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VARIOUS METHODS FOR MEASURING AND ANALYSING ECONOMIC ASSISTANCE

(Note by the Secretariat)

1. At the 63rd Session of the Committee for Fisheries Member countries having already carried out quantitative and/or qualitative analyses on relevant issues regarding the study on economic assistance were invited to present their work and their conclusions at the Committee's 64th Session. The attached paper "Measuring Economic Assistance to the Fishing Industry", has been submitted by the Australian authorities.

2. This document is circulated to the Committee for Fisheries for INFORMATION AND DISCUSSION at its 64th Session, scheduled for 27-29 September, 1989.

MEASURING ECONOMIC ASSISTANCE TO THE FISHING INDUSTRY

INTRODUCTION

1. It has been well established from empirical research that industry assistance imposes costs on other sectors of an economy. These costs arise because the various sectors of the economy have to compete for resources. Protection and support for, say agriculture, attracts or keeps more resources in that sector than would normally be the case, reducing opportunities for existing industries in other sectors to expand or new industries to establish. In this way the pattern of resource use in the economy is distorted and costs are imposed.

2. Measuring industry assistance provides the information required by government to improve resource allocation by reducing the differences in assistance levels between the various sectors in the economy.

3. In recent times, there has been increasing recognition of the potential benefits from reducing or eliminating industry assistance policies. As well as the benefits to domestic economies referred to above, the reform of industry assistance can be expected to lead to a freer and more efficient pattern of international trade. The multilateral negotiations taking place on reducing international barriers to trade under the auspices of the General Agreement on Tariffs and Trade (GATT) are a testament to the growing international awareness of the positive effects of reducing industry assistance. Against this background, it is appropriate that assistance to the fishing industry should become subject to international scrutiny.

4. This paper has been prepared in response to the Secretariat's request for clarification of the main concepts associated with identifying and measuring assistance to the fishing industry. The starting point for any enlightened discussion of how to measure assistance must be the determination of what constitutes assistance in the fisheries context.

WHAT IS ASSISTANCE?

5. Government interventions which interfere with the free working of the market are generally designed to support participants in domestic industries. As a result, traditional evaluations of industry assistance use unassisted free trade prices for inputs and outputs as a comparative benchmark. Such traditional analyses implicitly incorporate the assumption of no market failure, or that if market failure does exist its effect is small and can be ignored.

6. This assumption cannot be made with respect to the fishing industry, in which market failure is widespread and rife. The cause of the problem is a lack of ownership rights by fishermen over the fish resources. Unlike other industries in which the participants own their productive inputs, and can thus exclude others from using them, ownership of fish is usually only affected

once they are caught. Individual fishermen are unable to exclude others from exploiting the fish resource, and as a result the resource commonly becomes over-used. Fishermen will continue to enter a fishery until all the potential economic benefits are dissipated. The biological and economic over exploitation of fish resources is a direct effect of market failure.

7. A rationale therefore exists for governments to intervene in fisheries to protect the fish resource and to improve the economic efficiency of the industry. In so doing, substantial benefits may be generated. Society benefits from a more efficient allocation of resources between industries, while fishermen can gain increased profits.

8. For example, government intervention in the Australian southern bluefin tuna fishery largely overcame the problem of market failure by giving each fisherman a more clearly defined property right over the tuna stock. These rights were in the form of individual transferable catch quota (ITQs) which entitled individual fishermen to a certain share of an annual total allowable catch from the tuna stock. The introduction of this management programme resulted in a rapid, large scale, industry financed, restructuring of the industry which substantially reduced the number of operators and increased industry profitability.

9. Government intervention of this nature in fisheries is therefore desirable and should not be classified as assistance. A benchmark is needed which will provide a basis for deciding whether government interventions are assistance or resource management policies, and which will facilitate the measurement of assistance.

10. The benchmark is unassisted free trade prices for inputs and outputs, and a resource management regime which overcomes the open access market failure and maximise the economic yield from the fishery. This benchmark is based on the objective of maximising the economic efficiency of the use of the economy's resources. An explanation of the fishery management concept of maximum economic yield in relation to this benchmark is given in Appendix I.

11. Government intervention which aims to conserve the fish stock and promote the economic efficiency of the industry will "move" the fishing toward the operational environment described by the benchmark. Such management policies cannot be classified as assistance and the budgetary costs of administering these policies should not, therefore, be included in the measurement of assistance.

12. This concept is implicit in the United States' Government contribution to this debate which states that Government funded projects with a management orientation and projects involving basic scientific research were excluded from their measurement of assistance to the United States fishing industry.

13. However, the distinction between management and assistance interventions is not apparent in the Secretariat's description of economic assistance to the fishing industry. This states that "assistance includes all policies which improve the fisheries environment and by that the living of fishermen and processors who are actively involved in the industry".

14. As the example of Australian Government intervention in the southern bluefin tuna fishery clearly shows, the welfare of fishermen can be improved by correcting a market failure without distorting input or output prices and thus without providing "assistance" to the industry.

15. It could, however, be argued that if fishermen received windfall gains as a result of Government policies to correct market failure, as in this example, then society which owns the fish resources, should derive a return from fishermen for the use of these resources. This is an issue currently being examined by the Australian Government.

HOW SHOULD ASSISTANCE BE MEASURED?

16. First, a decision must be taken as to whether all forms of assistance to the industry should be measured or just those interventions which directly distort trade in fish products, such as import tariffs.

17. The view of the Australian Government is that all assistance intervention should be identified and measured. The reason being that all forms of assistance can distort resource allocation and thereby affect the cost of fishing, the level of fishing effort and the quantity of fish produced, as well as the price received for the fish. For example, a fuel subsidy aimed at lowering the costs incurred by fishermen may result in increased fishing effort, thereby increasing the supply of fish to the market and lowering market prices for fish. Thus, if any of the numerous forms of possible government assistance are ignored, the results of an assistance measurement programme are unlikely to be representative of the true competitive status of the industry.

18. Measures which include interventions assisting the outputs of an industry and interventions influencing prices of the industry's inputs are known as "effective" measures of assistance. The effective rate of assistance (ERA) is the measure preferred by the Australian Government. The ERA captures all assistance specifically directed to a particular industry through the net effect on inputs and outputs. In addition, it takes account of the effects of any taxes of subsidies on the inputs used, in this instance, by fishermen to catch fish.

19. Another measure of assistance which is fairly comprehensive is the producer subsidy equivalent (PSE). This is an estimate of the monetary amount which would be needed to compensate producers for the removal of Government assistance. The PSE as advocated in the United States' paper, is similar to the ERA except that it does not take into account tariffs and other measures which might increase the price of inputs used by fishermen. The procedures to calculate ERAs are similar to those used to calculate PSEs and are well described in the United States' paper.

20. The other potential measurement approaches outlined in the Secretariat's discussion document are much less useful as their scope is limited and they provide only a partial view of the extent of government assistance.

PROBLEMS OF MEASUREMENT

a) Discriminating between management and assistance interventions

21. There are two categories of government intervention in fisheries; those which provide support to domestic fishermen or processors and those which are associated with overcoming the problems arising from fishermen's lack of property rights over the fish resource.

22. Unfortunately, there can be difficulties in identifying into which category of intervention a particular measure should be placed. Measures associated with bringing about structural adjustment in the fishing fleet provide a good example.

23. If a measure is aimed at achieving a reduction in fishing effort via structural adjustments and thereby improving the overall economic performance of the industry, then this is clearly a management intervention. The fishery is being moved towards the maximum economic yield benchmark as discussed earlier.

24. On the other hand, structural adjustment policies which encourage modernisation of a fleet without regard to the optimum level of effort in the fishery, represent assistance. The beneficial effects of this type of assistance are generally very short lived. This is because the modernised fleet has a greater fishing power and is able to exert more fishing effort, placing fish stocks under increased pressure. Catches may rise above sustainable levels in the short term and result in long term declines in fish abundance and catches. The lower catches negate the benefits from the assistance and result in an absolute loss to society of the amount commited to the modernisation programme, plus the costs of reduced efficiency of the industry. This reinforces the important point made by the Canadian Government in their paper that measurement of assistance to the fishing industry does not provide a measure of the benefits actually derived by the industry from the assistance.

b) Data limitations

25. Many of the procedures and data requirements for calculating ERAs and PSEs are very similar and have been well illustrated by the United States' and Canadian contributions. Some extra information is required when calculating ERAs on assistance to input supplying industries. This is to allow an estimation of the amount by which fishermen are taxed by having to pay higher prices for their inputs.

26. The large number of different fish species and product forms often produced by the fishing industry increases the amount of data required and presents difficulties in terms of standardising the data to a common base. The approach adopted by the United States Government of converting all processed products to live weight equivalents seems an appropriate solution to the problem.

27. The measurement of assistance provided by tariffs on imports of fish products poses additional data requirements. Ideally, what is needed is

information on the supply response of the catching sector to increases in fish price brought about through the tariff protection. Economic research on this issue is sparse, and it is unlikely that many nations have an adequate understanding of the supply characteristics of their fishing industry to estimate how changes in fish prices might influence supplies. Also, identification of a world reference price for the protected fisheries product may prove difficult in view of the wide range of product forms and product qualities available on the world market.

28. The approach used by the United States and Canada is a pragmatic response to these difficulties and should be adopted as the measurement procedure for estimating tariff support. This appproach is based on the assumptions of no supply response by the domestic industry, and the use of duty collected per unit of product imported as a proxy for the assistance per unit of domestic production.

29. The United States and Canadian example of the measurement of assistance clearly illustrates that data limitations need not prevent the calculation of comprehensive measures of assistance.

CONCLUDING COMMENTS

30. This paper has sought to outline some of the key issues relevant to the measurement of assistance to the fishing industry. An important concept is the distinction between management and assistance interventions. Some guidelines have been given as to how to distinguish between these two categories of government intervention, and a benchmark suggested against which assistance can be measured.

31. The key point is that management interventions to conserve the resource or promote industry efficiency cannot be viewed as assistance. The budgetary costs of administering these programmes should not therefore be included in any procedure to measure assistance.

32. To significantly improve the transparency of government assistance measures, a relatively comprehensive measure of assistance should be used, either ERAs or PSEs. The United States' and Canadian quantitative examples of the use of PSEs in fisheries show clearly that the use of such comprehensive measures is technically feasible in fisheries.

33. Overall, the Australian Government strongly supports the proposal that assistance to the fishing industry should be quantified for all OECD Member countries.

APPENDIX I

THE BENCHMARK

1. The benchmark is unassisted prices for outputs and inputs and the establishment of a management scheme wnich maximises the economic returns from the fishery. That is, the fisheries administration acts as if it were the profit maximising sole owner of the resource.

2. The concept is illustrated in Figure 1 in which the total sustainable revenue (OAF) and total cost (OE) for a fishery are shown as functions of fishing effort. For simplicity, the price of fish is assumed to be independent of the catch, so that the shape of the total revenue curve is the same as the shape of the long run total catch (or yield) curve. The fundamental characteristic of this catch (and revenue) curve is its general shape, exhibiting diminishing marginal revenue per unit of effort. This fishery "production function" is similar to that familiar from basic economic theory. In fisheries, however, the part of the curve beyond B is potentially relevant, whereas it is not in the economic analysis of private property industries.

3. Figure 1 portrays the long run steady state equilibrium position. That is, the total revenue curve is based on the size of catch that is sustainable when a given level of effort is being constantly applied to the fishery. The total revenue curve thus shows the sustainable equilibrium level which is eventually reached as a consequence of constant fishing effort at any specified level for a number of periods. For example, constant fishing effort at level B eventually gives a sustainable revenue BA. A permanent shift in the level of effort to D leads eventually to a sustainable revenue of DC.

4. The straight line cost function, OE, assumes constant cost per unit of effort in the fishery. "Costs" here include the opportunity costs of the factors of production: that is, an allowance is made for a "normal" rate of return to labour and a "normal" reward for capital invested. Thus, at the economic equilibrium point, C, where total returns equal total costs, the level of profit obtained from the fishery is not zero but is equal to the level which could be obtained by employing the same resources elsewhere in the economy. Above-normal profits (hereafter referred to as "rent") can be obtained for levels of fishing effort between O and D. This rent is measured by the vertical distance between the revenue and cost curves. Thus, at effort level K there will be a rent of JH. The rent available at levels of effort below D will attract new vessels to the fishery until the equilibrium effort, D, is reached. At that point, all rent will have been dissipated, there will be no incentive for additional vessels to enter the fishery and "normal" returns will be achieved by those participating.

5. If the fishery were under sole ownership, rent could be captured by restricting effort to less than D, and could be maximised by operating at K. Note that, though the latter strategy gives less than the maximum sustainable yield, it maximises long term profit and therefore, net benefit to society.

6. Under open access, however, there is no incentive for individual fishermen to reduce effort in the current period in order to increase catch in future periods, since other fishermen will continue to catch fish in the current period so long as the benefits exceed their costs of doing so.

7. In Figure 1, the total cost (OCE) and total revenue (OAF) are assumed to be based on unassisted prices for outputs and inputs, and embody the full payment by fishermen for any fishery administration. From this analysis the benchmark would be to establish a management scheme which produces HJ rents to be extracted by the nominated owner of the resource, either society or individual fishermen, and to produce OK fishing effort (and hence a given level of output and revenue based on the total revenue curve (OAF).

Figure 1 : LONG RUN FISHERIES REVENUE AND COST FUNCTIONS