterns are categorized under the so-called Amber Box of the Uruguay Round Agreement on Agriculture (e.g. direct price support of agricultural commodities, input subsidies);

^{26/} In 2001, the members of the European Union, Japan and the United States account for 82 % of total domestic support of the whole OECD area (OECD statistical database, at www.oecd.org).

^{27/} 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.

^{28/} URAA, Article 20.

^{29/} An overview of the negotiating positions of WTO members as per end-2002 is given in WTO (2002b).

^{30/} Doha Ministerial Declaration, paragraph 13.

(b) Measures that are “decoupled” from agricultural production and prices are assumed to have no, or at most minimal, trade-distorting effects, and are therefore excluded from the reduction commitments of the Uruguay Round Agreement on Agriculture. Such subsidies are said to be in the *Green Box* of the Agreement. *Inter alia*, payments under environmental programmes fall under the Green Box, provided that they meet a number of provisions;

(c) Subsidies granted under production-limiting programmes that are based on fixed area and yields, or are made on 85 per cent or less of the base level of production, or are made on a fixed number of head are characterized to be partially decoupled from production and fall under the so-called *Blue Box* of the Agreement of Agriculture.

27. Even while the overall level of domestic support decreased only moderately pursuant to the implementation of the Agreement on Agriculture,^{31/} important changes in the composition of related measures could be observed: a *reduction* in trade-distorting Amber Box support, an *increase* in “decoupled” Green Box support, an, in particular, a major *increase* in payments under environmental programmes (although remaining at a relatively low overall level), as well as *increase* in partially decoupled *Blue Box* measures (payments under production-limiting programmes).^{32/}

28. The most significant part of the relationship between agricultural subsidies and biodiversity passes indirectly through effects and patterns of production. Specifically, the promotion of domestic agricultural production stemming from Amber Box domestic support, export subsidies and tariffs that shield the domestic market translates into the following effects, which in turn, will affect biological diversity:

(a) An intensification of agricultural production on given acreage, through changes in cropping or livestock regimes, pest management practices and mechanization;

(b) A change in land use patterns, that is, an expansion land used for agricultural purposes.

29. In those countries that heavily rely on such support policies, the subsequent further intensification of agricultural production is said to have negative effects on biological diversity especially if based on heavy mechanization, inappropriate reliance on monoculture and the excessive dependence on agro-chemicals as well as external energy and water inputs. Conversely, positive effects resulting from a removal of such policies include, *inter alia*,

(a) A reduced level eutrophication of water ecosystems through agricultural run-off from fertilizer use, with a positive impact on inland waters biodiversity;

(b) A positive impact on soil biodiversity through, *inter alia*, reduced soil compression by heavy machinery;

(c) Reduced intoxication or killing of pollinators and other non-target wildlife species through pesticide use;

^{31/} 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 31% in 2001 (OECD statistical database, at www.oecd.org).

^{32/} However, in 2001, 69% of support measures in OECD countries as measured by the PSE were still in the form of market price support or output-based payments. The corresponding figure is of 82% in 1986-88. Payments based on area planted or livestock numbers (under the Blue Box) represent 13% of total support to farmers (up from 7% in 1986-88), and payments based on input use represents 8% of support in 2001 (down from 9% in 1986-88) (OECD statistical database, at www.oecd.org). For further details on the observed re-instrumentation, see document UNEP/CBD/COP/7/INF/1, Section 3.

(d) The use of more crop varieties as a means to reduce risk of pests. ^{33/}

30. The removal of such measures may also lead to a *contraction of agricultural land* in those countries. Such conversion of specific areas is often said to have positive biodiversity impacts especially when previous agricultural production on these areas was highly technified and specialized, and when effective environmental and conservation policies are in place to restore the initial, non-agricultural habitats (e.g., wetlands). A crucial precondition of a successful long-term restoration is that the conversion has to be irreversible, which may warrant the use of specific legal or economic tools within such conservation policies.

31. In consequence, Amber Box support policies and other policies that encourage domestic production can be characterized as often generating perverse incentives for the conservation and sustainable use of biological diversity, whose removal or mitigation may be warranted to further the objectives of the Convention on Biological Diversity. As the further reduction of such support is an important item in the ongoing WTO agricultural negotiations, there is considerable potential to realize synergy and mutual supportiveness between the international biodiversity and trade regimes.

32. As explained above, Green Box support is said to be decoupled from agricultural production and prices. However, it was shown in the debate that the decoupling of Green Box support measures from output and prices is never complete once aspects like market imperfections, the risk-averseness of farmers and the political dynamics of granting subsidies are taken into consideration.^{34/} When compared with a no-subsidy scenario, some expansive effects on agricultural production are therefore to be expected from Green Box measures, with subsequent negative impacts on biological diversity. However, compared with Amber Box policies that *directly* target market prices and/or quantities, the production effects analysed here are more indirect. It could therefore be argued that the impact on production of a given level of (formally decoupled) Green Box support would be quantitatively less important than the impact of a similar level of an Amber Box support payment. In consequence, the negative impact on biodiversity would also be more restrained.

33. To some extent, such reasoning also applies to Blue Box support measures, which are said to be only partially decoupled. Quantitative assessments undertaken with the OECD policy evaluation matrix (PEM) confirm that area payments, even when assumed to be implemented with a requirement to plant, are less trade distorting than market price support, payments based on output, or payments based on input use.^{35/} Again, the negative impact on biodiversity resulting from such indirect production effects would be more restricted (although more important than under Green Box payments).

34. In consequence, the “re-instrumentation” of domestic support from Amber to Blue and Green Boxes measures, described above, appears to be another important mechanism to at least partially remove the perverse incentives stemming from some domestic support measures while still pursuing policy objectives like, for instance, national food security, rural development or income support to poor farmers through subsidization.

35. The introduction of regulatory requirements on agricultural practices and production methods, that is, of agri-environmental performance or practice standards, is another means to mitigate the perverse incentives stemming from specific domestic support measures ^{36/} For instance, the eligibility for payments

^{33/} See UNEP/CBD/COP/6/INF/2, paragraphs 72-80, and included references, for a more extensive analysis.

^{34/} See OECD (2000b) for a more extensive discussion.

^{35/} OECD (2000d).

^{36/} See Claasen et al (2001), 34-35; Latacz-Lohmann (2000), 346.

under (partially decoupled) Blue-Box programmes could additionally be conditioned on compliance with agri-environment environmental standards, as is envisaged under the “cross-compliance” approach of the European Union. ^{37/} However, several limitations to such a mandatory, regulatory approach can be identified.

(a) The national system of land and property rights may limit the use of such an approach. 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.

(b) Such standards would have to be based on a comprehensive set of environmental performance indicators. However, current agri-environmental indicators are often characterized to be deficient with regard to agricultural biodiversity. In a recent overview, the NAFTA Commission for Environment Cooperation (CEC) concludes that “progress in honing non-pollution indicators capable of showing changes in biodiversity, forest cover, habitats and ecosystems remains less developed and certainly less quantitative than pollution-related indicators.” ^{38/}

36. The removal of Amber Box support policies is said to not always and necessarily generate positive effects for biological diversity. First, agricultural production in other, mainly (but not exclusively) developing countries is usually expected to increase pursuant the reduction of domestic support given to farmers in developed countries. While reducing production incentives for domestic producers because of lower producer prices, the removal of Amber Box domestic support would increase market prices for the relevant agricultural commodities, which would generate further production incentives for farmers in those countries that did not use, or to a far lesser extent, trade-distorting domestic support. ^{39/} The effects on biodiversity of the subsequent expansion of agriculture in these countries are ambiguous and depend (i) on the extent of national subsidy reform, especially with regard to input subsidies; (ii) on the role and extent of income effects; and (iii) on the level and type of induced intensification and land use change. ^{40/} 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.

37. Second, the contraction of agricultural land, to be expected following a removal of support in developed countries, is said to have rather negative impacts if previous production relied on traditional, extensive farming practices that are important for creating and maintaining semi-natural areas with high levels of biodiversity. Hence, in such regions, a rich agricultural biodiversity may actually depend on the continued application of these traditional farming techniques. Furthermore, such agricultural activities have also been associated with land conservation and related ecosystem services, like the avoidance of landslides and flooding. Such extensive farming systems, however, are often located on marginal lands, which would be taken out of production first when producer prices decrease pursuant to a removal of Amber Box subsidies. ^{41/}

^{37/} It is under debate with regard to whether, and if so, under what particular provisions, Blue Box measures with cross-compliance could be accepted as Green Box payments. See e.g. Swinnen (2001), 29; Beard and Swinbank (2001).

^{38/} See CEC (2002). There are, however, recent efforts at the international level to develop indicators that could not only serve as a basis or better assess agricultural impacts on biodiversity, but may also eventually serve as a basis for targeted regulatory policies. See OECD (2001d) for recent developments of the OECD work on agri-biodiversity indicators. Upcoming 2003 OECD expert meetings will focus on land conservation as well as soil erosion and soil biodiversity.

^{39/} Lankoski (1997), 13, 17; see also Anderson (1991); Lutz (1992); Anderson and Strutt (1996); Ervin (1996); UNEP/CBD/COP/6/INF/2, 9.

^{40/} See UNEP/CBD/COP/7/INF/1, paragraphs 45 to 50, for further discussion.

^{41/} OECD (2000e), 28-29.

38. The policy challenge appears to be to keep such marginal lands under production and to preserve traditional farming techniques with positive impacts on biodiversity while taking out of production those *infra-marginal* lands whose extensification or 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. However, this is not a strong argument in favour of Amber Box support. As it is mainly poor farmers on small farms that hold marginal land, Amber Box support, as typically granted today, will not be very effective in preserving their production. A recent OECD study shows that most of production-based support goes to the larger farms, which are often the richer farms; and that only 25 per cent of market-price support ends up as a net income gain for the farmers. ^{42/}

39. If Amber Box support measures are removed, additional policy measures may be warranted to keep such marginal lands under production and to preserve traditional farming techniques with positive impacts on biodiversity. More generally, it is often argued that biodiversity conservation and the services or amenities provided by agricultural ecosystems (e.g., flood and erosion control) represent positive external effects of agricultural production provided to the public at large. 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 carefully designed and targeted agri-environmental programmes would ensure appropriate remuneration and would therefore contribute to internalize the positive externalities into farmers' decision-making. ^{43/}

40. Again, even while belonging to the Green Box, payments under environmental programmes are not completely decoupled, because of the reasons given in paragraph 32. However, compared with Amber Box policies that *directly* focus on market prices and/or quantities, their expansive effect on production is more indirect, and subsequent negative impacts on biodiversity would therefore also be more restricted. ^{44/} Furthermore, and notwithstanding existing design and measurement problems, payment programmes, in principle, can directly target the conservation and/or improvement of agricultural biological diversity. ^{45/} Compared with other types of domestic support measures, the ability for such targeting would give payments under such environmental programmes an immediate relative advantage for the conservation and sustainable use of biological diversity.

B. Key lessons for the elaboration of proposals to remove or mitigate perverse incentives

41. An important part of agricultural subsidies comes in the form of domestic support measures. According to WTO practice, these can be categorized into trade-distorting (Amber Box) domestic support measures that are coupled to agricultural output and prices (e.g., direct price support, input subsidies), into partially decoupled Blue Box measures (area and head payments), and into decoupled Green Box support measures (e.g., direct income support, payments under environmental programmes).

42. Trade-distorting Amber Box support measures have an expansive effect on domestic agricultural production and, because of subsequent changes in land use and the level of intensification, often have a

^{42/} See OECD (2003).

^{43/} See, e.g., OECD (2001a), 30-32, 37.

^{44/} See document UNEP/CBD/COP/7/INF/1 for further elaboration on payments under environment programmes and the preconditions attached to them.

^{45/} A Pan-European Conference on Agriculture and biodiversity, recently convened by the Council of Europe, UNEP, and the French government, recommends that agri-environmental programmes be applied for dispersed biodiversity and landscape values. See Council of Europe (2002).

negative effect on agricultural biodiversity. Conversely, it appears that the effects of removing such policies on agricultural biodiversity would be mostly positive. It can therefore be concluded that such policies often fall under the category of perverse incentives for biodiversity conservation and sustainable use, whose further reduction may be warranted.

43. Because of incomplete decouplement, both an increase of Green Box measures and of (partially decoupled) Blue Box measures would lead to some expansive effect on agricultural production, with subsequent negative impacts on biodiversity. However, such effects are more indirect than under Amber Box measures, and furthermore, such effects would smaller the more decoupled the measures under consideration. 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, especially so under Green Box measures.

44. In consequence, the “re-instrumentation” or conversion of domestic support from Amber to Blue and Green Boxes measures that happened pursuant to the Uruguay Round Agreement on Agriculture appears to be another important means to at least partially remove the perverse incentives stemming from Amber Box domestic support measures.

45. Furthermore, the fact that such re-instrumentation happened pursuant to the implementation of the Uruguay Round Agreement on Agriculture underlines the importance of international legal instruments for coordinated, multilateral action on perverse subsidies and their removal. It is sometimes underlined that unilateral policy reforms to remove perverse subsidies may not be a feasible option for large democracies with diverse constituencies, because, for instance, domestic industries fear losing competitiveness pursuant to such removal, and put up political resistance. In such cases, coordinated action at the international level may be a key precondition to effectively remove such policies. ^{46/}

46. In addition, the introduction of regulatory requirements on agricultural practices and production methods, that is, of agri-environmental performance or practice standards, appears to be a means to mitigate the perverse incentives stemming from specific domestic support measures. Several possible limitations were identified to such an approach. They include

- (a) The land and property rights of farmers,
- (b) Indicator and measurement problems.

47. In some cases, the removal of Amber Box support policies may generate negative effects for biological diversity. The contraction of agricultural land, to be expected further to a removal of Amber Box support in implementing countries, is said to have rather negative impacts if previous production relied on traditional, extensive farming practices that are important for creating and maintaining semi-natural areas with high levels of biodiversity. In such cases, additional policy measures may be warranted further to the removal of Amber Box policies, for instance, the implementation of well-designed and targeted agri-environmental programmes that may include payments to farmers for biodiversity-related ecosystem services.

^{46/} See Steenblick (1999), Section III, for further discussion.

IV. FORESTRY

A. *Review of the discussion*

48. Concerns raised with regard to the destruction of natural forests include the loss of forest biodiversity, including wildlife species, and a loss of related ecosystem services like watershed protection, carbon sequestration and non-timber forest products. High deforestation rates have been credited mainly to unsustainable timber and fuel wood harvests as well as the expansion of crop and permanent pasture. Deforestation is increasingly a phenomenon that involves land with poor soils inadequate for sustainable agricultural activities or that results in significant social costs like erosion and downstream sedimentation of water resources, reduced revenues from non-timber products and international forest services like carbon sequestration, as well to reduced existence and option values for populations outside the relevant region. However, land-use decisions are, to a large extent, made by private agents that do not take into account such externalities. ^{47/}

49. A number of critical factors have been identified in the literature to explain aggregate deforestation rates. ^{48/} These include:

(a) Demographic pressures as indicated by, e.g., rural population density, reflect both an increasing demand for income-earning opportunities and an indirect growing demand for food production;

(b) Road building for logging activities that make remote forest areas more accessible for agricultural activities;

(c) Higher income levels indicate better income opportunities from non-forest related activities, e.g., agricultural intensification or urban occupations, as well as an increasing regulatory capacity and a positive income elasticity of the demand for conservation;

(d) Higher agricultural yields that lower the pressure on the agricultural frontier and subsequently reduce land conversion.

50. In addition, a number of government policies were identified as contributing to accelerating deforestation. For instance, policies that increase the profitability of agricultural activities are often blamed for inefficient land use. Such policies include credit, input and marketing subsidies, road construction and transport subsidies, tax incentives and price support through tariff and non-tariff protection for selected crops. ^{49/}

51. Furthermore, deficiencies in the design and enforcement of land rights and tenure systems are also said to promote deforestation. In many countries, key tenure problems relate to the open access character of forestlands. When well defined and secure property rights are absent, it is argued land users have no incentive to use the forest resource in a long-term sustainable manner:

(a) Publicly owned forest lands are often subject to de facto open access because, given the size of public lands in those countries, governments often do not have the funds and capacity to enforce their property rights and/or implement adequate tenure systems;

^{47/} Jaramillo and Kelly (1997).

^{48/} See Southgate (1990), Cropper and Griffiths (1994), Barbier (1997), Chomitz and Gray (1996), Alson et al. 1995, Mahar and Schneider (1994). See Jaramillo and Kelly (1997), 4, for a summary.

^{49/} Binswanger (1991); Barbier (1997).

(b) In other cases, informal, common-property based tenure and management systems as well as related customary practices are eroded or no longer adequate for sustainable resource management due to demographic pressure and increasing scarcity of the land resource, without being supplemented by formal land rights and tenure systems;

(c) Law governing forest use and land conversion often comes from different sources. The interaction between these sources and, more specifically, between formal and informal or customary law, is often complex and, as a result, conflicting and unclear, resulting in reduced ownership security.

52. More specifically, a number of tenure-related policies and customary practices have been identified as generating perverse incentives for the conservation and sustainable use of forest ecosystems: 50/

(a) On public lands, a requirement to remove the forest cover has been a precondition for titling in many countries. Such requirements, which are often deeply rooted in legal tradition have been shown to be a major factor in land conversion in a number of countries; 51/

(b) Even when not required by formal law, land clearing is often an informal means to signal the claim of a specific area and subsequently increase ownership security;

(c) Laws that threaten “idle” lands with expropriation or higher taxes also encourage deforestation and subsequent economic activities even when market forces would dictate otherwise; 52/

(d) Legal provisions that require payments for land improvements, including the removal of trees, have motivated squatters to clear forests on private lands;

(e) Legal provisions that separate ownership from forest resources promote the clearing of private lands, especially when forest resources are formally owned by the State. In such cases, the lack of enforcement capacity makes forests on private lands an open-access resource;

(f) The establishment of protected forest areas without effective enforcement may generate perverse results because illegal settlers – who have no possibilities of acquiring legal titles – have greater incentives to mine the forest resource; 53/

(g) Temporary leases to private concessionaires for logging or the exploitation of other resources that are too short were also argued to not generate appropriate incentives for these private companies to include long-term considerations into their calculations. 54/

53. In a number of countries, considerable efforts have been made to remove these laws generating perverse incentives for forest conservation and sustainable use, especially with regard to land-clearing requirements. However, while such efforts appear to contribute to lower deforestation rates, a number of limitations have been observed:

50/ See Jaramillo and Kelly (1997) for a summary.

51/ Kaimowitz (1995), Mahar and Schneider (1994), Southgate and Whittaker (1992), Peucker (1992), CIFOR (1996). See also Contreras-Hermosilla (2000).

52/ Lopez and Ocana (1994).

53/ Jaramillo and Kelly (1997), 21.

54/ Panayotou (1989).

(a) Governments often do not have the capacity to monitor the assignment of tenure rights and to properly enforce them. In addition, the costs of adequate titling programmes and adequate monitoring and enforcement institutions may often appear large in relation to the social benefits. As a consequence, even while land clearing requirements have been removed in a number of countries, they continue to be required in practice, reflecting the absence of alternative low-costs methods to assign individual rights in newly settled areas; 55/

(b) Forest clearing also achieves other objectives, beyond increasing tenure security. Demonstrating that the land can be used for agriculture increases the likelihood that other settlers will migrate to the region, with subsequent commercial flows and private as well as public investment. This cycle of increased integration of remote areas into the formal economy offers the potential for land-price appreciation and subsequent capital gains for initial settlers; 56/

(c) On a more general note, and notwithstanding the positive externalities stemming from forest-ecosystem services, the long-term economic value of timber and non-timber forest resources are often less profitable for individual users than the one-time mining of the timber resource and subsequent agricultural activities. 57/ Hence, removing the perverse incentives enumerated above may prove to be necessary, but not sufficient to halt deforestation;

(d) Long-term forest concessions have led to mixed experiences in Latin American countries. Even when long-term concessions have been granted, institutional instability and the fear that concessions will be revoked often led to the short-term optimization of timber harvests, ignoring regeneration activities and sustainable practices. Concessionaires have often found little resistance in ignoring related management plans. Moreover, the political power of the logging industry has often thwarted attempts to enforce stricter regulation. 58/ Again, removing perverse incentives proved to be necessary, but not sufficient to halt unsustainable exploitation of the forest resource.

54. It was concluded that the removal of perverse incentives through the abolishment of related legal provisions often needs to be complemented by other policy measures. Recommendations made to this effect include:

(a) The reform of traditional macro-economic and sectoral policies that have encouraged the unsustainable use of the forest resource and/or the conversion into agricultural land of areas without agricultural value; 59/

(b) Strengthening community involvement and capacity in managing natural resources, including protected areas, and bridging the gap between formal and customary law embedded in local social codes; 60/

(c) Ensuring the adequate monitoring and enforcement of regulations and use restrictions for protected areas, by improving related capacity or by adjusting the size of protected areas to what may be effectively protected with available resources. 61/

55/ Jaramillo and Kelly (1997), 7, 17.

56/ Mueller (1997), Schneider (1995).

57/ Southgate (1997); Jaramillo and Kelly (1997), 16.

58/ World Bank (1995), Jaramillo and Kelly (1997), 22.

59/ Jaramillo and Kelly (1997), 30, 32.

60/ CIFOR (1996).

B. Key lessons for the elaboration of proposals to remove or mitigate perverse incentives

55. The loss of forest biodiversity, including wildlife, may be caused by a complex interaction of several root factors. In consequence, the identification of perverse incentives resulting from legal provisions or customary practice is often difficult, as their extent may often crucially depend on the design and degree of implementation and enforcement of other policies.

56. The removal of laws that generate perverse incentives may be not sufficient to halt the loss of natural forests if other macro-economic and sectoral policies and key socio-economic reasons for deforestation remain unchanged.

57. Conversely, in such circumstances, it will be difficult to prove the need to remove such laws, as their abolishment will not lead to improvements as long as these other policies and socio-economic reasons are not changed.

58. Even though laws that generate perverse incentives can, in principle, often be removed easily, the effectiveness of their removal may be impaired because viable alternatives are not available or because of a general lack of monitoring and enforcement capacity on the part of the State.

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⁶¹/ Jaramillo and Kelly (1997), 30, 32.

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