



Medium Term Plan

2007 - 2009



Medium Term Plan 2007-2009



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WorldFish Center: Our Mission, Vision and Values

The WorldFish Center is part of the Future Harvest Alliance of international research centers supported by the Consultative Group for International Agricultural Research (CGIAR).

The WorldFish Center's **Mission** is:

“To reduce poverty and hunger by improving fisheries and aquaculture”

Our Vision is:

“To be the science partner of choice for delivering aquaculture and fisheries solutions for developing countries”

Taken together our Mission and Vision clarify our fundamental purpose and ambition.

Our Values codify the principles by which we will operate as an organization to achieve these ends:

- Our two most fundamental values are integrity and trust. We will trust each other to be honest and open, and hold one another accountable for honoring that trust.
- In the workplace, we will strive for fairness and equity. We will provide equal opportunities for all staff, recognize achievement, celebrate diversity and respect individual dignity. We will strive to practice effective leadership at all levels and empower staff so that they can give their best.
- In our work, we will search for excellence and innovation in all that we do. We will continually seek to improve the quality and efficiency of our products and services, and accept the need for risk taking and genuine mistakes as opportunities for learning.
- We will also value teamwork over individual effort, sharing knowledge amongst ourselves and our partners to build on our collective strengths and interdependencies.

A. Overview

1. Introduction

This Medium Term Plan (MTP) sets out the plans for the WorldFish Center to pursue its mission within the context of current global events, and in response to feedback from partners and other external sources. The Plan continues the process of change that the Center commenced in 2005, with a consolidation of its new organizational structure, the development of an updated research strategy, and the sharpening and re-aligning of its research focus.

The challenges for global fisheries and aquaculture are immense, and have remained largely unchanged in recent years; increasing threats of over-exploitation and stock collapse continue to dominate the wild capture sector, while rapid growth of aquaculture production brings with it growing concerns about sustainability.

According to statistics from the Food and Agriculture Organization of the United Nations (FAO), the total world capture fisheries production in 2003 was 90.2 million tonnes. Over the last three decades this figure has changed little, and concerns regarding the livelihoods of fishers, the sustainability of fisheries and of the aquatic ecosystems upon which they depend continue to escalate. Further fishery collapses would undoubtedly lead to hardship, particularly in the case of small-scale fisheries. Statistics provided by FAO in 2002 showed that out of the world's 29 million fishers, 20% or 5.8 million were small-scale fishers earning less than US\$1 a day. Another 17.3 million of those falling under the income-poor category were at least partially dependent on upstream and downstream fisheries activities such as boatbuilding, marketing and processing. Thus, as many as 23 million income-poor people plus their dependents rely on small-scale fisheries. An absolute priority for the small-scale fisheries sector is to increase their resilience to ecological, social and economic change.

In 2003 aquaculture contributed 42.3 million tonnes (32%) of total world fish production. Over the last two decades, aquaculture has been one of the world's most innovative and rapidly growing food sectors, with notable investment, technical development and growth in many regions. This has had significant and positive effects on rural and urban food supply and on income and employment in many developing economies. Based on current per capita consumption targets and future population growth, and with limits to growth in most capture fisheries, aquaculture is being promoted as the means for satisfying the world's growing demand for aquatic food products. Though the means may exist to do so, however, the expansion and growing internationalization of aquaculture has been accompanied by increasing concern over environmental impacts, inequity and social exclusion. Apart from addressing technology problems to improve efficiency and productivity, aquaculture development must also focus on issues pertaining to social equity and environmental sustainability.

In light of these challenges facing fisheries and aquaculture the Center has implemented a broad program of change that is designed to better position us to pursue our mandate more effectively over the coming decade. Central to this change process has been an updating of the Center's strategy and in turn the research structure that we will use to implement this. The Strategy Update¹ is rooted in the Center's Mission, Vision and Values and guided by the Millennium Development Goals (MDGs). These goals set a benchmark for achieving our Mission against which our actions can be judged in the medium term. To drive performance over the next 3-5 years we have identified three Thematic Goals, from which our annual quantified Key Performance Goals (KPGs) are derived. Organized around five key stakeholder groups, our 2006 KPGs (Annex I) operationalize our Thematic Goals for the year and provide the detailed set of

¹ A summary of the strategy update can be found at: <http://www.worldfishcenter.org>

measurable targets to be achieved. A fundamental principle for WorldFish is that the KPGs set at the organizational level are cascaded down to operational units and individuals, thereby ensuring clarity, alignment and engagement with our objectives.

The most fundamental strategic choice we have made is where we will be active. Answering this question has required us to be as specific as possible about the kind of research we will do, the categories of outputs we will produce, our key technologies, and the geographic and aquatic segments we will focus upon (Figure 1). We have also sought to be very clear about how our activities add value and deliver benefits and how we can partner with others to undertake research.

Building on this analysis and our review of the challenges facing world fisheries and aquaculture the Center is now focusing its research on those areas where we believe our comparative strengths are greatest. Accordingly we will give emphasis to resilient small-scale fisheries (SSF) where fishers are among the poorest of the poor, and on pro-poor aquaculture approaches where technologies, governance arrangements and investment are amenable to the poor and




Areas of WorldFish Activity Based on Research Disciplines			
	Natural Resource Management	Aquaculture and Genetic Improvement	Policy, Economics and Social Science
 We will increase	<ul style="list-style-type: none"> • Development of tools for small-scale fisheries management; • Fisheries analysis for management of inter-sectoral basins and coastal zones; • Ecological assessment; • Research support for management approaches involving interaction between water and fisheries. 	<ul style="list-style-type: none"> • Synthesis of lessons and approaches for management of production systems (including environmental and health); • Genetic improvement; • Development of dissemination methodologies; • Coordination and synthesis of research on low-cost feed and shmeal replacement; • Development of livelihood options based on adding value to aquatic products; • Focus on coastal aquaculture. 	<ul style="list-style-type: none"> • Institutional and governance analysis; • Gender analysis and the role of fish in human development; • Development of tools for policy development and decision-making; • Analysis of trade and market access and private-sector development; • Studies of small-scale fisheries and their role in decentralized governance and economic development; • Research support for local (rural) commercial approaches to development; • Economic analyses of ecological/environment issues.
 We will maintain or adapt	<ul style="list-style-type: none"> • Knowledge bases; • Stock enhancement. 	<ul style="list-style-type: none"> • Dissemination of new breeds; • Focus on inland aquaculture. 	<ul style="list-style-type: none"> • Impact assessment; • Resource valuation; • Co-management arrangements and their (real) implication for poverty reduction through small-scale fisheries.
 We will not do	<ul style="list-style-type: none"> • Lab-based genetic analysis research; • Development of tools for stock assessment of single species. 	<ul style="list-style-type: none"> • Development of post-harvest technologies; • Breeding and culture research; • Development of technologies for fish disease diagnosis and treatment; • Extension of aquaculture technologies. 	<ul style="list-style-type: none"> • Direct (operational) support to community-based management in Asia; • Traditional farm-management surveys at the micro level.

Figure 1. Extract from the WorldFish Strategy Update 2005, describing the areas of activity that we will increase over the next three to five years, shown from the perspective of the research disciplines. Also shown are those aspects of our work that will be maintained with current levels of emphasis and investment and those areas where we will not be active ourselves. A summary of the strategy update can be found at: <http://www.worldfishcenter.org>

friendly to the environment. In doing so we will directly address the challenge set by the MDGs through our role in knowledge generation, knowledge synthesis and knowledge sharing, and we will look to other organizations to play the leading role in knowledge application-extension activities and technology dissemination. To help achieve this we will build strategic partnerships with such organizations. Geographically we will continue to increase attention and resources allocated to our research in Africa, but in the near term will also sustain activities in Asia and the South Pacific.

There is strong evidence that women in many economic sectors, including those in the fisheries industry, have often borne the brunt of poverty. The Center recognizes that women and girls bear the brunt of poverty in poor fishing communities as a result of their subordinate position in the family, their lack of education or low academic qualifications, and the absence of decision-making. We believe that gender mainstreaming in the fisheries sector will help to provide gender equity in giving opportunity for economic development and self-empowerment to women. The Center is therefore committed to research that places priority on the gender dimensions—sex disaggregated data, gender analysis and gender mainstreaming are important components in our research work.

Table 1: WorldFish activities in relation to CGIAR research priorities

WorldFish Activities in Relation to CGIAR Priorities				
1. Sustaining biodiversity for current and future generations	2. Producing more and better food at lower cost through genetic improvement	3. Reducing rural poverty through agricultural diversification and emerging opportunities of high-value commodities and products	4. Promoting poverty alleviation and sustainable management of water, land and forest resources	5. Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger
1A: Promoting conservation and characterization of staple crops	2A: Maintaining and enhancing yields and yield potential of food staples	3A: Increasing income from fruit and vegetables	4A: Promoting integrated land, water and forest management at landscape level	5A: Improving science and technology policies and institutions
1B: Promoting conservation and characterization of underutilized plant genetic resources	2B: Improving tolerance to selected abiotic stresses	3B: Increasing income from livestock	4B: Sustaining and managing aquatic ecosystems for food and livelihoods	5B: Making international and domestic markets work for the poor
1C: Promoting conservation of indigenous livestock	2C: Enhancing nutritional quality and safety	3C: Enhancing income through increased productivity of fisheries and aquaculture	4C: Improving water productivity	5C: Improving rural institutions and their governance
1D: Promoting conservation of aquatic animal genetic resources	2D: Genetically enhancing selected high-value species	3D: Promoting sustainable income generation from forests and trees	4D: Promoting sustainable agro-ecological intensification in low- and high-potential areas	5D: Improving research and development options to reduce rural poverty and vulnerability

Key – Relative research emphasis  > > >

WorldFish Programs and CGIAR Research Priorities

WorldFish continues to review its programs to ensure that they remain relevant to global development needs. In the past year we have also paid particular attention to the congruence

between our research activities and the new CGIAR research priorities for the period 2005-2015, which we have described in a new publication². Many of our programs and achievements support the CGIAR system priorities (see Table 1) and we will ensure that our current and future programs align with this requirement (see section on Project Narratives for 2007-2009 and the allocation of resources to system priorities).

2. Building for the Future

The analyses that resulted in our 2005 Strategy Update and the subsequent findings of the External Program and Management Review (EPMR) panel in 2006 have provided WorldFish with a clear agenda for consolidating and building on the change process we have embarked upon. This section addresses some of the key issues for focus that emerged from these analyses.

Implementation of EPMR Recommendations

The Worldfish Board of Trustees (BoT), together with Management, considered the report of the 3rd EPMR when it met in Penang from 6-9 March 2006. The Center acknowledges the Panel's explicit recognition of the impact of our work on poverty, and will be seeking to increase this as we implement our Strategy by strengthening our focus, partnerships and internal capacity and welcomes the Panel's conclusion that the Center has been a good investment for our donors.

Many recommendations converge with initiatives already underway in the Center to strengthen regional impact, increase science output, improve management efficiency, and streamline governance. The need for increased scientific focus and the development of strategic partnership is being directly addressed through the Center's recently updated research strategy (Table 1). This is being implemented beginning in 2006, and will see an increase in focus on key regions (especially Sub-Saharan Africa) and key topics (e.g. small-scale fisheries). The Center is also embarking on an ambitious program of investment in new scientific staff at the senior and junior levels. These new staff will focus on specific priorities set out in the Center's updated research strategy and will augment the Center's output of peer-reviewed publications.

Details of the Center's plans to implement its responses to the EPMR recommendations are set out in Annex III.

Defining the research agenda

As a comparatively small research organization with an ambitious mission, it is important that the Center clearly defines the major research challenges where it will concentrate its research activities in order to achieve maximum impact. It is with this requirement in mind that we have developed the concept of the WorldFish Campaign. Campaigns are intended to provide a clearer and more integrated picture of the fisheries and aquaculture research that is needed to help achieve the Millennium Goals, together with the scale of impact expected from the investment.

The campaigns will be organized around a set of outcome focused, time-bound goals that are designed to make a difference to the poor at the global scale. These campaigns are not intended simply as an ambitious and focused research program for WorldFish alone, nor are they conceived as a management structure or program. Rather, they are explicitly intended to be broader in scope and to provide a framework for action which can help to align the interests, capabilities and efforts of a wide range of partners and collaborators to address the key research problems at hand. We envisage these campaigns as devices for articulating the problems to be solved,

² "Addressing Global Development Needs: Strategic Research by WorldFish and the CGIAR" which is available at <http://www.worldfishcenter.org>

defining the interlocking pieces needed for solving them and for monitoring progress in delivering solutions. In meeting this need they will also serve to synthesize information, integrate experience, and challenge thinking on priority issues for the next ten years. Intended to produce alignment and co-investment around major issues affecting poor fishing and fish-farming communities, these campaigns directly address the need for the new development partnerships identified in the MDGs.

Box 1: Resilient Small-scale Fisheries

Objective: To secure and improve food access and income for 50 million poor fishing households by 2015.

Most of the world's fishers live in developing countries and work in small-scale fisheries. These fisheries make important but poorly quantified contributions to national and regional economies, and to the food security and development of many millions of people. Individually, SSF have a range of attributes that make them, and the people who depend upon them, vulnerable to threats operating from the largest global scale (e.g. distortions in trade and markets, and climate change) to the smallest internally-derived process (e.g. overfishing and conflict). As a generalization, fishers suffer poorly defined rights, are among the poorest and most marginalized parts of society, and are poorly represented in national and international policy forums. When viewed from an assessment and management perspective, these attributes are often compounded by sparse data, weak institutions within communities, overfished stocks, degraded ecosystems, and lack of alternative livelihoods.

In order for SSF to fulfill their potential as engines of social and economic change we need appropriate frameworks and approaches for their management. It is implausible to promise sustainable SSF in the developing world within the single-species biological yield maximization research and management paradigm that has dominated fisheries since the 1950s; nor is it tenable to promise model-based ecosystem sustainability advice for SSF within the current fisheries research paradigm. The way forward must lie in more pragmatic, adaptive approaches that are set within larger rights-based and democratic processes.

The last decade or so has seen fisheries research and management broaden considerably in the search for better ways of doing things. These developments have seen new approaches, concepts and methods, such as the precautionary principle, ecosystem approaches to management ('ecosystem management' for short), the sustainable livelihoods approach, participatory methods and co-management, adaptive management, and so forth. Nevertheless, for all this endeavor, there remains no unifying set of principles nor agreed structure for attacking the particular problem of SSF in the developing world.

This campaign is aimed at increasing the sustainable contribution of SSF to food security and poverty alleviation over the course of the next 10 years. The campaign is global in scope but will focus on countries where small-scale fisheries play a significant role, particularly for the poorer sections of the community. It will develop new tools for assessing sustainability, provide new guidelines for making the lives of people dependent on SSF more resilient to ecological, social or economic changes, and improve the capacity of the countries to assess and manage their small-scale fisheries. The campaign will be divided into four work packages:

- **Framework and methods:** The framework will accommodate the full diversity of small-scale fisheries, and will be developed to organize lessons and guide methods development. In addition, as a related, but separate issue, we need to develop indicators of sustainability that are appropriate to the classically data sparse and institutionally weak environment of SSF;
- **Synthesis and awareness raising:** Achieving the outcomes sought from the campaign will require a mix of research and non-research activities in which research agencies can play brokering or convening roles in activities such as management and institutionalization. We need to develop a typology of small-scale fisheries that will allow us to ask larger and more structured questions, such as "what are the major correlates of success?", or "are there particular combinations of fishery, biological, social, and economic attributes that predispose certain forms of management to success?";
- **Field testing/Case studies:** The framework and methods identified as most appropriate will be tested, using case studies within specific guidelines developed by the project. The case studies will directly engage partners from developing countries in methods development, ensuring that they are applicable and acceptable. The theoretical and methodological material will then be refined and published;
- **Capacity Building:** It will take place at different levels (regional and national), involve different stakeholders, and will specifically address capacity building in integrated assessment and management of small-scale fisheries in developing countries.

In order to drive towards the successful achievement of the MDGs, and for global fisheries and aquaculture to play their role in achieving these goals, renewed focus and effort is required around the challenges of:

- **Resilient small-scale fisheries:** ensuring a sustainable and well managed supply of fish and livelihoods from small-scale fisheries;
- **Pro-poor aquaculture:** increasing the sustainable production of fish through aquaculture as a source of protein and income for poor communities;
- **Global change and fisheries:** understanding and exploiting the global vectors of change affecting fisheries and aquaculture so that they benefit the poor.

To date, most progress has been made on defining the research agenda for our first campaign, 'Resilient small-scale fisheries', which requires new and innovative approaches for the assessment, management and governance of small-scale fisheries (see Box 1). Significant effort and resources will be deployed in 2007 to initiate this Campaign. Following the successful recruitment of a new Discipline Director for Aquaculture and Genetics, effort will also be devoted to further development of the research ideas under-pinning 'Pro-Poor Aquaculture'. An outline of this campaign will be submitted to the Board of Trustees (BoT) for consideration in September 2006 and further detail incorporated into our next MTP.

In order to carry out the research in these campaigns, and to address specific regional priorities the Center has implemented an internal research structure as a matrix of three global disciplines and seven regional portfolios³.

Campaign developments to date are reflected in the Medium Term Plan (MTP) research agenda, by defining separate global projects detailing outputs, outcomes and impacts. During 2006 the Center will be recruiting a global director in the area of Policy, Economics and Social Sciences, which will enable the Center to develop its third campaign, 'Global Change and Fisheries' (to be reported in the 2008-2010 MTP). In subsequent MTPs we will also progressively gather our research into three global projects which will set out our research priorities within the context set by the three campaigns described above.

Staging our regional engagement

Our activities will be focused primarily on Africa, Asia and the S. Pacific. Africa because it is the continent in greatest need, Asia because it is currently the main focus of our activities and need continues to be high, and the S. Pacific because many countries in the region have high levels of poverty and few alternatives to providing livelihoods from aquatic resources. To better manage our activities we have organized ourselves into six regional portfolios, each with the responsibility for conceiving and delivering regionally and nationally focused science outputs and for developing and maintaining relationships with regional and national investors and partners. In each region the Center will address priority issues where concerted programs of research can inform policy and improve capacity to manage fisheries and aquaculture development. These research activities will be pursued in countries and sites where opportunities for impact and learning are greatest. To complement these regionally focused research activities focal countries have been identified where the Center will seek to engage strategically in support of national programs for fisheries and aquaculture research.

In selecting these focal countries, the Center has been concerned to strengthen the potential for learning that has region-wide and global value. There is high potential for drawing lessons from

³ The three disciplines are: Natural Resources Management; Aquaculture and Genetics; and Policy, Economics and Social Science. The seven regional portfolios are: Pacific; Greater Mekong; East & Southeast Asia; South Asia, Southern & Eastern Africa; West and Central Africa; and West Asia & North Africa.

research in each country where we work that is applicable to other countries. The following additional criteria were used to make the final selection on where we work:

- **Human Development Need**
 - Is there development need in the country, based on the national poverty and hunger statistics?
- **Resource Potential**
 - Are the fisheries resources and aquaculture potential of major significance in meeting national and regional food security and livelihood needs?
- **Potential for Impact by WorldFish**
 - Is there high potential for improvements in fisheries and aquaculture to deliver impacts on poverty and hunger?
- **Enabling Environment**
 - Does the institutional and security environment in the country make research for development activities and the delivery of outcomes and impact feasible?
- **Past relationships and need**
 - Do we have sufficiently well established relationships with institutions in the country to warrant focal country status and are we fulfilling a research need that partners cannot?

Growth and consolidation in Africa

In sub-Saharan Africa the Center has moved to consolidate its regional portfolios to match the Consultative Group on International Agricultural Research (CGIAR) sub-regions of Eastern and Southern Africa and West and Central Africa. The first of these will be managed from our regional office in Malawi and options for a regional office in West and Central Africa are being explored with a view to locating the Portfolio Director there in 2007. At the same time the Center has opened an office in Zambia in order to pursue a more intensive program of research there, and an office will be opened in the Democratic Republic of the Congo in the second half of 2006. Linked to these changes the Center has also recruited additional staff for its Africa program, including two additional scientists in southern Africa, and a third scientist will be relocating from the Cairo office to be based in southern Africa. These changes reflect the directions set out in the Strategy Update and also respond directly to the EPMR and Commentary of the Science Council on the importance of focusing the research activities of the Center on areas of greatest need and opportunity for impact.

In addition the Center views this strengthened presence as an important opportunity to strengthen collaborative links with other CGIAR Centers in the region. To this end the Zambia office will be collocated with the Center for International Forest Research (CIFOR), and the Congo office collocated with CIFOR and the World Agroforestry Center (ICRAF).

An alliance with China

China is the world's dominant aquaculture producer, delivering 70% of the world's output. In view of this pre-eminence and the developing interest of China in the international development agenda, the 2005 WorldFish Strategy update identified the exploration of a strategic alliance with China as a key activity. A Memorandum of Understanding between the WorldFish Center and the Chinese Academy of Fishery Sciences (CAFS) was developed in 2005 with the objective of increasing sustainable fish production to improve rural livelihoods and improve food security. The MoU is one of the initiatives that contributes to the process of strengthening the partnership between the CGIAR and China that is underway at the system level. The five-year agreement builds on long-term collaborative work between China and the WorldFish Center, particularly in the development of improved strains of important farmed fish species. It also seeks to promote joint research into improving the sustainability and social and economic impacts of aquaculture

development. These are priorities for both China's rural development strategy and for WorldFish. Specific outcomes of the collaboration will be:

- the generation of aquaculture production and socioeconomic data to underpin sustainable rural development;
- strengthened mutual research capabilities;
- increased economic, social and environmental sustainability of fisheries production;
- dissemination of information and increased capacity for resource training and international exchanges;
- increased protection of key fish genetic resources.

The endorsement of the Ministry of Agriculture for formal signing of the MoU is now in process and a draft workplan has been developed that identifies and summarizes potential key research areas that may be pursued under the collaborative arrangements detailed in the MoU. This workplan was formulated during roundtable discussions held in Beijing in early April 2006 with the Chinese Academy of Agricultural Sciences (CAAS) and in follow-up discussions between WorldFish Center staff and staff from CAFS, Beijing, and the Freshwater Fisheries Research Centre (FFRC) in Wuxi. General areas of collaboration are agreed, and priorities established. The consistency of themes and topics was reviewed in the context of the priorities identified by the Science Council.

Improving science quality

The Center recognizes that one of its key comparative advantages is its ability to provide high quality scientific advice and information in a development-oriented, pro-poor context. As recognized in our recent EPMR, however, maintaining that advantage requires increased attention to improving our researcher base and increasing the output of peer-reviewed scientific publications. Science quality is therefore being given an increasingly strong emphasis within the Centre, through a range of new and ongoing initiatives.

In particular, the recent restructuring of the Center's research groups into a matrix comprised of regional portfolios and academic disciplines is an important step towards improved focus on the development of high quality scientists and scientific outputs. Each of the three Disciplines (Natural Resources Management, Aquaculture & Genetics, and Policy, Economics & Social Sciences) is to be led by a Director who is a recognized international scholar and leader in their field. All researchers belong to one of these Disciplines, and each Discipline Director is responsible for setting and reviewing the scientific outputs of researchers, for allocating research staff to project activities, and for developing the competencies and careers of researchers.

Scientific capacity is also being enhanced by drawing on our financial reserves to invest in a number of new appointments at both the senior and junior level. Since these increases in staffing need to be financially sustainable however, investments in new staff are being made in a gradual and focused manner to ensure that we attract commensurate increases in resources in the longer term to support our work. To complement these investments, the Center is also implementing a number of mechanisms to increase research partnerships with ARIs through the creation of Senior Research Fellowships, support for sabbatical arrangements, part time appointments, joint appointments with other CGIAR Centers, and Adjunct Professorships.

The recent EPMR has commended the Center on its record of publications targeted at partners and users, and designed to promote uptake of its research findings. However, the panel also recognized that publishing research findings in internationally peer-reviewed journals and books is needed in order to maintain our high standing within the scientific community. As one of its KPGs for 2006 the Center has set an ambitious but achievable goal of two peer-reviewed publications per scientist. An additional target to submit at least four articles to the two most

influential journals (Science and Nature) has also been set for this year. Early data suggests that, for the Natural Resource Management Discipline, where the Discipline Director has now been in place for just over one year, this approach is already delivering substantial improvements in research outputs.

Box 2: Research Dissemination: Key Publications

A total of 34 peer-reviewed papers on aquatic fisheries and the environment were produced in 2005. Some papers were published in journals with a high impact factor (IF) rating (such as *Advances in Marine Biology*, IF 2.938; *Biological Journal of the Linnean Society*, IF 1.935; *Aquaculture*, IF 1.627; *Fisheries Research*, IF 0.932). A few of our scientists were lead authors and contributing authors to several chapters in the Millennium Ecosystem Assessment publications. A list of selected publications that highlight our work is shown below:

- Aquaculture-Food and livelihoods for the poor in Asia: a brief overview of the issues** by Dey, M. M. and Ahmed, M. in *Aquaculture Economics and Management*, 9 (1&2): 12-37;
- Spatial patterns of rural poverty and their relationship with welfare-influencing factors in Bangladesh** by Kam, S. P. et al. in *Food Policy* 30: 551-567;
- Fisheries and the millennium development goals: solutions for Africa** by Béné, C. and Heck, S. in *NAGA* 28(3/4): 8-13;
- Restocking and stock advancement of marine invertebrate fisheries** by Bell, J. D et al. in *Advances in Marine Biology*, Vol. 49;
- Managing by-catch and discards: how much progress are we making and how can we do better?** by Hall, S. J. and Mainprize, B. M. in *Fish and Fisheries* 6: 134-155;
- Rebuilding coastal fisheries livelihoods after the Tsunami: key lessons from past experience** by Stobutzki, I. and Hall, S. J. in *NAGA* 28 (1/2): 6-12;
- A review of community driven regulation: balancing development and the environment** by Ratner, B. in *Society and Natural Resources*, 18(7): 672-674;
- Genetic parameters and response to selection for live weight in the GIFT strain of Nile Tilapia (*Oreochromis niloticus*)** by Ponzoni, R. W. et al. in *Aquaculture* 247: 203-210;
- Heritability of cold tolerance in Nile Tilapia, *Oreochromis niloticus*, juveniles** by Charo-Karisa et al. in *Aquaculture* 249: 115-123;

Ultimate oversight of the scientific and programmatic quality of the Center's research program is the responsibility of the Board. In 2006 the Board decided to abolish its Program subcommittee and to refer all key decisions and oversight responsibilities directly to the full Board. In addition it has decided to set up a more comprehensive Scientific and Advisory Review Committee. This committee will be established in late 2006 and will include external experts who would actively work with each Discipline to review existing and proposed research and then make recommendations to the Board.

3. Highlights from 2005/2006

The following section describes three selected highlights from the past year. More detailed highlights from our research work in each MTP project are presented in Annex II.

WorldFish Tsunami Responses

The Center has developed partnerships with Indonesian scientists and government offices that have resulted in important outcomes following the Asian Tsunami of 2004. The Tsunami had devastating impacts on coastal fishing communities in Indonesia, many of which were already poor and vulnerable and with few livelihood options. A natural response of many aid agencies and NGOs was to provide new boats and gear to fishers to restart their livelihoods. The Center published two policy briefs on post-Tsunami rehabilitation as part of a series by the Consortium to Restore Shattered Livelihoods in Tsunami Devastated Nations: 1) Rebuilding boats may not

equal rebuilding livelihoods, and 2) Rehabilitating Livelihoods in Tsunami-affected Coastal Communities in Asia.

As intended, these policy briefs have influenced decision making in a positive manner. For example, their publication, and follow-up discussions with Indonesian and Australian agencies, led to a decision by the Indonesian Ministry of Marine Affairs and Fisheries (MMAF), to undertake an Australian Centre for International Agricultural Research (ACIAR) supported study to ensure that the Indonesian Strategy for rehabilitation and restoration of capture fisheries results in improved and sustainable fisheries livelihoods for coastal communities and improved fisheries management. The project will provide the Indonesian Strategy with key inputs regarding community needs and perspectives in terms of sustainable fisheries livelihoods strategies in the aftermath of the Tsunami. The Asian Development Bank (ADB) fisheries rehabilitation project (Earthquake and Tsunami Emergency Support) has also adopted the recommendations from the policy briefs.

Partners in Indonesia and the FAO are also actively using WorldFish-generated GIS-derived maps of aquaculture pond damage as part of response activities. More of WorldFish involvement can be found under the 2005/6 research highlights under the ESEA region in Annex II.

NEPAD - Fish for All Summit

Fish support the food and nutrition security of 200 million Africans and provide income for over 10 million engaged in fish production, processing and trade. Moreover, fish has become a leading export commodity for Africa, with an annual export value of US\$ 2.7bn. Yet these benefits are at risk as the exploitation of natural fish stocks is reaching limits set by nature and aquaculture production has not yet fulfilled its potential.

To help build a broad strategic understanding of the importance of fisheries and aquaculture for Africa's development, and to address the challenges being faced by the sector, the WorldFish Center, joined with the New Partnership for Africa Development (NEPAD) Secretariat, FAO, and the Government of Nigeria to hold the NEPAD-Fish for All Summit in Abuja in August 2005. This has proved to be a landmark event both for the governments and national fisheries bodies in participating countries, and for the Center.

The Abuja Summit has provided a major stimulus for substantive actions designed to strengthen the contribution of fisheries and aquaculture to meeting the MDGs in Africa. The high level Summit chaired by President Obasanjo adopted both the NEPAD Action Plan for the Development of African Fisheries and Aquaculture, and the Abuja Declaration on Sustainable Fisheries and Aquaculture in Africa. At the national level Presidential initiatives on fisheries and aquaculture in Nigeria and Malawi have been developed while at sub-regional level, there has been adoption of fisheries priorities by the Southern African Development Community (SADC) Ministers. At the pan-African level the African Union (AU) and the NEPAD Secretariat have integrated fisheries and aquaculture into implementation of the Comprehensive African Agriculture Development Program (CAADP).

The ongoing challenge is to build on these efforts and increase international development investment in fisheries and aquaculture actions that can make a sustainable difference for Africa's poor. The NEPAD Action Plan and Abuja Declaration provide the framework for this.

The successful conclusion of this process and the partnerships developed through it has helped sharpen the focus for the WorldFish Center's activities in Africa. With the clear guidance and strengthened mandate that it has provided, the Center is now moving to substantially strengthen its investment in Africa. This is reflected in an increase in the number of scientists working in the region, as well as the opening of country offices in Zambia and the Democratic Republic of the Congo.

In 2006 the WorldFish Center has continued to work with NEPAD by providing a Fisheries Advisor to support implementation of the Action Plan and focus on those areas where research on fisheries and aquaculture is a priority. In doing so the Center is also working to strengthen collaboration with the African Union and with the Forum for Agricultural Research in Africa (FARA), while also strengthening links with Regional Economic Communities (RECs) to support sub-regional research priorities under CAADP, notably through SADC and the Common Market for Eastern and Southern Africa (COMESA) in the first instance.

WorldFish IWMI Collaborations

Following meetings of WorldFish and the International Water Management Institute (IWMI) Boards in March 2006, the two Boards agreed to pursue their organizational alliance. Key elements of the alliance include research support services, joint research activities and limited governance alignment.

The Boards confirmed the establishment of a Joint Venture, named "International Research Support Services", between the two centers, from which they intend to source their finance and HR support services, together with the associated Information and Communications Technology (ICT) services. The two centers will align their finance and HR policies and processes and share joint applications of SAP for finance and HSEid for HR.

Following implementation by the two centers the same services will also be offered to other Future Harvest Centers. To this end, interested centers will be invited to provide inputs to the Joint Venture agreement that the two centers are drafting.

Recognizing that there is also considerable potential for collaboration in research the two Centers have also identified areas for such collaboration that include:

1. Wetlands, agriculture and fisheries in the Mekong basin.
2. Basin synthesis of multiple use water productivity and water poverty, with a focus on the Nile and Ganges basins.
3. Integrated small-scale irrigation and aquaculture in Southern Africa.
4. Shared Geo-informatics support for WorldFish and IWMI research.

It was agreed that a MoU be developed to facilitate research collaboration between the centres, which would largely be encouraged through a process of bottom-up engagement of researchers. The two Boards also agreed to align governance through possible joint Board memberships, regular meetings of the Board Chairs and Director Generals and co-located meetings as needed.

4. Modifications to the previous Medium Term Plan (MTP)

Following the development and approval by the BoT of the WorldFish Strategy Update, and the response to the recommendations of the recent EPMR, this MTP sets out a more focused research agenda. It emphasizes work in areas and on problems where there is a significant need, where the Center can clearly make an important contribution, and where the likelihood of impact is greatest. This sharpening of our research focus will become increasingly clear and specific in forthcoming MTPs, as the Center completes its organizational transformation and the recruitment of key research leaders.

Key differences in the organization of the research into MTP projects are the inclusion of a second global project entitled "Pro-Poor Aquaculture", and an increased focus on the management of small-scale fisheries within the Global Project on Natural Resources Management.

MTP Projects 2006-2008	MTP Projects 2007-2009
1. Pacific Regional Project	1. Pacific Regional Project
2. East and Southeast Asian Regional Project	2. East and Southeast Asian Regional Project
3. Greater Mekong Regional Project	3. Greater Mekong Regional Project
4. South Asian Regional Project	4. South Asian Regional Project
5. Sub-Saharan Africa Regional Project	5. Sub-Saharan Africa Regional Project
6. West Asia and North Africa Regional Project	6. West Asia and North Africa Regional Project
7. Natural Resources Management Global Project	7. Natural Resources Management Global Project
-	8. Pro-Poor Aquaculture Global Project

5. Highlights of the 2007 Project Portfolio

The highlights of the 2007 project portfolio are the formulation and eventual implementation of the two global campaigns: “resilient small-scale fisheries” and “pro-poor aquaculture.” Research under the “sustainable fisheries livelihoods” campaign will be implemented through the Natural Resources Management Global Project. The output targets for 2007 include the preparation of a framework for the diagnosis and management of SSF and the development of new definitions of sustainability for SSF. Research related to the pro-poor aquaculture project will be implemented through the Pro-Poor Aquaculture Global Project. Output targets for 2007 will include the development of codes of practice and risk assessment procedures for transfer of cultured species and improved strains, as well as the assessment of key opportunities and constraints for aquaculture development in Africa and Asia.

Highlights from the other projects include the delivery of the following output targets:

- Development of decision support tools for management of inland fisheries;
- Development of faster growing strains of tilapia and carp in Asia and Africa;
- Assessment of evolving local, national and regional market opportunities for aquaculture production;
- Development of sea cucumber fishery management plans;
- GIS based planning tools for identification of high priority areas for freshwater aquaculture development in tropical Africa and Asia;
- Options identified for fisheries enhancement and improved management in tropical reservoirs;
- Framework for integration of community-based organizations (CBOs) with the local level administration and institutions as a component of community-based fisheries management;
- Tools developed for resolving conflict amongst fishers in areas where fishing pressure is high.

6. Center Financial Indicators

For 2007 the Center will meet or exceed all financial benchmarks. Details of these are contained in the Finance section and financial tables. With regards to long-term ratios, the Center has exceeded the recommended range in past years. The Center’s Board of Trustees is aware of this and, in response to the recommendations of the EPMR, has approved plans to reduce the level of the Center’s reserve substantially during 2006 and 2007 but has agreed to maintain levels at no less than 100 days of working capital.

B. WorldFish Center Project Portfolio

The Center's research is organized as a matrix of regional programs and disciplinary areas. For the period 2007-2009 there are eight MTP projects, corresponding to six regional portfolios of project activities and two global projects: the natural resources management global project and the aquaculture and genetics global project. This section presents the detailed narratives and logframes for each of the MTP projects.

1. Pacific Regional Project

Background and Rationale

Most Pacific island peoples derive a significant proportion of their sustenance and livelihoods from the sea. Globally, the highest per capita fish consumption is in the Pacific islands. An increasing trend away from subsistence fishing and toward fishing for commercial purposes has, in many places in the Pacific, led to a depletion of fish and shellfish resources. The WorldFish Pacific regional project seeks to work with communities, all levels of government, and other organizations to develop methods to effectively develop and implement sustainable management practices for inshore fisheries, and to measure the success of these interventions. Through this project the Center will assist rural/coastal communities to obtain adequate income for their basic needs (food, health and education) and to achieve stable, healthy fish populations through sustainable harvesting practices. This will be achieved through appropriate project activities, partnerships with regional NARS and ARIs, and by enhancing the capacity of NARS to provide the necessary institutional support. We recognize the need for a multi-partner, multi-disciplinary approach if the project activities are to succeed fully in meeting their objectives. This is especially true for projects that seek to achieve the sustainable use of natural resources.

Goal

The overall goal of the Pacific Regional Project is to assist Pacific island countries to develop sustainable livelihoods through freshwater and marine aquaculture, and to conserve aquatic resources and manage these sustainably.

Objectives

1. To implement sustainable fishing practices for sea cucumber

This objective is associated with Output 1 (*Improving sustainability and profitability of village sea cucumber fisheries in Solomon Islands*), which seeks to prevent the serious depletion of sea cucumber stocks (the primary source of income from the sea in many coastal communities in Solomon Islands), as has happened in other tropical countries.

2. To accelerate the rate of recovery of severely depleted sea cucumber populations

This objective is associated with Output 3 (Large-scale restocking of sea cucumbers in Pacific island countries). It also addresses natural resource sustainability issues, but is a fishery management tool for accelerating the rate of recovery of severely depleted populations which might otherwise take many years (or decades) to recover. This extension will draw on experience gained from several years of aquaculture and restocking research by WorldFish in the Solomon Islands and New Caledonia, which will conclude in mid-2006. One component of Output 4 (Sustainable aquaculture development in the Pacific Islands region and northern Australia) is extending the scope of the project in Output 3 by providing training in sea cucumber culture and release methods to Pacific island countries.

3. To provide a range of livelihood opportunities for Pacific communities that are socially, culturally and economically appropriate

This objective will be met through Outputs 4 (above), 5 (Creating rural livelihoods in Solomon Islands through environmentally friendly aquaculture and trade of marine ornamentals) and 6 (Pearl farming as a sustainable livelihood for coastal communities). It will be addressed through targeted research. Techniques to restore depleted sea cucumber fisheries and models for management of fisheries at the community level are being developed with the explicit intention that they are applicable in countries across the region as well as in selected other Asian countries where there is growing demand for this technology, thus leading to the development of International Public Goods.

Alignment with CG System Priorities

Allocation of Resources to system priorities										
Project number	Title : Pacific Regional Project	1D	2D	3C	4A	4B	5A	5B	5C	5D
Output 1	Improving sustainability and profitability of village sea cucumber fisheries in Solomon Islands				90%				10%	
2	Sea ranching and restocking sand fish in the Asia-Pacific			60%		40%				
3	Sustainable aquaculture development in the Pacific Islands region and northern Australia – Phase 2			80%		20%				
4	Rural livelihoods in Solomon Islands enhanced through environmentally friendly aquaculture and trade of marine ornamentals			100%						
5	Pearl farming as a sustainable livelihood for coastal communities			100%						

Impact Pathway

Outputs 1 and 2, will help coastal communities obtain greater and more regular income from restored and better managed sea cucumber resources by contributing key information to: a) national steering committees responsible for developing sea cucumber management plans in the Asia-Pacific, b) the 'Manual for management of sea cucumber fisheries' currently being developed for the Pacific with support from ACIAR, and c) community fisheries and livelihoods projects supported by NGOs and the United Nations Development Program (UNDP) in Asia-Pacific.

The science stemming from Output 3 will be transferred to the private sector, communities and NGOs by the Aquaculture Program at the Secretariat of the Pacific Community (SPC). This regional organization is the focal point for development of aquaculture in the Pacific. It is the first port of call by governments, industry and NGOs seeking information within the sector.

Output 4 will help create new livelihoods for coastal villagers through dissemination by the World Wide Fund for Nature (WWF) to more villages in Solomon Islands; local workshops, and promotion through the Marine Aquarium Council (MAC) and the SPC. Discussions are also underway with the French-funded 'Coral Reef Initiative for the South Pacific' to promote the benefits of the MAC certification system. This is expected to generate more demand for the eco-friendly products from projects like the one in Solomon Islands.

For Output 4, targeted presentations will be made to investors expressing interest in pearl farming in the Solomon Islands. All information needed by potential investors to make decisions about pearl farming in the Solomon Islands will be provided. Policy and licensing conditions will also be prepared for negotiations between the government and interested investors that provide a clear mechanism for local villagers to take part in the developing industry.

Linkages and Partnerships

In order to maximize the probabilities of success for this project area (one of the four criteria set for projects under the CGIAR Research Agenda), the resource management activities that we undertake will be linked with interventions that either provide alternative livelihoods directly (to mitigate the short-term economic burden caused by reducing rates of fishing to sustainable levels) or that provide, indirectly, the means to develop such alternatives. Details of these linkages are set out below.

List of Key Partners and their roles		
Partner	Output	Role
Solomon Islands Dept of Fisheries & Marine Resources	1	Project support via Fisheries Officers, and to gain experience in the various project activities associated with resource assessment and the development of fishery management plans
Dept of Agriculture, Forestry and Fishing – Institute of Aboriginal Affairs (Australia)	2	Liaison with Aboriginal communities to identify how best to involve them in the production chain for supplying sea cucumbers derived from hatcheries
University of the Philippines Marine Science Institute	2	Liaison with coastal communities selected for sea ranching and restocking of sand fish. Hatchery production of sand fish and field experiments to improve survival of sand fish released in the wild
Philippines Bureau of Agricultural Research	2	Liaison with local fishing communities to implement effective management arrangements
Secretariat of the Pacific Community (Aquaculture Section)	3	Collaborative role in selecting mini-projects to support; review mini-project proposals; oversee mini-project execution and reporting
Queensland Dept of Primary Industries	3	Overall management of the project; collaborative role in selecting mini-projects to support; review mini-project proposals; oversee mini-project execution and reporting
WWF	4	Extension of aquaculture methods to communities
Marine Aquarium Council	4	Training of communities to obtain eco-labeling for aquaculture commodities
Solomon Islands Dept of Fisheries & Marine Resources	5	Training in all aspects of capture and culture of marine postlarvae to strengthen their extension service
Solomon Islands Dept of Fisheries & Marine Resources	5	Participation in all aspects of project to improve capacity in resource surveys, report writing, drafting legislation and attracting investors for aquaculture
Solomon Islands Department of National Planning and Aid Co-ordination	5	Increased capacity to attract investors for sustainable livelihoods in the fisheries sector
Solomon Islands Dept of Fisheries & Marine Resources	6	Legal responsibility for the fishery management plans; project support via Fisheries Officers, and to gain experience in the various project activities associated with developing fishery management plans

MTP Project Logframe – Pacific Regional Project				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Improving sustainability and profitability of village sea cucumber fisheries in Solomon Islands</i>				
Output Targets 2007	1) Report describing the fishing practices, triggers and incentives for sea cucumber fishing, and perceived trends in the fishery over time	WorldFish Center; NARS (=Solomon Islands Fisheries Dept.) researchers	Development and implementation of sustainable sea cucumber fishery management practices at the community level	More effective implementation of sustainable fishing practices and plans in the Melanesian context Long-term security of sea cucumber as an income source for Solomon Islands coastal communities
	2) Improved sea cucumber processing methods developed and communicated to users	WorldFish Center project extension officers; sea cucumber fishers	Improved incomes for coastal communities from sea cucumber fishing	Critical expenses such as school fees will be payable, with consequent improvement of education level in remote coastal communities
	3) Village-run resource monitoring program conducted in at least one village	Coastal communities	Improved monitoring of fished resources leading to better fishery assessment and management	Feedback of resource monitoring to the resource management process
2008	Support for local NGOs to extend the resource management planning process widely throughout Solomon Islands	Local NGOs; coastal communities	Effective dispersion of natural resource management process and practices throughout Solomon Islands	The impact area of the project is extended as widely as possible throughout Solomon Islands
Output 2 <i>Sea ranching and restocking sea cucumbers in Asia-Pacific</i>				
Output Targets 2007	Sea cucumber aquaculture facilities strengthened in the Philippines and northern Australia	Coastal communities, NGOs, NARS (Bureau of Agricultural Research) ASI researchers, extension officers	Greater production of sea cucumbers from the hatchery at Bolinao and construction of a hatchery for producing juvenile sea cucumbers for sea ranching and restocking at Mindanao	Capacity to produce large numbers of juvenile sea cucumbers Awareness by fishing communities of new methods for increasing production of sea cucumbers, and restoring over fished populations
	Trained local hatchery technicians Sites for sea ranching and restocking identified sea cucumbers produced and released from at least one facility			
2008	Large numbers of sea cucumbers produced, and released into natural habitats	Coastal communities, NGOs, NARS (Bureau of Agricultural Research) ASI researchers, extension officers	Releases of hatchery-reared juveniles into selected sea ranching sites to provide basis of new cash crops, and restocking of selected no-take zones to augment wild populations	Awareness of need to protect released animals by coastal communities to safeguard investment in hatchery production and provide future benefits
2009	As for 2008	As for 2008	As for 2008	As for 2008

Outputs		Intended user	Outcome	Impact
Output 3 <i>Sustainable aquaculture development in the Pacific Islands region and northern Australia – Phase 2</i>				
Output Targets 2007	At least 2 mini-projects on aquaculture for development conducted in village communities	Provincial aquaculture researchers; ARIs; NARS; village communities	Solving bottlenecks to aquaculture production in village communities	Improved aquaculture production in village communities
2008	As for 2007	As for 2007	As for 2007	As for 2007
2009	As for 2007	As for 2007	As for 2007	As for 2007
Output 4 <i>Rural livelihoods in Solomon Islands enhanced through environmentally friendly aquaculture and trade of marine ornamentals</i>				
Output Targets 2007	Commercially viable aquarium products being actively produced and disseminated from the WorldFish aquaculture facility	Coastal village communities	A fully functional hatchery facility for giant clams in Solomon Islands Western Province	
	One national and two provincial fisheries officers and two NGOs (future extension officers in the project) trained in aquaculture and on-growing methods, and in capture/culture of postlarval ornamental fish species	WorldFish Center; NARS (Solomon Islands Dept of Fisheries and Marine Resources); coastal villagers, NGOs	Increased national capacity to improve the well-being of people in rural communities by recognising and developing opportunities to generate income in a sustainable way Villagers trained in farming techniques for aquarium species	Creation of new jobs and alternative sources of income Sustained harvests of fish from the wild for the marine aquarium trade, resulting in long-term opportunities to earn income
2008	Recommendations on revised fisheries and aquaculture regulations to support the sustainable growth of the aquarium industry, and certification of all steps in the process by the Marine Aquarium Council system	WorldFish Center; NARS (Solomon Islands Dept of Fisheries and Marine Resources); coastal villagers, NGOs	A more comprehensive fisheries legislation that promotes and stipulates sustainable use of coral reef resources	Sustainable fishing of inshore marine resources Price premium for eco-friendly aquaculture products
2009	As for 2008	As for 2008	As for 2008	As for 2008
	Transfer of aquarium-products holding depot to a selected village; small-business training for depot managers	WorldFish Center; NARS (Solomon Islands Dept of Fisheries and Marine Resources); coastal villagers, NGOs	Villagers proficient in running an aquarium-products holding depot and in small-business practices	Improved levels of income in remote communities Increased adoption of aquarium-based business independent of external donors or WorldFish

Outputs		Intended user	Outcome	Impact
Output 5 <i>Stimulating Investment in Pearl Farming in Solomon Islands</i>				
Output Targets 2007	Documentation of past research likely to be of interest to investors National survey of the location, abundance and quality of white-lip pearl oysters Analysis of climatic and habitat advantages for pearl farming Summary of investment climate Policy guidelines for sustainable pearl farming Presentations to potential investors Recommended licensing conditions for pearl farming	WorldFish Center; NARS (Solomon Islands Dept of Fisheries and Marine Resources); coastal villagers, NGOs	Clear indications of the financial and social feasibility of commercial pearl farming in Solomon Islands One or more sites identified as suitable for pearl farming Decisions about investment in pearl farming	If offshore pearl companies decide to invest, impacts will be improved levels of income in remote communities from a socially and culturally appropriate village-based activity (capture of pearl oyster larvae, on-growing to suitable size for pearl culture, and sale to the pearl farmer)

2. East & Southeast Asia Regional Project

Background and Rationale

The East and Southeast Asian countries are major world producers and consumers of fish and other aquatic products. The current very large contribution of fish and aquatic products to both food security and exports underpins the strategic importance of WorldFish Center research in the region. Recent work at WorldFish has shown that the demand for fish will grow substantially in ESEA and projections suggest that if production can match demand total fish consumption in the region will rise from around 41.5 million t in 2005 to 52.3 million t by 2015.

Fish (including all living aquatic resources) is a particularly important source of food for millions of poor people in the region. Results of a recent WorldFish study¹ conducted in east and southeast Asia show that the share of fish protein in total animal protein expenditure is higher for lower income groups, and that poor people consume mostly low-price fish, indicating the importance of low-price fish as a primary source of protein among relatively poorer households in these countries. Countries with low per capita gross domestic product tend to have a higher proportion of fish protein in their animal protein consumption. In Indonesia and the Philippines in particular fish comprises 50% of animal protein intake. There it is the major—and often the only—source of animal protein for the poor, and is also an important source of vitamins and micro-nutrients. With rising population and demand (including export demand), expansion of fish supplies to maintain food security has emerged as a priority concern.

¹ Dey, M.M., Rab, M., Paraguas, F.J., Piomsombun, S., Bhatta, R., Alam, M.F. & Ahmed, M. (2005) Fish consumption and food security: A disaggregated analysis by types of fish and classes of consumers in selected Asian countries. *Aquaculture Economics and Management*, vol 9 (issue 1&2).

In addition to providing food for the poor directly, fish also provide either the main or a supplementary source of employment, livelihood and income for the majority of the region's poor. Research can contribute to improving the livelihoods of these fish dependent poor by fostering the sustainability of the resource, and through helping to develop management measures that share the benefits of these fisheries more equitably.

Goal

The overall goal of this project is to enhance the contribution of fish to the alleviation of poverty, hunger and malnutrition, in an equitable and sustainable manner. The Center's research activities in the ESEA region are focused on addressing the Millennium Development Goals (MDGs) through the following specific goals: a) improved livelihoods through equitable and sustainable management of capture fisheries and sustainable increases in aquaculture production, b) improved access to fish by the poor, c) environmental sustainability, d) improved knowledge and awareness of the links between fish, poverty and the environment, and e) improved understanding and promoting of gender issues in aquaculture and fisheries. A key approach in achieving our goals is to use scientific knowledge on the above issues to inform national governments, nongovernmental agencies, development assistance partners, other aquatic research agencies and the wider public on the complex place of fish in poverty alleviation.

Objectives

Research targeted to several of the multiple roles of fish in development can make contributions to poverty eradication, food security and environmental conservation. Our work in the region focuses on: improving equity and benefits from fisheries catches and aquaculture, enhancing the livelihoods of fishing and farming households, improving access to fish at affordable prices for consumers, reducing the impact of fishers on overstressed resources, increasing the number of fish farmers where resources permit, and protecting the aquatic environment and biodiversity. Specific objectives of our work that will contribute towards these goals are:

1. To develop strategies for fisheries research in ESEA

This objective is associated with Output 1 (*Regional and country-specific strategies for fisheries research developed*), which seeks to support national governments in the development of strategies and policies for sustainable and equitable development of their fisheries sectors. In doing so it also seeks to increase the technical capacity of scientists and managers.

2. To improve fish strains and associated fish farming technologies

This objective is associated with Outputs 2 and 3 (*Improved carp and tilapia strains and associated farming technologies developed and disseminated among farmers in China, Indonesia, Malaysia and the Philippines; and strategies and options developed for increased aquaculture and fisheries production to benefit poor communities*). The objective seeks to produce genetically superior carp and tilapia strains which would increase fish production at minimum cost. This addresses the challenge of sustainably and safely increasing aquaculture production for the benefit of poor people.

3. To develop strategies and options to increase aquaculture and fisheries production for poor communities

This will be met through Output 1 and 3 (*Regional and country specific strategies for fisheries research developed; and strategies and options developed for increased aquaculture and fisheries production to benefit poor communities*). The outcome of this objective is an increase in fish supply and economic benefits from fish production. This will be achieved through assessment of the fish and food supply and demand outlook for the poor, and implementation of projects for identifying and implementing options for improving the

livelihoods of rural communities. This objective also seeks to increase the awareness of the importance of coastal small-scale fisheries for livelihoods and food security, and to promote sustainable and equitable harvest of wild stocks from inland and marine ecosystems.

Alignment with CG System Priorities

This project addresses a number of CG system priorities, with emphasis on priority area 2D (genetic enhancement of selected species to increase income generation by the poor) and 4B (sustaining and managing aquatic ecosystems for poor and livelihoods). Our work on genetic improvement (output 2) focuses on carps and tilapia. In addition to our current collaborative genetic research in the region, we are establishing an international fish genetic improvement facility in Wuxi, China, to conduct collaborative research focusing on tilapia and carps in the first instance. This facility will also be used as a training center to enhance the capacity of the developing countries in Asia and Africa. This project is implementing a number of activities (outputs 2 and 3) to design, test and implement technical and institutional options aimed at improving the livelihoods of poor communities through the use of fisheries and aquatic resources (CG priority 4B). Many of these activities are focusing on the rehabilitation of livelihoods of coastal communities in Aceh (Indonesia) affected by the 2004 Asian Tsunami. This project is also implementing collaborative research on community based fish culture in flooded rice fields in China and on community-based/co-management of coastal communities in Aceh (CG priority 4B).

Allocation of Resources to system priorities										
Project number	Title	1D	2D	3C	4A	4B	5A	5B	5C	5D
2	East and Southeast Asia Regional Project	5%	35%	10%		30%	10%		10%	

Impact pathway

Research on improved carp and tilapia strains (Output 2)

The impact pathway and indicators for research for output 2 is straightforward. The research output will provide production innovations i.e. genetically improved fish, a device, or production practice. The innovation will then undergo an on-farm validation phase, following which it will be released for dissemination by impact intermediaries (e.g. the government extension system). It is expected that fish farmers will then adopt the technology, which in turn will lead to productivity changes. Through markets, this will affect consumers, producers, and link suppliers and traders, through their consumption and earnings.

The impact indicators are the increase in yield (at similar cost), or decrease in cost (at similar yield), change in quality (for similar yield and cost), or even reduced variability of output (i.e. lower production risk). Once the technology is disseminated and adopted, impact can be measured at the field level. Upon adoption, production side benefits take the form of higher profit and increased activity for vertically linked sectors (e.g. input suppliers, farm traders, etc.). For consumers, widespread diffusion of the technology may lead to aggregate increases in consumption, better quality, and lower price. The economic gains will then be distributed between the poor and nonpoor. For some research approaches (i.e. participatory research on rural aquaculture), part of the impact takes the form of changes in attitudes, knowledge, and capacities of the adopters.

Research on natural resource management (Output 3)

The research outlined under output 3 includes management interventions for aquatic resources such as identification and implementation of improved livelihoods options for coastal

communities. Research outputs will take the form of management recommendations, or more broadly, decision support for management action. Management options may involve restrictions on the magnitude of fishing effort; regulations on the way fishing activity is conducted to reduce environmental damage; and other regulations on human activities to attenuate environmental damage. As with the case of technology, natural resource management research needs to undergo a trial phase (i.e. piloting) to validate or modify its output. The influence on intermediaries of research impact (NARES, fisher organizations, etc.) will be extended by dissemination activities, capacity building, and advocacy.

Policy and strategy (Outputs 1 and 3)

The impact pathway for policy research resembles that for resource management research. It is expected that adoption by intermediaries will lead to policy actions that lead to the intended benefits. The impact channel will occur through management and technology adoption, as well as by actions whose impact is felt at the level of the social and economic system (e.g. national policy on taxes and subsidies).

The identification of indicators along the impact pathway is a major challenge for policy research (even more so than natural resource management research). Lower down in the pathway, we may identify economic indices and trends as measures of impact. Further up the pathway, indicators for “influence” (applicable more or less to each of the intermediaries) may include: budget allocation to the fish sector (or to specific initiatives within this sector), citations in publications or official plans, partnerships formed, endorsements, etc. We can use these indicators as a basis for estimating the openness or favorability of the policy environment (measured by some suitable index) to the recommendations and implications of policy and strategy.

Linkages and Partnerships

For research work in ESEA to succeed, there must be many linkages and partnerships among and between national governments, nongovernmental agencies and academic institutions.

Building on this consultation all outputs will be achieved through collaboration with the national governments of China, Indonesia, Malaysia, and the Philippines. As part of this process more collaborative work on fisheries research among national governments and NARS is expected to evolve out of this project. It is expected that the scientists, managers, policy makers, and donors will increase collaboration and capacity among themselves leading to an improvement in aquatic resources management in the ESEA region.

A small component of this project will be carried out as part of the Water & Food Challenge Program.

MTP Project Logframe – East & Southeast Asia Regional Project				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Regional and country-specific strategies for fisheries research developed</i>				
Output Targets 2007	Fisheries/aquaculture research strategy for Indonesia, Philippines and China completed and disseminated	NARS in Indonesia, Philippines and China	Increased collaborative work on fisheries research within ESEA	National governments adopt development strategies based on research
2008 and 2009	At least one collaborative initiative among scientists and managers developed which promotes the implementation of a country-specific policy	Scientists and managers, policy makers, and donors	Sustained partnership among members of ESEA to foster improved developmental capacity building activities	Improved capacity of scientists and managers leading to improved aquatic resources management

Outputs		Intended user	Outcome	Impact
Output 2 <i>Improved carp and tilapia strains and associated farming technologies developed and disseminated</i>				
Output Targets 2007	Improved genetic strains of tilapia developed in Malaysia Improved genetic strains of common carp developed in China Recommendation domains for appropriate freshwater aquaculture technology developed in China	Scientists & resource managers in NARS, NGOs, other aquatic-dependent communities, fish farmers	Genetically improved carp and tilapia strains increase aquaculture production sustainably Improved knowledge on potential areas for different types of aquaculture practices	The availability of genetically superior fish strains will increase aquaculture production at minimum cost thereby increased income among small-scale farmers result Expanded areas under sustainable aquaculture practices and increased aquaculture production
2008 and 2009	Sustainable and appropriate technologies and strategies for freshwater areas developed and disseminated in China ² , Indonesia, Malaysia and the Philippines. Improved genetic strains of common carp and tilapia for Asian countries	As above	Improved and widely adoptable pro-poor knowledge/technology on aquaculture resources and its management amidst environmental changes Genetically improved carp and tilapia strains increase aquaculture production sustainably	Improved management of aquatic resources with participation of smallholder farms through better and widely available knowledge resulting in sustainable increase in aquaculture production The availability of genetically superior fish strains will increase aquaculture production at minimum cost thereby increased income among small-scale farmers result
Output 3 <i>Strategies and options to ensure that increased aquaculture and fisheries production benefits poor communities</i>				
Output targets 2007	Identification and dissemination of options and for improving the livelihoods of coastal communities affected by Tsunami in Aceh	Policy makers, government agency managers, local government, NGOs, poor farmers and fishers	Options derived through assessment of economic, social and environmental policy issues are implemented	Increased sustainable fish supply to meet increasing market demand and ensure food security among the poor through improved market performance
2008	Policies and guidelines for improved management of small-scale fisheries in at least 2 countries in ESEA developed and endorsed by stakeholders (focus is on rehabilitation of Fisheries in Aceh affected by Tsunami)	As above	As above	As above
2009	Improved strategies and institutional arrangements for resource access, quality management, supply networks, markets and trade developed and disseminated in at least 2 ESEA countries	As above	As above	As above

² Work in China will be carried out, in part, through the Center's involvement in the Challenge Program on Water and Food.

3. Greater Mekong Regional Project

Background and Rationale

Fish production in the Greater Mekong region (Vietnam, Cambodia, Laos, Thailand, Myanmar) is exceptionally important as a source of food and livelihood. Yet several factors now threaten the food security and livelihoods of communities dependent upon fish and related aquatic resources in the region. Growing competition over water flows in the Mekong River and other major river systems, stemming in particular from hydropower and irrigation diversion schemes planned or underway, threatens the functioning of sensitive aquatic ecosystems. Private sector exploitation of the fisheries harvest for regional markets is in many areas undermining local users' access to and control of aquatic resources. Policy and institutional obstacles often prevent poor households from obtaining an equitable share of the benefits from fish production and trade.

WorldFish Center's Mekong regional project is focused on small-scale fisheries because of their importance to livelihoods and food security of poor households. This encompasses not only those who engage in fishing as a primary activity, but also the much larger number – perhaps the majority of the rural population – whose livelihoods and nutrition are supplemented by the living aquatic resources of wetland ecosystems. Because of the complexity of these systems in social and ecological terms, there remain significant opportunities for strategic research to clarify options for management and policy improvement. In pursuing these research directions the Center seeks to contribute directly to improving fisheries management in the Mekong region while also generating Institutional Performance Goals in the form of improved methodologies for managing conflicts around access to and benefit sharing from inland fisheries in the developing world. These methodologies will contribute to the Center's growing global investment in small-scale fisheries, and the development of International Public Goods based on these methodologies.

Goal

The goal of the regional project is to improve livelihoods and food security for poor households who depend in part on small-scale fisheries. This requires elucidating trade-offs from development decisions outside the fisheries sector that affect the sustainability of aquatic ecosystems and livelihoods, as well as supporting improvements in fisheries management directly.

Objectives

We pursue this goal through two complementary objectives:

- 1. Strengthening governance, policies, and institutions.** We research the effectiveness of alternative governance arrangements and policies affecting people's access to and equitable use of common pool resources, as well as their ability to derive benefit from fish marketing and trade. This objective is pursued through output 1.
- 2. Integrating science in resource management decisions.** We develop decision support tools to analyze the factors that influence fisheries productivity and sustainability, including land use change and water management, improvement of knowledge about the ecology of fisheries, and work to ensure that these are used in management decision-making. This objective is pursued through outputs 2 and 3.

For each of these objectives, capacity building is integral. Recognizing the significant capacities of many national and regional organizations covering a range of technical and management aspects in the fisheries domain, our efforts are focused exclusively on building capacity to undertake research, analyze trends and options, and make use of the results of these analyses in decision-making.

Geographically, the approach is to build on our existing partnerships in Cambodia and Vietnam, and subsequently Lao PDR. Work in Thailand will be primarily pursued as components of regional outputs, where there are particularly strong opportunities for exchange of lessons.

In the medium term we will continue to focus most efforts on the Mekong River Basin, because of its central importance for the two poorest countries in the region (Cambodia and Laos), the transboundary nature of challenges to sustainability in the basin, and because an accumulating body of research positions us well to link problems at different spatial scales. Vietnam is currently pursuing an aggressive drive to expand fisheries production for export. This raises a host of challenges to equity and sustainability for coastal communities that are relevant cross-regionally. We therefore see a strategic rationale for partnering in research on these issues. Specific targets will be introduced as this collaboration takes shape.

Alignment with CG System Priorities

Our regional project aligns fully with the new CG system priorities. The main emphasis is on priority 4b (sustaining and managing aquatic ecosystems for food and livelihoods), which addresses governance of the fisheries sector (output 1), including intersectoral linkages, as well as tools for ecological assessment in data poor environments and the capacity to use them (outputs 2 and 3). Our collaboration (particularly with IWMI) to assess governance and trade-offs at the landscape level, especially regarding water-fish linkages (outputs 1 and 2) contributes to priority 4a (integrated land, water, and forest management at the landscape level). Our work on improving policies and institutions so that poor households, especially women, can benefit from fish production and trade aligns with priority 3c (enhancing incomes through increased productivity of fisheries and aquaculture).

Allocation of Resources to system priorities								
CG Priorities	1D	2D	3C	4A	4B	5A	5B	5C
Greater Mekong			10%	30%	60%			

Impact Pathway

The key assumption driving our strategy for achieving impact is that better information and analysis alone do not change policies, reorient institutions, or alter decision-making in resource management. Research must be undertaken through appropriate partnerships (see below) so that key stakeholders have confidence in the conclusions of new analysis, and can make use of the tools to assess options and advocate for change independently. For each output, research activities have been designed in close cooperation with research partners and in direct response to needs articulated by intended users. By pursuing the research with these partners and in continuing dialogue with the users the probability of achieving the desired outcomes and in turn impacts is optimized. Specifically, Output 1 addresses exchange of lessons within a network of government and civil society partners focused on implementation of successful approaches, and funded through multiple channels. Output 2 develops tools applicable to a wide range of contexts but specifically tailored to address needs at the Mekong River Basin, subnational and provincial scales, which a range of decision-makers are being trained to employ. Output 3 responds to policy demand for science to inform management and regulatory decisions in such areas as freshwater sanctuaries and the downstream impact of proposed dams.

Linkages and Partnerships

Our work in the Mekong region is undertaken in collaboration with intergovernmental bodies and with national institutes, with an aim to involve those who make and influence policy and management decisions in formulating research questions that address emerging challenges.

Recognizing the need for multiple stakeholders to be engaged in seeking solutions to the institutionally and politically complex issues of governance and intersectoral decision-making, we also partner with NGOs that have strong links to domestic and regional civil society networks.

Part of the work under output 2 is carried out as part of the Challenge Program on Water & Food and includes joint work with IWMI and IRRI.

List of Key Partners and their roles		
Partner	Output	Role
Mekong River Commission, National Mekong Committees	1, 2, 3	Transboundary resource management advice and decision-making
Tonle Sap Biosphere Reserve Secretariat	1, 2, 3	Intersectoral coordination
Southeast Asian Fisheries Development Center (SEAFDEC), Food and Agriculture Organization of the UN (FAO)	1	Advisory role to national policy and management decision making; regional convening and norm-setting roles
Department of Fisheries (Cambodia), Department of Livestock and Fisheries (Lao PDR) and the Ministry of Fisheries (Vietnam); related ministries in environment, rural development & water resources	1, 2, 3	Policy design and implementation
Inland Fisheries Research and Development Institute (IFReDI), Institute for Fisheries Economics and Planning (IFEP), Can Tho University, Nong Lam University	1, 2, 3	Domestic research capacity
IWMI, International Rice Research Institute (IRRI), Helsinki University of Technology, Biota BD (Finland)	1, 2, 3	Complementary scientific expertise
Asian Institute of Technology (AIT), WWF, Coastal Resources Institute (CORIN)	1	Training and local capacity building for wetlands management
World Conservation Union (IUCN)	1	Complementary research and convening roles
Oxfam America, Global Organization for People and the Environment (Canada), Fisheries Action Coalition Team	1, 3	Research and civil society advocacy for policy reform

MTP Project Logframe – Greater Mekong Region				
Outputs		Intended user	Outcome	Impact
Objective 1: Strengthening Governance, Institutions, and Policies				
Output 1 <i>Regional experience with alternative governance arrangements for common pool aquatic resources assessed and lessons exchanged, and opportunities identified to increase the benefits poor people obtain from fish marketing and trade</i>				
Output Targets 2007	Five local-level action research projects on the biological or socio-economic aspects of wetlands and aquatic resource management completed (and reports disseminated) in collaboration with national research institutes	Policy officials, government agencies with responsibility for aquatic resources and rural development, NGOs that serve rural communities	Policy and management decisions respond more effectively to the interests of poor communities reliant on aquatic resources, and government agencies and NGOs have the capacity to serve them effectively	Improved food security and increased incomes for aquatic resource-dependent communities in Cambodia, Vietnam, and Lao PDR, and reduced livelihood vulnerability, particularly through measures that protect ecosystem sustainability

Outputs		Intended user	Outcome	Impact
2008	Study on intraregional trade networks identifying opportunities to improve poor people's market access and income (including gender equity) completed and report disseminated	As above	As above	As above
2009	Study on social, economic, and ecological trade-offs posed by alternative uses of water and wetlands at local and basin scales, and governance options for addressing these complete and report disseminated	As above	As above	As above
Output 2 <i>Decision support tools developed to predict the impact of development options on the aquatic resource base in freshwater ecosystems of the Mekong River Basin</i>				
Output Targets 2007	Decision support tools for Tonle Sap Lake upgraded; representatives of 8 national and regional agencies convene to consider the results of an analysis of impact of built structures (dams, roads, etc.) on the sustainability of fisheries in the Tonle Sap	Mekong River Commission, National Mekong Committees, national line agencies, provincial and local authorities, and NGOs who support them	Agencies that influence resource management decisions better equipped to consider the ecosystem requirements for maintaining or increasing food production	Ecosystem services of rivers, floodplains, coastal and estuarine systems protected for the benefit of the rural poor
2008	The 2001 model of fish production in the Mekong Basin is updated to reflect data accumulated in recent years	As above	As above	As above
2009	Prepare and disseminate adaptive management plans for aquatic resources in the Mekong Basin, drawing on decision support tools previously developed	As above	As above	As above
Output 3 <i>Knowledge on ecology of fisheries generated for management</i>				
Output Targets 2007	Two-year assessment of inland fish sanctuaries in Cambodia yields recommendations for sustaining long-term fisheries productivity	Ministry of Agriculture, Forests, and Fisheries; provincial and local authorities; community fishery organizations and NGOs who support them	Zones of crucial importance to the sustainability of fish production basinwide are better protected and managed, in particular: size, location, and management systems for Tonle Sap sanctuaries optimized to sustain production and benefit livelihoods	Productivity of wild capture fisheries sustained for the benefit of the rural poor
2008	A paper is developed and disseminated on sustainable management of the Khone Falls corridor in Lao PDR to secure fish production basinwide	Mekong River Commission, National Mekong Committees, national line agencies, provincial and local authorities, and NGOs who support them	As above	As above

2009	Assessments of role of sanctuaries and impediments to their functioning are taken up by national line agencies and incorporated in policy change	As above	As above	As above (output 3)
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4. South Asian Regional Project

Background and rationale

Nearly 40% of the world's absolute poor people live in South Asia. Within this region, fisheries and agriculture form the principal basis of food and economic security. Farming and fish capture to meet domestic consumption and export demand have been emphasized in the national strategies for economic growth and poverty reduction of many countries. Despite rapid growth in production from aquaculture and capture fisheries in the last three decades the fisheries sector still has great potential to develop further as an engine for economic growth, and provide income, employment and nutritional benefits to the poorer segments of the population in Bangladesh, India and Sri Lanka.

Smallholder aquaculture development, involvement of the poor in product marketing and input-supply chains, and empowerment of inland and coastal fishers through co- and community-based management of fisheries and water bodies, can all provide huge benefits to poor people. However, technologies and institutional arrangements to support further growth in aquaculture need to be developed, as do new approaches for the management of wild fisheries. In addition we need to improve understanding of how fisheries and aquaculture can best develop in a globalized economy. Balancing fish trade for the poor is an especially crucial issue under expanding markets. The Center will pursue research for active policy development to ensure that macro-level benefits of high value fish and the shrimp trade export extend beyond the wealthy to the poor.

The work that the Project will undertake during this MTP will focus primarily on Bangladesh. However the results will be broadly applicable to other countries in the region, notably India and Sri Lanka, as well as a range of tropical developing countries in other regions. In particular, the development of community-based management approaches which have been pioneered by WorldFish is making an important contribution to global thinking on effective management in highly populated systems with a mixture of agriculture and aquaculture potential. In addition the market integration research into seed dissemination, integrated agriculture-aquaculture, and aquaculture development in seasonal floodplains has applications in many other regions.

Projects delivered by the SA office continue to consider the extent and level of women's participation in each of its projects, assess the effects of project interventions on overall advancement of women and explore new areas to improve gender relations due to project interventions. Project focus and impact indicators to promote gender equity and opportunities for women continue to build on recent successes in developing alternative income generating activities to support wetland community managed fishing bans. The project will build on previously successful women's participation in small-scale aquaculture by developing new technologies which seek opportunities to impact upon improving livelihoods of poor women. Examples include woman managed decentralized hatcheries and shrimp nurseries, niche roles in pond management, cage culture and new opportunities in mussels and crab culture, more active roles in river management approaches and define more active participation in the marketing chains for aquatic products.

Goal and Objectives

The overall goal of the South Asia Regional Project (SARP) is to harness the benefits of fisheries and aquaculture for poverty reduction through development of 1) improved community-based approaches for management and conservation of inland and coastal fisheries resources, 2) viable and sustainable technologies for aquaculture, 3) integrated enterprise and marketing processes for aquatic products and; 4) sound policy recommendations and institutional arrangements for trade, legislation, water use, environmental issues and inland fisheries management.

In this MTP, the wording of the outputs has been changed compared to last year in order to provide a better description of the medium term deliverables which will be produced. However the anticipated work and the range of output targets has not changed significantly.

Projects delivered by the SA office continue to consider the extent and level of women's participation in each of its projects, assess the effects of project interventions on overall advancement of women and explore new areas to improve gender relations due to project interventions. Project focus and impact indicators to promote gender equity and opportunities for women continue to build on recent successes in developing alternative income generating activities to support wetland community managed fishing bans. The project will build on previously successful women's participation in small-scale aquaculture by developing new technologies which seek opportunities to impact upon improving livelihoods of poor women. Examples include woman managed decentralized hatcheries and shrimp nurseries, niche roles in pond management, cage culture and new opportunities in mussels and crab culture, more active roles in river management approaches and more active participation in the marketing chains for aquatic products.

Alignment with CGIAR System Priorities

Project activities are all closely aligned with CGIAR System Priorities as set out in the table below. At the same time they also support the national strategies and action plans of the focal country, Bangladesh, notably the PRSP and National Fisheries Strategy. The main focus is on priority 4B through development of approaches for poverty and equity focused integrated wetland management in Bangladesh, and 3C through development of new technologies and refinement of existing technologies for improving fish production in aquaculture. Priority 1D will also be addressed through habitat restoration and community-based fishery management to restore fish biodiversity and projects to preserve genetic quality of indigenous stocks in the rivers of Bangladesh, while 4C will be addressed through analysis of water use and productivity in relation to fisheries and aquaculture in the Ganges river basin. Priority 5B will be addressed by research to improve institutional approaches and policies that enable development of small and medium enterprises (SME) and enhance performance of value chain actors.

Allocation of Resources to system priorities									
CG Priorities	1D	2D	3C	4A	4B	4C	5A	5B	5C
South Asia	10%		30%		40%	10%		10%	

Impact Pathway

The outputs generated through the Center's research are designed to provide practical solutions for improved pro-poor fisheries and aquaculture, and address institutional, policy and systemic improvements for public service providers and private agencies. These needs have been identified through intensive ongoing consultation and partnership with key stakeholders, and through their engagement in the research. This is the central rationale underpinning the pathway for Outputs 1, 2 and 3. All will deliver outputs to stakeholders who have been engaged

with the design of the work and so the chances that the outputs will indeed lead to the desired outcomes and impacts will be maximized.

Output 1 builds upon many years of working with multi-stakeholder processes for improved fisheries management in Bangladesh and responds to needs articulated by Government NGOs and community groups engaged in fisheries management. By targeting the information outputs at these groups and working with them to identify the implications for their actions we believe that the likelihood of appropriate actions leading in turn to the identified impacts is maximized.

Output 2 responds to growing recognition of the need for small enterprise development for the long term sustainability of aquaculture and is designed to address key questions concerning the design and role of these enterprises. The need for this research has been expressed by government, communities and the private sector and there is clear evidence of strong demand for the outputs identified. By working with these stakeholders as the research is carried forward and identifying how best to package and communicate the results there is every likelihood that the outputs will be taken up and lead to the outputs and outcome specified.

Similarly Output 3 has been developed to respond to the growing recognition that the aquatic environments that sustain fisheries and aquaculture need to be sustained if these resource systems are to continue in the long term. As for the other outputs this research will be pursued through strongly participatory processes that will be designed to keep all key stakeholders engaged and their needs and perceptions reflected in the outputs being generated through the research. This will help guide these stakeholders in the use of the outputs so maximizing the probability that the outputs will be used and lead to the outcomes and impacts specified. Where appropriate partnerships will be built with other organizations and Ministries in order to strengthen the use and impact of the research.

Linkages and Partnerships

In delivering its outputs the Center will collaborate with a wide range of partners from the public and private sectors, both nationally and internationally. Long term investors such as Department of International Development (DFID), United Kingdom, and International Fund for Agricultural Development (IFAD) continue support into 2007 with the CBFM2 and SSEA-CBFM projects. New initiatives are being sought with USAID and European Union and the Dhaka office will explore new linkages with international organizations such as the International Development Enterprises (IDE), Small Enterprises Development Foundation (SEDF) and FAO.

The excellent working relationship and partnerships with the NARS and government institutions continues to strengthen with joint projects, strategic planning initiatives and conferences. This was recognized by the CGIAR awarding the 2004 CGIAR Science Partnership Award to the WorldFish Center, Department of Fisheries (DoF) and NGO partners for the collaborative work done on the CBFM2 project. The WorldFish Center Dhaka office will continue partnerships for relevant collaborative research with 11 NGOs currently working with the Center on the CBFM2 project and continue to support joint initiatives outlined in the MoU agreed in 2005 with the Bangladesh Shrimp and Fish Foundation (BSFF). A new agreement is planned with the Bangladesh Fisheries Research Forum linking the Center to all universities in Bangladesh engaged in fisheries research.

Activities under the Challenge Program on Water for Food will continue to be implemented with traditional local partners DoF, Bangladesh Agricultural Research Council (BARC) and Bangladesh Fisheries Research Institute (BFRI). Together with the new international partners IWMI, the South Asia Regional Project will explore collaborative programs to study water management issues in the Indus-Ganges Region.

Partnerships with international academic institutions such as Stirling University UK, Lund University, Sweden and University of Manitoba, Canada will continue and additional linkages with similar institutions will be explored.

List of Key Partners and their roles		
Partner	Output	Role
IWMI	1	Help conduct water productivity and use analysis for inland fisheries and aquaculture in Indus-Ganges Basin
Private sector e.g. Chemonics international, local businesses	2	Lead on USAID funded multi-sector enterprise development projects. South Asia Regional Project adopts a supporting role for shrimp and fish production and marketing research
NGOs	1, 2, 3	Key role in implementation of development projects and some research to support the Center
NARs	1, 2, 3	Project implementation, policy dialogue, training, event management
ARIs	1, 2, 3	Specific research topics, research projects, dissemination of knowledge; training. Special link with countrywide university forum for specific expertise for the South Asia Regional Project
Foundations; Bangladesh Shrimp and Fish Foundation and Small Enterprise Development Foundation	2, 3	MoUs developed for shared proposal development and implementation responsibility
FAO	1, 3	Leading on coastal livelihood empowerment projects. WorldFish provides co-management expertise

MTP Project Logframe – South Asia Regional Project				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Comprehensive community led management approaches for inland and coastal fisheries management developed and policy support provided to reform and scale up these new approaches</i>				
Output Targets 2007	Policy Analysis (brief) on macro impacts of CBFM approaches completed and disseminated to stakeholders	Ministry of Fisheries and Livestock (MoFL)	Institutional support for pro-poor policies and institutions to support CBO management of water bodies	Productivity of wild capture fisheries sustained for the benefit of the rural poor
	A framework for better integration of community-based organizations (CBOs) with the local level administration and institutions developed and distributed	All agencies involved in planning CBFM	Enhanced performance for programme implementers	CBOs and local institutions work together more harmoniously
	Complete analysis of the applicability, appropriateness, implications and impacts (ecosystems and hydrology) of extending different CBFM approaches across the country completed and disseminated	Policy makers and investors	Improved understanding of macro level impacts of certain development scenarios	Appropriate government planning for scaling up CBFM
	Assessment of water productivity and water use for fisheries and aquaculture in the Indus-Ganges Region completed and disseminated	Indian and Bangladesh government planners, International scientists	Planners and scientists aware of effects of water utilization and potential development limitations in the future	Better use of water for production and enhanced livelihoods

	Outputs	Intended user	Outcome	Impact
2008	CBFM approaches in managing resources in Bangladesh scaled up to a greater range of users	Water body users and implementers	Improved management at sites of intervention	Higher yields from ecologically sustainable inland fisheries benefiting many poor fishers and community members
	A comprehensive macro model for the inland fisheries sub-sector as a whole developed and disseminated	Planners and scientists in government, NARS and international agencies	Improved planning of fisheries and aquaculture development	Fisheries sector integrated into overall poverty and growth targets
	Community-based management models extended to the coastal communities	Government, donors and coastal communities	Adjustment of the CBFM model to suit coastal communities	Livelihood benefits for some early adopters. Model under development
2009	Water management strategy for the agriculture and fisheries sectors co-developed and disseminated	Relevant Ministries and development planners	Integrated strategy developed for overall improved management of the land and water interface to sustainably increase productivity	Strategy incorporated into new policy development process for ultimately improving combined land and water productivity (including fisheries)
	Effective community-based management approaches for coastal communities documented	Relevant Ministries and development planners	Improve co-management approaches for coastal communities	Co-management approaches developed for equitable and sustainable resource management
Output 2 <i>Enhanced production technologies, improved marketing chains and trade, and a strengthened policy environment developed in support of integrated enterprise for aquaculture</i>				
Output Targets 2007	Ex-post evaluations on decentralized seed supply systems completed and disseminated	Farmers, scientists and extension agencies	Alternative fish seed supply model developed for extending to farmers	Increased number of producing poor farmers attaining higher production from better quality fish seed and rice-fish production units
	A comprehensive analysis of the impact of Integrated Aquaculture Agriculture and completion of the resource modeling tool RESTORE conducted	Department of Fisheries, scientists, NGOs, entrepreneurs, private sector and farmers	Improved IAA systems optimizing nutrient utilization for higher productivity	Higher total farm productivity increasing incomes and improving livelihoods
	Complete and disseminate fisheries sub-sector analysis for competitive enterprises	Project planners, government, NGO and entrepreneurs	Improved understanding of value chain and market development	Targeted approach for successful enterprise development
	Policy brief and action plan for improving genetic quality of cultured species and seed dissemination practices	Department of Fisheries, scientists, NGOs, entrepreneurs, private sector and farmers	Policy decision makers and others are better informed to formulate national policies to improve quality of seed supplies	Extension agencies and service providers recommending improved seed production technologies
	Analysis of community-based fish culture in irrigation systems and seasonal floodplains	Department of Fisheries, scientists, NGOs, communities	Improved understanding of management in seasonal floodplains	Develop test models to refine the fisheries management approach methodology

	Outputs	Intended user	Outcome	Impact
2008	A model for vertical integration of fish marketing institutions and agents developed	Department of Fisheries, scientists, NGOs, entrepreneurs, and private sector agencies	Improved institutional linkages	Marketing efficiency improved for more poor entrants to sell diversified products at higher prices
	Develop Small and Medium Enterprise (SME) competitiveness strategies for aquatic products	As above	Participation of poor households in input supply and product marketing and processing chains	Wider opportunities for the poor identified
	Co-implement a project addressing management of genetic quality and seed dissemination supply systems	As above	Early benefits of new management systems realized	Improved quality and supply systems emerging to benefit participating farmers.
	Pro-poor community-based floodplain aquaculture systems promoted to users	As above	Increased fish production for participating communities	Participants experience significant livelihood improvements. Ecosystems maintained and biodiversity increases
2009	Establish and strengthen the backward and forward market linkages to enhance fish and shrimp production and pro-poor economic growth	Direct beneficiaries participating in the value chain	Improved efficiency across the value chain marketing increasing volumes of diversified product	Direct livelihood benefit for farmers, industry workers, marketing agents and their employees
	New culture technology defined	Department of Fisheries, scientists, NGOs, entrepreneurs, and private sector agencies	Uptake applicable to poor farmers	Contribution to national production for many participating farmers
Output 3 <i>Resource management strategies for conservation of coastal and riverine environments</i>				
Output Targets 2007	An action plan for conflict resolution for fishers of the coastal areas is developed and disseminated in Bangladesh	Department of Fisheries, relevant government agencies, NGOs and participating Communities	Agencies incorporate the conflict resolution process to support river and coastal fishers	Fishers manage the resource in a more sustainable and equitable manner
	Develop and present a management strategy for one or more rivers in Bangladesh to conserve genetic resources	Department of Fisheries and project planners	Strategy developed for implementers	Remediation of river environments may be initiated
2008	CBFM approaches are developed for integrated into coastal resource management projects and government strategies	Department of Fisheries, relevant government agencies, NGOs and participating Communities	Improved agency program delivery mechanisms to support coastal resources management	Improvement of productivity, employment and income to coastal communities
	Initiate a project to conserve genetic resources and maintain fisher livelihoods of one or more important rivers	As above	Project pathways established	Project implementation effective and fishers' livelihoods improving
2009	Impacts of CBFM approaches in coastal area on reducing fishing pressure are assessed and potential AIGA activities are identified	As above	Institutionalization of pro-poor policies and institutions to support coastal resources management	Refined CBFM approaches to improve community resource management strategies for enhanced livelihoods

	Outputs	Intended user	Outcome	Impact
	Analysis of measures required to restore important river fisheries and maintain stocks of mainly indigenous Indian Major Carps and freshwater prawn is completed and disseminated	As above	Mechanisms for communities and implementing agencies established	Approaches to conserve genetic resources and improve resource user livelihoods identified. Increased numbers of participating resource users improving their livelihoods

5. Sub-Saharan Africa Regional Project

Background and Rationale

Great opportunities exist in Africa today for harnessing fisheries and aquaculture in the fight against poverty. Fish already make a vital contribution to the food and nutritional security of 200 million Africans and provides income for over 10 million mostly small-scale fishers, farmers and entrepreneurs engaged in fish production, processing and trade. In addition, fish has become a leading export commodity for Africa, with an annual export value of US\$ 2.7bn. Yet these benefits are at risk as the exploitation of natural fish stocks is reaching limits, fisheries management and trade increasingly target global markets, and aquaculture has not yet fulfilled its potential as a major source of fish supply for the continent. As a result, per capita fish supply in sub-Saharan Africa has declined to a global low of 6.7 kg/year, at a time when global supply is still growing. To redress these trends, key investments are needed to improve resource governance, production, markets and nutritional development. By 2020, Africa will need 27.7% more fish per year just to keep consumption at present levels. This is a tremendous challenge, but also an opportunity to utilise the existing human and physical resources for developing a sustainable fish economy for the continent. By seizing this opportunity there is enormous potential for investments in fisheries development to make vital contributions to meeting the MDGs in Africa. In many parts of Africa, fisheries and aquaculture offer strategic entry points for short and long-term investment opportunities to contribute to food security and improved health, women's economic empowerment, local enterprise development, market access for the poor, and improved environmental governance.

Goal

In this context the overall goal of the Center's work in sub-Saharan Africa is to assist countries of the region to achieve the MDGs by improving fisheries and aquaculture. In pursuing this goal the Center will focus on four primary objectives:

1. sustainable aquaculture development
2. enhanced livelihoods in small-scale fisheries
3. improved food security and health benefits
4. managed implications of expanding markets and trade

Objectives

1. Sustainable aquaculture development

This objective is being pursued through generation of Output 1 (*Opportunities and constraints assessed and development options identified for increasing the up-take, productivity and sustainability of pro-poor aquaculture*). Activities are focused on the Center's long term research in Malawi and Cameroon, and on the countries where the learning from this work is being scaled out (Zambia and Mozambique). The approach combines strengthening the understanding of social, economic, and institutional opportunities and constraints for aquaculture development in different contexts within the region, with the testing of

approaches that can be used to seize these opportunities and remove these constraints. This is combined with continued research on technologies that will increase productivity and strengthen sustainability of pro-poor aquaculture.

2. Enhanced livelihoods in small-scale fisheries

This objective is being pursued through generation of Output 2 (*Governance arrangements and management processes to support sustainable small-scale fisheries identified*). Activities during this 3-year period will focus on river fisheries (Lake Chad basin, Zambezi and rainforest rivers), lakes (Lake Chilwa) and reservoirs (Nile and Volta basins). The approach is based on recognition of the importance of improved fisheries governance as a central prerequisite for improving the benefits of small-scale fisheries for the poor. This will be complemented by research on the impact of catchment management on fisheries (Lake Chilwa) and research on the scope for ornamental fish production in rainforest rivers and options for improving fisheries production from reservoirs. The latter research will be carried out as part of the CGIAR Challenge Program on Water and Food.

3. Improved food security and health benefits

This objective is being pursued through generation of Output 3 (*Contribution of fisheries to human development goals assessed and supporting policies and processes informed*). Priority will be given to understanding and mitigating the impact of HIV/AIDS on fisheries development in the region. This reflects the emerging recognition of fishing communities as amongst the most vulnerable to HIV/AIDS and the consequent need to understand and mitigate the effects of the disease if the development potential of Africa's fisheries is to be realised. The Center's approach combines the identification of best practice models among development agents and scientists with analytical studies of HIV/AIDS vulnerability, together with adaptive technology development to meet the needs of affected households. All these activities will seek to develop strong and innovative linkages between scientists in the fisheries and health sectors. Complementary research on fish and nutrition will also be developed.

4. Managed implications of expanding markets and trade

This objective is being pursued through generation of Output 4 (*Impact of expanding markets and trade on small-scale fisheries and aquaculture assessed and development options identified*). Expanding markets and trade are one of the fundamental drivers of changes in fisheries and aquaculture in the region, with as yet uncertain impacts on livelihoods and food security. The Center is consequently developing a program of research to improve understanding of these issues and build regional capacity to address them. During the next three years activities will be centered on the fisheries of Lake Tana (Ethiopia), Lake Nasser (Egypt) and Lake Volta (Ghana) where research will assess current markets and marketing systems as well as the potential for increased market integration. This research will be expanded to a larger regional scale when the required resources are secured.

Alignment with CG System Priorities

The Sub-Saharan Africa Project focuses primarily on system priorities 3C and 4D, but with smaller contributions to 5B and 5D. Priority 3C will be addressed through the development of technologies that increase productivity and profitability of aquaculture systems, improving market access for small and medium scale farms by taking advantage of expanding market opportunities from urbanization and emerging markets. These activities have been selected because of their high potential to accelerate the adoption of fish as a high value crop for diversifying agriculture in Africa and increase farmer incomes through production and participation of rural poor in the value chain (processing and input and output marketing).

Priority 4B will be addressed through research that focuses on improving governance of aquatic resources, and enhancing livelihoods in small-scale fisheries. This will seek to develop and assess governance arrangements that arrest decline in fisheries production and fisher incomes and strengthens the safety net functions of these fisheries. This research therefore also contributes to priority 5D with its focus on reduction of rural poverty and vulnerability. Finally the project also contributes to priority 5B by implementing research which will result in increased understanding of how expanding markets impact the poor and developing strategies for the poor to benefit from these markets.

Project number	Title	1D	2D	3C	4A	4B	4C	5A	5B	5C	5D
5	Sub-Saharan Africa Regional Project			35%		50%				5%	10%

Impact Pathway

All four outputs of the project have been identified in direct response to the needs of the intended users, and will be pursued in collaboration with them through the participatory approach that the Center has developed. This participatory and needs driven process means that there is a very strong likelihood that the planned research will lead to the outcomes and impacts identified.

Output 1 concerns the assessment of opportunities and constraints to aquaculture, together with the development of technologies to better seize the opportunities and address the constraints. In keeping with the participatory approach the project has been designed explicitly to develop tools and methods for assessing market and production constraints identified by farmers and other key stakeholders. It is expected that improved methods and tools for identifying and assessing constraints and identifying options will lead to better design and siting of aquaculture development projects and consequently more rapid uptake of aquaculture. Adoption of new and improved technologies in zones of rapid uptake will in turn increase productivity, incomes, food security and livelihoods of farmers. By working across regions and in different contexts, the project provides a basis for broad recommendations which can be applied by NARS, policy makers within the focal countries and other countries in the region thereby ensuring benefits of improved aquaculture to the region.

Output 2 focuses on small-scale fisheries (SSF) and reflects the widespread recognition that improved fisheries governance is a central prerequisite for improving the benefits (food security employment, income, livelihood safety, nutritional security and health) of small-scale fisheries for Africa's poor. By working with stakeholders to assess key constraints to enhancing the value of SSF, the project has been designed to respond to their perceived needs, inform process and policies supporting fisheries governance and management, and in turn develop options for improving fisheries governance and management. While the vulnerability of Africa's SSF, notably to the external environment, makes this a particularly challenging part of the regional project we believe that the probability of success is maximized through the participatory approach that has been used in developing the project and will be used in its implementation.

The research designed to generate Outputs 3 and 4 is derived from similar participatory processes, and there is therefore a high probability that the outputs will lead to the outcomes specified. By working with and through not just the fisheries departments, but especially the Ministries concerned with health and trade, there is also a high probability that the improved understanding created will lead to the institutional changes required to strengthen the capacity of communities to confront the cross-sectoral problems of health and trade that need to be addressed if SSF are to realize their full development potential.

Linkages and Partnerships

The Project objectives will be pursued through strong and innovative partnerships at local, national and regional levels. Collaboration will continue with NARS institutions in Malawi, Zambia, Mozambique, Cameroon, Ghana, and Ethiopia, and will be expanded to new countries of operation. These include national fisheries and aquaculture research institutions as well as universities and training institutions. In addition, partnerships with NGOs in aquaculture development will be developed further to allow for a more efficient and wider spread of impact. At the regional level, the Center will build on the outcomes of the SADC regional consultation on Demand and Supply held in late 2004, and the NEPAD-Fish For All consultations held in 2005. In support of these programs, stronger linkages will be sought with the African Development Bank and other regional financing agencies that are increasing investment in fisheries and aquaculture.

List of Key Partners and their roles		
Partner	Output	Role
ARIs	4B, 5B, 5D	Research implementation and mobilization of new science; advanced training (Doctoral and Post-doctoral)
FAO/UN system	3C, 4B, 5B	Technical advice on investments; implementation of country level and regional programs
NEPAD	3C, 4B, 5B, 5D	Development of regional Fish Sector Program; implementation of science and capacity building components
Regional Economic Communities (SADC, ECA, ECOWAS)	3C, 4B, 5B,	Policy development; science support on regional issues; capacity building
Development banks	3C, 4B	Technical advice on lending and investments
NARS	3C, 4B, 5B, 5D	Strategy development; capacity building; research implementation; technical support for participatory planning and monitoring; fisheries management options
Alternative science providers (private consultancies; development groups etc.)	3C, 4B, 5B	Strategy development; capacity building; research implementation
NGOs	3C, 4B	Linkages with science and technical training providers; research and capacity building implementation
Private sector commercial enterprise	3C, 4B	Development of PPPs with government and civil society investments; options for partnerships with small-scale producers and fishing communities

MTP Project Logframe – Sub-Saharan Africa				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Opportunities and constraints assessed and development options identified for increasing the up-take, productivity and sustainability of pro-poor aquaculture</i>				
2007	1) Assessment of the contribution of market constraints to aquaculture development in Malawi, Zambia and Mozambique completed and disseminated	NARS, government agencies, development assistance agencies	Work on aquaculture development focused on areas where market conditions support rapid uptake of aquaculture	Increased uptake of aquaculture technologies and improved livelihoods in Malawi, Zambia and Mozambique
	2) Improved aquaculture technologies disseminated	NARS	Farmers adopt new technologies and management practices in Malawi, Zambia, Cameroon	Livelihoods of farmers improved
	3) GIS based planning tools developed for identification of high priority areas for freshwater aquaculture development in Malawi and Cameroon	Policy makers, donors and NARS in Africa	Work on aquaculture development focused on those areas identified as having highest potential for aquaculture development	Increased uptake of aquaculture technologies and improved livelihoods in Malawi and Cameroon
	4) Two new practices (profitable production models, optimal harvesting strategies) disseminated to farmers and producer associations	Farmers, NARS, CGIAR	Farmers adopt new technologies and management practices in Malawi, Zambia, Mozambique	Livelihoods of farmers improved
2008	1) Methodology developed for assessing the impact of market constraints on aquaculture development	NARS, development agencies	Improved understanding of current aquaculture market conditions and options for maximizing development impact	Aquaculture producers in the region better linked to expanding markets
	2) Sustainable systems and guidelines for the dissemination of aquaculture information and technology to fish farmers	Policy makers, NARS and development practitioners	Participatory technology development and transfer methods adopted	Increased rates of adoption of freshwater aquaculture in Malawi and Zambia
2009	1) Improved models and good practice for effective and sustainable research and advisory services to small and medium scale aquaculture producers developed and disseminated	Policy makers, entrepreneurs, NARS, development practitioners	Improved modes for sustainable research and advisory services adopted	More effective research and advisory service delivery for aquaculture sector

Outputs	Intended user	Outcome	Impact	
Output 2 <i>Governance arrangements and management processes to support sustainable small-scale fisheries identified</i>				
Output targets 2007	1) Improved models and good practice for effective and sustainable research and advisory services to small and medium scale aquaculture producers developed and disseminated	NARS and local communities	Action plan for enhanced fisheries options being implemented	Community capacity in resource management and local governance strengthened
	2) Options for restoring capture fisheries of Lake Malawi identified and discussed with stakeholders	NARS	Fisheries restoration strategies adopted	Sustained fish supply and livelihood benefits from Lake Malawi fisheries
	3) Methodologies for small-scale inland fisheries valuation conceptually developed and published	NARS, NGOs	Techniques for small-scale fisheries valuation developed	Small-scale fisheries profile raised
	4) Pilot transboundary (Malawi and Tanzania) fisheries management plan for small shared river basin developed	NARS, DoF, NGO's	Management plan adopted at river basin level	Improved transboundary river fisheries management and planning
	5) Management options and technologies for ornamental fish production in rainforest rivers developed and documented	NARS; local communities and entrepreneurs; DoF	Technology and production systems for ornamental fish production in rainforests better understood and available for use by local communities	Improved livelihoods of communities in African rainforests through sustainable use of aquatic resources
2008	1) Improved options for fisheries enhancement and co-management in Lake Nasser and Lake Volta evaluated and adjusted through participative process	NARS, local communities, CGIAR and ARIs	Better options for fisheries enhancement developed and implemented through a co-management framework	Sustainability and economic viability of fisheries in Lake Nasser and Lake Volta improved
	2) Methodologies for small-scale inland fisheries valuation empirically tested in Lake Chad and Zambezi basins	NARS, DoF, local and national partners, CGIAR and ARIs	Planners and policy makers better informed to promote pro-poor investments in small-scale fisheries through PRSP and other integrated planning processes	Increased pro-poor investments in small-scale fisheries
	3) Development of models for assessing the potential and options for restocking of collapsed fisheries developed and disseminated	NARS, ARIs, CGIAR	Improved capacity amongst scientists and planners to assess potential and options for restocking	Improved management of freshwater fisheries through realistic investments in restocking
	4) Methods developed, tested and disseminated for assessing ecological and socio-economic impact of ornamental fish production in rainforest rivers	NARS; local communities and entrepreneurs; DoF	Impact and sustainability of ornamental fish production in rainforests better understood	Improved livelihoods of communities in African rainforests through sustainable use of aquatic resources

Outputs		Intended user	Outcome	Impact
Output 3 <i>Contribution of fisheries to human development goals assessed and supporting policies and processes informed</i>				
Output targets 2007	1) Factors underlying HIV/AIDS vulnerability in fishery sector assessed	NGOs, fishing communities, fisheries departments, donors	Improved understanding of socio-economic factors of HIV/AIDS vulnerability in the sector	Improved capacity among fisheries stakeholders to manage impact of HIV/AIDS in the sector
2008	1) Options for reducing risk and impact of HIV/AIDS through economic investments in the fishery sector identified, documented and disseminated	NGOs, fishing communities, private sector, fisheries departments, donors	Set of investment options in key economic areas affecting HIV/AIDS vulnerability of fishing communities available	Improved capacity among fisheries stakeholders to manage impact of HIV/AIDS in the sector
Output 4 <i>Impact of expanding markets and trade on small-scale fisheries and aquaculture assessed and development options identified</i>				
2007	1) Current and potential markets for fish products from Lakes Nasser, Tana and Volta assessed, documented and disseminated	Local communities	Improved knowledge base on markets for local and regional investments	Improved commercial options and associated increased income for local communities

6. West Asia and North Africa Regional Project

Background & Rationale

The shallow seas and major river systems of West Asia and North Africa support important fisheries that play a locally (and in some cases nationally) important role in providing employment, income and food. In addition Egypt has emerged as Africa's leading aquaculture producer, and now ranks 12th in the world. Despite the importance of these resources there is growing regional concern as to how the rising demand for fish can be met and how the future management of fisheries and aquaculture can bring benefits to a wider range of beneficiaries, notably poor urban and rural families. In this context the development of fish farming in Egypt has provided an important template for the development of technologies with regional relevance and continues to provide an important source of experience for the countries of the region as they seek to develop aquaculture. For this reason the Center's work in West Asia and North Africa focuses upon the further development and testing of technologies that while helping to improve aquaculture production in Egypt, can be synthesized with learning from other countries to develop a robust body of International Public Goods in aquaculture development.

Goal

The overall goal of the Center's work in West Asia and North Africa is to assist countries of the region to develop sustainable and equitable aquaculture. In doing so the Center will help build regional capacity, develop appropriate technologies, share learning with other regions, and build on this to develop a body of technologies that have wide international application.

Objectives

1. To support the development of sustainable aquaculture

This objective is being pursued through generation of Output 1 (*Constraints and opportunities for sustainable aquaculture in Egypt identified and regional lessons distilled*). Activities are focused on Egypt as the leading aquaculture producer and the country where the greatest opportunities exist to harness regionally relevant lessons through the identification of existing and emerging constraints and opportunities. A strong regional network, including participation in (and convening of) regional workshops, facilitates analysis of regional implications and dissemination of knowledge.

2. To develop technologies that can support sustainable aquaculture

This objective is being pursued through generation of Output 2 (*Technologies to remove constraints identified and disseminated within Egypt and the region*). This work builds on several years of research on aquaculture production technologies, but is targeted at addressing new constraints that farmers are encountering as aquaculture production increases, markets become more competitive, costs increase, and legislation changes. The focus is on diversifying technologies in order to be able to access a greater diversity of markets, and reduce costs. This includes an increasing investment in the development of improved strains of both Nile tilapia (*Oreochromis niloticus*) and African Catfish (*Clarias gariepinus*) which are used widely in African aquaculture and where opportunities for dissemination of the new technologies is especially large. Building on lessons learned from the Center's work in Asia this Output will also involve research on the institutional arrangements for dissemination of improved strains in Egypt and more widely at regional level.

3. To harness learning from the regional experience in aquaculture and communicate this through regional (and multi-regional) training courses

This objective will be achieved through Output 3 (*Results of research communicated through regionally targeted training and capacity building*). This will build on a substantial track record in training and capacity building developed over the course of the past 5 years. The regional dimension of these training courses will continue and the number of longer term training activities (such as in-service training) will also continue to increase. These courses will reflect the results of learning from the evolution of aquaculture development in Egypt, experience from the wider region, and also exchange with other regions and global research projects. Contributions to training courses from regional partners, ARIs, and PhD training arrangements, will also be developed.

Alignment with CG System Priorities

This regional project contributes to system priorities 1D, 2D and 3C. Special emphasis is however placed on 2D and 3C which are the major focus of Output 2. The new technologies that this Output provides include both genetically enhanced strains of tilapia and African catfish, and a suite of new aquaculture management approaches, including low cost feeds and pond management techniques. One component of this research will also contribute to priority 1D by maintaining stocks of wild strains of tilapia. Outputs 1 and 3 will also contribute to priorities 2D and 3C by the generation of policy relevant information on aquaculture development opportunities and options, and through dissemination of information through training activities.

Project number	Title	1D	2D	3C	4A	4B	4C	5A	5B	5C	5D
6	West Asia and North Africa Regional Project	5%	40%	55%							

Impact Pathway

Output 1 is being developed in direct response to Ministerial requests for support to the development of fish production and increased focus on the key constraints. Equally these concerns are voiced by producers and their associations. Based on this consultation we believe that there is a high likelihood that Output 1 will guide both policy and private investment, so achieving the outcome and the ultimate impact. Similarly Output 2 responds to the direct expression of farmers' needs. In addition by running farmer field days at the Center's pond research facility where much of this research is conducted, farmers are able to see the impacts directly. Past experience shows that this leads to enthusiastic adoption of the technologies and we therefore believe that this will occur for the new technologies should they prove successful. This will in turn lead to the desired impact subject to no major negative changes in the market or policy environments.

The Center has developed a strong track record of successful training courses at its Abbassa facility and Output 3 will build on this. This track record gives confidence that the planning training will lead to improved capacity of NARS to pursue aquaculture and in turn increased adoption of aquaculture in the region. Achievement of this outcome and the ultimate impact of sustainable aquaculture will however depend on many other factors including the technologies developed under Output 2 and the policies under Output 1. To help strengthen this impact pathway the Center is seeking to increase the focus of its training, drawing students from a series of coastal countries and developing a set of follow-up measures at national level.

Linkages and Partnerships

The work described here is focused on the development of strong partnerships at multiple levels. In Egypt this is rooted in collaboration with government institutes and universities, but is developing particularly strongly with the private sector that is leading the development of innovations in aquaculture. Collaboration is also good with regional bodies such as the Arab Organization for Agricultural Development (AOAD) and FAO. At a wider regional level strong links are being developed with NEPAD which has encouraged transfer of the lessons from Egyptian aquaculture as a means of fostering aquaculture development in sub-Saharan Africa. Partnerships are also being fostered with ARIs, in particular for provision of high-level expertise in genetics, fish health, and economics, and for development of PhD training opportunities.

List of Key Partners and their roles		
Partner	Output	Role
Central Laboratory for Aquaculture Research	1 2 3	Provision of expert opinion Collaborative research Provision of trainers and trainees
Institute of Oceanography and Fisheries	1	Provision of expert opinion
Egyptian International Center for Agriculture	3	Convener and co-organiser of training courses
Egyptian Agribusiness Association	1, 2	Identification of key research needs
Fayoum Fish Farming Association	1 2	Provision of farmer opinion Testing of technologies
Kafr El Sheikh Fish Farming Cooperative Society	1 2	Provision of farmer opinion Testing of technologies
Arab Organisation for Agriculture Development	3	Identification of training needs; co-organiser of training course
NEPAD	3	Identification of training needs; co-convener of training courses

MTP Project Logframe – West Asia and North Africa				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Constraints and opportunities for sustainable aquaculture in Egypt identified and regional lessons distilled</i>				
Output targets 2007	Assessment of evolving local, national and regional market opportunities for aquaculture production completed and disseminated	NARS, government agencies, private sector	Aquaculture investments targeted at viable market opportunities	Economically sustainable aquaculture
2008	Identification of future trends that will impact sustainability of aquaculture	NARS, government agencies, private sector	Long-term investment strategy for aquaculture	Sustainable aquaculture, and long-term benefits for employment and food security
Output 2 <i>Technologies to remove constraints identified and disseminated within Egypt and the region</i>				
Output targets 2007	One new technology (for enhanced disease resistance in farmed tilapia) developed; improved aquaculture technologies disseminated in Egypt and Jordan; new practices refined	NARS, private sector	Farmers adopt new technologies and management practices	Livelihoods of farmers improved; food security enhanced
2008	One new technology (faster growing strains of African catfish) developed; one new practice developed and others refined	As above	As above	As above
2009	Institutional approaches for dissemination in Egypt of improved strains of fish assessed and regional lessons distilled and disseminated	As above	As above	As above
Output 3 <i>Results of research communicated through regionally targeted training and capacity building (including both WANA and SSA)</i>				
Output Targets 2007	4 regional (or multi-regional) training courses (2 WANA; 2 SSA); 2 national courses; Total of 50 trainees	NARS	Improved adoption of aquaculture management practices across the region	Sustainable aquaculture in WANA and SSA
2008	4 regional (or multi-regional) training courses (2 WANA; 2 SSA); 2 national courses; Total of 50 trainees	NARS	As above	As above
2009	6 regional (or multi-regional) training courses (2 WANA; 4 SSA) Total of 100 trainees	NARS	As above	As above

7. Natural Resources Management Global Project

Background and Rationale

At least three quarters of the world's 30 million fishers work in small-scale fisheries (SSF). If fisheries-associated livelihoods, such as marketing and processing as well as women, children and the elderly are also included, an estimated 150 million people directly depend on SSF and associated industries. The importance of these statistics from a development perspective is reinforced by the fact that small-scale fisheries provide about half of the world's fisheries production used for direct human consumption; about 1 billion people rely on the sector for their main source of animal protein. In many parts of the world small-scale fishing also provides an important means of income generation for the rural poor, including those that fish only occasionally and are not officially recognized as fishers. In the wider context of rural development and the empowerment of women; small-scale fisheries have major and partially unrealized potential as engines for social change.

SSF in the developing world are diverse, numerous, geographically dispersed, vulnerable to forces external to the sector, and in crisis. Historically, development interventions for this sector have sought to reduce poverty through accelerated economic growth, improvements in technology and infrastructure, and market-led economic policy reform. The limited results of these interventions, however, has led to a re-examination of the causes of poverty, the recognition of the significance of vulnerability and the recognition of the need for new strategies for poverty reduction.

There is increasing recognition that establishing appropriate pro-poor governance and institutions for fisheries management are central to maximizing the contribution of fisheries to poverty alleviation and food security. Such strategies may include rights-based approaches, co-management regimes and fishing capacity reduction.

The last decade or so has seen fisheries research and management broaden considerably in the search for better ways of doing things; these developments have seen new approaches, concepts and methods, such as the precautionary principle, ecosystem approaches to management, the sustainable livelihoods approach, co-management, adaptive management, and so forth. Important international instruments and codes have been promoted to normalize their use. Nevertheless, for all this endeavor there remains no unifying set of principles nor agreed structure for attacking the particular problems of SSF in the developing world.

The project is supported by two global information systems: FishBase – a database of almost 30,000 species of fish and their habitats; and ReefBase a global information system on the status, threats and management of coral reefs and associated ecosystems in over 100 countries and territories. Both of these databases are highly regarded as International Public Goods. Continued development of these databases is critical for the provision of information on species and ecosystem status. FishBase will develop new interfaces on resources management and biodiversity conservation. The project will also develop countermeasures to threats to aquatic diversity based on information collected on species biology, habitat requirements and genetics, and will provide an important contribution to the coastal management portal developed within the project IncoFish. ReefBase will develop comprehensive information pages on critical management issues such as climate change, over-fishing and livelihood options targeted at policy makers and resource managers.

Beginning in 2007, a new output on the diagnosis and management of small-scale fisheries has been included in this project. In subsequent Plans, this will be augmented with additional outputs relating to the Resilient Small-scale Fisheries campaign.

Goal

This project will develop new tools for the diagnosis and management of small-scale fisheries and will provide the conceptual foundation for the Resilient Small-scale Fisheries Campaign.

Objectives

The objectives of this project are to:

- Develop a framework for the diagnosis and management of small-scale fisheries
- Provide comprehensive information on the existing biodiversity and values relating to fisheries and key habitats and their role in empowering women in rural communities
- Develop knowledge management and decision support tools to enhance the ability of aquatic resource managers and users to achieve improved and sustainable levels of productivity
- To build the capacity of aquatic resource managers to better use existing knowledge when developing management practices and policies related to fisheries and the management of coral reef ecosystems

Alignment with CG System Priorities

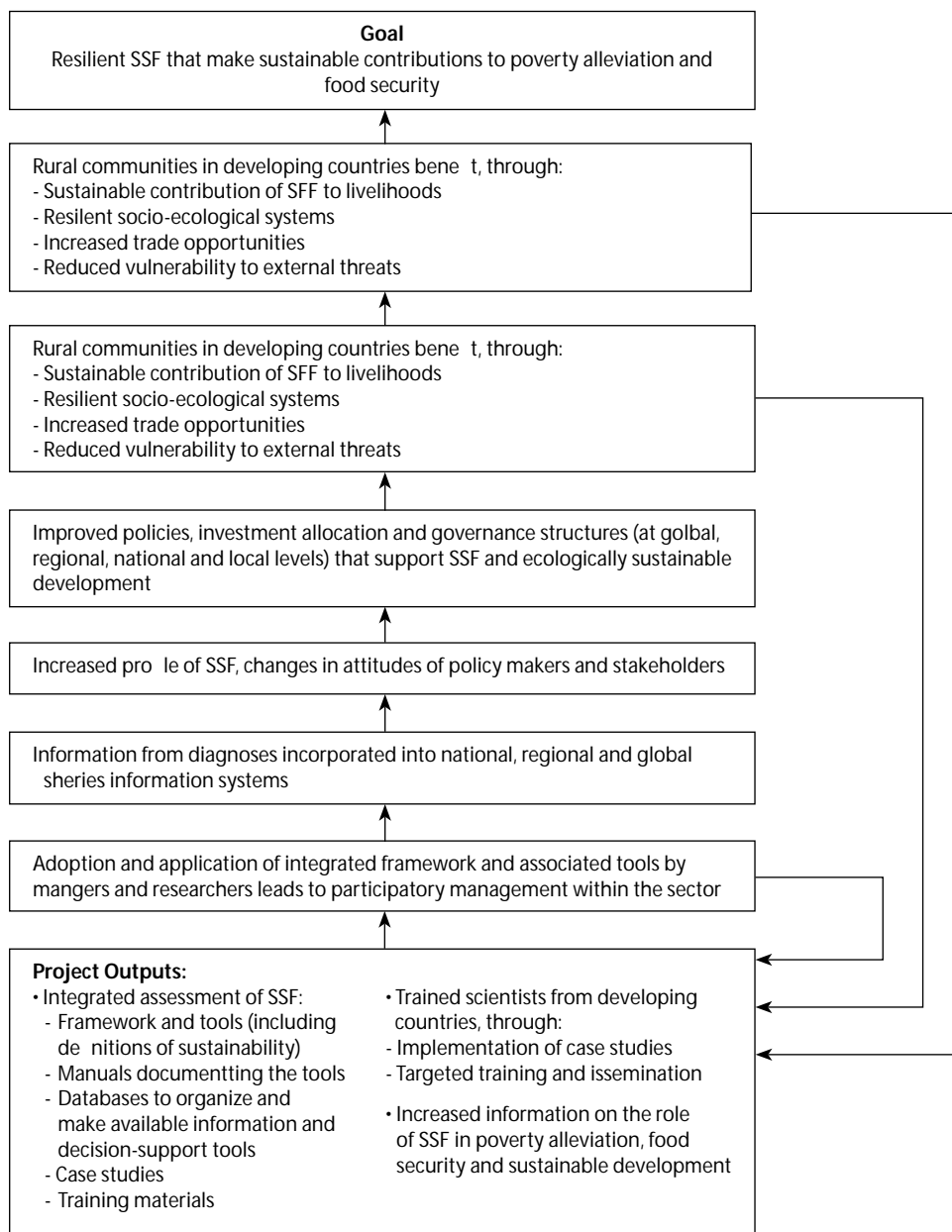
The project will provide a mix of tools and methods that may be directly applied in the management of these fisheries, along with global public good databases that organize and make available enormous reserves of information. In this MTP greater emphasis has been placed on research that will directly improve the livelihoods of the many millions of people dependent on small-scale fisheries impacts. In inland fisheries this will be given effect through better integration with aquaculture and other uses of water (priorities 3C, 4A, 4C). In nearshore fisheries, research for management will focus on improved tools for diagnosing the biological and social constraints on improved fisheries, and on refining and testing adaptive management tools for across a wide range of ecological and social settings. In both inland and nearshore environments, small-scale fisheries need to be better placed within poverty reduction strategies and other national development agendas. In large measure this requires management to be re-imagined, and to reach up and out of the narrow sectoral bounds that limited its effectiveness (priority 5D). FishBase and ReefBase, previously the focus of this project, will remain the world's primary sources of information for fish and coral reefs, and these databases will be maintained. Developments in ReefBase and those in FishBase directly supported by WorldFish will concentrate on providing greater access to new decision support tools for small-scale fisheries.

Project number	Title	1D	2D	3C	4A	4B	4C	5A	5B	5C	5D
7	Natural Resources Management			30%	5%	40%	10%				

Impact Pathway

Fisheries management has, by and large, failed to deliver resilient ecosystems and sustainable livelihoods for the millions of people dependent on SSF in the developing world. This project will develop new tools for assessing ecosystem sustainability and provide guidelines for making the lives of people dependent on SSF more resilient to change (ecological, social, or economic). The research needed to achieve these changes will be conceptual in the first instance with WorldFish playing a primary research role. This work will have a direct impact on policy makers at the international, national and local level, and will lead to the development of more effective SSF management.

Beyond the conceptual and theoretical work already initiated, a feature of the proposed research is the integration of research and management. This means that there will not be a long lag between the development of new methods and concepts and their application in fisheries. The research will quickly evolve to action research that directly impacts on the communities involved. Through direct training and the use of dissemination tools/systems WorldFish will play a facilitating and catalyzing role to ensure that local communities are made aware of the benefits of the new tools and guidelines. Increased awareness will in turn lead to fishing practices and social behaviours which will make fishery-dependent communities and the underlying ecosystems more resilient to change, and ultimately provide greater food security and income to fishers and the communities that they are imbedded in. During this and latter stages, the extension and institutionalization of field-tested techniques will be pursued through partners (particularly NGOs and FAO) and through FishBase and ReefBase.



Linkages and Partnerships

This project relies on strong partnerships with FAO, NARS and advanced research institutions. Much of the base information for coral reefs and fish is obtained from the records of museums, universities, government agencies and research institutions and NGOs. There are also strong links with these and other agencies in the design and operation of the information systems to ensure that they are focused on the information needs of target users and beneficiaries.

List of Key Partners and their roles		
Partner	Output	Role
IWMI	3C, 4A, 4B, 4C	Help develop appropriate valuation methodologies for integrating inland sheries with other productive uses of water
FAO	3C, 4B, 5D	Collaborate in development of small-scale sheries management tools; institutionalizing those tools; capacity development and agenda setting
NARs	3C, 4B, 5D	Research and training; implementation
ARIs	4A, 5D	Research, especially in relation to the provision and supervision of PhD and PD researchers; dissemination of knowledge; training
NGOs	3C, 4B, 5D	Research and implementation

MTP Logframe: Natural Resource Management Global Project				
Outputs		Intended user	Outcome	Impact
Output 1 <i>The diagnosis and management of small-scale fisheries</i>				
Output targets 2007	A framework for the diagnosis and management of small-scale sheries	Fisheries managers and extension workers in government departments, research agencies, NGOs in developing countries	Fisheries managers and researchers use the framework to improve decision making and sheries policies	Small-scale sheries are more resilient and the livelihoods of shery-dependent communities are improved
	New de nitions of sustainability for small-scale sheries	as above	as above	as above
2008	A database that characterizes small-scale sheries in a range of institutional and ecological settings	as above	as above	as above
	Valuation of the role of small-scale sheries in the development and empowerment of women	as above	as above	as above
	Case studies of improved small-scale sheries management	as above	as above	as above
2009	Development of best-practice guidelines for researchers and managers	as above	as above	as above

Outputs		Intended user	Outcome	Impact
Output 2 <i>New and enhanced FishBase tools and interfaces for fisheries and aquaculture managers in developing countries</i>				
Output Targets 2007	An interface with new information and distribution maps on small-scale fisheries implemented on Fishbase	Fisheries researchers, managers and extension workers in government departments, research agencies, NGOs in developing countries	Fisheries managers and researchers use FishBase to obtain information which contributes to more effective decision making and fisheries & aquaculture policies	Fisheries and aquaculture are more productive and efficient, while also being ecologically sustainable
2008	A range of information products targeted to NARS and management bodies in developing countries developed	as above	as above	as above
2009	Integration of IncoFish output to propose more dedicated management 'wizards' for small-scale fisheries incl. standardized downloadable packages for tools and related information	as above	as above	as above
Output 3 <i>Additional content and information which improve the relevance of FishBase to developing country</i>				
Output Targets 2007	New Asian and ACP inputs included in FishBase through country-defined submissions and data	Fisheries researchers and managers and extension workers in government departments, research agencies NGOs in developing countries	There is an increase in the proportion of managers, researchers and other fisheries stakeholders in developing countries using FishBase	Developing country fisheries increase their commitment to and implementation of more effective management practices and policies
2008	Completion and validation of data on marine species at country, ecosystem, and FAO area level for Asian, African and Pacific countries	as above	as above	as above
2009	Completion and validation of data on freshwater species at country, ecosystem, and FAO area level in Asian, African, and South-American countries	as above	as above	as above
Output 4 <i>A comprehensive knowledgebase and information system on the status, threats and management of coral reef ecosystems and their resources</i>				
Output Targets 2007	ReefBase is updated with information derived from the ReefBase Pacific, MPA Global, and LMMA projects	Coral reef managers, policy makers, researchers, NGOs and other stakeholders	Policies and management practices for use and management of coral reefs are based on information derived from ReefBase	Overexploited coral reef resources are restored to sustainable use levels, and the livelihoods of dependent communities are improved as a result

Outputs		Intended user	Outcome	Impact
2008	ReefBase is updated with a new analysis of "Reefs at Risk" and information from the GEF Lessons Learnt and GCRMN projects	as above	as above	as above
2009	A set of spatial analysis tools is developed for ReefBase which enables users to explore the relationship of key status, threat and management indicators	as above	as above	as above
	National databases and coral reef decision support systems have been established in at least 3 countries in the Pacific region	as above	as above	as above
Output 5 <i>Training and capacity building are provided to key stakeholders in Asia and the Pacific in order to improve the capacity of reef managers and researchers to manage, analyze and interpret existing coral reef data and information</i>				
Output Target 2007	A dedicated CD ROM containing information on coral reefs of the Pacific is produced	Coral reef managers, researchers and NGOs in Asia and the western Pacific	Key stakeholders make better use of existing data and information from their region within status reports, management plans and policy briefs	Reefs in the Asian and Pacific regions are more effectively managed due to the enhanced capacity of managers
2008	National databases and coral reef decision support systems have been established in at least 3 countries in the Pacific region	as above	as above	as above
2009	ReefBase is updated with a summary of the GEF Lessons Learnt project	as above	as above	as above

8. Pro-Poor Aquaculture Global Project

Note: The Center is currently revising its Strategy for Aquaculture and this will be reviewed by the BoT at its meeting in September 2006. The current project is therefore expected to evolve substantially over the course of 2006.

Background and Rationale

Over the last two decades, aquaculture has been one of the world's most innovative and rapidly growing food sectors, with notable investment, technical development and growth in many regions. This has had significant and positive effects on rural and urban food supplies and on income and employment in many developing economies. In view of current per capita consumption targets and future projections, and with limits to growth in most capture fisheries,

realizing the promise of aquaculture is widely seen as essential to satisfy the world's growing demand for aquatic food products. However, the expansion and growing internationalization of aquaculture has been accompanied by increasing concern over environmental impacts, inequity and social exclusion, and there is an urgent need for sustained investments to address these concerns.

The key drivers for the sector have been technical development, market opportunity, and investment. A pattern is emerging of expanding output, increasing competition, greater efficiency, lower production costs and stable or falling real prices. Such trends must continue if food needs are to be met, particularly in poorer countries, but they must do so while minimizing environmental costs and maximizing social benefits; otherwise such development will not be sustainable. Meeting these requirements is a major challenge and the Center will seek to contribute to doing so by developing research based solutions to current and future strategic constraints to aquaculture development. We will build upon the dynamics for growth, taking account of environmental and social change, while developing approaches and technologies that mitigate undesirable environmental and social impacts and ensuring that an equitable proportion of the derived benefits can be shared by the poor.

Goal

The overall goal is to help grow output by 30% in a sustainable and diversified manner that helps deliver improved livelihoods and nutrition for 1 billion poor people by 2015. In addition to directly addressing the MDGs of reducing poverty and hunger and ensuring environmental sustainability, indirectly it will impact on promoting gender equality, reducing child mortality, improving maternal health and combating major diseases. The Center can only do this through the formation of strong strategic partnerships at national, regional and international levels in order to:

- assess the dynamics of resource access, market demand, employment (especially in relation to women) and food supply, and legal, institutional and other barriers to aquaculture development;
- develop, test and disseminate aquaculture technologies that increase the efficiency of resource use in important agro-ecosystems and explore how regions presently constrained in terms of production might share the significant benefits of the sector;
- identify environmental risks associated with aquaculture and develop and champion adoption of risk assessment procedures and technologies that minimize impacts on aquatic ecosystem structure and function and other stakeholders.

In addition, if aquaculture and its benefits are to bring sustainable and equitable benefits to the poor it will be essential to collaborate in establishing a broad framework for sectoral development at the local, national and regional levels to achieve effective interactions with other resource users, production sectors and institutional agents.

Objectives

1. To analyze aquaculture trends and identify drivers, impediments and opportunities for sustainable increases in production and dissemination of benefits

This objective is being pursued through generation of Output 1 (*Assessment of aquaculture production trends, drivers and impediments*). Data on global, regional and national trends in aquaculture production must be collected and analyzed in order to identify drivers and impediments to increased production and dissemination of benefits, especially among the rural and urban poor. Opportunities at the agro-ecosystem level need to be identified, including systems not traditionally associated with aquaculture (e.g. semi-arid areas), where appropriate technologies can offer opportunities for both rural enterprise and improved

management of scarce resources. The opportunities and barriers to women acquiring new skills and increasing income, demonstrated in earlier studies, will be further studied and the opportunities capitalized on. The comparative roles of artisanal and commercial producers and options for promoting rural enterprise at various points along the value chain will also be assessed and disseminated. The ways in which development processes can be directed to meet needs of poorer households and communities will be identified. Practical strategies and policies for investment and scale-up from best practice will also be identified.

2. To develop technologies that support sustainable aquaculture

This objective is being pursued through generation of Output 2 (*Identification and dissemination of technologies for sustainable aquaculture*). Work here is targeted at addressing constraints that farmers encounter as aquaculture production increases, markets become more competitive, costs increase, and legislation changes. The focus is on diversifying technologies in order to be able to access a greater diversity of markets, make more efficient use of scarce resources, reduce wastes and increase profitability. It will be necessary to work with public and private sectors, producers and research communities to build indigenous capacity to develop appropriate solutions and institutional arrangements for dissemination and uptake of new technologies. Among key issues the Center will address are:

- assistance in the development of agroecosystem-specific selective breeding programs and seed dissemination strategies for commercially important species of global (e.g. *Oreochromis niloticus*, common carp *Cyprinus carpio*), and regional (e.g. African catfish *Clarias gariepinus*, giant freshwater prawn *Macrobrachium rosenbergii*) and local interest;
- improvement of the efficiency of resource use, especially through the conservation and wise management of water and the development of novel feeds from agricultural and other surpluses;
- development of holistic approaches to aquatic animal health management.

Again, appropriate mechanisms for training and dissemination of international public goods are inherent in meeting this objective.

3. Identify environmental risks and champion adoption of risk assessment procedures and technologies to minimize impacts on aquatic ecosystems

This objective will be achieved through Output 3 (*Risk assessment and development of environmentally sound aquaculture technologies*). This will build on the FAO Code of Conduct for Sustainable Aquaculture. It seeks to identify the risks to aquatic environments in general and biodiversity in particular posed by the expansion and intensification of aquaculture production. With partners, it will focus on:

- championing the development and uptake of risk assessment procedures associated with aquatic animal movements;
- the development of environmentally sound, pro-poor approaches to development of aquaculture in floodplains, and
- investigating and seeking reform of unsustainable practices within the shrimp and cage aquaculture sectors.

Alignment with CG System Priorities

The figures used below are preliminary, as the campaign and strategic plan for the discipline are currently under development and have yet to be scrutinized or approved by the Board.

Allocation (%) of resources to system priorities

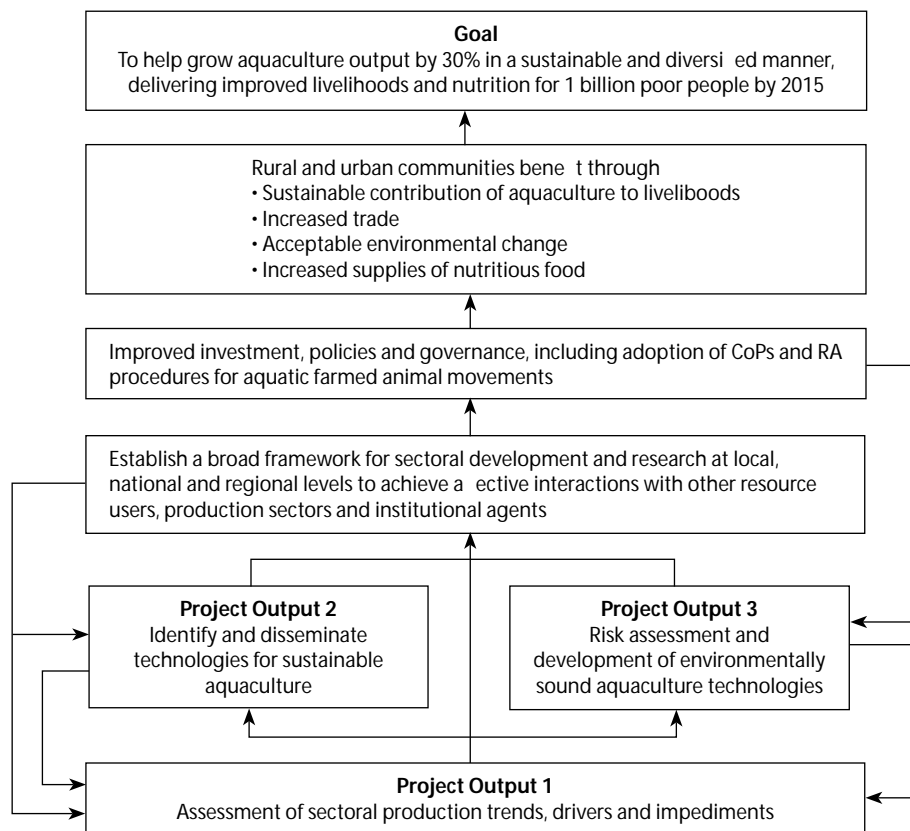
Project number	Title	1D	2D	3C	4A	4B	5A	5B	5C	5D
8	Pro-Poor Aquaculture Global Project	10%	35%	35%	10%	10%				

The aquaculture global project places special emphasis (i.e. 70% of its resources) equally on system priorities 2D and 3C, the balance (30%) being divided among system priorities 1D, 4A and 4B. All outputs—assessment of aquaculture trends, drivers and impediments, identification and dissemination of technologies and development of environmentally sound technologies—contribute to system priorities 2D and 3C. Output 3, the development of Codes of Practice and Risk Assessment procedures, in particular, is targeted at addressing system priority 1D. Outputs 2 and 3 address system priorities 4A and 4D.

Impact Pathway

The Figure below summarizes the project impact pathway. If aquaculture investments are to be targeted at viable market opportunities trends in aquaculture production and markets, and their impacts on livelihoods need to be understood in different regions and agro-ecosystems. Equally the constraints to further sustainable development need to be understood. On the basis of such analysis the Center will provide advice on market opportunities for public and private sector investment that will achieve sustainable and equitable benefits.

One of the major constraints to aquaculture development is the need for an evolving suite of improved technologies that can be adapted for use by a wide range of users. Output 2 seeks to address this requirement by developing improved strains of aquatic animals, improved seed (fry, fingerlings), aqua-feeds that are safe and sustainable, together with guidance on best practice in use of on-farm materials. The targeting of this research at identified current and prospective future needs, and doing so through participatory approaches, form the basis of an approach that is designed to ensure both the projected outcomes and the ultimate impacts will be achieved.



The progressive adoption of new technologies and the projected continued growth of aquaculture bring risks for both the sustainability of aquaculture and the wider environment, including wild fisheries. Output 3 seeks to address these risks by again working through participatory processes involving the intended users. The strategy for achieving the outcomes and impacts is based on engaging the users and in particular the appropriate policy bodies from the outset.

Project outputs will promote a broad framework for sectoral establishment and research at local, regional and international levels and improved integration of aquaculture with other activities, including agriculture and fisheries. Increased production, with minimized environmental costs and the demonstrable opportunities for the involvement of the rural poor in production, will help grow aquaculture output by 30% in a sustainable and diversified manner, delivering improved livelihoods and nutrition for one billion poor people by 2015.

Linkages and Partnerships

To ensure that the potential of aquaculture to impact on MDGs of poverty eradication and environmental protection is fully realized requires access to a comprehensive range of skills and resources. Only some of these reside within the WorldFish Center or are better delivered by partner institutions. In order to continue to be the partner of choice the Center must focus on the quality of its delivery and on building and maintaining relationships through an on-going process of consultation and strategic planning with its partners. Our strategy for aquaculture is still under development, a Discipline Director only having been appointed in April 2006. However, it is recognized that a number of the CG Centers are key partners, including IWMI with respect to the Challenge Program for Water and Food and International Livestock Research Institute (ILRI) in relation to the conservation of farmed animal genetic resources. The involvement of FAO in all aspects of the development of aquaculture is recognized, as is that of the IoE in relation to the development of integrated disease management strategies. In terms of research, the involvement of ARIs from around the world is essential. In developing and delivering knowledge transfer strategies, we will primarily target the development of region-wide solutions involving both indigenous and global expertise from the public and private sectors, including the ARIs. Implementation will require a wide range of partnerships with public and private sectors and with NGOs.

List of Key Partners and their roles		
Partner	Output	Role
IWMI	3	Help develop appropriate valuation methodologies for aquatic production and risk assessments of interventions in floodplains associated with aquaculture
ILRI	2, 3	Development of strategies for conservation of farmed animal genetic resources
FAO	1, 2, 3	Data gathering; assistance with formulation and championing of Codes of Practice and Risk Assessment; dissemination of international public goods
IoE	1, 3	Help develop risk assessment and management strategies with respect to the introduction and control of aquatic animal diseases
NARs	1, 2, 3	Research and training; implementation
ARIs	1, 2, 3	Research, especially in relation to the provision and supervision of PhD and PD researchers; dissemination of knowledge; training
Commercial sector	1, 2, 3	Provision of data and information
NGOs	2, 3	Research and implementation

MTP Project Logframe – Pro-poor aquaculture				
Outputs		Intended user	Outcome	Impact
Output 1 <i>Assessment of aquaculture production trends, drivers and impediments</i>				
Output Targets 2007	Assessment of key opportunities and constraints for aquaculture development in Africa and Asia	WorldFish and our partners, including NARS and ARIs	Clearer directions for targeted research	Better focused and designed research
2008	Assessment of evolving local, national, regional and international market opportunities for aquaculture production in Africa and Asia	FAO, NARS, government agencies, private sector	Aquaculture investments targeted at viable market opportunities	Economically sustainable aquaculture
2009	Identification of future trends that will impact sustainability of aquaculture	FAO, NARS, IoE, government agencies, private sector	Long-term investment strategy for aquaculture	Sustainable aquaculture, and long-term benefits for employment and food security
Output 2 <i>Identification and dissemination of technologies for sustainable aquaculture</i>				
Output Targets 2007	New technologies (faster growing strains of common carp and tilapias) developed in Africa and Asia	FAO, NARS, ARIs, private sector, NGOs	Farmers adopt new technologies	Livelihoods of farmers improved; food security enhanced
2008	New technologies (faster growing strains of African catfish, common carp, tilapias, giant freshwater prawn) developed and disseminated in Africa and Asia; two technologies (integrated agriculture-aquaculture; development of aqua-feeds) refined in Asia	As above	Farmers adopt new technologies and management practices	As above
2009	Institutional approaches for dissemination of improved strains and fish seed assessed in five countries (China, Malaysia, India, Bangladesh, Malawi) and regional lessons distilled.	As above	As above	As above
Output 3 <i>Risk assessment and development of environmentally sound aquaculture technologies</i>				
Output Targets 2007	Codes of Practice and Risk Assessment procedures for transfer of species and improved strains	FAO, ILRI, IoE, NARS, ARIs, public and private sectors	Adoption of CoPs and RA procedures by governments	Environmental risks reduced and livelihoods of farmers improved; food security enhanced
2008	One new technology developed (community based floodplain aquaculture) and guidelines for sustainable use disseminated	IWMI, FAO, NARS, ARIs, public and private sectors, NGOs	Farmers adopt new technologies and management practices	Livelihoods of farmers improved; food security enhanced
2009	One additional technology refined (freshwater cage aquaculture) and guidelines for sustainable development disseminated	FAO, NARS, ARIs, public and private sectors, NGOs	As above	As above

C. Finance Plan

1. 2005 Results and 2006 Development

The 2005 expenditure level was US\$ 15.75 million of gross expenditures and US\$ 15.13 million net of recovery of indirect cost. About 77% of 2005 resources were utilized for programmatic activities. The WorldFish Center (ICLARM) ended the year with a deficit of US\$ 1.68 million. This reflects the decision of the Board to draw down on the Center's Reserves over a period of several years through a strategic program of investment which will promote growth in priority areas.

The 2005 grant income from donors amounted to US\$ 13.30 million in addition to US\$ 0.15 million of earned income. Grant income for 2006 is projected at US\$ 18.71 million. The increase in 2006 Center income is due to more restricted fund. Recovery of indirect costs from funded projects amounted to US\$ 0.62 million.

The 2006 expenditures are estimated at US\$ 20.11 million compared to actual spending of US\$ 15.13 million for 2005. The increase in expenditure is in line with the increase with the restricted project funding.

Resource allocation to programs for 2006 is projected to be around 89% of the total resource available.

Table 1: Comparison of 2004* performance and 2005 current estimate

	2005 Actual* (US\$ million)	2006 Estimate (US\$ million)
Sources of Funds		
Donor Funding	13.30	18.71
Earned Income	0.15	0.20
Total	13.45	13.45
Application of Funds		
Programmatic	11.66	17.88
Management and General Expenses	3.77	2.57
Depreciation	0.32	0.57
Less: Overhead Recoveries	(0.62)	(0.91)
Net Expenditures	15.13	20.11
Unexpended Balance	(1.68)	(1.20)

* Targeted project funding which follows the matching principle was under-spent by approximately US\$ 1.65 million in 2005.

** Negative balances were planned and approved by the Center Board as part of its strategy to reduce its reserves by investing in key areas for future growth.

The 2005 spending and 2006 current planned resource allocation by CGIAR activity is summarized below:

Table 2: Actual and planned resources allocation by CGIAR activity for 2005 and 2006

	US\$ (million)		
	2005 Actual	2006	
		Estimate	%
Increasing Productivity	5.73	7.81	39
Protecting the Environment	1.38	1.81	9
Saving Biodiversity	1.18	1.76	9
Improving Policies	3.40	4.67	23
Strengthening NARS	3.44	4.06	20
Total	15.13	20.11	100

0.32 million as against US\$ 0.25 million in 2004. Most of the Center assets were recently purchased, including a major investment in Enterprise Resource Planning ("ERP") System.

1.3 Capital Fund

The purpose of the Capital Fund is to finance all Center core capital requirements and to fund investment activities in the areas of science and development strategic management. The balance of the Capital Fund at 31 December 2005 was US\$ 0.44 million, appropriated by the Board of Trustee for property and equipment renewal.

1.4 Working Capital (Days)

The working capital as of 31 December 2005 can support operations for 203 days compared to the CGIAR norm of 120 days of operations. As mentioned above, the Board has approved an investment plan that will draw down reserves to 100 days of working capital in the next 2 years.

1.5 Liquidity

The Center's liquidity continues to improve.

The Center is continuing its efforts to improve its liquidity position to absorb minor unexpected shocks and possible cash shortages. The Center is focusing attention on refining the cash flow by programming operating and capital expenditures to improve overall liquidity and spending patterns.

Table 4: Liquidity ratio analysis

	2004	2005
Current Ratio (times)	2.38	2.12
Quick Ratio (times)	2.38	2.12
Cash to current assets (%)	79	79
Cash to Current Liabilities (%)	188	168

1.6 Equity: Longer term management of resources

Minimum equity (net assets less fixed assets) of 25% to cover three months of operations is required for research operations as determined by the CGIAR. The Center Equity for 2005 was at 55% or 6.5 months of operations compared to System proposed standard of 25% or 3 months of operations. This equity will be reduced over the next 2 years as the Center uses its reserves for strategic investment purposes.

2. 2007 - 2009 Plans

2.1 Funding Requirements and Financing Plans

The funding level for the first year of the MTP 2007 – 2009 was based on a carefully projected core and project funding. In 2006 the level of funding is higher due to the inclusion of carry over project unexpended funds from 2005 and the Center expects more new projects to materialize in the year.

The expected level of donor funding for 2006 is projected at US\$ 18.71 million and indirect cost recoveries from funded projects of US\$ 0.91 million. The Center's projected operating levels (net of indirect cost recoveries) for 2006 to 2009 are:

Table 5: The WorldFish Center Operating Levels

	US\$ (million)			
	2006	2007	2008	2009
Projected Donor Funding	18.71	18.56	21.63	23.43
Center income	0.20	0.20	0.20	0.20
Reserve draw down	1.20	1.42	0.28	0.00
Total	20.11	20.18	22.11	23.63

An annual growth for revenue of 16% and 8% respectively was incorporated into the plans for the years 2008 and 2009 which is a conservative growth rate considering the Center's historical annual funding increase since 1992.

The annual growth rate for spending for the years 2008 and 2009 are 10% and 7% respectively.

Earned income: Earned income is expected to be at the level of US\$0.20 million for the duration of the plan.

Indirect Cost Recovery: Indirect cost recovery is a critical component for financing the Center's non-research activities and operations that are essential and critical support services to research. The Center has embarked to develop a full cost recovery system similar to the private sector which will be tested in 2007. The Center's indirect cost recovery is expected to be around US\$ 0.91 million for 2006. Indirect cost recovery is still well below the full costs of targeted research projects.

2.2 Operating Budget 2007-2009

The research activities and allocation of resources were determined by an in-depth review of WorldFish Center discipline and research projects, and a Center-wide review by Board and management was conducted. The seven portfolios were allocated over 71% of total resources consistent with the Center's priorities and strategies. The allocation of funds to the projects, sources of funding, and linkage with the CGIAR research agenda within the newly adopted log frame are reflected in the main budget tables.

Allocation of resources by object of expenditures (cost structure): The WorldFish Center carefully monitors the cost structure of operations to ensure that fixed costs are kept within a reasonable proportion of the annual budget. Approximately 44% of the resources are allocated to personnel costs for the years 2005-2008 (Financial Table 6).

Allocation of resources by CGIAR undertaking: The allocation of resources to CGIAR undertakings is in accordance with the Center's research directions and consistent with CGIAR strategies and priorities (Financial Table 4).

Allocation of resources by region: Approximately 64% of resources are allocated to Asia, 16% to Sub-Saharan Africa, 1% to Latin America and the Caribbean and 19% to West Asia and North Africa (Financial Table 5).

Personnel input: Center-hired Internationally Recruited staff (IRS) level is estimated at around 55 positions including post-doctoral fellows and visiting scientists. Additional positions are planned subject to funding availability in 2007 and beyond (Financial Table 9).

Regionally Recruited Staff (RRS) level is approximately 9 positions. The RRS represents the Philippine senior national staff relocated to the new Penang headquarters in February 2000 and few other positions at other regional research sites.

Nationally Recruited Staff (NRS) overall level will reach in 2007 around 286 for all Center sites.

2.3 Capital Budget

The major capital requirements have been met. An expansion of the conference and meeting facilities was completed in 2003, this has increased meetings and workshops with national system scientists and partner institutions. The Center will be budgeting modest amounts for laboratory and research equipment purchases as follows.

Table 6: The WorldFish Center capital requirements 2007 – 2009, US\$ (million)

	2007	2008	2009
Capital Needs (US\$ K)	219	124	176

2.4 Financial Ratios

Management has been putting special efforts into improving and sustaining the liquidity position of the Center. The liquidity position of The WorldFish Center is shown in Table 4.

2.5 Inflation and Exchange Rates

Combined annual weighted inflation in developed countries is projected to be around 2.5-3.5% while local inflation is estimated to fluctuate between 2.0-3.0% during the plan period. The RM (Malaysian Ringgit) was fixed at an exchange rate of RM3.80 to 1US\$ on September 2, 1998. This

fixed exchange rate lasted until July 21, 2005 when it was abandoned in favor of a managed floating system. The Ringgit is now allowed to float against a basket of currencies and monitored by the central bank of Malaysia. Since its floatation the Ringgit has appreciated and its exchange rate to the dollar was 3.62 on 31 May 2006. The impact on the budget of the managed floatation is being assessed.

The US dollar had slightly declined against major currencies, which has resulted in a positive impact on non-US dollar denominated contributions for 2006 (to June 2006).

2.6 Financing Plan 2007

The confirmed and high probability funding for financing the Center operations in 2007 amounts to US\$ 18.56 million. Included in this amount is US\$ 1.0 million from the World Bank.

The projected core funding and project funding amounts to US\$ 7.30 million and US\$ 11.26 million respectively. The 2007 Core funding of the Center has increased to 39% of total funding level in 2007.

2.7 Summary of Financing Plan

The resource requirements over the plan period are based on the 2006 Budget level and the best estimate of resources for 2007 which is the basis for this plan period. The spending plan is increased by an annual growth of 10% and 7% for years 2008 and 2009 respectively.

Table 7a provides details of the funding and donor support for 2007 agenda.

Financing of the 2007 Plan

	US\$ (M)	%
Core support	7.30	39
Targeted/restricted Funding	<u>11.26</u>	<u>60</u>
Subtotal	18.56	99
Center earned income	<u>0.20</u>	<u>1</u>
Total revenue	18.76	100
Draw down on reserve	<u>1.42</u>	<u>-</u>
Expenditure in 2006	20.18	100

D. FINANCIAL TABLES FOR 2007–2009

- Table 1. WorldFish Center – Cost Allocation: Financial Requirement by CGIAR System Priorities 2007
- Table 1a. WorldFish Center – Cost Allocation of Resources by CGIAR System Priorities 2006 - 2009
- Table 2. WorldFish Center – Cost Allocation: Project Cost Summary, 2005 - 2009
- Table 3. WorldFish Center – Cost Allocation: Allocation of Project Cost to GGIAR Priorities, 2006 - 2009
- Table 4. WorldFish Center – Allocation of Project Costs to CGIAR Activities, 2005 – 2009
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- Table 7. WorldFish Center – Financing: Members and Non-members, Unrestricted and Restricted Grants, 2005 – 2006
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- Table 8. WorldFish Center – Allocation of Grants and Center Income to Projects, 2005 – 2007
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- Table 11. WorldFish Center – Financial Position: Statement of Financial Position at 31 December 2005 and 2004
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Table 1. WORLD FISH CENTER - COST ALLOCATION : FINANCIAL REQUIREMENT BY CGIAR PRIORITIES 2007
(in US \$ million)

MTP Projects	Priority 1 D	Priority 2 D	Priority 3 C	Priority 4 A	Priority 4 B	Priority 4 C	Priority 5 A	Priority 5 B	Priority 5 C	Priority 5 D	PROJECT TOTAL
001. Pacific Regional Project			1.07		0.88				0.04		1.99
002. East and Southeast Asia Regional Project	0.15	1.07	0.30		0.92		0.31		0.30		3.05
003. Greater Mekong Regional Project			0.28	0.84	1.69						2.81
004. South Asian Regional Project	0.23		0.59		0.70	0.24	0.23	0.11	0.12	0.12	2.34
005. Sub-Saharan Africa Regional Project			1.92		2.74			0.28		0.55	5.49
006. West Asia and North Africa Regional Project	0.09	0.73	1.01								1.83
007. Natural Resources Management Global Project			0.58	0.10	0.77					0.29	1.93
008. Pro-Poor Aquaculture Global Project	0.08	0.26	0.26	0.07	0.07						0.74
TOTALS	0.55	2.06	6.01	1.01	7.77	0.43	0.54	0.39	0.46	0.96	20.18

CGIAR Priorities

- 1 D - Conservation of aquatic animal genetic resources
- 2 D - Genetic enhancement of selected high-value species
- 3 C - Enhancing income through increased productivity of fisheries and aquaculture
- 4 A - Integrated land, water and forest management and landscape level
- 4 B - Sustaining and managing aquatic ecosystems for food and livelihoods
- 4 C - Improving water productivity
- 5 A - Science and technology policies and institutions
- 5 B - Making international and domestic markets work for the poor
- 5 C - Rural institutions and their governance
- 5 D - Improving research and development options to reduce rural poverty and vulnerability

Table 1a. WORLD FISH CENTER - COST ALLOCATION OF RESOURCES BY CGI AR PRIORITIES, 2006 - 2009
(in US \$ million)

Priorities	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
1 D - Conservation of aquatic animal genetic resources	0.39	0.55	0.60	0.64
2 D - Genetic enhancement of selected high-value species	1.79	2.06	2.26	2.41
3 C - Enhancing income through increased productivity of fisheries and aquaculture	2.95	6.01	6.59	7.04
4 A - Integrated land, water and forest management and landscape level	0.96	1.01	1.11	1.19
4 B - Sustaining and managing aquatic ecosystems for food and livelihoods	9.24	7.77	8.51	9.10
4 C - Improving water productivity	-	0.43	0.47	0.50
5 A - Science and technology policies and institutions	2.15	0.54	0.59	0.63
5 B - Making international and domestic markets work for the poor	0.97	0.39	0.43	0.46
5 C - Rural institutions and their governance	1.50	0.46	0.50	0.54
5 D - Improving research and development options to reduce rural poverty and vulnerability	0.16	0.96	1.05	1.12
Total	20.11	20.17	22.11	23.63

Table 2. WORLD FISH CENTER - COST ALLOCATION : PROJECT COST SUMMARY, 2005 - 2009
(in US \$ million)

Projects	2005 (actual)	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
001. Pacific Regional Project	1.42	1.98	1.99	2.18	2.33
002. East and Southeast Asia Regional Project	1.93	4.19	3.05	3.34	3.57
003. Greater Mekong Regional Project	1.35	1.84	2.81	3.08	3.29
004. South Asian Regional Project	4.02	5.31	2.34	2.56	2.74
005. Sub-Saharan Africa Regional Project	1.97	2.65	5.49	6.01	6.43
006. West Asia and North Africa Regional Project	2.54	1.89	1.83	2.01	2.14
007. Natural Resources Management Global Project	1.52	1.78	1.93	2.12	2.26
008. Pro-Poor Aquaculture Global Project	0.38	0.47	0.74	0.81	0.87
Total	15.13	20.11	20.18	22.11	23.63

Table 3. WORLD FISH CENTER - ALLOCATION OF PROJECT COST TO CGIAR PRIORITIES, 2006 TO 2009
(in US \$ million)

Project	Priorities	2006	2007	2008	2009
		(estimate)	(proposal)	(plan)	(plan)
001. Pacific Regional Project	Enhancing income through increased productivity of fisheries and aquaculture	0.99	1.07	1.18	1.26
	Sustaining and managing aquatic ecosystems for food and livelihoods	0.99	0.88	0.96	1.02
	Rural institutions and their governance	-	0.04	0.04	0.05
		1.98	1.99	2.18	2.33
002. East and Southeast Asia Regional Project	Conservation of aquatic animal genetic resources	0.21	0.15	0.17	0.18
	Genetic enhancement of selected high-value species	1.68	1.07	1.17	1.25
	Enhancing income through increased productivity of fisheries and aquaculture	-	0.30	0.33	0.36
	Sustaining and managing aquatic ecosystems for food and livelihoods	2.30	0.92	1.00	1.07
	Science and technology policies and institutions	-	0.31	0.33	0.36
	Rural institutions and their governance	-	0.31	0.33	0.36
		4.19	3.05	3.34	3.57
003. Greater Mekong Regional Project	Enhancing income through increased productivity of fisheries and aquaculture	0.37	0.28	0.31	0.33
	Integrated land, water and forest management and landscape level	0.18	0.84	0.92	0.99
	Sustaining and managing aquatic ecosystems for food and livelihoods	0.74	1.69	1.85	1.97
	Science and technology policies and institutions	0.37	-	-	-
	Making international and domestic markets work for the poor	0.09	-	-	-
	Rural institutions and their governance	0.09	-	-	-
		1.84	2.81	3.08	3.29
004. South Asian Regional Project	Conservation of aquatic animal genetic resources	-	0.23	0.26	0.27
	Enhancing income through increased productivity of fisheries and aquaculture	-	0.59	0.64	0.69
	Sustaining and managing aquatic ecosystems for food and livelihoods	2.65	0.70	0.77	0.82
	Improving water productivity	-	0.23	0.26	0.27
	Science and technology policies and institutions	1.06	0.23	0.26	0.27
	Making international and domestic markets work for the poor	0.53	0.12	0.13	0.14
	Rural institutions and their governance	1.06	0.12	0.13	0.14
	Improving research and development options to reduce rural poverty and vulnerability	-	0.12	0.13	0.14
		5.31	2.34	2.56	2.74
005. Sub-Saharan Africa Regional Project	Conservation of aquatic animal genetic resources	0.13	-	-	-
	Enhancing income through increased productivity of fisheries and aquaculture	0.53	1.92	2.10	2.25
	Integrated land, water and forest management and landscape level	0.40	-	-	-
	Sustaining and managing aquatic ecosystems for food and livelihoods	1.06	2.74	3.01	3.21
	Science and technology policies and institutions	0.13	-	-	-
	Making international and domestic markets work for the poor	0.13	0.27	0.30	0.32
	Rural institutions and their governance	0.13	-	-	-
	Improving research and development options to reduce rural poverty and vulnerability	0.13	0.55	0.60	0.64
		2.65	5.49	6.01	6.43
006. West Asia and North Africa Regional Project	Conservation of aquatic animal genetic resources	-	0.09	0.10	0.11
	Genetic enhancement of selected high-value species	-	0.73	0.80	0.86
	Enhancing income through increased productivity of fisheries and aquaculture	0.95	1.01	1.10	1.18
	Science and technology policies and institutions	0.57	-	-	-
	Making international and domestic markets work for the poor	0.19	-	-	-
	Rural institutions and their governance	0.19	-	-	-
	1.89	1.83	2.01	2.14	
007. Natural Resources Management Global Project	Enhancing income through increased productivity of fisheries and aquaculture	-	0.58	0.63	0.68
	Integrated land, water and forest management and landscape level	0.36	0.10	0.11	0.11
	Sustaining and managing aquatic ecosystems for food and livelihoods	1.43	0.77	0.85	0.90
	Improving water productivity	-	0.19	0.21	0.23
	Improving research and development options to reduce rural poverty and vulnerability	-	0.29	0.32	0.34
		1.78	1.93	2.12	2.26
008. Pro-Poor Aquaculture Global Project	Conservation of aquatic animal genetic resources	0.05	0.07	0.08	0.09
	Genetic enhancement of selected high-value species	0.12	0.26	0.28	0.30
	Enhancing income through increased productivity of fisheries and aquaculture	0.12	0.26	0.28	0.30
	Integrated land, water and forest management and landscape level	0.02	0.07	0.08	0.09
	Sustaining and managing aquatic ecosystems for food and livelihoods	0.07	0.07	0.08	0.09
	Science and technology policies and institutions	0.02	-	-	-
	Making international and domestic markets work for the poor	0.02	-	-	-
	Rural institutions and their governance	0.02	-	-	-
	Improving research and development options to reduce rural poverty and vulnerability	0.02	-	-	-
		0.47	0.74	0.81	0.87
Total		20.11	20.18	22.11	23.63

Table 4. WORLD FISH CENTER ALLOCATION OF PROJECT COSTS TO CGIAR ACTIVITIES, 2005 TO 2009
(in US \$ million)

Project	Activities	2005	2006	2007	2008	2009
		(actual)	(estimate)	(proposal)	(plan)	(plan)
001. Pacific Regional Project	Production Systems	0.71	0.99	0.99	1.09	1.16
	Protecting the Environment	0.28	0.39	0.40	0.43	0.47
	Improving Policies	0.21	0.30	0.30	0.33	0.35
	Strengthening NARS-Training	0.07	0.10	0.10	0.11	0.12
	Strengthening NARS-Networks	0.14	0.20	0.20	0.22	0.23
		1.42	1.98	1.99	2.18	2.33
002. East and Southeast Asia Regional Project	Production Systems	0.39	0.84	0.61	0.67	0.71
	Enhancement and Breeding	0.58	1.25	0.92	1.00	1.07
	Improving Policies	0.39	0.84	0.61	0.67	0.71
	Saving Biodiversity	0.29	0.63	0.46	0.50	0.54
	Strengthening NARS-Training	0.10	0.21	0.15	0.17	0.18
	Strengthening NARS-Networks	0.19	0.42	0.30	0.33	0.36
		1.93	4.19	3.05	3.34	3.57
003. Greater Mekong Regional Project	Production Systems	0.34	0.46	0.70	0.77	0.82
	Improving Policies	0.40	0.55	0.85	0.92	0.99
	Saving Biodiversity	0.07	0.09	0.14	0.15	0.16
	Protecting the Environment	0.27	0.37	0.56	0.62	0.66
	Strengthening NARS-Training	0.13	0.18	0.28	0.31	0.33
	Strengthening NARS-Networks	0.13	0.19	0.28	0.31	0.33
		1.35	1.84	2.81	3.08	3.29
004. South Asian Regional Project	Production Systems	1.01	1.33	0.59	0.64	0.69
	Enhancement and Breeding	0.40	0.53	0.24	0.25	0.28
	Improving Policies	1.21	1.59	0.70	0.77	0.82
	Saving Biodiversity	0.40	0.53	0.23	0.26	0.27
	Protecting the Environment	0.40	0.53	0.23	0.26	0.27
	Strengthening NARS-Training	0.20	0.27	0.12	0.13	0.14
	Strengthening NARS-Networks	0.40	0.53	0.23	0.25	0.27
		4.02	5.31	2.34	2.56	2.74
005. Sub-Saharan Africa Regional Project	Production Systems	0.99	1.33	2.74	3.01	3.22
	Improving Policies	0.59	0.80	1.65	1.80	1.93
	Protecting the Environment	0.10	0.13	0.28	0.30	0.32
	Saving Biodiversity	0.10	0.13	0.27	0.30	0.32
	Strengthening NARS - Training	0.10	0.13	0.28	0.30	0.32
	Strengthening NARS - Networks	0.10	0.13	0.27	0.30	0.32
		1.97	2.65	5.49	6.01	6.43
006. West Asia and North Africa Regional Project	Production Systems	0.89	0.66	0.64	0.71	0.75
	Enhancement and Breeding	0.25	0.19	0.18	0.20	0.21
	Improving Policies	0.25	0.19	0.18	0.20	0.21
	Strengthening NARS - Training	0.64	0.47	0.46	0.50	0.54
	Strengthening NARS - Networks	0.51	0.38	0.37	0.40	0.43
		2.54	1.89	1.83	2.01	2.14
007. Natural Resources Management Global Project	Improving Policies	0.30	0.35	0.39	0.43	0.45
	Saving Biodiversity	0.30	0.35	0.39	0.42	0.45
	Protecting the Environment	0.30	0.36	0.38	0.42	0.45
	Strengthening NARS - Information	0.23	0.27	0.29	0.32	0.34
	Strengthening NARS - Training	0.15	0.18	0.19	0.21	0.23
	Strengthening NARS - Networks	0.23	0.27	0.29	0.32	0.34
		1.52	1.78	1.93	2.12	2.26
008. Pro-Poor Aquaculture Global Project	Production Systems	0.09	0.12	0.19	0.20	0.22
	Enhancement and Breeding	0.09	0.12	0.19	0.21	0.22
	Protecting the Environment	0.02	0.02	0.04	0.04	0.04
	Improving Policies	0.04	0.05	0.07	0.08	0.09
	Saving Biodiversity	0.02	0.02	0.04	0.04	0.04
	Strengthening NARS - Information	0.04	0.05	0.07	0.08	0.08
	Strengthening NARS - Training	0.04	0.05	0.07	0.08	0.09
	Strengthening NARS - Networks	0.04	0.04	0.07	0.08	0.09
		0.38	0.47	0.74	0.81	0.87
	Total	15.13	20.11	20.18	22.11	23.63

Summary by Undertaking, Activities and Sectors :

	2005 (actual)	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
Increasing Productivity	5.73	7.81	7.98	8.74	9.35
<i>of which:</i>					
Germplasm Enhancement & Breeding	1.32	2.09	1.52	1.66	1.78
Production Systems Development & Management - Fish systems	4.41	5.72	6.46	7.08	7.57
Protecting the Environment	1.38	1.81	1.89	2.07	2.22
Saving Biodiversity	1.18	1.76	1.53	1.68	1.79
Improving Policies	3.40	4.67	4.74	5.20	5.55
Strengthening NARS	3.44	4.06	4.04	4.42	4.72
<i>of which:</i>					
Training and Professional Development	1.43	1.59	1.65	1.81	1.93
Documentation, Publications, Info. Dissemination	0.27	0.31	0.37	0.40	0.42
Networks	1.74	2.16	2.02	2.21	2.37
Total	15.13	20.11	20.18	22.11	23.63

**Table 5. WORLD FISH CENTER - ALLOCATION OF PROJECT COST TO CGIAR REGIONS
2005 - 2009 (in US \$ million)**

Project	Region	2005 (actual)	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
001. Pacific Regional Project	Asia	1.42	1.98	1.99	2.18	2.33
	Total Project	1.42	1.98	1.99	2.18	2.33
002. East and Southeast Asia Regional Project	Asia	1.93	4.19	3.05	3.34	3.57
	Total Project	1.93	4.19	3.05	3.34	3.57
003. Greater Mekong Regional Project	Asia	1.35	1.84	2.81	3.08	3.29
	Total Project	1.35	1.84	2.81	3.08	3.29
004. South Asian Regional Project	Asia	4.02	5.31	2.34	2.56	2.74
	Total Project	4.02	5.31	2.34	2.56	2.74
005. Sub-Saharan Africa Regional Project	SSA	1.97	2.65	5.49	6.01	6.43
	Total Project	1.97	2.65	5.49	6.01	6.43
006. West Asia and North Africa Regional Project	WANA	2.54	1.89	1.83	2.01	2.14
	Total Project	2.54	1.89	1.83	2.01	2.14
007. Natural Resources Management Global Project	SSA	0.38	0.45	0.48	0.53	0.57
	Asia	0.76	0.89	0.97	1.06	1.13
	LAC	0.05	0.05	0.06	0.06	0.07
	WANA	0.33	0.39	0.42	0.47	0.50
	Total Project	1.52	1.78	1.93	2.12	2.26
008. Pro-Poor Aquaculture Global Project	SSA	0.09	0.12	0.19	0.20	0.22
	Asia	0.19	0.24	0.37	0.41	0.43
	LAC	0.01	0.01	0.02	0.02	0.03
	WANA	0.08	0.10	0.16	0.18	0.19
	Total Project	0.38	0.47	0.74	0.81	0.87
TOTAL		15.13	20.11	20.18	22.11	23.63

Summary by Region, 2005 - 2009

REGION	2005 (actual)	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
Sub-Saharan Africa (SSA)	2.45	3.21	6.15	6.74	7.21
Asia	9.67	14.44	11.53	12.63	13.50
Latin American and the Caribbean (LAC)	0.06	0.07	0.08	0.09	0.09
West Asia and North Africa (WANA)	2.95	2.39	2.42	2.65	2.83
TOTAL	15.13	20.11	20.18	22.11	23.63

Table 6. WORLD FISH CENTER - EXPENDITURES BY OBJECT, 2005 - 2009
(in US \$ million)

OBJECT OF EXPENDITURE	2005 (actual)	2006 (estimate)	2007 (proposal)	2008 (plan)	2009 (plan)
Personnel	6.51	8.80	8.83	9.68	10.34
Supplies and Services	4.72	5.51	5.53	6.06	6.47
Collaborators/Partnerships Costs	1.64	3.58	3.59	3.94	4.21
Operational Travel	1.94	1.66	1.67	1.82	1.95
Depreciation	0.32	0.56	0.56	0.61	0.66
TOTAL	15.13	20.11	20.18	22.11	23.63

**Table 7. WORLD FISH CENTER - FINANCING : MEMBERS AND NON-MEMBERS
UNRESTRICTED AND RESTRICTED GRANTS, 2005 - 2007
(in US \$ million)**

Member	2005 (actual)		2006 (estimate)	
	(US\$)	(national currency)	(US\$)	(national currency)
Unrestricted Contributions				
Australia	0.33	A\$0.45	0.38	A\$0.50
Canada	0.54	C\$0.67	0.37	C\$0.46
Denmark	0.32	US\$0.32	0.34	US\$0.34
Egypt	0.25	US\$0.25	0.25	US\$0.25
Food and Agriculture Organisation	0.05	US\$0.05		US\$0.05
Germany	0.46	EURO0.35	0.29	EURO0.24
India	0.04	US\$0.04	0.14	US\$0.14
Israel			0.03	US\$0.03
Netherlands	1.26	EURO0.95	1.14	EURO0.95
New Zealand	0.21	NZ\$0.30	0.21	NZ\$0.30
Norway	0.83	NOK5.5	0.78	NOK5.00
Philippines	0.02	PHP1.17	0.02	PHP0.94
Sweden	0.32	SEK2.40	0.33	SEK2.40
United States	0.80	US\$0.80	0.68	US\$0.68
United Kingdom	0.84	GBP0.44	0.84	GBP0.46
World Bank	1.00	US\$1.00	0.90	US\$0.90
subtotal	7.27		6.70	

Member	2005 (actual)		2006 (estimate)	
	(US\$)		(US\$)	
Targeted Contributions				
Asian Development Bank	0.34		2.14	
Australia	0.37		0.52	
Canada	0.01		0.12	
Challenge Program on Water and Food	0.53		1.19	
European Commission	0.88		0.80	
Ford Foundation	0.10		0.03	
France	0.02		0.08	
Germany	0.27		1.06	
International Development Research Center	-		0.05	
International Fund for Agricultural Development	0.12		0.13	
McArthur Foundation	0.13		0.08	
New Caledonia	0.05		0.04	
New Zealand	0.07		0.40	
Norway	-		0.10	
Oxfam	0.04		-	
Philippines	0.03		0.06	
Sweden	0.02		0.15	
The Organization of Petroleum Exporting Countries Fund for International Development	0.05		0.10	
United Kingdom	2.10		3.30	
United Nations				
Food and Agricultural Organization	0.02		0.01	
United Nation Environment Program	0.04		0.29	
United Nation Development Program (South South Cooperation)	0.03		0.00	
United States of America	0.57		0.63	
World Bank	0.01		0.15	
Others (Australian Institute for Marine Science, FishBase Information and Research Group, Inc etc.)	0.23		0.58	
subtotal	6.03		12.02	

TOTAL CONTRIBUTIONS	13.30	18.72
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Summary Statement of Activity	2005 (actual)	2006 (estimate)
Investor Grants	13.30	18.72
+ Center Income (other revenues)	0.15	0.20
= Total Revenues	13.45	18.92
Less:		
Total Expenses	15.13	20.11
Surplus (Deficit) of total revenues over total expenses	(1.68)	(1.20)

**Table 7(a). WORLD FISH CENTER - FINANCING : MEMBERS AND NON-MEMBERS
UNRESTRICTED AND RESTRICTED GRANTS, 2005 - 2007**
(in US \$ million)

Member	2006 (estimate)		2007 (proposal)	
	(US\$)	(national currency)	(US\$)	(national currency)
Unrestricted Contributions				
Australia	0.38	A\$0.50	0.38	A\$0.50
Canada	0.37	C\$0.46	0.53	C\$0.66
Denmark	0.34	DKK2.00	0.34	DKK2.00
Egypt	0.25	US\$0.25	0.25	US\$0.25
Germany	0.29	EURO0.24	0.30	EURO0.24
India	0.14	US\$0.14	0.14	US\$0.14
Israel	0.03	US\$0.03	0.03	US\$0.03
Malaysia	-	-	0.03	US\$0.03
Netherlands	1.14	EURO0.95	1.20	EURO0.95
New Zealand	0.21	NZ\$0.30	0.19	NZ\$0.30
Norway	0.78	NOK5.00	0.90	NOK5.50
Philippines	0.02	PHP0.94	0.02	PHP0.94
Sweden	0.33	SEK2.40	0.33	SEK2.40
United States	0.68	US\$0.68	0.80	US\$0.8
United Kingdom	0.84	GBP0.46	0.86	GBP0.46
World Bank	0.90	US\$0.90	1.00	US\$1.00
subtotal	6.70		7.30	
Targeted Contributions				
	(US\$)		(US\$)	
Asian Development Bank	2.14		1.52	
Australia	0.52		0.94	
Belgium	-		0.20	
Canada	0.12		0.18	
Challenge Program on Water and Food	1.19		0.85	
European Commission	0.80		1.37	
Finland	-		0.70	
Ford Foundation	0.03		-	
France	0.08		-	
Germany	1.06		0.94	
International Development Research Center	0.05		-	
International Fund for Agricultural Development	0.13		0.04	
McArthur Foundation	0.08		-	
New Caledonia	0.04		0.10	
New Zealand	0.40		0.25	
Norway	0.10		0.10	
Philippines	0.06		-	
Sweden	0.15		1.10	
The Organization of Petroleum Exporting Countries Fund for International Development	0.10		0.05	
United Kingdom	3.30		0.96	
United Nations			-	
Food and Agricultural Organization	0.01		-	
United Nation Environment Program	0.29		0.57	
United Nation Development Program (South South Cooperation)	-		0.26	
United States of America	0.63		0.75	
World Bank	0.15		0.13	
Others (Australian Institute for Marine Science, FishBase Information and Research Group, Inc etc.)	0.58		0.25	
subtotal	12.01		11.26	
TOTAL CONTRIBUTIONS	18.71		18.56	
Summary Statement of Activity				
	2006 (estimate)		2007 (proposal)	
Investor Grants	18.71		18.56	
+ Center Income (other revenues)	0.20		0.20	
= Total Revenues	18.91		18.76	
Less:				
Total Expenses	20.11		20.18	
Surplus (Deficit) of total revenues over total expenses	(1.20)		(1.42)	

**TABLE 8. WORLDFISH CENTER - ALLOCATION OF GRANTS AND CENTER INCOME
TO PROJECTS, 2005 - 2007**
(in \$ million)

Project	Member	Actual 2005	Estimate 2006	Proposal 2007
001. Pacific Regional Project	Australia	0.32	0.39	0.56
	European Commission	-	0.19	0.07
	France	0.02	0.08	-
	Germany	-	0.08	-
	New Caledonia	0.05	0.04	0.10
	New Zealand	0.07	0.40	0.25
	Others	0.01	0.00	-
	United Nations Environment Program	-	0.08	0.21
	Unrestricted+center inc.	0.95	0.72	0.80
	Total Project		1.42	1.98
002. East and Southeast Asia Regional Project	Asian Development Bank	0.27	1.32	0.75
	Australia	0.05	0.13	0.38
	Canadian International Development Agency	0.00	0.08	0.04
	Challenge Program on Water and Food	0.13	0.44	0.38
	European Commission	0.19	0.18	-
	Food and Agriculture Organisation	0.01	-	-
	Ford Foundation	-	0.03	-
	Germany	0.22	0.58	0.30
	International Development Research Center	-	0.05	-
	Others	0.01	0.17	0.18
	Philippines	0.03	0.06	-
	United Kingdom	0.13	-	-
	Unrestricted+center inc.	0.89	1.15	1.02
	Total Project		1.93	4.19
003. Greater Mekong Regional Project	Asian Development Bank	0.07	0.83	0.77
	Challenge Program on Water and Food	0.10	0.13	-
	European Commission	0.14	0.11	0.13
	Finland	-	-	0.60
	Ford Foundation	0.10	-	-
	Germany	0.01	-	-
	Others	0.02	0.00	-
	Oxfam International	0.04	-	-
	Sweden	0.02	0.08	0.30
	United Kingdom	0.20	-	-
	Unrestricted+center inc.	0.65	0.69	1.01
	Total Project		1.35	1.84
004. South Asian Regional Project	Challenge Program on Water and Food	0.03	0.03	0.10
	Food and Agriculture Organisation	0.01	0.01	-
	International Fund for Agricultural Development	0.12	0.12	0.04
	Others	0.05	0.02	-
	Sweden	-	0.02	-
	United Kingdom	1.65	3.30	0.96
	United States of America	0.57	0.63	0.50
	World Bank	-	-	0.10
	Unrestricted+center inc.	1.59	1.18	0.64
	Total Project		4.02	5.31
005. Sub-Saharan Africa Regional Project	Belgium	-	-	0.20
	Canada	0.01	0.04	0.14
	Challenge Program on Water and Food	0.09	0.50	0.37
	European Commission	-	-	0.50
	Finland	-	-	0.10
	Germany	0.04	0.40	0.64
	International Fund for Agricultural Development	-	0.01	-
	Norway	-	0.10	0.10
	Others	0.05	0.10	0.02
	Sweden	-	0.05	0.80
	The Organization of Petroleum Exporting Countries Fund for International Development	0.05	0.10	0.05
	United Kingdom	0.13	-	-
	United Nations Development Fund	0.03	0.00	0.26
	United States of America	-	-	0.25
	World Bank	0.01	0.15	0.03
Unrestricted+center inc.	1.56	1.20	2.03	
Total Project		1.97	2.65	5.49
006. West Asia and North Africa Regional Project	Challenge Program on Water and Food	0.18	0.10	-
	Others	0.04	0.03	-
	Unrestricted+center inc.	2.32	1.76	1.83
	Total Project		2.54	1.89
007. Natural Resources Management Global Project	Australia	0.03	0.03	-
	European Commission	0.54	0.32	0.49
	McArthur Foundation	0.13	0.08	-
	Others	0.02	0.22	0.05
	United Nations Environment Program	0.00	0.21	0.36
	Unrestricted+center inc.	0.80	0.92	1.03
	Total Project		1.52	1.78
008. Pro-Poor Aquaculture Global Project	European Commission	-	-	0.18
	Others	0.00	0.00	-
	United Nations Environment Program	0.04	-	-
	Unrestricted+center inc.	0.34	0.47	0.56
	Total Project		0.38	0.47

Center Totals

	2005	2006	2007
Total Targeted Funding	6.03	12.01	11.26
Total Unrestricted Funding + Reserve	8.95	7.90	8.72
Total Center Income	0.15	0.20	0.20
Total Allocations	15.13	20.11	20.18

**Table 9. WORLD FISH CENTER - STAFF COMPOSITION: INTERNATIONALLY AND
NATIONALLY RECRUITED STAFF, 2005 - 2009**

	2005 (actual)		2006 (estimate)		2007 (proposal)		2008 (plan)		2009 (plan)	
	Hired by:		Hired by:		Hired by:		Hired by:		Hired by:	
	center	other	center	other	center	other	center	other	center	other
<u>Internationally-Recruited Staff (IRS)</u>										
Research and Research Support	24		46		48		50		52	
<i>of which:</i>										
Post-doctoral Fellows	1		4		4		4		4	
Associate Professionals										
Training / Communications	2		1	1	1	1	1		1	
<i>of which:</i>										
Post-doctoral Fellows										
Associate Professionals										
Research Management	4	1	4	1	4	1	4	1	4	1
<i>of which:</i>										
Post-doctoral Fellows										
Associate Professionals										
Total IRS	30	1	51	2	53	2	55	1	57	1
<u>Regionally-Recruited Staff (RRS)</u>										
Research and Research Support	10		7		7		7		7	
<i>of which:</i>										
Post-doctoral Fellows										
Associate Professionals										
Training / Communications										
<i>of which:</i>										
Post-doctoral Fellows										
Associate Professionals										
Research Management	3		2		2		2		2	
<i>of which:</i>										
Post-doctoral Fellows										
Associate Professionals										
Total RRS	13		9		9		9		9	
<u>Support Staff</u>	263		275		286		286		286	
TOTAL STAFF	306	1	335	2	348	2	350	1	352	1

Table 10. WORLD FISH CENTER - FINANCIAL POSITION: CURRENCY STRUCTURE OF EXPENDITURE, 2005-2007
(In \$ million)

Currency	2005 (actual)			2006 (estimate)			2007 (proposal)		
	Amount	\$ value	% share	Amount	\$ value	% share	Amount	\$ value	% share
US Dollar	9.24	9.23	61%	12.15	12.15	60%	11.41	11.41	57%
Malaysian Ringgit	21.24	5.62	37%	26.73	7.19	36%	30.43	8.43	42%
Others		0.27	2%		0.77	4%		0.34	2%
TOTAL		15.13	100%		20.11	100%		20.18	100%






















**Table 11. WORLD FISH CENTER - STATEMENT OF FINANCIAL POSITION,
AT 31 DECEMBER 2005 AND 2004 (in \$'000)**

	2005	2004
<u>Assets</u>		
Current Assets		
Cash and cash equivalents	4,101	7,162
Investments	8,452	7,061
Accounts receivable		
Donor	2,643	2,135
Employees	102	109
Other CGIAR Centers	37	35
Others	498	1,120
Other current assets	63	405
Total Current Assets	15,896	18,027
Non-Current Assets		
Property, Plant and Equipment	652	366
Other Assets	130	104
Total Non-Current Assets	782	470
Total Assets	16,678	18,497
<u>Liabilities and Net Assets</u>		
Current Liabilities		
Accounts payable		
Donor	4,122	3,127
Employees	130	107
Other CGIAR Centers	267	208
Others	1,313	2,396
Accruals and provisions	1,626	1,739
Total current liabilities	7,458	7,577
Non-Current Liabilities		
Accounts payable - Employees	320	333
Total non-current liabilities	320	333
Total liabilities	7,778	7,910
Net Assets		
Unrestricted		
Designated	2,492	2,998
Undesignated	6,408	7,589
Total net assets	8,900	10,587
Total Liabilities and Net Assets	16,678	18,497

**Table 12. WORLD FISH CENTER - STATEMENT OF ACTIVITIES
FOR THE YEAR ENDED 31 DECEMBER 2005 AND 2004 (in \$'000)**

	<u>Unrestricted</u>	<u>Restricted</u>		<u>Total</u>	<u>Total</u>
		Temporary	Challenge Programs	2005	2004
Revenue and Gains					
Grant Revenue	7,272	5,498	530	13,300	14,146
Other revenue and gains	146	-	-	146	879
Total revenue and gains	7,418	5,498	530	13,446	15,025
Expenses and Losses					
Program related expenses	5,629	5,498	530	11,657	11,818
Management and general expenses	4,095	-	-	4,095	2,981
Sub Total expenses and losses	9,724	5,498	530	15,752	14,799
Indirect cost recovery	(619)	-	-	(619)	(793)
Total expenses and losses	9,105	5,498	530	15,133	14,006
Net Surplus/(Deficit)	(1,687)	-	-	(1,687)	1,019
Object of Expenditures					
Personnel	4,441	1,872	198	6,511	6,460
Supplies and services	3,150	1,469	97	4,716	3,438
Collaboration/ Partnerships	12	1,492	140	1,644	2,485
Operational Travel	1,277	573	95	1,945	1,372
Depreciation	225	92	-	317	251
Total by Center	9,105	5,498	530	15,133	14,006

WorldFish Key Performance Goals 2006

CGIAR	Goal	Measure	Target
1)	 Increase CORE funding	\$ value of CG core contribution	\$7.3m mobilised for 2007
2a)	 Improve project pipeline, to support MTP	\$ value of proposals submitted	\$19m
2b)		# of proposals submitted	48
Investors	Goal	Measure	Target
3)	 Increase funding to WorldFish programs	\$ Value of project funding	\$9.7m mobilised for 2006
4)	 Increase the diversity of investors	% of funds mobilized from new investors	10% of funds from submitted grants in 2006 targetted at new investors
5)	 Improve overall scientific and organisational performance	# performance against WorldBank Indicators	Among the Top 6 CG Centers
6a)	 Increase outputs, outcomes and impacts of our research	# ex post impact assessments provided	6
6b)		% satisfaction with quality of investor reports and project outputs	80% of respondents feel that reports met or exceeded expectations.
7)	 Increase support to investors to build the case for increase support for R&D within their constituencies.	# special reports, briefs and publications provided	6
NARS/NGO's	Goal	Measure	Target
8)	 Increase partner engagement to enable expanded research agenda.	\$ value of partner activities	\$200K in collaboratively funded activities in China
9a)	 Increase human and institutional capacity in NGOs and NARS	# scientists/students from developing countries co-supervised/supported	25 FTE
9b)		# WorldFish scientists working in NARS and NGO facilities	15 person months
9c)		# national or regional policy briefings/seminars held	3
9d)		# training courses (>5days) provided	15
ARIs	Goal	Measure	Target
10)	 Increase collaboration with ARIs to support the WorldFish mission	# person weeks of ARI scientists working at WorldFish, but supported externally	12
11)	 Improve opportunities for ARIs to develop research programs and attract resources in support of the WorldFish mission.	# proposals developed in collaboration with WorldFish	5 proposals with \$ value > \$1m supporting WorldFish activities
Our People	Goal	Measure	Target
12a)	 Improve project management	% progress milestones achieved for research projects	80% of progress milestones achieved on time
12b)		% project underspend	<10% underspend on grant-funded projects
13a)	 Increase the number of quality scientific publications	# papers/scientist published in peer-reviewed publications	2 publication per research scientist
13b)		# mean impact factor for submitted papers	20% increase in mean impact factor over 2005 performance
13c)		# Nature or Science articles/comments submitted for publication	4
14)	 Increase proposal success rates	% success rate for project proposals	60%
15)	 Improve staff understanding of the strategic direction, operational procedures and expected performance standards.	% of staff who feel they understand the link between their work and the WorldFish KPG's	80% of respondents have a clear understanding of the link between their Performance Management Plan and WorldFish KPG's
16)	 Improve work-life balance	% satisfaction with work-life balance	80% of staff believe that the work-life balance they achieve is satisfactory
17)	 Increase capacity and effectiveness of staff in their jobs	# average number of training hours provided.	3 hours training for all staff on performance management
18a)	 Increase in the quality and timeliness of corporate service delivery	% satisfaction with financial information and budget management tools	75% of respondents feel that service met or exceeded expectations.
18b)		% satisfaction with Human Resources Service Delivery	75% of respondents feel that service met or exceeded expectations.
18c)		% satisfaction with Information and Communications Service Delivery	75% of respondents feel that service met or exceeded expectations.
19)	 Increase staff attraction and retention rates	% satisfaction with performance management system	75% of respondents feel that their clarity over performance expectations has improved.
20)	 Improve the gender and diversity profile of the center	To be determined	To be determined
21)	 Reduce the risk of health and safety related incidents in the workplace	To be determined	To be determined

Annex II. Detailed highlights of our research achievements within each MTP project in 2005/6

Pacific Regional Project

The ability of the Pacific office to develop, win and execute projects has been greatly increased by the recruitment of three senior scientists to the portfolio. Principal scientist, Johann Bell, relocated from WorldFish headquarters in Penang to the Pacific office in Nouméa in February 2005; we were fortunate to recruit two senior marine scientists to our Western Pacific Research Center in Solomon Islands through the New Zealand Volunteer Service Abroad (VSA) scheme. This has revealed the overriding importance of having a minimum "critical mass" of senior researchers within the portfolio to effectively address the Center's mission, and to expand our activities to meet the needs and demands of donors, partners and poor communities.

Major focus is being given to developing the project pipeline and securing grant funding for 2006 and later years. The pipeline is now growing steadily. Two projects under development in late 2005 have been submitted to donors: *Fish for schools* (New Zealand Agency for International Development - NZAID) and *New rural livelihoods for Solomon Islands through pearl farming* (European Union (EU) Stabex Fund). Projects just completed, currently under way and under development are shown below:

- Optimal release strategies for sea cucumbers in New Caledonia (end of project: December 2005).
- Determination of optimal release strategies for restocking and stock enhancement of the tropical sea cucumber (end of project: June 2006).
- Improving sustainability and profitability of village sea cucumber fisheries in Solomon Islands (end of project: December 2008).
- Sustainable aquaculture development in the Pacific (end of project: December 2006).
- Enhancing conservation and sustainable use of coral reefs through information coordination and knowledge management tools in the Pacific region (end of project: March 2006).
- Creating alternative livelihoods in Solomon Islands through environmentally friendly aquaculture and trade of marine ornamentals (end of project: March 2008).
- Desktop study of the feasibility of trepang reseeded in Indonesia (end of project: February 2006).
- ReefBase Pacific: strengthening information access and dissemination in support of effective coral reef conservation and management (end of project: December 2008).

ESEA Regional Project

Three projects were initiated in Aceh for rehabilitation of the December 2004 Tsunami-affected coastal communities:

- Fisheries rehabilitation in tsunami-affected Indonesia: community needs assessment and resource status (End of project - December 2006): WorldFish is providing input into the Indonesian Strategy for rehabilitation and restoration of capture fisheries through two key activities, mainly through an assessment of the community needs and perspectives in terms of sustainable fisheries livelihoods strategies, and through an assessment of the status of the fisheries and natural resources.
- Integrated natural resources management and livelihood paradigms in recovery from the Tsunami in Aceh (End of project- December 2006): WorldFish is providing technical inputs on the rehabilitation of coastal ponds (tambaks) as well as conducting an appraisal of the specific "sanctuary" role of mangroves along Aceh's west coast with a view to mangrove rehabilitation.

- Aquaculture assessment and planning (completed): This project focuses on the mapping of aquaculture ponds impacted by the Tsunami using remote sensing data. Collaborating partners were the Centre for remote imaging, sensing and processing of the national University of Singapore (CRISP-NUS) and the Universitas Syiah Kuala (UNSYIAH), Indonesia.
- CCER: The CCER for ESEA was successfully conducted from 18-27 May 2005. The panel has made a number of recommendations on how to strengthen: the targeting of research and development efforts to better deliver on the Worldfish mission; the quality of institutional partnerships; the quality of research activities and outcomes; the balance of staff capacities needed to improve the performance of Worldfish in the region; and the regional strategy and WorldFish capacity to pursue the strategy successfully.
- Regional Development Plan: The draft of the Center's Development Plan for ESEA was prepared in May 2005. The main features of the Plan are as follows:
 - It places fisheries in a wider context of human, social and economic development in the countries and the region;
 - It emphasizes a shift from supply-led to demand-driven research to support development;
 - It proposes a new strategic process, building on existing cooperation arrangements where possible, with future activities categorized into four broad groups: a) food security and improving health, b) reducing poverty and improving livelihoods, c) sustaining aquatic ecosystem, and d) improving knowledge and awareness of fish, poverty and environment links.

Greater Mekong Regional Project

The Center took the calculated risk to invest in a new regional office in Cambodia to support our planned expansion in the region, and this is clearly paying off in terms of increased visibility for the Center, new partnership opportunities identified, effectiveness in project delivery, and increased credibility with our investors. In 2006, anticipated overhead recovery from grant projects, plus direct administration costs covered by grant projects are expected to fully offset the cost of regional office operations, including the full cost of financial and administrative staff. Between July 2005 and January 2006, 10 staff appointments were made for work focused on the region. This includes: four internationally recruited staff (IRS) research and project leader positions, two regionally-recruited research (RRS) positions and four nationally recruited staff (NRS) positions.

With three grant contracts to support work in the Greater Mekong, we are set to realize a 70% increase of grant funding for 2006 as compared to 2005. On-going and recently completed projects are listed below:

- Community-based fish culture irrigation systems and seasonal floodplains in Cambodia and Vietnam (end of project: January 2009).
- Mekong Initiatives - knowledge generation and integration for management of inland fish resources in Cambodia and Lao PDR (ongoing – rolling planning and annual).
- Institutional capacity building for inland fisheries research in Cambodia -Phase II (end of project: February 2006).

South Asian Regional Project

Both the Community-based Fisheries Management Phase Two (CBFM2) and the Development of Sustainable Aquaculture (DSAP) projects (in total more than USD12 million in project value) were entering the dynamic and intensive phases of their project periods, as CBFM2 had crossed the mid-point with all planned activities under way and DSAP was very busy winding up before its closure in August 2005. Out of a total of 16 projects ongoing at the beginning of 2005, 5 were completed in 2005 and another 6 will end by the end of 2006. One new project was successfully

developed during the last quarter of 2005; the United States Agency for International Development (USAID) funded Shrimp Quality Support Project (SQSP) to run from January to September 2006 valued at USD629,000. Strengthening our partner base and strategic alliances to position ourselves for new challenges took up a significant part of our time in 2005/6.

Sub-Saharan Africa Regional Project

Several projects were carried out in countries located in the Sub-Saharan Africa region:

- Malawi: Research efforts focus on consolidating the integrated aquaculture-agriculture (IAA) research program and the implementation of the policy related research on the contribution of IAA to water management in semi-arid environments, mitigation of HIV/AIDS impacts through aquaculture and development of small-scale commercial aquaculture models.
- Zambia: The on-going pilot phase for the project entitled "Health and co-management in small-scale fisheries" is being implemented successfully in the Kafue Flats. The level of commitment of the communities is high and a Memorandum of Understanding has been signed between the Worldfish Center and the Department of Fisheries, Zambia.
- Democratic Republic of Congo: Aquaculture and fisheries are major entry points for poverty alleviation in the Democratic Republic of Congo. A concept note for a project (Euro 1.2 million) in collaboration with Care International was submitted to the EU/FED to develop activities in the Kivu province. Discussions are also carried out with World Wide Fund for Nature (WWF) to explore the possibility of collaborating in some of their on-going USAID-funded activities in the Salonga/Equator region.
- South Africa: Consultations were held with the NEPAD Secretariat, the South African National Department of Agriculture and a regional NGO, NOVA Africa to develop a national NEPAD program for small-scale aquaculture development in the Limpopo Province.

West Asia and North Africa Regional Project

Most of the work in this region was carried out in our outreach site in Abbassa. Selective breeding of African catfish, *Clarias gariepinus* was started in the summer of 2005. This was possible due to the successful standardization of the basic techniques of controlled reproduction and pair spawning, separate rearing of fry by family, and controlling for cannibalism and tagging. In Abbassa, the following refinements of pond technology to reduce production costs were achieved:

- Low cost feeds developed from local ingredients indicate the possibility of complete replacement of imported herring fish meal with either locally produced fish meal (LFM), poultry byproduct meal (PBM) or a 50-50 mixture of LFM and PBM.
- During the final three months of the growing season under conventional pond farming conditions, it was possible to lower the crude protein levels to 17% in the diets and by feeding at 3% of the total fish biomass, and still achieve highest production and net profit rates.
- Mixed species farming of *Oreochromis niloticus* and *Clarias gariepinus* significantly improved the pond production rates over a monoculture of either species.
- The excessive growth of the blue green alga, *Microcystis aeruginosa* which results in low pond fish productivity could be controlled from an economic and fish health point of view with an application of 1-2 ppm tannic acid. Biocontrol of *M. aeruginosa* was demonstrated using the plankton, *Chlorella ellipsoides* and *Scenedesmus bijuga*.
- Comparative studies on immunostimulants effect of *Echinacea* sp. and garlic on tilapia fingerlings were evaluated during summer and winter seasons. Both the agents offered protection against disease challenges; however, the response to *Echinacea* sp. was higher.

The 5-year project on “Development of Integrated Aquaculture-Agriculture Systems for small-scale Farmers in the Forest Margins of Cameroon” was completed. The principal results are as follows:

- Farming systems diversification through the integration of aquaculture in central Cameroon significantly increased the fish harvest from 498 kg/ha to 2525 kg/ha over five years. The amount of fish consumed by the farming families in periurban areas where freezers were available to store fish for later use, was higher (50 kg/family/9 months) than in rural areas, (8 kg/family/ 9 months).
- Cost of providing participatory research services was higher in rural areas (£26,900 per 50 rural farmers per year) compared to periurban areas (£7,140 per 50 farmers per year) mainly due to differences in transportation cost.
- Provision of high-quality technical advice to farmers with market access can have a strong positive impact on farm productivity and profitability among small and medium-scale farmers. In areas with good market access, these impacts are quickly translated into improved cash flow and household nutrition. In areas with little or no access to markets, the number of fishponds and fish farmers can be increased and pond productivity can be improved, therefore increasing local food supplies; however, economic impacts are not clearly visible in the short-term.

Natural Resources Management Global Project

Major highlights from the Natural Resources Management Global project include:

- A study describing the linkages between trash fish, capture fisheries and aquaculture in Southeast Asia and the Greater Mekong was presented at an FAO Regional Workshop in Vietnam on 7-9 June 2005.
- Five regional overviews from the “Sustainable Management of Coastal Fish Stocks in Asia” project were published as a special section in the Fisheries Research journal.
- In collaboration with PESS, we produced a policy framework and guidelines on “Managing fishing capacity and its impact on national/regional security”
- We finalized FIRST (ver. 2004) software with a web-based interface and improved report and data validation module.
- In November we completed a training workshop on “Participatory appraisal for community needs assessment and resource status” with our research partners in Indonesia.
- We also provided technical support to the Fisheries Research Institute, Malaysia on the analysis of trawl survey data for the Tsunami Seminar on 11-12 August 2005.
- In partnership with NOAA, ReefBase developed a database for entering and viewing of socioeconomic survey data.
- ReefBase (in partnership with South Pacific Commission) organized a “Coral Reef Fisheries Workshop” in New Caledonia. Key experts discussed the guidelines for development of a management-relevant coral reef fisheries information portal in ReefBase.
- In late 2005, ReefBase started the development of a major new version of its online information system (to be launched mid-2006) which will offer substantial improvements in terms of ease of navigation, quality of the information, and relevance to its user base. At the end of 2005, ReefBase has 7,700 registered users.
- In March 2006, FishBase reached 29,300 species (707 new entries). Long-term problems with staffing and conditions were resolved and the role of WorldFish within the FishBase Consortium has been stabilized and better defined.

Annex III . Progress Report on Implementation of EPMR Recommendations

Dates of EPMR Report Presentation and Discussion:

Science Council : 10 April 2006

Executive Council : 18 May 2006

CGIAR Annual General Meeting : December 2006

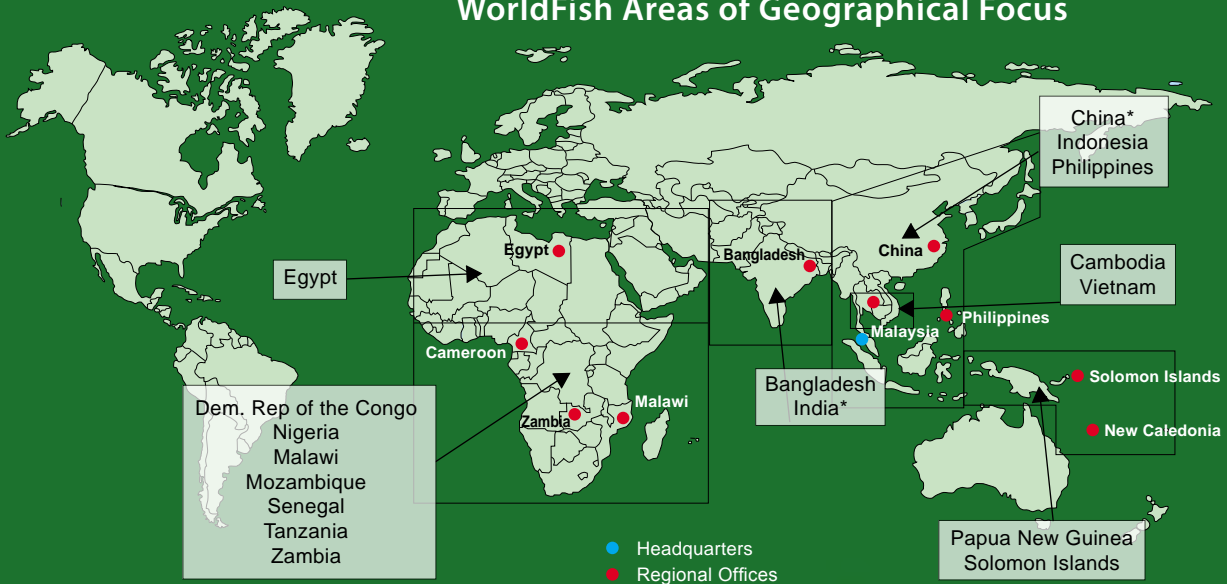
Recommendations	Center's Response	Milestone/Goal	Target Date of Completion	Progress Achieved
1. Commission an external review of new research structure by mid 2007.	Agreed but allow a full 3 years of operation of matrix and 2 full years of completion of Strategy Update before review. BoT requested rolling program of CCERs.	1. Rolling program of CCERs to be presented to BoT; 2. Center-wide review.	1. Sep '06 2. 2008	Schedule of rolling CCERs in preparation for Board approval.
2. Define strategy for leveraging additional resources through joint ventures, including co-funding of PhD and postdoctoral grants. Develop relationships with scientists and laboratories in advanced research institutes and develop joint research proposals.	Agreed. Center is already implementing a number of mechanisms such as Senior Research Fellows, sabbatical arrangements, part time appointments, joint appointments with other CGIAR Centers and Adjunct Professorships.	1. Prepare comprehensive review of strategic standing approach; 2. Develop policy on opportunities leveraging additional resources.	1. Sept 2006 2. Feb. 2007	A "Picture yourself at WorldFish" initiative to attract individuals with their own resources to work with WorldFish already started; 2 academics (from Australia and USA) joining us on sabbatical in '06
3. Identify and embrace a limited number of key scientific issues and research objectives that could be achieved within a reasonable period of time (4 to 6 years) and that could: stimulate WorldFish scientists of different disciplines and promote interdisciplinary research; be recognized by the scientific community as a cutting-edge research center and stimulate collaboration with scientists from both developed and developing countries; demonstrate the comparative advantage of the Center and its leadership capacity in the field of aquaculture and fisheries for developing countries.	Agreed. Discipline Directors for NRM and Aquaculture are developing research strategies for these Disciplines that are designed to provide such a focus for the Disciplines for the next 5-10 years.	1. NRM and Aquaculture strategies to be presented to BoT 2. Strategy for PESS to be further developed following recruitment of PESS Discipline Director.	1.Sep. 2006 2. 2007	NRM strategy finalized for presentation to the BOT. A concept paper on redefining small-scale fisheries is being finalized for submission to a high impact journal. Research efforts are being refocused so that all work within the NRM Discipline focuses on this central theme. Aquaculture strategy under development.
4. Conduct further research on GIFT focusing on genetics and nutrition using more controlled experimental conditions, and testing a large range of feeding levels.	Agreed in principle.	1. Research on genetics and nutrition incorporated into the Pro-poor Aquaculture Strategy Document.	1. Sep. 2006	The strategy is currently being developed.

<p>5. Move away from downstream development activities and explore opportunities for development-related activities to be executed by local or bilateral entities, where available; Analyze impacts and identify constraints and bottlenecks of development-related activities; Identify partners' strengths and weaknesses in order to better target capacity building, especially of NGOs; Synthesize and package existing information, including frameworks, manuals, protocols and guidelines to ensure greater dissemination and use of its products.</p>	<p>Agreed.</p>	<p>1. Undertake assessment of partners' strengths and weaknesses globally and in regions; 2. Re-examine strategy and approach to knowledge sharing.</p>	<p>1. Ongoing/ 2008 2. Dec 2006</p>	<p>The recently commissioned CCER for G. Mekong has among its TOR a requirement to evaluate the appropriateness and quality of our partnerships in the region. Similar requirements will be placed in subsequent CCERs.</p> <p>The Center has recently committed to a substantive revision of its approach to knowledge sharing and dissemination by creation of new joint Knowledge Sharing group with IWMI. A jointly appointed Head and Deputy-Head already recruited.</p>
<p>6. Define Center's continuing involvement and role in FishBase, including specifying how the various demands on staff will be met.</p>	<p>We believe we have already defined our continuing role. We have signed an MoU which commits us on a long-term basis to ensure development for the FishBase project. We are committed, both in human resources and financial support, to continue to fully participate in the consortium.</p>	<p>1. Develop a position paper for Board approval which clearly defines the Center's role in FishBase; 2. Communicate approved position to FishBase Consortium members.</p>	<p>1. Sept 2006 2. Dec. 2006</p>	<p>Position paper being developed</p>
<p>7. Expand modeling work on the supply and demand of fisheries and aquaculture and undertake additional ex-post impact assessment in aquaculture, paying particular attention to technological environmental impacts and non-negligible dynamic (inter-temporal) effects of fisheries and aquaculture activities.</p>	<p>Agreed - our research on fish demand and supply has been highly effective in guiding policy and future research on fisheries and aquaculture.</p>	<p>1. Undertake ex-post impact assessments of the Center's aquaculture research; 2. Present a major analysis of fish supply and demand in Asia and publish in a primary journal.</p>	<p>1. Ongoing/ 2008 2. Dec. 2006</p>	<p>WorldFish has recently committed to further develop its approach to modeling fish supply and demand as part of a joint initiative with FAO. A workshop to begin this study was recently held in Bangkok.</p>
<p>8. Define on a pragmatic and objective basis, the acceptable dissemination area of an improved fish strain, and the realistic monitoring that should be implemented in relation to this dissemination.</p>	<p>Agreed. The Center is committed to expanding our work on the development of improved breeds of tilapias, carps and African catfish and in doing so, to developing improved tools for assessing both economic utility and environmental risk of introducing specific strains.</p>	<p>1. Develop improved tools for assessing both economic utility and environmental risk of introducing specific fish strains; 2. Develop policy and risk assessment methods for use of the GIFT tilapia strain (See MTP Pro-poor Aquaculture Global Project no. 8).</p>	<p>1. 2007 2. 2007</p>	<p>One research project to develop risk assessment methods has already been developed. A draft policy relating to dissemination of GIFT was discussed out of session at the March '06 BoT meeting and a revised policy, with associated procedures and tools to support monitoring and risk management is now under development, and will be submitted to the BoT in September '06.</p>

<p>9. For PESS: Secure a Discipline Director (DD) as soon as possible; Conduct a strategic process of research planning and prioritization that enables the discipline to more precisely identify its research domain and a selected set of issues to produce significant IPGs; Develop and apply a balanced growth policy for qualified scientific staff according to research priorities.</p>	<p>Agreed. When the position was advertised internationally in 2005, no suitably qualified candidate was secured, but we are confident that this will happen in 2006. When in post, the DD will have explicit responsibility for leading a strategic research planning process and for developing the staff capacity to pursue the discipline strategy.</p>	<p>1. Procure DD for PESS; 2. Develop research strategy for PESS.</p>	<p>1. 2006 2. 2007</p>	<p>A worldwide search for a suitable candidate is underway and a second round of advertising will be initiated shortly.</p>
<p>10. WorldFish explores opportunities in sub-Saharan Africa for collaboration with other CGI Centers, in particular International Institute of Tropical Agriculture (IITA), West Africa Rice Development Association (WARDA), International Rice Research Institute (IRRI), Center for International Forest Research (CIFOR), International Water Management Institute (IWMI), International Food Policy Research Institute (IFPRI) and International Center for Research and Forestry (ICRAF), possibly within the context of task forces, to identify gaps in the application of IAA technology and methodology or for activities related to fisheries governance.</p>	<p>Agreed. The Center is already collaborating with IWMI, ILRI and ICRAF in sub-Saharan Africa (and with IWMI and IRRI in Asia), and WorldFish and IWMI are collaborating on water management aspects of agriculture in southern Africa (See MTP sub-Saharan Africa project no.5).</p>	<p>1. Increase partnership with CGIAR Centers wherever this adds value to the work of both Centers.</p>	<p>Ongoing/2008</p>	<p>A workshop held between IWMI and WorldFish scientists in March 2006 has already identified areas where a collaborative approach to project definition and implementation which can add value in both Southern Africa and the Greater Mekong. Following the lead taken by IITA, we have committed exploring opportunities for further work in the region in collaboration with WARDA, IWMI, ILRI and ICARDA. Plans to co-locate staff with CIFOR in Zambia and IITA in Congo are also in train.</p>
<p>11. Give high priority to: Recruitment of senior scientists with a proven track record or the involvement of such scientists in Center projects through various forms of partnership and adjunct arrangements; Recruitment of a cadre of younger, recent PhD graduates, particularly in view of present and past difficulties in attracting more senior scientists.</p>	<p>Agreed. The Board of Trustees and Management are committed to strengthening the scientific capacity of the Center. This is being pursued actively but it is important to emphasize that these increases in staffing need to be financially sustainable and considerable effort is being invested in developing staff capacity in a staged manner in order to ensure sustainability.</p>	<p>1. Complete recruitment of 10 new scientists as approved by the Board under the investment strategy; 2. Develop staff capacity in stages manner in order to ensure financial sustainability.</p>	<p>1. Dec 2006 2. Ongoing/2008</p>	<p>Further effort undertaken to recruit a PESS Discipline Director. Recruitment of senior Fisheries Advisor to NEPAD in the final stages of selection. Other planned recruitments on track.</p>
<p>12. Elaborate a Partnership Strategy focusing on, among others, the modus operandi for establishing strategic partnerships and alliances that would add significant value to the current research activities undertaken by the Center; Explicitly define the roles and responsibilities of the Center relative to its partners in all major projects; Determine its positioning on the research-to-development continuum, within the framework of an impact pathway analysis, for all major projects; Elaborate a human capacity building policy for its staff and its partners taking into account, as appropriate, the suggestions that have been provided.</p>	<p>Agreed. We are committed to strengthening and expanding our partnerships in order to further increase our impact. We believe that a formal Partnership Strategy would assist by providing clear guidance to staff in pursuing this work and we will develop such a strategy, and the elements recommended by the Panel will be addressed including clarifying the position of the Center and partners on the R&D continuum, and building capacity of staff and partners. WorldFish uses the Value Chain diagram as advice to guide discussion and thinking about these issues.</p>	<p>1. Prepare formal Partnership Strategy; 2. Build capacity of staff and partners through workshops and/or training events.</p>	<p>1. 2007 2. Ongoing/2008</p>	<p>See response to recommendations 2 and 5.</p>

<p>13. Reduce Board size to not more than nine Trustees, including the ex-officio Director General, Host Country representatives and the FAO nominee; Modify Board Committee Structure to retain the Audit Committee, the Nominating Committee, and the Executive Committee, and eliminate the Program Committee; Include in the Center's Annual Reports a Report of the Trustees, discussed and approved by, and signed on behalf of, the Board, and Audited Financials, duly certified by the Director General and the Chief Financial Officer, along with the Independent Auditor's Report; Constitute a Science Advisory Committee of an appropriate number of members with suitable qualifications and experience/expertise, with a member of the Board as the Committee Chair. The Committee will report to the Board, and the Committee Chair (or any other member other than the Director General) should brief the Board at every meeting on its deliberations and advice; Plan for CCERS on a three-year rolling time frame, to be updated each year, to obtain the best panelists with adequate advance notice, and spreading the workload evenly over the period; CCER Panel Chairs should be requested to make the presentations to the Board on their Reports and Recommendations.</p>	<p>The Center initiated a process of Board reform in September 2005, and we are pleased that the Panel Recommendations reflect the direction that has been taken.</p>	<ol style="list-style-type: none"> 1. Reduce Board size to eight Trustees, including the Director General and Host Country representatives; 2. Modify Board Committee structure to retain the Audit Committee; 3. Replace the Nominating Committee with a Governance Committee; 4. Eliminate the Program Committee; 5. Pursue establishment of a Science Advisory Committee, with the Terms of Reference and operating procedures for this Committee to be reviewed at the 30th meeting of the BoT; 6. Produce an Annual Report of the Trustees, approved and signed on behalf of the Board, as well as Audited accounts; 7. Plan CCERS on a 3-year rolling time frame (to be considered by BoT at 30th meeting) 	<p>1. March 2006</p> <p>2. March 2006</p> <p>3. March 2006</p> <p>4. March 2006</p> <p>5. Sept 2006</p> <p>6. June 2006</p> <p>7. Sept 2006</p>	<p>Items 1 to 4 are complete</p> <p>Items 5 and 7 are being developed for approval at the Sept 2006 Board meeting</p> <p>Item 6 is being implemented and will be reflected in the 2006 annual report.</p> <p>Item 7 is being implemented and will be approved by the Board in September 2007</p>
<p>14. Continue to maintain reserves at a prudent and yet not unduly excessive level, and to give this matter very high priority and importance so that necessary and appropriate allocations are expeditiously approved and utilized.</p>	<p>Agreed. The Center has developed a plan to draw on the Center's reserves to allow investment in science development.</p>	<ol style="list-style-type: none"> 1. To utilize USD1.2m for additional scientists and support costs in 2006; 2. To make further strategic investments in research and support bringing reserves to no less than 100 days operating expenses. 	<p>1. 2006</p> <p>2. 2008</p>	<p>Board has approved 1.2 million draw-down on reserves in 2006 and will consider further proposals for additional draw-down in 2007 and 2008</p>

WorldFish Areas of Geographical Focus



* Building strong partnerships with China and India figures prominently in our strategic plan because both have emerged as global leaders in aquaculture research and development.

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