

WHAT IS THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT?

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Received: 10 September 2014

Accepted: 05 December 2014

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ABSTRACT

The Ecosystem Approach to Fisheries EAF has been developed in recent years in order to address the failures of fisheries management practices. FAO has devoted a considerable amount of work in bringing the principles of EAF into practical fisheries management plans. However although there are several examples around the world on the application of EAF, there is still a big misconception of what EAF actually is and how it can be applied to fisheries management. This article tries to give a short overview of the development of the EAF approach and how it can be applied in practice. EAF is basically a management planning process rooted in the principles of sustainable development and using risk assessment methodologies. It tries to balance out different societal objectives such as the resources, the ecosystem and the human dimension of fisheries. This is done through the development of a fisheries management plan with the active participation of stakeholders. The planning process goes through four main steps in order to identify the scope of the management plan, identify the issues concerned and decide which are the most important priorities and then develop the management system with several management measures. The last step involves the monitoring and review of the management measures put in place. This process, however must be developed based on the particularity of each area and fishery and that all the important stakeholders are involved from the start of the process. This is a key factor in making any fisheries management plan successful.

Key words: Ecosystem approach to fisheries, management plans, stakeholders, planning

EKOSİSTEM YAKLAŞIMLI BALIKÇILIK YÖNETİMİ NEDİR?

ÖZET

Ekosistem Yaklaşımli Balıkçılık (EYB), balıkçılık yönetimi uygulamalarındaki başarısızlıklara vurgu yapmak amacıyla son yıllarda geliştirilmiştir. FAO EYB prensiplerini uygulamalı balıkçılık yönetim planlarına aktarabilmek için önemli bir çaba göstermiştir. EYB uygulamasına ilişkin dünyada çeşitli örnekler bulunmakla birlikte, EYB'nin gerçekte ne olduğu ve balıkçılık yönetimine nasıl uygulanacağı ile ilgili büyük bir yanlış anlama vardır. Bu çalışma, EYB yaklaşımının gelişimi ve uygulamada nasıl olacağı ile ilgili genel bir bakış vermeye çalışacaktır. EYB, temel olarak köklerini, risk değerlendirme yöntemlerini de kullanarak, sürdürülebilir gelişim prensiplerinden alan bir yönetim planlama yöntemidir. Yaklaşım, balıkçılığın kaynaklar, ekosistem ve insan boyutu gibi farklı objektiflerini dengelemeye çalışır. Bu işe, tüm paydaşların aktif katılımını sağlayarak balıkçılık yönetim planının geliştirilmesiyle yapılır. Planlama işlemi, yönetim planının kapsamını tanımlamak, endişe duyulan problemleri belirlemek, en önemli önceliklere karar vermek ve sonra çeşitli yönetim tedbirleri ile beraber yönetim sistemini geliştirmek için 4 ana basamakta ilerler. Son basamak ise yürürlüğe koyulan yönetim tedbirlerinin izlenmesi ve yeniden değerlendirilmesini gerektirir. Bu işlem, her bir alan ve balıkçılığın özelliğine göre geliştirilmeli, işlemin başlamasından itibaren tüm paydaşlar yer almalıdır. Bu, tüm balıkçılık planlarının başarılı olmasındaki en önemli faktördür.

Anahtar kelimeler: Ekosistem yaklaşımli balıkçılık, yönetim planları, paydaşlar, planlama

INTRODUCTION

In recent decades concerns about the collapse of fisheries, the uncertainty that underlines fisheries assessments and the recognition that management objectives do not relate solely to the fish stocks, has led to a diversification of fisheries science and management. For many years fisheries scientists have given advice that could be used to prevent overexploitation or collapse of a fish stock. However, the increasing intensity of fishing throughout the world has had impacts on the marine ecosystem, and other aspects than those on target species plus these impacts are now the focus of many research and management programmes (Jennings et al. 2001). Over the past few years, new fisheries management approaches have been developed in response to concerns that weaknesses in present management practices have led to impoverished stocks, and caused conflicts between various stakeholders. In recent management approaches, there is an increased input from sociologists and economists who consider how different management strategies will affect the lives and incomes of fishers and associated communities. There is also a greater emphasis on the effects of fishing on the marine environment and the impacts on the species and habitats of conservation concern. In many fisheries activities, various fish, seabirds and marine mammals are caught on longlines or in nets when fishers are pursuing other species. Other concerns about the ecosystem effects of fishing focus on the impacts of towed gears on benthic fauna and habitats, the impact of fishers who use dynamite and poisons on coral reefs, and the effects of fishery waste on populations of scavenging birds and fish. Fishing can also effect food webs by removing predators, such as fish that eat other fish or prey such as small shoaling fish that are eaten by seabirds and marine mammals (Kaiser and de Groot 2000). In the past years in addition to these effects, what is known about them and what can be done to mitigate them are being considered and incorporated into fisheries management practices and plans.

Why Manage Fisheries?

Fisheries are managed because the consequences of uncontrolled fishing are undesirable. These consequences include fishery collapse, economic inefficiency, loss of employment, habitat loss and

decrease in the abundance of rare species. Management is intended to maximize some specific biological, social or economic benefits from the fishery while minimizing costs. Management is usually imposed by an external regulator rather than the fishers themselves. It may seem to be surprising that external regulation is needed in order to control the undesirable effects of fishing. If fisheries management is to work, the management objectives must be specified. Without clear objectives it is impossible to judge the success or failure of management or to design a management strategy. Fisheries could for example be managed to increase food production, income or employment, to conserve non-target species and habitats to placate lobbyists or to encourage fishers to vote for you. For many years the objectives of fisheries management was to maintain the maximum biological sustainable yield (in weight), with limited concern for social, economic and environmental factors. In many cases this was assumed rather than specified. Objectives can be grouped in several ways including biological (e.g. MSY), economic, social and political (Cochrane and Garcia 2009). In order to determine whether objectives are met, the manager will need indicators. When indicators are truly quantitative, in the sense that there is a threshold against which an indicator can be compared, it is much easier to judge the success of management. However it is rather difficult to judge the success of management when indications of any success or failure are based on the emotional setting of the fisheries manager or management authority. While some of these indicators are relatively easy to measure, it is much harder to set appropriate targets for them. The objectives are not independent, and thus an attempt to meet one objective is likely to compromise one or more of the others. For example attempts to maximise catches from a trawl fishery that catches many species, may mean that many species are overexploited. Should catches, income and employment be sacrificed to save a species of conservation concern? Conservation groups may say yes and fishers would say no. Most fisheries managers nowadays are faced with such problems. For example, governments may ask a manager to improve the profitability of a fishery. The manager asks fisheries scientists to run a bio-economic analysis and this demonstrates that profitability will increase if 20 large vessels are licensed to operate from a single port at the expense of the

small scale fleet. However the larger vessels will provide fewer jobs than the numerous small boats that land catches in small harbours all along the coast, and representatives of fishing communities start lobbying the government. Government can be more concerned about that conflict with the fishers would result in bad publicity and jeopardise their chances of re-election, and can decide to allow 20 larger vessels to enter the fishery, but also subsidize small vessels so that they keep on fishing. The new policy is no longer based on the bio-economic model but attempts to meet non-quantitative economic, social and political objectives. Government would make such decisions by feel, based on consultation, scientific advice and their own political goal. The end result is that too many vessels are chasing too few fish and overall profitability of the fishery falls even further. Most managers are dealing with multiple objectives, most of the time driven by the political situation in the country, which may be based on economic, environmental concerns and so on. In this respect, fisheries managers need a framework for making balanced decisions.

Principles of the Ecosystem Approach to Fisheries (EAF)

A need was felt in fisheries management to initiate a process that would facilitate how to address the problems in fisheries, especially those faced by different stakeholder groups. An evolution was suggested by FAO to draw up guidelines for the application of EAF (FAO 2003), followed by a simplified version (FAO 2005) and a toolbox¹ for implementation (FAO 2012, Fletcher and Bianchi 2014). EAF was defined as a risk based management planning process rooted in the principles of sustainable development (Bianchi 2008). According to FAO (2003):

“An Ecosystem Approach to Fisheries strives to balance diverse societal objectives, by taking into account of the knowledge and uncertainties about biotic, abiotic and human components of ecosystem and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries.”

Also according to FAO (2003), the purpose of EAF: *“is to plan, develop and manage fisheries in a manner that addresses the multiplicity of societal needs and desires, without jeopardizing the options for future generations to benefit from marine ecosystems”*

The above definitions clearly indicate that EAF

addresses both human and ecological well-being and merges two paradigms: that of protecting and conserving ecosystem structure and functioning and that of fisheries management that focus on providing food, income and livelihoods for people. Many feel intimidated by the perceived complexity of the ecosystem approach. However, none of the principles of the ecosystem approach are new and they can all be traced in earlier instruments and agreements (such as the UNCLOS, the Fish Stocks Agreement and the FAO Code of Conduct for Responsible Fisheries (FAO 1995)). However implementation in the field of the EAF principles has lagged behind. The reasons for the delay in implementation are many and compounding. One aspect is related the distance between the discourse at the international level and what actually happens on the ground, and the lack of knowhow in order to transpose the international agreements into practice. Another reason for this is that there is a wide perception that the application of the EAF principles in practice is extremely difficult due to the complex ecosystem, societal needs, and the politics involved. Furthermore there is a lack of investment in the process. EAF is a long-term commitment with long-term benefits, which may be difficult to present convincingly to governments which normally work in shorter cycles and tend to prioritize short term objectives as opposed to long-term goals. In many cases there is an insufficient participation of stakeholders since it may be extremely difficult to satisfy all of them. EAF planning often involves dealing with stakeholders with unbalanced level of information, power and political influence. Illegal stakeholder behaviour, through illegal fishing, lack of implementation of flag/port state responsibilities and misreporting are common impediments to the EAF approach. The EAF approach can be considered as an attempt to build a bridge between the commitments and their actual implementation in order to solve the practical problems faced by fisheries. Although there has been a lack in the implementation of the EAF principles, in recent years it was shown that implementing the EAF approach is not impossible and can be done in a practical and useful way as shown by many case studies around the world (Murawski 2007). The EAF approach highlights and reorganizes the principles of sustainable development making their application more imperative. Key features of the EAF

¹EAF-Net.EAF Toolbox.FI Institutional Websites. [online]. Rome. Updated 27 May 2011.<http://www.fao.org/fishery/eaf-net/topic/166272/en>

include:

- it is participatory, at all levels of the planning and implementation steps, in which the principle of equity are adhered to, i.e., fair distribution of rights between various stakeholders;
- it is based on a broader stakeholder participation in the management process, including data collection, knowledge building, option analysis, decision making and implementation;
- it is comprehensive by ensuring that all key components of the fishery system are taken into consideration, including those related to the ecological, social-economic and governance dimensions, while also taking into account external drivers;
- it encourages the use of the best available knowledge and the precautionary approach in decision-making, including both scientific and traditional knowledge. The lack of full scientific knowledge shall not be used as an excuse for postponing to initiate the EAF process;
- it promotes the adoption of an adaptive management system and stresses the importance of establishing mechanisms for feedback into the management process to improve the management performance based on past and present observations and experiences;
- it uses incentives as complementary management measures to support positive behavioural change;
- it promotes a risk assessment in management and a move from a predictive to an adaptive science framework, involving the use of methods to support decision making in conditions of high uncertainty.

EAF and Management Plans (MPs)

The application of the EAF principles in the field works through the planning, setting up and implementation of a fisheries management plan. As defined by FAO (1997), a fisheries management plan is:

“a formal or informal arrangement between a fishery management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives for the fishery and specifies the management rules and regulations which apply to it and provides other details about the fishery which are relevant to the task of the management authority”.

The management plan is the main instrument that specifies how management is to be conducted in the future. In many fisheries, management plans are often

also instrumental not just for planning but for operational management. These plans do not just document the way to reach management goals in the future (strategic) but also describe how to manage the fishery in the present (tactical). Ideally a fisheries management plan is a formal document however it may also be a management arrangement that may be achieving the management objectives of a specific fishery but are not formally collated into a document called fisheries management plan. One important aspect is the process by which a management plan is drawn up. There is little chance of success if the plan is not done with the full participation of the main stakeholders such as the fishers and those who interact with, monitor and police them. As put by Pomeroy and Rivera-Guieb (2006)

“any plan or agreement is only as good as the process that generated it”

Although there is no blueprint for formulating a fisheries management plan, there are some basic elements that have to be included as suggested in FAO (1997). One important aspect of a fisheries management plan within the context of the EAF is the inclusion of all the components of the system, being ecological well-being, social well-being and governance. The process of developing or modifying a management plan according to the EAF process requires a series of iterative steps to be carried out by managers or by a management body established for this purpose, with support and active participation of stakeholders. Four main steps have been defined for the EAF planning process. These are presented below, with the aim of each step and can be better pictured in Figure 1.

1. Initiation and scope: To generate an agreed and clear definition of the fishery plus a shared understanding of the social, economic and ecological objectives to be achieved.

2. Identification of assets, issues and priorities: To identify all relevant resource assets, community outcomes and the issues affecting their management and determine priorities for direct actions to best achieve objectives.

3. Development of management system: To develop a management system to cost-effectively deal with all high priority issues, including setting clear operational objectives and indicators and assessing the merit of alternative management options.

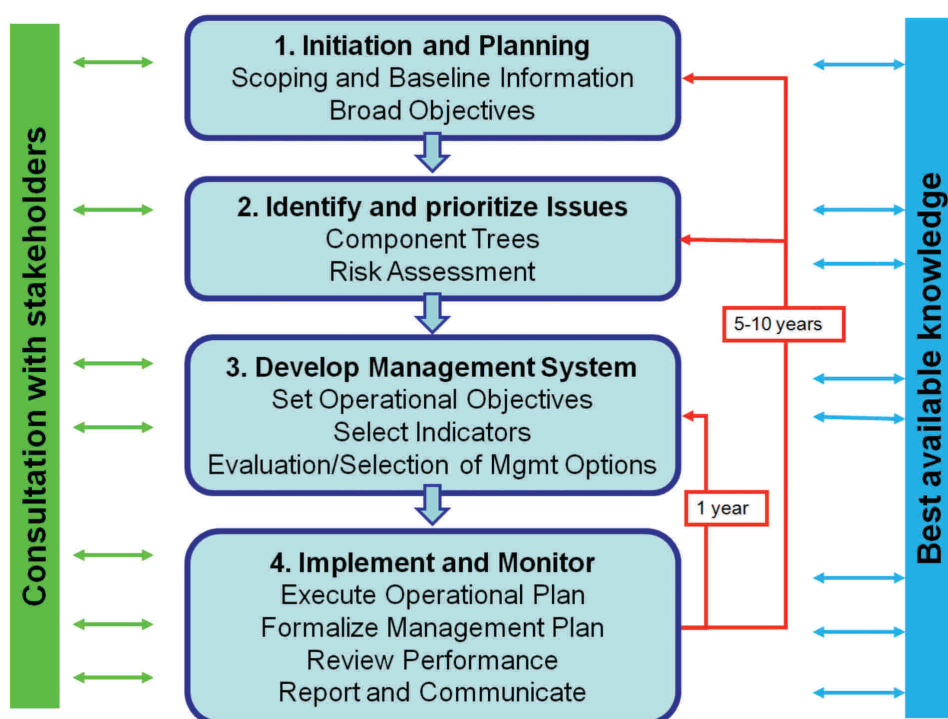


Figure 1. Four main EAF steps which makes possible the application of the EAF principles in practice

4. Implementation, monitoring and performance review: To document the actions required to implement the management system, monitor their completion plus evaluate and report on their performance in delivering acceptable community outcomes.

Step 1: Initiation and Scope

The first step in undertaking a comprehensive planning process such as for EAF should begin with the formation of a project team (e.g. EAF National Task Group) and the development of a roadmap (see EAF toolbox). This should outline the key drivers (internal and external) for undertaking the process, the expectations and motivations of the proponents, document the relevant stakeholders, likely impediments, the human and financial resources available and the specific set of methods to be used. This can be a very brief document (e.g. for a small community-based fishery) or a very detailed and comprehensive project plan and analysis (e.g. for a major fishery sector) which can be used to obtain formal endorsement, political backup and operational support from the relevant stakeholders and decision-making authority (central or local) to proceed. EAF planning should not proceed until there is a sufficient support and the scope of the exercise is at a practical level. A perceived lack of

information should not, however, be used as an excuse to delay initiation because EAF deals with such situations. With agreement to proceed, it is essential to formally define the scope and scale of the fishing activities, communities and geographic areas that will (or will not) be covered by the planning process. This may require clarifying any uncertainties about which agencies have management responsibility for the area and/or ecological resources under consideration. This scoping should also identify the relevant societal/community values and high level objectives (e.g. fisheries, environment, economic, etc.) to be achieved and their hierarchy. These underpin the operational objectives targeted by management and affect which management options will generate better stakeholder compliance. All of these decisions plus summaries of any relevant background material should be documented in a baseline report.

Step 2: Issue Identification and Prioritization

Based on the agreed scope of the fishery and the community values to be achieved, the next step is to identify and examine all issues relevant to the fishery to decide where to focus the management system to generate the best community outcomes. To assist with this process, the issues can be separated into the three

EAF component groups:

- i.** Ecosystem wellbeing - All ecological “assets” (e.g. stocks, habitats, ecosystems) relevant to the fishery and the ecosystem where it occurs and the issues/impacts being generated by the fishery that may be affecting them.
- ii.** Human wellbeing - The social and/or economic outcomes currently being generated by the fishery; both the good - those outcomes the community wants to have generated (e.g. food security, economic development), and the bad - those it wants to avoid (e.g. conflicts; injuries).
- iii.** Ability to achieve - The management and institutional systems in place or proposed to deliver the wanted outcomes (e.g. access and tenure systems, compliance, democratic processes, conflict resolution, stakeholder participation), along with the external drivers (not controlled by the fishery) which may be affecting performance.

Because a large number of assets and issues can be identified, the key part of the whole EAF processes to ensure only the most important issues that are addressed by a direct management intervention. This requires determining their relative priority using some form of risk assessment and/or prioritization procedure based upon the fishery trying to deliver the hierarchy of community objectives and values, not just the ecological ones. Without effective prioritization of the identified issues, the remainder of the planning process will almost certainly fail.

Step 3: Operational Objectives, Indicators and Management Options

After identifying the issues (ecological, social, economic or institutional) which require direct intervention, the next step is to develop a management system that will deliver successful outcomes. This requires clearly determining specifically what you want the fishery to achieve for each issue and why. These operational objectives need to be clear, measurable and directly linked to one or more of high level objectives. To ensure each operational objective to be achieved, there is a requirement of some way of measuring if the management system is working or not. This involves having one or more indicators to measure performance, plus having performance measures (limits, targets, thresholds, etc.) that clearly describe what levels of the indicator define an

acceptable performance. The operational objective, indicator and performance measure together form a package; none is useful without the others. The other critical part of the management system is the determination of what combination of management measures will most likely achieve each of the operational objectives given the available resources and any other constraints. This involves assessing which of the current management arrangements have deficiencies or inefficiencies and identifying potentially better alternatives. Each option should be evaluated based on its cost effectiveness, impact on risks and objectives, likelihood of adoption, etc. to determine which is the most appropriate.

Step 4: Validation, Implementation, Monitoring and Performance Review

Implementing a new management system can be helped by generating an operational (or action) plan that outlines, in detail, what would need to be done by whom, by when, and where. This includes identifying all the activities that need to change, any additional activities needed, plus those activities no longer needed. The complete set of the required activities and their timelines with the resources available should show whether the proposed set of management arrangements is feasible or if they need to be revised. When the feasibility of the system is confirmed, all proposed fishery management actions and arrangements need to be incorporated into a formal Fisheries Management Plan which has an appropriate legal basis. This can require drafting legislation, regulations or other less formal documentation depending on the country and the provisions made in its laws. Monitoring, evaluation and review of performance is a critical step in the adaptive management planning process. It is essential both to ensure adequate performance is being generated for current objectives and also that the fishery is maintaining relevance with community expectations. The review process includes three inter-related cycles:

- i.** Frequent reviews of the operations to determine if each of the activities outlined in the operational plan is being undertaken or not.
- ii.** Periodic reviews of the outcomes to determine whether the activities undertaken are generating an acceptable level of performance in relation to each issue.

iii. Occasional review of the entire EAF plan. After a pre-determined period, or if a major crisis occurs, review the entire management system to check if it is still relevant to the communities' current circumstances. An important activity in the process is to regularly report the outcomes of the management system to all stakeholders so they can consider whether the performance against each of the objectives has been acceptable or not.

CONCLUDING CONSIDERATIONS

The EAF was developed in order to move from the paradigm where fisheries management primarily focussed on the sustainability of target species to a broader set of management objectives related to ecosystem and social/economic sustainability. This is achieved through the development of a participatory and context specific management system. The EAF is a sector-based approach that should be integrated within broader and multi-sectoral governance frameworks such as, for example, integrated coastal area management (ICAM). An important aspect is that every effort to develop such plans must be done in context of the area or country in which such a plan is being developed, and address the most pressing issues in the fishery but at the same time examining all the relevant aspects in the fishery. The structured process by which management plans according to the EAF are developed make them suitable, in that all important stakeholders are involved and the plans become living documents which are reviewed periodically to reflect changes in the circumstances of the fishery. Political attitude is a considerable important aspect in the long term success of the development of fisheries management plans (Gezelius and Raakjær 2008). Usually political decisions prioritize relatively short-term goals from 4-5 years based on the democratic process in a country over the long term sustainable ones. This may also lead to conflicts between short and long term goals such as an increase in political pleasing versus sustainable ecosystem use and conservation. Domestic priorities are always highest on a country's agenda allowing its fishers to reap the benefits of implemented policies at a short term at the expense of the benefit to the long term objectives. Unless the power relations that influence the setting of policy on a short term are taken into consideration it is unlikely that long term goals will be the highly

prominent in any fisheries management system. The EAF promotes strong stakeholder participation in all the steps of the fisheries planning and implementation process. Stakeholder participation increases the sense of ownership of the decision taken, their quality and increases the probability of sustainable outcomes for the fisheries sector. It is recommended that fisheries authorities consider a greater level of autonomy as compared to what has been the practice in conventional fisheries management in the past decades.

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