

MANAGEMENT NEEDS FOR FISHERIES RESEARCH

G.V. Rohan

*Australian Fisheries Management Authority
PO Box 7051 (CMC)
Canberra ACT 2610*

1. Whose Ball?

The common property nature of fisheries resources is generally well documented but it is relevant to the subject at hand and remains a hot issue in the current approach the various players are taking in regard to fisheries management issues. It is useful to highlight certain aspects for the purpose of this presentation.

In most industries, increased demand for a product, usually reflected in increased prices, results in more resources being directed to the production of the product. In the case of wild fish stocks, increased fishing effort in response to increased demand, results in depletion of stocks and lowered supply. Operators in the fishery have little or no incentive to curb their individual harvests to conserve stocks where others would reap the benefit. In an unmanaged fishery situation, it is a rational decision for operators to seek to maximise their individual yield, even where they may recognise that it may not be in the interests of the fishery in the long term.

In the open entry situation, there is similarly no incentive for the individual operator to invest in research, or indeed in any other management related services. Accordingly, there is little incentive for operators to contribute to research where they cannot capture all or most of the benefits.

Most discussions on management of a fishery tend to concentrate on the amount of fish

removed from the water and this applies to both input and output controls. The broad, and at times passionate, industry campaign for property rights in fisheries is generally directed at having harvesting rights recognised as property rights.

Whilst wild fishery stocks are generally accepted as being community resources, the question of how the rights to harvest a community resource can be a private property right will be further tested in the courts.

However, the increasingly important focus for management, and indeed for researchers, is on what is happening to fish stocks which are left in the water.

2. Goal Posts and Rules of the Game

AFMA is guided by legislative objectives which may be summarised as:

- keeping fish harvests within ecologically long term sustainable levels
- providing for efficient harvesting methods and cost effective management.

There is generally broad agreement on the individual objectives. However, the way in which they are achieved and how they combine with the other objectives in any one fishery management plan usually generates much discussion. The many players in the game, researchers included, may have substantially different inter-

pretations of what the objectives mean, what weighting should be placed on different objectives and how they should be achieved. In this sense, the players on the field may not be well coordinated if they are shooting for different goals and have not agreed on the rules of the game nor on how to get the ball between the posts, wherever the posts might be.

Included in the mixture of objectives may be industry specific goals which include security of tenure, stability of harvests and long term profitability. Whilst these are admirable and understandable goals, they may not be compatible with a natural resource such as wild fish stocks.

Indeed, much of the management focus over the last decade has been on developing safe and stable harvest levels through such concepts as maximum sustainable yields, maximum economic yields and even maximum prudent yields. Other 'neat' formulas have sought to link harvests to residual stocks through percentage yields.

At the same time, there has been increased recognition of the variability of wild fish stocks. This may be caused by natural perturbations in terms of currents, water temperatures, variations in the availability of food or the number of predators in the complex interaction between species. Or it may be contributed to by external forces such as habitat change through human interference. There has also been a sobering acknowledgement of the small time frames in which we have been monitoring fisheries and the scope for large scale influences, or non-cyclical effects, such as El Niños, to upset a 'stable' regime.

Also sobering, has been recognition of the magnitude of change which may occur in a fish stock before it is detected in key indicators. What should we make of a change in catch and effort or in average length of fish taken and how do we distinguish between a cyclic variation and a trend. Whilst there has been some progress made in predicting recruitment and future po-

tential yields, the management of fish stocks is invariably a case of reacting to changes in abundance to which previous fishing activity may or may not have been the major contributor. Separating the effects of fishing from natural variations is a major challenge.

The advantage of adaptive management is that it recognises variability and uncertainty as part of the game, perhaps like the uneven bounce of the ball, and focuses attention on accepting change, monitoring change and having a process in place (the rules of the game) for dealing with change.

Keeping Score

Matters of key importance to the fisheries manager are the size of the residual adult biomass relative to virgin stocks; the level of recruitment to the fishery overall and to adult stocks; and, the relative effects of different harvest strategies on adult stocks and recruitment.

In dealing with uncertainty and in making risk decisions, an understanding of the characteristics of the species and its stock dynamics may be important in determining thresholds or management boundaries. These would be such matters as the minimum level of parental biomass below which fishing should cease. Fisheries biologists have a key role in advising on the probabilities of recruitment failure for different levels of parental biomass. Such advice may well take the form of the effects of different catching options over several years, rather than in seeking to establish a single 'optimal' catch level.

Similarly, research advice on the upper limits of parental biomass beyond which there would be expected to be little increase in the level of average recruitment, or relative increases in stock security, would help to set the decision making framework.

It is recognised that these 'basic' requirements of management may not be easily achieved

but the important point is to recognise what it is that we are aiming for and to be able to assess research programs on their ability to contribute to these needs. This would enable all those involved in the fisheries management process to consider the relative benefits of alternative research programs on their expected outcomes relative to stated management requirements. It will also facilitate the involvement of the non technical person in the discussion where they have an interest in the fishery and an ability to contribute. Indeed, it will assist management and funding organisations in being proactive in directing research resources into areas of agreed and demonstrated need.

Of course, such a process will place the emphasis on managers to state what it is they are trying to achieve and on developing frameworks for assessing and reviewing these needs.

Strategies

The management process is made difficult not only by the uncertainty in our knowledge of what is happening under the water, but by different approaches to risk in how to use that information. Different participants in the management process may have different levels of aversion to risk. Individual operators may often have different approaches to risk and its implications for future harvests, depending on their personal attitudes and business situations. Again, this needs to be resolved by management by negotiating and reaching agreement on a risk strategy for the fishery overall.

Pearse and Walters (1992) have emphasised the need for a clear distinction between the role of management in providing a risk management process and the role of researchers in contributing to risk assessment. In establishing decision making rules, managers may reasonably expect researchers to provide information relevant to those needs. This has a corollary of seeking to minimise the costs of management by not undertaking research which does not meet

these needs. At the same time, researchers may reasonably expect to obtain management support for projects which are directed at stated management requirements.

Of course there are other elements of resource management other than harvesting and these may include intrinsic value and environmental benefits. The effects of harvesting on other users of the resource or on downstream users of the resource also must be considered. Such matters should be included in an integrated management approach and dealt with in the decision making process, or at least in separate management processes. Research associated with such needs would be no less valid but should be exposed to the same rigorous assessment of relevance and cost effectiveness in meeting objectives.

Irrespective of whether industry is paying for research, or whether the general community is paying through government funded programs, managers will be seeking to examine the cost of research programs and their relative contribution to the overall risk assessment process. Increasingly, managers will be asking researchers to what extent a program will contribute to reducing uncertainty in a fishery, to what extent the program will need complementary research for it to be useful in the decision making process and how much it will cost relative to other projects.

It is expected that there will be an increased focus on developing key indicators of changes in stock abundance and recruitment and a more critical look at the relative benefits of existing data collecting programs in terms of how much they are actually being used or are capable of being used in making decisions. This need not necessarily result in the abandonment of such programs and may lead to the establishment of other programs to make better use of the data already collected. Once the management parameters are developed, it is expected that researchers and research agencies will take a major part in the assessment of research pro-

grams. Also, they can expect a greater involvement of industry in this process.

In the increasing trend toward "user pays", which is affecting fisheries research as well as other aspects of fisheries management, it should be expected that industry will be looking critically at the return on their investment in this field. Where the demand for research from this sector is strong while the cost is subsidised by the general community, demand for research may be tempered by the willingness (or unwillingness) to pay. Similarly, industry and governments will need to determine how much they are willing to pay to reduce uncertainty in our knowledge of the fishery and to reduce the swings in production between boom and bust.

Half Time

In summary, fisheries managers (and this includes industry participants as managers) will be seeking more information from researchers on risk thresholds and on probabilities for different harvesting strategies. Also there will be a closer assessment of costs of projects measured against their relative value in the decision making process. At the same time, researchers will be pressing managers to establish parameters and risk thresholds, in terms of how Environmentally Sustainable Development (ESD) and economic efficiency are to be applied to the fishery in an operational sense, so that researchers may get on with developing methods for measuring and assessing them.

Whilst this process is underway, managers will continue to look to the research community for new concepts and ideas, for innovative advice and broad perspectives, for a continual reassessment of methods and assumptions and above all for an objective approach in a field where all players keep sight of the ball.

References

- Hilborn, R. and J. Silbert (1987). Management Strategies for Newly Developing Fisheries. *Fins* 20 No. 1, 18-21.
- Keen, E.A. (1991). Ownership and Productivity of Marine Fishery Resources. *Fisheries* 16 No. 4.
- Pearse, P.H. and C.J. Walters (1992). Harvesting regulation under quota management systems for ocean fisheries. *Marine Policy*, May 1992, 167-182.