THE MRC PROGRAMME FOR FISHERIES MANAGEMENT AND DEVELOPMENT COOPERATION

ANNUAL REPORT

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Foreword

The Mekong River Commission Fisheries Programme continues to focus on ensuring the long term sustainability of the Mekong fishery, its provision of food and employment within the region, and therefore remains among the most vital of MRC's programme activities.

This report presents the activities and achievements of the MRC Fisheries Programme from April 2002 to March 2003. Within an environment of change, the Fisheries Programme has remained focused on its key objectives and implementation of strategies supporting a socially and economically sustainable inland fishery for the Mekong region.

A highlight in the 2002 MRC calendar was the success of the International Symposium on Large Rivers for Fisheries (LARS2) in Phnom Penh, Cambodia, jointly organized with the Department of Fisheries and the Food and Agriculture Organisation (FAO). LARS2 was attended by more than 220 scientists, researchers and fishery professionals from all over the world. MRC through its Fisheries Programme proved to be at an advanced stage of knowledge building and made significant contributions to the Symposium. The symposium made a call to the Third World Water Forum to recognize the essential role of river fisheries in providing food security, to include river fisheries in water use plans, and to adopt the ecosystem approach to management. The impact of LARS2 at an international level has been significant.

The Fisheries Programme is also a leader in the facilitation of regional cooperation. MRC's commitment to the Fisheries Annual Meeting and Annual Technical Symposium along with continued cooperation with regional fisheries agencies have ensured that MRC remains at the forefront of regional discussion regarding inland fisheries management. In February 2003 a new Fisheries Institute, constructed under the Fisheries Programme, was handed over to the Government of Cambodia. All four MRC countries now have modern facilities for the research and development of inland fisheries and an even greater opportunity to increase regional cooperation in this area.

The Fisheries Programme has also played a critical role in increasing public awareness of Mekong fisheries and MRC generally. Its programme of professional publication of technical and conference papers has raised MRC's profile considerably over the past year and increased access to the knowledge base of the organization. The Fisheries Programme continues to explore the new and innovative use of technology to create interest in and improve knowledge of fisheries in the Mekong.

With all of these successes in mind, I would like to take this opportunity to sincerely thank the national line agencies for fisheries, the National Mekong Committees of Cambodia, Lao PDR, Thailand and Viet Nam, and the principal donor Danida, for their continued support for the MRC Fisheries Programme. Finally, I congratulate the MRC Fisheries Programme Team for their continued commitment to their work and their contribution to the outcomes outlined within this Annual Report.

Joern Kristensen
Chief Executive Officer
Mekong River Commission Secretariat

Objectives

The Development Objective of the MRC Fisheries Programme (FP) is:
Coordinated and sustainable development, utilisation, management and conservation of the fisheries of the Mekong Basin.

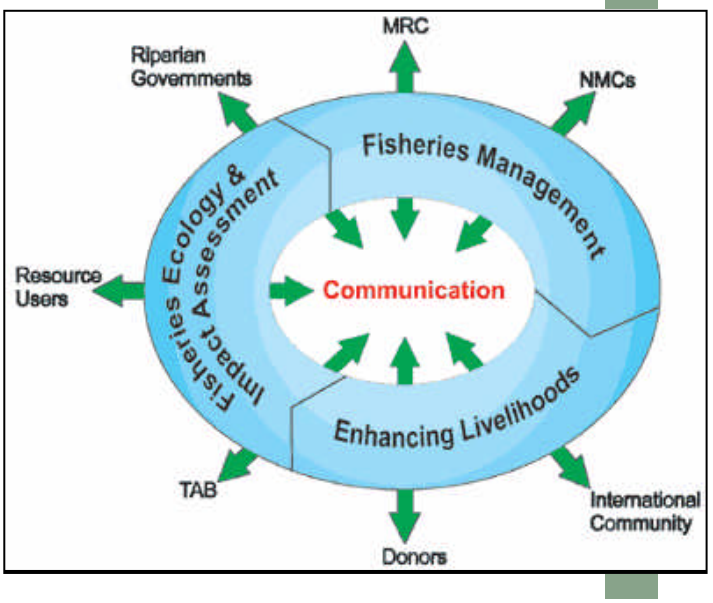
The Immediate Objective is:
Relevant fisheries information generated, communicated and used by resource users, riparian governments and MRC in management planning and implementation.

The FP is about generating and communicating information on the fisheries sector, for use by basin planners and line agencies in sustainable development and management of the river's resources. Accurate and reliable information on the biology, ecology, economics and social aspects of fisheries is the basis for any action and is therefore the cornerstone of the FP. That information has to be communicated to the core programmes of MRC (particularly the Basin Development Plan and the Water Utilisation Programme), and national and regional institutions using it for policy and planning.

The FP is, therefore, concerned with generation, communication and use of information, as expressed in the following Outputs:

1. *Relevant information on fisheries biology, ecology and socio-economics generated.*
2. *Relevant fisheries information communicated to management agencies and resource users.*
3. *Use of relevant information facilitated.*

The design and implementation of FP activities ensures that all three outputs are addressed within each component. That is, components include plans for the communication and use of the information produced. The work undertaken by the Programme can be grouped into thematic areas, as shown in the diagram below.



Thematic areas of the MRC Fisheries Programme. The thematic areas are part of a continuum, intimately linked with each other in the delivery of the outcomes of the Programme.

The Year in Review

The period April 2002 to March 2003 has seen many changes in the Fisheries Programme. The principal donor, Danida, reduced its allocation to development activities around the world, and this of course included MRC. Consequently, the Fisheries Programme was reviewed and restructured to align itself with the new funding situation. This has resulted in fewer advisors, scaling back of some activities and reducing others.

Despite this, the MRC Fisheries Programme remains the most significant grouping supporting fisheries activities in the Lower Mekong Basin. The three field components each have a strong presence in the 4 MRC-member countries, covering work in river fisheries ecology, fisheries management and aquaculture. The components are now more integrated, providing a coherent programme approach to the work undertaken. In conjunction with the Institutional Support component, they cover the thematic areas of work as defined in the document "Fisheries Programme 2003-2010".

The review of the Fisheries Programme recommended that the Technical Advisory Body (TAB) for Fisheries Management take a more prominent role in priority setting for the Programme. Accordingly, the TAB is now a full member of the Programme Steering Committee. And in line with the programme approach, there is now one Steering Committee for the Fisheries Programme, as distinct from the previous practice of individual steering committees for each component.

The Fisheries Programme has attracted new funding in the last 12 months, to support activities of current components. Funding is being provided under the DfID-funded Fisheries Management Science Programme to activities of the Management of River and Reservoir Fisheries component. A project proposal has been developed between the Australian Centre for International Agricultural Development (ACIAR) and the Assessment of Mekong Capture Fisheries component for studies on the population genetics of trey riel, the dominant species in the dai fishery catches. The proposal is currently being assessed by the ACIAR Board, with a view to start-up in 2004. These supporting funds are testimony to the quality and relevance of the work of the Fisheries Programme.

Communication of the outcomes from the Programme has gained momentum in the last year, and will continue to do so in the coming year. The Fisheries Programme has also been involved (with FAO and other agencies) in two major international symposiums in 2002-03, which will lead to new development opportunities for inland fisheries in the Mekong region.

Throughout the restructuring process of the last 12 months, the Fisheries Programme has continued to enjoy the full support of the national fisheries agencies and the National Mekong Committees. In what has been a difficult period for all, it has been very encouraging to see the on-going enthusiasm and commitment they have brought to the Fisheries Programme partnership. The FP is now firmly on track to delivering outcomes to benefit the MRC core programmes, line agencies for fisheries, and ultimately, the users of the fisheries resources in the Lower Mekong Basin.

Assessment of Mekong Capture Fisheries

The Mekong River and its associated wetland habitats provide the majority (70-80%) of the fish and other aquatic animals consumed by the Basin's inhabitants. River fish are also a major component of regional trade and export, and are a key component of feed for aquaculture of higher value fish.

The Mekong's high productivity derives from high species diversity, the annual flood pulse, flat topography creating vast wetlands, and the lack of dams on most large rivers. The Mekong is very rich in species of fish and other animals, such as shrimps, crabs and mollusks, so many niches are exploited and the system is resilient, meaning that reduction in abundance of a species may be offset by increases in abundance of others. The river annually floods large areas, providing productive habitat for fish to feed and grow rapidly, so most catches are made as flood-levels fall. There are no dams on the lower Mekong mainstream and in most of the large tributaries in Cambodia and Laos, so fish can migrate freely within this system to breed and to move into feeding areas.

Much of our current knowledge on size and nature of the fishery has been gained very recently through MRC/Danida-supported research, carried out via line agencies in the four lower Mekong Basin countries. Support to the Cambodian DOF began in 1995 (the Cambodian Capture Fisheries component - CCF) via basic studies on the production of the capture fishery, which after a period of capacity-building, were followed by studies of fish catch, trade and consumption.

A separate component (Assessment of Mekong Fisheries - AMF) began in 1997 with coordinated studies of migration and spawning patterns of the most important fishes, together with assessments of the nature and scale of the fishery and the importance of fish and other aquatic animals in diet. The two components have produced greatly increased estimates of the scale of the fishery and have provided major inputs to planning through regional, national and international workshops, and the output of research papers and CDs.

The research elements of the CCF and the AMF were combined in 2003 into the Assessment of Mekong Capture Fisheries (AMCF). The AMCF will now run to mid-2005. The new AMCF will continue to pursue the same objectives and produce the same outputs as the two prior components, but with fewer resources. Activities which were formerly carried out under strong direction by advisors or consultants will now be implemented primarily by counterparts, who will play a leading role in implementing activities in each country. This is an appropriate change in emphasis as national capacity has increased greatly over the last 5 years.

The ongoing activities include the following:

- River Fishery Monitoring, which includes continuation of assessment of dai fisheries in Cambodia and monitoring of selected fishers in key areas in each country, the aim being to provide long-term data on trends in catches;
- Larvae/juvenile monitoring in Viet Nam and Cambodia, which is providing long-term data on trends in spawning and recruitment;
- Consumption of fish and other aquatic animals, which will measure actual consumption in selected households to calibrate previous studies that mainly relied upon interviews;
- Market monitoring, that aims to establish systems to provide long-term data on sales at selected markets as an indicator of trends in the fishery;
- Larval fish sampling and identification training to improve skills for possible future basinwide studies;
- Training workshops on mitigation of impacts of water management on fisheries;
- Re-designing and seeking additional funding for activities which were not carried out or which are logical extensions of AMFC. These include
  - Fisheries Impact Assessment
  - Basinwide Fish Larvae and Fry Studies
  - Mekong Flagship Species Project
  - Estuarine Fishery Study.

In addition to ongoing work carried out by the AMCF, many existing data have been reported and workshopped internally in national languages, but have not been fully reported in English in a format in which they could be most useful to MRC and others. Such data include:

- Migration and spawning daily logbook data from 40 fishers during 2001;
- Viet Nam larval studies 1999-2003, 5-year dataset;
- Socio-economic baseline studies: Champassak, Songkhram, Tra Vinh, An Giang;
- Basinwide fish and other aquatic animal consumption report;
- Catch per habitat area studies in Cambodia.

In the coming year, the AMCF will publish these data, and the results of the on-going activities mentioned above.

Capacity-building for Inland Fisheries Management

As seen from images on temple walls all over the region, Mekong fisheries and their management were at the center of local attention for many centuries. With the development of nation states, fisheries management became the responsibility of central governments. Unfortunately, important elements of local fisheries management disappeared in the wake of centralised fisheries development. However, problems continued on local, national and trans-boundary levels, and consequently, management capacity was required at these levels as well.

A step forward was taken with the establishment of the Management of Reservoir Fisheries in the Mekong Basin (MRF) component in 1995. A major thrust of this endeavour was to strengthen inland fisheries management through capacity-building. Typically, this approach is two-pronged: firstly, training of young riparian fisheries scientists in methodologies of fisheries management - or human capacity development; and secondly, the collection of baseline information on the status of these fisheries, their

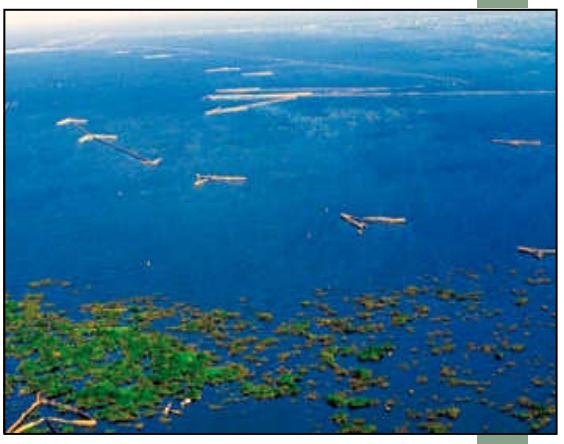
management problems and possible solutions - or knowledge capacity development.

The component emphasises the involvement of resource users in a system of participatory management. This process builds capacity by extending management functions and responsibilities to a group of 'co-managers' comprising both local resource users as well as government staff. It also extends the usual perception of capacity-building as training of mainly individuals, into a broader and more holistic concept which now includes institutional and community-based capacity development.

Component efforts center therefore on the building of:

- organisational capacity, through the formation and continuous strengthening of a variety of user groups who share management responsibilities with the authorities concerned;
- institutional capacity, through the formulation of joint management plans by user groups and local-level government staff, as well as the review and modification of fishing regulations;
- technical capacity, through the joint planning and implementation of collective management measures, such as stocking of water bodies and identification, demarcation and maintenance of fish conservation zones and harvest reserves; and
- financial capacity, through efforts directed at the identification and development of sources of income and funding for management groups and activities contained in management plans.

A major emphasis is placed here on building communicative capacity through the creation of frameworks of mutual obligation, care, concern and interest. These frameworks support a process of learning through interaction, both horizontally (across agencies, sectors and even communities and countries) and vertically (agencies to communities and individuals, and local to national and regional levels).



In all these efforts particular attention is being given to the capacity development of women from fishing communities, who today play a significant role not only in the uptake of alternative livelihood activities but also in the decision-making of management groups. Furthermore, participatory management approaches are not limited anymore to a certain type of waterbodies, that is, reservoirs, but apply to the development of inland fisheries as a whole.

All components of the MRC Fisheries Programme have provided important inputs to participatory fisheries management. Since 2003 however, support

to participatory fisheries management in all types of water bodies, such as reservoirs, lakes, rivers and wetlands of the Mekong Basin, is being led mainly by the now-called Management of River and Reservoir Fisheries in the Mekong Basin (MRRF) component, which will run to mid-2005. The new MRRF component will continue to pursue the objectives and outputs originally assigned to the "Reservoir Component"; in addition, it will build on the valuable results contributed particularly by the earlier Cambodian Capture Fisheries and Assessment of Mekong Fisheries components.

In doing so, the MRC Fisheries Programme responds to evolving policies expressed by the riparian line agencies, which all emphasise participatory management as a major strategy to sustainable inland fisheries development. Furthermore, it provides an important input to a major concern of the MRC and its member governments by developing examples of public participation in natural resources management and development in the Mekong Basin.

The ongoing activities include the following:

- 'Consolidation by adaptation' of its co-management model in presently 16 water bodies in the Lower Mekong Basin; joint management planning and implementation by resource users and government staff has entered its 3rd yearly cycle in 2003;
- Extension of a participatory management approach to 4-5 identified river sites in Cambodia, Lao PDR, Thailand and the Central Highlands of Viet Nam; it is expected that reduced financial and human resources available to MRRF will be offset by synergies to be gained from intensified and improved collaboration with similar initiatives in the region;
- Continuation of a series of Regional Training Courses in Co-management of Inland Fisheries, by which a regional group of presently more than 60 specialists in participatory management is being built up in national fisheries line agencies;
- Further development of examples of public participation in aquatic resource management through co-management approaches, by interacting and collaborating with local resource users, national government agencies and international organisations, and dissemination of the results obtained.

Aquaculture - Alien or Indigenous Species?

Aquaculture contributes substantially to the fish production in the Mekong basin and is promoted and developed by many international and national agencies. As a regional organisation, MRC assumes particular responsibility for issues with potential trans-boundary consequences. One such issue is invasive alien species. Globally, this is one of the major causes of environmental disturbances and loss of biodiversity. However, introductions can also be harmless or even beneficial. In fact, the great majority of the farmed plants and animals that we take for granted are alien species.

Unfortunately, it is difficult or impossible to accurately predict the effects of introducing a new species. To minimise risks, all possible efforts should be made to avoid unintentional introductions. Planned, intentional introductions should be properly appraised in advance, with full regard to potential impacts on biodiversity and economy as well as existing national and international legislation.

The approach taken by the MRC component 'Aquaculture of indigenous Mekong fish species' focuses on the development of indigenous alternatives to alien species. This is an area of development with high potential, but so far relatively little action. Nine priority species (out of 18 originally selected), have been identified for intensified work, namely *Anabas testudineus*, *Barbonymus gonionotus*, *Cirrhinus microlepis*, *C. molitorella*, *Leptobarbus hoevenii*, *Hemibagrus wyckioides*, *Osphronemus exodon*, *Pangasianodon hypophthalmus* and *Pangasius bocourti*. These species have high potential to complement or replace exotic species in small-scale aquaculture.

To ensure that the knowledge generated on culture of indigenous species is relevant for small-scale farmers, new species and culture systems are tested and developed with active participation of small-scale farmers. This is necessary to ensure their local knowledge is incorporated in the development of the culture systems. Women's participation in on-farm activities amounted to 24% during 2001-2003.

Available information indicates that there is good scope for developing economically competitive culture systems using indigenous species. Current work includes market surveys to improve economic evaluations, which are carried out either as independent surveys or in cooperation with others.

The progress toward improved broodstock management practices at the 11 cooperating aquaculture stations took an important step forward in the second half of 2002, when existing broodstock management facilities and practices of each were evaluated. Recommendations were developed for each station, including budgeting of the proposed improvements. The recommendations are now being discussed and gradually implemented.

The time required for successful development of new species for aquaculture is in most cases beyond the current component time horizon of mid-2005. Substantially improved strains can be expected at the earliest three generations after the start of a broodstock management programme, or in the case of the priority species, some 5-20 years. Therefore, ensuring continuity of broodstock management programmes is crucial. External funding from donors and other sources is rarely allocated over such time scales. Therefore, the broodstock management functions should preferably be budgeted from the core funding of national agencies.

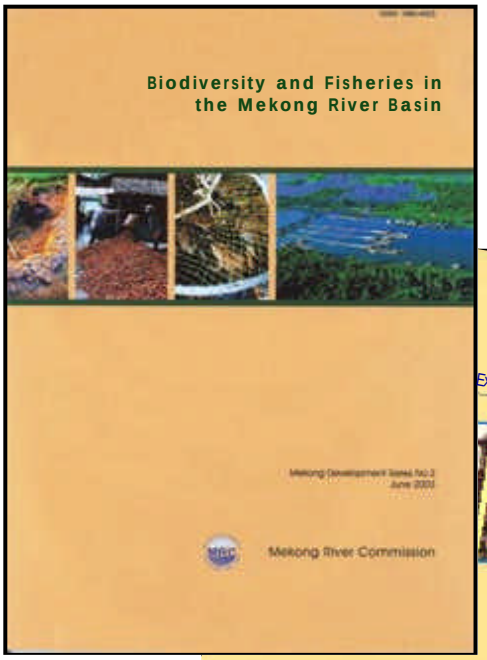
Communications

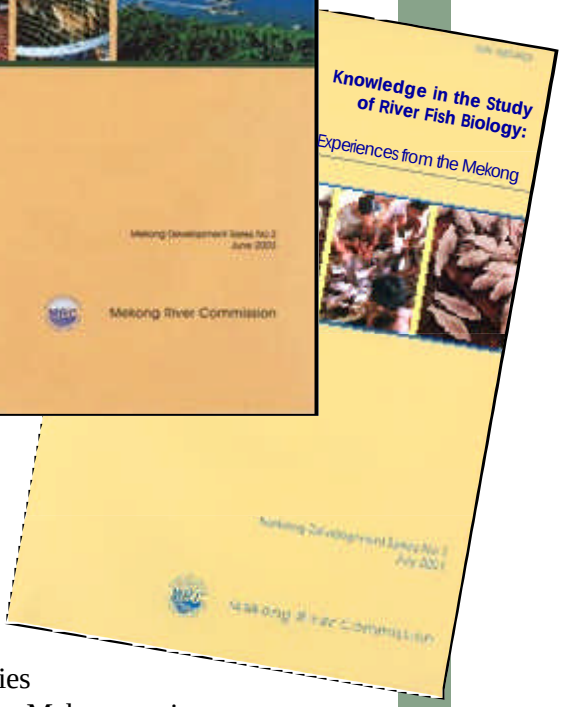
The Fisheries Programme attaches high priority to communication of the results of its studies. Publications cover technical matters, so that we build the base knowledge for fisheries workers, as well as reports in a non-technical language. The latter is to ensure that information on the requirements for maintenance of healthy fisheries is disseminated to all policy makers and governments associated with the resources of the Mekong.

Production of the newsletter *Catch and Culture* has continued, with 4 issues produced in 2002. The newsletter will be relaunched in June 2003 with an updated format and a more thematic approach to the content.

Three more issues in the MRC Technical Report Series were published. The body of the reports is in English, the official language of MRC, but the summaries are now in English, Cambodian, Laotian, Thai and Vietnamese languages. It is considered that this will increase the utility of the reports amongst regional staff involved in natural resource management.

Two CDs on fisheries in the Mekong were produced in 2002. One is on fish migrations and their importance for productive fisheries; the other is a comprehensive database of fishes of the Mekong.





The mailing list for the distribution of fisheries publications was reviewed and improved in 2002. It now comprehensively covers the libraries of academic and fisheries institutions in the region, as well as the people who have traditionally been on the mailing list.

The Technical Report Series and selected articles from *Catch and Culture* will soon be available on the MRC website. Making them available electronically will facilitate easy access and wider distribution. Other fisheries agencies in the region will be encouraged to cross-link their websites to the publications on the MRC website.

The film on Cambodian fisheries has been shown on local television, and efforts are currently being made to show it internationally. In the coming year, the FP will continue to seek funding for production of short films on the Mekong fisheries in Thailand, Lao PDR and Viet Nam. The focus on publication of our work will continue, including collation of databases and reports in an easily accessed format. In particular, emphasis will be given to synthesising fisheries information, and making it available to a broad audience in the Mekong region.

Gender in Fisheries

Major steps forward have been taken in integrating gender aspects into planning and decision-making within the MRC Fisheries Programme. The plan of implementation of the MRC Fisheries Programme was presented to and discussed by the participants of the "Network for Promoting Gender in Fisheries Development". Furthermore, the members of the Technical Advisory Body (TAB) decided at their 5th meeting in April 2003 to invite the Regional Coordinator of the Network to participate in the 6th TAB meeting (June 2003). These steps will ensure that the voices promoting gender are heard at all management levels of the MRC Fisheries Programme.

The attention towards ensuring gender equity is not new in the MRC Fisheries Programme. Since 1996 the Programme has facilitated the establishment of four national networks that, together, constitute a regional network for promoting gender in fisheries in the Mekong Basin. Each year, the MRC Fisheries Programme brings members of the regional network

together to exchange views and seek solutions to the challenges which are faced, especially by women in fisheries. The year 2003 was no different and the meeting was this time held in Lao PDR, where among other things targets for networking activities were set.

The various components of the MRC Fisheries Programme have increasingly directed attention to gender by setting targets and indicators for the involvement of women and men in their activities.

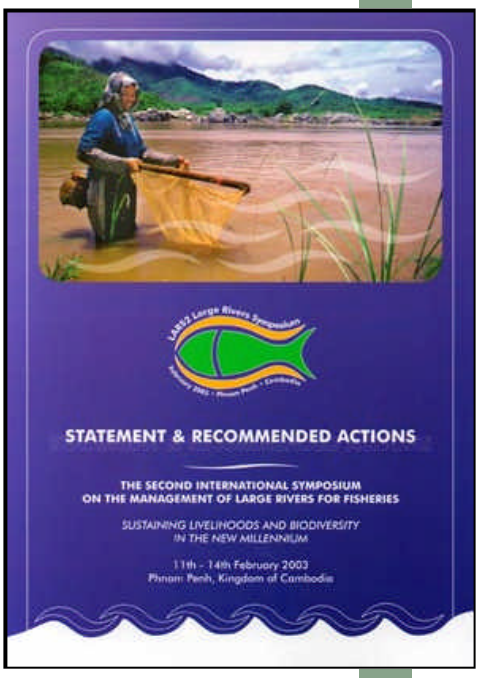
Training provided on co-management in inland fisheries has extensively dealt with gender issues. During the last Regional Training Course on Co-management held in Viet Nam in October 2002, a major theme was 'gender and fisheries management'. Thirsty-two percent of participants attending this ten-days training event were female. Under the Management of River and Reservoir Fisheries component several fisheries management activities, traditionally carried out by women, now form part of the jointly formulated management plans. Examples of such activities are fish processing and fish marketing. Moreover, studies on fish-consumption have collected data separately by gender, adding to the gender-related information essential for basin development planners.

The role played by women in fisheries has in many cases been underestimated by fisheries managers and basin developers alike. The MRC Fisheries Programme will continue to emphasise that both women and men are key players in the coordinated and sustainable management of aquatic resources in the Mekong Basin.

Symposiums

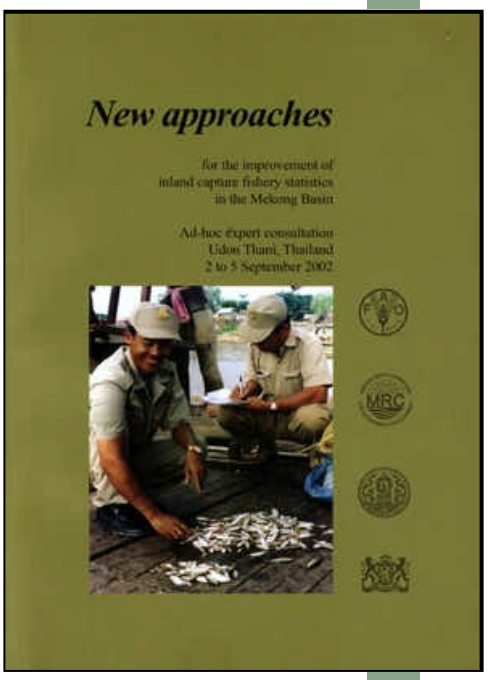
Large Rivers Symposium

The Second International Symposium on the Management of Large Rivers for Fisheries (LARS2) was held in Phnom Penh in February 2003. LARS2 was jointly organised by MRC, the Cambodian Department of Fisheries and FAO. Over 220 river scientists and managers from around the world attended, and contributions covered studies and developments in 96 rivers from all continents. By all measures, the Symposium was a great success. A summary statement was produced, and was used to take the findings of LARS2 to the Third World Water Forum in Japan in March 2003. This resulted in the world Water Forum Statement including a paragraph emphasising the importance of river fisheries as food for riparian peoples. The Proceedings of LARS2 are currently being edited, and will be published in 2004.



Expert Consultation on Inland Capture Fishery Statistics

The Thai Department of Fisheries, FAO, MRC and the Government of the Netherlands convened an "Expert Consultation on New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin" in Udon Thani, Thailand, in September 2002. The meeting investigated methods for better valuing river fisheries, so that their true contribution to food security can be properly brought to the forefront in managing rivers and their resources. An excellent Proceedings has been published, which includes several papers from MRC Fisheries Programme staff. In an MRC context, the outputs of the consultation provide further justification for the planned component on "Strengthening of Inland Fisheries Statistics".



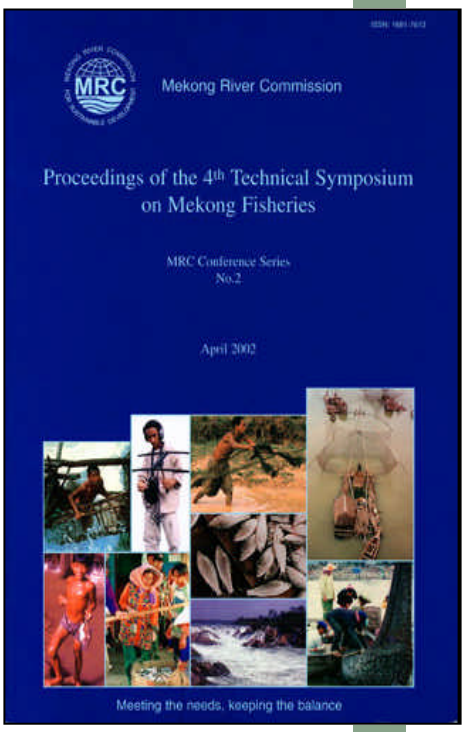
Fifth Technical Symposium on Mekong Fisheries

Every year since 1998, the MRC fisheries Programme has held a Technical Symposium on Mekong Fisheries. The objectives of the Symposium are:

(i) to train counterpart scientists in scientific report production and presentation;

(ii) to exchange information within an MRC Fisheries Programme context, including previous, ongoing and future technical activities; and

(iii) to improve planning, coordination and implementation of future fisheries research activities.



A formalised poster session was included for the first time at the Fifth Technical Symposium, held in Khon Kaen, Thailand during 11th-13th December 2002. This proved to be a great success, as it allowed good viewing and discussion of information that could not be presented in the oral presentation sessions. The scientists from the national fisheries agencies can be proud of their presentations, which all acknowledge have improved every year. The Proceedings now represent a major documentary record of the work of the Programme.

The Symposium will continue to evolve in accordance with the original objectives and the emerging needs of the MRC Fisheries Programme and the national fisheries agencies.

Annex 1

Short Descriptions of Proposed New Components

The information and development needs in the fisheries sector in the Mekong Basin are enormous. Given the size and importance of the fisheries, comparatively little is known about the ecological and sociological requirements for sustainable management of the resources, and maintenance of the livelihoods of people dependent on the fisheries. Consequently, the FP is continually seeking new opportunities for implement studies in line with the requirements of MRC and its line agency partners, as well as assist other agencies in their fisheries research and development efforts.

The FP has certain criteria that underpin the selection of new components (or projects). These are

- The component should have trans-boundary significance;
- The component should fit within the objectives and thematic areas of the FP;
- The work and results produced should be relevant to the MRC Strategic Plan and contribute to the implementation of the MRC core programmes;
- All component ideas should be developed in conjunction with national fisheries line agencies, and approved by the Technical Advisory Body for Fisheries Management; and
- The component should not be focused on work that is covered by other programmes or agencies.

The following proposal descriptions are a preliminary list based on consultation between the FP, the core programmes of MRC and the fisheries line agencies in the four MRC member countries. The component proposal list is continually updated in response to the emerging needs for fisheries management and development in the Mekong Basin.

1. Strengthening of Fisheries Statistics and Information Systems in the Mekong Basin

Background and Justification

An accurate valuation of the fisheries of the Mekong is essential information for planners in the region. The valuation needs to include the weight of fish caught, the value of the fish, value adding through marketing, and the contribution of the fishery to employment and food security. Without such information, it is difficult for fisheries values to be properly considered in development planning.

Currently, national inland fisheries statistics in the Mekong Basin do not reflect the huge importance of inland fisheries in the food security, nutrition and income generation of the people living in the Mekong Basin. Estimating the yield from the fishery in the Mekong Basin is extremely difficult using traditional fisheries statistics collection methodologies. The problem is recognized by the government line agencies for fisheries. Consequently, the MRC Fisheries Programme has been requested to assist in developing processes to derive accurate and reliable inland fisheries statistics.

Initiatives underway in the SE Asian region would form synergistic partnerships with the present proposal. FAO and SEAFDEC (following the Millenium Conference) are undertaking studies on fisheries statistics systems in Asean countries which are not MRC members. Both groups have expressed the desire for MRC to take a leading role in development of and training in statistics gathering systems, because of the previous pioneering work of the MRC Fisheries Programme in identifying the importance of fisheries in the LMB.

Aims

The aims of the project are to:

- develop a system for collecting statistics and information that clearly defines the role of inland fisheries in the national economies and rural people's livelihoods; and
- use this information to ensure that fisheries are properly considered in macro-level economic planning in the Mekong Basin.

Expected Benefits

The major benefit arising from the work will be recognition of the importance of fisheries in the Mekong Basin, and thus proper consideration in development planning. Hence the major beneficiaries of the work are the people of the Basin who are heavily dependent on the fisheries of the Mekong for their employment, income and food security. In general, these are rural people, usually poor and with few (and sometimes no) alternative livelihood strategies.

The immediate target group is the government agencies and their staff responsible for collecting, processing and disseminating fisheries statistics. The final target group for the fisheries statistics and information is the national and regional economic planners that are usually positioned in the Ministries of Planning and line agencies for fisheries and agriculture.

Fields of Action

- Definition of fisheries statistics and information needs and collection systems. There are many steps that need to be taken in defining the most appropriate fisheries statistics collection system. Countries must decide on what information is required; for what purposes; end-users or target groups for the information; and level of accuracy required. Assumptions in the chosen collection system must be identified, and procedures developed to test the assumptions. The system must be repeatable in years to come, so it must be efficient, cheap, and able to be put into operation with the resources available in-country.
- Implementation of regional fisheries statistics and information surveys. Once the most promising system is identified, it must be tested and modified as necessary, before embarking on a regional study. Rigorous stratification across the region (i.e. sampling design) will be needed to cover variations in population, fishing intensity and seasonal patterns.
- Enhancement of in-country capacity to collect, analyse and disseminate fisheries statistics and information. Capacity building within fisheries statistics institutions, and periodical publication of fisheries statistical information.

2. Basin-wide Study of Fish Larvae and Fry in the Mekong Basin

Background and Justification

The MRC Fisheries Programme has generated significant knowledge on fisheries ecology of the Mekong Basin over the past decade. Large-scale fish migration patterns have been identified, and species-specific migration pathways and stock structure have been hypothesized. The most important remaining gaps in knowledge of the ecology of Mekong fishes are: information on specific spawning sites (habitats); information on the importance of tributaries compared with the mainstream, and the biological differences between tributaries and the mainstream; and information on the larval and juvenile stages of Mekong fishes.

The study is important because:

- it complements migration studies already implemented by the MRC FP, and should test migration and population hypotheses generated through local knowledge surveys;
- it will provide information on spawning habits of important species; and
- it will provide quantitative data on fish populations and recruitment of migratory fishes to the fishery - such data are very difficult to obtain through sampling surveys of adult fishes.

A fish larvae and fry study has been carried out in An Giang Province in southern Viet Nam since 1998 by FP counterparts, and some other studies were carried out on the Tonle Sap and the Mekong near Phnom Penh. These studies have confirmed that a large number of species rely on floods to distribute their offspring to rearing habitats, but provide little other information needed for planning purposes.

Aims

This study aims to provide information on spawning habitats, the relative importance of tributaries and the mainstream, and basic information on larvae and fry of Mekong fishes through a basin-wide study.

The basic principles are that drifting larvae and fry indicate that spawning occurred upstream of the point of collection, and the stage of development of the fish provides an approximate time since spawning, and can be used to deduce the approximate distance the fish spawned upstream. The study would provide much other useful information, for example on species distributions (as very large numbers of fishes can be collected as larvae or juveniles), on growth and feeding, and on the ecological relationships between species.

Expected Benefits

Improved understanding by decision makers of the wild fishery, and the relative importance of different habitats. This will provide inputs for future development planning, environmental assessment and management regarding the need to maintain migration routes and spawning habitats. Additional monitoring information on important invertebrates will be available for fisheries planners. Counterparts will be trained in planning, field sampling, laboratory techniques, data analysis and reporting, fish ecology, and specific techniques for larval / fry studies. The sampling regime will be integrated with environmental sampling, and will provide additional information on important invertebrate species collected along with the fishes. This will further elucidate the important role of aquatic animals other than fish in the nutritional and livelihood strategies of resource users.

Fields of Action

It is intended to extend sampling to the whole of the Lower Mekong Basin in a coordinated and consistent manner. The activities would be phased as follows:

- Review of previous studies, and methods trial and validation at one site;
- Preparation of identification and training manuals and training courses for counterparts;
- Basin-wide study at a number of key sampling sites, based on ecological criteria and sampling carried out at each site simultaneously, at ecologically relevant time intervals; and
- Reporting and dissemination of study results.

3. Strengthening Capacity in Fisheries Impact Assessment in the Mekong Basin

Background and Justification

The livelihoods of millions of people depend upon the maintenance of the Mekong River's wild fishery. Dams, flood-control schemes and other water management projects (WMPs) are the major threat to the fishery, as they alter hydrology, water quality, and habitat, and create barriers to fish passage. Mitigation of impacts depends upon implementation of effective environmental impact assessment (EIA), under which the baseline condition of fisheries is properly described and valued, the impacts of a project are identified and costed, and the costs and benefits of mitigation and management measures are quantified. The EIAs for fisheries will be called Fisheries Impact Assessments (FIAs). Agencies should also have the ability to technically audit FIAs and to supervise and monitor mitigation and management of fisheries impacts.

Activities within MRC also require that Fisheries Programme can quantify the impact of WMPs on fisheries. The Basin Development Plan (BDP) and Water Utilisation Programme (WUP) will want to know the economic, ecological and social impact of any developments that may alter the natural ecology of the river. The FIA process is designed to provide methodologies for making such assessments.

Aims

The objective is to improve the capacity of government line agency counterparts to be involved effectively in FIAs that deal with WMPs that may impact fisheries. Aims are:

- to develop a manual for Fisheries impacts Assessments;
- to train staff in application of the FIA procedures, especially in understanding and valuing Impacts; and
- to train staff via workshops and pilot activities for measures in methods to mitigate impacts of WMPs on fisheries.

Expected Benefits

The main benefits will be seen in the performance of line ministry and fishery institution staff who will have functioned as counterparts during the implementation of the component. They will have been trained in planning and implementing various FIA activities, including mitigation measures, at project and planning levels. Demonstration projects will have been completed that will serve to catalyse further implementation by national line agencies. A FIA manual will have been completed that will guide further assessment, management and

mitigation activities by line agencies. The planning processes within MRC will benefit from development of methodologies to assess and mitigate the impact of WMPs on fisheries.

Fields of Action

This project would be primarily implemented by counterparts from all line agencies involved in WMPs, including fisheries, environment, hydroelectricity, irrigation and planning. The project would comprise five main activities:

- FIA review exercises of existing relevant documentation in the four main Mekong Basin languages, and relevant world literature;
- Baseline studies and recommendation of mitigation measures for a flood control scheme and for a hydroelectric scheme;
- Planning level EIAs of major schemes proposed for the Mekong Basin to evaluate major fisheries impacts;
- Mitigation measures, which would include:
    - fish passage and fishways demonstration projects;
    - reservoir destratification, review of existing systems; and
    - mitigation of impacts on large existing projects, feasibility studies for retrofit; and
- Fisheries Impact Assessment Manual, a comprehensive manual for the Mekong Basin.

4 Trans-boundary Management of Critical Species and Habitats in the Mekong.

Background and Justification

Managing the fisheries if the Mekong is a complex undertaking. The resources (fish and water) cross national boundaries. Habitats in one country can be vital for fisheries productivity in others. The numbers of people involved in the fisheries are enormous (up to 40 million people are involved at least part-time or seasonally in some aspect of the fishery). Very importantly, the rural poor are particularly dependent on the fisheries. There is a great diversity in methods, scale of operations (from commercial to family fishing), and timing of fisheries activities. Obviously, the complexity of fisheries such as these make it difficult to develop and implement management practices that will ensure sustainability of the resources.

Participatory management is the approach now being increasingly taken by governments in the LMB. Participatory management is by definition focused on people. Development of complementary management actions which include ecosystem principles would greatly enhance the outcomes of participatory management practices. There is an ideal opportunity to do this in the Mekong, using critical species and habitats as units for direct management, and as vehicles to introduce and promote broader goals of ecosystem management.

The critical species are the large, conspicuous migratory species. They are ideal starting points for developing a management framework based on ecosystem principles because they depend on large areas and many different habitats for completing their life cycles. Within the Mekong, a few of the larger "icon" species may even cover the whole lower basin and visit all six countries of the Mekong Basin as part of their life cycle (although this has yet to be firmly established). The migratory fauna includes some very unique endemic species, such as:
- the Mekong giant catfish (*Pangasianodon gigas*);
- the giant barb (*Catlocarpio siamensis*), the largest cyprinid fish of the world; and
- Jullien's golden carp (*Probarbus jullieni*).

Critical habitats in the Mekong include the deep pools, which recent research has shown to be essential for ecosystem productivity and functioning. They act as dry season habitats where many fish species, including most long-distance migratory species, seek refuge while waiting

for the next floods. In addition, deep pools are also inhabited by sedentary species, which complete most of their life cycle there. Two stretches are particularly important as deep pool refuge habitats: (1) Kratie to Stung Treng in Cambodia, and (2) the Khone Falls area on the border between Lao PDR and Cambodia. In these sections deep pools and their resident species play a crucial role for the fisheries productivity in the lower part of the basin, particularly in the flood plains of southern Cambodia, including the Tonle Sap catchment, and in the Mekong Delta in Viet Nam.

Because of their discrete and local nature, deep pool habitats can also be used as indicators of ecosystem health. Preliminary studies have shown that it is feasible to obtain quantitative data on fish biomass from selected deep pools using hydro-acoustic methods. Such data could potentially be incorporated into a system of ecological and fisheries indicators.

Aims

The overall goal of the project is to facilitate the management of icon species and deep pool habitats in the Mekong, and in so doing promote the incorporation of ecosystem-based principles into other fisheries management activities in the Basin. Specific aims include:

- to establish management practices to protect and conserve the icon species;
- to integrate deep pool habitats into transboundary management frameworks;
- to establish ecosystem health indicators, using the fishes of the deep pools, and methods for monitoring the indicators;
- to facilitate co-management groups to incorporate ecosystem principles in their management processes.

Expected Benefits

Beneficiaries will be the population groups in the Basin that are dependent on the biodiversity of the Mekong for their livelihoods. Knowledge of what is required to sustainability manage critical species and habitats will lead to greater appreciation of the need for regional, cross-border cooperation in fisheries and ecosystem management. This in turn should facilitate planning decisions that will ensure maintenance of a healthy river system. Line agency staff in the MRC member countries will gain new skills in co-management strategies and practices and in methods to develop long-term data sets on ecosystem health.

Fields of Action

- Undertake participatory research to determine critical, trans-boundary species, deep pool habitats and migration corridors to be managed / conserved;
- Produce and disseminate educational and awareness raising materials;
- Develop, implement and refine co-management strategies at critical habitats and migration corridors;
- Develop training courses to extend the management principles developed to other groups in the Basin; and
- Assess various techniques for quantitative monitoring of fish assemblages in deep pools, with a view to establishing indicators for ecosystem health.

5. Biological Diversity Conservation Through Improved Management of Indigenous Species in Aquaculture and Stock Enhancement

Background and Justification

The existing Fisheries Programme component Aquaculture of Indigenous Mekong Fish Species (AIMS) has as its objective *"economically feasible aquaculture systems developed using indigenous Mekong fish species, which may complement or replace the use of exotic species for culture purposes in the Mekong Basin"*. Thus, AIMS strives to provide alternatives to the use of

exotic species for culture. This task is on-going, as relatively little aquaculture development work has focused on indigenous species compared to the effort that has been directed to exotic species.

At present there is no clear distinction made between fish intended for aquaculture and fish intended for stocking, or enhancement, in the riparian countries. Therefore, widespread availability of seed from indigenous species may pose a threat in itself. Culture of fish almost without exception carries the risk of escape of the organisms into the wild, and enhancement by definition implies intentional release into the wild. The impact may range from undetectable to catastrophic. If an alien[1] stock is able to establish itself in the environment this may affect the environment in several ways. Possible biodiversity impacts include loss of genetic variability, introgression, and loss of (sub-) species.

Intentional release for stock enhancement purposes is likely to impact the environment, since the number of individuals released is high. The likelihood of hybridization and introgression increases with the relatedness of the organisms, meaning that domesticated or otherwise alien stocks (e.g. from reproductively isolated sub-populations) of indigenous species are more likely to have a direct impact on the genetic integrity of the local populations than exotic species. The risk of impacts is further exacerbated in combination with reduced natural recruitment due to ecosystem degradation. The stress on the Mekong environment will undoubtedly increase over the years to come, as will the potential for substantial impacts from unwise aquaculture and stocking practices.

There are international conventions and recommendations for the protection of the wild fish stocks (e.g. Convention on Biological Diversity and FAO Code of Conduct for Responsible Fisheries). These lend strong support to policies for transboundary management of the natural resources and biodiversity of the Basin. To safeguard aquatic biodiversity of the Mekong it will be necessary to develop and implement improved management practices based on codes of conduct with regard to the movement and stocking of live fish.

Aims

The aims of the project are to improve the availability of indigenous species for aquaculture, and to facilitate riparian governments to institute the regionalized codes of conduct for the movement of live indigenous fish species as part of national fisheries management procedures.

Expected Benefits

The benefits are that there will be a more ecologically appropriate suite of species and genetic stocks available for aquaculture in the region. Staff of government line agencies will be aware of the issues that may arise from indiscriminate movement of indigenous species for aquaculture and stock enhancement. It is expected that line agency staff of the MRC member countries will participate in the development and implementation of regional codes of conduct for the movement of indigenous fish species.

Fields of Action

- Continued development of aquaculture techniques based on indigenous species;
- Assessment of the financial feasibility of farming indigenous species;
- Development of extension packages for aquaculture of indigenous species;
- Development of regional codes of conduct for the movement of species, in consultation with line agencies and other relevant organisations;
- Demonstration of environmentally safe techniques for the movement of fish and stocking programmes; and
- Undertake various processes to increase knowledge of the importance of conserving aquatic biological biodiversity for present and future sustainable use among riparian governments and the general public.

[1] For the purpose of this proposal the term "alien" will be used for indigenous Mekong organisms that are introduced outside their natural range, including sub-species, aquaculture strains and hybrids. Exotics may also be labelled as alien, but the focus here is on Mekong organisms that are alien in relation to the natural

6. Fish Population Studies Using Genetic Tools

Background

A large number of Mekong fishes are trans-boundary species, migrating between two or more countries. Managing such species requires cooperation between countries at several levels, from regional to national to local. One of the major constraints in the development of management strategies for such species is that no information exists about the degree to which they consist of genetically distinct populations, or stocks. This is important in terms of management, because stocks are the management units rather than species.

Recent studies based on Local Ecological Knowledge (LEK), carried out by the MRC Fisheries Programme, hypothesized on stock structures for a number of important fish species of the Mekong Basin. Tools for identifying distinct populations of species have been developed and significantly improved using molecular genetic techniques. Through these techniques it is possible to not only identify populations, but also to assess the degree to which mixing occurs between populations. These techniques have been applied in fisheries management in other parts of the world. In the Mekong Basin, however, practically no experience has been built up in the application in these tools in capture fisheries research and management.

Aims

The aim of the studies is to develop capacity, at various levels within the region, in the field of genetic tools and their application and interpretation in relation to fisheries research and management. This will involve outlining the population (stock) structures for important Mekong fish species, thereby delineating management units.

Expected Benefits

The main benefit will be an improved understanding by line agency staff of the population structures of important trans-boundary Mekong fish species, which is of immediate use for management at both the species level and ecosystem level. There will be an improved technical capacity at various levels in the use and interpretation of data from molecular genetic methods, and in addition there will be an improved capacity to integrate information from different sources, e.g. LEK, genetic studies and others, into fisheries and ecosystem management.

Fields of Action

- Select species for pilot study based on existing knowledge;
- Develop sampling plan based on existing hypothesis on population structure for the species;
- Carry out sampling and analysis;
- Train technical and managerial staff in the application of genetics data in fisheries management; and
- Reporting and dissemination of study results.

7. Participatory Management of Fisheries in the Lower Mekong Basin

Background and Justification

Decentralization of natural resource management has become national policy in all countries of the Lower Mekong Basin (LMB). In order to facilitate this process and to benefit from it, riparian line agencies place emphasis on promoting participatory management practices and techniques.

Within all components of the MRC Fisheries Programme (FP), valuable experiences have been made with participatory management. However, these experiences were often restricted to one of several parameters, such as management levels (local, district, provincial), types of water bodies (reservoirs, flood plains, rivers), management functions (e.g. data collection), "managers" involved (government staff and/or resource users), and form of interaction (consultative, cooperative).

Given the fact that riparian governments have to deal with a wide variety of situations in aquatic resource management there is a need to extend the experiences gained by the FP into more general use in fisheries management in the Basin.

Aims

In general, the objective is to maintain fisheries productivity and a balanced aquatic system through sustainable management practices at all levels. The aims of the component are:

- to facilitate fisheries line agencies to promote and support diverse forms and methodologies of participatory fisheries management; and
- to support selected user groups and government staff in successfully applying co-management methodologies and practices at different levels and in a variety of aquatic resource use situations.

Expected Benefits

The direct beneficiaries of the project are riparian line agencies, whose effectiveness will be supported by the expected results. The indirect beneficiaries will be the natural resource users, whose productivity is expected to increase through their participation in the management aspect of fisheries.

Participatory natural resource management is also an important area for the MRC natural resource activities other than the aquatic, and is one of the BDP management goals. Within the MRC, the experiences from the Fisheries Programme are the most extensive regarding participatory management. There is thus a potential for utilising these experiences in other MRC sectors.

Fields of Action

- Developing approaches and experiences about co-management on the community level in a range of habitats and socio-economic settings in the LMB including river and flood plain habitats as a learning, adaptive activity;
- Strengthening the capacity of line agency staff and local resource users in participatory management;
- Extending the development of approaches and implementation of co-management at the community level to other resource types beyond fisheries;
- Sharing and disseminating experiences basinwide;
- Monitoring co-management implementation experiences from the Basin; and
- Establishing a basinwide network for fisheries co-management and/or for co-management of natural resources in general.

8. Catchment-based Fisheries Development

Background and Justification

The fisheries production systems in the Mekong Basin are in most cases larger than the area exploited by a few communities. Impacts of other activities on fisheries often occur over large areas. At present, no approaches have been developed or experimentally implemented for participatory natural resource management at a level beyond "the community"; that is, there are no management systems in place commensurate with the scale of the biological production system or environmental interactions. Management at the level of sub-catchments or major river/floodplain areas will be the major focus in the future. Clearly this is the case with the Basin Development Plan (BDP) being prepared by the MRC. The BDP has identified sub-catchments as the geographic units for development planning. Consequently, there is an urgent need to develop co-management approaches and institutions on such geographic dimensions.

The catchment approach to fisheries management recognises that enhanced developmental benefits will be obtained if fisheries activities are integrated with developmental activities in other sectors, such as forestry, health, education and governance. Therefore, the Fisheries Programme is keen to form alliances with other sectors involved in sub-catchment development.

Aims

The component are to undertake aquaculture and capture fisheries management and development activities in selected trans-boundary catchments. Particular aims are to improve planning for wild fish resource management, improve aquaculture development opportunities, develop institutional arrangements to cater for trans-boundary fisheries requirements, and enhance community awareness of the requirements for maintaining healthy fisheries.

Expected Benefits

The direct beneficiaries of the project are riparian line agencies, whose effectiveness will be supported by the results of the component. The indirect beneficiaries will be the natural resource users, whose productivity is expected to increase through their participation in the catchment management aspect of fisheries.

Fields of Action

- Compile information, close information gaps, and communication to agencies concerned;
- Form catchment consultative and coordination group involving participating governments and user organizations;
- Formulate trans-boundary catchment management strategy and plan;
- Establish and/or strengthen fisheries management and development institutions, such as a catchment-based "Joint Fisheries Management and Development Body";
- Implement catchment-wide management plans; and
- Extend the knowledge of catchment-wide management practices to other catchments in the LMB.

9. Communication of Fisheries Knowledge within the Mekong Basin

Background and Justification

Communicating knowledge and information to stakeholders and politicians is an essential element of all research and development activities. The information can come from specific research activities or it can be collated from diverse sources. It must be communicated in different ways, and the impact of the message and its delivery measured. The important point is that the knowledge must make a difference - it must be used and not simply accrue in reports (or even worse, remain unreported).

The Fisheries Programme has communication as an integral element of all its components, although the focus for these components is primarily publication of technical reports. Consequently, there remain many functions which lie outside the ambit of sector-based components, and must be taken up at a Fisheries Programme and MRC level. These functions basically fall into two broad areas: firstly, synthesizing information and presenting it in various formats; and secondly, coordinating basin-wide communication activities among fisheries workers and planners. One particular emphasis in the first area is the production of films, as this medium is by far the most effective in getting a message across to busy politicians and planners unfamiliar with the particular issues.

Aims

The aims of the component are:

- to inform governments and natural resource planners of the importance of fisheries as a source of employment, income generation and nutrition for the people of the Basin;
- to make available a variety of information products on fisheries, for use by governments, planners and resource users; and
- to develop feedback mechanisms relating to information requirements, delivery and uptake, and to react accordingly.

Expected Benefits

The major benefit coming from the communication activity will be increased understanding by all stakeholders of the importance of fisheries. Without doubt, putting knowledge into the hands of decision makers will help to ensure the sustainable management, use and protection of the fisheries resources.

Fields of Action

- Production of films on the fisheries of Thailand, Lao PDR and Viet Nam;
- Production of short film clips on a range of topical issues in fisheries;
- Repackaging technical information into attractive, written reports for a broad audience;
- Translation and publication of selected reports from English into the languages of the MRC-member countries;
- Production of CDs covering broad areas of fisheries ecology (e.g., fish biology, larval ecology, migration, impacts of developments) in the LMB;
- Training of counterpart staff in the presentation of work, both verbally and in published formats;
- Continuing enhancement of the Fisheries Programme's periodical newsletter *Catch and Culture*;
- Providing logistical support to the Technical Advisory Body on Fisheries Management;
- Enhancing distribution networks for information products; and
- Developing mechanisms to assess the impact of the information products.

All activities would be integrated with the MRC's Communication Strategy and the work of the Communication Unit.