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Fisheries Subsidies and Overfishing: Toward a Structured Discussion

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Introduction

1. During the past eighteen months, the issue of subsidy reform in the fisheries sector has been introduced as part of the agenda for serious consideration in the context of the next round of multilateral trade negotiations. However, the issue clearly remains in the early pre-negotiation stage. Discussions within the World Trade Organization (WTO) Committee on Trade and Environment (CTE) have not yet moved to the stage of structured discussions aimed at building consensus on what should be done. However, such a structured approach, which focuses on a set of substantive and procedural issues to be discussed, might be useful in order to explore differences in greater depth and search for ways to accommodate those differences. A structured approach to discussions would assist in advancing the debate on fisheries subsidies.

2. This paper is aimed at providing the basis for such a structured approach to the next phase of international discussions of the issue of fisheries subsidies and sustainable fisheries management. The paper has three main sections: section I provides a brief historical overview of the issue of fisheries subsidies in the context of world trade negotiations and the evolution of WTO treatment of trade and environment issues. Section II is an analysis of the state of knowledge of the relationship between fisheries subsidies and overfishing. Section III presents a set of procedural and substantive issues that should be discussed in a more structured and systematic way in order to develop greater international consensus on the need for and feasibility of new disciplines on fisheries subsidies. The section discusses a range of options for resolving each of the issues discussed, with reference to the WTO and other relevant international organisations.

I Historical Background: Fisheries Subsidies and World Trade Negotiations

3. International efforts to move towards agreement on removing environmentally harmful and trade distorting fisheries subsidies have not yet achieved the necessary consensus to move to the negotiation stage. During the Uruguay Round negotiations, fisheries was discussed in the Negotiating Group on Natural Resource Based Products (NRBPs) based on the recommendations in a report of a Working Party that had been established on these products (L/5895). Numerous proposals related to fisheries were submitted to the Negotiating Group, yet no agreement could be reached on how to address these different proposals, which included subsidies, tariffs, non-tariff measures and access to resources. Towards the end, it was decided to negotiate fisheries issues along with other natural resource based products as part of a broader negotiation; fisheries issues were moved to the Market Access Group along with other negotiating subjects. The work in the Negotiating Group on NRBPs was not successful for a number of reasons, partly due to the insistence of the EC, Japan and Korea on linking access to resources with access to markets. As a result of the Uruguay Round, therefore, fisheries subsidies are included under the remit of the WTO Agreement on Subsidies and Countervailing Measures (SCM), which covers all goods except for agriculture.

4. Since the establishment of the World Trade Organization in 1995, a significant change in the political context of the issue has taken place. The impetus for inclusion of fisheries subsidies on the international trade agenda has increased substantially, primarily because it has been treated not only as an issue of efficiency and equity in international trade but also as an issue of protecting natural resources from depletion. The creation of the WTO Committee on Trade and Environment (CTE), reflecting an effort by the WTO to be more sensitive to the environmental implications of trade as well as the trade implications of environmental policy measures, has allowed the first discussion of the potential environmental advantages of reducing or eliminating subsidies. In setting its work plan for 1997-98, the CTE agreed in late 1996 that fisheries subsidies would be included among the economic sectors that would be discussed by the Committee in the context of the environmental benefits of subsidy removal (WTO, 1996).

5. Discussions within the CTE on fisheries subsidies in 1997-1998 highlighted political differences on whether the evidence supported the view that fisheries subsidies have a negative impact on the status of fish stocks and whether such subsidies should be singled out for special treatment. New Zealand argued in an early submission (WT/CTE/W/52) that economic theory suggests that fishing industry subsidies accruing to fishers, vessel builders

and vessel owners "generally encourage the expansion of fishing fleet capacity." The United States also asserted in an early submission (WT/CTE/W/51) that "most subsidies have a negative impact from a conservation standpoint," citing the stimulation of additional capital investment in an already overcapitalized sector and the encouragement of overfishing by vessels already in the fisheries.

6. On the other hand, some participants in the debate downplayed the importance of subsidies as a cause of overfishing, suggesting that it should not be singled out as a factor, that not all subsidies exert a negative impact on fishing capacity, and that sustainable fisheries management needed to be dealt with in a comprehensive manner. A European Communities note (WT/CTE/W/99) took the position that "subsidies do not necessarily exert increased pressure on fisheries resources," and that "overexploitation of stocks is not due to the subsidies regime."

7. Further impetus for inclusion of fisheries subsidies in the future round of multilateral trade negotiations developed in 1999 from the emergence of a broader international coalition in support of a WTO agreement on subsidy removal in the fisheries sector based on the fishing fleet overcapacity problem. During a special session of the General Council of the WTO on the multilateral trade round, Iceland proposed (WT/GC/W/229) that members agree to "eliminate subsidies that contribute to fisheries overcapacity, in view of the fact that they distort trade, seriously undermine sustainable utilization of fish stocks and hamper sustainable development." Nearly 20 countries expressed support for the proposal at the same meeting, including a relatively large number of developing countries. However, in its submission to the General Council on preparations for the 1999 Ministerial Conference (WT/GC/W/221), Japan held that it is "inappropriate to single out" fisheries subsidies.

8. In preparation for the multilateral trade round, a group of states calling itself "The Friends of Fish", including Australia, Iceland, New Zealand, Norway, Peru, Philippines and the United States, was formed to work on the inclusion of fisheries subsidies in the multilateral trade round. New Zealand submitted a proposal (WT/GC/W/292) on behalf of that group of states for a "work programme" on elimination of "subsidies that distort trade in fish products and impact adversely on the conservation and sustainability of global fish stocks".

9. In the final CTE meeting before Seattle in October 1999, the European Communities (EC) and Korea argued that the issue of fisheries subsidies should be dealt with in the FAO, which was in the process of identifying the factors contributing to overcapacity, including subsidies. Canada and Japan were among the delegations arguing that the issue should be

dealt with in the context of broader negotiations on improving subsidy disciplines under the Agreement on Subsidies and Countervailing Measures (WTO/CTE, 1999).

10. "The Friends of Fish" successfully pushed for inclusion of a paragraph in the draft declaration for the Seattle Ministerial calling for the formation of a negotiating group on fisheries subsidies. The proposed negotiating group would examine fisheries subsidies to identify those that "may have adverse effects on trade, environment and sustainable development" as well as those that "may have positive effects in these areas." In a later phase, the group would use this analytical work as the basis for "developing and elaborating WTO commitments and disciplines with respect to fisheries subsidies." The paragraph went to the Seattle Ministerial in brackets (WTO, 1999).

11. At the Seattle Ministerial Conference, the issue of whether and how fisheries subsidies would be integrated into the agenda of a new multilateral trade round was the subject of intensive negotiations. No agreement had been reached when the Seattle meeting broke up without any final ministerial declaration.

12. Discussions on fisheries subsidies in the CTE during 2000 continued to focus on the linkages between subsidies, overcapacity and overfishing and on how best to categorize the full range of subsidies to the fisheries sector in regard to their relationship with overfishing (WTO/CTE, 2000a).

13. Meanwhile, other international organizations are carrying out work that intersects with and contributes to the CTE's work on fisheries subsidies. In 1998, a Food and Agriculture Organisation (FAO) Technical Working Group did substantial technical work on the management of fishing capacity which addressed the role of subsidies (FAO, 1998). FAO then adopted a voluntary International Plan of Action for the Management of Fishing Capacity in February 1999 (FAO, 1999) that calls for states to develop national plans for capacity management that would "balance fishing capacity with available resources on a sustainable basis." In such plans, states should "reduce and progressively eliminate all factors, including subsidies", contributing to overcapacity. In late 2000, FAO convened an Expert Consultation on Economic Incentives and Responsible Fishing (FAO, 2001), which reviewed and issued a report on such issues as the definition of a subsidy, classification of subsidies, and the impacts of subsidies on fishery resources and on trade.

14. In the early 1990s, the Organisation for Economic Co-operation and Development (OECD) undertook the first analytical study of the measurement of fisheries subsidies in member countries (OECD, 1993), which included the first classification of such subsidies to

the fish harvesting sector. More recently OECD published an important study of the fisheries subsidies in OECD countries, which included an estimate of financial transfers to fishing industries in OECD member countries and an analysis of the implications of those transfers for the sustainability of fishery resources (OECD, 2000a). OECD is currently undertaking further work on the costs of government interventions to manage fisheries resources and how these costs are shared between management authorities and users of the resources (Wallis and Flaaten, 2000).

15. The Asia-Pacific Economic Cooperation Forum (APEC) Fisheries Committee commissioned a study that attempted to collect the most complete data possible on fisheries sector support programs in the APEC member economies, to categorize these support programs, and to estimate the total incidence of subsidies in the APEC economies (APEC, 2000). The APEC study did not collect or analyze evidence of the impacts of fisheries subsidies on fishing capacity or on the level of exploitation of fish stocks.

16. International efforts to reform the subsidies regime will require the cooperation of all intergovernmental organisations with relevant expertise on the subject. The FAO, the OECD, APEC and UNEP could continue to build consensus on the issue among their own members or even adopt common principles or guidelines in regard to fisheries subsidies. They could also cooperate with the WTO in the continued development of the data and methodologies for analyzing the relationships between fisheries subsidies and resources, as well as between subsidies and trade in fish products. They might collaborate with the WTO in undertaking further studies on these issues, as suggested in Section III.A.

17. The WTO could negotiate on binding trade rules regarding fisheries subsidies in conjunction with a new multilateral trade round, provided that it finds the subsidies to be trade-distorting. Any such negotiations would presumably involve the existing SCM Agreement. Discussions in the CTE could provide the necessary impetus for future action on fisheries subsidies by the WTO. The next stage of development of the CTE's work could be a structured discussion of substantive issues of fact and analysis and of analytical tools and processes that might be used to achieve greater clarity and consensus on possible policy responses to trade-related fisheries subsidies issues.

II Fisheries Subsidies and Overfishing: Substantive Issues

18. Addressing the relationship between fisheries subsidies and the status of fisheries resources is complex but manageable, because the primary mechanism linking subsidies with the threat of overfishing and ultimate depletion is fishing fleet overcapacity. According to the most recent assessment of the state of the world's fish stocks, of the world's major fish stocks on which enough information is available for assessment, 73-75 percent were either fully exploited, over-fished, depleted or recovering slowly from depletion (FAO, 2000). That means that the fishing fleets fishing for the vast majority of the world's fish stocks either already have too much catching power or cannot add any further catching power without threatening the sustainability of those stocks. Evidence from a wide range of sources indicates that the national fishing fleets of most major fishing countries already suffer from overcapacity that is more than twice the level necessary for a sustainable level of catch (Porter, 1998).

19. Fishing fleet overcapacity has been identified by both FAO fisheries specialists and independent experts either as a major cause of unsustainable levels of fishing or as the principal threat to marine capture fishery resources (FAO, 1997; Mace, 1997; Garcia and Newton, 1997; Pauly et al, 1998; FAO, 1998; FAO, 1999b; Greboval and Munro, 1999; Kirkley and Squires, 1999). The FAO International Plan of Action for the Management of Fishing Capacity (FAO, 1999a), moreover, expressed an international consensus that "Excessive fishing capacity is a problem that, among others, contributes substantially to overfishing." Although fisheries managers have tried for decades to control overfishing, primarily by applying a range of controls on fish catch or fishing effort, such restrictions have invariably failed to prevent expansion of overall fishing effort, because fishers have found ways to compensate for restrictions on some variables by increasing their reliance on variables that are not subject to restrictions (Wilén, 1988; Arnason, 1993). The key issue for analysis and assessment in regard to the linkage between subsidies and overfishing is whether and to what extent fisheries subsidies contribute to fleet overcapacity.

20. In order to clarify the issue of the causal linkages between fisheries subsidies, overcapacity and overfishing and to sort out real disagreements from apparent ones, this analysis addresses four major questions at the heart of the debate:

- Are fisheries subsidies the main cause of fishing fleet overcapacity?
- Do some fisheries subsidies contribute to fishing fleet overcapacity?

- Can well-managed fisheries avoid or minimize the problem of overfishing, even if the fishing fleets are subsidized?
- Do some fisheries subsidies contribute to reducing overcapacity?

A *Are subsidies the main cause of overcapacity?*

21. It is generally accepted that an open-access, common-pool fisheries management system creates a powerful economic incentive for overfishing. Economic theory posits that, in an open access system in which no individual producer has the right to exclude any other from harvesting any part of the fishery resources, fishers will continue to enter the fishery and to maximize their fishing effort until fish stocks are reduced and catch per unit effort declines. Even after the onset of decline, fishers will continue to increase effort until operating costs cannot be covered, by which time the fishery will already be in a state of serious depletion. Thus overcapacity will occur in an open-access, common-pool fishery, whether or not accompanied by subsidies (FAO, 1993; Arnason, 1993; Matthiasson, 1996; Greboval and Munro, 1999).

22. Although open-access, common-pool fisheries are the fundamental cause of fishing fleet overcapacity, subsidies also play a role in increasing capacity, and in some cases have also contributed significantly to the velocity and degree of fishing fleet overcapacity and overfishing. The application of economic theory to the fisheries sector demonstrates that in an open-access fishery a revenue-enhancing or cost-reducing subsidy increases marginal profits at each level of fishing effort and therefore leads to an increased overall fishing effort. This may have the short-term effect of creating additional economic rent for fishers active in the fishery. However, either new entrants or increased effort by existing fishers stimulated by the subsidy will shift the level of effort to the point where rent is dissipated. If the fishery is already at or near maximum sustainable yield, that level of effort will reduce fish biomass (Stone, 1997; Munro, 1998; Arnason, 1999; Nordstrom and Vaughan, 1999; WTO/CTE 2000b; OECD, 2000b). In other words, assuming that the management system does not effectively impose a sustainable level of catch, cost-reducing and revenue-enhancing subsidies will drive the level of overcapacity and overall effort even further than would an open-access, common-pool fishery in the absence of such subsidies.

23. Empirical evidence on the impact of subsidies on capacity and overfishing has been found mainly on case studies of programs involving loans, grants and risk-reduction programs for vessel construction and modernization. These cases, involving programs from the 1960s through the 1980s, are particularly important because they show how subsidies can speed up significantly the transition to overcapacity and overfishing in a given fishery. These cases,

which occurred in a context in which no fisheries management system maintained sustainable catch levels, subsidies for vessel construction and modernization through grants and below-market loans or loan guarantees, produced major leaps in fleet capacity. And those major increases in capacity contributed, in turn, to declining catches or even collapse of commercial fish stocks. Although cyclical natural fluctuations also may have played a role in precipitous stock depletion (OECD, 2000), it is clear that fleet overcapacity was the major factor in stock collapse or decline.

24. The case of Canada's Northwest Atlantic offshore fleet is a particularly striking example of dramatic increases in capacity as a result of subsidies leading to stock depletion. Between 1954 and 1968, Canadian subsidies increased the capacity of the Northwest Atlantic offshore fishing fleet by more than 18 times, creating twice as much capacity as could be used for a sustainable level of catch. A 1970 Canadian government report acknowledged explicitly that its subsidies for vessel construction and modernization over the previous two decades had led to the rapid expansion of larger vessels, creating serious overcapitalization of Northwest Atlantic fleet (Porter 1998a).

25. Despite the collapse of cod stocks in the Grand Bank of Newfoundland in the late 1960s and early 1970s, a new round of Canadian subsidies for vessel construction and improvement in the late 1970s and 1980s increased capacity to five times the catching power needed to catch the annual quota by 1989 (Porter, 1998a). This new expansion was followed by a far worse collapse of Canadian cod stocks (OECD, 1995; Schrank, 1997).

26. The EC and the United States have also provided subsidies for fleet expansion and modernization that resulted in reduction of commercial fish stocks. Between 1970 and 1987 both the EC and member states provided grants for the modernization of the member states' fleets, doubling the gross registered tonnage and tripling the engine power of the combined fleets between 1970 and 1987 (Holden, 1994). The EC Fisheries Directorate concluded in retrospect that "massive state aids" to the fishing fleets of EC member states in the 1970s and 1980s had "encouraged the growth the fishing capacity in the 1980s" (European Commission Directorate General XIV, 1995). That surge in capacity led, in turn, to drastic declines in populations of most of the major commercial fish species in European waters (Holden, 1994).

27. The United States used low-interest loans and loan guarantees in the 1980s to help its fishing industry finance the construction of a large fleet of factory trawlers for the Alaska Pollack fishery of the Eastern Bering Sea, Aleutian Islands and the Gulf of Alaska. As a result, the fleet quickly developed four times more capacity than the fishery could support sustainably. Only the closure of the fishery for most of the year prevented the collapse of the

fishery (Milazzo, 1998; Porter, 1998a). Other major fishing states in which generous subsidies for vessel construction have contributed significantly to overcapacity in the past include: Spain in the 1960s (Hjul, 1972) and Chinese Taipei in the 1960s and 1970s (Chuang and Zhang, 1999).

28. The OECD's study of OECD countries' subsidies and resources sustainability, based primarily on case studies submitted by member states themselves (OECD 2000a), confirms that subsidies contributed to overcapacity in the cases of New Zealand in the 1970s and early 1980s, Spain's Gallician fisheries in the 1980s, Norway in the 1960s, the United States in the late 1970s and 1980s and the EU during the 1980s. It does not address the cases of Canadian subsidies in the 1960s, 1970s and 1980s.

29. The timing of each of these subsidy programs for vessel construction and modernization made it particularly important to the development of fleet overcapacity. Each of these cases involves fishery resources that were in a transition phase from not yet being fully exploited to being overexploited. Although it is impossible to know how rapidly the fisheries in question would have reached the point of overexploitation in the absence of subsidies, we know that it would not have occurred as rapidly as it did in fact.

30. Assessing the relationship between continuing subsidies and overcapacity under the present circumstances of most marine fisheries is more complex. According to FAO, global fleet capacity appears to have grown only marginally in the 1990s (Greboval, 1999). Furthermore, additional catch and effort restrictions have been imposed in many countries, so that additions to capacity do not always translate into additional effort. Finally as OECD has noted in its study of fisheries subsidies and resource sustainability in OECD member states (2000a), there are multiple influences on fish stock health. So it is not surprising that the subsidies provided in recent years in OECD countries could not be directly linked in most cases to continued deterioration of fishery resources.

31. With most major fishing fleets already suffering from serious overcapacity, however, a central problem for fisheries management is how to *reduce* that capacity as rapidly as possible. In many marine fisheries worldwide, fleet overcapacity is accompanied by inadequate controls over effort, leading to overexploitation of resources. In fisheries with excess capacity, fishers have strong incentives to exceed catch limits, and to underreport their catch, thus making it more difficult for fisheries management to set catch limits at sustainable levels while increasing their monitoring, control and surveillance problems (Shepherd, 1981; Beddington and Rettig, 1983; Anthony, 1990; Nielsen, 1992; McCay and Finlayson, 1995; Corten, 1996; Greboval and Munro, 1999; OECD, 2000a). Moreover, the existence of fleet

overcapacity creates greater political pressures on fishery managers to agree to set catch limits beyond sustainable levels (FAO, 1983; Dupont, 1996).

32. Moreover, it is not sufficient to ask whether a particular fisheries subsidy leads to *increased* capacity. It is also important to know whether or not the subsidy hinders efforts to *reduce* capacity. Vessel owners tend to delay exit from the industry by scrapping boats because of high sunk costs (FAO, 1993). But the existence of subsidies further inhibits the difficult process of capacity adjustment. Just as subsidies attract more investment to the fishing industry in an under-exploited industry than would have occurred without subsidies, they have the effect of slowing down the exit of capital from the fishing industry even when the industry is in serious financial difficulty because of overcapacity and resource depletion (Beddington and Rettig, 1983; FAO, 1993). An extreme example of the inhibiting effect of subsidies on withdrawal of capital from an industry that is financially troubled because of declining catches is the case of the increased Norwegian support for the fishing industry in the late 1970s and early 1980s, which masked the decline in fish catches and net value added and resulted in *increases* in the number of vessels, fisheries and fleet engine power (OECD, 2000a). High levels of support thus effectively obscure the signals from the fishery calling for capacity adjustment,

33. Payments to foreign countries to cover a significant part of the effective costs of a distant water fleet's access to a foreign fishery have the effect of subsidizing the foreign fleet in question. Explicit but indirect subsidies are imbedded in international fishing access agreements through an agreed level of compensation for an agreed level of access for distant water fishing fleets (IFREMER, 1999). Some of the fisheries to which such payment has ensured access were already fully exploited or over-exploited. Thus analyses of foreign access payments have suggested that they have, in some cases, encouraged and facilitated overfishing in the fishing zones of developing countries (Porter, 1997; Milazzo, 1998).

34. Tax preferences affect fleet capacity mainly by making it cheaper for vessel owners to purchase intermediate inputs, particularly fuel. Empirical observation, based on several case studies, has established that the most important effect of tax preferences for fuel is that they have encouraged vessel owners to buy more expensive fuel-intensive engines. Those engines, in turn, allow greater range of fishing and much larger catches (Beddington and Rettig, 1983; McGoodwin, 1990).

35. The impact of income maintenance programs on fleet capacity lies in their slowing the process of exit from the fishing industry, despite massive overcapacity and stock depletion (McLeod, 1996; Schrank, 1997). The distorting effects of such programs have been

documented in the case of the Canada's Special Seasonable Fishermen's Benefits Programme (1956-1996). This programme, which provided income maintenance payments to unemployed fishers during the "off-season", probably increased the fishing season of marginal fishers and delayed the restructuring of the Canadian industry that followed the North-West Atlantic groundfish collapse in 1992 (Schrank, 1997; OECD 2000b). One potential danger of such subsidies is that the idle fishermen and vessel owners will put pressure on fisheries managers to reopen depleted fisheries prematurely and to allow more fishing than is sustainable (McLeod, 1996).

B *Can well-managed fisheries avoid or minimize the problem of overfishing, even if the fishing fleets are subsidized?*

36. Whether the fisheries management system can neutralize the negative impacts of subsidies on fishing fleet capacity and over-exploitation is a critical issue for potential negotiations in this area. In a recent submission to the CTE (WT/CTE/W/173) Japan asserted that "possible negative effects of fishery subsidies can be minimized if appropriate management and conservation measures are taken." Other states have taken the same position.

37. An analysis based on a simple economic model argues that in a fishery managed through individual transferable quotas (ITQs), subsidies would not result in any change in fishing effort or in biomass of fishery resources unless the subsidies were accompanied by a change in the total allowable catch (TAC). Without such a change in TAC, the subsidy would simply represent a straight transfer of resources to industry (Arnason, 1999). However, this theoretical exercise is of extremely limited practical importance. Historically, subsidies have accompanied common-pool fisheries management systems in which the race to fish is a major problem, rather than systems in which user property rights have been assigned. It is extremely unlikely that the management authority of a fishery managed through ITQs would choose a scheme of harvesting subsidies as a policy (Arnason, 1999).

38. If a combination of fisheries management instruments other than ITQs could effectively control the level of effort at the level at which rents in the fishery are maximized, it would similarly negate the effect of subsidies in expanding capacity and effort (Flaaten and Wallis, 2000). But very few fisheries management systems have demonstrated the ability to keep catches below levels that put pressure on the stocks. As argued above, excessive fleet capacity, which is the most common situation in global fisheries, significantly complicates the problem of preventing overexploitation of fish stocks.

39. Even if continued subsidies to the fisheries harvesting sector do not cause increased capacity or effort in a given country, they are very likely to delay or prevent the major reductions in capacity and effort that are needed throughout the world. Without such major cuts in capacity, the world is not likely to achieve sustainability in marine fisheries. It would be unwise, therefore, to base international policy toward the fisheries subsidies regime on the theoretical proposition that well-managed fisheries can neutralize the negative impacts of subsidies.

C *Do some fisheries subsidies contribute to reducing overcapacity?*

40. One of the issues of greatest concern in the fisheries subsidies debate is whether subsidies aimed at reducing capacity and "adjusting" fleet capacity are considered as environmental subsidies and given a special status within a fisheries subsidies regime, as are some subsidies in the WTO Agriculture Agreement. This concern reflects the fact that funding for withdrawal of fishing vessels or licenses, or both, and for vessel construction and modernization linked with fleet adjustment represents the single largest category of financial transfers apart from fisheries management services. These programs represent nearly 40 percent of the total of OECD direct payment and cost-reducing subsidies to fisheries. For Spain, these capacity-reduction and capacity-adjustment subsidies account for 56 percent of national subsidies and 50 percent of EU subsidies for that country's fleet. For both the United Kingdom and Sweden, they represent 100 percent of the direct payment and cost-reducing subsidies (OECD 2000a).

41. Virtually every major fishing state has used some kind of decommissioning scheme over the past three decades in order to reduce overcapacity in its fishing fleet. A number of states are now carrying out such programs, including the United Kingdom, Spain, the United States, Canada, Korea and Chinese Taipei (OECD, 1985; OECD, 1995; OECD, 2000a). In discussions within the CTE (WT/CTE/M/22), several participants have strongly asserted that state aid for decommissioning of fishing vessels should be considered as benefiting the fishery.

42. Under ideal circumstances, programs to reduce capacity by retiring vessels or licenses could make a major contribution to capacity reduction worldwide. A recent study based on case studies submitted by OECD member states (OECD, 2000a) found that transfers aimed at capacity reduction, "combined with appropriate management measures, can reduce pressures on fish stocks." However, experience with such subsidies in a number of countries shows that it is extremely difficult to design a decommissioning scheme that will stem the continued growth of fishing capacity as long as the overall incentive structure in the sector continues to

encourage the "race for fish". These programs may temporarily remove vessel capacity from the fleet, but those who remain in the industry will still be motivated to make additional investment in greater total effort or more efficient gear (i.e., "input stuffing") and will have additional resources with which to do so. The eventual increase in capacity can easily drown out the initial reductions in capacity obtained by the decommissioning or buy-backs (Munro, 1999). Immediate reductions in capacity obtained by buy-backs have been overwhelmed by "input stuffing" in a number of fisheries, including the Australian southern shark fishery, the British Columbia salmon fishery, and others in the Netherlands and Denmark (Gates *et al.*, 1997b).

43. The designers of decommissioning schemes face a dilemma in determining how to use the money available for decommissioning premiums. To the extent that the program succeeds in reducing capacity in the short run, it will make the fishery more profitable for those remaining in the fishery. That will in turn makes vessels and licenses more valuable and stimulate increased investment in fishing capacity. Eventually, this increased investment translates into increased pressures on stocks. An example of this pattern is the license buy-back in the Atlantic Canada Inshore Lobster Fishery, which retired 22.6 percent of the licenses in the fishery as of 1978. The short-term result was both increased landings per fisherman and an increase in spawning females. However, as income increased, vessels became increasingly larger, more powerful and better equipped, overwhelming the earlier retirement of licenses (Gates *et al.*, 1997b).

44. Some decommissioning programs in the past decade, including EC-funded programs in Holland, Denmark, the UK, France and Spain, have either offered a fixed rate premium based on tonnage and engine power, or have actually given priority to older and less technologically upgraded vessels, rather than basing the premiums on the catch records of the vessels (Gates *et al.*, 1997b; Nautilus Consultants, 1997). The Chinese Taipei decommissioning scheme was based on a fixed payment per vessel ton (Chuang and Zhang, 1999)

45. Under these circumstances, vessel owners usually apply for withdrawal subsidies for those vessels with the least economic value, and then use funds from buy-back programs to purchase and/or modernize another vessel, often one that had previously been inactive. For example, the UK decommissioning scheme from 1993 to 1996, was found to have caused only the withdrawal of those vessels with lower "effort characteristics" in all but two fleet segments (beam and nephrops trawlers). The vessels commissioned were older, had fewer days at sea and lower annual earnings. Vessel owners reported that they were motivated to decommission vessels that were "near the end of their economic life." The UK scheme reduced fleet capacity in the short-run but provided capital to vessel owners that could be

reinvested in the purchase of newer vessels or modernize existing ones (Nautilus Consultants, 1997). A 1990-91 vessel withdrawal program in Japan's Shimane prefecture, funded by both central and prefectural government as well as by vessel owners who remained in the fishery, reduced the number of vessels in the fleet by 22 percent, but accelerated the replacement of aging vessels with new, more powerful ones (OECD, 2000a).

46. A systematic obstacle to the meaningful reduction of capacity through decommissioning schemes is that there are already many licensed but inactive vessels in overcapitalized fisheries that can easily be turned into active capacity if rents in the fishery are increased. By paying premiums for the removal of vessels from the fishery, decommissioning schemes stimulate the conversion of such idle capacity to active capacity by making the reactivation of vessels more profitable and by providing capital with which modernization of previously idle vessels can be carried out (Holland and Sutinen, 1998). In the case of the UK scheme, the removal of a significant number of vessels from the fleet led to the creation of a more dynamic market for second-hand vessels both by increasing the demand for such vessels (Nautilus Consultants, 1997).

47. The negative externalities of decommissioning schemes are often exacerbated by loosely drawn rules allowing vessel owners relatively wide latitude in reinvesting their premiums or in reusing the vessel and gear associated with a retired license. In Taiwan, for example, the buy-back program carried out after 1990 allowed vessel owners not only to use withdrawal premiums to upgrade other boats, but also to absorb the crew from the withdrawn vessel, thus more than offsetting the positive effect of the subsidy. Although the number and tonnage of vessels decreased after the program went into operation in 1990, the total engine power continued to increase (Chuang and Zhang, 1999). A study of the UK scheme found that the main reason for decommissioning by vessel owners was that they could use the decommissioning premiums to finance the purchase of new vessels (Nautilus Consultants, 1997). In EC member countries, decommissioning schemes were viewed during the 1980s primarily as a means of modernizing the fleet by scrapping older vessels rather than as a means of reducing capacity and overfishing (Salz, 1991).

48. Many withdrawal programs have no limits on the use of vessels owned by an owner whose license is retired under the program. Some programs allow the vessel to be used in the same fishery (Holland and Sutinen, 1998). Until 1994, the EC-financed program failed to withdraw licenses when vessels were withdrawn, which allowed vessel owners to use their scrapping premiums to build new vessels (European Commission, 1995). The UK program did not clearly require that the vessels decommissioned be scrapped, with the result that they subsequently reappeared on the UK fleet register (Nautilus Consultants, 1997). Other

programs allow the export of the vessels outside the country or countries covered by the program. Canadian and EC programs have encouraged such migration of excess capacity to distant water fisheries (World Resources Institute, 1996; FAO, 1998b, Munro, 1999). In the 1994-99 period, approximately one-third of the vessel capacity withdrawn from EC member fleets under Community-financed programs had been exported to overseas fleets or fish in distant water fisheries in connection with joint enterprises (OECD, 2000a). Such loose conditions make decommissioning programs more attractive to owners, so closing that loophole would make it far more expensive to buy back licenses (Holland and Sutinen, 1998).

49. Fishing states that implement current decommissioning schemes have begun to link them with tighter controls on capacity and effort. Korea, for example, is requiring the retraction of licenses and prohibiting reentry of decommissioned vessels in conjunction with its vessel buy-back program. The UK has established stiffer penalties for license aggregation and imposes limits on "days-at-sea" in conjunction with its decommissioning scheme (OECD 2000a).

50. But even these controls may not prevent "in-put stuffing" from occurring. One of the most important factors in a vessel's capacity is the skill of the captain. If a skipper from a retired vessel is brought on to a previously inactive one, it can significantly increase that boat's real ability to catch fish (Gates *et al.*, 1997a). Vessel owners who own other vessels cannot be prevented from making technological improvements to them with the decommissioning premium. If total capacity active in the fishery is substantially reduced, vessel owners still active in the fishery will take advantage of the opportunity for additional profit by finding ways to increase the catching power of their vessels.

51. Part of the dilemma of vessel buy-backs in a fishery is that they raise "moral hazard" problems. Based on basic economic logic, the existence of a capacity reduction subsidy scheme can be expected to encourage investors or potential investors to believe that such a scheme will be available in the future, thus reducing the expected costs of investment in new capacity are reduced (Arnason, 1999; Munro, 1999; OECD, 2000a). A survey of vessel buy-backs comes to the same conclusion: such schemes create the implicit expectation that the government will rescue the fishing industry whenever profitability is threatened by stock depletion or developments that raise its costs (Gates *et al.*, 1997a). Moreover, if the program ranks applications on the basis of the ratio of the bid to historical catches, which is necessary to maximize the short-term effect on capacity, it will benefit those who have caught the most fish. That could, in turn, cause vessel and license owners in other fisheries that are overcapitalized to attempt to increase their share of the catch in order to maximize anticipated future benefits from such a program (Read and Buck, 1997).

52. The experience of past decommissioning or buy-back schemes indicates that it is dangerous to assume that they will succeed in reducing capacity. They may even inhibit the necessary adjustment by the industry.

53. An example of a subsidy that is justified by the objective of contributing to the adjustment of fishing capacity to sustainable levels is the European Community's assistance for "fleet renewal and modernization". This program is linked with the EC's "Multi-annual Guidance Programs" (MAGPs), which set targets for fleet capacity reduction for each member state. The EC provides support for vessel construction and modernization for a member state's fleet on condition that an equal or greater amount of capacity is retired from its fleet, in keeping with the capacity reduction targets set in each member state's MAGP. The fleet renewal and modernization program is aimed at providing an incentive for EC member states to meet these targets.

54. The need for deep cuts in fishing fleet capacity of EC members states has been apparent at least since 1990, when an independent group of scientists convened by the European Commission advised that fleet capacity had to be cut by at least 40 percent on average (European Commission, 1995). The targets for capacity reduction for the 1991-1996 period (MAGP III) for the EC fleet as a whole represented an 8 percent reduction in tonnage and a 7 percent reduction in engine power (European Commission, 1995). According to the Commission's data on the final results of MAGP III, the combined EC fleet, excluding Sweden and Finland (both of which entered the EC in 1995), showed overall reductions of 18 percent in tonnage-- from 20.1 million GRT at the end of 1991 to 16.44 GRT at the end of 1996 --and 12 percent in engine power -- from 83.5 million Kw at the end of 1991 to 73.3 Kw at the end of 1996 (European Commission, 1997).

55. Both the Commission and the European Court of Auditors cast doubt on these figures, however. Later data on the fleet register as of the end of 1996 showed that total fleet tonnage was nearly 20 percent higher than had previously been shown on the fleet register and that engine power was 3 percent higher (European Commission, Directorate-General XIV, 2000). The new data would change the 18 percent reduction in tonnage to a 2 percent increase and the 12 percent reduction in engine power to a nine percent reduction, averaging out to an overall 3 percent capacity reduction. Even the revised figures were not considered reliable because of the heterogeneous measuring units for fleet tonnage used by different member countries and the widespread practice of lowering the engine power of vessels in order to meet MAGP targets (European Court of Auditors, 1994; European Court of Auditors, 1997; Earle, 1998).

56. Another serious problem in calculating changes in EC fleet capacity is the effect of technological improvements, which is not captured in figures for weight and engine power of vessels. The European Commission estimated the rate of increase in fleet capacity from this factor at 2 percent annually (European Commission, 1995). However, six different case studies of growth in the productivity of fleets in OECD member country fisheries suggest that the average annual increase in catch from technological change is probably 3 percent and could be even higher (Porter, 1998b). When the nominal changes in capacity achieved by MAGP III are adjusted to reflect the otherwise unregistered increase in capacity in the EC fleet from technological change of 15 percent or more, it appears that fleet capacity had increased by as much as 12 percent during the five year period.

57. The MAGP IV targets for capacity reduction for 1997-2001 again fall short of what would have been needed to prevent further expansion of capacity in the EC-wide fleet. The Commission proposed that, in light of evidence of a net increase in depleted and over-fished stocks during MAGP III, fleet segments exploiting depleted and over-fished stocks should be reduced by 30 percent and 20 percent respectively, bringing about an overall reduction of 15 percent. However, the plan adopted by the EC Council allowed fleet segments targeting depleted and over-fished stocks to reduce *less* than other fleet segments, producing an overall effort reduction target of only 5 percent. Half of that target is to be accounted for by activity reductions rather than capacity reductions (European Commission, 2000). When technical progress is taken into account, the achievement of the MAGP IV target would still allow another 12 percent increase in fleet capacity.

58. The lesson of the EC experience appears to be that subsidies for modernization of a fleet, unless accompanied by stringent management conditions, can actually hinder efforts to reduce overall effort in the fishery as well as the fleet's overall capacity. Such management conditions include standard measures of tonnage and engine power, close attention to the technological change that is not captured by these measures, and effective monitoring claims of capacity reduction. These management conditions may be politically very difficult to achieve.

III. Issues and Options for Structured Discussion

A. Methodology and Process for Establishing a Common Factual Baseline regarding Subsidies and Overfishing

59. Significant descriptive and analytical work on the relationship between fisheries subsidies and overfishing has been done by various international organisations in recent years. Nevertheless, wide differences of view among interested states remain on how different types of subsidies impact on fisheries resources. Therefore, it would be useful if agreement could be reached on either methodologies or processes, or both, by which a body of facts and analysis on the linkage between subsidies and overfishing could be established as the basis for further international discussion and possible action.

60. In order to determine which subsidies are harmful to fisheries resources and which are not, it is necessary to choose appropriate criteria and methodologies for establishing the linkages between subsidies and overfishing. What criterion should be used for evidence that a subsidy harms fishery resources? Does it have to be shown that a subsidy results directly in increased exploitation of fishery resources? Or is it enough to show that subsidies hinder the necessary process of reducing effort or fleet capacity in a fishery that is already overexploited? As noted above, most fleets are already seriously overcapitalized, and it is arguable that the criterion for judging a negative impact on sustainability in those cases should reflect the historic shift in the nature of the problem for most fisheries from preventing overcapacity to reducing it.

61. The methodologies to be used depend on the criterion that is appropriate to the case. The FAO Expert Consultation on Economic Incentives and Responsible Fisheries (FAO, 2001) identified two additional methodological approaches to the analysis of impacts of subsidies on fishery resources that would involve dynamic bioeconomic models. These approaches would attempt to trace the effects of subsidies through changes in profits, changes in effort and finally to changes in the state of the stock as measured by changes in biomass. Although such methodologies would be appropriate in the case of fisheries that are still under-exploited or fully exploited, they would not identify all the impacts of subsidies on fisheries that are already overexploited. Other methodologies need to be devised for analyzing the linkages between subsidies and the process of adjustment of fleet capacity to sustainable levels of catch.

62. If the international community determines that the impacts of fisheries subsidies on the sustainability of the resource should be established in a manner that is broadly accepted internationally, three procedural options could be discussed.

- A study by secretariats of intergovernmental organizations;
- A study by independent experts;
- A mediated intergovernmental fact-finding process.

63. The WTO Secretariat has traditionally undertaken the function of providing background papers to delegations of member states to assist WTO committees in carrying out their work programs. A recent Secretariat paper outlined the contribution of economic theory to assessing fisheries subsidies and summarized the literature on the subject (WTO Committee on Trade and Environment, 2000b). As a next step, the CTE could mandate a detailed analysis of different types of fisheries subsidies in regard to their impact on overcapacity and overfishing. This work would need to be undertaken with the cooperation of other international organisations, such as the FAO, the OECD, APEC and UNEP, based on the work already done by those organisations. Another possibility is a joint study undertaken by the secretariats of two or more international organizations.

64. A working group of specialists could be used to provide the finding of facts on the impacts of different types of subsidies on fisheries resources. Given the complexity of the problem of fisheries subsidies and resource sustainability, this option would have to go beyond a single expert consultation. It would require that a group of experts meet several times and that its members undertake research during the periods between meetings. The independent experts would consider the work on fisheries subsidies and overfishing done previously by international organizations, determine what additional work is required, and allocate responsibilities for undertaking that work.

65. The option of a mediated intergovernmental process of fact-finding has been used to build or maintain consensus on basic scientific or technical issues associated with various global environmental problems (Porter et al, 2000). In the case of the global climate regime, the function of fact-finding has been carried out since 1988 by the Intergovernmental Panel on Climate Change, which is a body combining government officials and independent scientists. Short-term mediated fact-finding has also been used to overcome conflicting views. A 1986 conference of government experts on alternative regulatory strategies for ozone protection, which was convened and facilitated by UNEP, helped build consensus on the need for international regulation of CFCs by establishing a common understanding of the consequences of various regulatory schemes (Benedick, 1991). Such a mediated process for government representatives to try to reach a common understanding of the impacts of fisheries subsidies could be convened under the auspices of one or more intergovernmental organisations.

B. Defining a Subsidy for the Purpose of Fisheries Subsidy Reform

66. One of the threshold issues that would need to be addressed in crafting a regime for the use of fisheries subsidies is how to define the term subsidy in the fisheries sector. Reaching agreement on the definition of a subsidy in the fisheries sector would be a necessary step toward bringing fisheries subsidies under a discipline for both environmental and trade purposes.

67. The definition of a subsidy found in the SCM Agreement is now the only legal definition of a subsidy in international trade law. This agreement defines a subsidy in specific terms as a "financial contribution provided by, or at the direction of, a government" that confers a "benefit" (WTO, 1995). It further specifies that, in order to be considered a subsidy, such a contribution has to involve one of the following:

- Direct transfer of funds or potential direct transfer of funds or liabilities;
- Forgone or uncollected revenues that would otherwise be owed the government;
- Provision of a good or service to a firm or industry other than general infrastructure;
- Any type of income or price support.

68. In order to establish a new fisheries subsidies regime based on trade law, the current SCM Agreement definition of a subsidy would need to be reviewed for possible amendment or clarification. It is not clear whether the existing definition can be interpreted as covering some of the measures that are relevant to the both trade and resource sustainability in the fisheries sector (Stone, 1997, Porter, 1998a).

69. In establishing a definition of subsidies in the context of a new fisheries subsidies regime, therefore, four broad options appear to be open to the international community:

- to use the existing definition in the SCM Agreement without amendment or clarification.
- to make sector-specific clarifications and adjustments in regard to the scope of the definition, for instance by including indirect but explicit subsidies and determining what government infrastructure programs in the fisheries sector, if any, should be excepted from the scope of the definition.
- to include the failure to charge the costs of some or all fisheries management services to the fishing industry within the scope of the definition, in addition to the modifications in the second option.

- to establish a radically expanded definition of subsidy in the fisheries sector that would include within its scope not only the broadening in the second and third option but the failure by government to enforce adequately sustainable fishing practices within its fisheries.

70. One issue that needs clarification is whether the SCM definition covers cost-reducing interventions to meet some of costs of access to foreign fishing zones for distant water fleets through payments to foreign countries under bilateral fishing access agreements. The SCM Agreement definition requires an actual or potential *direct* transfer of funds to the beneficiaries of the subsidy. Some trade specialists suggest that the word "direct" in this context does not necessarily mean that the transfer must be directly to the producer. However, the language lends itself to the argument that it was not intended to cover such government to government payments under a fisheries access agreement (Porter, 1998a). Clarification of the definition in regard to the criterion of the directness of a resource transfer would be necessary to deal with this type of subsidy in any new fisheries subsidy regime.

71. Another issue relating to application of the SCM disciplines on subsidies to the fisheries sector is the requirement that a subsidy must be "specific to an enterprise, industry or group of enterprises or industries" in order to be actionable under the Agreement's disciplines. In the past this requirement for specificity has been narrowly construed so that an entire economic sector such as agriculture was not considered a specific industry for the purpose of subsidy law (Ragosta, 1990). It is not clear, for example, whether fuel subsidies to a country's fishing fleet would be considered an actionable subsidy under the SCM Agreement if similar tax benefits were available to other sectors as well (Porter, 1998a).

72. A major issue in defining a subsidy in the fisheries sector is whether the provision of fisheries infrastructure projects or government fisheries management services without charge to the industry should be included within the scope of the definition of a subsidy. The issue of fisheries infrastructure deserves special attention in this regard. The SCM Agreement exempts "general infrastructure" programs from the scope of that element of its definition of subsidy covering a "service to a firm or industry". In general, that term is understood to encompass the basic infrastructure, such as highways and ports, which benefit both a specific industry and the general public. If the infrastructure project funded by a state is more specific to a particular industry, it could be considered a subsidy, however. Unfortunately, past trade dispute resolution panels have not clarified how "general" and "specific" are to be distinguished. Trade lawyers have suggested that the issue could turn on whether the private sector normally pays for the type of infrastructure in question, as well as how broadly the benefits are distributed within the sector as a whole (Milazzo, 1998).

73. In 1997 OECD member states spent approximately \$4.9 billion on fisheries infrastructure projects and on fisheries services, mainly, research, management and enforcement -- about 77 percent of their total financial transfers to the fisheries sector. And of this figure the largest item of expenditure was for fisheries infrastructure, such as fishing ports, artificial reefs, and "enhancing fishing communities" (Flaaten and Wallis, 2000). Japan alone has spent approximately \$2 billion annually on fishing ports and villages (Milazzo, 1998). Obviously, such infrastructure projects are used by and benefit primarily by the fishing industry. It is arguable that they represent a "a good or service" that is being provided to the fishing industry at no cost, and therefore should be considered a subsidy under the current WTO definition.

74. The provision by governments of fisheries management services aimed at averting the threat of depletion of fish stocks (monitoring and surveillance, stock assessments, research on sustainable fishing gears, etc.), present a somewhat different problem. These services clearly benefit the general public as well as the industry. Based on this characteristic, they could be excluded from that part of the definition involving provision of a "service" to an industry. However, government funding of such services could also be viewed as allowing that industry to avoid internalizing the environmental costs of fishing. In economic theory, when the full social costs of production of a good are not borne directly by the producer or the consumer, but by the rest of society, it is considered to be an "implicit subsidy" (OECD, 1996). The principle of full internalization of environmental costs in natural resource pricing was adopted in UNCED's Agenda 21 (Paragraph 8.31(a)). The purpose of the principle was to reverse the tendency to treat the environment as a "free good" and to pass environmental costs on to society as a whole.

75. States hold conflicting views on how the benefits of such fisheries management functions, such as research on the sustainability implications of different gears, stock assessments and monitoring and surveillance, should be treated. Most countries have regarded such services as benefiting the general public more than the fishing industry; whereas others have considered that they benefit the fishing industry primarily (OECD 2000a). Australia and New Zealand currently recover 100 percent of attributable costs of management from commercial fisheries from the industry through fishing permit fees and other charges to the fishers (Hatcher and Pascoe, 1998).

76. The FAO Expert Consultation on Economic Incentives and Responsible Fisheries (FAO, 2001) was unable to reach a conclusion on "whether the failure to charge for the costs of fisheries management services constitute(s) a subsidy to the producer." The consultation noted that the issue has not been sufficiently researched and that economic reasoning is not

conclusive. Work now being undertaken by OECD on the costs of management services should be helpful in further clarifying the issue.

77. The disadvantage of defining a subsidy in the fishery sector to include public funding for these management services or the failure to regulate fishing operations adequately is that it would greatly complicate the task of reaching agreement on fisheries subsidy reform. Very few governments appear ready to consider such a step at this stage. Building global consensus on full-cost internalization, regardless of the sector in question, may be possible only through a voluntary approach of establishing basic principles and guidelines, as has been practiced in OECD in the past, rather than through new trade rules.

78. Some fisheries specialists would extend the concept of implicit subsidy to include the failure of government to require the fishing industry to harvest fish in a sustainable manner. It has been argued that this shifts the costs of negative externalities associated with fisheries to the public, and that argued that such implicit subsidies may have significant impacts on both fishery resources and trade (FAO, 2001). This far-reaching definition would be unlikely to obtain any support from the international community, however.

C. Alternative Approaches to Categorizing Subsidies

79. Participants in the CTE discussions have generally agreed on the importance of establishing a categorization of subsidies that would reflect differences in their impact on the sustainability of fisheries resources. Agreement on a common scheme for categorizing fisheries subsidies could be reached without prejudice to questions of how a subsidy should be defined in legal terms. A common set of categories could be regarded as a point of departure for further discussion of both definitional and analytical issues.

80. Four different schemes for categorizing fisheries subsidies were produced in 2000 by the United States (WT/CTE/W/154), the OECD Secretariat (OECD, 2000a), the APEC Fisheries Working Group (APEC, 2000), and the FAO Expert Consultation on Economic Incentives and Responsible Fisheries (FAO, 2000). The scheme proposed by the United States includes 21 distinct types of subsidy organized into two broad themes and ten categories. The ten broader categories are shown in Figure 1. The OECD analysis (see Figure 2) uses seven distinct categories, (OECD, 2000a), while the APEC "generic" list of categories (see Figure 3) includes six categories, most of which overlap with the OECD scheme. The FAO Expert Consultation (FAO, 2001) added twelve types of subsidies under the categories of cost-reducing and revenue-enhancing subsidies, with fishing capacity reduction programs as a third category.

Figure 1

U.S. Categories	
<u>Cost-reducing subsidies</u>	
1.	Commercially applicable research funding
2.	Capital cost-reducing subsidies
3.	Reduction of income and sales taxes
4.	Risk mitigation
5.	Government-ownership and state trading if inconsistent with market terms
6.	Assistance to shipbuilding specifically for fishing vessels
7.	Foreign access payments and assistance to foreign fishing ventures
<u>Subsidies that support incomes and prices</u>	
8.	Price support programs
9.	Trade-promoting subsidies
10.	Sector-specific social assistance programs

Figure 2

OECD Categories	
1.	Fisheries infrastructure
2.	Management, research, enforcement and enhancement
3.	Access to other countries' waters
4.	Decommissioning of vessels and license retirement
5.	Investment and modernization
6.	Income support and employment insurance
7.	Taxation exemptions

Figure 3

APEC Categories	
1.	Direct assistance to fishers and fisheries workers
2.	Lending support programs
3.	Tax preferences and insurance support programs
4.	Capital and infrastructure support programs
5.	Marketing and price support programs
6.	Fisheries Management and conservation programs

81. The four schemes have a number of overlapping categories, some of which can be simplified without losing the common mechanism by which the subsidies are linked with resources. The APEC scheme has usefully combined subsidies for vessel construction and modernization and other capital costs with infrastructure projects which are also capital costs. how various capital costs are treated. Another major difference among the schemes is how decommissioning schemes are handled. The U.S. combined category of subsidies that support incomes and prices constitutes another useful simplification, because the objective in both cases is to maintain incomes rather than to affect the fleet or the management of the fishery.

82. The U.S. scheme deliberately omits vessel decommissioning on the ground that they are considered as capacity-reducing subsidies. The OECD and FAO schemes treats it as a distinct category, whereas the APEC scheme puts both vessel and permit buy-back programs under the category of Fisheries Management and Conservation. Decommissioning and license retirement schemes clearly have a relationship to the fishery resources that is different from basic fisheries management services and should be separated out from such services. It should be included in any common categorization scheme as a key form of subsidy whose status in relation to overfishing remains to be determined.

83. The US and OECD schemes cover foreign access payments as separate categories, but the APEC schemes puts it within the category of "capital and infrastructure support", even though such payments are not capital costs but recurring costs.

84. Categories such as "lending support" and "tax waivers and deferrals" are less useful for the purpose of categorizing subsidies, because they relate to the instrument used to provide the financial support rather than the result that the support is aimed at bringing about.

Focusing on what the financial support provides to the industry (payment of capital costs, cheaper intermediate inputs, particularly fuel), brings us closer to the analysis of impacts.

85. A simplified categorization scheme, based on the above observations, is shown in Figure 4.

Figure 4

A Synthesis Categorization

- 1. Fisheries management services**
- 2. Subsidies to capital costs, including infrastructure**
- 3. Decommissioning and license retirement**
- 4. Subsidies to access to foreign fisheries**
- 5. Subsidies to incomes**
- 6. Subsidies to intermediate inputs**

86. This simplified categorization is not intended as a guide to policymaking but would serve as the basis for further work in analyzing the impacts of fisheries subsidies on fisheries resources. In the case of management services, identifying it as a putative subsidy to be studied should not be taken as a determination that it should be included in the scope of a revised or clarified legal definition of subsidy. Nor should the identification of decommissioning and license retirement studies by their announced objective be taken to mean that they necessarily achieve that objective and should be granted a privileged status in any subsidy regime.

87. Two approaches have been suggested for using a categorization scheme as the basis for international policymaking on fisheries subsidies. The US list of types of subsidies identifies only those that are considered as "environmentally harmful" and trade-distorting, suggesting that all such subsidies should be prohibited. This approach might be called the "red list" approach to a subsidies regime. It would assume that each type of subsidy could be identified unambiguously either as 1) contributing to overcapacity and overfishing, or as 2) contributing to the sustainability of the resources. The major advantage of such a scheme would be its simplicity and its minimization of opportunities for evasion. This approach could result in a very clear set of obligations, without opportunities to continue fisheries subsidies in a new guise.

88. The main disadvantage of this approach is that it does not deal with the objection raised by some governments that the impact of a particular subsidy type cannot be determined in the abstract, but only in the context of a particular set of management system parameters. Japan (WT/CTE/W/173) has argued that international measures on fisheries subsidies should not be taken by broad categories of subsidies, but should be based on a "case-by-case" consideration, identifying the circumstances, in terms of different types of management systems, in which a given subsidy would have negative impacts on fishery resources. That in turn suggests an approach that would identify *combinations* of subsidies and management system parameters that would either contribute to overfishing, help reduce overfishing or be neutral in its effect. Such an approach would take the form of a *matrix* rather than a list. Instead of identifying a set of prohibited subsidies, it would identify the general management conditions under which a given subsidy type would be acceptable and those under which it would be unacceptable.

89. An example of how a matrix might be constructed is shown in Table 1. Along with the seven basic subsidy types, the matrix presents in very simplified form four management parameters: whether the fishery is open access, whether property rights have been allocated to fishers, and whether effort and output controls are weak or strong. The case of open access with property rights has been omitted as an unrealistic scenario, and output and capacity controls are combined in order to reduce the cells to a minimum. An effort to make the matrix more realistic would entail separating output controls from capacity controls.

90. The matrix in Table 1 does not include as a parameter the state of exploitation and fleet capacity in the fishery. The assumption underlying this matrix is that this variable would be taken into account as a *criterion* for assessing the impact of the subsidy on the sustainability of the resources in the fishery. If the level of capacity and effort in a fishery is already excessive, it is not enough to ask whether a subsidy results in greater fishing effort; the relevant issue is whether the subsidy inhibits capacity adjustment in the fishery.

Table 1
Subsidies and Overfishing:
Subsidy Type and Management Conditions

Subsidy Type	open access no property rights weak output /capacity controls	open access no property rights strong output /capacity controls	limited access no property rights weak output/capacity controls	limited access property rights weak output/capacity controls	limited access property rights strong output/capacity controls
Management services					
Subsidies to capital costs					
Decommissioning and license retirement					
Subsidies to foreign access					
Income support					
Subsidies to intermediate inputs					

91. The matrix approach could thus be the basis for both a “red list” of subsidy types found to contribute to overcapacity or overfishing under all management conditions in the matrix, and a “yellow list” of those subsidy types identified on the matrix as harmful *unless* certain conditions apply. Each subsidy type on the “yellow list” would be acceptable only under conditions to be spelled out in detail.

92. The obvious candidates for “yellow list” status would be decommissioning and license retirement schemes. If the economic incentives for input stuffing have not been removed from the fishery by the allocation of rights to a portion of catch of individual fishers, the temporary removal of capacity from the fishery will tend to stimulate further effort and capacity on the part of vessel owners remaining in the fishery. Thus it would be appropriate for the acceptability of such subsidy schemes to be conditioned on either the removal of perverse incentives through property rights allocations, or a combination of very stringent regulations on capacity and effort, including, inter alia:

- requiring physical scrapping of the vessels for which premiums are given,
- prohibiting or limiting changes by vessel owners in the capacity of replacement vessels (size, tonnage or engine power) or in effort (days-at-sea),
- freezing the construction of new vessels,
- freezing all new technology,
- mandatory retirement of licenses along with decommissioning or buy-back of a vessel.

D. Special Consideration for Developing Countries

93. An issue of considerable importance in contemplating international action to reform the fisheries subsidy regime would be whether and how developing countries would be given special treatment in regard to subsidy elimination. Both the SCM Agreement and the Agriculture Agreement have given "special and differential treatment" to developing country members, setting a precedent for similar treatment in the context of fisheries subsidy reform. But the fisheries subsidy issue poses some special problems in this regard that are worth considering.

94. The SCM Agreement (WTO, 1995) has a number of provisions for "special and differential treatment" of developing countries (Article 27), including the following:

- The least developed countries are exempt from the prohibition on export subsidies, while the countries listed in Annex VII (b) are exempted from that prohibition until their GNP per capita reaches \$1,000 per annum.

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- Other developing countries will have eight years in which to phase out such subsidies, except for a developing country that has achieved "export competitiveness" in the product, which has two years to phase-out export subsidies. Further extensions of the phase-out period are possible in consultation with the Committee on Subsidies and Countervailing Duties.
- Subsidies granted by developing countries cannot be challenged on the allegation of "serious prejudice" but only on the basis of positive evidence that they "nullify or impair benefits" accruing under the 1994 Uruguay Round Agreement or that cause injury to a domestic industry in the market of an importing member country.

95. The WTO Agriculture Agreement (WTO, 1995) similarly provides that developing country Members may implement their commitments to reduce support for agriculture over a ten-year period rather than the six years required for industrialized countries, and that least-developed countries are not required to undertake any reductions in agricultural subsidies.

96. In the case of fisheries subsidies that contribute to overcapacity, one option for "special and differentiated treatment" would be to parallel the SCM and Agriculture Agreements by allowing a multi-year phase-out period for developing countries, and a complete exemption from a prohibition on certain types of fisheries subsidies. However, the issue should be examined carefully. A strong argument for differentiating between industrialized and developing countries in regard to agricultural subsidies was that in general agriculture in developing countries is far less intensive than in OECD countries, mainly because developing countries have agricultural prices well below world market prices. Evidence has been gathered showing that farmers in developing countries, especially in South Asia and Africa, use much less fertilizer than is optimal (Warford, Munasinghe and Cruz, 1997).

97. In the fisheries sector, however, the contrast between industrialized and developing countries in regard to fishing fleet overcapacity is often not clear-cut. Fishing fleet overcapacity is endemic among fishing nations, and a number of developing countries have had serious overcapacity in their national fleets for many years (Porter, 1998c). Exempting developing countries from the elimination of subsidies that contribute to overcapacity, or stretching out the process of subsidy elimination, would go against the real interests of those countries in making their fisheries more sustainable. Fisheries subsidies do not provide real economic benefits to fishers or to the country's domestic fishing industry as a whole.

98. A second option would be to exempt only certain types of subsidies in developing countries, such as those going to small-scale, inshore or artisanal fishing fleets. However, overcapacity has plagued the artisanal fleets of many developing countries as well, especially as an increasing proportion of those fleets have been motorized in recent years (Matthew,

1998). Coastal fisheries, on which artisanal fishing fleets depend, are usually the most heavily over-fished in the world (FAO, 1995b). For example, a recent study by the Central Marine Fisheries Research Institute in India of all three Indian fisheries sub-sectors (non-mechanized, small-scale mechanized and mechanized deep sea) revealed dwindling catch per unit of operations in all three types of fishing, which in turn showed excess capacity in the artisanal fishing fleet (Martin, 1999).

99. If a fisheries subsidies regime were to give approval to continued subsidies for artisanal fleets which are already overcapitalized, this would not benefit the development of those fleets, unless the subsidies were aimed at effective measures to facilitate the transition of artisanal fishers to other economic sectors.

100. An approach that would be more beneficial to developing countries, therefore, is to distinguish between those fisheries and sectors that already suffer from overcapacity and those that are clearly still underdeveloped. Developing countries whose fishing zones are still under-exploited should be exempt from prohibitions on fisheries subsidies that contribute to overcapacity, because such prohibitions assume fully exploited or overexploited fisheries. The relatively small proportion of developing countries with under-developed fisheries would therefore be given special treatment under a fisheries reform regime.

References

Anthony, V. C. (1990). The New England Groundfish Fishery after Ten Years under the Magnuson Fishery Conservation and Management Act. *North American Journal of Fisheries Management* 10: 179.

Asia Pacific Economic Co-operation (APEC), Fisheries Working Group. 2000. *Study Into the Nature and Extent of Subsidies in the Fisheries Sector of APEC Members Economies*. Draft Report. 19 June.

Arnason, R. 1993. Ocean Fisheries Management: Recent International Developments. *Marine Policy*. September.

Arnason, R. 1999. Fisheries Subsidies, Overcapitalisation and Economic Losses. In Hatcher, A., and C. Robinson (Eds), *Overcapacity, Overcapitalisation and Subsidies in European Fisheries, Proceedings of the First Workshop of the EU Concerted Action on Economics and the Common Fisheries Policy, October 28-30, 1998*. Portsmouth, United Kingdom: CEMARE, University of Portsmouth.

Beddington, J. R. and R. B. Rettig. 1983. *Approaches to the Regulation of Fishing Effort*. Fisheries Technical Paper No. 243. Rome: FAO.

Benedick, E. R. 1991. *Ozone Diplomacy*. Cambridge, Mass.: Harvard University Press.

Chuang, C. and X. Zhang. 1999. Review of Vessel Buyback Schemes and Experience in Chinese Taipei. In M. Riepen (ed.), *The Impact of Government Financial Transfers on Fisheries Management, Resource Sustainability and International Trade*, Report of the Proceedings of the PECC Workshop held on 17-19 August, 1998, Manila, Philippines. Singapore: Pacific Economic Co-operation Council.

Corten, A. 1996. The Widening Gap between Fisheries Biology and Fisheries Management in the European Union. *Fisheries Research* 27: 4.

Dupont, D. P. 1996. Limited Entry Fishing Programs: Theory and Canadian Practice. In D. V. Gordon and G.R. Munro (eds.), *Fisheries and Uncertainty: A Precautionary Approach to Resource Management*. Calgary: University of Calgary Press. Pp. 107-128.

Earle, M. 1998. The European Union: Fleet Capacity and Subsidies. Paper submitted to the FAO consultation on Fishing Capacity. 26-30 October.

European Commission, Directorate General XIV. 1995. Structural Policy to Assist Fisheries and Aquaculture. Discussion seminar held by the Commission with the European Parliament. 2-3 October.

European Commission, Directorate General XIV. 2000). Situation of Fleet Register as at 1 January 1998. www.marsource.maris.int/fleet/1998/sum.html

European Commission. 1997a. Annual report to the Council and to the European Parliament on the results of the Multi-Annual Guidance Programmes for the fishing fleets at the end of 1996. www.europa.eu.int/comm/dg/info/inf17_en.htm

European Commission. 2000. Preparation for a Mid-term Review of the Multi-annual Guidance Programmes. Report from the Commission to the Council. 5 October. http://europa.eu.int/comm/fisheries/topics/topic_en.htm

European Court of Auditors. 1994. Special Report No. 3/93 concerning the implementation of the measures for the restructuring, modernization and adaptation of the capacities of fishing fleets in the Community together with the Commission replies. *Official Journal of the European Communities*. 4 January.

European Court of Auditors. 1997b. Annual Report Concerning the Financial Year 1996, Vol. I, Part III, Chapter 9: Common Policy on Fisheries and the Sea.
www.eca.eu.int/EN/RA/1996/chapt9/htm.

Flaaten, O. and P. Wallis. 2000. Government Financial Transfers to Fishing Industries in OECD Countries. Rome: FAO. <http://oecd.org/agr/fish/publications.htm>

Food and Agriculture Organisation of the United Nations (FAO). 1983. *Report of the Expert Consultation on the Regulation of Fishing Effort (Fishing Mortality), Rome, 17-26 January, 1983*. FAO Fisheries Report, No. 289. Rome: FAO.

FAO. 1993. *Marine Fisheries and the Law of the Sea*. FAO Fisheries Circular No. 853. Rome: FAO Fisheries Department.

FAO. 1995b. *The State of World Fisheries and Aquaculture*. Rome: FAO.

FAO. 1997. *The State of World Fisheries and Aquaculture 1996*. Rome: FAO.

FAO. 1998. Report of the FAO Technical Working Group on the Management of Fishing Capacity, Preliminary Version. Rome: FAO.

FAO. 1999a. *The International Plan of Action for the Management of Fishing Capacity*. Rome: FAO Fisheries Department.

FAO. 1999b. *The State of World Fisheries and Aquaculture 1998*. Rome: FAO.

FAO. 2000. *The State of World Fisheries and Aquaculture 1999*. Rome: FAO.

FAO. 2001. *Report of the Expert Consultation on Economic Incentives and Responsible Fisheries, Rome Italy, 28 November-1 December 2000*. Fisheries Report No. 638. Rome: FAO.

FAO, Committee on Fisheries, Subcommittee on Fish. 1998. Trade Issues of International Trade, Environment and Sustainable Fisheries Development: Fisheries Management, Subsidies and International Fish Trade. Sixth Session. Rome: FAO.

Foundation for International Environmental Law and Development (FIELD). 1998. Challenging Environmentally Harmful Government Subsidies through the WTO Dispute Settlement Procedure: Feasibility Study of the Fisheries Sector. Draft paper London: FIELD.

Garcia, S. M. and C. Newton. 1997. Current Situation, Trends and Prospects in World Capture Fisheries. In E. K. Pikitch, E. D. Huppert and M. P. Sissenwine (eds.), *Global Trends: Fisheries Management*. Bethesda, Maryland, USA: American Fisheries Society. 3-27.

Gates, J., D. Holland and E. Gudmundsson. 1997a. Theory and Practice of Fishing Vessel Buy-back Programs. In *Subsidies and Depletion of World Fisheries*. Washington, D.C.: WWF's Endangered Seas Campaign.

- Gates, J., D. Holland and E. Gudmundsson. 1997b. Theory and Practice of Fishing Vessel Buyback Programs: Appendix. Unpublished paper for the Endangered Seas Campaign, World Wildlife Fund.
- Greboval, D. 1999. Assessing Excess Fishing Capacity at World-wide Level. In D. Greboval (ed.), *Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues*. Rome: Food and Agricultural Organisation of the United Nations.
- Greboval, D. and G. Munro. 1999. Overcapitalization and Excess Capacity in World Fisheries: Underlying Economics and Methods of Control. In D. Greboval (ed.), *Managing Fishing Capacity: Selected Papers on Underlying Concepts and Issues*. Rome: Food and Agricultural Organisation of the United Nations.
- Hatcher, A. and S. Pascoe. 1998. Charging in the UK fishing industry: a report to the Ministry of Agriculture, Fisheries and Food. Report 49, Centre for the Economics and Management of Aquatic Resources (CEMARRE). <http://www.maff.gov.uk/fish/charging/htm>
- Holden, M. 1994. *The Common Fisheries Policy*. London: Fishing News Books.
- Holland, D. and J. Sutinen.. 1998. Draft Guidelines on Fishing Capacity. Unpublished Background Paper for FAO Technical Workshop on Capacity Management, La Jolla, California, 14-18.
- Hjul, P. 1972. Shelter-deck Stern Trawlers Built Since 1963, in P. Hjul (ed.), *The Stern Trawler*. London: Fishing News Ltd.
- Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER). 1999. *Evaluation of the Fisheries Agreements Concluded by the European Community*. http://europa.eu.int/comm/fisheries/doc_et_publ/liste_publi/studies/rsen.pdf
- Kirkley, J. and D. Squires. 1999. Measuring Capacity and Capacity Utilization in Fisheries. In D. Greboval (ed.), *Managing Capacity: Selected Papers on Underlying Concepts and Issues*. Rome: FAO.
- Mace, P. 1997. Developing and Sustaining World Fishery Resources: The State of Science and Management. Unpublished paper delivered to the World Fisheries Congress, Brisbane.
- Martin, K. A. 1999. Investments in Marine Sector at Rs 3,100 cr. *Financial Express* (Bombay). 1 February.
- Matthew, S. 1998. Remarks by Sebastian Matthew, International Collective in Support of Fishworkers, India, at WWF Conference "Creating a Sea Change: Resolving the Global Fisheries Crisis," Lisbon, Portugal. 13-14 September.
- Matthiasson, T. 1996. Why Fishing Fleets Tend to Be Too Big. *Marine Resources Economics* 11: 3.
- McCay, B. J. and A. C. Finlayson. 1995. The Political Ecology of Crisis and Institutional Change: The Case of the Northern Cod. Paper presented at the annual meeting of the American Anthropological Association, Washington, D.C., November 15-19, 1995.
- McGoodwin, J. R. 1990. *Crisis in the World's Fisheries*. Stanford, Calif.: Stanford University Press.

- McLeod, R. 1996. *Market Access Issues for the New Zealand Seafood Trade*. Wellington: New Zealand Fishing Industry Board.
- Milazzo, M. 1998. *Subsidies in World Fisheries: A Reexamination*. Washington, D.C.: World Bank.
- Munro, G. 1999. A Theoretical Framework for Examining Interactions between Subsidies, Overcapitalization and Resource Overexploitation: Short Term and Long Term Consequences. In M. Riepen (ed.), *The Impact of Government Financial Transfers on Fisheries Management, Resource Sustainability and Trade*. Report of the Proceedings of the PCC Workshop held on 17-19 August, 1968, Manila, Philippines. Singapore: Pacific Economic Co-operation Council.
- Nautilus Consultants. 1997. *The Economic Evaluation of the Fishing Vessels (Decommissioning) Schemes*. Report on behalf of the UK Fisheries Department. Edinburgh: Nautilus Consultants.
- Nielsen, J. R. 1992. Structural Problems in the Danish Fishing Industry: Institutional and Socio-economic Factors as Barriers to Adjustment. *Marine Policy* (September): 352.
- Nordstrom, H. and S. Vaughan. 1999. *Special Study on Trade and Environment*. WTO: Geneva.
- Organisation for Economic Cooperation and Development (OECD). 1980. *Financial Support to the Fishing Industry of OECD Member Countries*. Paris: OECD.
- OECD. 1985. *Problems of Trade in Fisheries Products*. Paris: OECD.
- OECD Committee on Fisheries. 1993. Economic Assistance to the Fishing Industry: Observations and Findings. Document No. AGR/FI(93)11REV1, 3 November. <http://oecd.org.agr/fish/doc/ObsFind.pdf>
- OECD. 1995. *Review of Fisheries in OECD Countries*. Paris: OECD.
- OECD. 1996. *Integrating Environment and Economy: Progress in the 1990s*. Paris: OECD.
- OECD. 2000a. *Transition to Responsible Fisheries: Economic and Policy Implications*. Paris: OECD.
- OECD 2000b. Modeling the Effects of Government Financial Transfers on Resource Sustainability and Fishing Capacity. In *Transition to Responsible Fisheries, Government Financial Transfers and Resources Sustainability: Case Studies*. AGRI/FI (2000) 10/FINAL. Paris: OECD Directorate for Food, Agricultural and Fisheries, Fisheries Committee. 227-39.
- Pauly, D. V., V. Christensen, J. Dalsgaard, R. Froese and F. Torres. 1998. Fishing Down Marine Food Webs. *Science* 279: 6 February.
- Porter, G. 1997. Euro-African Fishing Agreements: Subsidizing Overfishing in African Waters. In *Subsidies and Depletion of World Fisheries: Case Studies*. Washington, D.C.: WWF's Endangered Seas Campaign.
- Porter, G. 1998a. *Fisheries Subsidies, Overfishing and Trade*. Geneva: United Nations Environment Programme.
- Porter, G. 1998b. *Estimating Overcapacity in the Global Fishing Fleet*. Washington, D.C.: World Wildlife Fund.

- Porter, G., J. W. Brown and P. S. Chasek. 2000. *Global Environmental Politics*. Third ed. Boulder, Colo.: Westview Press.
- Ragosta, J. 1990. Natural Resource Subsidies and the Free Trade Agreement: Economic Justice and the Need for Subsidy Discipline. *George Washington University Journal of International Law and Economics* 24: 255-303.
- Read, A. and E. Buck. 1997. *Commercial Fishing: Economic Aid and Capacity Reduction*. Washington, D.C.: Congressional Research Service.
- Salz, P. 1991. *The European Atlantic Fisheries*. The Hague: Agricultural Economics Research Institute.
- Schrank, W. 1997. The Newfoundland Fishery: Past, Present, and Future. In *Subsidies and Depletion of World Fisheries*. Washington, D.C.: WWF's Endangered Seas Campaign.
- Shepherd, J. G. 1981. Matching fishing capacity to the catches available: a problem in resource allocation. *J. Agric. Econ.* 43: 331-340.
- Steenblik, R. and G. Munro. 1999. International Work on Fishing Subsidies--an Update. In M. Riepen (ed.), *The Impact of Government Financial Transfers on Fisheries Management, Resource Sustainability, and International Trade*. Report of the Proceedings of the PECC Workshop held on 17-19 August, 1998, Manila, Philippines. Singapore: Pacific Economic Co-operation Council.
- Stone, C. D. 1997. Too Many Fishing Boats, Too Few Fish: Can Trade Laws Trim Subsidies and Restore the Balance in Global Fisheries? *Ecology Law Quarterly* 24: 505-44.
- Wallis, P. and O. Flaaten. 2000. Fisheries Management Costs: Concepts and Studies. FAO Staff paper. Rome: FAO <http://www.oecd.org/agr.fish/publications.htm>
- Warford, J. J., M. Munasinghe and W. Cruz. (1997). *The Greening of Economic Policy Reform, Volume 1: Principles*. Washington, D.C. : The World Bank.
- Wilen, J. 1988. Limited Entry Licensing: A Retrospective Assessment. *Marine Resources Economics* 5: 313-324.
- World Resources Institute. 1996. "Water and Fisheries," in *World Resources 1996-97: A Guide to the Global Environment*. Washington, D.C.: World Resources Institute. Also on the web at www.wri/wr-96-97/wa_txt2.html.
- World Trade Organization (WTO). 1995. *The Results of the Uruguay Round of Multilateral Trade Negotiations*. Geneva: WTO.
- WTO. 1999. Preparations for the 1999 Ministerial Conference, Ministerial Text: First Draft. 7 October.
- WTO, Committee on Trade and Environment (CTE). 1996. Report of the WTO Committee on Trade and Environment. WT/CTE/W1. 12 November. Geneva. WTO
- WTO, CTE. 1997. Environmental Benefits of Removing Trade Restrictions and Distortion. Note by the Secretariat. WT/CTE/W/67. 7 November. Geneva: WTO.
- WTO, CTE. 1999. Report of the Meeting Held on 12 October 1999. WT/CTE/M/22. 29 October. Geneva: WTO.

Fisheries Workshop Paper

WTO, CTE. 2000a. Report of the Meeting Held on 5-6 July 2000. WT/CTE/M/24. 19 September. Geneva: WTO.

WTO, CTE. 2000b. Environmental Benefits of Removing Trade Restrictions and Distortions: The Fisheries Sector. Note by the Secretariat. WT/CTE/W/167. 16 October. Geneva: WTO.