



Ecosystem approach to fisheries – some practicalities

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Abstract

) Capture fisheries, from both marine and inland waters, comprise a major food production industry providing some 92 million tonnes of fish a year. Some 24 million tonnes are used as feed for cattle, pigs, poultry and aquaculture contributing indirectly to food security. Fish is particularly important for many developing countries where it is often the major source of animal protein and export earnings. With its low import duties (“industrial products”) fish has become the most globally traded food item with developing countries supplying more than half of the fish provided to international markets.

) FAO is the UN Agency that regularly monitors the worldwide state of fisheries, and this includes the status of some 600 fish stocks and stock items. The latest count in 2002 shows almost half of these stocks (47%) were fully fished but not over fished; a quarter (25%) of the stocks was moderately fished with some room for expansion; while the remaining 28% were overfished, depleted or recovering. Thus, some three-quarters of stocks appear to be moderately to fully fished today. These aggregate figures have remained largely unchanged over the past few years, yet overfishing is of great concern. Great advances in the technology of finding and capturing fish, coupled with increasingly open and accessible markets for fishery products worldwide, make it imperative that effective fisheries management regimes be put in place for all fisheries.

) There is no shortage of fishery conservation instruments, guidelines and international plans of action on how to deal with fisheries issues. Today, the global management structure for fisheries is to a largely in place, with the United Nations Convention of the Law of the Sea (UNCLOS) of 1982 at its epicentre. This framework provides a basis for how governments and institutions can control the fishing sector. FAO produced its own overarching Code of Conduct for Responsible Fisheries in 1995. It is now being recognized that fisheries governance is a holistic activity that needs to be decentralized, participatory and transparent in order to be regarded as responsible and effective. In its broadest perspective this approach has been termed the Ecosystem Approach to Fisheries. Although there is as yet no clear blueprint on how the Ecosystem Approach can be achieved in practical terms, it evidently demands a much greater amount of information be collected and analysed on a real time basis than is the case at present.



) Many industries have put in place systematic and auditable “self controls” within governmental regulatory frameworks. This is particularly true of the food processing industry, which is managing complex information regarding food safety and quality - something that ecosystem management will require. The philosophy and practice of safety and quality management is now well established. National and international frameworks require the food industry to be “self controlling” in terms of food safety and quality, which includes keeping one’s own records to prove so.

) The fish capture sector needs to adopt such approaches to operationalise the Ecosystem Approach. It is high time that the fisheries capture sector itself examines how it can “manage itself” in a transparent and credible way. Experience shows that industry is capable of operating in a volatile environment, systematically minimizing its risks, and successfully achieving its long term strategy. However, for an Ecosystem Approach to materialise in fisheries, the governing structures of the sector have to move towards participatory and rights-based approaches and – very importantly - be backed by sufficient and reliable data. This, however, will require the decentralization of fisheries management and the allocation of specific fishing rights.

) The premise of this paper is that the fishing industry must set aside its internal differences and draw on its shared capabilities to drive the transition to decentralized fisheries management based on clearly defined fishing rights – that is, if the global industry wants to ensure both its future and a future that has fish still waiting to be caught in the water.

1 Introduction

) It is tempting to say that the idea that the great oceans are inexhaustible has finally been put to rest. Yet, in hoping this, it is important to realise that the inexhaustibility of the oceans was not so many decades ago taken as an accepted fact. Such grand romantic ideas do not die so easily. It is also important to understand that most fishers are hunters and even commercial fishermen experience a similar feeling as enthusiastic sports fishermen on a good day. Most fishermen have a genuine desire to have a “good catch” of a lot of fish in a short period of time. The same mindset prevails in industrial fisheries. Part of the grand romantic idea is that “there must be more fish out there”. Fishery biologists are still frowned upon as being too conservative, and the general atmosphere is not to get the “accountants” into this business.

) I for one am convinced that the grand romantic idea is still at work. Surveys conducted in industrialised countries have shown that the fisherman, not the least the small scale fisherman, is seen as the last bastion of the self employed, free from the bureaucracies of the industrial worker, out of reach of the “accountants”. However, reality is grey and not pink. It is now becoming recognised that the Command and Control systems mostly used to manage fisheries with a “top down” approach are not delivering the results - of well controlled fisheries that ensure sustainable levels of fish still left in the water for the future.



) Coastal States have sovereign rights to explore and utilize the living resources within their 200-mile Exclusive Economic Zone, as well as the duty to conserve and manage these resources. On the high seas, fisheries resources are open to exploitation by all States. High-seas fisheries account for some 10% of the annual global marine catch, and most are managed through regional fishery bodies. Unfortunately, many of these bodies are as yet weak and under-funded.

The Food and Agriculture Organization (FAO) and other United Nations agencies have, for decades, been in putting in place the governance framework for the world's fisheries as well as related instruments and guidelines. These include The United Nations Convention on the

Law of the Sea (UNCLOS) in 1982, the "Compliance Agreement"¹ in 1993 and the "Fish

Stocks Agreement"² in 1995.

) In addition both the 1992 Rio Declaration on the Environment and Development (in which countries commit themselves to utilizing natural resources in a sustainable way) and the ten year follow up to Rio, the World Summit on Sustainable Development in Johannesburg in June 2002, set an important agenda for fisheries. In particular, it includes that fish stocks should be restored "on an urgent basis and where possible not later than 2015" and encourages "the application by 2010 of the ecosystem approach, noting the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem".

) This, of course, is a major commitment by governments. It is, in fact, operationalizing the FAO Code of Conduct for Responsible Fisheries and its International Plans of Action³. These are now widely recognised by governments and non-governmental organizations as the global standard for sustainable fisheries and aquaculture and as a basis for national fisheries legislation.

¹Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.

² Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks

³ These are the International Plan of Action for the Management of Fishing Capacity, the International Plan of Action for the Conservation and management of Sharks, the International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries, and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.

⁴ Atlantic cod, haddock, saithe (+pollock), redfish, Cape hakes, South American hakes, hoki, Alaska pollock, Pacific cod, North Pacific hake.



2 The State of Fish Resources

) Capture fisheries have been the fastest growing sector of the food industry in the world for decades, but now the supply is levelling off (FAO, 2002). Capture fisheries have stabilized at around 92 million tonnes per year, and further increases in fish supply have to come from improved management of the resources or from aquaculture. Overfishing has become a problem of great concern. Some stocks are considered endangered and are subjected to controls, e.g. through the CITES mechanism. In addition, there are many other activities than fishing affect the marine environment - such as pollution from industry, agriculture, urbanization, coastal development and global warming. All these factors make the managing of fisheries multifaceted and complicated.

) FAO is the UN Agency that regularly monitors the state of fisheries worldwide, and this includes some 600 selected fish stocks or stock items. The latest count in 2002 shows almost half of these stocks (47%) were fully fished, but not over-fished; a quarter (25%) of stocks was moderately fished, with some room for expansion; while the remaining 28% were over-fished, depleted or recovering (FAO, 2002). Thus, some three-quarters of stocks appear to be moderately to fully fished today.

) The estimate of total marine catches has remained largely unchanged over the past few years. However, the composition of landings has changed significantly: relatively more low value fish are now being harvested. Landings from ten of the most valuable groundfish stocks⁴ have globally been reduced by almost 45% over the last 15 years (FAO databases) - largely due to overfishing. Interestingly, this overfishing is most pronounced in those countries that should have the best conditions to control their fishing activities.

) Needless to say, for many people in developing countries, fish is often the major source of animal protein and export earnings. For these countries overfishing is, therefore, of particular concern.

3 The Ecosystem Approach to Fisheries

In trying to meet the need for fisheries management that is more successful in achieving the objectives of sustainability and profitability, a series of multidisciplinary approaches have been suggested (Metzner, 2002):

- the sustainable development framework,
- the ecological sustainability framework,
- the participatory framework,
- the devolutionary framework,
- community-based framework, and
- the ecosystem-based framework.

) Yet, this author (Metzner, 2002) saw a reason to remind us that the bottom line for fisheries managers is a simple sounding one, i.e. to ensure that enough fish remain



in the water each year to generate new fish for the future. In short, we have all the frameworks and analyses and international plans of action – but we seem to be unable to grapple with the matter of how to practically and effectively manage this basic requirement of all fisheries and have enough real time information about the ecosystem to know what is happening.

) A Conference on Responsible Fisheries in the Marine Ecosystem was held in Reykjavik from 1 to 4 October 2001. The challenge provided to the conference was to define the practical next steps to move from the present fisheries management framework to ecosystems based management. The papers presented were published in a book (Sinclair & Valdimarsson, 2003) and the main findings and conclusions of the Conference in a separate paper (Sinclair et al. 2002).

) With the subsequent Reykjavik Declaration on Responsible fisheries in the Marine Ecosystem, countries declared that they would individually and collectively work on incorporating ecosystem considerations into fisheries management. It was confirmed that “the objective of including ecosystem considerations in fisheries management is to contribute to long-term food security and human development”, and FAO was encouraged to develop technical guidelines on how this could be best done.

) The Guidelines have been produced by FAO as a supplement to the Code of Conduct for Responsible Fisheries under the general title of Fisheries Management (FAO, 2003).⁵ The stated purpose of the guidelines is to make the ecosystem approach to fisheries (EAF) operational, and to provide guidance on how to translate the economic, social and ecological policy goals and aspirations of sustainable development into operational objectives, indicators and performance measures.

⁵ FAO has further published a Technical Paper on the Ecosystem Approach to fisheries management (Garcia et al. 2003).

) The guidelines are seen as an extension of current fisheries management rather than a replacement of them. It is emphasized that the EAF involves a broad range of stakeholders and specifically calls for new deliberation and decision-making processes through participatory mechanisms. Indeed, the EAF needs broader assessment and a mechanism to obtain consensus among stakeholders, even if their interests often compete or conflict.

I think it is no longer debatable what we want to achieve with fisheries management but how best to achieve it. Yet, it should be kept in mind that this requires much additional commitment from the vessel operators in the fishing communities, e.g. significantly more information regarding compliance with various requirements of the EAF, such as more detailed catch statistics, discard statistics (whether or not discards are allowed), fishing location, fishing gears used, catch of vulnerable and or protected species, use of selectivity / mitigation devices etc.



4 Achieving EAF

) Annex 5 of the new FAO Guideline (FAO, 2003) discusses how best to achieve EAF. It emphasises the disappointing performance of “command and control measures”. Yet, while the limitations of such command and control measures have become evident they are still the method by which most government agencies have chosen to control their fisheries. Regulations are elaborated within the administrations often with little analysis of the incentives the measures will create for compliance or non-compliance. Most management systems currently in use make racing for the fish inevitable and, practically speaking, create a vested interest in avoiding monitoring, control and surveillance. The “Tragedy of the Commons” still prevails.

) There is growing interest in the use of economic instruments to achieve sustainable development objectives, i.e. to create an incentive structure more likely to be conducive of responsible behaviour than the control and command approaches. For such incentives to evolve, the rights to utilize the resource must be defined. They must be secured in such a way that the benefits to the holders of the rights are linked to the productivity and value of the resource. In theory, rights secured in the long-term, facilitate the acceptance of short-term sacrifices for long-term gains.

) Thus, governments ought to give rights or similar privileges, complemented by, e.g. rules on transferability and enforceability of rights.⁶ The shares can designate an amount of catch, be denominated in units of fishing effort (such as days or hours of fishing) or even as exclusive geographical areas that are coupled with time periods when fishing is allowed.

) The holders of rights can be a person, a corporation, a community, a collective, or nominated representative of a group. In many parts of the world it will be appropriate to vest these rights to the local community where there are active fish harvesters. These communities would then take responsibility for further allocation and monitoring the use of resources. Similarly, it has been pointed out that traditional fishing rights once existed in many fisheries throughout the world but have eroded over time. These traditional rights could serve as a starting point to re-establish and formalise fishing rights not the least in developing countries (e.g. Sissenwine & Mace 2003).

⁶ It is rightly stressed, however, that the assignment of specific user rights is, however, no panacea for removing all incentives to overuse or otherwise degrade and harm ecosystems (FAO, 2003, WHAT 2000). Indeed, no system can deliver such ideal outcomes.

) Indeed, the initial allocation of rights is a politically delicate issue that needs to involve intensive consultations amongst all stakeholders as part of the process of letting those affected define an equitable allocation of such rights. This is particularly important because in such



fisheries, self monitoring becomes of key importance in control of the fishery and disenfranchised stakeholders may choose to undermine the rules of the system.

) Although there are infinite variation on the design of rights-based systems based on a total allowable catches (TACs) divided into shares, individual transferable quota (ITQs) systems seem to be the form of rights-based management that are at present receiving most attention. Notwithstanding the fears that went along with setting up these systems, significant experience is being gained from numerous such fisheries arrangements which have been in places for decades or more around the world and which have a track record of creating fisheries that are not overfished (because the TACs are set at levels that do not result in overfishing) and that are profitable.

Curiously, and despite widespread fears of the negative side effects of rights-based management, there seem to be even greater fears about trying out systems that explicitly address two fundamental issues:

- the issue of conservation – that the total allowable catches are sustainable; and
- the issue of wealth - that poverty can be alleviated by creating, not frittering away, wealth for the participants.

Arguably, nowhere are these two issues of more importance than in the many developing countries where most of the people involved in fisheries live and work.

5 How does the processing sector cope with complexity?

) To manage fisheries with an ecosystem approach is very complicated but the processing industry can offer some solutions. Fish processing is developing fast and - like other food industries - is making use of ever more sophisticated technologies and marketing its products globally in a very competitive environment. Processing food from raw materials as complex and diverse as fish can be a complicated affair. As more than 1200 aquatic species are utilized commercially, the raw material is usually a mix of many species that come in different sizes and shapes and each having seasonal characteristics in composition that affect processing.

) In such a processing environment the mindset is clear: you know exactly how much raw material is at hand; how much material is needed to for your markets and profits; processing yields have to be carefully monitored to avoid losses; safety and quality measures have to be rigorously checked and recorded; and losses minimised along the processing chain. The rule is: if it cannot be measured – it cannot be controlled, and this is the basic scenario for most developed processing industries.

) For the last decades there has been growing awareness of the importance of an integrated, multidisciplinary approach to food safety and quality that considers the entire food chain. FAO defines the “food chain approach” as recognition that the responsibility for the supply of food that is safe, healthy and nutritious is shared along



the entire production process - by all involved with the production, processing, trade and consumption of food. Stakeholders include farmers, fishermen, food processors, transport operators, distributors, consumers, as well as governments are obliged to protect public health. The holistic approach to food safety along the food chain differs radically from previous models in which responsibility for food safety mainly concentrated on the food processing sector and government control services.

) Some 30 years ago the method of choice for controlling safety and quality of food produced was end product sampling and application of standards. The science was much about representative sampling of the final product and the likelihood that a defect would be detected in the sample taken. The inadequacy of retrospective testing as a control tool gradually became evident: it was based on command and control approaches that to a large extent put the responsibility for safety and quality on the government inspection agency.

) The change in policy came in the 1960's when the preventive approach to food safety was developed by the fish industry - i.e. the Hazard Analysis Critical Control point approaches (HACCP) - that was adopted and made obligatory by health authorities in the main importing countries in the 1990's (Lupin 1997, Lima dos Santos and Lupin 1997, Valdimarsson et al. 2003) .

This system, which was actively promoted by FAO, is based on four principles:

- Obligation of means: Fish and fish products should be processed in certified plants that must meet minimal requirements in terms of layout, construction, hygiene and sanitation.
- Obligation of in-plant quality control: The fish industry is responsible for implementing HACCP-based in-plant quality control programs ("auto-control"), which ensures that the products meet quality and safety standards (Obligation of results).
- Mandatory inspection: A regulatory competent authority is in charge of certifying food plants and establishments, approving and monitoring in-plant quality control programs.
- Equivalency and recognition of control systems: For export, an additional control is exercised by the importing party (country or regional grouping such as European Union EU, North Atlantic Free Trade Agreement, etc.). The importing party regularly audits the national control system of the exporting country to ensure that it is at least equivalent to the control system applied by the importing party. Equivalency and recognition conditions are set and monitored at the international level.

) In this way, the fish processing industry was made responsible for implementation of HACCP and to maintain the necessary documentation to be reviewed by the competent authority.

) The risk based HACCP system is being developed further, in part because the Sanitary and Phytosanitary Agreement (SPS) of the WTO (1995) requires that sanitary measures be based on an assessment of the actual risks to humans, animal



and plant life using internationally accepted risk assessment techniques. As a result, risk assessment work for fishery products is actively being pursued.

) Moreover, developing countries are very active in international trade in fishery product and they, too, have had to adapt to the stringent requirements of the main importing countries.

) At the latest count there were 63 developing countries out of the total of 73 - that are on the EU List I, meaning that they meet the EU sanitary requirements.

) Besides HACCP, the fish /food industry is adopting wider quality systems such as the ISO 9000. The core of the “self management quality system” or “own checks system” consists of three simple rules:

- State in a written form how you intend to run your business;
- Do as you stated you would do; and
- Provide documentation that you were actually doing as you said you would do.

) Industry is putting these methods into practice, and they have become an indispensable part of modern food processing. There were over 600,000 production management systems certified as complying with ISO standards in 2002. These are awarded through 750 specialized certification bodies around the world. The ISO 14000 series which deals with environmental management is up to almost 50,000 certificates which represent a 35 percent increase from 2001 (ISO, 2003). A number of fishing enterprises are among these.

) The UN Earth Summit in 1992 (Agenda 21) called for corporate environmental reporting. Not surprisingly the business community was said to have reacted initially by saying that no company in its right mind would do such reporting voluntarily. That, however, has not been the case. In particular, international companies have embarked upon publishing such reports with environmental information at the core, but increasingly including various social issue considerations. Today, a few thousand companies are issuing such reports, which as yet are few as there are, globally, over fifty thousand multinational corporations. Yet, it is clear that the issue of the trustworthiness and transparency of companies is seriously on the agenda (Trust Us, 2002).

6 Self-governance by the fishing industry?

) Food production from capture fisheries involves a long and complicated chain from the fishing ground to harbour to processing, packaging and distribution. To keep such a process under control needs much real time information to be analysed and used for decision making - information is the basis for control!

) As described earlier, this is already in operation for the processing side, indeed, to a high degree of sophistication, but is utterly lacking when it comes to the capturing side. Many countries have a problem with even the most rudimentary information



such as accurate landing statistics of the targeted resources, not to mention bycatch and discards. With the open access mentality many do not even see the necessity for such data and there is, e.g. widespread sympathy for allowing fishers to land their fish wherever they please.

) This is particularly worrisome because the new governance approaches, such as the EAF, requires far more real time information than fisheries have been accustomed to giving. On the other hand the tools for gathering and disseminating information have become revolutionised and made much easier. A good example are satellite based vessel monitoring systems (VMS), which in less than 10 years have become standard part of the gadgetry of most larger fishing vessels. Not only do they provide real time information to the flag state of the location of the vessel but can be used to transmit various reports such as catch data catch permits, etc.

) The new holistic approach towards responsible fisheries requires that the fishing industry, the scientists and the authorities collaborate fully in fishery research and foster an open-mindedness and transparency of access to information relating to the fishery (Sissenwine & Mace, 2001). These authors state that “the fishing industry increasingly recognizes that it must govern itself in an appropriate manner for there to be responsible fisheries”. They would like the fishing industry to: accept responsibility for providing fisheries information, embrace collaborative research, be informed participants in the fisheries management decision process, comply with fisheries management regulations and not tolerate violations, avoid waste and destructive fishing practices, be respectful of other stakeholders and finally develop training programmes to help instil a responsible fishing ethic. For fisheries to be responsible it must in their view meet four criteria:

- be sustainable;
- produce human benefits;
- have a ‘fair’ distribution of benefits, and;
- not cause ‘unacceptable change’ in marine ecosystems.

) To summarize, it is indeed high time to move away from ineffective Command and Control systems currently in place. Perhaps it is time to ask those who have experience in running complicated, information demanding production systems with many different stakeholders, to suggest how capture fisheries can be managed effectively. They are almost certain to suggest that secure fishing rights are a prerequisite for getting the capture fisheries sector under control.

The views expressed in this article are of the author and do not necessarily reflect the views of FAO

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