

1 WORLD FISH CENTER IN A CHANGING ENVIRONMENT

ICLARM, now WorldFish Center, started its operations in 1977 through the support of the Rockefeller Foundation. The Center was admitted into the CGIAR in 1992 following the expansion of the CGIAR to incorporate explicitly natural resources management concerns. As a condition to joining the System, ICLARM was asked to develop a Strategic Plan, which subsequently provided the basis for the development of its first medium-term plan covering the period 1994-98. The CGIAR specifically agreed to support research on inland and coastal area fisheries but not support research on deep sea capture fisheries or capital intensive aquaculture, as these sectors of the industry were dominated by large scale commercial operators.

The Second EPMR of the Center was conducted in 1999. Among other things the Panel noted the difficult circumstances under which ICLARM operated and recommended that “the ICLARM Board and Management place the highest priority to locating and transitioning to a permanent site that meets ICLARM’s criteria”. At its Fifteenth Meeting in February 1999, immediately following the EPMR Report, the ICLARM Board decided to locate the global headquarters in Penang. The move finally took place in February 2000.

During the past seven years (1999-2005) ICLARM/WorldFish Center has undergone a strategic transformation characterized by *inter alia*: the relocation of its headquarters from the Philippines to Malaysia, the change of its public name from ICLARM to WorldFish Center (WorldFish), the adoption of two strategic plans and an evolution in program structures and the recruitment of a new Director General as well as an extensive revision or introduction of supporting organizational arrangements. All these have taken place at a time of continued stagnation and even degradation of global capture fisheries, the tremendous growth of aquaculture industry and the intense globalization of fish products which have great relevance to developing countries livelihoods, and provide both challenges and opportunities for WorldFish. Changes have also occurred within the CGIAR and in the international development agenda as dictated by major international conferences.

This review assesses these changes and their effects, actual and potential, on the work of the Center. Accordingly, the Panel has attempted to provide a comprehensive and rigorous review of WorldFish’s science, governance and management to ensure that WorldFish can continue to fulfill both its and the CGIAR’s mission for fisheries and aquaculture. The retrospective part of the review assesses the outputs and impacts of the Center based principally on the old program structure since the new program had just been put in place.

1.1 Some Major Challenges and Opportunities in World Fisheries and Aquaculture

The WorldFish Center is committed to poverty reduction and food security with a fish focus with due concern to maintaining environmental sustainability. From a fisheries and aquaculture perspective, and in the context of contributing to the MDGs some of the major challenges and opportunities can be grouped under three principal headings: Fish and Food Security, Fish and Poverty and Fish and environmental sustainability.

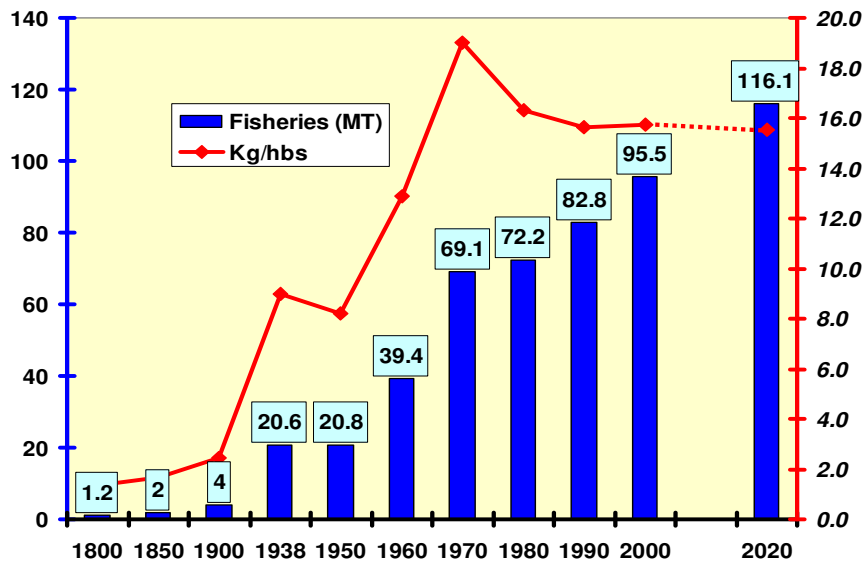
1.1.1 Fish and Food Security

Fish, as well as other aquatic plants and animals, are a crucial food source for millions of people through out the world. Poor people in developing countries are particularly dependent on fish for income and basic nutrition. In many Asian countries for example, the proportion of the food budget spent on fish is highest in low income groups. In low income food-deficit countries, fish provides 20 percent of animal protein in a typical diet versus 13 percent in industrialized countries. In several countries in Asia, the proportion is 30 percent and in some countries it is higher than 50%, e.g. Bangladesh (51%), Indonesia (58%) and Cambodia (75%). In the past 50 years the world’s average per capita consumption of fish increased by more than 70 percent and demand is likely to increase further by nearly 21 percent worldwide by 2020 and by as much as 30% in developing countries, according to the “Fish to 2020” study.

Global fish production is no longer keeping pace with demand while capture fisheries are generally declining and have little scope for future growth since 75 percent of the wild caught fish come from stocks that are even now depleted, over-fished or fully exploited. The potential of capture fisheries appears limited with only a one percent annual increase expected to the year 2020 under the most plausible scenario (Fig. 1.1). Under an “ecological collapse” scenario, it could even decline by as much as 20 percent. Even under ideal conditions, long-term sustainable production from capture fisheries (including food fish and fish for meal) is estimated at about 100 million metric tonnes while the proportion of capture fisheries for fish meal is expected to increase by about 2% by 2020 (From 32 to 34%).

In 2002, worldwide production of fish, crustaceans and mollusks reached 132.2 million tonnes. More than 76 percent of the total amount was used for direct consumption. Inland capture fisheries accounted for 6.1 percent. While the majority of inland fisheries production countries have an Environmental Sustainability Index (ESI) that range from moderate to high, of concern are the countries, generally poor developing countries, for which the ESI ranges from moderately low to low and for which the trend in production is slowly or moderately decreasing.

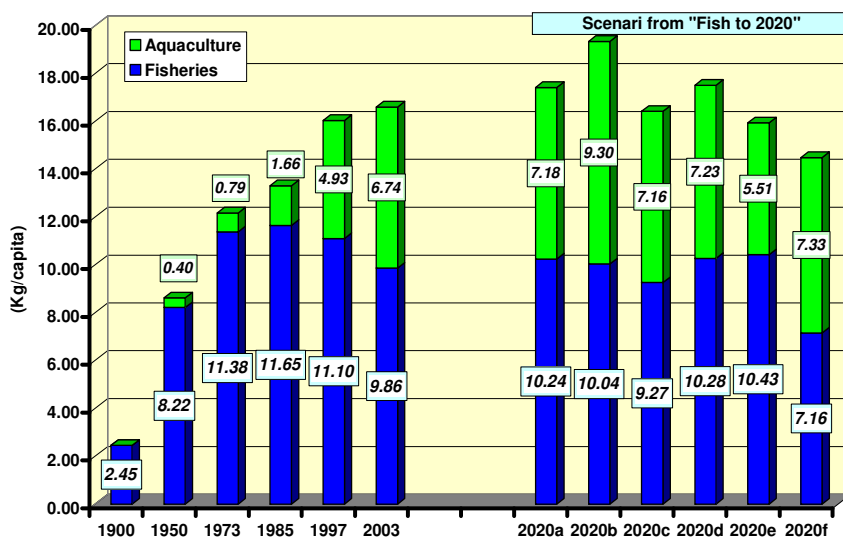
Figure 1.1 World Fisheries from 1800 to 2000, per capita consumption and 2020 perspective
(source FAO and “Fish to 2020”)



Aquaculture by contrast is providing a steadily increasing proportion of the total fish production – 30 percent in 1997 to a projected 41 percent in 2020 - and represents the main area of future growth (Fig.1.2). Developing countries contribute almost 90 percent of global aquaculture production, of which Asian countries produce 87 percent. It is estimated that a yearly increase of 2 percent would be sufficient to maintain the per capita consumption rate of aquatic products at global level. However, to raise per capita consumption in developing countries from 14 to 18.2 Kg/year, aquaculture production would need to expand by 4 percent per year. However pollution, mangrove destruction, fish disease and the use of wild-caught fish as feed for aquaculture species, mean that sustainable growth in this sector is far from simple. Currently, 34 percent of the capture fishery production is used for non-human consumption, i.e. fish meal. The figure is likely to increase unless alternate food sources are developed for livestock and aquaculture. Thus the future growth of aquaculture may have to depend on the development of alternate sources of fish feed, or the development of herbivorous fish for large-scale aquaculture.

Low value food fish (LVFF) will be a strategic issue for developing countries because it constitutes 47% of total fish production (capture + aquaculture). In developing countries about 95% of LVFF is used for human consumption and as animal and fish feed and represent 65% of total aquatic products consumption in these countries and would still be 60% in 2020. Presently, 61% of the global supply of LVFF comes from capture fisheries but more LVFF will be produced from aquaculture in the future, particularly from developing countries. The bulk of LVFF is produced in developing countries; however, the role of aquaculture in enhancing the value of low-value by-products into high value fish or crustaceans will remain very secondary in developing countries.

Fig.1.2 Contribution of fisheries (excluding fish meal) and aquaculture to World per Capita fish consumption (source: "Fish to 2020")



Whereas meat prices have fallen by half in real terms since the 1970s and are expected to continue to decline, fish prices are projected to rise over the coming two decades, including prices for low-value food fish that the poor consume. Much depends on the rate of aquaculture expansion, and on the state of ecosystems that underpin fish production. The risk is that, as production continues to fall short of demand, rising prices will reduce fish consumption by the very groups who need it most.

1.1.2 Fish and Poverty

Most poor people are concentrated in tropical developing countries, with high percentages of the poor in South Asia and sub Saharan Africa. Fisheries can contribute directly to achieving some specific MDGs and indirectly to all the goals. It is the strength of fisheries, and in particular small-scale fisheries, that it enables millions of poor fishers, processors and traders to diversify their livelihood strategy on the basis of income and commercial skills while at the same time supplying vast numbers of poor consumers with essential nutrition. Reducing poverty requires a focus on livelihoods, not just incomes, and recognizing the diversity of livelihood strategies employed by small-scale fishers, fish-farmers, and processors. In most regions fishers' livelihoods are under threat from: (i) over-fishing that reduces stocks, (ii) commercial exploitation that constraints access to fisheries by the poorest and (iii) pollution, habitat destruction and associated changes in land use that undermine ecosystem productivity. The failure to sustainably manage these common pool resources has three consequences: it reduces the food supply, it shrinks employment opportunities for fishers and processors (and farmers and others who supplement their incomes and diets through part-time fishing), and it creates conflicts that can unravel social progress in other domains, such as health and education.

The challenge of securing adequate supplies of fish for the world's poor is especially acute in those areas where hunger is most prevalent. Sub-Saharan Africa for example accounts for 198 million of the undernourished and represents 75 percent of all undernourished children in developing countries. The prevalence of hunger is particularly high among small farmers, herders, fishers and those who rely on the natural resource base. These communities account for about 20 percent of underweight children below five years of age.

Between 1970 and 1990 the number of fishers and fish farmers in the world doubled. Most of this occurred in Asian countries where four fifths of all fishers dwell. Globally, an estimated 200 million are now employed in fishing and fish processing and the vast majority of these are small-scale operators.

Fish are also an increasingly important export commodity in developing countries (Table 1.1). Roughly 35 percent of global fish output by value was traded across international borders in 2002, compared to less than 10 percent for meat. Fish products, especially from aquaculture, contribute significantly to gross domestic products (GDP) and foreign exchange earnings in low-income Asian countries.

The markets for high valued fish are often vulnerable to trade policies and import requirements of their customers from the developed world. In addition, they often rely on imported fish gears or feeds. The demand for fish is expected to double by 2020 in developing countries, providing fish producers access to larger local markets. Fish trade between developing countries is also growing in importance. By 2020, developing countries will both produce and consume nearly 80 percent of the world's fish. In many countries, small-scale fishers are both politically and economically marginalized which means that targeted policy measures are needed to ensure that growing trade opportunities will benefit the poor. Indeed, over the past two decades, the absolute increase in global fish trade had been substantial and the developing countries' relative contribution to this growth was much higher than those of developed countries. However, the export/production ratio is likely to decrease in the future for many countries except in Latin America (See Table 1.1).

Table 1.1 Export/production ratio for food fish in different regions

Region	1973			1997			2020 (Baseline scenario)		
	Prod. (MT)	Exp. (MT)	E/P %	Prod. (MT)	Exp. (MT)	E/P %	Prod. (MT)	Exp. (MT)	E/P %
China	4854	-108	-2.2	33339	181	+0.5	53074	543	+1.0
SE ASia	5360	-324	-6.0	12632	1131	+8.9	17521	482	+2.7
India	1851	-49	-2.6	4768	122	+2.5	7985	426	+5.3
Other Asia	1172	26	-2.2	2056	84	+4.1	2999	-157	-5.2
Latin America	2330	44	+1.9	6380	2435	+38.2	8807	3047	+34.6
WANA	674	35	+5.2	2248	50	+2.2	2776	-538	-19.4
SSA	2064	-604	-29.3	3738	-54	-1.4	6015	-492	-8.2
Developed World	26880	818	+3.0	25194	-4045	-16.0	27618	-2813	-10.2

1.1.3 Fish and Environmental Sustainability

Fishing is currently the largest extractive use of wildlife in the world. Because of this, the links between fisheries productivity and ecosystem health are even more direct than in other areas of food production. Several fundamental requirements for achieving the MDGs identified by the Millennium Project Task Force on Environmental Sustainability apply equally to the fisheries and aquaculture sectors. They include stakeholder recognition of the importance of environmental sustainability to poverty reduction, implementation of substantive environmental safeguards, incorporation of sustainability criteria into economic and trade policies, international agreements and enforcement that guarantee equitable resource allocation, and development planning based on realistic estimates of future population growth and distribution.

The poor are the most vulnerable to environmental change which could be due to urbanization, industrialization, tourism and growing coastal population. Achieving environmentally sustainable productivity gains in the face of natural and human induced climate change presents an additional challenge. Furthermore, the whole fisheries ecosystem may be at risk from some aspects of climate change. Coral reefs and mangroves are vulnerable to climate change via temperature mediated coral bleaching and sea-level rise respectively and there could be substantial losses in productivity from some areas over the next 20-50 years.

Raising productivity, particularly in aquaculture, also requires special precautions to manage against risks from the introduction of alien species into new habitats and escapes of alien stocks from controlled environments into natural ecosystems. The sensitivity of aquaculture to environmental changes has also become more apparent in recent years, as well as its capacity to cause environmental damage if not managed responsibly.

These challenges highlight the need of an integrated approach to water resources management in freshwater systems and the need to protect marine and coastal environments. Furthermore, some of the challenges in the fisheries sector are underpinned by inappropriate governance. In many areas, a governance revolution is needed to redress the root cause of the current crisis. Technical actions invariably fail unless policy changes remove constraints to progress and create capacity in order to expand the scale of successful hunger-reduction-actions.

To address these challenges eight broad areas of scientific emphasis have been identified by WorldFish. The Panel agrees on the importance of these areas and believes they merit special attention in the coming years. These areas of emphasis map to the technical arenas outlined in the WorldFish Strategy Update and link to achieving the MDGs. The broad areas are:

- Comparative analysis of alternative governance /institutional arrangements;
- Geospatial sciences and geo-informatics for fisheries and aquaculture research;
- Advances in fish nutrition to farm-based feeds for resource poor farmers;
- A systematic approach to genetic improvement programs for aquatic species;
- Developing Tools for Improved Management of Small-scale fisheries;
- Improving resilience of inland fisheries and freshwater aquaculture production;
- Fish Markets and Trade; and,
- Impact Assessment for Improved Delivery of research outputs and development outcomes.

Various components of these broad areas are addressed by the Center in the 2006 – 2008 MTP and are the subject of review in this report.

1.2 Changes within the CGIAR and External Environment

Major changes and reforms within the CGIAR since the last EPMR have had an impact on WorldFish. Since the last review, the CGIAR adopted a new vision and modified its overarching goal and mission statement². It identified an integrated strategic approach for System activities based on seven “planks”. In particular, the System re-affirmed even more strongly its ‘people and poverty’ focus giving greater priority to Sub Sahara Africa and South Asia; a regional approach to research planning and implementation was adopted; new types of partners and new forms of partnerships were advocated; and task forces were encouraged in addressing major, clearly identifiable problems. Finally, it was recommended that the role of the CGIAR as a catalyst, integrator and disseminator of knowledge should be strengthened.

Other key reforms in the CGIAR included (i) the establishment of a executive body for streamlining decision making (Executive Council), (ii) incorporating a programmatic approach to research planning and funding (the Challenge Programs or CPs), (iii) transforming the Technical Advisory Committee into a Science Council (SC), and (iv) establishing a virtual System Office comprised of various support units. These changes have, in one way or another, affected all 15 CGIAR Centers and some, like WorldFish, contributed in a major way to their development.

Arguably, one of the most significant activities in which the CGIAR has been engaged recently relates to the identification of System level priorities. The need for developing a small and well defined set of priorities had been growing for some time, with the main rationale being to avoid dispersion and atomization of research, to mobilize research capacity across system, to enhance coordination and cooperation, and to enhance accountability. After an intensive and highly interactive two-year exercise led by the SC

² CGIAR vision: A food secure world for all; CGIAR goal: To reduce poverty, hunger and malnutrition by sustainably increasing the productivity of resources in agriculture, forestry and fisheries; CGIAR mission: To achieve sustainable food security and reduce poverty in developing countries through scientific research and research-related activities in the fields of agriculture, forestry, fisheries, policy and environment.

that involved numerous stakeholder meetings and various deliberations and consultations with the donors and CGIAR Centers themselves, the SC presented, and the Group endorsed at AGM'05, a set of 20 System priorities, grouped into five broad areas³. It is significant to point out that there are at least 7 priorities where WorldFish is likely to have or could easily play a significant role in their implementation, by virtue of its current expertise or the problem area identified. These are:

- Conservation of aquatic animal genetic resources
- Genetic enhancement of selected high-value species
- Enhancing income through increased productivity of fisheries and aquaculture
- Sustaining and managing aquatic ecosystems for food and livelihoods
- Improving water productivity
- Sustainable agro-ecological intensification in low - & high-potential areas
- Rural institutions and their governance.

The new priorities will, ultimately, not only guide resource allocation but also help to define a framework for the selection of the mode of operation, including the CPs. The Group is now in the process of developing a plan for implementing the priorities over a 3-year period, with obvious implications for funding allocation decisions by donors.

MDGs

In September 2000 the member states of the United Nations unanimously adopted the Millennium Declaration - a common commitment to end global poverty and suffering. The MDGs are part of the road map for implementing this Millennium Declaration. The CGIAR, for its part, undertakes research that generates the science and technologies to underpin advances towards each of the MDGs, especially those related to rural poverty (Goal 1, Target 1); hunger (Goal 1, Target 2); health (Goals 4,5, and 6); and the environment (Goal 7). The CGIAR's new priorities draw explicit reference to the MDGs and WorldFish's own KPGs are annual targets that reflect the MDGs.

The Report of the UN Millennium Project "Investing in Development" released in January 2005, highlighted the importance of science and technology in achieving the MDGs. Indeed, the report recognizes the contribution of global public goods and the unique and continuing contribution of the CGIAR, and recommends a large increase in financial support to sustain and expand the research and impact of the System.

1.3 Center's Response to Recommendations of the Second EPMR

The Second EPMR in 1999 made six important recommendations and raised concerns on 10 major issues, the implementation of which has greatly shaped the Center over the past seven years. Several of these recommendations address topics that are still relevant to the Center today and the Panel has, in the pages of this report, deliberated further on them. Nevertheless, following standard practice, the current EPMR Panel has reviewed the

³ The resulting five System Priority Areas for CGIAR research are:

1. Sustaining biodiversity for current and future generations;
2. Producing more and better food at lower cost through genetic improvements;
3. Reducing rural poverty through agricultural diversification and emerging opportunities for high-value commodities and products;
4. Poverty alleviation and sustainable management of water, land, and forest resources; and
5. Improving policies and facilitating institutional innovation to support sustainable reduction of poverty and hunger.

recommendations of the 2nd EPMR report, along with WorldFish's updated response to them and provided in Appendix III its assessment of the present situation.

1.4 Conduct of the Review

In early September 2005, the Panel Chair had a formal telephone briefing with the Chair of the SC. The Panel Chair and the Panel member responsible for Governance and Management attended the Twenty-eighth Board of Trustees Meeting in mid-September 2005 to observe the Board, interact with Board members concerning review expectations and to elicit views and perceptions from the Board about the major challenges and opportunities facing the center.

The entire Panel and the consultant on financial matters visited WorldFish headquarters in Penang, Malaysia from 24-29 October 2005 for the Initial Phase of the Review. The Panel received briefings from the Director-General and the Senior Management Team, Discipline and Portfolio Directors, other scientists and administrative staff and had an opportunity to visit the research station in nearby Jitra and meet counterparts there. The briefings during the Initial Visit provided the Panel with an overall view of the center's goals, priorities, strategies and a sense of the Center's own perceptions of its place in the international scene, the future challenges and mechanisms to address them. Panel members further held more in-depth discussions with some staff. The Initial Visit also permitted the Panel to make an assessment of the progress on the implementation of the recommendations of the Second EPMR, to identify key strategic issues and formulate hypothesis for key findings, to agree on the outline of Draft Report and plan a strategy for completing the Review.

Field trips were undertaken in October/November 2005 to Malaysia and Malawi and to Egypt and the Mekong Basin Region in January 2006. In each of the countries, panel members met with government, private sector and WorldFish partners (representatives of NARs, ARI, NGOs, etc).

The Panel conducted the review in an as objective and transparent manner as possible and through out the review the Panel Chair maintained close contacts with the DG of WorldFish.

Between the Initial Visit and the Main Phase, a host of individual interviews were conducted by the Panel with the previous Director General and the two immediate previous Board Chairs of WorldFish, the DGs of some CGIAR Centers, Donors, Peers, and Clients, including a full day of discussions with colleagues at FAO in Rome. The Panel also conducted a staff survey through anonymous submission of an electronic form, available to all staff both at headquarters and out-reached centers. In all, information was received from 118 WorldFish staff, 8 CGIAR Centers, 9 representatives of donors and over 60 representatives of partners, clients and peers.

The entire Panel less the Consultant on Finance visited WorldFish HQ again during the Main Phase of the review, from 30 January to 10 February 2006. During that time Panel member drafts were integrated into a complete Panel report. Final drafts of the Report were shared with the DG and relevant senior staff for comments and factual correction. On 10 February the Panel's report was presented to WorldFish staff and Management. The Board Chair was also present.