

Floodplain River Fisheries: A Managers Guide

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Photo: *Katha* fishing in northwest Bangladesh © A. S Halls

Purpose and Scope of the Guidelines

This Guide is aimed at Department of Fisheries Staff, particularly those working in the field who are responsible for implementing national fisheries policy through local management plans.

The Guide aims to improve understanding of the management process and offers practical advice on formulating, implementing and evaluating management plans alongside other key stakeholders such as NGO's, local managers and resource users.

The Guide also contains sources of further information and practical advice for undertaking these activities.

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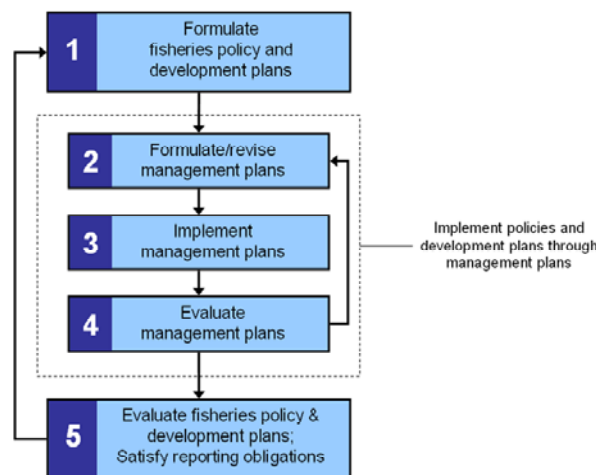
For managers to be effective in their duties, it is important that they share a common understanding of what management is, and exactly what it involves.

1.1 The Management Process

Management is a *process* to make fisheries policy and development plans work in real life. Fisheries policy describes the general goals on how resources should be used and managed including co-management arrangements. These goals are implemented through management plans for each fishery, resource or management unit. Management is a cyclical process involving **5 main activities** (Figure 1):

1. Formulating (making) and reviewing fisheries policy and development plans.
2. Formulating and coordinating management plans, which includes setting objectives and management rules and regulations for each fishery, resource or management unit.
3. Implementing plans to meet the management objectives.
4. Evaluating the performance of management plans.
5. Evaluating fisheries policy and development plans and satisfying obligations.

Figure 1: The Five main activities that form the management process. Source: Halls *et al.* (in press).



1.2 Co-Management - sharing responsibility for management

Co-management, where the responsibility for undertaking these activities is shared with local managers and other key stakeholders such as Non-Government Organisations (NGOs), is becoming increasingly popular in many parts of the world, including Asia. Co-managers, typically the Department for Fisheries (DoF) and resource users represented by some form of local management institution share responsibility for undertaking these activities according to what they can do best often with the support of NGOs and other government organisations. For example, DoF staff may help local managers formulate their management plans and help enforce their rules and regulations. In return, local managers may agree to participate in data collection programmes that will help to ensure they meet their own goals and also meet the reporting responsibilities of DoF staff required for policy evaluation purposes. Field-based managers are most likely to have responsibility for helping to formulate, implement and evaluate local management plans. Therefore, the remainder of this document offers guidance with respect to these three key management activities.

2.1 Involve Key Stakeholders

The formulation of a management plan should be undertaken with the involvement of key *stakeholders*, regardless of whether or not the fishery is co-managed. *Stakeholders* are groups of people or organisations that have an interest or role in the management process. Local stakeholders are also likely to be the main source of much of the information required to formulate the plan.

Stakeholder analysis is a systematic way of identifying key stakeholders. It can provide important information about who will be affected (positively and negatively) by management, who needs to be involved and how they should be involved given their capacity and interest. Sources of further information on stakeholder analysis are provided in Section 5.1

2.2 Formulate and Record the Plan

Formulating (making) the plan will involve the following steps. The first five of these steps can be used as the structure for recording the plan (See Section 5 for sources of further guidance):

1. **Describe the resource, environment, fishery, fishers and other stakeholders.** For this, it may be necessary to carry out baseline studies using various approaches including Sustainable Livelihoods Analysis (SLA), Participatory Rural Appraisal (PRA) and frame surveys.
2. **Select local management objectives** that do not conflict with national policy. These might include biological, ecological, and socio-economic related objectives, such as sustaining production and biodiversity, and improving fisher incomes and food security. Bear in mind that some objectives will be incompatible and compromises and priorities will need to be made.
3. **Select management strategies to achieve the objectives** that comply with national legislation. Management strategies are the management control measures (e.g. closed seasons, mesh size regulations, effort restrictions...etc) and interventions such as stocking or habitat enhancement employed to realise the management objectives. The strategy should include details of access rights, existing legislation and sanctions for non-compliance. Sources of guidance for selecting management control measures to achieve different objectives are provided in Section 5.1. These include guidance on selecting harvest reserves and measures to improve yield and biodiversity inside flood control compartments.
4. **Agree the Performance Evaluation Criteria and Decision-Making Arrangements**, including details of the indicators and criteria used to evaluate the performance of the management plan in relation to the specified management objectives, and to adjust or refine the management strategy as necessary (see Section 4). This might also include procedures for consultation and joint decision-making among stakeholders.
5. **Agree on the roles and responsibilities of each stakeholder** to help implement and evaluate the management plan. This should take account of the stakeholder capacities identified during the stakeholder analysis. It is important to describe exactly the area of competence, geographical area, and fish resources each stakeholder is responsible for.
6. **Record the plan.** The management plan should be written down and made available to all stakeholders. Agreeing on a common format for each sector or management unit will make it easier to coordinate different management plans and help make sure that the same explanatory variables are available for management plan evaluation purposes (see Section 4). Maps are a useful way of recording and presenting information contained in the management plan.

The implementation of the management plan involves the actions required to ensure that the management plan is put into operation and operates efficiently. These include monitoring (collecting) and collating data and information necessary to evaluate the performance of the management plan; enforcing measures (rules) designed to achieve the objectives set out in the plan; and helping resolving conflict among stakeholders, different fisheries or management units or between other sectors of the economy that impact on the fisheries (e.g. agriculture, transport, industry... etc).

3.1 Enforcing rules and regulations and resolving conflict

DoF staff may have full or partial responsibility for enforcing rules and regulations in support of management strategies. In these cases, staff must have detailed knowledge and understanding of the rules and regulations. Information about the rules and regulations should be fully documented in the management plan and therefore it is important that DoF staff have a copy of each plan. In addition, it may be necessary to compile and maintain up-to-date registers of those fishers and their boats that have been granted access to the fishery (possibly by means of a licence agreement) in an attempt to control fishing effort. Knowledge of these rules and regulations, access rights and details of management jurisdiction described in the management plan will also assist DoF staff resolve conflicts (see Section 5.2 for sources of further guidance).

3.2 Designing and Implementing Monitoring Programmes

Monitoring programmes are required for evaluation purposes, or in other words, to determine if the management plan is meeting its objectives and to help managers decide what changes might need to be made to the management strategy to improve performance (see Section 4). As part of the formulation of the management plan, key stages required to design effective and sustainable monitoring programmes include selecting indicators to measure progress towards achieving the management objectives (accompanied by explanatory variables - see Section 4.2), reviewing existing data, selecting data sources and collection methods and exploring opportunities for sharing data and information (Figure 2).

Detailed guidance on how to undertake each stage of the eight-stage design process illustrated in Figure 2 are described by Halls *et al.* (in press) - see Section 5.2.

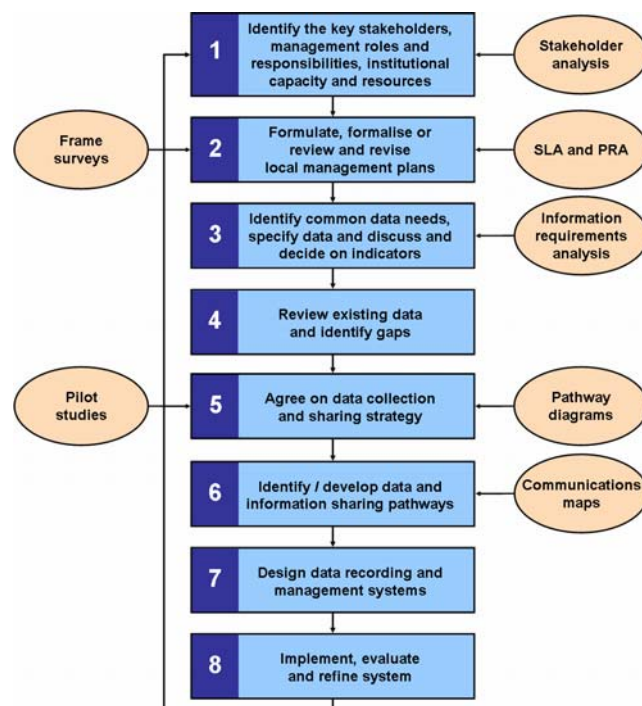


Figure 2: Monitoring programme design stages. Source: Halls *et al.* (in press).

4.1 Monitoring Performance

The evaluation of the management plan will typically involve monitoring management *performance indicators* through time often against agreed criteria or targets set in accordance with the stated management objectives. Such indicators may include catch per unit effort (CPUE) - an indicator of stock biomass. This performance evaluation exercise is typically undertaken on an annual basis, and followed by a review or adjustment of the plan based upon the outcome of the evaluation.

In Figure 3 for example, average CPUE for a given month has been plotted through time to determine any trend in the value of the indicator. The significance of the trend (either upward or downward) can be tested by fitting a regression model to the time series. A trend is typically judged to be significant when the probability that the slope coefficient is zero is less than 5% ($\alpha \leq 0.05$).

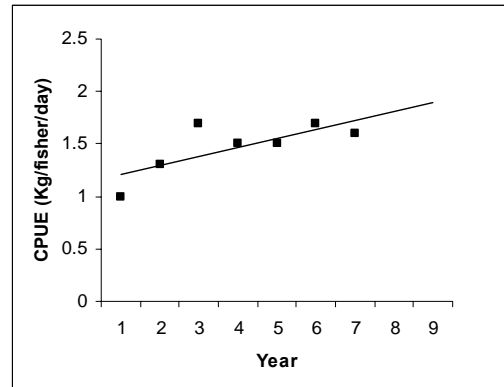


Figure 3 CPUE plotted as a function of time. In this example, the probability that the slope coefficient is zero (i.e. no significant upward trend) is less than 1% ($\alpha = 0.01$) implying that the upward trend in CPUE is unlikely to simply reflect random variation.

4.2 Explaining Performance

Monitoring performance indicators cannot, by themselves, inform co-managers whether or not the performance of the plan can be improved, or what measures should be taken to make improvements.

To achieve this, inputs to the fishery (e.g. fishing effort or numbers of fish stocked) and other *explanatory variables* (e.g. flood extent) must also be routinely monitored or adequately recorded in the management plan to explain and predict differences in management performance.

Empirical (observation) models of the type illustrated in Figure 4 that link performance indicators and explanatory variables can then be constructed to guide improvements to the plan.

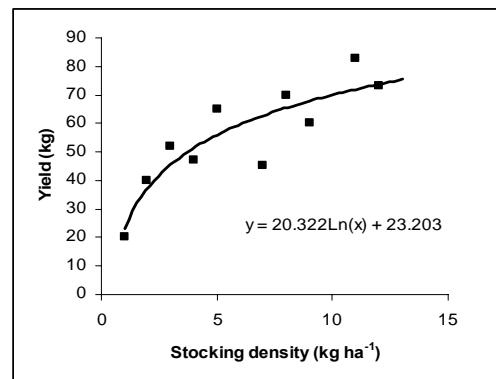


Figure 4 An example of an empirical model describing the (logarithmic) relationship between yield and stocking density.

4.3 Among fishery or management unit comparisons

Refining and improving management strategies on the basis of empirical models developed for specific locations or waterbodies could take years of formal monitoring. DoF staff and researchers can accelerate this *passive adaptive learning* process by comparing performance indicators and explanatory variables among sites, fisheries or management units, constructing empirical models using these data, and feeding back advice or lessons of success and failure to local managers via meetings, or appropriate information networks.

Sources of further guidance on management plan evaluation including the construction of empirical and *analytical* models, and stock assessment are provided in Section 5.3.

5.1 Formulating Management Plans

Management Planning: Hindson, J., D.D. Hoggarth, M. Krishna, C.C. Mees and C. O'Neill (2005) How to manage a fishery: A simple guide to writing a fishery management plan. MRAG Ltd, UK and Centre for Environmental Education, Allahabad, India. <http://www.fmsp.org.uk/r8468.htm>

Stakeholder Analysis: Visit <http://www.iied.org/forestry/tools/four.html> or Annex D of IFAD (2002): <http://www.ifad.org/evaluation/guide/index.htm>.

Sustainable Livelihoods Analysis: http://www.livelihoods.org/info/info_guidancesheets.html

Frame Surveys: See Halls *et al.* (in press) below.

Participatory Rural Appraisal: Berkes *et al.* (2001). *Managing small-scale fisheries: Alternative Directions and Methods*, IDRC 2001, 320 p. The book is available online at <http://www.idrc.ca/>. Other sources are cited in Halls *et al.* (in press) below.

Selecting Management Strategies: Hoggarth *et al.* (1999). Management Guidelines for Asian Floodplain River Fisheries. *FAO Fisheries Technical Paper*, 384/1&2 FAO, Rome 63pp & 117pp. <http://www.fao.org/DOCREP/006/X1357E/X1357E00.HTM>

Harvest Reserves: Hoggarth (2000). Selection Criteria and Co-management Guidelines for River Fishery Harvest Reserves. <http://www.fmsp.org.uk/r7043.htm>. Training Resources: Visit <http://www.fmsp.org.uk/r8486.htm>.

Management Strategies to Mitigate Flood Control Impacts:

Halls, A. S. (2005). The Use of Sluice Gates for Stock Enhancement and Diversification of Livelihoods (R8210). Fisheries Assessment Report. MRAG, 75pp. <http://www.fmsp.org.uk/r8285.htm>. For presentation visit: <http://www.fmsp.org.uk/r8486.htm>

5.2 Implementing Management Plans

Designing Monitoring Programmes: Halls *et al.* (in press). Guidelines for Designing Data Collection and Sharing Systems for Co-Managed Fisheries. Part II: Technical Guidelines. *FAO Fisheries Technical Paper*. No. 494/2. Rome, FAO. 2005. <http://www.fmsp.org.uk/r8462.htm>.

Co-managing fisheries: see Hoggarth *et al.* (1999) above.

5.3 Evaluating and Refining Management Plans

Management Plan Evaluation: see Halls *et al.* (in press) above.

Adaptive Management: Visit <http://www.adaptivelearning.info/>

Stock Assessment: Hoggarth *et al.* (in press). Stock Assessment for Fishery Management – A Framework Guide to the use of the FMSP Fish Stock Assessment Tools. *FAO Fisheries Technical Paper* No. 487. Rome, FAO. 2005. 261+xvi pp. http://www.fao.org/fi/eims_search/publications_form.asp

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