

"A Note on Sardines as an Economic Development Tool"

Don Pepper

**Pacific Sardine Association
Occasional Paper No. 2
November 2001.**

This is one of a series of occasional papers outlining some issues in the development of the sardine fisheries of BC. Readers can provide comment and feedback to: dapepper@shaw.ca

All comments will be acknowledged and may be incorporated into the final draft of a paper from the Pacific Sardine Association entitled:

*"A Management and Development Plan
For the Sardine Fisheries of BC".*

This paper is provided for discussion purposes only.
The views expressed herein are those of the author only
and not necessarily those of the Pacific Sardine Association.

A Modern Fable

The meaning of numbers

A certain government bureaucracy wanted to implement a particular project for political reasons. Having made up their minds they knew the project would be done but they felt it necessary to supply some justification for the project. Accordingly, they advertised for a development expert to write a paper analyzing the project. They narrowed the candidates to three: an accountant, a mathematician, and an economist. They then interviewed each to select the best one suited for the job.

The first was the accountant. They asked him, "We have a simple test for each candidate and the answer determines who gets the job. The question is this: what is two and two?" The accountant replied that this was easy. "Two and two makes four no matter how you look at it. You can't violate the laws of arithmetic and accounting". They thanked him and went to the next candidate.

The second as the mathematician and they put the same question to him. "Two and two could be four in arithmetic and two to the power of two is also four but it also could be twenty two". They thanked him and went to the last, the economist.

"Well", they asked. "What is two and two?"

The economist replied "What do you want it to be?"

He got the job.

Table of contents

1. Introduction
2. The development problem
3. An early project: Salmon enhancement
4. Benefit cost analysis in detail
5. Regional development and a curious result
6. The benefits and costs of a sardine fishery
7. Conclusions
8. Bibliography

Introduction

At one time the fisheries were considered a useful economic development tool. However, over-capitalization in vessels and plants, declining fish stocks and a host of problems in the fisheries have put the concept into cold storage. Nonetheless, the rationale and the analysis of the fisheries as a "engine of growth" have a current application in the sardine (*sardinops sagax*) fishery in BC. The return of the sardines after a fifty-year absence raises the possibility of a fishery that can be a tool in economic development particularly in depressed coastal communities and to the industry generally..

This paper gives a rough summary how of a fishery can be an economic development tool and outlines some of the issues involved. Many of the issues are highly technical but these are avoided except where necessary to make an argument. Further, the discussion of benefit-cost analysis may be somewhat arcane but the attentive reader is rewarded with an understanding of the issues, if not the methodology. Finally, an attempt is made to show how an expanded sardine fishery can provide tangible benefits to the economy of BC and in particular to some depressed coastal communities.

2. The development problem

No resources, such as money and fish, are infinite. Indeed, they are scarce. The development problem then emerges: what should one do with the available resources? This entails selecting projects and regions where one can maximize the benefits to society from the use of the resources (we are leaving aside political considerations here). Immediately problems arise: should one focus on the long-term such as a dam or on the short-term such as cash payments for flood damage? And so it goes. Questions arise. What region? What projects? What are the objectives? There is an obvious need for some sort of rigor and a methodology for the selection for development projects. It is also well-known that projects are undertaken for political reasons but we leave these aside (and recognizing that sometimes analysis is presented to support the political decisions). Mirabel Airport, outside of Montreal, is a case in point. Detailed studies were made to justify a largely political decision (pump money into the Quebec economy). In a proper and well-ordered system development projects are selected on the basis of economic and financial factors. However, it is not straightforward, some economic factors are difficult to quantify. The next section details such a case and the rather unique method of dealing with complex biological and socio-economic (as well as political) factors.

3. An early project: the Salmon Enhancement Program in BC

In 1976 the federal government decided to spend \$156 million to "double the number of salmon". So the Salmonoid Enhancement Program (SEP) for BC was invented. With all that money it was necessary to select many projects and some criteria were needed to provide the rationale for the decisions. An obvious method that had the sanction of Treasury Board and the Department of Finance was benefit/cost analysis. However, this technique had a number of limitations as there were biological, political and social factors that had to be reconciled. First, the projects were about salmon and the need for re-building threatened runs made benefit/cost analysis superfluous. That is, a project might be selected that had less of a reward in terms of the economic benefits because it restored a run of salmon. Once benefit/cost analysis was seen as inadequate for the selection of projects a number of other so-called "accounts" were created. They were:

- the benefit/cost account
- the biological or 'fish' account
- the Native employment or cultural account
- the regional development account
- the employment account.

This "five account" system allowed projects to be ranked by the account's criteria and selection of projects was then made on a subjective basis as to the "best" project. In this method a large variety of projects were undertaken that had some validity in their selection. A moment's reflection tells us that the process was highly arbitrary and flawed in many respects. In its defense, however, one notes that the method allowed for analysis on other than purely financial and economic criteria embodied in the benefit/cost method. At least the method of the five account system was transparent and its overall purpose clear. Secondly, it allowed the bureaucrats to deal with political pressures. For example, the returns per investment dollar for steelhead and spring salmon were low but under the "fish account" projects could be selected that appeased the sports fish lobby.

How did the "five account" system work? First, projects were selected from a "wish list" and then benefit/cost analysis was done on them. The required investment was compared to the possible returns of salmon. That is, benefits were compared to costs. Next, projects were ranked under the various accounts. From them a list of projects was determined and this became the program. Whether or not the method was sound was not the issue: it *seemed* to be rigorous. This description is perhaps a gross over-simplification but in essence that is how it was done. The actual results of SEP are not of interest here but the method is illuminating. It shows a wide variety of social and economic (and political) factors can be accommodated into a rational (sort of) methodology.

4. Benefit cost analysis in detail

The benefit/cost method was invented to deal with large-scale projects such as hydro-electric dams that require massive up-front investment and provide benefits only over a long term. Further, a wide variety of indirect effects had to be incorporated into the analysis. For example, what is the monetary value of flood control in the future? For each step in the process certain arbitrary judgments had to be made and the choice of assumptions obviously determines the results. Of crucial importance is the discount rate (rate of interest) used in the analysis. Nonetheless, the method at first glance seems simple: Calculate the direct benefits and then the indirect and discount the benefits to a present value dollar value. Similarly, costs are treated the same way. However, the method is fraught with problems. These arise because the analyst is making assumptions about future events and estimating certain results. The key word is *estimating*.

A particular thorny issue is the estimation of indirect benefits and costs. It is easy to get a good benefit/cost ratio by over-estimating benefits and under-estimating costs, especially indirect ones. A good example of this is the Aswan Dam in Egypt. The decline in fish populations from the lack of silt in the delta was not entered into the calculations. Other examples abound. On balance, benefit/cost analysis is a useful tool but it must be used with caution. The game may be crooked but it is the only game in town.

5. Regional development and a curious result

Regional development schemes are usually undertaken as a means of social engineering. Putting money in regions is supposed to make them ultimately better off. The experience of federal investment in the Maritimes and Newfoundland is a prime example. A major criticism of regional development grants and projects is that the region becomes dependent upon grants. And sometimes the projects provide little or no benefits. Nonetheless, there is a powerful rationale for regional development grants and subsidies. The analysis is presented as Case A.

CASE A

Suppose you have \$1,000 worth of fish that takes a month to catch to give to someone. Who do you give it to so you can maximize the benefits to society? You have two choices: a man working in garage in Vancouver at \$800 per month or some one in coastal, community on welfare (at \$800 per month). Using benefit/cost analysis you get the following result:

Comparing the two regions the extra benefit to the Vancouver region is only \$200. The extra benefit to the coastal community is \$1000. From society's point of view the total benefit to Vancouver is \$1,000 but for the coastal

community it is \$1,800. The conclusion is perhaps curious but valid. You give the fish to man on welfare.

This extreme case demonstrates the part of economics that is usually forgotten: it is not only about efficiency, it is also about the distribution of benefits. Development economics is ultimately about the distribution of benefits.

If we apply this logic to an expanded sardine fishery the conclusion is that society (BC) can receive many more benefits than otherwise if allocations of quota are made such that coastal communities receive something tangible in terms of benefits either in fish or employment or both. However, at present there are no indications of how DFO will expand the sardine fishery and how allocations are to be made. (A wag noted, "There are two mysteries in life: what goes into sausages and how policy is made at DFO".) But it is clear that there is an opportunity for regional development to take place by using sardines as a means of creating employment in coastal communities. How this is to be done is beyond the scope of this paper.

6. The benefits and costs of a sardine fishery

This section details a first approximation of the benefits and costs of an expanded sardine fishery. A number of assumptions are made to produce the analysis. First, it is assumed the cost of the sardines is free. This leaves out the actual costs to society of the management of the fishery. DFO has a policy of charging incremental costs to the industry of any new fishery but this is not applied uniformly so it is assumed away here. Second, it is assumed that there are no fixed or overhead costs in the fishery as there is excess plant and vessel capacity. Thus, the only costs are variable or operational and are those associated with fishing and plant operations. The increase in benefits are those that accrue to vessel-owners, plants and workers in the two sectors. The analysis is presented as Case B.

CASE B

A thousand tons of sardines are caught, processed and sold into the food market. The results are:

GROSS values in the fishing sector

Landed value: \$600,000 (\$600 per ton)

returns to vessel: \$300,000

returns to crew: \$300,000

Crew share: \$37,750

Fishing days: 50

Jobs created: 70 Employment: 3,500 days

GROSS values in the processing sector

Processed value: \$1,500,000
Returns to plant owner \$200 per ton
Processing costs: \$700,000
Processing days: 50 (20 tons per day)
Jobs created: 25
Employment: 1,250 days
Net from operations: \$200,000

These are all gross sums. In the fishing side no allowance is made for grub and fuel and maintenance and depreciation for the vessel-owner. For the plant owners the possible net of \$200,000 from operations allows an allocation for administrative and marketing costs and some contribution to overhead.

From society's point of view we can use the gross data to estimate net benefits from the gross benefits by assuming payments to workers, vessel-owners and plant operators are net benefits because they are extra benefits that were not there before. In other words, any increase is a net increase.

From a 10,000 ton fishery we get the following:

Landed value: \$6,000,000
Processed value: \$15,000,000
Fishing jobs: 350
Fishing Employment: 3,500 days
Processing jobs: 250
Processing sector employment: 12,500 days

The above is a "best possible case" and must be discounted for a possible price decrease from increased production, or some product going to the bait market at \$1,000 per ton and other errors and omissions. Other scenarios can be given using different assumptions but these are some preliminary benchmarks to provide, at best, a rough estimate of the benefits from an expanded sardine fishery.

The above data must be used with extreme caution as circumstances may change, which is a feature of fisheries.

7. Conclusions

1. BC analysis is useful but there are arguments for making allocations using other criteria that satisfy political and social objectives.
2. Allocations made to where there are no other opportunities (jobs) maximize the benefits to society. This is a possible argument in favor of regional development through sardine allocations made to coastal communities.
3. Gross benefits can be assumed to be net benefits as the incremental (operational) costs generate economic activity, which is a benefit to society.
4. 10,000 tons of sardines can provide up to \$6 million in gross landed value and \$15 million in gross processed value. An expanded sardine fishery will provide jobs in the fishing and processing sectors.
5. A possible regional multiplier effect may take place. For the Canadian economy this is usually assumed to be two. Thus, up to \$30 million in gross benefits to BC is possible from an expanded sardine fishery of 10,000 tons.