



Technical Assistance Consultant's Report

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Cambodia: Capacity Building of the Inland Fisheries Research and Development Institute Phase 2 (Final Report)

Prepared by



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For the Ministry of Agriculture, Forestry, and Fisheries

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ABBREVIATIONS

ADB	–	Asian Development Bank
CARDI	–	Cambodian Agricultural Research and Development Institute
CAREC	–	Cambodian Agricultural Research Council
CDRI	–	Cambodia Development Resource Institute
CFDO	–	Community Fisheries Development Office
DOF	–	Department of Fisheries
DRS	–	Domestic Resource Specialist
EEPSEA	–	Economy and Environment Program for Southeast Asia
FAO	–	Food and Agriculture Organization
GDP	–	gross domestic product
IFM	–	Institute for Fisheries Management (Denmark)
IFREDI	–	Inland Fisheries Research and Development Institute
IRS	–	International Resource Specialist
LMB	–	Lower Mekong Basin
MAFF	–	Ministry of Agriculture, Forestry, and Fisheries
MRC	–	Mekong River Commission
NGO	–	nongovernment organization
R&D	–	research and development
SDCFM	–	Sub-Decree on Community Fisheries Management
SEAFDEC	–	Southeast Asian Fisheries Development Center
TA	–	technical assistance
TTD	–	Technology Transfer Division
TSEMP	–	Tonle Sap Environmental Management Project
UNDP	–	United Nations Development Programme

KNOWLEDGE SUMMARY

"Linking research to practice" was the guiding principle behind the conceptualization and implementation of the second phase of the technical assistance (TA) package that built the capacities of the Inland Fisheries Research and Development Institute (IFREDI). The knowledge that the TA generated, packaged and disseminated to various stakeholders is substantial and wide-ranging—from eco-system variables that affect fish production to the economic valuation and the emerging issues in the research and policy domain. Most was generated by research conducted during Phase 1; some additional findings were gleaned from discussions and rapid appraisals conducted during Phase 2. Secondary information was included in the communication products to complement the TA's primary data.

In fish bio-ecology, the TA elucidated environmental variables—such as water regime and fish migration—that affect fisheries production, the knowledge gaps that hamper management, and the importance of inland fisheries from the perspectives of fisheries production, livelihoods and biodiversity. This highlights the need for a holistic approach to managing this fragile resource. The TA also developed a guide that enable people on the field to identify the different species of catfish in Cambodia based on simple external criteria and a dichotomic key. Prior to the guide's development, species identification had to follow laboratory processes. The TA also identified the top 20 fish species that are commercially important in Cambodia.

In the field of socioeconomics, the TA's major contribution is the identification of the different livelihoods of more than 1.3 million people living around Tonle Sap Lake, and the degrees of their dependency on the lake's resources. The TA found that: 195,000 households make a combined annual income of \$255.5 million from fisheries-based livelihoods but only one-third of the amount goes to 72% of the households whose average annual income is less than \$1,000. This knowledge makes it imperative for policymakers to put in the center of all discussions about sustainable management of Tonle Sap Lake fisheries the rural poor's concerns for secured access to resources and basic rights to food security, jobs, education and health care.

The TA provided the first analysis of social, economic and ecological issues that are likely to ensue from the implementation of the Sub-decree on Community Fisheries. Issued in May 2005, the sub-decree provides the rules and procedures for identifying and managing areas for community fisheries. The study concludes that the smooth implementation of the decree hinges on the adequacy of the people's knowledge about the fishery resources and the institutional arrangements that are being put in place by the government for the use and stewardship of these resources.

For knowledge dissemination purposes, the TA produced posters, video clips, technical reports, policy briefs, and policy papers both in English and Khmer versions. The Department of Fisheries aided in the systematic distribution of the communication products through its national and provincial offices. To ensure that the knowledge generated is officially communicated to concerned government agencies and stakeholders groups, the TA sponsored a national conference in Sihanoukville on February 14–15. With the theme "Prioritizing Fisheries for Cambodia's National Development and Community Aspirations," the conference produced the Sihanoukville Declaration which will be nationally disseminated through posters in Khmer and English. The uploading of research results on the IFREDI website ensures that the materials are also available internationally.

I. INTRODUCTION

1. **"A future in which Cambodia and its people are able to enjoy sustainable social and economic benefits from the exploitation and farming of living aquatic resources."**

This is the Cambodian government's vision of its fishery resources as expressed in the Fisheries Sector Policy.

2. The inland and coastal waters of Cambodia are rich with fish and other aquatic resources. The Department of Fisheries estimated the 2004 fish production from inland and marine fish catch and aquaculture to be 325,000 mt, 77% of which comes from inland fisheries. The Mekong River Commission estimated annual inland production in mid-1990s to be 289,000–431,000 mt valued at about \$300 million. This corresponds to about 12% of the country's gross domestic product (MRC, 2004).

3. The inland fisheries are the main source of food and livelihood of the rural poor. Nearly 70% of the animal protein intake of the country's population comes from inland fisheries. Millions of people depend on the inland fisheries for livelihood as fishers, fish processors, traders, transporters, firewood gatherers, edible aquatic plant gatherers, and hired hands.

4. During the past decade, however, Cambodia's fishery resources have been under severe threat. The fishers, constrained by pervasive poverty and their desire to increase their catch, have been using destructive fishing gears and methods that indiscriminately kill fish stock. The growing communities and industries located along the banks of rivers and lakes pollute fish habitats by unscrupulously dumping their wastes into the water.

5. Resource use conflicts are arising over fishing rights between stakeholders, such as fishing lot operators and fishing communities as governance structures are weak. The present management capacity of the DOF is weak to address the use conflict issues. This is compounded by use conflicts outside the control of DOF such as infrastructure development like dams and competing water utilization. Meanwhile, flooded forests are converted to agriculture, habitats are fragmented and overfishing continues unabated.

6. The Cambodian government has come up with laws and instituted policy reforms to avert further damage to the inland fisheries, and accord poor communities' equitable access to the fishery resources.

7. One of the policy reforms instituted by the government is the Sub-decree on Community Fisheries Management (SDCFM). Approved by the Council of Ministers on May 20, 2005, the SDCFM provides the rules and legislative procedures for identifying and managing areas for community fisheries and for establishing Community Fisheries Committees and prescribing their roles, duties and rights. The SDCFM also prescribes the procedures for the preparation of the Community Fishing Area Agreement and Community Fishing Area Management Plan. A Royal Decree authorizing the Prime Minister to implement the sub-decree was subsequently issued. The Ministry of Agriculture, Forestry and Fisheries (MAFF) was mandated as implementing arm of the government. The Community Fisheries Development Office (CFDO) is mandated to oversee the efficient implementation of the Sub-decree. Due primarily to lack capable manpower in the CFDO, there is lack of effective supervision on the social preparation of the community fisheries. There is a need to assess the status of the management and regulatory framework instituted by the government.

8. The government also established agencies that are mandated to plan and implement programs for fisheries development, and to conduct research and disseminate scientific information to various fisheries stakeholders.

9. The Inland Fisheries Research and Development Institute (IFREDI) was established in October 2002 to become the country's center of knowledge on fisheries. IFREDI is mandated to generate scientific information and technology through research, and to provide the government and other fisheries stakeholders (e.g. policymakers, legislators, fishing communities, government and nongovernment extension workers, the academe and media, and aid donors) with timely and relevant information for the sustainable development of the inland fisheries.

10. At the request of the Cambodian government, the Asian Development Bank (ADB) gave IFREDI a technical assistance grant (ADB TA 4025–CAM) for the building of its capacities for research, extension and management. The objective was to kick-start the Institute towards becoming a relevant and reliable research and development (R&D) arm of the government. The capacity-building project was implemented in May 2003–June 2004.

11. Through a combination of several teaching techniques—learning-by-doing, formal short-term courses, and on-site training—the IFREDI personnel learned the ropes of institute management, scientific research, and technology transfer and policy development. They also acquired/improved their English language skills through special tutorial courses tailored for them. The TA resulted in a functioning research center with enhanced capabilities, and a professional staff with self-confidence and brighter career outlook.

12. The successful implementation of the IFREDI capacity-building project encouraged the Cambodian government to request ADB for another grant—a second phase that would build on the capacities acquired under the first grant. ADB approved a 6-month Phase 2 (TA 4563–CAM). Implemented in August 2005–February 2006, Phase 2 focused on developing capacities for the "linking of research to practice," i.e. the packaging and dissemination of information for technology transfer, policy development, fishing communities education on resources management and exploitation, and planning and implementation of fishery resources development programs. The technical assistance framework is shown in Appendix 1.

II. TA ACCOMPLISHMENTS AND TANGIBLE OUTPUTS

13. With "Linking Research to Practice" as guiding principle, the TA Phase 2 was successfully implemented as evidenced by accomplishments listed on Table 1 and by communication products delivered at the end of the project (Table 2). These accomplishments marked the start of the implementation of the 2-year Operational Plan of the IFREDI Technology Transfer and Information Dissemination Program (Appendix 2) which was put together under TA Phase 1 and refined at the beginning of Phase 2. IFREDI researchers and officers became more aware of the importance of making information dissemination as integral part of research proposals, not just an afterthought upon completion of research projects.

Table 1: TA Phase 2 Accomplishments
22 August 2005–21 February 2006

Agreed Activities (Per Performance Indicators in TA Framework)	Accomplishments
<p>A. Research and Development</p> <p>1. Bio-ecology</p> <ul style="list-style-type: none"> • Information about the bioecology and requirements of dominant species is gathered and synthesized starting Month 1 • Information about the relationships between fish production and the water regime and habitat is synthesized starting Month 1 • The flood-fish relationship model is refined and updated starting Month 1 • Management guidelines are drawn from the flood-fish relationship model at the end of Month 5 • Findings are synthesized and recommendations are made by Month 6 • On-the-job training is provided to counterpart staffs starting Month 1 • Meetings with stakeholders are organized to share research findings and raise awareness starting Month 5 • Materials for technology transfer are designed starting Month 3 <ol style="list-style-type: none"> 1. Poster: fish and fish issues 2. CDROM: updated flood-fish model 3. Book: dominant fish species 	<p>Done</p> <p>Done IFREDI publication by T. Jantunen in press</p> <p>Done Comprehensive report on the BayFish Tonle Sap model (in press)</p> <p>Done Policy brief published and disseminated</p> <p>Done</p> <p>Done Domestic counterparts can work with increased autonomy</p> <p>Done</p> <p>Done</p> <p>Done A brochure was also produced with a key to scientifically identify the 17 species of Cambodian Pangasiid catfishes</p> <p>Done With corresponding publication and a users manual</p> <p>Done <u>Two</u> books have been produced on dominant species in Cambodia. Each of them details all available information on ten selected species</p>
<p>2. Socioeconomics</p> <ul style="list-style-type: none"> • A synopsis of the economic and livelihoods values of inland fisheries is prepared by the end of Month 2 	<p>Done</p>

Agreed Activities (Per Performance Indicators in TA Framework)	Accomplishments
<ul style="list-style-type: none"> • Socioeconomic conflicts over property rights, resource access, technology, markets, and fishing effort are analyzed by the middle of Month 2 • Findings are synthesized by the end of Month 3 and recommendations are made by end of Month 5 • Training is provided to counterpart staffs starting Month 2 • Meetings with fisher folk are organized to share research findings in the field and test recommendations by the end of Month 3. • Materials for technology transfer are designed from Month 3 and formal training is done in Month 6 <ol style="list-style-type: none"> 1. Synopsis on economic values of inland fisheries 2. Technical report on conflict over property rights and resource access in markets and fisheries 3. Policy briefs for stakeholders on items 1 and 2 4. Webpage updates of Phase 1 research outputs starting Month 3 	<p>Not yet complete (see notes below)</p> <p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p> <p>Not yet complete (see notes below)</p> <p>Done</p> <p>Done</p>
<p>B. Policy Development and Dialogue</p> <ul style="list-style-type: none"> • Provision of policy inputs to key stakeholders continued starting Month 2 • Feedback from policy dialogue is assessed and approaches are refined in response starting Month 2 • Findings are synthesized and recommendations are made starting Month 3 • Training is provided to counterpart staffs starting Month 2 • Materials for technology transfer are designed starting Month 3 <ol style="list-style-type: none"> 1. Policy briefs based on socioeconomic and 	<p>Done</p> <p>Done</p> <p>Done</p> <p>Done</p> <p>Done (published and disseminated)</p> <p>Done (published and disseminated)</p>

Agreed Activities (Per Performance Indicators in TA Framework)	Accomplishments
<p>biological inputs</p> <p>2. Policy brief on national and sectoral concerns and IFREDI position</p> <p>3. Summary of sub-decree on community fisheries</p> <p>The governance structure that will guide IFREDI toward excellence is elucidated starting Month 1 and recommended by the end of Month 6</p>	<p>Done</p> <p>Done (in collaboration with Team Leader and IFREDI/DOF key officers and Senior Scientists)</p>
<p>C. Technology Transfer</p> <ul style="list-style-type: none"> • Counterpart staff are activated in the field of technology transfer starting Month 1 • The two-year operational plan for technology transfer and sets of information dissemination strategies are implemented starting Month 1 • Technology transfer packages are designed by Month 3 • Twinning arrangements with 2 research and development institutes are promoted and concluded by the end of Month 6 • The governance structure that will guide IFREDI most efficiently and effectively toward professionalism and excellence is elucidated and recommended by the end of Month 6 • Press briefings are held on a regular basis to inform civil society • At least one information material (poster, brochure, flyer, video clip, etc.) for each discipline (biology, socioeconomics, community fisheries, fisheries domain, and aquaculture will be designed, produced, and delivered starting Month 4 (Operational Plan of Techno-Transfer of IFREDI) • Webpage updating will be done starting Month 2. 	<p>Done</p> <p>Done</p> <p>Done</p> <p>Done (CDRI and SEAFDEC)</p> <p>Done (in collaboration with Policy Development IRS) (see report)</p> <p>Done</p> <p>Done</p> <p>Done (all communication products of this TA already uploaded)</p>

A. Research and Development

1. Bio-ecology and Modeling

14. **Bio-ecology of dominant species.** Additional information on the bioecology and requirements of dominant species were gathered and synthesized on time. Data-gathering from

the field was done by counterpart Domestic Resource Specialists and students of Thammasat University in Thailand and Paris 6 University in France.

15. **BayFish Tonle Sap Model.** The BayFish Tonle Sap model was developed further, refined, tested and validated. This is attested by a peer-reviewed publication in an international symposium on modeling in December 2005. Additional information on the databases that feed the model has been synthesized and has resulted in the publication by T. Jantunen. The BayFish model has been packaged into a CDROM with its accompanying report and users' manual.

16. Conclusions and management guidelines have been prepared and are part of a comprehensive report about the BayFish Tonle Sap model. Findings were synthesized and recommendations were summarized in a policy brief co-authored with the Policy Development specialists.

17. Local counterparts were coached and resulted to many achievements and with great autonomy.

18. Meetings with stakeholders and IFREDI biologists were organized in five provinces to share the research findings, disseminate materials produced, and raise their awareness on the model.

19. A bilingual poster on the importance of Cambodia fisheries was produced and distributed. An additional brochure on the identification of 17 key species of Cambodian Pangasiid catfishes was also produced.

2. Recommendations (Bio-ecology and Modeling)

20. Mentoring by the IRS on the DRS and in the same token, by an IFREDI senior researcher to junior researcher was found to be an effective way of building the capacity of co-workers in a research team. This has been evident with the bio-ecology team. IFREDI should adopt a senior-junior researcher mentoring system, especially in the conduct of applied research studies. The senior researcher should supervise and teach the junior partner on how to conduct field studies, input the data, and make preliminary analysis of the data. This is "learning-by-doing" approach which was found effective in both Phases 1 and 2 of the TA on the capacity-building of IFREDI researchers.

21. IFREDI should pursue a time-series fish monitoring as part of its yearly research activities. It is advisable to continue what MRC started in fish monitoring in order to have an accurate and current assessment of the fish stocks. The data will be very useful in the management of the fishery resources.

22. IFREDI should pursue the production and dissemination of information materials generated from research through the Technology Transfer Operational Plan and Strategies as proposed in this TA. From the initial feedbacks of stakeholders, the communication products disseminated under this TA have been found beneficial to the users. Moreover, IFREDI researchers have been encouraged to produce and disseminate their research findings through the most effective and appropriate methods.

3. Socioeconomics

23. **Synopsis.** The synopsis is a concise summary of socioeconomics and livelihood values of the people living in and around the Tonle Sap Lake. It distinguishes, for the first time, the different degrees of livelihood dependency of these people based on their reported annual gross income. The work on the synopsis was the most engaging activity under the Socioeconomic Component. It involved re-analysis of data obtained from Phase I surveys and information compiled from other studies. The fruitful collaboration between Component members resulted in an important contribution to the discussion about sustainable management of Tonle Sap Lake fisheries.

24. **Policy brief.** The policy brief was based largely on the above synopsis. Through collaboration with the Policy Development IRS, the policy brief was written in simple language (avoiding scientific jargon) and highlighted key issues and information considered useful for managers and policy makers. With help from the Technology Transfer Component, the brief was designed with a 'reader-friendly' presentation to encourage use of the information.

25. **Course on 'Values and Valuation'.** Capacity-building and training are important aspects of the Component. Component members benefited from knowledge sharing and capacity-building on data compilation and analysis, report writing, workshop organization and presentation preparation. A one-day course on 'Values and Valuation' (Annex 1) was conducted for IFREDI researchers and other interested people. It introduced participants to the concepts, principles and methods of values and valuation. The course could serve as preparation for more intensive courses in the future. Through this training, collaboration between IFREDI and the Environmental Economics Program for Southeast Asia (EEPSEA) was formed.

26. **Consultation with stakeholders.** Consultation with stakeholders took place on two distinct occasions. First was the field visit to Kampong Chhnang, which was an opportunity to observe different fishing activities. Useful information about the fisheries was obtained from the meeting with Community Fisheries members and the Provincial Fisheries Officer. The second occasion was a one-day workshop conducted at IFREDI where 40 participants from government (including provincial fishery offices), nongovernment and intergovernmental organizations gathered to discuss issues related to socioeconomics and livelihoods of the fisheries-dependent communities of the Tonle Sap Lake. The workshop resulted in a list of research and policy recommendations that were incorporated in the synopsis and policy brief.

27. **Pending task: editing of Phase 1 technical report.** There is one item under the Socioeconomics Component that was not completed according to plan: the technical report on conflict over property rights and resource access in markets and fisheries. The decision at the mid-term workshop was for the Component team to do some necessary revisions of content on the Phase I marketing report, including re-analysis of data, to bring it to the quality standards required for dissemination as a technical report. Because the lead author of the Phase I report was not accessible to confer on the necessary changes during the implementation period, the decision was to delay distribution until both the quality standards and the consent of authors are attained. Regardless of that, the aim is to complete the revision of the report, and then make it available on the IFREDI website by April 2006.

4. Recommendations: Socioeconomics

28. The synopsis shows the importance of fisheries and aquatic resources to various groups of stakeholders. Another important message from the synopsis is the significant income

inequality among fisheries stakeholders. This demonstrated the importance of research to further specify the livelihood values of aquatic resources, particularly when disaggregated by income group and stakeholder categories (defined, for example, by relative dependence on fisheries, and by ethnic group). IFREDI should develop a proposal for follow-on research to improve the estimates of values to key aquatic resource stakeholders, and to provide a means for analyzing trade-offs and monitoring impacts of policy reforms on different stakeholders.

29. Feedback from participants of the training workshop on 'Values and Valuation' overwhelmingly suggested that more in-depth training should be provided on this topic, including practical field exercises. Training on socioeconomic research design, including questionnaire design, was also recommended. Additional needs identified include: additional training on how to write and publish reports and policy briefs, as well as preparing manuscript for peer-reviewed publication; training on grant/proposal writing, including searching for funding sources; and support for IFREDI researchers to present their work at conferences. IFREDI should identify partners to continue capacity development in socioeconomic research.

5. Policy Development and Dialogue

30. **Capacity Building.** The plan for the policy development process of positioning IFREDI on the spectrum of national and sectoral priorities fully implemented through discussions, learning-by-doing training, and provision of background information and conducting of national conference.

31. Capacity building activities by involving counterparts in field consultations and entrusting the process of planning for the national conference with appropriate guidance has given them some new capabilities.

32. **Policy Briefs.** One major policy paper developed as a result of the discussions with IFREDI staff, visits to the field, and discussions with several stakeholders. The counterparts were fully involved in this process based on their own competencies. This policy paper is the first detailed analysis and prognosis of the emerging policy and research issues arising from the Community Fisheries after they have come into de jure existence. The paper has also been translated and disseminated in Khmer. It is therefore likely to be the basis for much discussion in the future.

33. Preparation of two policy briefs became the basis for inter-disciplinary dialogue and learning for the IRS and the counterparts are involved.

6. Recommendations: Policy Development and Dialogue

34. IFREDI should continue in earnest the process of greater inter-disciplinary research, enhanced interaction with local communities and collaboration with other research institutes. These were processes which were initiated in this phase and need to be followed up with commitment if the institute is to become increasingly relevant to the research and development needs currently arising in the sector.

35. IFREDI should create within it an atmosphere of greater collegial relationships between the researchers. This can be achieved if more accountability is introduced in the work undertaken by the staff. More internal work-in-progress seminars, production and distribution of working papers and peer review processes are essential to achieve this.

36. IFREDI should actively engage in the policy development process of the fisheries sector. Providing credible information to the policy makers and making an independent analysis of the same is essential to guide their actions. The practice of making policy papers and briefs should be continued.

37. IFREDI should push for greater autonomy in making decisions on its research agenda, obtaining its research funds and setting up of a transparent and attractive incentive system for the researchers. This may be the only way to attract and retain talented researchers.

7. Technology Transfer

38. **Planning Workshop on IFREDI Technology Transfer Operation Plan.** The planning workshop on the IFREDI Technology Transfer Operational Plan on September 5, 2005, discussed the framework, concepts, strategies, and work plans. It was stressed that the Technology Transfer Component would serve as launching platform and conduit for disseminating research outputs of the IFREDI and DOF units (Aquaculture, Community Fisheries Development, Fisheries Domain, and Marine). The participants submitted proposals and media strategies for further study.

39. **Training course on communication strategies.** A training course on Communication strategies towards community fisheries for sustainable resource development was held on 17–18 October 2005. It was attended by 30 IFREDI and DOF researchers and staff, including provincial fisheries offices' staff. The course objective was to orient and train the participants on communication concepts and strategies for linking research to fishing communities. The groups prepared short concept plans for their respective units at IFREDI and DOF.

40. **Training on scientific writing.** A training course on How To Write and Publish a Scientific Paper (Annex 2) was held on February 2-3, 2006. It was attended by 20 fishery and agricultural researchers from IFREDI/DOF and MAFF, and a faculty member of an agricultural school in Phnom Penh. The lecturer was Dr. Diana Parsell, a WorldFish Center visiting science writer. The course topics included: (i) overview of scientific writing; (ii) publishing process and choice of journal; (iii) electronic, on-line and open-access scientific writing; (iv) planning and writing; and (v) language. The participants who had ready manuscripts consulted with Dr. Parsell after her lecture.

41. **Hands-on training.** Hands-on training was continuously done throughout the project period. In collaboration with the other components (bio-ecology, socioeconomics and policy development), actual field consultations with fishing communities were undertaken to learn first-hand their information needs and the most effective channels to disseminate information.

42. **Communication products:**

- (i) **Training.** As part of their learning process, the researcher-proponents joined and observed actual shooting and production of video clips, and participated actively in the designing and lay-outing of materials for printing or publication.
- (ii) **Products.** The Technology Transfer produced 3 video clips and one poster in collaboration with DOF Fishery Officers and Extension Workers. The video clips were: i) "Father's Advice.." (Fisheries Domain Unit); ii) Sub-decree on Community Fisheries (CFDO); and 3) Better Practices Guidelines of Resource Users and Managers (Aquaculture Unit). The poster was on "Endangered Freshwater Species in Cambodia".

8. Recommendations: Technology Transfer

43. IFREDI should earnestly implement the Operational Plan on the Technology Transfer and Information Dissemination through the following actions:

- (i) Operationalize the Technology Transfer and Information Dissemination (TTID) Division as proposed in Phase 1, favorably endorsed by the DOF and subsequently approved by the MAFF. Staffing of the Division through the designation of competent officers (Division Chief and Deputy Chief/s) and at least 3 staff members (Associate and Assistants) should be effected within the next three months. The main responsibility of the TTID Division is to effectively and efficiently implement the TTID operational plan.
- (ii) The dissemination and efficient distribution (refer to Technology Transfer Pathways–Appendix 2) of the communication products of the TA should be implemented by considering the most effective channels in reaching out to the different stakeholders. An example would be to hold regular policy dialogues with selected policy makers and legislators and discuss the highlights of the policy papers on aquarian reforms, socioeconomic values of the Tonle Sap Fisheries, and the significance of the model in improving laws, rules and regulations in managing the fisheries resources. The recently concluded National Conference was a good venue to present the highlights of the policy papers. All participants were given copies of the communication products. Provincial fisheries were given sufficient number of copies, especially the Khmer version publications, for distribution in their respective areas. A full set of the products should be provided to other research and development agencies in Cambodia and to library collections consulted by researchers such as the collections at FAO, CDRI, ADB, and the World Bank.
- (iii) IFREDI should partner with other units of Department of Fisheries, other government agencies, and NGOs, to provide educational materials targeted at fishing villages in particular. The establishment of community-based organizations of fisherfolk and farmers have provided a strategic vehicle in disseminating information to the local people on matters that affect their food and livelihood. Their level of education is low and their skills are limited mostly to traditional methods of catching fish, growing crops and raising animals for their daily sustenance. Recent developments on community work provided by donors and NGOs in Cambodia have started to create some awareness and knowledge on the importance of taking care of the natural environment and the need for participatory arrangements in managing the natural resources. They need information on the state of their resources (fisheries, forestry etc) that are useful in training them to be active partners in resource management. Information materials must use the local language and media that can reach them effectively. Video clips can be shown during general assembly meetings in the fishing villages. Khmer versions of the relevant printed materials such as the Sihanoukville declaration and the colorful posters can be posted in strategic locations in fishing communities.

III. COMMUNICATION PRODUCTS

44. The TA produced substantial and useful communication products (Table 2) for various stakeholders—policy makers, researchers and academicians, provincial fishery officers and extension workers, development workers, fisherfolk community organizers and leaders, and international aid donors.

Table 2: Communication Products Delivered by the TA Components

Products	Target Audience
A. R&D:	
<p>1. Bio-ecology and Modeling</p> <ul style="list-style-type: none"> • Poster 1: "<i>Importance of Inland Fisheries</i>" • Poster 2: "<i>Drivers of Fish Production</i>" • CDROM: "<i>Flood-fish Relationship Model</i>" • Report: "<i>Flood-fish Relationship Model</i>" • Report: "<i>Databases that Feed the Flood-fish Relationship Model</i>" • Policy brief: "<i>Factors That Drive the Fish Catch in Cambodia: What is the role of Community Fisheries?</i>" • Brochure: "<i>Identification of Pangasiid Catfishes</i>" • Book: <i>Dominant Fish Species – Volume 1</i> • Book: "<i>Dominant Fish Species – Volume 2</i>" <p>2. Socioeconomics</p> <ul style="list-style-type: none"> • Synopsis: "<i>Socioeconomics and Livelihood Values of Tonle Sap Lake Fisheries</i>" • Technical report: "<i>Market Study of Inland Fisheries: Structure, Distribution, Access and Conflicts</i>" (not yet complete, see notes) 	<p>Policy makers, Fisheries Officers, extension and development workers, researchers, academe</p> <p>Researchers, fisheries officers, extension and development workers, academe, policy makers</p>
B. Policy Development and Dialogue	
<p>Policy briefs</p> <ul style="list-style-type: none"> • "<i>Cambodia's Aquarian Reform: Emerging Challenges on Policy and Research</i>". • "<i>Socioeconomics and Livelihood Values of the Tonle Sap Fisheries</i>" • "<i>Factors That Drive the Fish Catch in Cambodia: What is the role of Community Fisheries?</i>" 	<p>Policy makers, DOF fisheries officers, academics, extension and development workers, community fisheries committee members, commune council officers</p>
C. Technology Transfer	
<p>Video clips</p> <ul style="list-style-type: none"> • "<i>Father's advice</i>" – for Fisheries Domain • "<i>Sub-decree on Community Fisheries</i>" – for CFDO • "<i>Better Practices Guidelines for Resource Users and Managers</i>" <p>Poster</p> <ul style="list-style-type: none"> • "<i>Endangered Freshwater Species in Cambodia</i>" 	<p>Fishery officers, extension and development workers, community fisheries committees, donors, media practitioners, international organizations, policy makers, researchers, academe</p>

A. Highlights of the Communication Products

45. Highlights of the communication products by project component are provided in boxes 1–4 below.

Box 1: Highlights of Communication Products: Bioecology and Modeling

Poster 1: *Importance of Inland Fisheries*

The poster describes in 15 illustrated boxes the size, extent and role of inland fisheries from three different perspectives: fisheries production, livelihoods and biodiversity/culture. Each text box is bilingual. The objective is to inform the public about the exceptional importance of this resource for the country

Poster 2: *Drivers of Fish Production*

The poster explains graphically the main variables that contribute to sustainable fish production, with a focus on environmental variables such as flooding, migration or refuges. The poster is bilingual. The objective is to raise awareness about the need for environmental management from a fish production perspective.

Policy Brief: *Factors That Drive the Fish Catch in Cambodia: What is the role of Community Fisheries?* (co-authored with Policy Component) The first part of the policy brief expounds on the main environmental variables that contribute to sustainable fish production, the status of knowledge about the fish resource, and the gaps hampering good management. The second part points out the likely action and impacts of the newly created Community Fisheries on these variables, and stresses the need to integrate this new institutional setting in the broader picture. The policy brief also expounds on the impacts of pollution and aquaculture on wild stocks. The objectives of this brief are: i) to raise awareness among decision makers about the need for a certain natural functioning of the ecological system if the fish resource is to be sustained, and ii) to call attention to changes in the environment induced by a new institutional setting in fisheries.

Technical Report: *BayFish Model of the Tonle Sap Fish Production*

The BayFish model of the Tonle Sap fish production is documented by an extensive report detailing all the steps of its building, its contents and the justification for each variable and parameter. This report, technical but easily understandable, is supplemented by another report focusing more specifically on the databases and data analyses (in particular, in hydrology and GIS mapping) that have fed the model. The latter report is for a technically informed readership. Last, BayFish-Tonle Sap is presented in a few pages in a peer-reviewed publication that provides an overview of the model of its principles, and of its outputs. This latter paper, available on Internet, is readable by all.

Brochure: *Identification of Pangasiid Catches in Cambodia*

The 8-page brochure for the identification of all Pangasiid catfishes in Cambodia was designed in such a fashion that enables people on the field to identify all species on the basis of simple external criteria and a dichotomic key. Such an identification tool was very much in need as the available literature did not allow identifying species on the field or on markets, but just in a laboratory with morphometric, osteologic or genetic criteria.

Technical Reports: Two volumes of *Biological Reviews on Important Cambodian Fish Species*

The two volumes of biological reviews on important Cambodian fish species detail all published information on 20 species that are either important in catches of capture fisheries, or in the aquaculture sector. These 10 reviews resulted from the extraction and the editing by the authors of information available in FishBase 2004, a biological database on fishes developed by the WorldFish Center in collaboration with the FAO. In each review, summary information is given on the family, the genus and the species. For each species are detailed synonyms, common names and misidentifications; morphology; maximum weight/length/age; distribution and ecology

Whenever available, introductions, diseases and FAO production data are also detailed as well as the biological features of the species (length-weight relationships, growth and mortality, diet, reproduction, genetic information). Each review is concluded by a comprehensive list of bibliographic references.

Box 2: Highlights of Communication Products: Socioeconomics

Synopsis: Socioeconomics and Livelihood Values of Tonle Sap Lake Fisheries

The importance of fisheries of the Tonle Sap Lake is indisputable, given the high contribution of about 60 percent to the total inland fisheries production. What may not be well recognized is the importance of the Tonle Sap aquatic ecosystem to the livelihoods of over one million people living in and around the areas who rely heavily, if not entirely, on the resources. This synopsis draws on recent studies to provide estimates of values of fisheries and aquatic resources to local communities in the five provinces bordering the Tonle Sap Lake, i.e., Siem Reap, Battambang, Pursat, Kampong Chhnang and Kampong Thom. The synthesis reveals that all households in these areas engage in diverse income-generating and livelihood activities, including fishing, fish processing, fish marketing, fish culture, farming, daily labor and firewood collection, regardless of their primary occupation. The gross annual household income from direct consumptive uses for all fisheries-dependent households in the five provinces is estimated at \$233 million. Only about one-third of this is captured in households with income less than \$1,000, which constitute about 72% of all households. These low-income households are mainly small-scale, subsistence fishers and farmers with high livelihood dependency on the Tonle Sap Lake. Clearly, their livelihood concerns, such as secured access to resources, and basic rights to food security, jobs, education and health care, should be emphasized in discussions about sustainable management of Tonle Sap Lake fisheries and aquatic ecosystems.

Box 3: Highlights of Communication Products: Policy Development and Dialogue

Policy Paper: Cambodia's Aquarian Reforms: The Emerging Challenges for Policy and Research

This paper is the first such analysis (after the June 2005 enactment of the Sub-Decree on Community Fisheries) to look closely at the way the process of reform is unfolding and the likely social, economic and ecological issues which will emerge in the near future, and the implications of the same for the different interest groups involved in the process.

Policy Brief: Livelihood Importance and Valuation of the Tonle Sap Lake Fisheries

This brief uses information generated by studies conducted in 1995 and in 2003 by the Socioeconomic Component. It highlights the livelihood importance and valuation of the Tonle Sap fisheries. It also analyses both the occupational variations and the income differentials of the communities. The brief assesses the direct-value of the fishery resource, including the value of fish consumed and the value of common property resources accessed by the communities. Policy and research recommendations are included.

Policy Brief: Factors That Drive the Fish Catch in Cambodia: What is the role of Community Fisheries?

This brief uses the Bayesian Network Model developed by the Bio-ecology Component to examine how the current institutional change towards community fisheries will have a bearing on the variables of the model and examine whether and how a better monitoring system can be put in place which will improve the quality of the data needed for the model. It also highlights the variables which will remain largely outside the control of community fisheries and should be addressed by policy decisions taken in other realms of the national economy.

Box 4: Highlights of Communication Products: Technology Transfer

Video 1: Importance of Local Fisheries Resource users and Managers Group (LRUMG) (Aquaculture Office, Department of Fisheries)

This video clip provides advice on better practices in managing fisheries resources as implemented by the LRUMG established in village/commune levels by the Department of Officers and Provincial Fisheries Extensions Officers. This project is in collaboration with the local authorities in the project area. The Group has managed their fisheries resources by preventing the use of destructive fishing practices. These management practices have led to more production of brood stock that produced more fry and fingerlings that increased fish production in the succeeding year.

Video 2: Sub-decree on Community Fisheries Management

This video tells about the provisions of the Sub-decree in a language that is easily understood by the fishing communities. The video can be shown during village meetings or even social occasions. Provincial fisheries officers, extension and workers, can show this film during training courses in the fishing communities.

Video 3: Advice of a Father

This is a fiction film that uses religion in the cultural context preventing illegal fishing practices. The film shows the dead father advising the son to stop electrocution as a means to catch fish because it is a sin in the Buddhist religion. The fear of "going to hell" has convinced the son and the neighbors to stop fishing by electrocution.

Poster 1: Conservation of Endangered Inland Fish Species

The poster is a pictorial presentation and identification of endangered freshwater species in Cambodia. The purpose is to create awareness among fisheries, provincial fishery officers, development workers, policy makers, and the academe of species that need to be conserved and managed to prevent extinction.

1. Recommendations: Communication Products

- (i) While the primary audiences for the various communication products are stakeholders as detailed above, the communication products should also be used to "market" IFREDI in attracting potential donors and investors. The communication products are proofs of the ability of IFREDI researchers and scientists to undertake research and disseminate the results to the stakeholders in a targeted manner.
- (ii) IFREDI should consider selling some of their "products" to the international public in order to recoup some of the expenses incurred in design and production. For example, the cost of the design and printing of the 30-page policy paper on "Aquarian Reforms..." was about \$0.80 per copy. A good English language report can sell for \$3.00 to \$5.00 at the retail level, which would allow IFREDI to recoup some of the management overhead and costs of research staff time incurred in producing the product, and subsidize the distribution of free Khmer language materials. Attractive posters and brochures on fish can be sold to tourists for a good price. If some reports run out, a portion of proceeds from the sales should be used for reprinting the information materials in order to have them continuously available for the scientific community and the public in general. It is important to point out that IFREDI should always make it a priority to get its products in the hands of key stakeholders free of charge, including providing copies to other research and development agencies in Cambodia and to library collections consulted by researchers.

B. Review Process of Communication Products From Research Report to User-friendly Scientific Information

46. Raw data generated by research should be processed into good scientific information before they are released to intended users. Their form and language should be made appropriate for different information users such as policy makers, researchers, members of the academe, extension workers, development workers, media practitioners, and members of community-based peoples' organizations.

47. Good scientific information should have the following characteristics: trustworthy (derived from legitimate sources); accurate (detailed or general); current (new information builds on old information); relevant (useful to the targeted users); clear (information adheres to logic); complete (substantial and comprehensive); and, significant (importance of information in addressing the overall topic).

48. A thorough and systematic review of information material—by experts other than the authors themselves—before its release to intended users ensures that the "product" will meet the above-mentioned criteria.

49. The TA generally adhered to the following collegial and peer review process that aims to ensure the quality of information materials.

50. At the draft stage, the members of the research team scrutinized the proposed information material for accuracy, trustworthiness, currency, completeness, relevance, significance and clarity, as well as for format and language. It is imperative that every member of the team knows the target audience and understands the importance and objectives of the product. Also, at this stage, sensitive matters, like authorship and acknowledgments, are decided. The manuscripts or text and art of the info product may have to undergo second and third drafts before these are forwarded for review by colleagues within the organization or by peers outside the organization. The panel of reviewers/readers within and outside the organization is decided by the research team. (Some organizations have a ready list of reviewers/readers in different fields of expertise.) This is a long and tedious process because the manuscripts/text and art go back and forth between the authors and the reviewers until the corrections/suggestions/ comments made by the reviewers are satisfactorily made or resolved. The team also decides whether or not to engage a language editor.

51. After peer review, the manuscripts are reviewed further by the DOF Director General. Only after this last review were the manuscripts be approved for submission for publication, or text/art endorsed for production into the intended medium (audio/video or print).

52. The authors of information materials and the Technology Transfer Component collaborated closely in the packaging and production of brochures, posters, and video/audio documentaries/clips.

53. Where translation of English materials into Khmer was necessary (as in the case of Cambodia's Aquarian Reforms), insiders who are proficient in both English and Khmer and who understand the technical aspects of the manuscripts were assigned to do the translation.

54. The synopsis of Socioeconomics and Livelihood Values of the Tonle Sap by the Socioeconomics Team and the policy paper Cambodia's Aquarian Reform by the Policy Development and Dialogue Team underwent both collegial or cross-discipline review within

IFREDI/DOF, and peer review by experts outside the organization, in addition to the WorldFish Center Regional Director.

55. In bio-ecology and modeling, the review process was an intrinsic part of the publication process. The publication on modeling was peer-reviewed at the international level. The posters for national distribution were first reviewed and approved by colleagues at IFREDI, then by the authorities at the Department of Fisheries. The biological reviews were based on a compilation of documents that have all been previously published then screened by the FishBase team in the Philippines, thus ensuring a thorough quality control of the information published.

Review Process of the TA Reports

56. Similar to the Mid-term Report, the review process of the draft and final reports started at the Final Workshop where participants from IFREDI, DOF, and external agencies gave their comments and suggestions so that there is more clarity in the reports. The Director General of DOF and the IFREDI Director alternately chaired the discussion on the report on the accomplishment of the TA as contained in the draft report.

57. Copies of the draft report were distributed to all the international and domestic resource specialists for further review taking in consideration the comments and suggestions that were brought out during the final workshop. The comments during the tripartite meeting were also consolidated in the final report taking into consideration the comments from ADB, WorldFish and IFREDI.

58. The final round of review was done by the Regional Director of WorldFish and lastly by the Director General of DOF for clearance of submission to ADB.

IV. PARTNERSHIP AND NETWORKING

59. The success and strength of institutional partnerships and networking depend on the mutual fulfillment of expectations from the relationship. The signing of memoranda of agreement without concrete plans for implementable projects is hollow; the partnership will not last. Where financial matters are involved, full transparency and accountability are imperative for the partnership to proceed smoothly.

60. IFREDI has chosen to pursue partnerships with the Southeast Asian Fisheries Development Center (SEAFDEC) and the Cambodia Development Resource Institute (CDRI) because their line of interests and advocacies are parallel to its own. SEAFDEC and CDRI have substantial access to international research donors and IFREDI hopes to tap into this resource through research collaboration with them.

61. **SEAFDEC.** Initial talks among representatives from SEAFDEC, IFREDI and The TA Team Leader started on September 20-22, 2005 in Kampot during the SEAFDEC-sponsored Workshop on Training and Development of Community-Based Fisheries Management in Coastal Areas in Cambodia. The TA Team Leader presented a paper on the capacity-building of IFREDI. It was agreed that the TA initiate communications with the SEAFDEC Secretariat to explore the possibility of developing a partnership arrangement between SEAFDEC and IFREDI.

62. Email communications between Mr. Suriyan Vichtlekarn and the TA Team Leader started on October 18 to pursue the work to be done in concluding a partnership arrangement

between the two organizations. On 1 November 2005, The TA Team Leader accepted the invitation of SEAFDEC Marine Fishery Resources Development and Management Department (MFRDMD) to present a person the capacity building of IFREDI during the "Final Regional Technical Consultation (RTC) under the Special 5-Year Program: Information Gathering for Inland Fisheries In ASEAN Countries" held in Kuala Lumpur, Malaysia on 28–30 November 2005.

63. The RTC officially adopted the reports and recommendations presented during the Consultation one of which was the development of a framework for partnership arrangements and networking of competent national institutions with the view to support future promotion of management of inland fishery resources. On 30 November, a meeting was convened specifically to discuss the steps to be taken in order to push the proposed partnership arrangements through the proper official communications of both institutes. The meeting was chaired by Mr. Suriyan Vichitlekarn and attended by Dr. Raja Mohammad Noordin (Chief of MFRDMD), Dr. Yoshinobu Konishi (Deputy of MFRDMD) Ms. Mahyam Mohd. Isa (MFRDMD), Mr. Srun Lim Song (IFREDI Director), Mr. Lieng Sopha (IFREDI Deputy Director), and TA Team Leader. It was agreed upon by the group that there will be exchanges of official communications between IFREDI/WorldFish ADB TA and SEAFDEC MFRDMD that will express the willingness of both parties to conclude a partnership in the context of the development of inland fisheries in ASEAN.

64. On 12 December, a letter signed by the IFREDI Director and the Team Leader was sent to Dr. Noordin confirming that IFREDI is agreeable to participate in the proposed project on the "Development of Integrated Inland Fisheries Management in ASEAN Countries" with SEAFDEC as the lead organization and IFREDI as a partner in the project.

65. On late 12 February 2006, Dr. Noordin confirmed in a formal letter addressed to Mr Nao Thuok the willingness of SEAFDEC-MFRDMD to conclude a partnership arrangement between IFREDI and SEAFDEC-MFRDMD. Mr. Nao Thuok, on the other hand, responded through a formal communication to the Dr. Noordin that IFREDI is ready to conclude a partnership agreement with SEAFDEC.

66. The areas and opportunities for mutually beneficial engagements between IFREDI and SEAFDEC are great. IFREDI intends to throw its support behind SEAFDEC's advocacy of responsible fisheries. IFREDI can provide information to policymakers and decision-makers, and undertake collaborative research in pursuit of this advocacy. SEAFDEC has a wide network of institutional partnerships that IFREDI intends to tap into for information and resource sharing. It must be noted, though, that even without formal partnership arrangement with SEAFDEC, IFREDI is automatically engaged in the orbit of activities of SEAFDEC because of Cambodia's membership in the ASEAN. IFREDI researchers have been invited to participate in SEAFDEC-sponsored training courses and international conferences. IFREDI was invited (Mr. Srun Lim Song (Director) and Mr. Lieng Sopha (Deputy Director) to the "Regional Technical Consultation on Information Gathering on Inland Fisheries" that was held in Kuala Lumpur in November 2005. The Team Leader of the TA presented a paper on the TA's objectives and achievements.

67. **CDRI.** The initial meeting between researchers and key officers of IFREDI and CDRI was held late December 2005 at the CDRI offices. Present in the meeting were Mr. Larry Strange (CDRI Executive Director) and Mr. Christian Sloth (Technical Adviser, CDRI). IFREDI was represented by Dr. So Nam (Senior Scientist), Ms. Hap Navy (Head, Socioeconomics of IFREDI), Mr. Heng Samay (IFREDI Deputy Head of Administration), and the TA Team Leader. It was agreed that CDRI will be a co-organizer of the National Conference that and will be

responsible in the preparation and presentation of a paper on the community's perceptions of fisheries in their lives and livelihood. This joint activity will usher the long-term partnership agreement of the two organizations

68. IFREDI and CDRI, together with the WorldFish Center, collaborated in the organization and conduct of the national conference on "Prioritizing Fisheries in Cambodia's National Development and Community Aspirations." The official communications of both organizations manifest the intentions to have a long-term partnership starting with the national conference. The CDRI Executive Director was one of the panelists in charge of preparing the conference statements.

69. As an off-shoot of the national conference, the CDRI Director suggested strongly that both CDRI and IFREDI researchers discuss and agree on: (i) a common research design and methodology; and (ii) peer review and critique of research reports and manuscripts before publishing or presenting in conferences and symposia. This will be a main talking point in the preparation of a long-term partnership agreement between IFREDI and CDRI.

70. The long-term partnership agreement between IFREDI and CDRI will be finalized after the collaborative project on the national conference. CDRI is strong in policy research on natural resource management, especially in forestry, and IFREDI can learn from their expertise. Likewise, CDRI can tap into IFREDI's expertise and data base when it will undertake a long-term water resource management study in the coming years.

A. Networking

71. Collaboration with Economy and Environment Program for Southeast Asia (EEPSEA), Cambodia was initiated through the participation of Dr. Hermi Francisco, as a guest lecture and co-host, in the training workshop on 'Values and Valuation of Inland Fisheries,' organized as part of the Socioeconomics component. The training, held on 7 February 2006, attracted about 30 participants from IFREDI, DOF, CFDO and several NGOs. Participants expressed keen interest in an in-depth training on these issues, which might lead to further collaboration between Socioeconomics Division of IFREDI and EEPSEA.

72. The Coastal Development Centre (CDC) is an independent, not-for-profit, research institution situated at Kasetsart University in Bangkok, Thailand. It was established in 1998 as a response to a rapid, but uncoordinated development of the coastal areas in Thailand and many countries in Asia-Pacific region. CDC's mandates include integration of knowledge in sustainable practices of coastal development, collaboration and partnership building between national and regional institutes and organization in integrated coastal management. Considering this mandate and the involvement of Dr. Ratana Chuenpagdee, CDC Co-Director, in the Phase 2 project, potential collaboration between IFREDI and CDC could be explored to facilitate and facilitate information sharing and resource exchanges between the two institutions.

73. Another important network linkage for IFREDI is the International Collective in Support of Fishworkers (ICSF). (see www.icsf.org). The ICSF is a global network of individuals and fishworker organizations which was started in 1986 at Trivandrum by John Kurien (Policy Development Specialist of this TA). The ICSF issues a daily global fishery news alert called SAMUDRA Alerts which culls out news from the fisheries world and sends it to a subscriber list of 2,000 persons from all over the world relating to fishery issues. The IFREDI website can give a link to the ICSF website and the ICSF website and Documentation Centre can also do the same. This contact will put IFREDI in "virtual" contact with fishery institutions and fishery

researchers, policymakers, NGOs, and fishworker organizations worldwide. The ICSF also organizes conferences, studies and publishes a journal called SAMUDRA in which IFREDI researchers can write popular articles which will spread the news about Cambodia's fisheries worldwide.

74. There was close collaboration between the component 2 of the TSEMP under FAO and TA 4563–CAM in terms of attendance in training and workshops. TSEMP international and local consultants were able to attend some of the workshop and training courses sponsored by this TA.

75. The development of the ADB-related Built Structures proposal comes at the first place, with the development of new activities involving the Institute and its researchers who have actively contributed to the research protocols devised in the proposal. Thanks to this project, collaborative links have been forged among IFREDI, WorldFish, the Cambodian National Mekong Committee and the Tonle Sap Biosphere Reserve Secretariat.

V. IFREDI RESEARCH GOVERNANCE STRUCTURE

A. Rationale

76. The importance of the role of IFREDI in the scheme of Cambodia's national development cannot be overemphasized. It is mandated to promote the sustainable development of a national resource—inland fisheries—that provides food and livelihood to millions of rural poor, and 70–80% of the country's animal protein intake.

77. It is thus imperative to enable the Institute to fulfill its mandate by: (i) building its capacities for research, extension and management; and (ii) providing it with governance structure that allows flexibility to respond efficiently to the needs of its various publics, and ensures transparency of operation that promotes healthy work culture and encourages assistance from donor agencies.

78. To build the capacities of IFREDI, the Cambodian government has availed itself of development grants and loans from international funding institutions for the upgrading of knowledge and skills of IFREDI's professional staff and for the acquisition of equipment and other materials for research and office use. It has also entered into collaborative research and partnership arrangements with international and local R&D institutions for information and resource sharing purposes.

79. One of the outputs of ADB TA 4563–CAM is a proposal for a governance structure that is envisioned to provide flexibility and transparency to IFREDI's operations.

B. Proposed Research Governance Structure

80. The proposed research governance structure for IFREDI has two distinct features: (i) the establishment of a policy-making body called Board of Research Review; and (ii) the granting of autonomy to IFREDI to relate directly with its different publics.

1. Board of Research Review

81. Board of Research Review

One important suggestion we have is the creation of a Board of Research Review. This should be a body composed of the following: DG (Fisheries) as Chairperson; the Director of IFREDI (Secretary of the Board); and members consisting of Deputy Directors of IFREDI; independent fishery experts; nongovernment representatives from the group of stakeholders of the fisheries sector; representation from the consortium of international donors and representation from the Cambodian Agricultural Research Council (proposed in the Master Plan for Agricultural Research of the Royal Government of Cambodia). The size of the Board and the number of representatives from each of the segments may be decided appropriately. All research proposals generated by the staff of IFREDI and those proposed by the Government and the donor agencies should be placed before this Board. Based on a set of criteria (which may be developed by the Board) the proposals may be prioritized and cleared for funding. The Board should also suggest uniform criteria for the acceptance of research projects by the staff; the nature of collaboration, research evaluation procedures and the incentive structures.

82. The Board of Research Review is meant to provide quality control for research projects, and check-and-balance or transparency for the handling of research funds. The presence of representatives of various sectors in the Board is meant to ensure the representation of interests and concerns of various stakeholders in the policymaking processes of IFREDI. The size of the Board and representation of each sector shall be determined by the Board.

83. Following is the proposed composition of the Board:

Chairperson -	Director General of the Department of Fisheries
Board Secretary -	Director of the IFREDI
Members -	Deputy Directors of the IFREDI Independent fisheries experts Representatives of Civil Society Representatives of the consortium of international donors Representative of the (proposed) Cambodian Agricultural Research Council (CAREC)

84. A Civil Society Committee, reporting directly to the Board, shall be created. It will be comprised of representatives from local NGOs, women' group, media, academe, private sector, and fisher's associations. The main task of the Civil Society Committee is to integrate the concerns of the different stakeholders from civil society in order to have a more unified stand in the research framework and objectives. The Committee Chair will be selected by the members on a rotating arrangement and will have a fixed term of office. He/ She becomes a member of Board by virtue of position as Chair of the Civil Society Committee.

85. The proposed functions of the Board are:

- Review and approve/disapprove research projects proposed for funding by the researchers of IFREDI, other government agencies and donor agencies.
- Set criteria for the approval of research projects for funding.
- Set criteria for collaboration with other agencies.
- Decide on peer reviewers for evaluation of research
- Set criteria and modes of research incentives.

2. Autonomy

86. The proposed autonomy for IFREDI to relate directly with its publics, such as NGOs, international research donors, community-based organizations, etc., is meant to give the Institute flexibility in responding to their needs or requirements in a timely and appropriate fashion. In the current set-up, IFREDI has to go through several layers of bureaucratic authority before it can finalize any action or decision. This set-up results in great delays that may cost IFREDI some opportunities, especially in the scramble for a share in the research grant pie where the early and efficient contenders usually get the proverbial pie.

3. Operational Systems and Transparency

87. IFREDI's ability to fulfill its mandate will depend largely on the quality of its personnel, particularly its research and extension staff, and the prevailing work culture and ethics. The TA Phase 1 produced a Human Resources Development Plan that includes a chart of career paths of IFREDI personnel and an incentive system. The Plan's objectives are to motivate the competent personnel to stay and grow with the Institute, and to attract others with good qualifications to join the organization. The incentives come in the form of rank promotion and financial rewards based on accomplishments (output-based) and time involvement (time-based).

88. IFREDI's initial and sustained growth will also depend to a great extent on grants from international funding agencies and on partnership with other R&D centers both local and international. Donors provide funding that will sustain research activities; partnership with other R&D centers provides avenues for knowledge and resource sharing. Donors of research funds demand full accounting of their grants, not only in terms of honestly documented disbursements but also, and perhaps more importantly, in terms of tangible and high-quality research output. Research collaborators/partners require transparency of resource sharing. The budgeting and accounting systems that were crafted under the TA Phase I are meant to address these concerns. These financial systems, together with appropriate management and auditing forms, provide mechanisms for transparency, accountability and control.

89. A review of the CDRI structure was made to provide some insights of governance structure of a non-profit private research organization. CDRI has a Board of Directors that ensures effective planning, adequate financial resources and management, and monitor programs to ensure the quality of work. The Board is composed of 50% of Cambodia heritage and the rest are international members. The Executive Director is a Board member. In the recommended IFREDI governance structure, composition will be mainly Cambodians. International members will come from donors and other international organizations. Similar to the CDRI Board, the IFREDI Board of Review will ensure effective planning and monitoring of research activities, and provide the platform to tap external funding.

C. Recommendations:

90. **Grant of semi-autonomy.** The IFREDI is currently under the Department of Fisheries and physically situated in its premises. The influence of the DOF over the IFREDI is therefore considerable. The IFREDI is also a young organization needing good care and fostering. While remaining within the DOF structure, the IFREDI is also getting ready to gradually take independent responsibility for its actions. IFREDI's move towards semi-autonomy must be encouraged in the realms of setting its research agenda, seeking for research funding and evaluation of the research outputs.

91. **Development of work culture and ethics appropriate for research.** Being a research organization, its internal work culture, staff motivation and professional expectations will be different from a government department engaged in the delivery of development outputs to the population. This is as it should be. Research—the activity of making active, diligent and systematic inquiry in order to discover, interpret or revise facts and events—requires an environment where the persons given this responsibility can have the freedom to make informed choices about their realms of inquiry. This is not freedom without license. It is a freedom that places a lot of responsibility on people—the responsibility to work; to search out important issues which need to be studied and to produce knowledge which is useful to society. This is the reason why the governance of research—importantly the setting of research agendas, planning for a portfolio of appropriate funding and a work incentive system—should be given a degree of autonomy.

92. **Research priority: fishery sector's aspirations.** It has been our considered opinion, and this has formed the basis of our policy development and dialogue component of this TA, that IFREDI should attempt to position itself along the spectrum of Cambodia's national concerns and the fishery sector's aspirations. Our efforts at capacity-building were singularly oriented towards this objective. Our learning-by-doing training, taking the IFREDI to the community, the policy papers and our efforts at encouraging IFREDI to accept the challenge of organizing the National Conference were all oriented to highlight IFREDI's current capabilities. Keeping the momentum going will require some committed and measured steps to give IFREDI the space to develop a research agenda which can follow up on the theme of the National Conference.

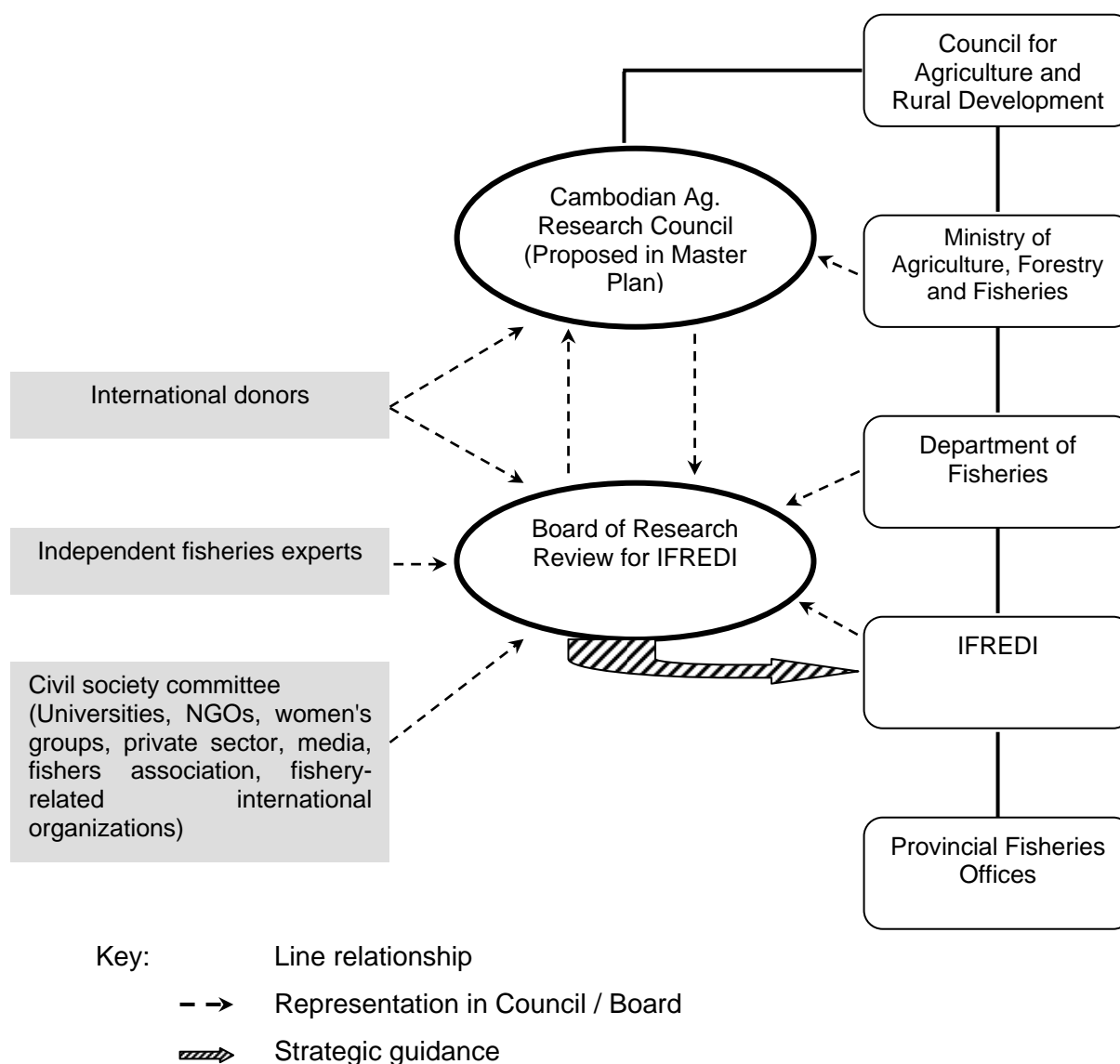
93. Adopt a revised governance structure for IFREDI with a Board of Research Reviews with representation from government, civil society and international organizations. What we have explained above is schematized in Figure 1 below. Our primary concern is with the relationships that demonstrate the composition of the Board of Research Review for IFREDI. As regards the upper part of the organogram, we have placed the Cambodian Agricultural Research Council under the stewardship of the Council of Agriculture and Rural Development chaired by the Prime Minister. All "line relationships" are indicated with straight black lines.

94. **Inter-disciplinary integration of research activities.** While this Board sets the agenda for research at IFREDI, its representative(s) who are deputed to the CAREC (the Master Plan for Agricultural Research of the RGC does not yet envisage such a link) must place the concerns of inland fisheries research at this body. This kind of mutual representation (which we would recommend should be the pattern followed by all the agriculture-related institutes in Cambodia vis-à-vis CAREC) is the best way for inter-disciplinary integration of agriculture and allied activity research in Cambodia. In the context of the emerging international research agenda which focuses on natural resource development and management (rather than on agriculture or fisheries or animal husbandry) this integration will facilitate greater access to funds for ALL the institutes under the Ministry of Agriculture, Forestry and Fisheries. In Cambodia the nature-driven interaction between water and land is another very important reason for integration of research. With the political agenda of decentralization and deconcentration—and in particular the granting of power to commune council to manage the natural resources in their areas—the political logic, as well as the ecological and economic rationale for integration should be obvious to all.

D. DOF/IFREDI Plans on Governance Structure

95. IFREDI key officers (Director and Deputy Directors), senior researchers and scientists, and most especially the Director General of the DOF favorably endorsed the adoption of the governance structure. Aside from the advantages cited above, the DOF DG firmly believes that more "brains" and ideas to upgrade IFREDI as a knowledge provider will benefit the inland fisheries of the country.

Figure 1: Model for Research Governance of the Inland Fisheries Research and Development Institute (IFREDI)



VI. WEBPAGE

96. A webpage technical consultant was hired to provide training and technical advice to the Web Master. The IFREDI Website is presently undergoing improvement to allow better linkage with other websites.

97. The "hosting capacity" of the IFREDI Internet server was increased from 50 MB (Phase 1) to 100 MB in order to accommodate more information materials into the website. A bigger UPS (Pulsar Extreme 3200C) was installed in the IFREDI Internet server system.

98. Electronic, on-line and open-access scientific publications produced under this TA will all be uploaded. They include: (i) policy paper on Cambodia's Aquarian Reforms; (ii) policy brief on Livelihood Importance and Valuation of the Tonle Sap Lake Fisheries; (iii) policy paper on Bayesian Network Model and Community Fisheries; (iv) Synopsis of the Socioeconomic and Livelihood Values of the Tonle Sap Lake Fisheries; and, (v) Technical report on Market Study of Inland Fisheries, Structure, Distribution, Access and Conflicts. Other communication tools such as posters, brochures, flyers, and other forms of information will also be uploaded.

99. A recommendation was forwarded by the Team Leader to the Director of IFREDI to create a Webpage Review or Editorial Board with the following tasks: (i) to supervise and coordinate the review and editing of the design and contents if all information materials for uploading in the website; (ii) to assign competent writers and editors of articles such as news and feature items; and (iii) to submit regularly reports to the Director on the results of the updating of the website. The Director of IFREDI agreed to the recommendation and will implement in connection with the staffing of the Technology Transfer and Information Division.

100. Scientific knowledge is public good. It should be available free because taxpayers provide the funds for research. Free and open access to scientific work is in keeping with the free exchange of information that is the hallmark of the scientific community. Open access will accelerate the spread of scientific knowledge and the benefits that come from it.

101. Posting research information online offers the following advantages: (i) cheap, almost free of charge; (ii) very fast, compared to most print media, and allows interactive actions such as linking with full journals and conference papers; (iii) enhances chances for getting future research sponsors by allowing people to see the quality of work; (iv) exposes work to new audiences; (v) facilitates online impact assessment; and, (vi) attracts investors knowing that the internet links research to practice (O. Serrat, 2005)

102. **Media Exposure.** IFREDI has good professional relationship with government TV stations which promptly broadcast in the prime time evening news the important events such as workshops and conferences conducted by the Institute. This healthy relationship should be sustained. However, IFREDI should positively engage the print media on burning issues related to the status of the inland fisheries and the actions taken by government to provide long-term solutions in the sustainable development of the inland fisheries. IFREDI should regularly hold press conferences and provide the press with synopsis of research findings, policy briefs, and other printable materials that will help provide the reading public with better understanding of the inland fisheries of Cambodia.

VII. NATIONAL CONFERENCE ON "PRIORITIZING FISHERIES FOR CAMBODIA'S NATIONAL DEVELOPMENT AND COMMUNITY ASPIRATIONS"

103. The national conference was a key milestone for IFREDI in positioning itself for its future role. The conference is summarized in Box 5.

Box 5: National Conference

The National Conference on "Prioritizing Fisheries for Cambodia's National Development and Community Aspirations" which was an integral part of the ADB TA (Phase II) was successfully held at Sihanoukville on 14-15th February 2006. The Secretary of State Mr. Por Try gave the Opening Speech. He highlighted the greater importance of fisheries for the economy of Cambodia when compared to other neighboring countries. The greater dependence of the whole population of Cambodia on fish and fisheries needed to be adequately appreciated and more carefully integrated into the planning process in the country. H.E Nao Thouk, Director General Department of Fisheries was in the chair. The representatives of the organizers of the conference – IFREDI, WorldFish and CDRI also spoke at the Inaugural session. They stressed the need to work more closely with each other in order to create more synergy in research and implementation of policy findings.

During the first Keynote Session, three of the research staff of IFREDI presented three of the main outputs of the TA. Ms. Hap Navy presented the paper on the economic and livelihood values of Cambodia's inland fisheries. Mr. Cheng Pheng presented a paper on the eco-system changes and the treats to the sustainability of Cambodia's inland fisheries and Dr. So Nam presented a paper on Cambodia's aquarian reforms and the future challenges. All these presentations were in Khmer and this ensured that the work done during the course of the TA was effectively disseminated to the participants. These talks were supplemented by the policy papers, policy briefs, synopsis and posters (in Khmer and English) which were the major outputs of the TA.

The second Keynote Session was addressed by Dr. Mahfuz Ahmed, Director of IFM. Being one of the pioneers in doing systematic research work on the socio-economic aspects of inland fisheries in Cambodia, Dr. Mahfuz's presence at the conference was especially welcome. Dr. Mahfuz spoke both the issues facing fisheries from a global and regional perspective and placed the challenges facing Cambodia's fisheries within that context.

The third session consisted of three presentations which were specifically intended to raise questions which would be the subject of group discussions. The presentation of Mr. Hov Kim Sreng of CDRI dealt with the perceptions of three very poor communities regarding the role of fisheries in their lives and livelihood. While the relative importance of fisheries varied across the three villages, the role of Community Fisheries in the three was highlighted to be inadequate and the management of the fisheries by community effort to be poor.

The presentation of Ms. Henriette Thorseng from Denmark highlighted the crucial nutritional importance of fish in the diet of Cambodians with particular reference to one species *E. longimanus*. The paper concluded that promoting the accessibility of nutrient dense commonly consumed fish has an unexploited potential for contributing to combating micronutrient deficiencies in the poor rural population in Cambodia.

The presentation from John Kurien of the Centre for Development Studies, India was focussed on the need to integrate fishing research and link this to the new needs of the rural communities in Cambodia. In this context the paper was specifically targeted to the internal changes which need to be made within IFREDI if their research was to become more interdisciplinary and obtain synergy. The need for and the manner whereby the rural communities can be more closely linked to IFREDI and how their needs can be assessed was also highlighted.

These presentations were followed by group discussions. The first group discussed the actions which should be taken to help communicate importance of fisheries in national policy. They highlighted that this National Conference was a good start and this should be followed up by more campaigns, more media coverage to enhance public awareness and the dissemination of the Declaration. They recommended that attention should focus on Tonle Sap and on fish as symbols of national identity; the crucial role of fish in nutrition; the importance of conserving the wetland ecosystem; assessing the value of fisheries to the household economy in the rural areas and the impact of infrastructure development on aquatic natural resources. The second group discussed the actions which can enhance the role of fisheries and aquaculture in improving the health and nutritional status of poor Cambodians. They stressed that economic actions should include promotion of small-scale homestead aquaculture of fish species with high nutritional and economical benefits. The possibility of school feeding programs which include fishery products like prahoc should be considered. The research actions should link the knowledge of nutritional benefits of specific species to the research on known nutritional deficiencies among the poor. The policy actions should include norms for regulation of new aquaculture activity such that it generates positive net additions to fish production. A policy for development of nutrition education in schools was also considered important in the context of the increase in the use of fast foods etc.

The salient issues that were raised in the course of all the presentations and the group discussions were then summarized into the form of a declaration—Sihanoukville Declaration on Fisheries. This Declaration was distributed to the participants and it was collectively discussed on the second day of the conference. Following a discussion, at which several changes and suggestions were made, the Declaration was adopted by the participants.

The Declaration will form the basis of a poster in Khmer. This poster will be widely distributed all over the country. This is one of the most important and enduring steps which will be taken to disseminate the findings and the commitments made at the conference.

VIII. PROJECT MANAGEMENT

104. **Organization and staffing.** The TA Team was composed of highly qualified international resource specialists and equally competent domestic resource specialists. An Administrative Assistant, a very much improved staff of IFREDI (Phase 1) and a Webmaster provided the support services and computer and internet technical assistance. The Terms of Reference of all the team members defined all the tasks, responsibility and expected outputs that should be delivered at the end of the project. All the IRS and DRS were deployed and activated at the start of the project. An organization was held at the start of the project to present the

105. **Coordination and monitoring.** Monthly team meetings were held to update all the team members of the status, problems encountered and actions taken to address the problems. Monthly accomplishment reports were submitted to ADB and the WorldFish Regional Coordinator. Tripartite meetings were organized and held after each workshop through video conference at the ADB Cambodia Country Office and attended by representatives from ADB, IFREDI/DOF and WorldFish Center. Important issues arising from the discussion in the workshops and other relevant matters were discussed during the tripartite in order to ensure the smooth project implementation.

106. **Workshops.** The Inception, Mid-term, and Final Workshops were organized and conducted as part of the tasks of the Team Leader.

107. The WorldFish Center was commissioned to implement the capacity-building project, both Phase 1 and Phase 2. The WorldFish Center engaged international resource specialists (IRS) to take charge of the implementation of the project components. The IRS have extensive experience in undertaking research in the areas of fisheries biology, policy development and socioeconomics, in packaging and conducting training courses, and in implementing technology transfer and information dissemination programs. The IRS were supported by Domestic Resource Specialists (DRS) with appropriate academic backgrounds and work experience.

108. The Phase 2 Inception Workshop was held on September 5, 2005 at the IFREDI Conference Room. The TA objectives, work plan and schedules, and expected deliverables were presented to 35 workshop participants from IFREDI, Department of Fisheries (DOF), UNDP and WorldFish Center. The participants discussed issues and insights pertaining to the necessity of linking research to practice, networking, and packaging and dissemination of information generated by research conducted under Phase 1 and by the DOF's collaborative projects.

109. The Mid-term Workshop, attended by 25 officers and researchers from IFREDI, DOF and WorldFish Center, and a representative of the FAO's Tonle Sap Environmental Management Project, was held on November 25, 2005. The three-month accomplishments of the TA and the planned activities for the rest of the project period were presented and discussed by the participants.

110. The Final Workshop was held on February 10, 2006 and was attended by 25 IFREDI/DOF researchers and officers led by the Director General, Mr. Nao Thuok, who delivered the Welcome Address. The TA team members presented the project accomplishments, lessons learnt and knowledge generated, and recommended future directions and challenges for IFREDI. Samples of the TA outputs such as the policy paper on "Cambodia's Aquarian Reforms: The Emerging Challenges for Policy and Research" and a poster on the "Importance of the Inland Fisheries in Cambodia" were ceremoniously turned over to the IFREDI Director, Mr. Srun Lim Song.

111. **Reporting System.** In addition to the monthly accomplishment reports, financial reports were submitted to the Finance Office of the WorldFish Greater Mekong Regional Office. Three copies each of the Inception and Mid-term Reports were submitted to ADB, IFREDI/DOF, and WorldFish Center on time.

IX. KEY LESSONS LEARNED AND KNOWLEDGE GENERATED

112. "Process Approach to Policy Development": slow-but-sure capacity-building technique
The efforts at initiating a "process approach to policy development" may be considered as a small step in the right direction. The involvement of the whole Institute in the "learning-by-doing" process of assessing the research needs of communities at the grass-roots level was a first step to highlight the need for research integration where biologists, socio-economists and technical persons (librarian, web-designer, etc) could talk collectively to the community leaders and understand the new needs which have arisen locally as a result of the community fisheries initiative of the government. This exposure program and the related lecture inputs became the basis for planning the national conference with the theme "Prioritizing Fisheries in the context of Cambodia's National Development and Community Aspirations," Though it was a slow process, it contributed to more long-lasting capacity-building and commitment to the cause as is evident from the enthusiasm and the demonstrated capability preparation for the organization of the conference.

113. **Policy briefs in Khmer: for greater information reach.** The common approach taken to link all the policy briefs to the institutional changes in the fisheries of Cambodia has produced a synergy of information output. Khmer version will ensure wider audience and greater dissemination of the views. This will foster more discussions about policy at all levels and not just to the top decision makers.

114. **IFREDI monthly meetings: venue for knowledge sharing.** The observation made about the increased engagement of the team members in the discussion of issues at the monthly meetings is a good indicator of progress in terms of skills and confidence building. These meetings also offer opportunities for IFREDI researchers to share ideas and knowledge and to discuss about future work. It is something that IFREDI might wish to continue after the project ends.

115. **Communication products and monthly public seminars: for greater visibility and image-building.** Documents, such as reports and policy briefs produced by IFREDI

researchers, will help establish IFREDI as a key institution in inland fisheries research. Their being published in Khmer and English will likely increase their potential uses and impacts on policy discussion. In addition to the national conference where the research results were presented, IFREDI may also benefit from the holding of public monthly seminars that showcase other research outputs. This will enhance IFREDI's 'visibility' and well-position it to lead important initiatives on research and policy formulation for inland fisheries in Cambodia as well as in the region.

116. **Tangible outputs: source of pride, motivation and excitement.** The positive influence of the TA Phase 2 has been obvious among the counterparts who have discovered the excitement, motivation and pride of being recognized for producing information that is tangible, professionally produced and widely distributed. This is a new perspective for scientists who used to be caught between domestic technical reports and inaccessible international publication standards.

117. "Triangulation" or close collaboration and sharing of insights among different disciplines/components comprising the TA team have become evident in this project. Triangulation is an interactive and interdisciplinary approach of sharing varied perspectives and insights of a research study in order to compare,, analyze initial findings and make some common preliminary conclusions and recommendations. A biologist, for example, can share his findings on the migration pattern of a dominant species which are fished by the fishing communities. The socio-economist can share with the biologist the significance of this species in terms of food security and livelihood of the fishers. Together, the biologist and socio-economist ca make some common recommendations on the use of appropriate fishing methods that will ensure better catch and income to the fisher without destroying the fishery resources. Joint field interview and consultation among the fishing communities have resulted to varied and often complementing perspectives on the problems and aspirations of the fishing communities in relation to their food security and livelihood. The exercise also provided the team members to assess the most efficient and effective way of disseminating information from research to the community.

X. DIRECTIONS AND CHALLENGES: SUMMARY OF RECOMMENDATIONS

A. Institute Management Systems

118. It is strongly recommended that IFREDI implement the administrative and management systems as contained in the operating manuals recommended under ADB TA 4025–CAM, as follows:

119. **Human Resources Development Plan:** The HRD Plan states the IFREDI policy and procedures of attracting qualified applicants, developing the present workforce, and adopting plans to maintain competent and loyal employees. Career planning and development strategies are explained in the manual for all IFREDI staff from research, technology transfer and information, and administration divisions. The career paths under the different divisions are shown in order to provide the staff with a clear vision of their career at IFREDI.

120. The methods of performance evaluation of all IFREDI staff are explained in the manual. For the semi-skilled workers such as clerks, assistants or those without decision-making responsibilities, the basis of evaluation will be on their inputs. Performance evaluation of unit and section supervisors and middle to top management (Division heads, Director and Deputy Director) will be based on outputs. The Key Result Areas (KRAs) of each management

personnel shall be agreed upon at the start of the evaluation period with his/her immediate superior.

121. Researchers/scientists should be provided incentives and rewards based on their outputs in the form of publications (scientific journals, technical reports, policy briefs, posters, technical brochures and flyers, video and radio clips, and other communication products). A point system, depending on the output, can be devised to formulate a reward and incentive system in the form of cash, promotions and other tangible benefits.

122. **Capacity-building:** Capacity-building activities (formal and "hands-on" should be institutionalized to form part of the HRD. Learning-by-doing and mentoring were found to be effective methods of teaching researchers to do better research, produce reliable scientific information on inland fisheries, and disseminate effectively to the various stakeholders. Technical writing skills should be a regular training course for researchers in order to improve their English language proficiency and their ability to write and publish scientific papers.

123. In-house seminars should be done to serve a venue for IFREDI researchers to present their research outputs before attending scientific workshops and conferences, and before submitting the manuscripts to scientific journals. These seminars shall serve as a forum for healthy critiquing of work by peers in the Institute and for senior scientists to give advice to junior researchers in improving their methods and manuscripts. This exercise also creates collegial relationships among IFREDI researchers.

124. **Financial Management Systems:** The manual provided overall guidelines, document systems and procedures in cash handling, accounting and reporting. The manual also provided procedures for accurate and timely information on the sources and uses of funds for directing human and capital resources in the most cost efficient manner. The manual also ensures proper and accurate reporting of all financial transactions and wise use of funds.

125. **Budgeting Manual:** The manual laid out a general guideline and procedures in budget planning, process and formulation of annual budgets including identification of the sources and application of funds, implementation of approved budgets, budget monitoring, reporting and control, budget calendar and flow charts and forms to be used.

126. **Purchasing Manual:** It provided the overall guidelines in requesting, purchasing, receiving, and issuing of items needed by different units/offices of IFREDI and to ensure honest and efficient purchasing practices.

127. **Asset Management Manual:** The Asset Management Manual has been finalized that will serve as guide in acquiring, issuing, recording, storing, and disposing of unserviceable fixed assets and equipment.

128. **Travel Procedures:** The Manual on Travel Procedures provides guidelines for making travel arrangements for IFREDI staff and official guests.

B. Research and Policy Challenges

129. Research planning and priority setting on demand-driven research studies should be institutionalized in the overall research programs and strategies. The process approach in determining the information needs of the stakeholders should be adopted in an interdisciplinary manner. This will require an effective consultation process through actual field interviews, general assembly meetings, and other interpersonal communication methods. IFREDI

researchers will learn first-hand the needs and aspirations of the stakeholders especially the fishers and farmers and other stakeholders such as policy makers, community-based organizations, fishery officers, and extension workers, development workers, researchers and the academe.

130. R&D thrusts of IFREDI should support the Sihanoukville Declaration (National Conference Statements) in order to prioritize fisheries in the context of the national development by: i) recognizing the true value of fish and fisheries in the country; 2) ensuring parents and school teachers to highlight to children what need to be done to take care of the water in the country so that fish will take care its people; iii) more careful investigation of life of fish species and make all citizens aware of the steps to be taken to protect the fish from harm; iv) becoming aware of measures taken in the other countries which will have adverse effect on fish life and mobilize public opinion on this; v) taking systematic steps to probe into the numerous ways in which people derive their livelihoods from fishing and assess its economic and socio-cultural significance; and vi) redefining research priorities to highlight the true contribution of fisheries in the economy.

131. R&D thrusts should also prioritize fisheries in the context of the community aspirations by: (i) promoting the initiative of community fisheries throughout the country and help communities stabilize their efforts to improve their lives; (ii) assessing the greater freedom and fresh opportunities which people have to related to the fish and water and prevent this from being taken back; (iii) understanding the new roles of women in community fisheries and how they can be more empowered to take greater initiatives in nurturing the resources which is under their stewardship; (iv) developing new organizational forms and alternative occupational activities which can combine to give greater economic self-reliance and generate greater self-confidence in the communities about their abilities to improve their living condition; (v) undertaking research with greater participation of the people, giving respect on their traditional knowledge; and working closely with official government institutions to give the community efforts legitimacy and political support; and (vii) build the capacity of the community in managing the inland fisheries resources to make them active and effective co-managers of the resource.

C. Technology Transfer

132. In order to sustain the initial success in the implementation of the operational plan on technology transfer especially the launching of various communications products (policy briefs, technical reports, poster, and video clips), the staffing and assignment of competent people to man the Division should be implemented in the next 3 months. The Division will be responsible in pursuing the technology transfer strategies and plans as contained in the Operational Plan.

133. Impacts assessments of use of the information materials should be conducted in terms of policy development and improvement, socioeconomic uplift of fishing communities, empowerment of the fisheries communities through active participation in resource management, and increase in compliance of fishery laws. Evaluation studies on the effectiveness of the dissemination strategies should be done regularly in order to improve the system as needed.

D. Governance Structure

134. The creation of a Board of Research Review is strongly recommended. The DOF Director, IFREDI Director and Deputy Directors, and key officers and senior scientists are urged to lobby for the approval of the recommend governance structure. The long-term benefits of the

structure will be greater opportunities for external funding and autonomy in setting priorities for research and development on inland fisheries.

E. Partnership and Networking

135. IFREDI should pursue the promotion of partnership and networking in the national, regional and international levels. Synergy and complementation with potential partners should be the main criteria in selecting potential partners with possibility of immediate collaborative R&D project implementation in inland fisheries.

136. SEAFDEC and CDRI partnership arrangements should be finalized by the signing of agreements of parties involved.

Table 3: Summary of Follow-up Actions

Follow-up action	Responsibility Center	Milestones
Full implementation of HRD, Financial Management systems and other administrative procedures	Director, IFReDI Head, Administration Division	1. Incentive and Rewards Systems in place 2. Financial Reports on Income and Expenditures
R&D activities	Socioeconomic and Biology Division	1. Research proposals 2. Research reports 3. Research publications
Technology Transfer plans and strategies	Technology Transfer Division	1. Design and production of communications products 2. Dissemination of communication products 3. Impact assessment of use of information materials 4. Uploading research publications and regular updating of website
Governance Structure of IFReDI	Director General, DOF Director and Deputy Directors of IFReDI	1. Submission of formal recommendation to the MAFF 2. Approval by the MAFF Minister

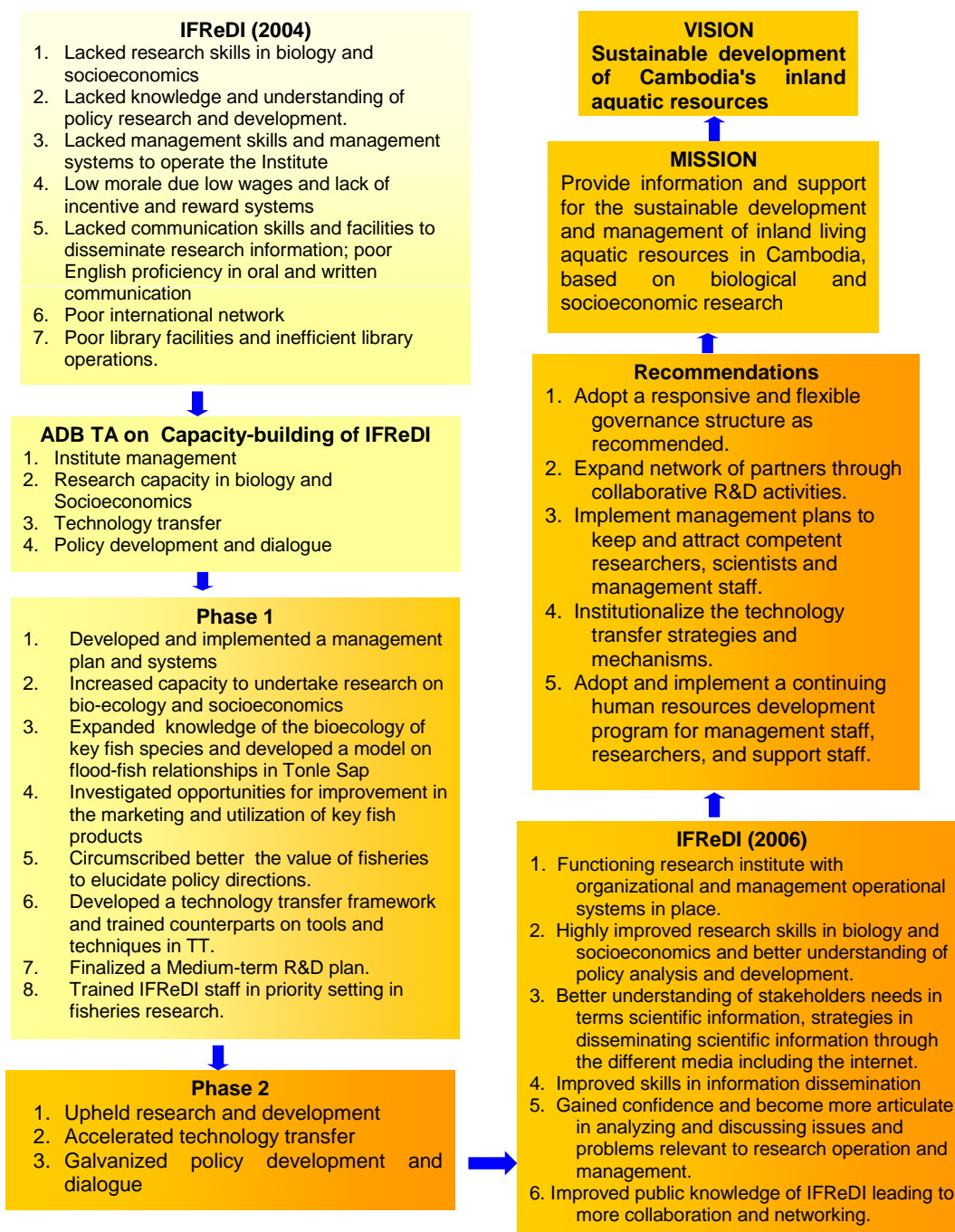
137. The IFREDI road map (Figure 2) leads the way to the sustainable development of inland fisheries in Cambodia. IFREDI management and researchers should continuously develop their skills in institute management, research and development, policy analysis and development, and communication strategies.

138. A very auspicious decision of the MAFF is the issuance of Declaration 090 dated March 3, 2006 that officially designated the officers and staff of the Technology Transfer Division (TTD) and movement and promotions in the Administration Division (AD) of IFREDI. AT TTD, Mr. Keng Seang, a very competent fishery socioeconomist and manager, was designated as Chief of the TTD. Designated Vice Chiefs were Mr. Heng Samay (Technology Transfer DRS under this TA) and Chuop Sokhan (Webmaster and Computer Administrator of ADB TA 4025–CAM and ADB TA 4563–CAM). In the Administration Division, Mr. Ou Sary, Administrative Assistant in both ADB TA 4025–CAM and ADB TA 4563–CAM, was designated as one of the Vice Chiefs. In an earlier Declaration, Dr. Chhoun Chamnan, Technology Transfer DRS in this TA, was also designated as one of the two Deputy Directors of IFREDI. This action of the officialdom of the MAFF, with strong endorsement by the IFREDI and DOF officials, proves that the efforts of the two TAs on the capacity-building of IFREDI have been highly recognized. With "graduates" of

the two ADB TAs on capacity-building now well placed in the organizational structure of IFREDI, this will also ensure the continuity of the plans and strategies of the IFREDI R&D activities set during the two TAs in order to meet its goals of providing relevant scientific information to the various stakeholders that will lead to the sustainable development of the inland fisheries.

139. This is just the beginning for IFREDI. It should be proactive in searching for opportunities through partnership and collaborative work with R&D organizations in the country and in the region. As the sole R&D institute focused inland fisheries in Cambodia, it should endeavor to provide the relevant and much needed scientific information which will lead towards a sustainable development of Cambodia aquatic resources.

Figure 2: IFREDI Road Map to Sustainable Development of Inland Fisheries



TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Goal</p> <p>Sustainable management and conservation of natural resources and biodiversity in the Tonle Sap Basin</p>	<ul style="list-style-type: none"> • Fisheries research is catalyzed. • Systems and capacity for natural resource management are enhanced. • Planning and management follow integrated, cross-sector approaches to the Tonle Sap Basin. • Stakeholders participate in decision making. • Rural livelihoods are sustained and improved. • Policies and institutions are pro-poor. 	<ul style="list-style-type: none"> • Government statistics • Research program publications • Policy statements • Funding for research 	<ul style="list-style-type: none"> • There is still opportunity to alter the current trends in the resource use before natural systems are irreversibly damaged. • There are sufficient win-win options that jointly benefit resource conservation/biodiversity and sustainable livelihoods. • Political will is adequate to recognize trade-offs and promote policies and management decision favoring long-term sustainability over short-term economic gain.
<p>Purpose</p> <p>To build further the skills and awareness of staff of the Inland Fisheries Research and Development Institute (IFREDI), so that it is better able to disseminate research findings relevant to improving policies and management.</p>	<ul style="list-style-type: none"> • Topics for research synthesis are selected that are highly relevant to decision-makers. • Research is undertaken in close collaboration with IFREDI and findings are disseminated. 	<ul style="list-style-type: none"> • Technical assistance (TA) framework • Final report by the WorldFish Center • TA completion questionnaire filled out by the Department of Fisheries (DOF) • TA completion report prepared by IFREDI • TA completion report prepared by ADB 	<ul style="list-style-type: none"> • DOF, IFREDI, and other relevant institutions have a clear vision about the sector goal to which the T.A. will contribute. • Trained counterpart staff remain at IFREDI.
<p>Outputs</p> <ol style="list-style-type: none"> 1. Research and development are upheld. 2. Technology transfer is accelerated. 3. Policy development and dialogue are galvanized 	<ul style="list-style-type: none"> • Findings are synthesized • Materials are disseminated • Twinning arrangements are promoted and concluded • The governance structure is elucidated and recommended • The skills and awareness of IFREDI staff are built through on-the-job training, learning-by-doing, and formal training courses 	<ul style="list-style-type: none"> • TA framework • TA reports and review missions • Tripartite meetings • Policy briefs • Other research dissemination materials 	<ul style="list-style-type: none"> • DOF and IFREDI understand clearly the purpose of the T.A. and how it is to be achieved. • TA outputs are publicized and disseminated, and lend themselves to follow-up analysis and action, including status reports and recommendations to DOF for management purposes.

<p>► Technology transfer</p>	<p>prepared by the end of month 2</p> <ul style="list-style-type: none"> • Socioeconomic conflicts over property rights, resource access, technology, markets, and fishing effort are analyzed by the middle of month 2 • Findings are synthesized by the end of month 3 and recommendations are made by end of month 5 • Training is provided to counterpart staffs from month 2 • Meetings with fisher folk are organized to share research findings in the field and test recommendations by the end of month 3. • Materials for technology transfer are designed from month 3 and formal training is done in month 6, such as <ol style="list-style-type: none"> 1. Synopsis on economic values of inland fisheries, 2. Technical report on conflict over property rights and resource access in markets and fisheries, 3. Policy briefs for stakeholders on items (1) and (2). 4. Webpage updates of Phase 1 research outputs starting month 3 • Counterpart staffs are activated in the field of technology transfer from month 1 • The two-year operational plan for technology transfer and sets of information dissemination strategies are implemented from 		
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<p>► Policy development and dialogue</p>	<p>month 1</p> <ul style="list-style-type: none"> • Technology transfer packages are designed by month 3 • Twinning arrangements with 2 research and development institutes are promoted and concluded by the end of month 6 • The governance structure that will guide IFREDI most efficiently and effectively toward professionalism and excellence is elucidated and recommended by the end of month 6 • Press briefings are held on a regular basis to inform civil society • At least one information material (poster, brochure, flyer, video clip etc) for each discipline (biology, socioeconomics, community fisheries, fisheries domain, and aquaculture will be designed, produced, and delivered starting from 4 (Operational Plan of Techno-Transfer of IFRDI) • Webpage updating will be done starting month 2. <ul style="list-style-type: none"> • Provision of policy inputs to key stakeholders continued from month 2 • Feedback from policy dialogue is assessed and approaches are refined in response from month 2 • Findings are synthesized and recommendations 		
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	<p>are made from month 3</p> <ul style="list-style-type: none">• Training is provided to counterpart staffs from month 2• Materials for technology transfer are designed from month 3, such as<ol style="list-style-type: none">1. Policy briefs based on socioeconomic and biological inputs;2. Policy brief on national, sectoral concerns and IFREDI position.3. Summary of sub-decree on community fisheries.• The governance structure that will guide IFREDI toward excellence is elucidated from month 1 and recommended by the end of month 6		
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IFREDI Technology Transfer and Information Dissemination Framework, Strategies and Work Plan

A. Linking Research to Practice (Guiding Principles in the IFREDI Technology Transfer Strategies)

Linking Research To Practice (Excerpt from Dr. Olivier Serrat's Message ADB TA 4563–CAM Inception workshop—5 September 2005)

1. Research encompasses two major activities: generation and dissemination of new knowledge and technology. In setting a research agenda, the dissemination of research findings should be given as much importance as the processes of generating them. The imperative goal of dissemination is utilization by the intended clientele.
2. For dissemination of research findings to be effective and efficient, it should be made part of the research agenda right from its (agenda's) inception. Each research agenda must have a dissemination policy, a dissemination plan and a dissemination strategy.
3. The dissemination policy reflects the vision and mission of a research institution, and sets out the values and measures that will be applied to help achieve the institution's goals through access to information content.
4. The dissemination plan lays out the processes that will link research to practice. A good dissemination plan should set the desired impact and outcomes; identify its intended users, their characteristics and needs; determine the information contents that are suitable for the needs and capacities of the intended clientele, and ensure that these are accurate and relevant; determine the medium and pathways appropriate for each clientele group; determine the appropriate time and context of execution; identify the obstacles to plan execution and to clientele access; and, identify the criteria for measuring accomplishments, and who will gather the data. A good dissemination plan harnesses and builds on existing resources, relationships and networks, and establishes new ones.
5. The dissemination strategy addresses issues that may cause the dissemination plan to fail. The issues may have to do with the users' ability to use the information content and to accept change brought about by new knowledge and technology; the perceived credibility, competence and motives of the source of information; the level of the users' confidence in the quality, relevance and utility of the information content; the context – professional, social, economic and industrial climates – in which the plan execution takes place; and the client-suitability, cost-effectiveness and timeliness of the medium and pathways of dissemination.
6. To link research to practice, R&D institutions employ both basic and advanced tactics of dissemination. The basic tactics refer mainly to written forms such as research reports and summaries, articles in journals and magazines/newspapers, and referencing materials in libraries, websites, databases and CD-ROM. The advanced tactics refer to dissemination via press and professional conferences, verbal feedbacks to published materials and verbal briefings, networks meetings, and integration of information content in training and academic degree courses.

B. IFREDI mission and policy statements

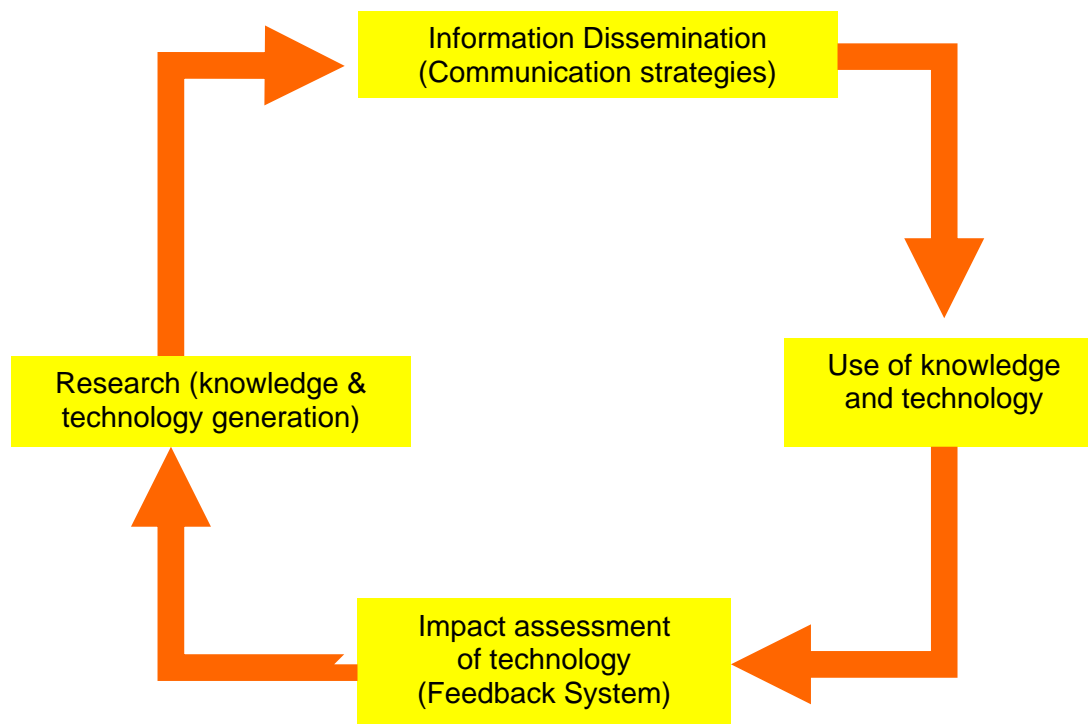
7. The IFREDI is mandated to promote the sustainable development of Cambodia's inland aquatic resources and help ensure the country's food security, and economic prosperity. Towards this end, the IFREDI shall provide its stakeholders scientific information and technical support for the management of the country's fishery resources.

8. Technology transfer policy statement: IFREDI shall disseminate accurate and relevant scientific information to all stakeholders in the most appropriate and efficient manner and in a timely fashion.

9. In the context of research and development, technology shall mean the accumulated knowledge and information needed to improve the social and economic well-being of society.

1. Framework, strategies and pathways

10. The conceptual framework of technology transfer (Figure 1) shows the flow of generating and disseminating knowledge or information using various communication pathways in order to reach the users effectively and efficiently. A feedback and monitoring system on the impacts of disseminated technology is an integral part of the research-dissemination-research cycle.



2. Technology transfer strategies and pathways

11. The technology transfer and communication strategies shall: (i) characterize the different stakeholders in terms of need, ability to absorb the information, and time needed to absorb the information; (ii) assess the appropriate research products (policy briefs, technical reports, brochures, etc) that will cater to the different clientele; (iii) evaluate the alternative delivery

systems or the communication channels to effectively and efficiently reach the target users of the information; and, (iv) adopt a feedback and monitoring system to assess the impacts of the different dissemination strategies, both qualitatively and quantitatively.

a. Characterization of Clientele/Stakeholders

12. The IFREDI clientele is classified into four categories: (i) highest level—the national government policy makers, planners and technocrats; (ii) second level—R&D institutions, NGOs, donors, academe; (iii) third level—local government units and community-based organizations (fishing and farming communities); and (iv) internal stakeholders - IFREDI/DOF staff.

- (i) **Policy makers, planners and technocrats.** Policymakers, planners and technocrats are highly-educated people who are hired to study, analyze, evaluate, and recommend policy options for the improvement of the well-being of the national constituents. Extremely busy with affairs of governance, their time is precious and must be used judiciously. They are supplied with voluminous information, sometimes conflicting ones. They are influential people who make decisions or recommend decisions that affect the lives of the great majority of the people. The information given to them must be clear, concise and direct-to-the-point and should be easily accessible.
- (ii) **Researchers, academicians, donors, and NGOs.** Researchers and academicians are scholarly, orderly and systematic (most of the time), and are precise in the use of language (scientific and technical). They devote most of their time searching for and acquiring new knowledge relevant to their particular field of specialization. They look for information to improve their research methodologies, compare their studies with those of other researchers, and make professional contacts with other researchers. Their careers hinge on their scientific outputs based on publications they produce and the effectiveness of disseminating or sharing their findings with the scientific world. Donors are generally development-oriented. The returns on their investments are measured in terms of the number of people who are benefited by the research activity and the sustainability of research intervention at the end of the project. The professional staff of donors are highly-skilled in the management and operation of projects. They spend a portion of their time analyzing project reports to make sure that the objectives are met within a given time frame and budget. The information needs of donors range from policy-relevant reports, scientific and technical publications to current developments and general information. The language for disseminating information to them is scientific and technical, concise and direct-to-the-point. NGOs are likewise development-oriented. Their primary concern is to ensure that benefits from development activities, especially if loan-financed, truly reach the target beneficiaries. The information needs of NGOs can range from the highly technical reports to simple, easy-to-understand materials that can be used in community-based projects. The professional staffs of NGOs are strong in community work and effective in advocacy of critical issues and policies that have long-term impacts on the community and the environment.
- (iii) **Local government units, provincial fishery offices, community-based organizations (fishers and farmers).** Local government units and provincial officers are both clients and partners of IFREDI. The Cambodian government has adopted a decentralization policy and so the community councils and the community fisheries offices will play important roles in assessing the information

needs of the fishing and farming communities. Their collaboration is also needed for the effective delivery of information to the people. They are involved in extension work and are in close and constant communication with the community. Their information needs include socioeconomic profile of the community, scientific information on the natural resources, relevant government policy notes, and easy-to-understand technology manuals. The establishment of community-based organizations of fishers and farmers has provided a strategic vehicle for disseminating information to the local people on matters that affect their food and livelihood. The level of education of the rural poor is low and their skills are limited mostly to traditional methods of catching fish, growing crops and raising animals for their daily sustenance. Recent efforts of donor agencies and NGOs to empower poor rural communities in Cambodia have started to create awareness about the importance of taking care of the natural environment and the need for participatory management of the natural resources. They need information on how to improve their source of income, sustain their source of food, and provide the basic necessities of their families (food, shelter and education). They also need information on the state of their resources (fishery, forestry, etc) that are useful in training them to be active partners in resource management. Information materials must be in the local language and disseminated through media that are easily accessible to them.

- (iv) **Internal clientele (IFREDI/DOF staff).** It is ironic, to say the least, that an IFREDI researcher has presented his/her research results in international scientific conferences but other researchers in the next room are not even aware of the research project. Such is the case at IFREDI. Thus, there is an urgent need for the setting up of an internal communication system that will provide information (research, training, administrative) to the staff.

b. Research Products

13. Research reports are usually prepared by researchers upon completion of their research projects for submission to the head of the research agency and to the funding agency. Many research reports, however, just end up gathering dust in the cabinets of the researchers, heads of offices, and even of funding agencies. There has been a great waste of research funds, dwindling as they are, because of the lack of policies and mechanisms for disseminating valuable information generated from research. IFREDI should, therefore, strive to disseminate their research findings to their various clienteles.

14. Research reports necessarily undergo some "processing and re-packaging" in order to convert them into appropriate forms or products (policy briefs, brochures, video clips, etc.) and using languages (scientific, technical, layman) that will be easily understood by the intended users of the information. For research products to be acceptable and useful, it is important that they be adapted to the characteristics, capabilities, idiosyncrasies and location of the users.

15. The following are the main research products: Scientific publications and Journal publications

- (i) Journal publications are the standard media for disseminating primary information from research. Manuscripts submitted to journals for publication undergo peer review to ensure the quality and integrity of the scientific paper. IFREDI senior researchers (with PhDs and MScs) will be encouraged to publish in scientific journals. This will require training in technical writing and close supervision by "published" scientists from within and outside the country. In

research, the motto is "publish or perish." This TA will conduct a course on technical writing for IFREDI/DOF researchers to assist them in preparing quality scientific manuscripts. Fishery journal readers are multidisciplinary researchers and scientists (fishery biologists, aquaculturists, fishery economists) and academicians (faculty and students of fisheries).

- (ii) Proceedings of scientific conferences and forums. There have been many scientific conferences in fisheries in and out of the region encouraging fishery researchers to present their results. IFREDI researchers have attended these conferences. IFREDI researchers should prepare quality manuscripts (well-critiqued and edited) to effectively disseminate their research outputs to peers in fishery science in the region and throughout the world. In some cases, papers submitted for presentation in scientific conferences are peer-reviewed before they are included in the proceedings. In cases where the papers are not peer-reviewed, it is the responsibility of the researchers to ensure the integrity of their research output. Readers of proceedings are also primarily researcher-scientists and academicians. Government development workers and NGOs are also users of information from proceedings.
- (iii) Technical Reports. Technical reports are scientific information materials that are produced internally (in-house-publications) by the research agencies. Most undergo in-house review. Readers of fisheries-related technical reports are fishery researcher-scientists academicians, development workers involved in fishery communities and policymakers.
- (iv) Non-scientific information materials.
 - Policy briefs - are syntheses of related research reports and publications that focus on specific issues of national significance, e.g. value of fisheries in the Mekong region, fisheries resource management, etc. Normally, policy briefs are prepared by an interdisciplinary team of researchers because of the cross-sectoral implications of the policy. Policy briefs are read by policymakers, planners and technocrats; therefore, the language must be concise and direct-to-the-point.
 - General information and updates on developments in the technological, bio-physical, socioeconomic fields. General information and updates on developments in the technological, bio-physical and socioeconomic fields are generally extracted from scientific publications and technical reports. They are intended for the general public and so their form (brochures, manuals, video clips, etc.) and language are necessarily simple and layman. Examples of the contents of these research products are technology tips and 'how-to's, market updates, and general information on natural resources and government policies.

c. **Communication and Multi-media Mix Strategy**

- (i) **Print**
 - **Books, brochures, flyers.** Reference books may be produced as outputs of research that provide substantial specific and general information on fish biology and socioeconomic background of fishing communities in Cambodia. Brochures and how-to manuals may be used to reach out to fishers and aquaculturists. Using layman's language, preferably local language, the brochures are designed for easy reading and understanding. In some cases, brochures may be sold, especially to aquaculturists. Institutional flyers may be produced in English and Khmer for image-building of IFREDI.

- **Newspapers/magazines.** Newspapers and magazines will be used to disseminate information—in straight news and feature story forms—regarding important activities of IFREDI. Depending on the nature of the information being disseminated, IFREDI may use either the local English newspapers and magazines, or the Khmer newspapers/magazines.
- (ii) **Radio and television.** The radio will be used primarily to reach out to fishers, fish vendors and middlemen, and fish processors. Techno-tips and calls for community assembly and participation in seminar-workshop and training courses may be broadcast in early morning, noontime, and evening programs. Some local television stations have public affairs programs for discussion of issues and for showcasing government development projects. These public affairs programs may be used by IFREDI to showcase its own projects and to disseminate information regarding its training courses and seminar-workshops. The television may also be used for demonstration of technologies for fish culture, handling and processing, and environmental care.
- (iii) **Audio-visual aids.** Audio-visual aids such as video/audio clips, and tapes and CDs for documentaries and instruction/demo are effective communication tools. The Institute will produce documentaries of its programs and projects for showing to visitors; video and audio clips for TV and radio broadcast; and instructional/demo tapes and compact discs on technologies for fish processors, fishery faculty and students, researchers, and development workers.
- (iv) **Interpersonal contact**
- **Policy briefings and dialogues.** Policy briefings and dialogues provide a venue for discussion of critical issues among different stakeholders.
 - **Seminar-workshops and in-situ training.** Seminar-workshops and in-situ training are effective means of teaching clients on the use of specific information and technology. Community assemblies will be conducted for consultation with fishing communities and local government units.
- (v) **Internet/Webpage.** The IFREDI webpage www.IFREDI.org will be optimally used for the dissemination of research information. IFREDI's capability to harness the Internet for this purpose is a major part of IFREDI's technology transfer strategy. Many of IFREDI's publics—researchers, students, academicians, government policymakers and decision-makers, fund donors, collaborators—are wired. During TA Phase 1, 75 access points for the Internet were installed. Using the 10 computers purchased during the TA Phase I, and other computers in the Institute, the Project's international resource specialists and their local counterparts have full access and use of the Internet. The system is open 24 hours to all IFREDI researchers and staff, as well as to WorldFish and MRC consultants.

d. Technology transfer pathways

16. Figure 2 shows the overall scheme of the IFREDI for disseminating scientific information. The diagram shows the flow of information (research products) from the source (research) to the different users through an array of delivery systems that have been determined to be suitable for the various stakeholders.

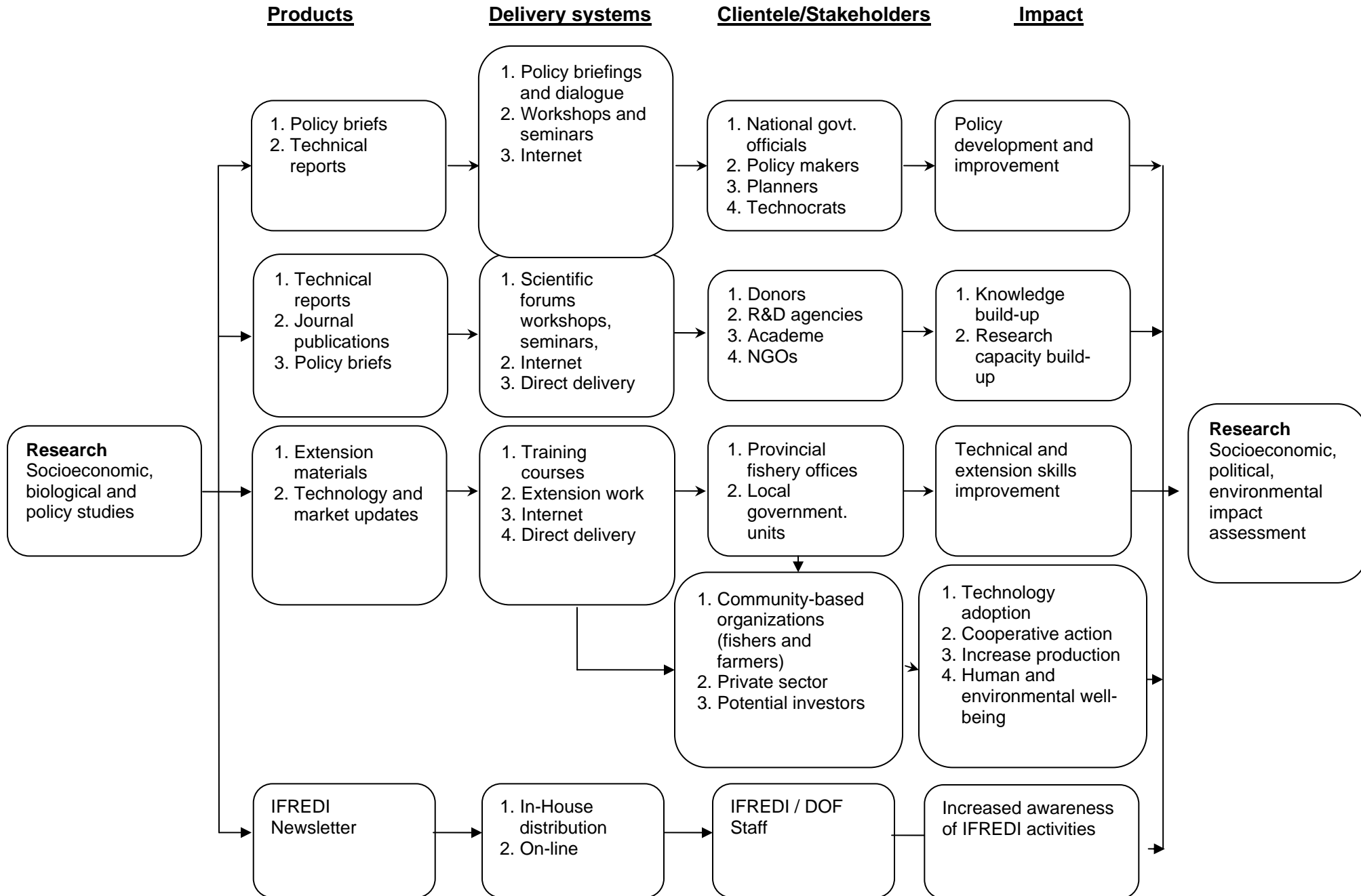
e. Pricing mechanisms

17. The guiding principles in costing and pricing the technology transfer products are affordability and competitiveness. The pricing mechanism of information materials (print, audio-visual, multi-media) will follow the full-cost approach in the long term. The full-cost approach will include the direct cost of labor and materials, the indirect cost of management and production overhead, and depreciation of production equipment.

18. In the short-term, however, it is suggested that direct cost, or the variable cost of production (inputs such as paper, ink and other supplies and hired labor, if any), shall be fully covered. Depending on the "marketability" of the products, a reasonable mark-up will be added to the direct cost to cover partially the fixed and other overhead costs. This will be the initial selling price of the information materials.

19. At present, however, the information materials produced with external funding from DANIDA, MRC, and ADB will be given free to the clientele. This will also serve as a promotion of IFREDI as a reliable provider of valuable scientific information.

Figure A2: Technology Transfer Pathways



Technology Transfer Pathways

- The technology transfer pathways show the distribution and dissemination channels of the communication products to reach the various clientele/stakeholders of IFREDI. The various products (policy briefs, technical reports, journal publications, posters, video clips etc) can be delivered through one or a combination of various delivery systems.
- Interpersonal approach as in policy dialogues, village general assemblies, and field extension work are very effective because it is interactive and gives the audience the opportunity to verify or invalidate any of the information contained in the information materials. The researcher, extension worker, or the technology transfer specialist can have actual feedback on the impacts of the information disseminated to the intended audience. Personal communication also gives the researchers or the extension worker the opportunity to explain the information in a more layman and easy-to-understand language especially among the fishing communities with low educational attainment. Communication materials can be distributed during these meetings and training field extension activities.
- The printed products may be distributed through direct mail or delivery to offices and/or houses of clients. IFREDI should always maintain an updated mailing list of the subscribers/stakeholders.
- The video clips should be shown in the local television stations. All the three video slips have duration of 18 minutes which should be able to catch the attention of the viewers. The video clips will be also shown during village meetings and conferences. All provincial fishery officers and local NGOs shall be provided with sufficient numbers of DVDs. IFREDI can easily and cheaply "burn" copies of the video clips for distribution to the intended clientele.
- The www.IFREDI.org website should always contain downloadable materials to reach out to customers from all over the world.
- A feedback mechanism must be set in place in order to regularly assess the socioeconomic, political, and environmental impacts of the research information on the various stakeholders and the effectiveness of the marketing system of the communication products.