Data Collection: Designing and implementing systems for co-managed fisheries

A Policy Brief on Designing Sustainable Data Collection Systems

November 2005

Designing Sustainable Data Collection Systems

The aim of this brief is to:

Explain why data collection is important for management; highlight the challenges faced by those involved in designing and implementing data collection systems or programmes; and describe how these challenges are addressed in a new set of guidelines published by FAO for designing data collection and sharing systems for co-managed fisheries.

Describe the experiences of, and lessons learnt by, fisheries management institutions working in South and South East Asia to design and implement data collection systems.

This document is aimed at:

Policy makers, but it will also be of interest to other stakeholders involved in the co-management of small-scale fisheries including fisheries managers, both local resource users and government representatives; research institutions; non governmental organisations (NGOs) and other intermediary bodies.

Contents

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Summary: Sustainable data collection systems

Fisheries are at the base of millions of poor people's livelihoods. The sector employs over 50 million people, with 98% of these from developing countries. Small scale fisheries are of particularly importance to poor people in rural Africa and Asia but their contribution to livelihoods and national economies is rarely recognised, often because of the lack of reliable information on the fishery.

Co-management of fisheries is an approach that aims to improve management of small scale fisheries and ensure that social and economic importance of the fishery is taken into account. It involves shared management responsibility although in practice the extent that decision making is shared depends on the context.

All fisheries require information to support decision-making. Without information to inform policy, fisheries can be undervalued and not fairly considered within the multi-sector planning environment. Responsible fisheries management requires information to determine trends in the fishery and whether objectives such as improved livelihoods or resource sustainability are being achieved.

Co-managed fisheries present particular challenges as there are a large number of different stakeholders involved and generally low levels of capacity. Furthermore co-management systems are often still in development: roles and responsibilities may not be clearly defined, management plans may not be in place and institutional arrangements may not yet be within a legal framework. Difficulties that emerge include clearly identifying information needs, coordinating data collection and sustaining systems.

Despite these challenges, opportunities frequently exist to share data and information and the responsibility for collecting it, which can greatly improve the efficiency of systems. It is possible to review the roles and responsibilities of stakeholders, determine current collection and information flows and build on these to create a system that is within the capability of stakeholders and is directly related to policy and decision making.

A series of FAO Guidelines for Data Collection Systems for Co-management seek to capitalise on the opportunities and address the challenges inherent in co-managed systems. They provide technical background information and a participatory eight stage approach to designing and implementing a data collection system. The Guidelines are split into two parts: a Practical Guide (Part I) and Technical Guidelines (Part II).

The potential benefits of using the participatory eight stage approach within the guidelines include increased ownership of the data collection system by all stakeholders, enhanced trust and sharing of data and information, more efficient systems with reduced overlap, and increased sustainability in the long-term. The guidelines are also an invaluable reference manual that can be turned to for comprehensive information on data types, data variables, indicators and data measurement, sampling and management.

This document provides an overview to the needs and challenges of data collection systems and ...and highlights some of the tools and methods described in more detail in the FAO Guidelines. It draws on case studies (in Bangladesh & Thailand) where the guidelines and eight-stage approach have been tested.

Co-management: a definition

Co-management covers a wide range of management arrangements but in its essence means a sharing of responsibility between 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.

Under most co-management arrangements, government departments share responsibility in undertaking management activities with Local Management Institutes (LMIs). LMIs represent the interest of local resource users and stakeholders. They may be people's organisations, community-based organisations (CBOs) or fishers' associations. Intermediary organisations such as NGOs or research institutes are often involved in providing support for management. The roles and responsibilities of LMIs and government vary in different situations and depend on the resources, skills, rights and motivations of stakeholders involved.

Co-management often results in participation of a wide range of stakeholders. There are often multiple management objectives to satisfy the needs for the varied stakeholders, for example ranging from improved resource sustainability to increased incomes and the protection of ecosystems.

1. Importance of Data Collection

- ✓ Information is required at each step of the fisheries management cycle from policy making, to management planning, and finally management plan implementation and evaluation.
- ✓ Information needs of different stakeholders involved in the management of the resource will depend on their specific roles and responsibilities within this cycle as well as their objectives and capacity.

Importance of information-based management

Information is required at each step of the fisheries management cycle (Box 1 and Figure 1).

Fisheries Policy & Development Planning

The significance of fisheries with respect to the regional, national and local economy must be understood before the best policy decisions can be made. This demands a clear understanding of the position or status of the fisheries sector within the national context. Policy and development planning therefore requires information relating to the importance of fisheries in terms of economics, employment and food production, and sometimes in terms of recreational opportunities. Information relating to the investment requirements of fisheries - in particular monitoring, control and surveillance, and subsidies—and the opportunity costs of the fishery in relation to competing sectors, is also required.

In Laos the use of current data on fisheries production is extremely limited and appears to be divorced from fishery planning exercises. Despite this official figures have a major influence on national policies. They currently suggest that capture fisheries are in decline and that aquaculture is of vital socio-economic importance. However the data this is based on is incredibly weak. [1]

Management Planning

Fisheries management planning requires information on the resource and the environment; the operational characteristics of the fishery; fishers and other stakeholders; stakeholder roles and responsibilities; and the results of previous evaluations and assessments.

In Uganda, frame surveys are conducted on Lake Victoria every 2-3 years in order to get a snap-shot of the fishery. This information is used to help design management measures and review institutional arrangements. [2]

Implementation

Information required to implement management plans typically centres around information required to enforce local rules and regulations. This can include registers of licensed fishers and vessels and details of access agreements and management control measures.

In the Philippines the staff of the national agency responsible for fisheries enforcement expressed the need for information on the extent and location of illegal fishing, the nature of violations and the number of convictions. [3]

Evaluation

Information is required to evaluate whether the management or development measures and activities adopted are having the desired outcome. Exactly what evaluation information is required depends on the management objectives described in the fisheries management plan and the way management decisions are made.

In Bangladesh both the community and the Department of Fisheries want to understand the reasons for increases and decreases in production in certain water bodies, in order to design measures to improve management performance. [4]

Box 1: Four categories of Information requirements for fisheries management

Information Category	Requirement	Example data Types	
Policy	Formulate and evaluate national fisheries policy and development plans	– Gross value of production – Fish landings – Imports and exports – Fish consumption – Distribution of benefits	– Employment in fisheries sector – Number of co-managed fisheries – CPUE
Planning	Formulate and adapt local management plans	– Fish species – Catch weight or value – Fishing gears and seasons	– Socio-economic categories – Fisheries legislation – Management responsibilities.
Implementation	Implement management plans including enforcing rules and regulations	– Registers of fishing units and licenses – Information from local management plans to coordinate action	– Adherence to regulations
Evaluation	Evaluate implementation of local management plans	– Abundance (CPUE) of species – Income – Fish consumption	– Occurrence of conflicts – Fishing effort – Environmental factors

The need for data collection

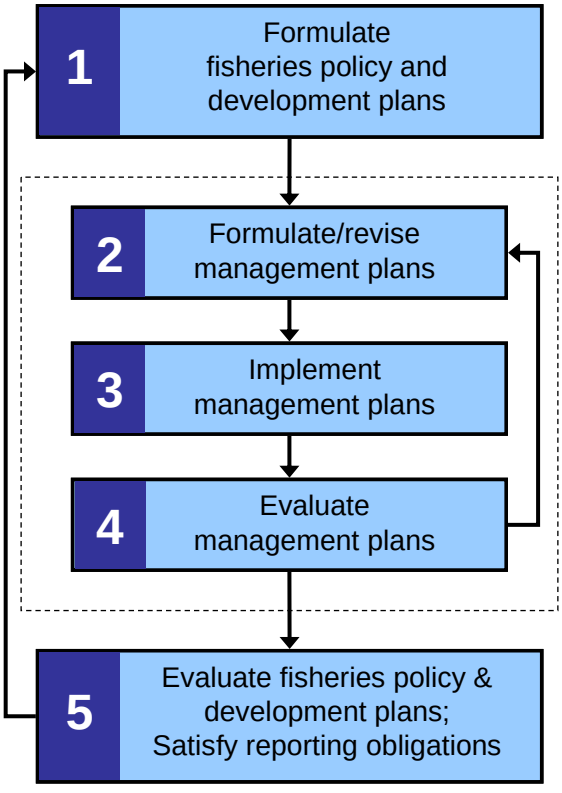


Figure 1: The five main activities in the fisheries management cycle

To meet these requirements data needs to be collected at the level of the fishery and analysed to provide useful information. Box 1 illustrates example data types for the different information categories. Both policy making and management planning require routine data collection, although policy making may also require one-off studies such as livelihood analyses.

Stakeholders involved in a review of data needs for co-managed fisheries in three water-bodies in Bangladesh identified the need for an annual analysis of monitoring data in order to measure trends in illegal fishing and whether the community based system is generating benefits. [5]

Participatory identification of data needs for management at the Huay Luang Reservoir, Thailand

2. Challenges of Data Collection Systems

- ✓ Co-management offers opportunities for sharing the responsibility for collecting data.
- ✓ However, the experiences of stakeholders in Bangladesh, Uganda, Cambodia, Laos, Philippines, Vietnam and Tanzania suggest there are significant challenges to designing effective and sustainable data collection systems to support co-managed fisheries.

Muddied waters: what are the data needs?

The first hurdle encountered when attempting to design appropriate data collection systems to support co-managed fisheries is gaining an understanding of the roles and responsibilities of the various stakeholders who might to be involved in the management process. These are not always clear.

In the Philippines decentralisation of fisheries management has resulted in 800 autonomous entities with management responsibilities, and while the legislation is clear on stakeholder roles this is poorly appreciated by the people themselves. [6]

The next challenge is to identify the management objectives of these different stakeholders and corresponding criteria they will use to measure progress. While management 'principles' may have been agreed by stakeholders these may not have been formalised in a legal management plan that has been agreed by all stakeholder and clearly identifies the objectives of management. It is often rare for the management to clearly the different roles of stakeholders provide indicators or performance criteria that have been agreed to measure performance against the objectives.

At the Kali Nadi water body in Bangladesh the management committee recognised that there is little prospect of establishing a participatory data collection system until appropriate enabling legislation exists to support the development of management plans. [7]

Without clear performance evaluation criteria within management plans, the necessary specification of required data is often overlooked and may not be sufficient to determine the significance of observed trends in performance indicators.

Staff of Lao fisheries agencies (Living Aquatic Resources Research Center [LARReC] and Department of Livestock and Fisheries [DLF] explore local knowledge of fishers on fisheries in deep pools of the Mekong, Khong island, Champassak Province.

Complexity of coordination

With a number of stakeholders operating at different locations and with different needs, the coordination of data collection activities can be a significant challenge. Different stakeholders can end up collecting the same data; opportunities for sharing data are missed; and resource intensive data collection systems are used where simpler solutions exist.

In Mozambique three different institutions collect data on small-scale fisheries. Different methods are used so that it is difficult to collate the data into useful information. The data is not comprehensive for the entire coast and data quality varies. The duplication of effort is partly due to unclear or overlapping roles and responsibilities. [8]

A lack of planning can result in a data collection programme that is unable to adequately monitor management performance.

In Bangladesh fishers on 50 inland lakes have been collecting catch data for the past four years, but a recent review found that this information is rarely collated, analysed or shared to inform management (See Case Study A).

Fishers weighing their landings of Nile perch (*Lates niloticus*) on the shores of Lake Victoria, Uganda.

Standing the test of time

Data collection systems are often put in place but cannot be sustained. This can be because of the lack of resources or a lack of interest on the part of data collectors to sustain the system. This is a critical issue for co-managed fisheries where capacity is typically limited. Problems often arise where those with the responsibility for collecting data are not involved in design of the system. A lack of ownership over the system or appreciation in the value of the data undermines the sustainability of the system.

Fishers at one fishery site in Bangladesh (Kali Nadi) expressed uncertainty over the purpose of external data collection and reported no effective feedback . [9]

The move towards co-management has often led to the burden of data collection being placed on the resource users. However involvement in data collection systems may incur high opportunity costs.

Systems also often fail to provide the necessary support and incentives to stakeholder collecting or providing data.

On Lake George in Uganda, the opportunity costs of participation compared to the perceived benefits may be threatening the sustainability of the Catch Assessment Survey (CAS). With poor preservation facilities, fisherman experience a decline in the value of their catch as they queue at "weighing check-points" to have their catches sampled. Due to this constraint data collectors are only able to record catch data for 25% of boats that landed. The resulting data may not be precise enough to detect changing in productivity or abundance of the fish stock. [10]

3. Addressing the Challenges

- ✓ The guidelines published in the *FAO Fisheries Technical Paper* series seek to address the challenges inherent in designing data collection systems for co-managed fisheries. These guidelines advocate for a participatory eight-stage design approach.
- ✓ This approach ensures that information needs are clearly identified by involving stakeholders throughout the design process.
- ✓ The approach encourages coordination and cooperation among and between stakeholders and the collection of data that is relevant to the objectives of management.

The eight-stage approach

Both Parts I and II of the Guidelines are framed around an eight-stage participatory process for designing and implementing sustainable data collection systems for policy and management planning (Figure 2).

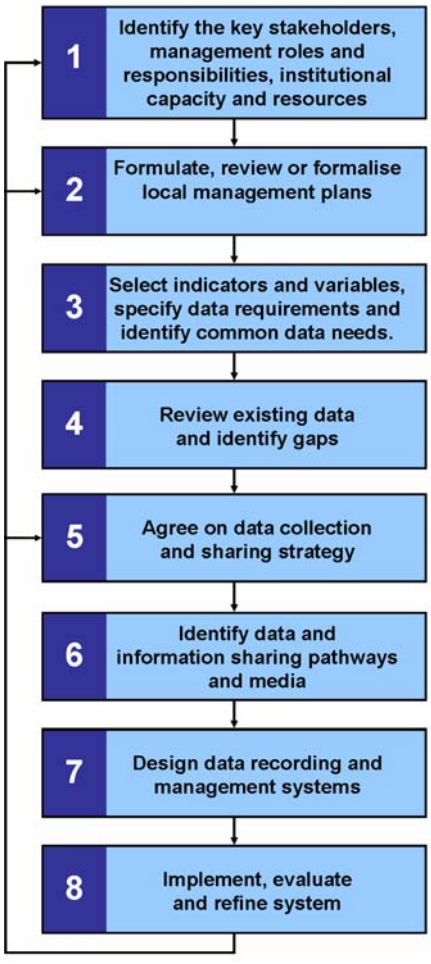


Figure 2: The Eight Stage approach

Benefits of the Eight-Stage approach

Identifying information needs:
- ✓ Identifies key stakeholders with an interest in data collection and sharing
- ✓ Identifies relevant information through management planning guidance

Coordination
- ✓ Promotes sharing of data for common needs
- ✓ Encourages data collection at the appropriate level
- ✓ Results in shared responsibility for data collection

Sustainability
- ✓ Encourages more efficient data collection
- ✓ Improves stakeholder buy-in

Identifying information needs

The eight stage approach encourages the participation of all key stakeholders, helps identify their information needs. It also helps select appropriate indicators and their data variables based upon roles and responsibilities and capacity of stakeholders, and explicitly defined objectives. It encourages managers to seek existing sources of data and helps identify common data that can be shared among stakeholders. Steps are included to help identify data and information sharing pathways, develop data management systems and to implement and refine the entire system.

Stakeholder analysis (Stage 1) is the basis of establishing roles and responsibilities within a co-managed system, and is a necessary first step in identifying the data requirements. It can also provide information on stakeholder's needs and objectives and their capacity to monitor and evaluate data.

A review of stakeholders for the Community Based Fisheries Management (CBFM) in Bangladesh identified over 30 stakeholder groups that are involved in or are affected by management of inland water bodies. A participatory planning exercise allowed each of the stakeholders to express their data needs. (Case Study B).

Building a data collection system on the basis of a management plan (Stage 2) ensures that all data requirements are justified and appropriate.

A participatory review of data collection systems for inland water bodies under the Fourth Fisheries Project resulted in a higher awareness of stakeholders of the need to justify data needs in relation to management objectives. Rather than leaving catch statistics unanalysed, the fisheries department committed to analyse the data, determine trends in production and feed back the results to monthly meetings of the Fisheries Management Committee (Case Study A).

Coordinating systems

The principle of participation in the design process, helps to ensure that the system addresses the needs of all stakeholders and avoids unnecessary duplication of effort. Through the process of discussion and negotiation, stakeholders are encouraged to identify common data needs (Stages 3 & 4) and determine how data - along with the responsibility for collecting it - can be shared (Stage 5). Co-designing the system promotes cooperation between stakeholders.

In Bangladesh the participatory planning exercise allowed common data requirements to be identified. Common data needs were identified such as fish catch data, required by both the Department of Fisheries and the water body management committees to help evaluate the success of management. (Case Study B).

A review of current information sharing networks (Stage 6) is an important stage in identifying the best channels or pathways to use. It helps to identify how information and data can be shared, and give a basis on which to make shared management decisions.

In Thailand a review of the current sharing system helped to identify three potential pathways to feedback analysed information to village heads (Case Study C).

The involvement of all stakeholders in the design allows the identification of bottlenecks in the system and the most appropriate methods to record and manage data (Stage 7).

In Cambodia a review of data collection systems revealed that the English language requirement to use the access database limits its usage. A Khmer version would promote sharing and accessibility of data. [11]

However participation also requires resources and the benefits of the outcomes will need to outweigh the costs of involving a wide range of stakeholders.

The fisheries department in Cambodia use participatory methods such as participatory rural appraisals tools and focus group discussion to understand the perceptions of local people. However at times the villages find it difficult participating in these processes if they are not compensated. [12]

Enhancing Sustainability

While the use of local knowledge can reduce costs of data collection, stakeholders are only likely to be motivated to collect data that is relevant to them. It is therefore important to negotiate shared indicators when developing the management plan (Stage 3).

Participation of stakeholders in designing the data collection system increases interest in ongoing monitoring. It also allows data collection methods to be piloted and refined so that all stakeholders are happy with the format.

A participatory review of data collection systems developed by stakeholders co-managing the Huay Luang Reservoir in Thailand included the field testing and refinement of log sheets designed for recording catch information. It also allowed discussions by stakeholders to determine the most appropriate water quality sampling locations and frequency. (Case Study C).

Feedback is one method of maintaining the interest of data collectors. The evaluation of the data collection system is an important stage (Stage 8) where inefficiencies in the system can be identified and addressed. Others ways of building incentives and enhancing efficiency are described in the box below.

Building Incentives for Sustainability

- ✓ Financial incentives including payment for time or travel
- ✓ Data collection as a precondition to access to the fishery
- ✓ Facilitating information feedback and flow
- ✓ Communicating the importance of data in shaping policy
- ✓ Timeliness and relevance of feedback of findings
- ✓ Acting on recommendations that are made by stakeholders
- ✓ Minimising opportunity costs
- ✓ Helping managers formulate, implement & evaluate local management plans

Enhancing efficiency

- ✓ Avoiding the duplication of effort to collect the same data
- ✓ Reviewing existing sources of data and building on systems that are currently in place
- ✓ Encouraging common information needs among co-managers
- ✓ Sharing responsibility for data collection tasks on the basis of who is best able or equipped to do so in terms of capacity and motivation including the use of local knowledge.
- ✓ Undertake participatory review of the data collection system

Case Study A: Bangladesh (1)

Fourth Fisheries Programme

Context

Since 1999, systems of community-based fisheries management have been established around 50 inland open water bodies in Bangladesh, under the DFID-funded Fourth Fisheries Project. This has promoted the creation of Fisheries Management Committees responsible for managing the fisheries resources and representing the interests of resource users from surrounding villages. Co-management agreements have been established with government fisheries officers through memoranda of understanding, and each Committee has developed a management plan detailing management measures and access rules. Management measures that have been introduced in the past 5 years include fish sanctuaries, gear restrictions, closed seasons, stocking and restoration of habitats through excavation.

Stakeholders identifying their information needs and opportunities for information sharing in Bangladesh.

Problems with data collection

Although a range of information is collected by the committee and Department of Fisheries officers, a review of the current systems (see below) revealed that information flow in generally upwards from the fishers to the Department of Fisheries will little feed-back. It was also found that catch records are often maintained by fishers, but this information is rarely compiled, analysed or shared.

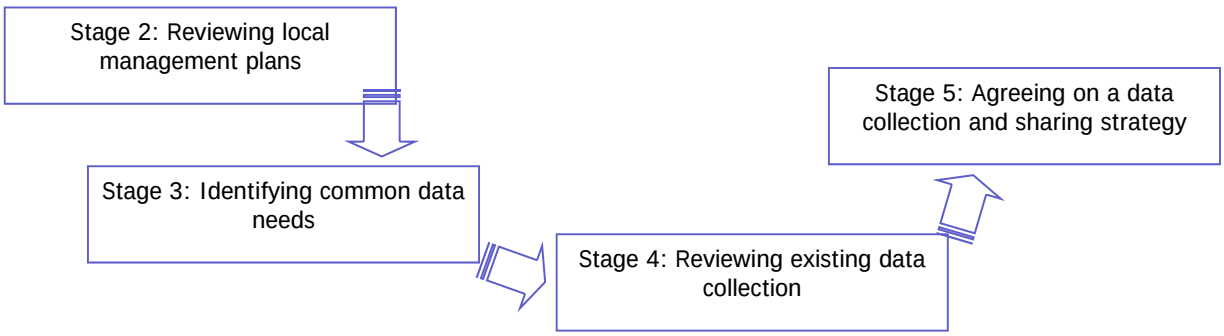
Addressing the problems

The data collection guidelines were used to review existing data collection systems in five inland water bodies: the Tangon River, Masankura Mora River, GSKB-Kalia, Old Brahmaputra and the Borobila Beel. Workshops were held for each of the water bodies including representatives of fishers, DoF statistical staff, local DoF staff and NGO staff.

The following tools from the guidelines were used:

- The eight-stage design process
- Guidance on the importance of feed-back to sustain motivation of stakeholders
- Guidance on justifying data needs in management plans

Each workshop worked through Stages 2-5 of the eight stage process as illustrated below:



Outcomes

The outcomes from the workshops are summarised below:

1. Identifying indicators for success

A review of the local management plans enabled stakeholders to identify indicators for success and data needs to measure these indicators.

2. Identifying common data needs

Working in separate stakeholder groups representing the FMCs and the Department of Fisheries, it was possible to identify the specific data needs of each group and identify where overlaps existed.

3. Reviewing current data collection systems

It was also possible to review current data collection systems and review whether they were providing or facilitating data sharing necessary to be able to measure success. Lastly participants were able to determine the pros and cons of current data collection methods and discuss how they could be improved.

4. Agreeing data collection and sharing system

Stakeholders identified information needs and reached agreement on who should collect information and who they should share it with.

Masankura Mora River Outputs

The workshop for the Masankura Mora river revealed that the Department of Fisheries needs information on fishers loans and savings in order to fulfil a management objective of providing a savings fund and helping fishers to save. It also revealed that both the fishers and DoF staff are interested in catches and related income. Currently catches are recorded only by fishers and the data are not analysed. It was therefore agreed that the fisheries management committee will collect information on loans and report this back to the DoF during monthly meetings. A format for recording fish catches and related income was agreed upon. The DoF agreed to analyse the catch and income data every 6 months and report their results back to the fisheries management committee.

Borobila Beel Outputs

In the Borobila Beel workshop stakeholders agreed to the following roles and responsibilities:

Fisher responsibilities:

I) Review the status of loans held by fishers and their level of skills and required training by recorded the following data in a one-off study:

Name	Source of loan	Amount of loan	Skills	Training requirements

II) Record catch and income by species on a daily basis

Species caught	Total amount (kg)	Tk earned	Rate (Tk/kg)	Kg fish kept for home consumption

III) Share data with the Department of Fisheries at monthly meetings

Department of Fisheries responsibilities:

I) Analyse catch data for the last six months
II) Feedback results at monthly fisheries management committee meetings
JJ) Ongoing analysis and feedback of data

Source: Sultana, P (2005) Evaluation Report with Forth Fisheries Project, Bangladesh

Case Study B: Bangladesh (2)

Community Based Fisheries Management (CBFM)

Context

The DFID-funded Community Based Fisheries Management (CBFM) Project implemented by the WorldFish Center has established fisheries management committees on 113 water bodies throughout Bangladesh. The co-management arrangements vary with some committees consisting only of professional fishers, while others involve representatives from a wide range of stakeholders groups ranging from the Department of Fisheries, local government structures, Department of Environment, Water infrastructure departments, water regulation departments, religious groups, NGOs and Community Based Organisations e.g. Beel Management Committees.

Involvement of women in data collection planning, Bangladesh.

Problems with existing data collection systems

Developing data collection systems to support the management activities under the Community Based Fisheries Management project is made difficult by the wide range of water body types and co-management arrangements included in the project. Information needs vary depending on the types of stakeholders involved and the type of water body under management. Information sharing is both necessary, because waterbodies are often connected, and beneficial for evaluating the effectiveness of different management strategies.

Addressing the problems

The Guidelines for Data Collection for Co-management were used to review the data requirements of resource users exploiting three water bodies and managers in the districts of Jessore, Tangail and Sunamganj. Workshops were held in each district involving the relevant stakeholders in each case. The participants undertook the following activities:

Stakeholder analysis
(Stage 1 of the Eight-Stage approach)

↓

Identifying common data needs
(Stage 3)

↓

Identifying data and information sharing pathways
(Stage 6)

Outcomes

The workshops enabled the identification of stakeholders involved in management of the water bodies; their data needs; opportunities for data sharing; and potential information and data sharing pathways.

1. Stakeholder Analysis

The workshops provided an opportunity to identify all the stakeholders involved in the management of the water bodies. The exercise revealed that at each location there were as many as 30 different stakeholders ranging from the Department of Fisheries and resource users to the departments of forestry and environment and to community based organisations and the social welfare unit.

2. Identification of common data needs

Through a compilation of all the stakeholders' information needs it was possible to identify common data requirements that could be shared between stakeholders. All stakeholders agreed that there was a need for a monitoring programme that could provide trends in the extent of illegal fishing, and whether the community based management system was providing benefits.

Some examples of common data needs are illustrated in the box below.

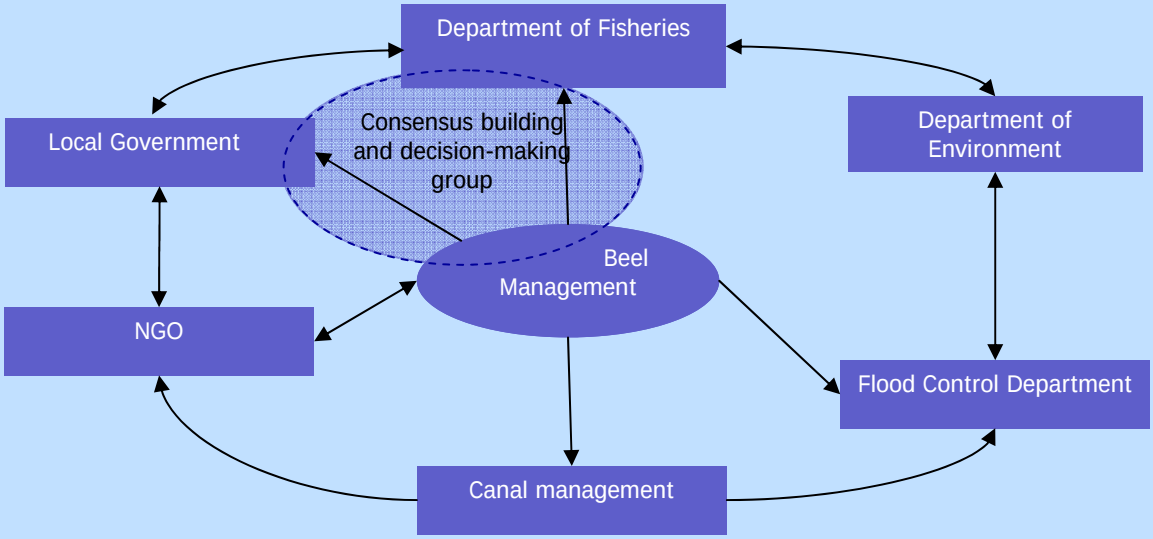
Examples of common data needs

- ✓ In some cases stakeholders had similar data needs for similar uses. For example, in Jessore, both the Department of Fisheries and the Beel Management Committee required information on fish landings and gear selectivity to help evaluate management strategies.
- ✓ In other cases stakeholders had similar data needs but for different uses. On the Elenga water body, CBOs required information on previous and present condition of the water body to calculate the lease value of the water body. This information was also required by government departments to assist with water management planning.

3. Identifying systems for sharing data and information

The workshops reviewed current information networks and identified new opportunities to share information between stakeholders. An example for a sharing network developed for the Jessore water body is illustrated below. It shows how the Beel management committee can act as a hub for information sharing, but how there are other networks to help share information. Some stakeholders are more critically involved in management through consensus meetings so information sharing between these groups will be particularly important.

DATA AND INFORMATION SHARING SYSTEM FOR THE JESSOR WATER BODY (BANGLADESH)



Source: Kashem, Rab & Mustafa (2005) Field testing of guidelines for designing data collection and sharing systems for co-managed fisheries. Community Based Fisheries Management (CBFM), Bangladesh

Case Study C: Thailand

Huay Luang Reservoir

Context

The Huay Luang Reservoir in North East Thailand supports the livelihoods of a number of local communities. Management of the reservoir and the fisheries is shared between a range of stakeholders including the Tambon Administrative Organisations (TAO) - representing local resource users; Provincial Fisheries Officers; the Udon Thani Inland Freshwater Research and Development Centre (IFRDC); the Provincial Natural Resources and Environment Office; the Tourism Office and the Irrigation Project Office.

Training stakeholders in data collection methods at the Huay Luang Reservoir in Thailand.

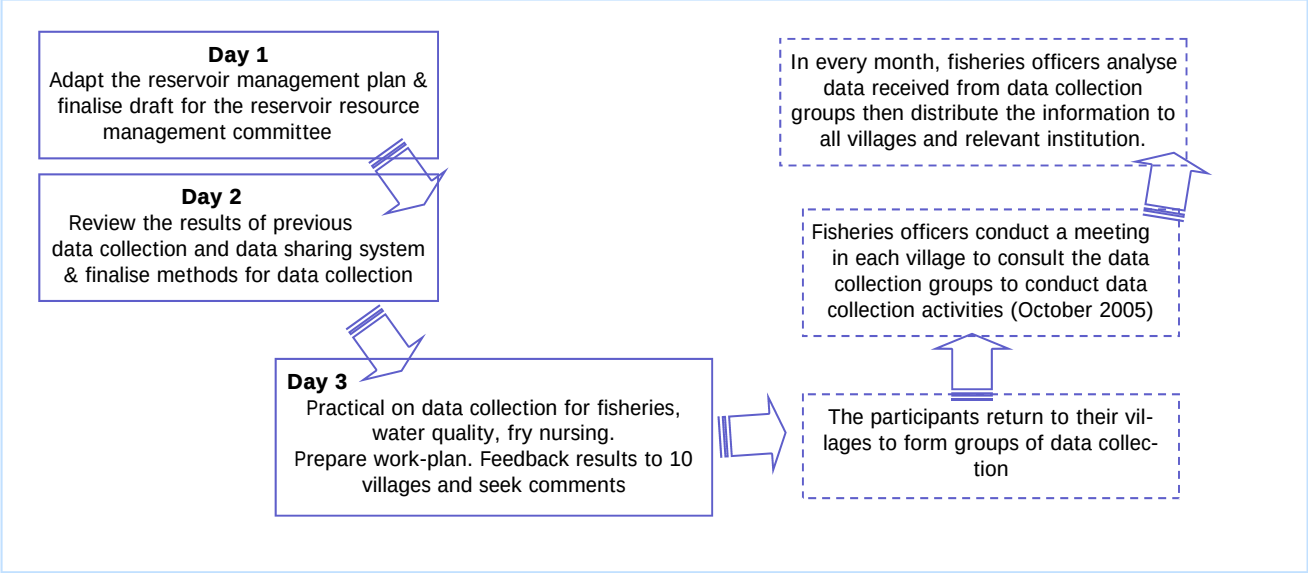
Problems with data collection

Consultation with this range of local stakeholders identified that they lack adequate information for management and planning of the reservoir. Although some information is regularly collected by government organisations there are no appropriate data sharing mechanisms so this information is not available to or used by local resource users.

Addressing the problems

Workshops were held in January and September 2005 to bring the stakeholders together and improve the data collection and sharing system to support co-management of the reservoir. As illustrated below the participants first looked at the reservoir management plan and clarified responsibilities of the management committee. This follows Stages 1 & 2 of the Eight-Stage approach. During Day 2 the participants reviewed previous data collection systems and determined a new system as well as determining methods for collection (Stages 3, 4 & 5). Following this the data collection methods were piloted and the results feedback to the 10 villages involved. Subsequent improvements to the data collection system were made.

The workshops took the participants through the following steps:



Outcomes

The workshops succeeded in developing an improved data collection and sharing system with the involvement of local resource users. There were five major achievements:

1. Identification of information categories

The most important information requirements for management and planning of the reservoir were identified and summarised into five categories: water quality; fisheries information; water management; development work plan and fisheries law.

2. Identification of a 'folk monitoring' programme

A work plan for monitoring a stocking programme was agreed with shared responsibilities among stakeholders. TAO members in 10 villages agreed to monitor water quality of stocking ponds, fishers agreed to monitor fish landings and the leaders of the stocking experiments agreed to monitor number of fry in the stocking ponds. The government fisheries agency committed to give technical supervision to the monitoring programme through i) holding training meetings at the village level on data collection methods and ii) analysing the data on a monthly basis and iii) providing feedback to all villages and relevant institutions.

3. Identification of current information flows

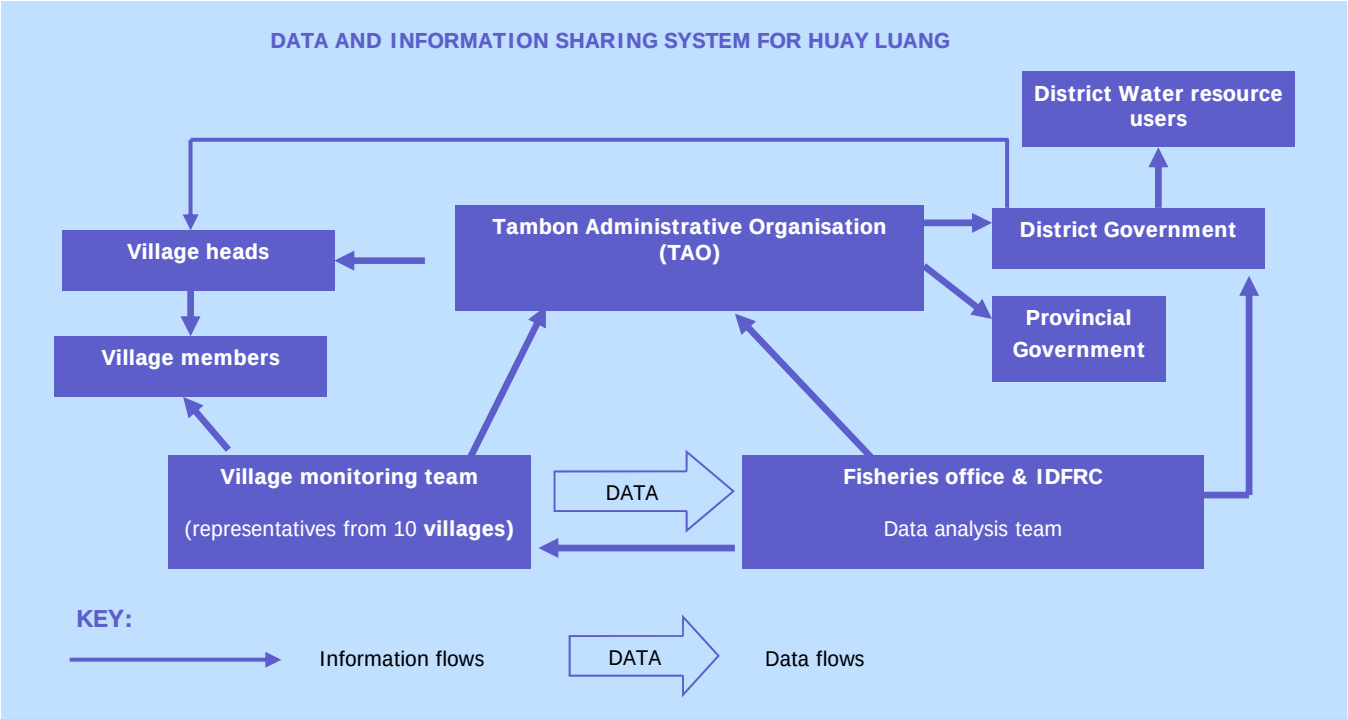
Current information flows were analysed and used as a basis to determine the most effective way of sharing information between stakeholders. It was agreed that data monitors within the villages would pass the data to the fisheries office and IDFRC for analysis. The resulting information would then be distributed through the TAO making use of its networks with village heads, provincial and district government. Other channels also exist e.g. monthly meetings between village heads and district government.

4. Design and testing of data collection systems for fisheries catch

It was agreed that fisheries information would be recorded by the fishers. Log sheets were designed to record catch and effort data and tested by two groups of participants. Additional indigenous species names and effort per day of each fishing gear were added to the forms after the test. An implementation plan for catch data collection was also agreed involving a survey of fishers and fishing gears, identification of surveyors to record catch information, and an evaluation of the survey.

5. Identification of the required frequency, location and methods for water quality data collection

The most appropriate locations for water monitoring were identified and the frequency of sampling agreed based on a need for regular data and a need to cover the main seasons. The timing of sampling was agreed to take place at the beginning of the dry and wet seasons and during the periods when fish deaths are most frequently observed.



Source: Hartmann (2004) Report on Systems Requirements for National Management Institutions ("Level 2") in Lao PDR

4. Key Messages

- The *Guidelines for Designing Data Collection and Sharing Systems for Co-managed Fisheries* published in the *FAO Fisheries Technical Paper* series offer guidance on all aspects of designing, implementing and evaluating systems for collecting and sharing data and information among stakeholders to support their roles within the co-management process. They aim to help develop sustainable systems with these stakeholders, providing relevant information in an efficient manner.

- Case studies indicate frequent but often unrealised opportunities for improving data collection systems through information sharing among co-managers. Stakeholders are often unaware of these opportunities until they have had a chance to discuss their information needs in relation to explicitly defined objectives and considered the most efficient way of meeting them (See Case Studies A, B & C).

- The involvement of stakeholders in the design of data collection systems has a number of benefits. Participation incurs costs both in resources and in time, but the advantages include higher commitment by stakeholders to implement the plan, more efficient systems and a coordinated approach.

- Data collection systems that are designed in a 'top-down' manner often wrongly assume that resource users or other stakeholders will contribute to data collection systems without incentives or feedback. In reality stakeholders will only be committed to collecting data that are of direct relevance to them or that noticeably influences policy or management that affects them. They are likely to be more motivated if there are incentives in place or compensation for any costs they might incur.

- Where data collection is carried out locally but the data are analysed elsewhere, it is important to give regular feedback on the results of the monitoring. Data collectors need to see the results of their hard work to understand how the data they collect contributes to the larger scheme of things. Providing regular feedback helps maintain motivation and ensures continued data collection is accurate and reliable.

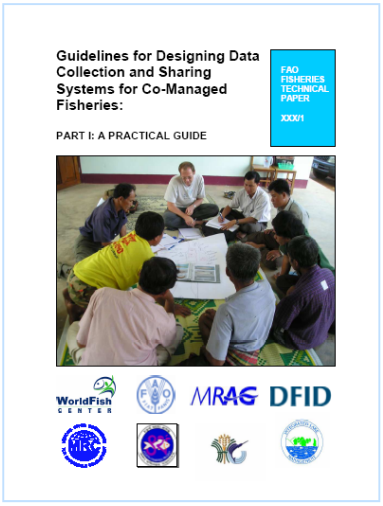
- The formulation or review of the management plan is fundamental during the design of data collection and sharing systems. Properly formulated and clearly recorded management plans will greatly aid the identification of appropriate indicators and data variables, as well as appropriate sources and data collection methods. In spite of the importance of the management plan not only in terms of designing monitoring programmes but also for coordinating and evaluating management activities, few adequate examples were encountered during the preparation of the Guidelines.

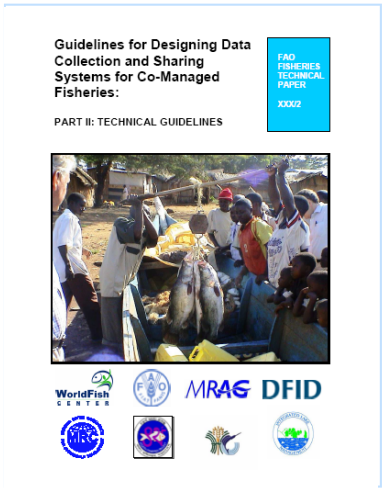
A Participatory Rural Appraisal exercise in Pabna, Northwest Bangladesh.

4. The FAO Guidelines

- ✓ The lessons learned through the case studies and the eight stage process have been detailed in a two part set of guidelines published FAO.
- ✓ **Part I:** ***A Practical Guide*** is aimed at stakeholders working with resource users in the field
- ✓ **Part II:** ***Technical Guidelines*** provides a comprehensive reference for managers and researchers requiring more technical detail
- ✓ Part I and II offer guidance on the design and implementation of sustainable data collection systems for co-managed fisheries.

What do the guidelines cover?





The Practical Guide (Part I)

- Field level guidance
- Step-by-step approach

Content: The guide offers simple and practical advice on helping stakeholders identify their information needs in relation to their management objectives and responsibilities. It assists in developing collaborative ways of collecting and sharing the information in the most effective way. References are made to the Technical Guidelines (Part II) which provide detail on methods, data types and data collection techniques.

Target: The guide has been written specifically for co-managers and facilitators working in the field.

The Technical Guidelines (Part II)

- Comprehensive reference manual
- Technical content

Content: The technical guidelines provide more detail for each stage in the design process. It is a comprehensive reference of information requirements and potential data variables for policy, development plan and local management plan formation and evaluation. Guidance is given on how to identify data types and sources for each category; select indicators for measuring progress against management objectives; designing sampling procedures and data collection methods; and how to effectively share data and information.

Target: The guidelines will appeal to Department of Fisheries and extension staff, research agencies and academic institutions that require technical background material. It will also provide field practitioners with an additional resource that can be referenced when necessary.

	Target
Part I: Practical Guide	• Field extension workers • Local NGOs • Resource Users
Part II: Technical Guidelines	• Technical Staff • Research agencies • Academic institutions • Management advisors

5. Further Information

Resources

Accessing the guidelines

The guidelines will be available on the FAO website (www.fao.org/documents). In the meantime, proofs of the document are available from the first week of December 2005 on the DFID Fisheries Management Science Programme (FMSP) website (www.fmsp.org.uk).

Part I: Practical guide	http://www.fmsp.org.uk or http://www.fao.org/documents
Part II: Technical guidelines	

Contacts

Further information is available from FAO, MRAG or the Fisheries Management Science Programme (FMSP) website:

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Tel +44 (0) 20 7255 7755 (MRAG)

Footnotes

1 Hartmann (2004) Report on the Systems Requirements for National Management Institutions (Level 2) in Lao PDR

2 LVFO (2004) Lake Victoria Fisheries Management Plan, LVFO, Jinja

3 Stream (2004) System Requirement Report: National management institutions for the Bureau of Fisheries and Aquatic Resources in the Philippines, STREAM, Thailand

4 Sultana, P (2005) Evaluation report with Forth Fisheries Project, Bangladesh.

5 Ibid

6 Stream (2004) System Requirement Report: National management institutions for the Bureau of Fisheries and Aquatic Resources in the Philippines, STREAM, Thailand

7 Sultana, P (2003) Systems Requirement Report: Level 1—Local management institutions. Case Study Kali Nadi, Bangladesh

8 Walmsley, S; Evison, S & Cansano, J (2002) Mozambique artisanal fisheries information systems, SADC RFIS Project

9 Halls (2004) Systems Requirement Reports—Description and Summary of Reports for Level 1 and 2

10 Lamberts (2004) Systems Requirement Report: Level 1—Local management institutions. Case Study: Integrated Lake Management Project, DFID

11 Felsing (2004) Systems Requirement Report: Level 2—Information needs of the Cambodia Department of Fisheries for the co-management of fisheries, STREAM, Thailand

12 Ibid