Support to Regional Aquatic Resources Management

System Requirement Report for 'Level 2' – National Management Institutions, Fisheries Department in Cambodia

A report conducted by the NACA STREAM Initiative under a
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Level 2 – System Requirement Report – Information needs of the Cambodia Department of Fisheries for the co-management of fisheries

This report was compiled by Malene Felsing with contributions (in alphabetic order) from:

Chan Ratana
Chan Tho
Chheun Sarik
Chhun Sony
Chhun Vannak
Deap Polin
Dy Moeun Naryin
Eric Meusch
Graham Haylor
Haiko Meelis
Heng Ponley
Kaing Khim
Keo Sovathepheap
Kou Huleang
Nao Thuok
Nem Kano
Nouv Buntha
Nut Ly
Paul Bulcock
Pech Bunna
Sam Nuov
Sem Viryak
Soeung Salinin
Somony Tha
Souk Vin
Srun Lim Song
Thach Pannady
Thor Sen Sereywath
Tit Phea Rak
Un Kanika
Un Veng
Ung Rachana
Ung Soleakhena
William Savage
Yath Sim
Yo Vichny

ACRONYMS

ADB:	Asian Development Bank
AIT:	Asian Institute of Technology
ARMP:	Aquatic Resources Management Program
CBNRM:	Community Based Natural Resources Management
CFDO:	Community Fisheries Development Office
CFDU:	Community Fisheries Development Unit
CITES:	Convention on International Trade in Endangered Species
CSP:	Country Strategy Paper
DANIDA:	Danish International Development Assistance
DFID:	Department for International Development
DoF:	Department of Fisheries
DoWA:	Department for Women's and Veteran's Affairs
EEZ:	Economic Exclusive Zone
EU:	European Union
FACT:	Fisheries Action Coalition Team
FAO:	Food and Agriculture Organisation
FEU:	Fishing Economic Unit
FLD:	Farmer Livelihood Development (formerly SCALE)
IAS:	Information Access Survey
ICLARM:	The World Fish Centre
IDRC:	International Development Research Centre
IFReDI:	International Fisheries Research and Development Institute
IO:	International Organisation
IUCN:	International Union for the Conservation of nature
LARReC	Living Aquatic Resource Research Center
MAFF:	Ministry of Agriculture, Forestry and Fisheries
MRAG:	Marine Resources Assessment Group
MRC:	Mekong River Commission
MCS:	Management, Control & Surveillance
MRRF:	Management of River and Reservoir Fisheries in the Mekong Basin
NACA:	Network of Aquaculture Centres in Asia-Pacific
NGO:	Non Governmental Organisation
PADEK:	Partnership for Development in Kampuchea
PMMR:	Participatory Management of Mangrove Resources
PRA:	Participatory Rural Appraisal
PSO:	Church World Service Program Support Office
SADP:	Southeast Asia Development Program
SCALE:	SAO Cambodia Aquaculture Low Expenditure
SEAFDEC:	South East Asian Fisheries Development Center
SIDA:	Swedish International Development Agency
STREAM:	Support to Regional Aquatic Resource Management
SWOC:	Strengths, Weaknesses, Opportunities and Constraints
SWOL:	Strengths, Weaknesses, Opportunities and Limitations
TFUK:	Tear Fund United Kingdom
TSBR:	Tonle Sap Biosphere Reserve
UN:	United Nations
UNDP:	United Nations Development Programme
VSO:	Voluntary Service Overseas
WB:	World Bank
WWF:	World Wide Fund for Nature

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Section A- Introduction

Preface

This report presents the findings from a thorough literature review and workshops, group and individual interviews conducted by a STREAM consultant in Cambodia in November and December 2003.

The ambitious scope of the report combined with the limited time frame and funding available to compile it necessitated the extensive use of secondary data, including both published and unpublished material written by staff of the agencies and organisations involved, with very limited editing of material used. All possible efforts were made to generate information in participation with the government institutions responsible for managing the fisheries, and all contributors (as well as many other stakeholders) were provided with multiple opportunities to comment on the report content. All contributors are listed on the front page of the report.

The report format, which was prescribed with the terms of reference, was elaborate and the suggested contents of several sections overlapped considerably. Rather than repeating information, a reference to previous sections was inserted where information was thought to otherwise be repeated. Although the suggested table of contents indicated that details should be provided in many areas, the allocated funding and time frame for the production of the report clearly limited the detail of information included.

The community fisheries in Cambodia are at a very early stage of development, and the exact management responsibilities are still poorly understood by many stakeholders. Because the DoF and the CFDO are still traversing a steep learning curve with respect to the management of community fisheries, the formulation of exact cost-effective data collection and sharing strategies was not feasible at the time of the survey. Rather, this report aimed to relate the information needs voiced by participants in this study, which can be taken to represent the ideas currently considered within the DoF in Cambodia.

1 Background

1.1 Purpose

The purpose was prescribed by the Letter of Agreement between FAO and NACA, as follows:

> i) Through meetings with stakeholders from national institutions with a responsibility or role in for fisheries management in Cambodia, compile information to enable the writing of this report.
>
> ii) Prepare a System Requirement Report on national level requirements for data collection and sharing mechanisms for fisheries co-management in Cambodia according to the Guidance Notes for Compiling System Requirements Reports (provided by FAO).

1.2 Report Focus

To provide a broad picture of the following for the national fisheries management level in Cambodia (from Guidance Notes for Compiling System Requirements Reports):

i) Range of data and information requirements that exists
ii) Typically available manpower, resources and institutional capacity
iii) Structure and operations of co-managed fisheries
iv) Existing and potentially appropriate data collection tools, sources and methods
v) Existing data storage and processing methods (if any)
vi) Requirements and opportunities for data and information sharing
vii) Lessons and experiences of previous or existing attempts to develop data collection and sharing mechanisms

Section B - Methodologies

This document reports the information needs for co-management of the national government institutions responsible for managing the fisheries in Cambodia. In Cambodia, the government agency responsible for fisheries management is the Department of Fisheries (DoF) under the Ministry of Agriculture, Forestry and Fisheries (MAFF). Within the DoF, issues pertaining to the co-management of fisheries fall under the responsibility of the Community Fisheries Development Office (CFDO). The DoF and CFDO national offices are located in Phnom Penh, which formed the venue for the consultation exercises that form the basis of this report.

Prior to the start of the investigation, legislation and reports were reviewed and a tentative list of management responsibilities of different stakeholders was drawn up, and meetings and workshops were arranged with relevant personnel within and connected to the DoF. The initial part of the study was spent revising the list of DoF management responsibilities with key staff of the DoF, providing a basis for the workshop on the third day. In the workshop these responsibilities were reviewed with CFDO staff, and a series of group discussions were conducted to determine the information needs and potential sources of information to enable the CFDO to fulfil its management duties. The results from the workshop were provided to the workshop participants for their comments and corrections. Further input from other stakeholders was sought on the fourth and fifth day of the study. A draft report was produced, and provided to key personnel within the DoF for their further comments a week following the initial visit. Comments were incorporated into the report, and the final version of the report was distributed to all contributors for further comments.

The schedule (including date, venue and persons met) is shown below.

Date	Itinerary	
24 Nov 03	*Interviews with* Kaing Khim CFDO vice chief and Mr Chhea CFDO vice chief, DoF Sem Viryak, Communications Hub Manager, STREAM-CFDO, DoF Haiko Meelis, expatriate consultant, CFDO, DoF Thor Sen Sereywath, Vice Chief, Statistics & Planning office, DoF Somony Thay, CFDO Chief	
25 Nov 03	*Interview with* Chheng Da Aquaculture office	
26 Nov 03	*All day: CFDO staff workshop. Participants:* Chan Ratana, Research & Development Chan Tho, Monitoring & Evaluation Chheun Sarik, Research & Development Chhun Sony, Legal & Administration Chhun Vannak, Monitoring & Evaluation Deap Polin, Monitoring & Evaluation Dy Moeun Nary, Admin Heng Ponley, Monitoring & Evaluation Keo Sovathepheap, Legal & Administration Kou Huleang, Research & Development Nem Kano, Monitoring & Evaluation Nouv Buntha, Legal & Administration	Nut Ly, Legal & Administration Pech Bunna, Legal & Administration Sem Viryak, STREAM Soeung Salinin, Monitoring & Evaluation Souk Vin, Legal & Administration Thach Pannady, Legal & Administration Tit Phea Rak, Research & Development Un Kanika, Research & Development Un Veng, Legal & Administration Ung Rachana, Research & Development Ung Soleakhena, Monitoring & Evaluation Yath Sim, Monitoring & Evaluation Yo Vichny, Legal & Administration
27 Nov 03	*Interviews with* Eric Meusch, Community Fisheries Advisor, Tonle Sap Environmental Management Project, FAO / ADB / DoF Phnom Penh	
28 Nov 03	*Interview with* Srun Lim Song, Director, Inland Fisheries Research and Development Institute (IFReDI), DoF	
10 Dec 03	*Interview with* Kaing Khim CFDO vice chief and Mr Chhea CFDO vice chief, DoF	
11 Dec 03	*Interview with* Nao Thuok Director General Department of Fisheries and Sam Nuov Deputy Director Department of Fisheries	

2 Description of DoF and associated stakeholders

The Department of Fisheries (DoF) within the Ministry of Agriculture, Forestry and Fisheries (MAFF), is responsible for fisheries management in Cambodia.

The role of the DoF

'DoF is custodian for Cambodia's living aquatic resources for the benefit of the nation and its people through scientific management and conservation of aquatic resources and their habitats'.

Source: DoF (2001a).

2.1 National and sectoral policy environment

Cambodian society has been undergoing several major transitions in the past few decades. Changes include the cessation of war, transition from a communist regime to a multi-party democracy, economical changes from an agrarian subsistence to an export-led economy, and wider integration into the world community (Degen et al., 2000).

The fisheries sector in Cambodia includes the 4th largest inland fishery in the world and is operated with almost no subsidy. Following years of intense competition amongst resource users, low levels of compliance with rules and regulations, and unaccountability of managers (Vuthy et al., 2000; Dara et al., 2003), the fisheries sector policy in Cambodia was thrown into a process of change in October 2000, when in response to widespread public protests; the Prime Minister publicly announced dramatic changes to fisheries management in the country. Three Prime Ministerial declarations began the process:

- The abolition of 56% of the commercial fishing lots that were previously auctioned by the government have been released for management by local communities
- The abolition of tax on middle-scale fishing gear
- The encouragement of communities to co-manage Community Fisheries (Proclamation Number 519 provides the Ministry of Agriculture Forests and Fisheries with the power to set up Community Fisheries prior to the promulgation of a sub-decree, see below)

The Department of Fisheries with support from the World Bank are drafting a Fisheries Master Plan 2001 – 2011, which is expected completed in June 2004. The plan will be finalised after stakeholder consultations within the fisheries sector have taken place. The plan lists DoF priorities, proposes a number of programmes, and details the external funds required to support programme implementation. Although the plan is not finalised, its contents can be taken to broadly represent DoF priorities. Within the plan, the DoF prioritises sustainable resource use, the allocation of resource use rights in lines with principles of 'good governance', adequate aquatic production to satisfy demands, and the reduction of poverty amongst vulnerable groups, including women, in fisheries communities. It is envisaged that these goals will be achieved through a national fisheries service, a sound legal and administrative framework, strong operational, technical and scientific capacity, and adequate funding provided by external agents.

The 1987 FIAT Law is being revised and the new law may complete its passages through the Council of Ministers this year (2004). The process of the new law being ratified by the National Assembly will take some time because the Fisheries Law will be the most recent of 22 law reformations currently before the assembly. This law defines the framework of the management, harvesting, utilisation, development and conservation of fisheries resources in the Kingdom of Cambodia.

The objectives of the law are to ensure the sustainable fisheries management for the social-economic and environmental benefits including the conservation of biodiversity and cultural heritage. The law provides a significant change to the management of fisheries in the kingdom. A sub-decree on

Community Fisheries that will frame the process of co-management in Cambodia has, at the time of going to press, just completed its passage through the Council of Ministers and is expected to be signed by the Prime Minister early in 2004.

The process for the development of policies and laws is not always straightforward. For example, a specially developed Royal Decree has enabled the drafting of an urgently required Sub-decree on Community Fisheries in advance of the (revised) Fisheries Law to which it will eventually relate. According to the sub-decree, all community fisheries shall have a by-law, internal regulations, a management plan, a map of the community fisheries and an agreement recognized by competent authorities according to provision of the Sub-decree.

The STREAM Initiative have recently agreed with the Director of Fisheries to work with a high level committee in the Fisheries Department during 2004 to research and develop a new definition for "family-scale fishing gear" within the law. This will be in the form of a clarification of the revised law via a mechanism called a *Prakas* (or Ministerial Declaration).

2.2 Roles and responsibilities

2.2.1 Department of Fisheries

In the draft Master Plan for Fisheries 2001 – 2011 (DoF, 2001a) the roles and responsibilities of the DoF are outlined as follows:

- Apply scientific management principles
- Formulate and implement policies and strategies
- Facilitate private sector engagement in fisheries
- Develop systems and procedures for the democratic distribution of rights and obligations
- Support the development of systems and procedures that will allow broad based community participation in fisheries management and distribute resource use rights and obligations
- Carry out scientific research to support management decisions
- Ensure that fisheries at all levels (including community fisheries) are carried out in a sustainable manner
- Facilitate private sector development and growth

The duties of the Fishery Administration are defined in the Fisheries Law as follows:

i. To ensure that fisheries resources are managed in a sustainable way by imposing regulations on fisheries activities.
ii. To conduct research on data collection of fisheries related to socio-economic science and environment for sustainable conservation, development and management of aquatic resources.
iii. To conduct research on fisheries science, technology and fisheries production from fisheries domains.
iv. To define, classify and identify fisheries domain for publishing fisheries domain map in coordination with the Ministry of Land Management, urbanization and construction, local authority and local communities.
v. To prepare and implement a management and fisheries development work plan for each class of Fishery Administration.
vi. To re-forest inundated forest and mangrove in destroyed and free forestland.
vii. To promote freshwater and mari-culture.
viii. To promote community fisheries development through providing appropriate financial and technical supports to communities.
ix. To take appropriate measures to conduct research, curb and crack down on all illegal fishing by ensuring effective law implementation.
x. To increase people education through programs on importance of fishery resources management, protection and maintenance.
xi. To increase international co-operation to strengthen capacity to protect and develop fisheries resources.

xii. To ensure on time and complete assessment of all activities related to fisheries, having no negative impact on society and environment before agreeing on those activities.
xiii. To define and make an inventory of all kinds of fishing gears, fishing materials, and means of transportation and fisheries resources.
xiv. To take necessary actions to rehabilitate the natural resources systems in fishing areas, and to maintain and protect fishery resources.
xv. To develop a base fee on fishing lots for bidding, burden book and organized fishing lots auction.
xvi. To define the fishing fee by specific gears.

2.2.2 Community fisheries

From Article 10 of the proposed sub-decree on community fisheries the roles and duties of Community Fisheries are as follow:

- To participate in the management and conservation of fisheries resources according to By-law and management plans of Community Fishing Area in compliance with Law and other Legislation related to the Fishery Sector;
- To comply with guidelines of Department of Fisheries and Ministry of Agriculture Forestry and Fisheries
- To set up fish sanctuaries in the Community fishing area, flooded forest protection and replanting, deepening shallow streams and lakes to improve ecosystems and fisheries environment;
- To ensure that members of Community Fisheries have *equal rights* of using fisheries resources in a sustainable manner as stated in the by-law of Community Fisheries;
- Implement the By-law of Community Fisheries and formulate management plans for Community Fishing Area;
- To sign agreements on Community Fishing Areas with the Department of Fisheries in order to manage fisheries resources sustainably;
- To keep important files/documents related to Community Fisheries

2.3 Institutional capacity and resources including manpower, finances etc.

In 2002, the central DoF in Phnom Penh employed 552 people, of whom 8% had Master's degrees, 34% Bachelor degrees, 24% were educated to Diploma level, and 26% had no training. DoF provincial and district offices employed 789 people, of whom 1% had Master's degrees, 11% Bachelor degrees, 18% Diploma and 18% college education, and 52% had no training (DoF, 2003). It is widely recognised that the DoF suffers from shortage of well-trained staff in the fields of fisheries, economics, sociology, marketing, and engineering, and that senior staff are in need of management training (DoF, 2001f).

Enforcement capacity of the DoF to curb illegal fishing activity (including fishing in reserves, in inundated forests in the inland fishery, and in mangrove forests in the marine area; illegal fishing in the EEZ; using illegal gear) is restricted by limited numbers of poorly trained staff, lack of surveillance resources, and the (frequently armed) resistance enforcement is often met with (DoF, 2001f). Prior to the establishment of the community fisheries corruption amongst provincial fisheries officers was widespread, and in some areas corruption and violence are still common problems (Degen et al., 2002).

Resources are extremely limited at the CFDO office, where most functions are funded by external projects. Mee et al. (2003) reported that DoF staff from all levels (district, provincial, central) found it hard to access information on aquatic resource management. The exceptions are those working on internationally funded projects. The same authors mention low budgets, salaries and motivation.

The CFDO currently employs 35 staff, of which 16 are educated to Master's level, 11 to Bachelor level, and the rest to diploma level in fisheries, forestry or rural development. 14 staff work on projects funded by NGOs or IOs. The CFDO recently completed a staff proficiency inventory, ranking the ability of staff in areas such as research, facilitation, computing, English proficiency etc., and

identifying training needs accordingly. Topics scoring highest in terms of training needs were 'Planning for Monitoring & Evaluation', 'Staff Development', 'Computer Training' and 'English Training'. Few people needed further training in participatory and focus group discussion methods.

After its establishment the Community Fisheries Development Office first received a budget in 2002. The CFDO was allocated a 1-year budget of 300,000,000 riel (c. USD 75,000). The proposed 2003 budget allocation (400,000,000 riel) has been delayed by the election. Even when this becomes available a large gulf still exists between this contemporary financial allocation and the scale of the 10-year plans recently proposed by World Bank consultants.

2.4 Links and relationships with other departments, organisations and institutions including local community-based or co-management stakeholders/institutions

The following draws mainly on Mee et al. (2003) and Khim (2003).

At the central level, information flow between the DoF and other government departments occurs via highly bureaucratic channels, and little information exchange occurs. The exception is interaction occurring through internationally funded projects. At provincial level, government departments work more closely together, and commonly share offices. The DoF has access to a national-level Office of Agricultural Extension, but there is currently little co-ordination of interactions between the DoF and the Office at national and provincial levels.

The DoF collaborates with, and receives funding from, a number of national and international research projects on aquaculture and aquatic resource management issues, including the AIT, the Belgium government, DANIDA, DFID, EU, FLD, MRC, New Zealand, Oxfam, PADEK, SIDA, TFUK and the World Bank.

In the past, the relationship between NGOs involved in aquatic resource management and the DoF has been tense with limited exchange of information. However, the CFDO (with support from the STREAM Initiative and the WWF) initiated quarterly 'Co-ordination and Partnerships Meetings', a forum for government and NGO national stakeholders. The CFDO has recently collaborated with Oxfam GB, Oxfam America, FAO, MRC, SADP and WWF / CBNRM in a 'Understanding Community Fisheries' training course, and with the local NGO FLD and the STREAM Initiative for building capacity to understand livelihood. Where CFDO staff are seconded to international and national NGOs, with support from VSO and STREAM they now share their experiences with the CFDO in monthly meetings. Table 1 provides an overview of the organisations supporting the CFDO on a national level:

Table 1: International agencies supporting CFDO on a national level.

Donor	Implementing Agency	Project Name	Start Date	End Date	Budget	Status
ADB	FAO	TA Improving the Regulatory and Management Framework for Inland Fisheries (Component 1: Strengthening NRM Coordination and Planning for the TSBR - Tonle Sap Environmental Management Project)	2003	2004		Ongoing
ADB	FAO	Component 2: Organizing Communities for NRM in the TSBR (Tonle Sap Environmental Management Project)	2004	2009		Not started yet
ADB	UNDP	Capacity Building for Sustainable Development in the Tonle Sap Region (Tonle Sap Environmental Management Project)	2003	2008		Ongoing
DANIDA	MRC	Management of River and Reservoir Fisheries in the Mekong Basin (MRRF)	2000	2005		Ongoing
DFID	Post-Harvest Fisheries Research Programme	Cambodia Post-Harvest Fisheries	3/1/2003	2/28/2005		Ongoing
DFID	World Fish Center	Aquatic Resource Valuation and Policies for Poverty Elimination in the Lower Mekong Basin	2003	2004		Ongoing
DFID	CFDO	Policy Reform Assessment	11/1/2002	10/31/2005		Ongoing
DFID	MRAG (through MRRF and STREAM)	Fisheries data collection and sharing mechanisms for (co-) management	3/1/2003	2/28/2005		Ongoing
IDRC	IDRC	Capacity Building for CF Development and Management in Cambodia	2/1/2003	7/30/2004		Ongoing
JICA	JICA	Strengthening of 3 community fisheries organizations in the provinces of Prey Veng, Kratie and Kampong Thom	1/5/2003	10/17/2003		Finished
OXFAM-UK, OXFAM-US, WWF, CBNRM, PMMR, IDRC, FAO		Stakeholders' consultation, CF Manual review, sub-decree consultations and CF management planning training	3/1/2003	Not defined		Finished
STREAM	CFDO	Communications Hub, Asia-Pacific wide communication and learning, livelihoods assessment	2002	2007		Ongoing
PSO (The Netherlands)	VSO	Management & Communications Advisor for CFDO	2/11/2003	12/24/2003	$8,000	Ongoing
Post-Harvest Fisheries Research Programme	VSO	Management & Communications Advisor for CFDO	1/15/2004	1/14/2005	$8,000	Not started yet
Donors Working Group on Natural Resource Management trust fund	VSO	Management & Communications Advisor for CFDO	1/15/2005	1/14/2006	$8,000	Not started yet
World Bank	CFDO & Domain Office	Agricultural Productivity Improvement Project	2002	2004		Deferred

Within the DoF, the CFDO is meant to collaborate with the Inspection Office about illegal fishing, the Exploitation Office about gear definition, the Fisheries Domain about CF boundaries and information dissemination about illegal fishing, the IFReDI about research and policy development, the Planning & Accounting Office about planning and statistics, the Aquaculture Office about rice-field community fisheries, community and small-scale pond culture management, and the Administration Office about administration. The Planning Office will be involved in the design and maintenance of the community fisheries monitoring system (Khim, 2003). The mechanism of collaboration is monthly and *ad hoc* meetings (CFDO, 2003). However, many staff feel that the working relationship and sharing of knowledge between different offices of the DoF are somewhat lacking.

The DoF access information on communities through their provincial staff, and from national staff working on internationally funded projects. The interaction between communities and DoF staff is normally minimal unless the DoF is working with an NGO or IO. Contact mainly occurs through Commune, Village, or community fishery Committee Chiefs, who report on illegal fishing activities to the provincial DoF officer. In areas where community fisheries Committees have been established, there appears to be more interaction between communities and the DoF.

District DoF officers have close contact with the community. These patrol the rivers and water bodies for illegal fishing, and issue fines, as well as collect or estimate fisheries statistical information. Because of their policing function, the community often fear these officers. This in turn will be likely to distort some types of reporting.

In spite of the efforts of the recently established CFDO and support agencies, there is still insufficient effective communication linkages between local communities, the provincial fisheries offices and the CFDO. The institutional capacity at national and provincial level is limited, as is the institutional and policy support, and the understanding of the roles and responsibilities of different stakeholders in co-management.

2.5 Description of co-management arrangements and activities (if any)

Following widespread conflict between fishing lot fishers and local communities, and substantial pressure from the Civil Sector and international projects, the Government of Cambodia announced a major change in fisheries management policy in 2000. This policy declared the reduction of fishing lot concession areas by 56%, and called for the participation of fishing communities in the management of fisheries and a focus on efficient, sustainable and equitable aquatic resource use. In addition to inland community fisheries, several community-based coastal resource management projects exist on the coastline, mainly funded by international projects and donors (Pichrathna et al., 2002).

The draft Fisheries Master Plan 2001 – 2011 offers a limited definition of the responsibilities of the DoF and the communities envisaged under co-management: ‘communities will allocate use rights and obligations within the DoF’s overall framework for managing Cambodia’s aquatic resources’.

A Community Fisheries Development Office (CFDO) was established under the DoF, to facilitate the establishment and development of Community Fisheries. The CFDO is part of NACA’s STREAM Initiative, and collaborates with various organisations including the ADB, DFID, FAO, MRC, WB and numerous NGOs.

CFDO vision

‘The establishment of a strong, self-reliant CF throughout Cambodia who have equitable access to and manage in a sustainable manner, fishery resources in partnership with capable and service-oriented staff from the CFDO and provincial fishery offices, thereby improving fisheries dependent livelihoods’

Source: CFDO, 2003.

The CFDO is meant to work closely with the Provincial offices and the Community Fisheries Development Units (CFDUs). The CFDUs collaborate with NGOs and IOs to provide community support for the establishment of CFs and act as a link between communities and the CFDO. The Provincial Fisheries Offices provide monthly status updates to the CFDO.

CFDO mandate

- Planning / implementing research on community fisheries and related socio-economic development
- Planning together with the community fisheries for the sustainable use of living aquatic resources
- Promotion and facilitation of the establishment and development of community fisheries
- Cooperating with other offices in defining the boundary of community fisheries
- Cooperating, coordinating and communicating with institutions, associations, and NGOs (national and international) to facilitate and enhance the development of community fisheries within the legal framework set
- Monitoring and evaluation of community fisheries activities
- Preparing guidelines (on e.g. by-laws, implementing rules and regulations on the sub-decree, management plans, committee election, boundary demarcation, accreditation, etc.) relating to the establishment, management and development of community fisheries and verifying all proposed documents for community fisheries establishment
- Cooperating to solve conflicts in community fisheries
- Disseminating guidelines, rules and regulations related to community fisheries
- Educating and training of DoF staff, community fisheries officers, and members to improve the skills for CF management
- Coordinating and supervision of provincial fishery offices working with CFDUs
- Responsible for other tasks as may be assigned by the DoF Director

Source: Article 16 of the declaration of the tasks and responsibilities of the DoF, quoted in CFDO (2003).

The CFDO office is headed by an Office Chief (overall responsibility) and three Vice Office Chiefs (one each for Research & Development Section, Legal & Accreditation Section, Monitoring & Evaluation Section).

Research and Development Section:

The Research and Development Section main responsibilities are to:

- Promote and facilitate the establishment and development of community fisheries
- Plan, implement and manage research work on community fisheries and related socio-economic developments
- Summarise research findings for the formulation of guidelines on the definition of small-scale and commercial fishing gears, harvest quotas, closed seasons for certain species, area zoning, etc.
- Maintain an updated list of projects on community fisheries management
- Ensure that due consideration of gender issues is given in community fisheries

Legal and Accreditation Section:

The Legal and Accreditation Section main responsibilities are to:

- Input into and follow up on the passage of the community fisheries sub-decree
- Support communities in the drafting of by-laws for the development and management of the community fisheries
- Cooperate with other offices in DoF to define appropriate boundaries for community fisheries
- Prepare guidelines and verify all proposed documents relating to the establishment and management of community fisheries
- Define and oversee the process for the registration of the community fisheries in collaboration with DoF provincial units
- Cooperate to resolve conflicts in community fisheries with Monitoring & Evaluation section and appropriate local authorities
- Disseminate guidelines, rules and regulations related to community fisheries

Monitoring & Evaluation Section:

The Monitoring & Evaluation Section main responsibilities are to:

- Gather, review and summarise the regular reports on community fisheries activities from provincial offices
- Provide mechanisms for community fisheries to report directly to the CFDO, especially in cases of problems / conflict with provincial fishery units
- Work closely with Research & Development Section and other partners involved in gathering research data on fish stocks etc., in ensuring that living aquatic resources are utilised in a sustainable way by community fisheries
- Document occurrence of conflicts, determine their causes and work closely with the Legal and Accreditation Section and appropriate local authorities for conflict resolution within community fisheries
- Establish, maintain and regularly update a database on community fisheries

Activities of the CFDO include the facilitation of community fisheries development, which to date has mainly been done following the process initiated in the Management of Reservoir Fisheries in the Mekong Basin, Cambodia sub-component, Phase II (MRF-II) project. The process involved the following steps (from Khim et al., 2002; Khim, 2003):

- Participatory Rural Appraisals (PRAs) providing background information needed to initiate the planning process
- Informal integration phase getting to know the villagers, sharing ideas and concepts, culminating in a planning meeting
- The formation of a voluntary 'core group' of knowledgeable, respected, keen fishers who can lead the community in the formation of a community fishers' organisation, the drafting of a constitution and by-laws, the consultation process for these, and providing general encouragement to community members to become involved in the process of establishing a community fishery
- Founding meeting of the fishers' organisation, with ratification of constitution and by-laws
- Election of officers / committees
- Community fishery planning
- Implementation of plans by community members, communication with CFDO via community officers / committees. The implementation relies on co-operation with the provincial DoF, NGOs, IOs, law enforcers and other authorities for the identification of areas suitable for sanctuaries, curbing illegal fishing, etc.

Throughout the entire process, capacity building and training was provided to the core group members, including instructions on how to motivate people, drafting constitutions and by-laws, facilitating the election and management and development of the community fishery according to the community fishery management plan (Khim, 2003).

3 The Fisheries

3.1 Resource and Environment

3.1.1 Stocks/fisheries and area of operation

Many of Cambodia's fisheries resources are widely thought to be fully exploited, over-exploited or depleted (van Zalinge & Thuok, 1999; Thuok & van Zalinge, 2000; DoF, 2001f).

Inland fishery

Cambodia's inland fishery includes the lower Mekong River floodplains and the upper section of the Mekong River delta, the Tonle Sap Great Lake, the Mekong and the Bassac river systems which drain the alluvial floodplains. 86% of Cambodia lies within the Mekong River floodplain (Murshid, 1998). The Tonle Sap water body swells from 3,000 km^2 during the dry season, to 10,000 km^2 in the rainy season (DoF, 2001b; ARMP, 2000; Coates, 2002).

More than 500 species have been recorded in the fresh waters of Cambodia, and of the approximate 200 species recorded in the Tonle Sap, about 100 species occur regularly (van Zalinge et al., 2001). The most frequently caught species in the Tonle Sap are cyprinids (49% of total catch) and snakeheads (Channa spp.) (Sopha & van Zalinge, 2001).

Inland fisheries are normally divided into two parts: the Great Lake / Tonle Sap fishery, and the Mekong / Bassac inundation zone (DoF, 2001f). Traditionally, regulation has been enforced at three levels:

- **Industrial fishing** takes place in fishing lots, which are auctioned every two years. Lots are divided into lake-stream fishing lots, bag net fishing lots, bag net fishing lots for white lady carp only, bag net fishing lots for prawns, bag net fishing lots for Pangasius seed, and sandbank fishing lots. Within lots, large-scale fishing gear is allowed, but there are some restrictions placed by the DoF. Fishing lots do not operate during closed season.
- **Middle-scale fishing** gear is used outside the fishing lots and in the middle of the Great Lake and rivers. Middle-scaled fishing requires license from the DoF, and cannot operate during the closed season.
- **Family-level fishing** is constrained but is allowed to operate during both open and closed seasons.

Marine fishery

Cambodia's coastal waters are amongst the most productive in the Gulf of Thailand (DoF, 2001a). The coastline stretches some 435 km between Vietnam in the East and Thailand in the West (DoF, 2001f). The fishery is dominated by a wet (summer) and a dry (winter) monsoon season. The Cambodian Economic Exclusion Zone (EEZ) was officially claimed in 1978. It stretches 200 km from the shore and measures 55,600 km^2, with an average depth of 50 m. A number of estuaries discharge freshwater flow during the rainy season. Inshore waters consists of three major estuarine bays:

- Kompong Som, covering about 2/5 of the overall coastline. The area receives great freshwater inputs from several rivers during the wet monsoon in June to October and early dry monsoon (January to February), during which time large-scale mixing occurs and productivity is high.
- Koh Kong Bay, influenced by several rivers originating from the Cardamom Chains. The Bay is dominated by the major river Dong Tong, which forms a large estuary including large areas of mangrove forests and seagrass beds. During the wet season, the salinity of the estuary goes down to zero, while in the dry season, the salinity averages at 29.5 PSU. Two sanctuaries exist in the area, the mangrove dominated Peam Krasob wildlife sanctuary (23,750 ha), and the Boman Sakor National Park (171,250 ha). Mangrove forests and seagrass beds provide habitats for mud crabs, cuttlefish, penaeid and metapenaeid shrimps and various estuarine fish species.
- Kampot Bay is characterised by little freshwater input. The area features important seagrass beds. Mixing events occurs during the wet and early dry monsoon seasons. Within the bay, the Preah Sihanouk National Park covers 21,000 ha.

The offshore area features upwelling events in February and July. Extensive coral reefs are present in Koh Kong, Koh Rong Sanlem, Koh Tang and Koh Pring.

According to the DoF (2001d) 474 species from 105 families have been identified from Cambodian offshore marine waters. Commercial species include mackerels, scads, anchovies, and snappers, which are exploited from September to January. Penaeid and Metapenaeid shrimps are exploited from May to August. Blue swimming crabs, cuttlefish and squid are fished throughout the year. Green mussels and oysters are fished in the Koh Kong estuary, blood cockle is fished in Thmar Sar of Kompong Som Bay and Trapeang Ropov of Kampot Bay.

For management purposes, the marine fisheries are divided into two groups:

Coastal fisheries: small family-scale fishing, operating in fishing zone 1, which extends from the coast to a depth of 20 m. Boats used are without engines or with engines of less than 50 HP. Licenses are not required for boats with no engine or with engine below 33 HP, but for boats with more than 33

HP engine, a license fee of 27,000 Riel[1] (= US$7) per horsepower per year. Fishing activities not allowed includes using trawls, light fishing and illegal fishing gear.

Commercial fisheries: large-scale fishing from 20 m depth to the limit of the EEZ. Boats used have engines with more than 50 HP, which must be licensed for a fee of 27,000 Riel per horsepower per year. Prohibited fishing gear and methods include pair trawling, light fishing and other illegal fishing gear.

All marine fisheries are open year round, apart from mackerel, for which there is a closed season from 15 January to 31 March (DoF, 2001f).

Community fisheries

Table 2 details the current status of the community fisheries.

Table 2: Current status of the community fisheries (from CFDO database). CF=Community fishery.

Province	Number of CFs	CF committee	Rules & regulations	CF by-law	Community Map	Management Plan	Fish Sanctuaries
Banteay Meanchey	11	11	0	0	0	0	0
Battambang	26	0	9	0	0	0	0
Kampot							
Kandal							
Kg. Cham							
Kg. Chhnang	43	6	0	5	0	0	0
Kg. Som							
Kg. Thom							
Koh Kong							
Kratie							
Phnom Penh							
Prey Veng							
Pursat	?	Yes	No	Yes	No	No	0
Siem Reap	10	10	10	0	10	0	12
Stung Treng	51						
Svay Rieng							
Takeo							
Total	**141**	**27**	**19**	**5**	**10**	**0**	**12**
		19%	**13%**	**4%**	**7%**	**0%**	

3.1.2 Information on the environment

Coastal erosion is increasing in Cambodia. The shrimp farms proliferating in the early 1990s destroyed several hundreds of hectares of mangrove forest before they were eventually abandoned because of widespread disease problems.

Farming activities have been recognised to pose great threats to the Cambodian inland fisheries. Widespread clearing of flooded forest, the use of chemicals such as insecticides, and the use of water for irrigation are known to adversely impact the fishery (Swift, 2001). The construction of dams for irrigation purposes in the Mekong River watershed upstream of Cambodia have allegedly caused a decrease in water flow and associated decrease in fish yields in Cambodian inland fisheries (Sokleang, 2000).

[1] 1 US Dollar (USD) = 3,855.90 Cambodian Riel (KHR) http://www.oanda.com/convert/classic

3.2 The Fishery

Fisheries data and information collection in Cambodia is carried out by the DoF, but extensive data collection has been part of a number of research projects. The estimate of the size of the fishery depends on the data source used, the DoF data is much lower than the research findings suggest. An extensive revision of the DoF data was carried out in 1999 (see e.g. Loeung, 1999; Roth & Sea, 1999; Sensereivorth et al., 1999; Bun, 2000), and now the research data is used rather than the DoF data to generate fisheries statistics.

The fishery is divided into the inland fishery, the marine fishery and aquaculture production. Research data is only collected for the inland fishery and aquaculture production, DoF data is used for the Marine Fishery. Information collected about the fisheries by the DoF and the MRC project in 2002 is presented in the categories shown in Table 3.

3.2.1 Status and trends

Inland fisheries

With the statistical revision in 1999, the officially estimated inland fisheries production increased drastically, from 75,000 t in 1998 to 231,000 in 1999. Since 1999, the estimate of inland fish production has been steadily rising, to the 2002 figure of 360,300 t. However, it has been argued that the true production is probably still higher again (Coates, 2002).

The health of the inland fishery is not known. A survey carried out by the CFDO found that villagers generally thought that catches were decreasing and that the mean size of fish caught was decreasing as well (Khim, 2003). A study carried out under the MRC programme found fish yields of 253 – 532 kg ha^{-1} $year^{-1}$ in the Kampong Tralach area of the Tonle Sap (Dubeau et al., 2001).

State owned fishing lots have been declining from 307 in 1980 to 164 in 2002. This is because of the change of ownership from commercial fishers to community fisheries in 1999. Reserved fish sanctuaries lots increased from 11 in 1980 to 13 in 2002.

Marine fisheries

Marine fisheries have been steadily rising, from about 20,000 t in the late 1980s to 45,850 t in 2002. The marine fishery involves coastal fishers in inshore areas and foreign fishers operating legally and illegally in offshore areas. Cambodia currently does not have the capacity to exploit offshore areas. Since 1992, marine fisheries statistics have included estimates of catches by foreign fishers licensed to operate in the EEZ of Cambodia (DoF, 2001d).

3.2.2 Numbers of fishers

The total number of fishers and aquaculturists in 2002 were recorded as 812,582 persons (357,291 families) or 6-7% of the population. This included 10,322 families involved in aquaculture (21,834 persons).

In marine fisheries, the number of fishing boats using < 50 HP engines was 5000 in 2001 (DoF, 2001d).

3.2.3 Gear types

The gear types used in the different fisheries are shown in Table 4.

Of the 164 fishing lots in 2002, 82 were lake-stream fishing lots, 60 bag net fishing lots, 8 bag net fishing lots for white lady carp, 13 bag net fishing lots for prawns, and 1 sand bank fishing lot.

Industrial Fishing gear in 2002 included 485 barrage nets, 73 fish bag nets, 34 shrimp bag nets and 19 arrow shaped bamboo fence traps (DoF, 2003).

Middle-scale Fishing gear in 2001 included just over 6 million gill nets, close to 9,000 seine nets, 199 deep bag nets, 70 V-shaped nets, 644 coned shaped nets, 116 rap mounted lift nets, and over 63,000 bamboo fence traps (lop nor rav) (DoF, 2003).

Family Fishing gear in 2001 included more than 1 million metres of gill net, over 25,434 cast nets, 65,824 oblong traps, 29,476 cylindrical drum traps, 31,420 small vertical slit traps, 38,257 scooping

baskets, 24,395 scooping nets, 1,827 small bag traps used in rice fields (leays), 543 raft mounted lift nets (chhnouks), and 329,650 hooked lines (santuchs) (DoF, 2003).

Most of the small-scale (engine < 50 HP) marine fishing fleet use alternative multi-fishing practices following the seasonal appearance of marine resources, including purse-seines, gill nets, push nets and trawling. Foreign poachers use prohibited gear such as large bottom trawls, long drift nets, pair trawlers, light fishing, explosives, etc. (DoF, 2001d).

A recent CFDO study found that illegal gears are increasingly being used in the community fisheries, mainly because catches using legal gear are too low (Khim, 2003).

Table 3: Gears allowed for inland fishing in Cambodia. L: length; D: diameter; H: height. Source: Tana (1988).

Type of fishing	**Gear type allowed**	**Used in**	**Target organism**
Inland			
Small-scale family fishing	Fork harpoon (sang)	Rivers, shallow water	Big fish, snakehead
	Three arrow harpoon (chbok)	Rivers, shallow water	Big fish, snakehead
	Spear (snor)	Rivers, shallow weedy areas	Big fish & other animals
	Three-piked pointed spear (sam)	Rivers, shallow weedy areas	Big fish & other animals
	Sharp forked spear (chamrob)	Rivers, swampy & muddy areas	Big fish, eel
	Handled scooping basket (chhneang day)	Rivers, shallow water	Small fish, shrimp
	Rice field small bag trap (leay)	Narrow water flows	Small fish
	Funnel trap (chuc)	Rivers, shallow water	Big fish
	Bamboo piece eel trap (luan)	Rivers, grassy & weedy areas	Eel
	Bamboo piece botia trap (bampong trey kagn chruc)	Rivers, streams	Botia fish
	Handled pick out cone shaped hard trap (ang rut)	Swampy, shallow water areas	Medium to big fish
	Small vase trap (chit)	Rivers, grassy & weedy areas	Fish
	Handled round scooping basket (kagn chreng chugn chuat)	Shallow water	Small fish, used with bait
	Small cylindrical drum trap (L < 80 cm, D < 30 cm) (lop)	All fisheries	Fish
	Small vertical slit trap (H < 80 cm, D < 30 cm) (sayoeun)	Rivers, streams, running water	Fish
	Small oblong trap (L < 80 cm, D < 30 cm) (tru)	Rivers, streams, running water	Fish
	Long trough shaped bamboo trap (saap)	Rivers, streams, running water	Small fish, shrimp
	Small cast net (L < 5 m) (sam nagn)	Open water	Fish
	Small scooping net (mouth D < 2 m) (thnang)	Flowing water, shallow areas	Small fish & shrimp
	Small raft mounted lift net (L each side < 2 m) (chhnuoc)	Open water	Fish
	Single hooked line	Open water	Fish, eel
	Small handled drag net (L < 3 m) (angn chuorng)	Shallow water	Fish
	Small gill net (L < 10 m) (morng)	Open water	Fish

Table 3 continued.

Type of fishing	Gear type allowed	Used in	Target organism
Inland (continued)			
Medium-scale fishing	Medium cylindrical drum trap (L > 80 cm, D > 30 cm) (lop)	All fisheries	Fish
	Medium vertical slit trap (H > 80 cm, D > 30 cm)	Rivers, streams, running water	Fish
	Medium oblong trap (L > 80 cm, D > 30 cm) (tru)	Rivers, streams, running water	Fish
	Medium cast net (L > 5 m) (sam nagn)	Open water	Fish
	Medium scooping net (mouth D > 2 m) (thnang)	Flowing water	Small fish & shrimp
	Medium raft mounted lift net (L each side > 2 m) (chhnuoc)	Open water	Fish
	Folded woven trap (la)	Shallow water	*Tricogaster*
	Medium handled drag net (L > 3 m) (angn chuorng)	Open water	Fish
	Medium gill net (L > 10 m) (morng)	Open water	Fish
	Big or middle sized vase trap (pong)	Rivers, streams, running water	Fish
	Vertical vase trap (tom)	Weedy, grassy areas	Small fish
	Immersed scooping basket (chhneang tram)	Near river bank	Fish
	Carried scooping basket (chhneang kuang)	Deep or flowing water	Fish
	River bank small barrage macrones trap	Near river bank	*Hystus, Sargasius*, using bait
	Big cone shaped net (chayra)	Open water	Fish
	Round shaped dip net (pruam)	Flowing water	Fish
	V-shaped net mounted on boat (chuorn)	Open water	Fish
	Mid-water trawl (neam)	Flowing water, rivers	Big fish
	Bamboo fence trap (lop nor / rav)]	Great lake	Fish
	Seine net (uorn hum)	Open water	Fish
	Drag net (uorn srong)	Open water	Fish
	Sinking net (uorn prayuong)	Open water	Fish
	River pelagic trawl (magn)	Mekong and Bassac Rivers	Fish
	Hooked long line (santuch ronorng)	Open water	Fish
	Cast single hooked line (santuch buos)	Flowing waters, rivers	Bottom dwelling fish
Fishing lots	Arrow shaped bamboo fence trap (nor rut chhung)	Great lake	Fish
	Fish bag net (day trey)	Bag net fishing lots	Fish
	Shrimp bag net	Shrimp bag net fishing lots	Shrimp
	Barrage trap (thnuos)	Rivers & streams	Fish

Table 3 continued

Type of fishing	Gear type allowed	Used in	Target organism
Marine			
Small-scale family fishing	Hand held crab lift net (chhnuork kdam) (< 30)	Coastal areas	Crabs
	V-shaped coastal dip net (chhiup)	Coastline shallows	Shrimp
	Dasyabatus gill net (morng babell) (< 20 m)	Open water	Dasyabatus
	Crab gill net (morng kdam) (< 20 m)	Coastal areas	Crabs
	Cylindrical drum squid trap (lop moeuk) (< 30)	Coastal areas	Squid
Commercial	Hand held crab lift net (chhnuork kdam) (> 30)	Coastal areas	Crabs
	Arrow shaped fence trap (poc)	Coastal shallow areas	Fish
	Coastal bag net (phorng phang)	Coastal areas with current flows	Fish
	Purse seine (uorn tit)	Open water	Fish, mackerel, baling
	Pelagic purse seine (uorn chhe)	Open water	Fish
	Anchovy purse seine (uorn kakoeum)	Open water	Anchovies
	Trawl (uorn uos)	Max 20 m depth, night fishing	Fish, shrimp
	Small shrimp purse seine (uorn kii)	Open water	Small shrimp
	Coastal handled drag net (uorn khuov)	Open water	Fish
	3 pieces fitted shrimp gill net (morng bangkea bey chuan)	Open water	Shrimp
	Shrimp gill net (morng bangkea muoy chuan)	Open water	Shrimp
	Dasyabatus gill net (morng babell) (> 20 m)	Open water	Dasyabatus
	Scomberomorus gill net (morng be kar)	Open water	Scomberomones
	Crab gill net (morng kdam) (> 20 m)	Coastal areas	Crabs
	Island gill net (morng sampan)	Open water	Fish
	Sardine gill net (morng sadine)	Open water	Sardines
	Large fish gill net (morng karav)	Open water	Carav fish
	Sea bass gill net (morng trey spong)	Open water	Sea bass
	Clupea gill net (morng trey kbuork)	Open water	Clupeids
	V-shaped net mounted on a canoe (chhup yun)	Coastal areas	Shrimp
	V-shaped small shrimp dip net (rong veas chab kii)	Coastal areas	Shrimp
	Round squid scooping net (thnorng dorng moeuk)	Open water	Squid
	Cylindrical drum squid trap (lop moeuk) (> 30)	Coastal areas	Squid
	Pomfret fish gill net (morng trey chap)	Open water	Silver & black pomfret
	Cylindrical drum crab trap (lop kdam)	Coastal areas	Crabs
	Mollusc scraper (chhneang chab kreng chheam)	Coastal areas	Molluscs

3.2.4 Seasonality

The Great Lake area undergoes extensive seasonal expansion. Aquatic resource production takes place in the wetland ecosystem that is driven by the annual flooding of the Mekong under the influence of the southwest monsoon (June-October) temporarily submerging 10,000-13,000 km^2 beside the river its tributaries, the Great Lake and Bassac river (compared to 2,600-3,000 km^2 in the dry season). The outlet of the Tonle Sap Great Lake (a river of the same name) flows into the Mekong during the dry season, whilst during the wet season the Mekong flood flows back into the lake.

3.2.5 Fishing locations

Inland fisheries

The inland fisheries are enumerated by province and cities:

- Phnom Penh
- Kandal
- Prey Veng
- Takeo
- Kompong Cham
- Kratie
- Stung Treng
- Kompong Thom
- Kompong Chhang
- Pursat
- Battambang
- Banteay Meanchey
- Siem Reap
- Odormeanchey
- Rattanakiri

Of these, the biggest fishing areas in 2002 were Kandal (21,000 t), Kompong Chhang (20,000 t), Siem Reap (12,000 t), Pursat (11,500 t) and Battambang (10,200 t).

Marine fisheries

Marine fisheries locations as enumerated in the DoF statistics are shown below:

- Kep
- Kampot
- Sihanouk Vill
- Koh Kong

Of these the biggest catches were recorded at Sihanouk Vill (21,200 t) and Koh Kong (17,750 t).

Community fisheries

A list of established and proposed community fisheries are provided in Table 4.

3.2.6 Landing locations

Landing locations are not separated from fishing locations in the official statistics.

Table 4: Community fisheries in Cambodia as of January 2003.

Province	Established community fishery	Community fisheries to be established	Total
Kg. Thom	10	2	12
Siem Reap	10	3	13
Bantey Meanchey	10	1	11
Battambong	19	4	23
Pursat	14	4	18
Kg. Chhnang	34	3	37
Kandal	17	1	18
Takeo	15	1	16
Prey Veng	22	8	30
Kg. Cham	18	2	20
Kratie	31	15	46
Stung Treng	38	8	46
Ratanakiri	3	1	4
Prea Vihea	2	0	2
Svay Reang	4	0	4
Phnom Penh	1	1	2
Kampot	8	4	12
Koh Kong	3	3	6
Kep	1	2	3
Sihanoukville	4	2	6
Total	264	65	329

Source: Kimchhea et al. (2003)

3.2.7 Socio-economic categories of fisherman

The DoF normally divides fishing households into three categories:

- Family fishing
- Middle-scale fishing
- Large-scale fishing

In the inland fishery, large- and middle-scale fishing is restricted to the open season. Large-scale fishing involvement occurs amongst lease or sub-lease holders, or shareholders of fishing lots. Gear used includes bagnets along the Tonle Sap River, and bamboo barrage / fence traps and seine nets used within fenced-off fishing lots. Middle-scale fishing involves license holders, with or without co-sharers, using gear such as hook long lines, bamboo traps, fence traps and gillnets. Family fishing occurs during both open and closed season, and normally uses gear such as single hook lines, small handled dragnets, bamboo / rattan traps and gillnets (Ahmed et al., 1998; Coates, 2002).

3.2.8 Socio-economic value of fisheries

The DoF data is limited to catch and export values. The fisheries export increased from about 34,000 t in 1992 to 52,500 t in 2002.

No government data exists on the socio-economic value of the fisheries of Cambodia. However, the MRC published an extensive survey 'Socioeconomic Assessment of Freshwater Capture Fisheries of Cambodia. Report on a Household Survey' (Ahmed et al., 1998). The report highlights the diversity of livelihood strategies amongst fishing community households, which includes farming, fishing, fish selling, fish processing, fish gear construction and selling, money lending, shop-keeping, labouring, government and NGO work, *cyclo*, taxi and boat services, and other activities. The survey showed poor living conditions of fishing communities, where community members often live on floating houses or over water, with a large percentage owning very little or no land. The conditions were found to be worst for female-headed households, who normally had lower levels of education and less involvement in income generating activities. The overwhelming majority of the households surveyed relied on products from common property or publicly owned resources, especially flooded forests, big rivers and lakes, flooded rice fields and riverbanks. Fish and fish products formed an important part of the diet, with total fish consumption by households living in the fishing dependent communes of up to 75.6 kg per capita per year (Ahmed et al., 1998).

Community members involved in middle-scale and large-scale fishing are wealthier than those relying on family fishing. Ahmed et al. (1998) estimated that a total of about 40% of the fish catch from family fishing activities was consumed within the community. This is supported by a survey carried out by the CFDO in five locations (Khim, 2003), which found that the majority of fish caught are consumed by the household, with only valuable species caught being sold at local markets. In addition, rice field fisheries have been shown to contribute substantially to the protein consumption and income of rural communities in Cambodia (Guttman, 1999).

3.3 The fishers and other stakeholders

The DoF divides fishers into three categories: family fishers, middle-scale fishers, and large-scale fishers (see Section 3.2.7). Within fishing households, Ahmed et al. (1998) found women to constitute about 50%. In addition, about 19% of households surveyed were headed by females (mainly widows). Female literacy among household heads was found to be lower than male literacy rates, and female headed households on the whole were poorer, and participated less in economic activities, than households headed by men. Women participated actively in fishing in up to 29% of households, and were greatly involved in fish processing (in up to 47% of households), fish selling (in up to 24% of households), and fish cage operation (in up to 41% of households).

Both women and men are involved in the community fisheries. In a recent study, Khim (2003) found that both men and women catch fish, and women do most of the fish marketing and the mending of nets.

3.4 Management control measures and existing monitoring (data collection) and control (regulatory) systems implemented at the national level for each fishery

The closed season for inland fishing lots is from June to September (DoF, 2001g). The gear restrictions within each fishery are described in Section 3.2.3. Community fisheries establish their own rules and regulations. These regulations must not permit activities disallowed by the Fisheries Law, but can be more restrictive. Within community fisheries, only ‘family gear’ can be used.

Provincial fisheries officers collect fees and confiscate illegal fishing gear and patrol fishing lots. These officers are also responsible for gathering / estimating (see Sensereivorth et al., 1999; Coates, 2002) data used for statistics presented to national and international authorities. For details on the data collection methods for each fishery, see Section 5.1.

Effective enforcement is restricted by limited numbers of poorly trained staff, lack of surveillance resources, and the armed resistance of illegal fishers (DoF, 2001f). Corruption and violence are also common problems (Degen et al., 2002).

Information collected about the fisheries by the DoF and the MRC project in 2002 is presented in the categories shown in Table 5.

Table 5: Information collected about the fishery:

Category	**Type of information collected / presented**
Inland fishery	Production by city and province (t) Fishing lots (no): - lake – stream fishing lots - bag net fishing lots - bag net fishing lots for white lady carp - bag net fishing lots for prawns - bag net fishing lots for seed of *Pangasius pangasius* - sand bank fishing lots - reserved fish sanctuaries lots Industrial fishing gears: - Thnuos (barrage trap) - Day trey (fish bag net) - Day bang korng (shrimp bag net) - Nor rut chhung (arrow shaped bamboo fence trap) Middle scale fishing gears: - Morng (gill net) - Uon Hum (seine net) - Neam (mid-water trawl) - Chuorn (V-shaped net mounted on boat) - Chayra (big cone shaped net) - Chhnuoc (trap mounted lift net) - Lop Nor rav (bamboo fence trap) Family fishing gears: - Morng (gill net) - Sam nagn (cast net) - Tru (oblong trap) - Lop (cylindrical drum trap) - Sayoeun (small vertical slit trap) - Chheang Kuang (carried scooping basket) - Thnang (scooping net) - Lear - Chhnouk (raft mounted lift net) - Santuch (hooked line)
Fishers and fish farmers	Family and rice field (families, persons) Mobile fisheries (families, persons) Fisheries industry (families, persons) Fisheries processing (families, persons) Aquaculture (families, persons)
Fishing boats	Boats without engine: - Boat load < 5 t - Boat load > 5 t Boats with engine - Power < 10 HP - Power 10 – 30 HP - Power 30 – 50 HP - Power > 50 HP

Table 5 continued.

Fisheries sector employees	Central office: - Masters - Bachelor - Diploma - College - Technical workers - No skills Local offices: - Masters - Bachelor - Diploma - College - Technical workers - No skills
Marine fishery	Production by city and province (t)
Fish export	By cities and provinces
Fish processing	Dry salted fish (t) Smoked fish (t) Dried fish (t) Pho-ork (t) Steamed fish (t) Dry shrimp (t) Dry slingay (t) Dry octopus (t) Processing shrimp (t) Crab meat (t) Salted crab (t) Trey bourb (t) Dry black sea cucumber (t) Ki (t) Fishmeal (t) Fish sauce (1000 l)

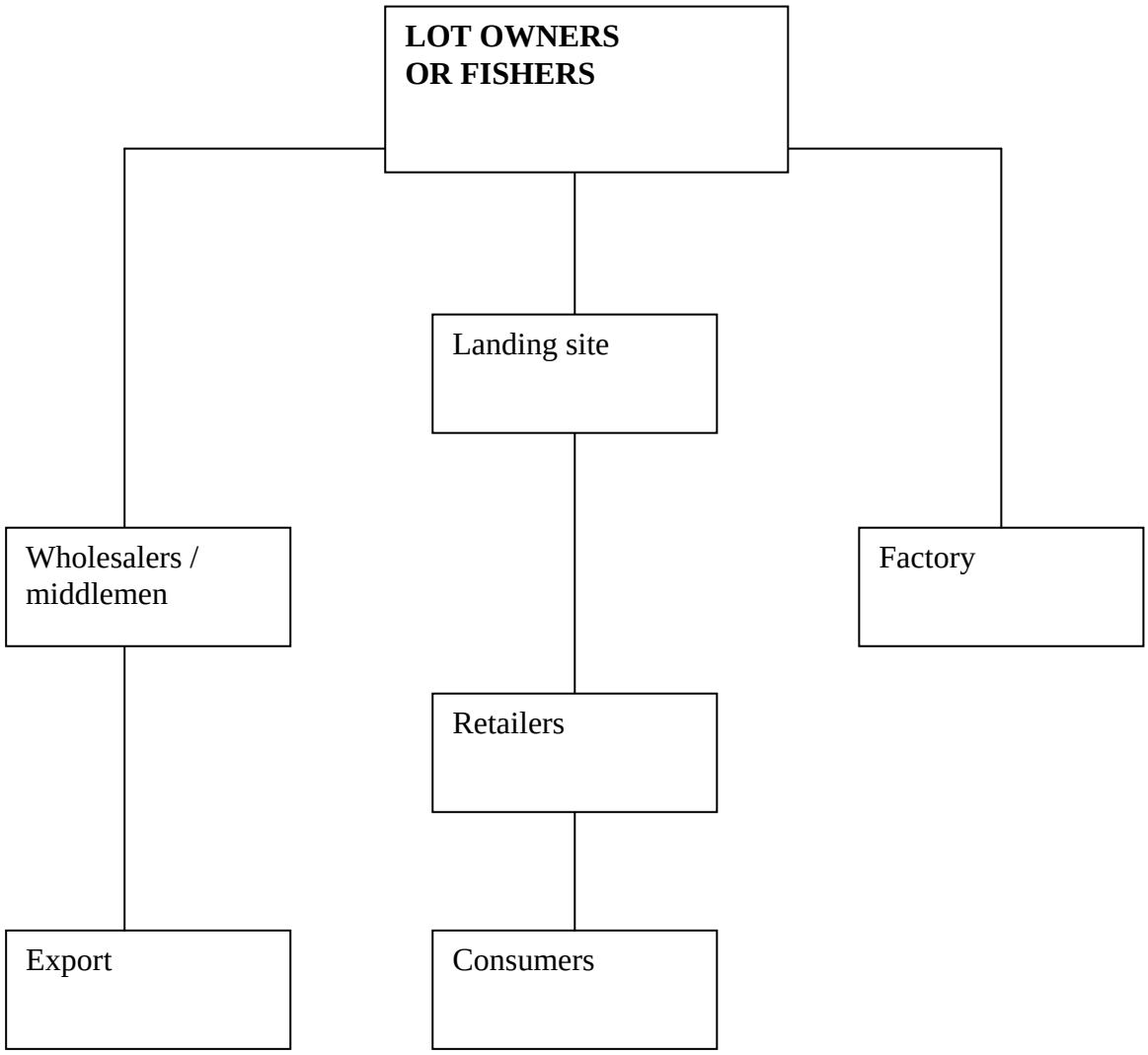
Source: DoF (2003).

3.5 Fish disposal

Inland fisheries

Marketing and distribution networks are well developed for the inland fisheries. Fishers normally sell their produce to small traders, who sell to medium traders, who distribute the fish through wholesalers (DoF, 2001g). Fish products range from live fish, to processed products such as fish paste, fermented fish, dry salted fish, steamed fish, smoked fish, fish sauce, etc. High value species are normally sold to traders in Phnom Penh or exported. Large-scale fishers tend to sell their products directly to wholesalers. The pathway of fish marketing for inland fisheries can be seen in Figure 1. Information was not available to enable percentages of the catch to be assigned to the different pathways.

Figure 1: Marketing chain from fishing lot inland fisheries in Cambodia. Source: DoF (2001g).



Marine fisheries

Domestic consumption of marine fisheries products is low and most marine fisheries products are exported (DoF, 2001g). Little data is available on the amount and value of export of fisheries products. The main export markets are in Thailand and Vietnam, and to a smaller extent Singapore, Malaysia, Hong Kong, China, Taiwan, Japan, USA and Australia.

4 Identification of data and information requirements

Because the planning of fisheries management is at a very early stage in Cambodia, existing data requirements to carry out contemporary managment functions are virtually non-existent. Further, the current capacity of the DoF / CFDO to carry out its management duties is very limited, which makes the distinction between minimum and desirable information needs difficult to ascertain. The information needs presented in sections 4.4 to 4.9 represent a 'wish list' of information which does not take into consideration the cost-effectiveness of methods of data collection or sharing. This is because the gap between the level of information and analysis required to manage a fishery, and the capacity within the DoF of Cambodia to do so, is so big that the most important information needs are not obvious to the DoF itself. Some issues pertaining to the level of accuracy required of, and the budgetary constraints to generating, the information are discussed in Section 5.

4.1 Details of any management plans for each fishery

Currently no finalised management plans exist for any fishery in Cambodia. The current framework stipulates that one-year, five-year and ten-year fisheries management plans be prepared, but the capacity to do so is limited.

The draft Fisheries Master Plan 2001 – 2011 details the plans for the Cambodian fisheries. The Master Plan development was supported by the World Bank, but the plan is still in a draft format because further consultation with various stakeholders is required for finalisation. The consultation phase is now planned to start in 2004, and the Master Plan is envisaged finalised some time thereafter.

The draft Fisheries Master Plan comprises three parts:

Part 1: The vision and strategic framework for Cambodia's fisheries

- Goal 1: Harvesting within sustainable limits
- Goal 2: Supplies meeting demands
- Goal 3: Poverty reduction

Part 2: Pre-requisites for fisheries development

- DoF capacity and capability
- Legal and administrative Framework
- Technical and scientific competencies
- Institutional sustainability

Part 3: Fisheries development programme 2001 to 2011

- Resources management and administration
- Providing industry support
- Poverty alleviation
- Capacity building

The Master Plan contains approximated budgets detailing financial assistance sought for carrying out the suggested fisheries development programmes. According to the World Bank or a ten year period, the Resources Management and Administration Programme cost is estimated at USD 16 million, the Providing Industry Support Programme at USD 151 million, the Poverty Alleviation Programme at USD 28 million, and the Capacity-building Programme at USD 31 million. Thus a total of USD 226 million is estimated required to carry out the planned fisheries management programmes. The current government budget allocation is USD 100,000.

No national management plans have been formulated for the community fisheries. However, a current ADB / FAO funded project is developing a management plan for the Tonle Sap system. A draft plan is expected to be completed by June 2004, and a three-year implementation phase 2 under which the plan will be field-tested and revised with the CFDO is expected to start in April 2004. A 2002 reservoir-wide management plan for the Boeung Chunlen Reservoir was produced as part of the MRC Management of Reservoir Fisheries in the Mekong Basin II Cambodia Sub-component project.

4.2 Management objectives for each fishery or as a whole

As there are currently no management plans, the management objectives of individual fisheries have not been formulated. However, the Master Plan for fisheries 2001 – 2011 states three overall objectives, each with a number of operational objectives as follows:

i) Cambodia's living aquatic resources are harvested within their sustainable limit and resources use rights and obligations are allocated and enforced within basic principles of democracy and good governance
   a. A continuous stream of scientific information is available to support the management and administration of Cambodia's fisheries resources
      - Generating biological knowledge of Cambodia's living aquatic resources for use in resources management and administration
      - Generating ecological knowledge about Cambodia's fisheries and its dynamic interaction with the broader ecosystem for use in resources management and administration
      - Generating social and economic knowledge about the fishing industry and the different localised fisheries communities for use in resources management and administration
      - Generate knowledge from the use of fisheries sanctuaries as a tool to conserve, protect and enhance the recruitment to fisheries for use in resources management and administration
   b. Extraction of living aquatic resources follow prudence under precautionary and ecologically sound fisheries management principles
      - Establishing revolving five-year fisheries resource management plans to support the management and administration of Cambodia's capture fisheries in inland and marine habitats. Management plans will incorporate precautionary and ecologically sound limitations on the exploitation of fisheries resources
      - Supporting local communities in establishing revolving one-year fisheries management plans to support community based management and administration of fisheries resources at community level. One-year management plans will cover the local areas under community management and administration. Local plans will also incorporate precautionary and ecological principles.
   c. Resources use rights and obligations are allocated within basic principles of democracy and good governance
      - Dividing Cambodia's fisheries domain into fisheries management zones, which lend themselves to the effective implementation of community based fisheries management
      - Establishing a registry over individuals and commercial entities eligible for participating in Cambodia's capture fisheries and aquaculture
      - Supporting the establishment of local fisheries management bodies (councils), and principles for the functioning, management and administration of local fisheries councils.
      - Supporting the establishment of one-year revolving fisheries management plans for local fisheries zones to guide the extraction of aquatic resources and the allocation of resources use-rights and obligations
      - Supporting the preparation of annual reports on the local utilisation of fisheries resources during the preceding year and recommendations for the coming year

- Providing general support to community based fisheries management through information sharing, training and capacity building at community levels

d. Fisheries monitoring and law enforcement is carried out through collaboration between local communities, local authorities, and the fisheries service
   - Reduce the number of violations of the Fisheries Law
   - Reduce the intensity of conflicts between stakeholders
   - Ensure transparency of governance in fisheries administration and law enforcement

ii) The supply of fish and fishery products keep pace with increasing demands

a. Ensuring capture fisheries are biologically, financially and economically sustainable and socially acceptable
   - Establishing optimal levels of fishing for inland and marine fisheries to safeguard the biological, financial and economic viability and long-term sustainability of the capture fisheries
   - Implementing a programme for balancing fishing effort to conform to the optimal levels of fishing effort

b. Supporting the private sector to increase the supply of fish and fishery products to keep pace with increasing domestic and export demands
   - Ensuring the capture fisheries retain its financial viability to provide sufficient incentives for the private sector to invest and maintain its investments in capture fisheries
   - Supporting a gradual and profitable diversification of capture fisheries towards farming-fisheries in both inland and marine habitats
   - Supporting an expansion of production of indigenous fish species in household and subsistence sized aquaculture enterprises in all habitats
   - Supporting private sector expansion into industrialised aquaculture enterprises in all habitats

c. Supporting the private sector to improve its effectiveness and efficiency in aquaculture
   - Developing and disseminating technology packages that will support the private sector to adopt cost-effective aquaculture farming systems
   - Maintaining a gene pool of indigenous fish species and carrying out propagation of fish fry to ensure the private sector has access to high quality, healthy and disease-free brood stocks and stocking materials
   - Develop and disseminate feeding technologies to the private sector
   - Responding to private sector needs, develop and disseminate technology packages that are aimed at improving the overall efficiency and effectiveness of Cambodia's aquaculture industry
   - Establish and maintain 'best practice' guidelines for the different types of aquaculture and for different habitats
   - Together with local fisheries councils develop and implement localised aquaculture management plans
   - Develop and maintain a continuous flow of technical, scientific and general information on aquaculture to local communities

d. Establishing and maintaining basic infrastructure facilities to improve fish marketing, price formation and to reduce post harvest losses
   - Ensure the basic fish harbour, landing and service facilities are available at major fish landing centres
   - Ensure specialised fish markets and improved fish marketing sections are available to fish traders and the general public in connection with fish landing places and major wholesale and retail markets
   - Provide support to private sector investors to increase the processing of fish and fishery products
   - Establish and implement fish and fishery product quality assurance schemes to ensure fish and fishery products destined for domestic and export markets conform to internationally accepted quality standards

e. Ensuring private sector operators in the fishing industry have access to institutional financing at comparable levels to other industries
    - Ensure the legal framework for fisheries and fishing industry is conducive to modern business practices and institutional funding
    - Ensure legal provisions and administrative practices allow for asset creation in the form of transferable resource use-rights, security of tenure and transferable ownership to immovable assets like land and water rights
    - Support the establishment of insurance systems that provides protection to owners and lenders when calamities strike

iii) Reduce the incidence of poverty among vulnerable groups of society, including women, in fisheries communities

a. Ensure the poor, vulnerable groups of society and women are directly and effectively supported to break the vicious cycle of poverty and deprivation characterising rural communities
    - Support the identification, demarcation and development of state land for resettlement and transfer to vulnerable groups of society
    - Together with stakeholders, local communities, NGOs and other agencies of government support creation of social and economic opportunities to advance the livelihood of rural poor and vulnerable groups of rural societies
    - Together with the financial sector and NGOs involved in the operation and management of micro-credit schemes, support the expansion of such schemes to cover investment and working capital needs of households engaged in fisheries sector activities
    - Providing technical support and assistance to help small and medium scale businesses to develop and operate in the fields of fisheries, aquaculture, processing, trade, marketing and any other activities related to the functioning of fishing and aquaculture industry

4.3 Decision-making methods for each management objective

Because no management plans have been formulated, the decision-making methods for management objectives are not finalised yet. However, the draft Master Plan for fisheries 2001 to 2011 details strategies to achieve each operational objective, from which some assessment of the criteria and mechanisms of decision making can be made. These include:

- From biological, ecological and socio-economic knowledge about species, the ecosystem, the fishery, and the impacts of sanctuaries. The data will be generated from modelling (including scenario assessments) and statistical analysis of scientific data collected and generated by research activities carried out by the DoF. Quantitative limits to the extraction of living aquatic resources will be established through research, and a comprehensive inventory of fishing effort will be established and maintained.
- A baseline will be established for the financial and economic performances, and the social utility of the fishery, and continuous monitoring efforts will ensure. This data will form the basis for management of the fishery. Detailed research and economic and financial assessments will establish the levels of economic and financial viability of Cambodia's capture fisheries.
- Precautionary and ecologically sound catch limits will first be defined from empirical data, and will be refined as research is carried out, including on the dynamic impacts of fisheries on species and populations.
- Community fisheries will be monitored and evaluated by the DoF and the community itself, with only broadly outlined mention of criteria used in the evaluation process, such as community consultation, continuous information exchange and the fisheries law.
- Aquaculture technology development and adaptation of proved technologies to Cambodian conditions will be carried out. Aquaculture operations 'best practice' guidelines will be developed for different habitats and species, and monitoring and evaluation of compliance with these will be

conducted by local councils and the DoF. State land for aquaculture activities in rural areas will be identified and demarcated in collaboration with local authorities, and systems and procedures will be put in place to support this process.

- Legal and administrative systems and procedures necessary for the financial sector to fund investment and working capital requirements of the fishing industry will be developed.

Thus it seems that the aim is to judge performance against scientifically established best practice guidelines, and to use a series of revolving five- and one-year plans for more detailed planning. However, it should be emphasised that the Fisheries Master Plan clearly states that the capacity of the DoF to carry out its management duties currently is virtually non-existing, and will have to be developed through externally funded programmes, the cost of which is estimated at USD 226 million.

4.4 Data and information requirements to control and regulate the fishery

Cambodia's fisheries legislation, the Fiat-Law on Fisheries Management and Administration, was issued in 1987, and includes six chapters and 44 articles covering definitions, including: the exploitation of inland fisheries, aquaculture and processing of freshwater fishery products; the exploitation of marine fisheries, aquaculture and processing of marine fishery products; legislation regarding fishery violations, penalties, etc. The Fiat-Law also includes sub-laws concerning the transportation of fisheries products and the rental of inland and marine water for fisheries purposes. Other sub-laws detail procedures for the auctioning of fishing lots and procedures for calculating fisheries taxes in inland and marine waters. The law classifies gears and stipulates gear use restrictions, demarcates inland fishing lots and fish sanctuaries, and provides general legislative frameworks for fisheries permits, fishing record keeping required, fishery inspection, etc. The DoF describes the fisheries regulations as comprehensive and geared towards sustainable resource use, but recognises that the law is not well understood by most fishers and fishery enforcers (DoF, 2001f).

The law is currently under revision, and at the time of this study, only a draft version of the new legislation was available. This draft includes more measures aimed at ensuring environmental sustainability of the fishery than the 1987 Fiat-Law, including regulations for the management of shrimp culture, and also legislation for the management of seasonally flooded areas.

Because little control of the fishery is currently exerted, the existing data requirements for the DoF to carry out this function are limited.

In the workshop and interviews conducted as part of this study, the DoF in Cambodia identified the following minimum information needs for the control and regulation of the fishery:

- Exact area of each fishery (marine, fishing lot and community fishery, on a map, with position co-ordinates)
- Details of license holders, including: contact details, vessel used, gear used, catch levels
- Community fishery rules and regulations, and how these are enforced
- Illegal fishing activities occurring in each fishery

4.5 Data and information requirements for policy and development planning

Current data and information are continually used for policy and development planning (Nao Thuok pers com.). For, example the government estimates of inland fish production (of c. 90,000 tons / year) were revised by research work conducted by the DoF together with MRC which estimate fish production to be much higher (c. 300,000 to 400,000 tons / year). The Department of Fisheries and the Ministry of Planning now use this new estimate.

The data and information needs identified during this study (through workshops and interviews) by the DoF in Cambodia for policy and development planning are shown in Sections 4.5.1 to 4.5.3.

4.5.1 Resource and fishery related

- How to manage fisheries resources in an environmentally sustainable way
- Catch levels by species for each fishery
- Catch levels by gear type for each fishery
- Value of catches (total, by species and gear type used)
- Inventory of type of fishing gear used in each fishery
- Community fishery management plan, and how this is carried out, including successes and failures
- Biological details of major fish species caught – status of stock, main habitats for each species, main species for each habitat, migration patterns, spawning areas
- Environmental details including weather, existing habitats, including knowledge about how ecosystems work
- Presence and impacts of the following for inland fisheries: industry, agriculture, forest clearing, charcoal kilns, pollution
- Presence and impacts of the following for marine fisheries: industry, soil erosion, mangroves (past and present), seagrass, coral reefs, pollution
- Efficiency of different gears and the sizes of fish caught using different fishing equipment
- Existing aquatic resource use in areas (including legal and illegal resource collection from common property areas)
- The needs of community fisheries
- Amount and value of import and export of fishery products
- Ecological impacts of fisheries and associated impacts on other sectors (e.g. tourism)

4.5.2 Socio-economic information

- No. of fishers in each fishery, details of gear use
- Income of fishers for each fishery and gear type / vessels used
- Equity within community fisheries, socio-economic status of households and individuals engaging in fishing activities, distribution of income, detailing of what income from what activity, food security, education levels
- Current and alternative livelihood strategies of people participating in the fisheries
- Importance of post-harvest activities such as marketing and processing, who is involved, what is their income, other livelihood strategies engaged in
- Gender issues (activities carried out by women and by men, incomes of women and men)
- Social framework of people participating in the fisheries (religion, ethnicity, traditions, relationships, beliefs)
- Extent of illegal fishing occurring, and who the culprits are
- Sources of conflicts and degree of cohesion and empowerment of fisheries organisations within community fisheries
- Power issues within community fisheries, including who are powerful and the implications of this for fisheries management
- Other projects established within community fisheries areas, including details of operating NGOs and their activities
- The needs of community fisheries
- Success and failure stories detailing impact of fisheries on people's livelihoods from community fisheries

4.5.3 For monitoring, control and surveillance (MCS)

- Success and failure stories detailing impact of fisheries on people's livelihoods from community fisheries
- Resources allocated to MCS within community fisheries
- Success and failure stories detailing impacts of past management plans in commercial fisheries
- Details of costs of MCS for commercial fisheries

4.6 Data and information requirements for compliance with international management responsibilities

The FAO International Code of Conduct For Responsible Fisheries obliges countries to conserve stocks and ensure exploitation is sustainable, through the collection of data to enable decision to be based on scientific evidence.

To ensure that a precautionary approach to fisheries management is followed, states are obliged to collect the following information (from Halls et al., 2000):

- Catch numbers or nominal weight by species, and fishing effort by fishery, fleet and location
- Where appropriate, length, weight, age and sex composition of the catch, and other biological information supporting stock assessments, e.g. growth, recruitment, distribution and stock density
- Vessel data and information for standardising fishing effort

The DoF in Cambodia is currently trying to collect / estimate the above information, but because of limited resources, the data collected by the DoF is thought to be unreliable (Sensereivorth et al., 1999; Coates, 2002).

4.7 Data and information requirements for international reporting responsibilities

4.7.1 FAO Regional Fishery Commission Requirements

Cambodia is a member of the Asia Pacific Fishery Commission (APFIC), and is required to report the following information to the FAO Fisheries Department annually (from Halls et al., 2000):

- Nominal (live weight) catch statistics fro the countries' flag vessels that fish in the area, by species
- Annual production of fishery commodities, imports and exports (country, volume, value and processing method)
- Fleet statistics (number and total tonnage of fish catching, processing, and support vessels utilised in commercial, subsistence and Artisanal fisheries by size and type of vessel
- Employment statistics for full-time, part-time and occasional workers in fishing and aquaculture by gender

4.7.2 SEAFDEC Requirements

The South East Asian Fisheries Development Center (SEAFDEC) requires member countries to contribute annual fisheries statistics, including:

- Gross fisheries domestic product
- No. of people employed in the fisheries and related sectors, and their wages
- Prices of fish and fish products
- Fish production (amount and value for different sub-sectors) for inland and marine fisheries
- No of fishing establishments by size of management for marine fisheries
- No. of fishers by working status for marine fisheries
- No. of fishing boats by type and tonnage
- Catch by species, value and gear type for marine fisheries
- No. of fishing units by gear type for marine fisheries
- Catch by species and value for inland fisheries
- Wholesale price at landing centre for freshwater and marine fish
- Consumer price for freshwater and marine fish
- Disposition of catch for marine and inland fisheries and total
- No. of fish processing establishments and production
- Export and import by fishery commodities
- Export / import of fishery commodities by country of origin / destination

4.7.3 CITES

The Convention on International Trade in Endangered Species (CITES) on wild fauna and flora was created to protect many plants and animals against illegal trade. Counties who sign the treaty have agreed to control or prohibit trade in over 40,000 species of animals and plants. The parties to the treaty apply a system of permits and certificated which are issued when certain conditions are met and which have to be presented when consignments of specimens of species listed under the agreement leave or enter a country.

Cambodia joined the Convention of the International Trade in Endangered Species (CITES) in 1997. The requirements of CITES are that member countries submit an annual report detailing:

- The number and types of permits and certificates granted
- The trade in specimens of the species listed by CITES
- The size and sex of the specimens in question

Reports should include detailed information on imports, exports, re-exports and introduction from the sea of specimens of, and manufactured products from, species listed by CITES. Exact quantities should be listed wherever possible, as should countries imported from and exported to, and impacts on wildlife resulting from the trade.

4.7.4 Convention on Biological Diversity

Cambodia acceded to the Convention on Biological Diversity in 2003. Accession requires a country to declare the extent of their competence with respect to the matters governed by the Convention or the relevant protocol. In order to declare the extent of competence, countries are required to identify and monitor components of biological diversity important for conservation, although few guidelines are provided as to what indicators should be used or how diversity should be assessed (Halls et al., 2000). To meet this requirement, Cambodia produced a 'National Biodiversity Strategy and Action Plan' in 2002 (under FAO / UNDP / GEF project CMB/98/G33). The report includes an estimate of marine and freshwater species, but the uncertainty of the estimate is clearly stated. Lists of endangered species are also provided, and sensitive habitats are identified (e.g. mangrove forests and coral reefs) (MoE, 2002). A draft sub-decree has been produced on the management of endangered species and a seminar on biodiversity and links with poverty alleviation issues with UNDP support has been held by MAFF (Sam Naow, DoF Deputy Director, pers. comm.). The communities living around deep pools in the Mekong river, which are important temporary refuges for brood stock of migratory fish species, Department of Fisheries and IUCN are working together to establish suitable co-management protocols.

4.8 Data and information requirements to support community-based fisheries

In the workshop and individual interviews carried out for this report, the CFDO of the DoF in Cambodia voiced its responsibilities to support community fisheries as including the facilitation of:

- The establishment of community fisheries
- The establishment of community fisheries by-laws, constitutions, management plans
- Agreement between the community fisheries and the DoF
- Demarcation of the community fishery boundary
- The strengthening of community fisheries
- Contact and the establishment of working relationships between community fisheries and NGOs
- Conflict resolution
- Capacity building within the Community Fisheries Development Units (CFDUs)

To carry out these responsibilities, the CFDO identified the following information and data needs in the study workshop:

- Location and area of community fisheries, as shown on a map, including clearly marked boundaries and position co-ordinates

- Existing and potential livelihood strategies and occupations of community members, including incomes from each occupation / contribution of occupation or strategy to overall livelihood, food security, alternative livelihood strategies to fishing
- Natural and physical resources present in local area, including infrastructure, rivers, lakes, areas of permanent and seasonal flooding, forests, agriculture, aquatic organism species, etc., and resource use for each of these
- Information pertaining to local conflicts related to fishing or aquatic resources use, including who is involved, how conflict can be resolved, power issues
- People's needs within the community and within the community fishery, including existing projects / initiatives to meet these needs
- Problems encountered in the community fishery, including strategies to resolve them
- Inventory of fishing gear used, the species, sizes and values of organisms caught by different gear types
- Details of the local understanding of community fisheries within the community
- Details of community fishery goals, rules, regulations and management plan, including status of by-laws, details of members of committees (age, gender, education, income), inventory of resources (funds, patrol boats, petrol, means of protection against illegal fishers), clearly defined conservation areas if present, fishing gear permitted in what areas, enforcement strategy and fines, data collected, local monitoring efforts, reporting requirements, details from any meetings and workshops held
- Details of illegal fishing, how much, by whom, gear used, species caught, actions taken against offenders
- Traditional / local knowledge and understanding of resources, including flooding patterns, fish migration patterns, nursery areas, etc.
- Status of understanding and knowledge of the Fisheries Law within the community fishery and the CFDU
- Social framework, including religion, ethnicity, relationships, belief systems
- Level of co-operation and agreement within the community fishery, the CFDU, and the local authorities
- Lessons learned by the community fishery, success and failure stories
- Power relations in the community
- Details on existing and potential external collaborators such as NGOs, including their agenda, contact details
- Details on the CFDU, including CFDU capacity, human resources, needs, perception of community fisheries within CFDU

4.9 Data and information requirements to co-ordinate and evaluate community-based fishery management activities

The CFDO of the DoF in Cambodia identified the following information needs for it to carry out its responsibility to co-ordinate and evaluate community fisheries:

- Information about biological and ecological resources in community fisheries areas, including health of fish stocks, interactions between fishing and the environment (including impact of clearing), sustainable fishing levels and gear use, fish migration patterns, spawning areas, area of different habitats (rivers, lakes, flooded forest) and the aquatic resources found in each of these, industries, pollution, agriculture in area
- Details of the working relationships and level of co-operation between the community fishery and other stakeholders (including the CFDU, local authorities and other organisations / institutions (including NGOs))
- Details of the working relationship between stakeholders, including the CFDU, local authorities and other organisations / institutions (including NGOs)
- Objectives and goals of different stakeholders (NGOs, local authorities, fisheries officers, etc.), including their understanding of community fisheries

- Information about constraints to the development of community fisheries
- Details of the development of the community fisheries, including exactly how the process was carried out, success and failure stories, sources of conflict related to management implementation
- Details of community fishery goals, rules, regulations and management plan, including status of by-laws, details of members of committees (age, gender, education, income), inventory of resources (funds, patrol boats, petrol, means of protection against illegal fishers), clearly defined conservation areas if present, fishing gear permitted in what areas, enforcement strategy and fines, data collected, local monitoring efforts, reporting requirements, details from any meetings and workshops held
- Inventory of fishing gear used, the species, sizes and values of organisms caught by different gear types
- Needs of the community fishery
- Human resources within the community fishery and within the CFDU, including training, education, gender, manpower, occupation, alternative livelihoods, level of understanding of the Fisheries Law

5 Description of existing, and identification of potentially appropriate, data collection tools, sources and methods

5.1 Existing data collection sources, tools and methods (including strengths and weaknesses)

5.1.1 Fisheries other than community fisheries

Fishing lot catch statistics (total catch and catch for different value categories of fish, no species information) from fishing lot logbooks are collected monthly by provincial fisheries officers or community based data collectors, of which there are five to six per province. The data are passed on to the national level following a provincial fisheries office meeting where values are discussed. Middle-scale fishery catches are estimated from license information and reports. Monthly surveys are supposed to be conducted, but in reality rarely occur. Provincial Fishery Officers also estimate family-scale fishing efforts. Sensereivorth et al. (1999) and Coates (2002) reviewed the data collected, and concluded that most are based on estimates with very low accuracy, partly because the data collectors are the same as the regulation enforcement unit, which makes many fishers unwilling to share information.

Provincial Fisheries Officers estimate marine fisheries statistics from licensing information and interaction with fishers. The data suffers from the same problems as that for the inland fisheries.

5.1.2 Community fisheries

The information collection from the community fisheries is still uncertain at the moment, as no formal evaluation has started. A self-review of community fisheries development was carried out in three community fisheries in 2002. The review was facilitated by the CFDO and by the Community Capacities for Development (CCD), a Cambodian NGO, and funded by the MRC / DoF / Danida Cambodian Capture Fisheries (CCF) component. The methods used in the self-review process are planned used on a nation wide basis by the CFDO (Degen et al., 2002).

The framework for the structured data generation and gathering are shown below (from Degen et al., 2002):

- A standard data entry form for village or commune chiefs on general community information (base line data collection)
- A standard form for community fisheries committees and patrol groups to be filled in during group interviews about community fishery specific issues
- A village walk engaging in informal talks with villagers in general and especially looking for poorer households
- A public plenary village meeting, in which a sort of Strengths, Weaknesses, Opportunities and Constraints (SWOC) analysis was conducted, assessing strengths and constraints of the community fishery association and plans with regards to each of the different participants in the community fishery process, which was recorded in semi-structured form
- A standard form for the review team to fill out at the end of the day to assess the situation in the community fishery association, mentioning all insights gained during fieldwork

A pilot survey, supported by STREAM, was carried out by the CFDO in early 2003. The survey aimed at identifying a process for the identification and recording the existence of community fisheries, monitoring activities and conflicts relating to co-management issues, assessing the maturity and operation of the fishery, and storing and updating this information using a database designed for the project (Kimchhea et al., 2003).

The survey covered 12 villages, where data was collected using participatory methods, including focus group discussions and key informant interviews (Kimchhea et al., 2003). An overview of the pilot database formation process developed by the CFDO is shown in Figure 2. The information included in the database developed by the CFDO is detailed in Table 6.

Figure 2: Flow chart of pilot database development. Source: Kimchhea et al. (2003).

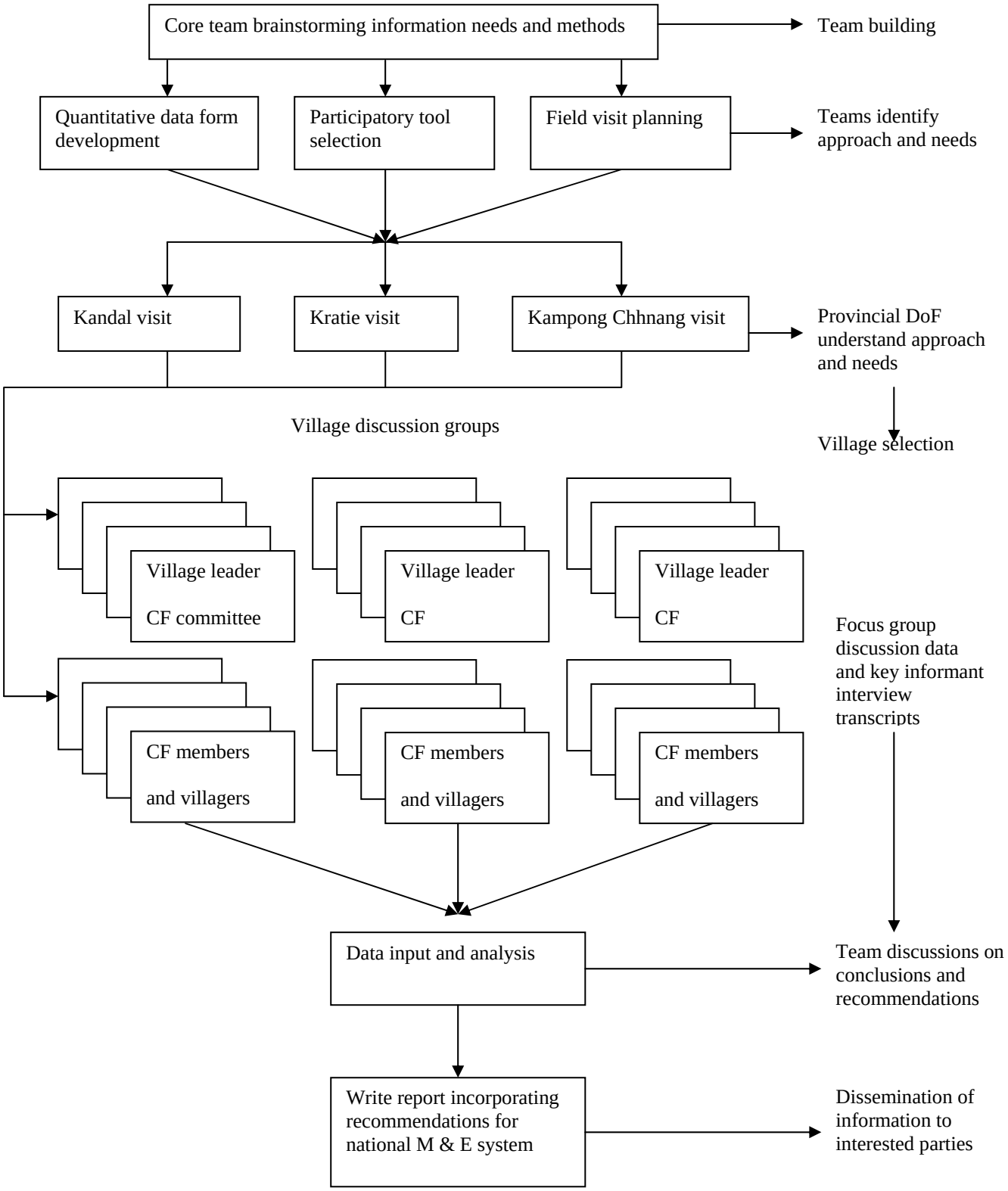


Table 6: Information collected for the CFDO database. PRA: Participatory Rural Appraisal; SWOL: Strengths, Weaknesses, Opportunities and Limitations analysis (from Kimchhea et al., 2003).

Table	Details
Village households and populations	From census • Name & code of village, commune, district & province • Registered population of village (households / men / women / total)
Village situation	From field survey • Location (GPS co-ordinates) • Actual population of village (households / men / women / total)
Community fishery background	From field survey • Election date • Number of people voting in election (men / women) • Partnership institution
Community fishery management 1	From field survey • Name of community committee • Details of committee members (name, sex, position, responsibility)
Community fishery management 2	From field survey • Term of office (number of years) • Fishery ecosystem, type of water body in community • Fishing community members (male / female) • No. of households involved in community fishing • No. of households mainly relying on community fishing • No. of households fishing for family use • No. of households doing cage culture • No. of households doing pond culture • No. of fishing areas in the community • Federation in the community (yes / no) • No. of communities in federation • Patrolling group (yes / no) • No. of patrolling groups • No. of members of patrolling groups • Community map made (yes / no) • Regulations stipulated (yes / no) • Fish sanctuary established (yes / no)
Legal fishing gear	From field survey • Legal fishing gears used in the communities
Illegal fishing gear	From field survey • Illegal fishing gear used in the communities
Conflicts and problems in the community	From PRA / SWOL • Committee group or village group • Topic of issues discussed • Success stories • Failure stories • Possibilities for positive change, strengths and weaknesses, limitations

5.2 Required accuracy and precision of data to support Sections 4.3 to 4.10

The required accuracy of sampling depends on the intended use of the statistics (Stamatopoulos, 2002), and as this has not been formulated yet, it is difficult to assess how accurate the data generated should be. There is a clear need for an assessment of the variability of landings between landing sites and between fishers using different types of gear and vessels. Currently the capacity to gather any

form of useful data is extremely limited, and funding for such activities come exclusively from external agencies, and is subject to the varying priorities and stipulations imposed by these. This suggests that a long-term strategy for the collection of accurate data is unlikely to be initiated in the near future.

5.3 Potential improvements to existing systems

Coates (2002) recommends that countries should incorporate inland capture fishery information requirements into surveys done by other agencies. This is exactly what happened in Cambodia, where the research data generated by the MRC has now replaced the official statistics for the inland fishery. The risk of relying entirely on research or other externally funded projects to generate data for management is that projects activities often are not continued past project life spans, and that the data required by internationally funded projects may change in format every few years as new paradigms are evolving. However, given the present situation in Cambodia where the DoF capacity to collect any data on the fishery is extremely limited, the most practical solution may be to continue relying on international funding.

Coates (2002) also recommends that countries with limited statistics collection activities should think carefully about investing in improved systems, and that focus should be placed on the generation of information about livelihoods. The potential to focus on livelihood related information is great in Cambodia, where national institutions accept participatory approaches. However, participatory approaches are expensive, and the CFDO is therefore currently planning to change their monitoring activities from the pilot participatory format to a structured questionnaire. It is clear that the data collection, storage and analysis method selected will have to be made very cost-effective as there is currently no core funding available for community fishery assessment (Kimchhea et al., 2003).

5.4 Alternative sources, and data collection tools

As mentioned in Section 5.3, the CFDO is currently planning questionnaire surveys to replace the participatory methods used in the pilot database formulation. The potential for collaborating with research agencies has been explored already in Cambodia, and research data forms the bulk of the statistics for the inland fishery (Sensereivorth et al., 1999).

Data collected in collaboration with internationally funded projects is already available to, and being used by, the CFDO, and many CFDO staff are employed using funding from external agencies. An example of information sharing between a project and the CFDO includes the Community Fisheries Self-Review (Degen et al., 2002).

5.5 Attitudes towards participatory data collection systems, required incentives etc.

Within the CFDO it is recognised that it is important for the DoF to establish links with local communities, so that the perceptions of local people can be used as a platform for community fisheries development (Somony, 2002). The CFDO uses a great deal of participatory methods, including PRAs and focus group discussions (Degen et al., 2002; Khim, 2003; Kimchhea et al., 2003). However, Khim (2003) identified that villagers sometimes find it difficult to spend time participating in these processes if they are not compensated, which can be done through the payment of transportation costs and the provision of snacks.

5.6 Use and potential of traditional knowledge

Traditional and local knowledge may provide the cheapest and most feasible way to collect information on the migration patterns of fish species (see Chhea, 2000), standard of living of local people, the health of the fishery etc. Traditional knowledge was used in an AIT project funded by SIDA to decide which areas would be most suitable for the establishment of fish sanctuaries (Chheng Da, Vice Chief, Aquaculture Office, DoF, pers. comm.). The CFDO community fisheries pilot database was developed exclusively based on local knowledge, which was accessed using participatory techniques (Kimchhea et al., 2003).

6 Data storage and processing methods

6.1 Existing and proposed including software, hardware, data processing capacity

6.1.1 Fisheries other than community fisheries

The DoF has a database containing their statistical data, including the number of boats operating. However, the Fisheries Master Plan 2001 – 2011 states that to date, the data has mainly been used for the purposes of collecting fees from the fisheries, and not as a tool for management (DoF, 2001a). They now plan a substantial restructuring of the data collected to better meet management information requirements, and the development of systems and procedures to incorporate data on fishing efforts into the fisheries management process. Also proposed is the establishment of a baseline and continuous monitoring of the financial and economic performances, and the social function, of capture fisheries. The DoF recognises the lack of fisheries related socio-economic data collection by government agencies to date, and plans to include this information in management plan formulation in the future. The DoF propose the use of modelling to formulate management plans for the fishery based on biological, social and economic data, and to test different management scenarios (DoF, 2001a).

However, the capacity building and data collection required to achieve sustainable management of the fisheries resources is currently beyond the budget of the DoF. The estimated cost of the proposed Resource Management and Administration programme was close to USD 16 million, and that of the Capacity Building programme exceeded USD 31 million (once again one must compare these values to the actual budget presented in Section 2.3).

6.1.2 Community fisheries

The CFDO developed an English-language Microsoft Access database (later converted to Excel for ease of operation for staff) for community fisheries status overview. A number of other organisations have databases for community fisheries management in Cambodia, including one developed by the Cambodia Development and Research Institute (CDRI), one developed by the WWF, and one developed by Oxfam GB. The CFDO is continuing to promote the sharing of information and database systems, for the benefit of the different projects in a series of meetings. However, issues of database ownership developed, and sharing arrangements were rejected by some the the organisations.

The estimated cost of scaling up the current pilot database to nationwide coverage, and for the collecting and inputting baseline data for a monitoring and evaluation system over a one-year period was estimated at USD 423,000 (USD 23,500 for each of 18 provinces) (Kimchhea et al., 2003). In addition to this, staff training in survey techniques would likely be required. The project recommends that a PC be dedicated to the database. For further information on the pilot database development project, see Section 9.1.3.

6.1.3 Potential improvements to existing systems

The community fisheries pilot database was originally developed using Microsoft Access, but was later changed to Microsoft Excel to ease operation by CFDO staff (Meelis, pers. comm.). This stresses the need for the development of information management systems with the end-users. The potential for executing queries and generating reports using Microsoft Excel is limited, but naturally the database is of no use if it cannot be operated at the local level. Kimchhea et al. (2003) stated that the English-language requirement using the Access version of the database was considered a limitation in its usage, and that alternative software which could accommodate Khmer script could be sourced. Khmer versions of the database are certainly required if the envisaged sharing of information with all stakeholders is to be achieved (although Kimchhea et al., 2003 stated that reports generated from the database could be translated into Khmer and then shared with other stakeholders in the way that the STREAM Communications Hub has achieved). Within the CFDO, the use of English in a database system may create confusion as different people with different written and spoken English abilities may use different terms for the same issues.

7 Identification of potentially appropriate data sharing and provision mechanisms

7.1 Channels of communication between and within fisheries institutions and stakeholders at different levels

See section 2.4. This report focuses on the information requirements of the DoF, and it is beyond the scope of this study to compare the information requirements of the main co-management stakeholders.

7.2 Opportunities for facilitating sharing or the provision of data

7.2.1 What "external data and information" would the DoF be interested to receive or is currently receiving

As outlined in Section 2.4, the DoF participates in a great deal of international projects, in which they have extensive collaborative relationships with international and national organisations and agencies. The CFDO forms part of STREAM, the regional communications and learning initiative of NACA from which it is able to regularly share knowledge about co-management as well as a wide range of issues related to aquatic resource management and poverty alleviation.

The DoF currently receives information from communities through provincial sources and from national level government staff working on projects run by international projects (Mee et al., 2003). Only DoF staff working on external projects (e.g. AIT or MRC projects) have the opportunity to carry out fieldwork in, and interact with, local communities.

The facility for the CFDO to receive information from communities is through the CFDUs and provincial offices.

In the workshop which formed part of the consultation process for this report, the CFDO expressed a great need for success and failure stories of community fisheries establishment and management, and for guidelines on how to go about the process of facilitating the establishment of community fisheries as well as how to co-ordinate the management of community fisheries on a nation-wide basis.

Some of the fisheries resources being co-managed within Cambodia include migratory species which cross provincial and national boundaries. In this regard the Fisheries Department has recently signed a Memorandum of Understanding with the Department of Livestock and Fisheries of the Government of Lao PDR especially about sharing knowledge between Lao PDR research institutions especially LARReC in Vientiane and IFReDI in Phnom Penh. In addition the Deputy Fisheries Director will next month join a Ministerial mission to Vietnam to address similar knowledge sharing issues (Nao Thouk pers. comm.)

7.2.2 What information would the DoF be willing to share/provide or is currently sharing or providing?

The CFDO recognises the need for organisations and institutions working with community fisheries to develop a shared understanding of the issues relating to community fisheries, for these to share data and work using the same definitions and principles. The CFDO suggest that the pilot community fisheries database developed by the CFDO with STREAM support should be made available to all stakeholders involved in community fisheries, through a central database system (Kimchhea et al., 2003). The CFDO envisages that reports generated from the database are shared amongst communities and other stakeholders throughout Cambodia, and that a list of partner organisations involved in community fisheries management are registered in the database, enabling the CFDO to build a contact network.

7.3 Existing and proposed information provision to, or exchange among, fisher communities

The CFDO is currently focusing on facilitating the establishment of community fisheries. This process has included various advocacy efforts, workshops, training sessions and participatory appraisals, during which the concepts, rules and regulations and visions for co-management in Cambodia were shared with communities. Most such activities were funded through external agents, and as such were subject to the specific stipulations and budgetary concerns of such projects.

The Community Fisheries Self-Review (Degen et al., 2002) established a method for communities to share information about the process of establishing community fisheries with each other. Another process for sharing learning experiences between communities was the sharing of (outputs from) a community fishery database suggested by the CFDO (Kimchhea et al., 2003).

Mee et al. (2003) identified that poverty, limited education and poor access to telecommunications, transport and other communication opportunities isolate rural communities in Cambodia. Their report indicated that District Fisheries Officers sometimes are not trusted in rural communities because of the policing role and 'rent-seeking' behaviour undertaken by some officers. The value of trust in information sharing is underscored by the reported importance of word-of-mouth information in rural communities, and Mee et al. (2003) recommended that information be brought to communities by trusted, regular and recognisable sources, and be delivered in an interactive manner. The report also mentions the potential use of mass media such as TV, which is becoming increasingly common in rural areas. The provision of information to communities through regular and lengthy field visits is expensive, and a better way to reach communities may be through the establishing of a network for sharing information where communities and other stakeholders interact directly with each other through a series of scheduled meetings (Mee et al., 2003).

7.4 Identification of requirements for sharing or providing information

For sharing of information to be efficient, trust must be developed between the different stakeholders involved in information sharing. A system of information sharing must be developed in consultation with all stakeholders, which satisfies the information needs by the CFDO / DoF. For this to occur, clearly defined co-ordinatory management objectives must first be formulated by the CFDO / DoF and these must be related to, and understood by, the community fisheries responsible for providing the information.

8 Existing or previous activities to develop data collection and sharing systems

See Section 5 and 6.1 for a discussion of existing and previous data collection and sharing systems initiatives.

9 Details of involvement in related research, studies, programmes

Below is provided a description of some of the projects currently operating in Cambodia with relevance to fisheries management or information exchange. For a list of additional projects related to community fisheries operating within the country, see Section 2.4.

9.1 Stream Initiative

The STREAM Initiative aims to support poor people's livelihoods through improved communications, and by influencing institutions and policy development to better support the needs of poor people who are involved with fishing and small-scale fish farming. The establishment of the CFDO within the DOF was supported by STREAM.

Knowledge is shared via a STREAM Communications Hub in the Community Fisheries Development Office of the Department of Fisheries. The hub, now more than 20 months old, is a conduit for information flow between a network of aquatic resource management stakeholders in Cambodia and

similar communities and service providers in nine other Asia Pacific countries. Over the last two years 140 original reports have been published by the STREAM Initiative. Many of these are available in Khmer. A full time Communications Hub Manager links every 21 days with counterparts in nine other Asia Pacific countries to share information about technologies, practices, ways of working, research, development, legislation and policy.

9.1.1 STREAM Journal

A range of communications are published in English, Khmer and other languages, including the STREAM Journal published quarterly in Khmer and English to promote participation, communication and policies that support the livelihoods of poor aquatic resources users in Asia-Pacific, and to build links within the aquatic resources management and other sectors across the region. The STREAM Journal covers issues related to people whose livelihoods involve aquatic resources management, especially people with limited resources, and government, non-governmental and international practitioners who work with them in communities. Such issues include learning, conflict management, information and communication technologies, aquatic resources management, legislation, livelihoods, gender, participation, stakeholders, policy and communications. Another equally important purpose of the STREAM Journal is to provide an opportunity for seldom raised voices to be heard and represented in a professional publication that is practical yet somewhat academic. The contents of the STREAM Journal do not reflect the views of any particular organization or agency, but are statements by individuals based on their own experience.

9.1.2 Livelihoods Capacity-building

There has been an extended period of capacity building amongst local government and NGO teams in livelihood analysis, with support from DFID. This began in January 2001 in three "fisheries provinces" in Cambodia as well as provinces in the Northern Mountains, Central Coast and Mekong delta areas of Vietnam. This work built capacity gave rise to a capacity building methodology and a CD "A Process and Practice for Understanding the livelihoods of Fishers and Farmers" which captures this learning process. The Cambodian partners in this process were the Department of Fisheries, The Department of Women's Affairs and the local NGO SCALE (which was supported by a VSO Rural Livelihoods Advisor funded by STREAM). With STREAM Initiative support, they are together undertaking an assessment of the livelihoods of subsistence fishers. This group of fishers are constrained by the current fisheries law in Cambodia from trading in fish to support their livelihoods. Because the Director of the Department of Fisheries appreciates the significance of this shortcoming of the law in relation to subsistence fishers, he is supportive of efforts to better understand their livelihoods. This approach is now well recognised in Cambodia.

Understanding the livelihoods of fishers and farmers in Cambodia, in the context of changing governmental policy on community fisheries is a key role of the STREAM national partner in Cambodia, the Community Fisheries Development Office. The CFDO proposed capacity building and livelihoods assessment pilot in the draft Country Strategy Paper for Cambodia, which was discussed at a National Stakeholders Meeting in Phnom Penh from16-17 May. Pilot livelihoods study began in June 2002 in two villages in each of Kandal, Kompong Chhnang and Kratie provinces. The teams report that working with a participatory approach is the best way to understand the real issues of a community and help work on developing solutions. An independent review of the analysis process was conducted by Kinsa Associates from New Zealand. The Kinsa team reported that PRA as introduced to these villages appeared to have worked well and the principles of sharing, maintaining a good attitude and engaging in appropriate behaviours appeared to have established the groundwork for a reasonably positive, trusting ongoing relationship.

9.1.3 Simple database of community fisheries

The Community Fisheries Development Office (CFDO) was established within the Cambodian Department of Fisheries (DOF) in 2001 as part of the on-going fisheries reforms to undertake the role of coordinating emerging Community Fisheries. As per Article 16 of the Declaration of the Tasks and Responsibilities of the Department of Fisheries the mandate of the CFDO office includes planning sustainable co-management of the fishery resource and promoting and monitoring community fisheries activities and the preparation of guidelines relating to the establishment, management and development of Community Fisheries.

In this regard, with the support of FLD, VSO and STREAM, a database pilot project has enabled the CFDO to investigate an Information Collection System and a Pilot Community Fisheries and Monitoring and Evaluation Database. Although useful information was collected in undertaking this project it was the processes involved in collecting and storing relevant data that was investigated, not the information itself at this stage.

The pilot was conducted in 12 villages in Kratie, Kandal and Kampong Chhnang Provinces and identifies a practical process for:

- Identifying and recording the existence and location of community fisheries
- Monitoring activities and conflicts relating to co-management issues
- Assessing the maturity and operation of the fishery at the time of visiting
- Updating this information regularly on the database

It includes the identification of financial, human and other resources required for each component.

Building on this work, Haiko Meelis a VSO volunteer Database Specialist working with the CFDO, met with FAO and ADB who are very enthusiastic about becoming the main partners to start with the CFDO on database coordination.

9.1.4 Country Strategy Paper (CSP) Planning March 2003

In Cambodia, the CFDO consultations with local stakeholders that were established with the support of STREAM and WWF continue with further meetings every quarter. The CFDO and STREAM Country Office have now relocated to larger premises on the ground floor of the Fisheries Department. More Community Fisheries are becoming established in Cambodia and the CFDO is looking at ways to engage with the communities and monitor their development, as highlighted in the STREAM Cambodia CSP.

Following the publication of the STREAM Cambodia CSP, the Initiative is now progressing with the key issues highlighted.

9.1.5 Information Access Survey 2003

In each of the countries where STREAM operates, an Information Access Survey (IAS) is carried out. The aim of the IAS is to identify and recommend means of communication that are appropriate to aquatic resources management stakeholders, focusing in particular on poor rural communities. This is done through consultations with a range of stakeholders, field studies and other communications-oriented research. The consultations and field studies typically consist of one-to-one interviews, group discussions, and participatory rural appraisal activities which focus on communications-related issues to identify how poor rural communities address their information needs.

The Cambodian IAS is available in pdf format from the STREAM Initiative website and as a hard copy from the CFDO and the STREAM Regional Office in Bangkok.

9.2 MRC Management of Reservoir Fisheries

The MRC project Management of Reservoir Fisheries in the Mekong Basin, Cambodia sub-component, Phase II (MRF-II) commenced March 2000. The Cambodian sub-component of the MRF-II project selected four sites (Boeun Chhunlen Reservoir, Truoy Chek Reservoir, Thuk Char Reservoir, and fishing lot # 18). The project objectives (from Khim et al., 2002) were to:

- Define recommendations for development or improvement strategies
- Establish a structure for the preparation and implementation of reservoir fisheries co-management plan
- Strengthen of the reservoir fisheries co-management capacity of all participating institutions, fishers and other water resource users

The project process (from Khim et al., 2002) is similar to that outlined in section 2.5:

- Background data collection
- Participatory Rural Appraisal (PRA)
- Integration of counterpart staff within village, selection of core group to advocate the need for organisation
- Groundwork by core group
- Drafting and consultation of constitution and by-laws
- Founding meeting
- Election of community fisheries officers / committees
- Community fisheries planning
- Choosing patrol group
- Launching fisheries federation or fisheries management fee discussion
- Reservoir wide management plan
- Implementation of reservoir wide management plan

The MRC project have contributed a great deal to the data collection efforts for the characterisation of the Cambodian fisheries, including through research on socio-economic issues, fishing gear and lot inventories, catch assessments and the relation between catch levels and fishing gear used (Degen & Leng, 1999).

Prior to 2000, the MRC (funded by DANIDA) has been researching fisheries production in Cambodia since 1995 (Coates, 2002).

9.3 ADB project formulating management plan

The development of a Fisheries Management Plan for the Tonle Sap system is currently funded by the Asian Development Bank (ADB). The management plan was expected to be completed in June 2003, after which the plan implementation stage is funded for another three years by an ADB loan agreement. The management plan includes guidelines on how to formulate a management plan with communities, and for individual fisheries at different levels (Eric Meusch, pers. comm.).

9.4 SEAFDEC Fisheries statistics programme

Cambodia is currently participating in a programme by SEAFDEC aiming to increase the quality of fishery statistics in Laos, Cambodia and Myanmar, through the facilitation from Thailand, the Philippines and Indonesia (Recide, Bureau of Agricultural Statistic, Philippines, pers. comm.).

9.5 Partnership meeting attendees

A wide array of organisation now attend partnership meetings with the CFDO these include: CBNRM, DFID, FACT, FAO, The World Fish Centre (ICLARM), IDRC, IUCN, OXFAM, PMMR, STAR Kampuchea, STREAM, VSO and WWF.

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