The increasing shift towards co-management has prompted managers to reflect upon their new roles and reconsider information requirements. This technical paper, in two parts, is aimed to meet the growing need among co-managers for guidelines to help design and implement appropriate and cost-effective data collection programmes or systems.

Part 1: Practical guide has been written specifically for co-managers and facilitators working in the field and offers simple and practical advice on helping stakeholders identify their information needs in relation to their management objectives and responsibilities, and developing collaborative ways of collecting and sharing the information in the most effective way.

Part 2: Technical guidelines provides more technical detail on each of the sections in the Practical guide, including examples of the types of data that might be of interest to different stakeholders, data collection methods and sources, the design of sampling programmes, and guidance on data analysis and interpretation. Part 2 is aimed particularly at Department of Fisheries and extension staff, research agencies and academic institutions, but can also provide field practitioners with an additional resource that can be referenced when necessary.

Together, Parts 1 and 2 draw on relevant elements of the literature and the output of DFID-funded research, as well as the experiences and expressed needs of co-managers currently designing or preparing to design their own data collection systems.
Cover photograph:
Staff of the Lao People's Democratic Republic's fisheries agencies (Living Aquatic Resources Research Center and the Department of Livestock and Fisheries) explore the local knowledge of fishers on fisheries in deep pools of the Mekong, Khong Island, Champassak Province. Courtesy of Sommano Phounsavath.
Guidelines for designing data collection and sharing systems for co-managed fisheries

Part 1: Practical guide

by
Ashley S. Halls
Aquae Sulis Ltd
Bath, United Kingdom of Great Britain and Northern Ireland

Robert I. Arthur
MRAG Ltd
London, United Kingdom of Great Britain and Northern Ireland

Devin Bartley
FAO Inland Water Resources and Aquaculture Service
Rome, Italy

Malene Felsing
Environment Waikato
Hamilton East, New Zealand

Richard Grainger
FAO Fishery Information, Data and Statistics Unit
Rome, Italy

Wolf Hartmann
Mekong River Commission Secretariat
Vientiane, Lao People’s Democratic Republic

Dirk Lamberts
MRAG Ltd
London, United Kingdom of Great Britain and Northern Ireland

John Purvis
Lake Victoria Fisheries Organisation
Jinja, Uganda

Parvin Sultana
Middlesex University
Enfield, United Kingdom of Great Britain and Northern Ireland

Paul Thompson
Middlesex University
Enfield, United Kingdom of Great Britain and Northern Ireland

Suzannah Walmsley
MRAG Ltd
London, United Kingdom of Great Britain and Northern Ireland

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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These guidelines (Parts 1 and 2) represent the main outputs of two collaborative research projects funded under the Department for International Development's (DFID) Fisheries Management Science Programme (F MSP): Fisheries Data Collection and Sharing Mechanisms for Co-Management (R8285) and Evaluation and Uptake Promotion of Data Collection Guidelines for Co-Management (R8462). Full details of both projects can be found at http://www.fmsp.org.uk/.

The goal of project R8285 was to provide co-managers with guidelines to develop appropriate cost-effective systems or guidelines mechanisms for the collection and sharing of data and information necessary to improve the sustainable management of their resources. The project involved a series of participatory research activities with the following collaborating institutions and projects (and their respective partners) representing a range of stakeholders operating at different levels in the management hierarchy (e.g. local, sub-national, national, and regional): MRAG Ltd, London; the Food and Agriculture Organization of the United Nations (FAO), Rome; WorldFish Center, Malaysia and Bangladesh [Community Based Fisheries Management (CBFM) Project and Fisheries Co-management Research Project (FCMRP)]; Mekong River Commission (MRC) [Mekong River and Reservoir Project]; the DFID-funded Sustainable Fisheries Livelihoods Project (SFLP); the DFID-funded Integrated Lake Management (ILM) Project, Uganda; and the DFID-funded Regional Fisheries Information System (RFIS) Project [including the Tanga Coastal Zone Conservation and Development Project]. All the research partners were actively engaged or interested in designing or improving data collection systems to support co-management either as part of their mandate or under their own projects and programmes in countries including the Lao People’s Democratic Republic, Cambodia, Thailand, Viet Nam, Bangladesh, Uganda and the United Republic of Tanzania. Project collaborators prepared “System Requirement Reports” (SRR) using a pre-defined format to report details of existing data collection systems, stakeholder needs, capacity, available resources, and opportunities. A total of 18 reports, downloadable at http://www.fmsp.org.uk/r8285.htm were prepared on the basis of literature reviews, focus group discussion, consultation exercises and workshops involving staff from regional management bodies, departments of fisheries and associated research institutions, local management institutions, and resource users. This process not only helped build capacity but aimed to ensure that the project outputs, including these guidelines, were demand-driven, maximizing the likelihood of their uptake by target institutions. The content of the reports were presented, discussed and synthesized at the project’s “Guidelines Development Workshop” held at the MRC headquarters in Phnom Penh, in April 2004, attended by more than 25 representatives of the collaborating institutions and their project/programme partners (see Guidelines Development Workshop Report at http://www.fmsp.org.uk/r8285.htm). The recommendations arising from this workshop, together with a synthesis of the relevant literature and outputs from earlier FMSP research, particularly projects R7042, R7335, R7834 and R8293 formed the basis of the first draft of these guidelines.

The utility of the guidelines was assessed at the Huay Luang Reservoir in Udon Thani Province, Thailand, under the “Management of Rivers and Reservoir Fisheries in the Mekong Basin Component (MRRF)” of the MRC Fisheries Programme in January 2005. Here, a two-stage workshop was implemented with 55 representatives of local resources users, the local management institution (Or Bor Tor) and administrative levels of government. The guidelines proved effective for identifying common data
and information needs among the stakeholder groups and helped them identify and agree upon a data and information collection and sharing strategy that was summarized graphically. This multistakeholder planning exercise also raised awareness among government bodies of the widespread interest of resource users to diversify their livelihoods to include tourism-related income generating activities. These field-testing activities also identified that a simplified version of the accompanying Part 2: Technical guidelines was required to provide all stakeholders, but particularly intermediaries working alongside resource users, with the opportunity to fully utilize the relevant and helpful tools contained in them. An earlier version of this Part 1: Practical guide was therefore written to address this need.

Project R8462 undertook further evaluations of both parts of the Guidelines involving stakeholder workshops and focus group discussions in Bangladesh under the Fourth Fisheries Project (FFP), and the Community Based Fisheries Management Project (CBFM); and during a second phase of testing in Thailand under the MRC’s MRRF Project in the Lower Mekong Basin (see Guidelines Evaluation Reports available at http://www.fmsp.org.uk/r8462). Subsequent revisions and improvements were made to both Parts 1 and 2 of the Guidelines.
Abstract

The increasing shift towards co-management has prompted managers to reflect upon their new roles and reconsider their information requirements. While a vast pool of useful literature already exists that can help guide co-managers design and implement data collection programmes to support their evolving needs, much of it has been written in the context of other sectors or with little emphasis on designing systems specifically for co-managed fisheries.

This Technical Paper is the first of a two-part set of guidelines that attempt to meet the growing need among co-managers for guidelines to help design and implement appropriate and cost-effective data collection programmes or systems.

This Part 1: Practical guide has been written specifically for co-managers and facilitators working in the field and offers simple and practical advice on helping stakeholders identify their information needs in relation to their management objectives and responsibilities, and developing collaborative ways of collecting and sharing the information in the most effective way.

The accompanying Part 2: Technical guidelines provide more technical detail on each of the sections in the Practical guide, including: examples of the types of data that might be of interest to different stakeholders; data collection methods and sources; the design of sampling programmes; and guidance on data analysis and interpretation. They are expected to appeal to Department of Fisheries and extension staff, research agencies and academic institutions, but they will also provide field practitioners with an additional resource that can be referenced when necessary.

Together, Parts 1 and 2 draw together relevant elements of the literature, the output of DFID-funded research, as well as the experiences and expressed needs of co-managers currently designing or preparing to design their own data collection systems. The guidelines are, however, intended to complement, rather than replace, existing related manuals and guides already published in this and other FAO publication series.

This document begins with the scope and purpose of the Guide. Section 2 explains, in the context of the co-management process, who needs information, what types of information they need, and why they need it. The main Section 3 describes an eight-stage participatory process for designing and implementing data collection and sharing systems to meet these needs in a participatory manner with relevant stakeholders. Further sources of information and advice are also provided in the Annex. Frequent cross-referencing to relevant sections of Part 2 is made throughout the document to complement the material provided.

Acknowledgements

These Guidelines represent the collaborative efforts of the Marine Resources Assessment Group (MRAG Ltd) that led the project; the Food and Agriculture Organization of the United Nations (FAO); the Mekong River Commission (MRC); the WorldFish Center and several DFID-funded projects including the Fourth Fisheries Project (FFP); the Integrated Lake Management (ILM) Project, Uganda; the Sustainable Fisheries Livelihoods Project (SFLP); and the Regional Fisheries Information System (RFIS) Project. The contributions of these collaborators and their research partners, including resource users, are warmly acknowledged.

Special thanks to the participants of the Guidelines Development and Evaluation Workshops: Ian Cowx, HIFI (workshop facilitator), Mao Sam Onn, IFReDI; Paul Thompson, WFC; Parvin Sultana, WFC; Devin Bartley, FAO; Richard Grainger, FAO; Alain Kodjo, SFLP Co-Management Team Leader; Ms Munoz, BFAR, Philippines; Mr Thay Somony, Chief, CFDO; Shunji Suguyma, FAO; Mr Hartman, MRC; Ms Kaing Khim, CFDO/MRRF; Mr Trung Ha Phuong, RIA 03/MRRF; Mr Somphanh Chanpengxay, DLF/AMCF; Ms Naruepon Sukumasavin, DoF/MRC-FIP; Mr Niklas Mattson, MRC/AIMS; Ms Kanokporn Deeburee, MRRF; Mr Thomas Augustinus, MRRF; Dirk Lamberts, ILM Project Technical Advisor; John Purvis, SADC RFIS Project; Mr Solomon Makoloweka, Regional Coastal Management Facilitator, Tanga Region; Dr Eric Verheijji, Technical Advisor, Tanga Coastal Zone Conservation and Development Project; Robert Arthur, MRAG Ltd; Mr Khamtanh Vattanatham, FIP/MRCs; Ms Daniela Kalikoski, FAO FishCode; Golam Mustafa, WFC; Abul Kashem, BAU; M.A. Rab, WFC; Mahbubur Rahman Khan, GoB DoF-CBFM-2; Shamsul Kabir, GoB, DoF-CBFM-2; Susmita Choudhury, WFC; Khalilur Rahman, WFC; Masood Siddique, FFP; Kafiluddin Kaiya, GoB DoF-FFP; and Zahirul Islam, FFP technical assistance.

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Definitions

**Co-management** is an approach to management in which the responsibility for management of resources is shared between the resource users and the government.

**Co-managers** are the people and organizations involved in and responsible for management of fisheries resources in a co-management system. This includes national government departments involved in fisheries and their staff, district or local government offices involved in fisheries, and resource users represented by a co-management body or local management institution (LMI, see below).

**Data types**
Groups of common data variables (see below).

**Data variables** are measurements or characteristics that can assume different values (e.g. catches, price, fish length, etc.). They are typically classified according to their scale of measurement e.g. scale vs. categorical, ratio and interval scale, ordinal and nominal scale, etc.

**Explanatory variables**
Variables selected to explain the response (change) of another (performance) variable through time or space.

**Facilitators** are people brought in to support the process of identifying information needs and developing data collection and sharing systems, by bringing together the various stakeholders and taking them through the process. They may or may not be fisheries specialists, although some knowledge and experience of the fisheries sector would be useful, to assist the identification of data needs and collection methods.

**Hypothesis matrix**
A table summarizing a selection of explanatory variables believed (hypothesized) to effect other performance) variables.

**Indicator**
A variable, pointer or index typically calculated from data variables (see above). Qualitative indicators may be assigned scores or values using subjective judgements.

**Information**
Information is the product of data that have been acquired, analysed, and interpreted for use.

**Local management institution (LMI)** is an organization or association that represents the interests of local stakeholders or resource users. They may be people’s organizations, community-based organizations, fishers’ associations that have no government representatives. They have the remit to manage the fisheries resources in partnership with government agencies.

**Stakeholders** are groups of people or organizations that have an interest or role in a process, in this case fisheries management.
1. Introduction

1.1 PURPOSE AND SCOPE OF THE GUIDELINES
This Practical guide forms the first of a two-part set of guidelines for designing and putting into practice data collection and sharing systems to support the co-management of fishery resources.

Part 1: Practical guide has been written specifically for co-managers and facilitators working in the field and offers simple and practical advice on helping stakeholders identify their information needs in relation to their management objectives and responsibilities, and develop collaborative ways of collecting and sharing the information in the most effective way.

Part 2: Technical guidelines provide more technical detail on each of the sections in the Practical Guide, including:
- examples of the types of data that might be of interest to different stakeholders;
- data collection methods and sources; and,
- the design of sampling programmes and guidance on data analysis and interpretation.

They are expected to appeal to Department of Fisheries and extension staff, research agencies and academic institutions, but they will also provide field practitioners with an additional resource that can be referenced when necessary.

Together, Parts 1 and 2 draw together relevant material from previous guidelines, the outputs of previous DFID-funded research, as well as the experiences and expressed needs of co-managers currently designing or preparing to design their own data collection systems, particularly in South and Southeast Asia. These guidelines are intended to complement, rather than replace, existing relevant manuals and guides already published in this and other FAO publication series.

1.2 STRUCTURE OF THE PRACTICAL GUIDE
This Practical guide is arranged in three sections plus Annexes:

<table>
<thead>
<tr>
<th>Section 1</th>
<th>Introduction and scope of the Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 2</td>
<td>The context of the co-management process</td>
</tr>
<tr>
<td>Section 3</td>
<td>An eight-stage participatory process for designing and implementing data collection and sharing systems</td>
</tr>
<tr>
<td>Annexes</td>
<td>Sources of further information and reference material</td>
</tr>
</tbody>
</table>
2. Information for co-management

Before thinking about what information is needed for co-management, it is worth considering the process of fisheries management and what co-management means in fisheries.

2.1 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 five 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](image-url)

The five main activities that form the management process

- Formulate fisheries policy and development plans
- Formulate/revise management plans
- Implement management plans
- Evaluate management plans
- Evaluate fisheries policy and development plans
  Satisfy reporting obligations

Implement policies and development plans through management plans
2.2 CO-MANAGEMENT: SHARING RESPONSIBILITY FOR MANAGEMENT ACTIVITIES

Co-management is defined as the sharing of responsibility and/or authority between the government and local resource users to manage a specified resource e.g. fishery, coral reef, waterbody (ICLARM and IFM, 1998). Co-management covers a broad spectrum of management arrangements with differing amounts of responsibility and authority of government and local resource users. It ranges from consultative co-management (where government consults user groups but decisions are taken by government), through cooperative co-management (where government and user groups cooperate as equal partners in decision-making) to delegated co-management (where user groups have management authority and inform government of their decisions) and an appropriate legal framework must support its implementation. Recent developments in the co-management literature argue that only cooperative co-management where genuine empowerment and user participation in setting management objectives on equal terms with government is “true” co-management (Jentoft, 2003). The usefulness of these Guidelines is not restricted to those situations of true collaborative co-management, but recognizes the wide array of possible co-management arrangements, and evolving arrangements, and aim to guide those involved to design appropriate and context-specific systems for information collection and sharing.

Under most co-management arrangements, government departments share responsibility for undertaking the five management activities shown in Figure 1 with local management institutions (LMIs). LMIs represent the interests of local stakeholders. The LMIs may be people’s organizations, community-based organizations (CBOs), or fishers’ associations that have no government representatives. Who takes responsibility for each of the five management activities will depend upon their resources, skills, rights and motivation. Intermediary organizations such as non-governmental organizations (NGOs) or foundations are often involved in supporting these five management activities. Examples of some of the most common roles for co-managers are described in Table 1; other roles may exist as well such as establishing infrastructure, capacity building and legislative frameworks.

A PRA exercise in Pabna, Northwest Bangladesh
TABLE 1
Typical roles or responsibilities adopted by co-managers and intermediary organizations in relation to the five key management activities

<table>
<thead>
<tr>
<th>Management activity</th>
<th>Examples of possible roles/responsibilities</th>
<th>LMI</th>
<th>Intermediaries</th>
<th>Government</th>
</tr>
</thead>
</table>
| 1. Formulating and reviewing fisheries policy and development plans | • Help ensure the true value of fisheries to livelihoods is known so that fisheries are given fair consideration in multi-sector planning, funding and decision-making activities  
• Help steer co-management policy and development plans | | | |
|                     | • Help ensure fisheries are given fair consideration in multi-sector planning, funding and decision-making activities  
• Help steer co-management policy and development plans | | | |
|                     | • Make fisheries policy, co-management policy and development plans  
• Ensure fisheries are given fair consideration in multi-sector planning, funding and decision-making activities  
• Assign financial and human resources to support plans | | | |
| 2. Formulating and coordinating local management plans | • Set objectives and rules and regulations for the local management plan  
• Share local knowledge and advice | | | |
|                     | • Help set objectives and rules and regulations for the local management plan  
• Coordinate local plans  
• Provide technical advice and information | | | |
|                     | • Ensure local management objectives and rules and regulations are consistent with national policy and legislation  
• Coordinate local plans  
• Provide technical advice and information | | | |
| 3. Implement local management plans | • Enforce rules and regulations including access restrictions and licensing  
• Monitor implementation of the plan  
• Watch out for and help solve conflicts | | | |
|                     | • Encourage people to share local knowledge and experiences  
• Help monitor implementation of local management plans  
• Make sure participatory monitoring meets relevant standards  
• Monitor local management activities  
• Watch out for and help solve conflicts | | | |
|                     | • Enforce rules and regulations including access restrictions and licensing  
• Encourage people to share local knowledge and experiences  
• Make sure participatory monitoring meets relevant standards  
• Monitor local management activities  
• Watch out for and help solve conflicts | | | |
| 4. Evaluating local management plans | • Evaluate the performance of the local management plan to see if it is achieving its objectives  
• Share information and learn from other LMIs | | | |
|                     | • Evaluate the performance of local management plans to see if they are achieving their objectives  
• Encourage information sharing and learning | | | |
|                     | • Evaluate the performance of local management plans to see if they are achieving their objectives  
• Encourage information sharing and learning | | | |
| 5. Evaluate national fisheries policy and development plans | • Evaluate the performance of fisheries policy and development plans  
• Evaluate the performance of co-management policy | | | |
|                     | • Evaluate the performance of fisheries policy and development plans  
• Evaluate the performance of co-management policy | | | |

2.3 FOUR CATEGORIES OF INFORMATION TO SUPPORT MANAGEMENT ACTIVITIES
Information is required to support the five management activities described in Figure 1. Examples of the types of information that may be required to support each management activity are provided in Table 2. Here information for both formulating and evaluating fisheries policy and development plans (activity 1) and to meet reporting obligations (activity 5) have been combined into a single category (1) because of their similar nature, leaving four categories of information. Exactly what data are collected by
whom to meet these information requirements will depend on who takes responsibility for each activity as well as the policy goals, management objectives and capacity of the main stakeholder groups.

2.4 MEETING INFORMATION REQUIREMENTS

A data collection and sharing system is the combination of data sources and collection methods, networks and activities that provides co-managers with the information from each category they need to undertake the management process. 

Data are the numbers and variables recorded such as catch, price, fish length etc. from members of a “population” of sampling units (e.g. vessels, households, fishers etc.). Information is the product of these data after they have been collected, analysed and interpreted for use.

Co-managers will have overlapping information needs (Figure 2). The greater the overlap the more opportunities will exist to share data and information and the

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### TABLE 2

The four categories of information required to support the management process

<table>
<thead>
<tr>
<th>Information category</th>
<th>Examples of information types</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information to help formulate and evaluate national fisheries policy and development plans including information to evaluate the success of a co-management policy. Information to help meet reporting management and reporting obligations.</td>
<td>Gross value of production, fish landings, imports and exports, fish consumption, employment in fisheries sector, number of co-managed fisheries, catch per unit effort (CPUE), distribution of benefits.</td>
</tr>
<tr>
<td>2. Information to help formulate and coordinate local management plans.</td>
<td>Fish species, catch weight or value, fishing gears and seasons, socio-economic categories and numbers of fishers, fisheries legislation, management responsibilities. Management strategies and activities described in local management plans to coordinate actions.</td>
</tr>
<tr>
<td>3. Information to implement management plans typically for enforcing rules and regulations and resolving conflicts.</td>
<td>Registers of fishing units and licences, lists of licensed fishers.</td>
</tr>
<tr>
<td>4. Information to evaluate and improve local management plans.</td>
<td>Performance indicators such as abundance (CPUE) of different species, income, fish consumption, occurrence of conflicts. Explanatory variables including fishing effort, details of management strategies and environmental variables such primary production and flooded area.</td>
</tr>
</tbody>
</table>

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![Figure 2](image.png)

The common data needs of co-managers

DATA NEEDS OF GOVERNMENT

DATA NEEDS OF LOCAL MANAGEMENT INSTITUTION

Common data needs
Responsibility for collecting it. Key stages in designing an effective and efficient data collection and sharing system are therefore identifying and maximizing this overlap, and reaching agreement on who should collect and share data to generate this information based upon their capacity and motivation.

Responsibility for collecting the remaining data will also have to be reached. In some cases, the Government and LMI may be happy to collect these data independently of one another (often informally in the case of the LMI) but then later share them with one another. In other cases they may agree to collect data on behalf of one another provided they are sufficiently motivated to do so.

This document provides practical guidance on how to undertake these key and other important stages for designing data collection and sharing systems for co-managed fisheries.