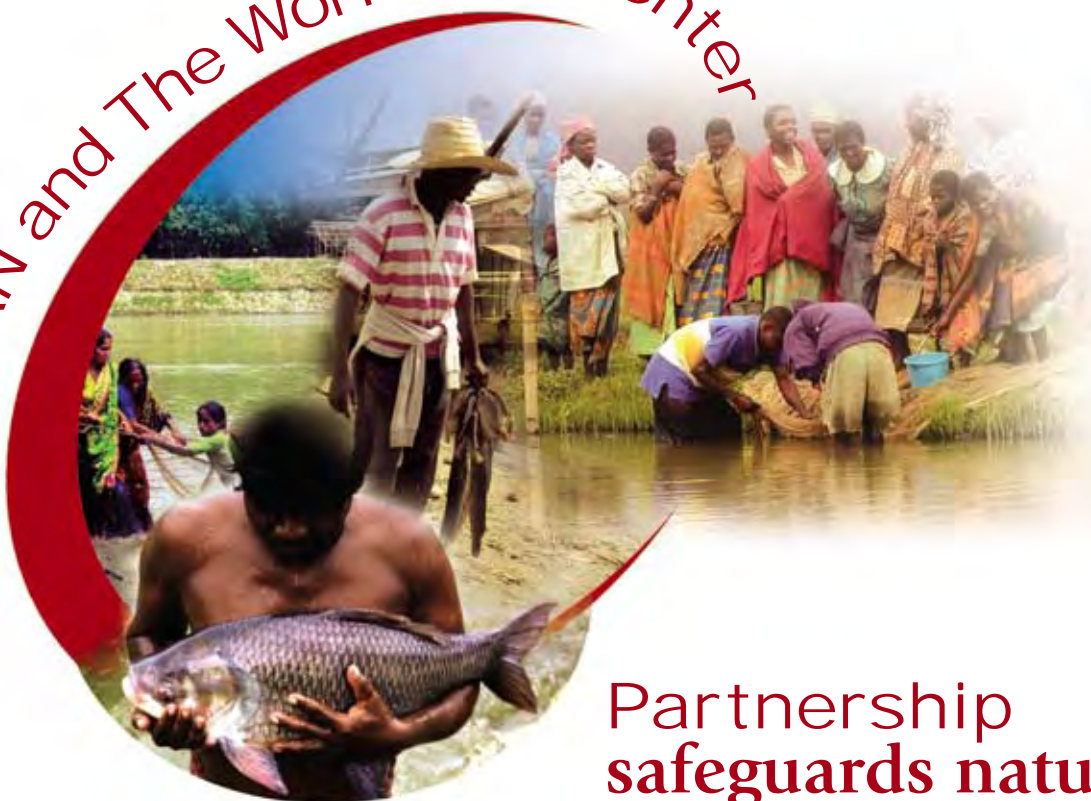


JAPAN and The WorldFish Center



Partnership safeguards natural resources and promotes rural development

Sustaining marine and freshwater fisheries

Fish are crucial to the welfare of poor people the world over. The last food industry that relies on wild animal stocks, fishing is often the mainstay or supplementary subsistence activity of landless rural families in developing countries with no other livelihood options. Yet overfishing and pollution threaten coastal fisheries worldwide, with many fish stocks falling by 70% or more in the past quarter of a century. Also threatened are freshwater inland fisheries that provide the last hope of sustenance to the poorest in many local communities.

The WorldFish Center is unique among the Future Harvest centers of the Consultative Group on International Agricultural Research (CGIAR), an

alliance of international research centers and member countries and foundations dedicated to sustainably improving the welfare of poor farmers, fishers and consumers in developing countries. Only WorldFish fulfills a mandate that spans both natural resource management in marine and freshwater capture fisheries and enhancing crop productivity with integrated aquaculture and agriculture. WorldFish research addresses how poverty and access to productive natural resources interact to deliver rural development that is sustainable.

Rich food for poor people. Asians derive much of their dietary animal protein from fish. The average Japanese eats 66 kgs of fish annually, and as a nation Japan ranks 8th in the world for fish consumption. Poor people in

Asia rely on fish to meet their dietary requirements and this dependency ranges from nearly a third or more in Bangladesh, Malaysia, Vietnam and Thailand to half or more in Cambodia, Philippines, Indonesia and Japan. Among the poor, this “rich food for poor people” is an even more dominant source of animal protein — sometimes the only source — and vital to health for the vitamins and other micronutrients it supplies. This is also true in Africa, the world’s other great locus of poverty, where 200 million people regularly eat fish, from which they obtain 22-70% of their protein.

“Rich food for poor people.”



Better livelihoods from fisheries, both captive and cultivated, can help eradicate extreme poverty and hunger, finance primary education, and empower the women who work in them.

Demand for fish will climb in both Asia and Africa with continued population growth and rising incomes. To meet this demand in Asia, aquaculture is growing rapidly and will likely supply by 2020 more than 40% of the fish consumed. In sub-Saharan Africa, declining capture fisheries and growing populations have pushed the supply of affordable fish per capita down from 9 kg per year in 1973 to 6.6 kg in 1997, less than half the world average. Reversing this trend requires a coordinated program of fisheries and aquaculture research and policy guidance. The potential is there. Today, aquaculture supplies only 2% of African fish production, but the Food and Agriculture Organization (FAO) of the United Nations projects that using just 5% of suitable areas in Africa would meet the continent’s fish demand. Emerging techniques for farming low-input species also promise to put fish back on the table for many poor Africans and Asians.

Achieving the Millennium Development Goals. Better livelihoods from fisheries, both captive and cultivated,

can help eradicate extreme poverty and hunger, finance primary education, and empower the women who work in them. Nutrition from fish reduces child and maternal mortality and helps people living with HIV/AIDS to resist secondary infections and respond to anti-retroviral drugs. Threats to marine and inland fisheries must be turned back to ensure environmental sustainability. Finally, answering the need for cross-border and regional cooperation to address fisheries-related issues helps advance a global partnership for development.

The WorldFish mission

WorldFish is an international research organization that works to reduce poverty, hunger and malnutrition in developing countries. It does this by applying sound science to improve aquaculture and fisheries, both marine and inland. Established in 1977 and now headquartered in Penang, Malaysia, WorldFish currently works in 22 developing countries and has regional offices in Bangladesh, Cambodia, Cameroon, Egypt, Malawi, Malaysia, New Caledonia, Philippines and Solomon Islands. It will soon have staff in China, Democratic Republic of the Congo, South Africa and Zambia.

WorldFish research focuses on natural resource management issues pertaining to fisheries and aquaculture, aiming to sustain the productivity of aquatic systems, promote the conservation of aquatic ecosystems, preserve biodiversity, improve resource management policies, and strengthen the capacity of developing countries in these areas. WorldFish has, with over 200 partner organizations,

- pioneered the breeding of improved lines of tropical food fish,
- developed methods to assess and better manage complex tropical fisheries and the health of coral reefs,
- developed and applied methods of comanaging Asia’s coastal fisheries,
- developed and applied technologies

to integrate aquaculture with existing agriculture systems,

- innovated culturing techniques for high-value coral reef species that village farmers can use,
- researched new practices for sustainably managing artisanal fisheries,
- developed global databases to assemble and make accessible essen-

tial knowledge for managing aquatic resources to protect biodiversity, and

- trained hundreds from government departments on resource management and thousands of trainers from nongovernmental organizations on techniques useful to farmers and fishers.



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Japan-WorldFish partnership

Over the last decade, the government of Japan

has been one of WorldFish's most important partners, having contributed almost US\$7 million (about ¥780 million at the 2006 exchange rate). Japan contributed \$2.8 million to rehabilitate and improve the facilities of Egypt's Central Facility for Aquaculture Research at Abbassa on the Nile Delta. Abbassa is the key base for research, innovation and training on pond-based aquaculture in West Asia and Africa. The pond and laboratory facilities enable world-class research to be conducted on such critically important issues as resource-use efficiency in pond aquaculture, fish disease, and the genetic improvement of Nile tilapia and African catfish. The facility at Abbassa is but one example of how WorldFish provides Japan with efficient avenues for supporting regional food security for the poor.

While densely populated Asia continues to be a priority for Japanese efforts to ensure food security, restore ecosystem health and overcome regional dispari-

ties, it is increasingly being recognized that helping

Africa feed itself is central to global food security and achieving the Millennium Development Goals. Japan's partnership with WorldFish has served these ends in both Africa and Asia. Japan has been represented on the WorldFish Board of Trustees without interruption since 1985. Currently on the board is Dr. Kunihiko Fukusho of the Port of Nagoya Public Aquarium, who follows Dr. Takeshi Nose (1999-2003) of the National Federation of Fisheries, Dr. Masaru Fujiya (1992-1998) of the Tokai National Fisheries Research Institute, and Prof. Keishi Amano (1985-1992) of the same institute and Tokyo University of Fisheries. However, Japanese funding for WorldFish has been modest compared with its support for other CGIAR centers, as Japanese contributions to WorldFish core funding have declined from a peak of \$873,000 in 2000, dipping to



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nothing in 2005. With Japanese scientist Yumiko Kura's recent arrival in the WorldFish Mekong office, the potential for synergy between WorldFish and Japan, the home of one of the world's great fishing traditions, offers tremendous scope for a restored and expanded partnership.

The following are several highlights of the Japan-WorldFish partnership since 2000.

Analyses guiding fisheries' contribution to economic development. The influential WorldFish report *Fish to 2020: Supply and Demand in Global Markets* tells

how enlightened policy and technology, both new and traditional, can enhance livelihoods and nutrition while avoiding environmental damage and waste. Influencing and informing policy on fisheries globally and regionally, the report was also the starting point for the AsiaFish model that WorldFish introduced in 2003. Focused on nine Asian countries, AsiaFish helps governments develop strategies and options for managing fisheries and aquaculture in the coming decades to sustain and increase fish supplies for both domestic consumption and trade.

Strengthening policy to increase the contribution of fish to African development. Japanese funding has supported WorldFish strategic policy analysis on the contributions of fisheries and aquaculture to food security and achieving the Millennium Development Goals in Africa. This has strengthened food security and nutrition policies both nationally and sub-regionally,

notably regarding the Southern African Development Community. In addition, WorldFish works closely with the New Partnership for Africa's Development (NEPAD) Secretariat and the African Union to strengthen recognition of fisheries and aquaculture in the Comprehensive African Agriculture Development Program. WorldFish is developing with NEPAD two regional programs on aquaculture and artisanal fisheries to contribute to program implementation.

Restoring degraded fisheries through community-based management and capacity building. WorldFish works to improve fisheries governance at various scales, and so defuse conflicts and facilitate cooperation to restore the ecosystem health and productivity of degraded fisheries resources. WorldFish work on sustainably managing coastal fish stocks prompted partner governments in Vietnam and Thailand to review national policies and incorporate the findings into national action plans. Having identified successful approaches toward enhancing cooperation among communities and governments, WorldFish followed up by developing cost-effective methods of collecting and sharing data to improve poor people's livelihoods in coastal areas.

The center also disseminated techniques for participatory consensus-building, initially in coastal areas of South and Southeast Asia and later in floodplain fisheries in Bangladesh and Cambodia, which are especially important to landless rural residents. Fish from wetlands supply 46% of all animal protein consumed in Bangladesh, where an award-winning WorldFish project facilitates sustainable incomes from fisheries while protecting fish stocks and restoring biodiversity through community-based fisheries management. The lessons learned and successes attained in Bangladesh are now being applied in Vietnamese communities, where fisheries co-management has become official government policy.

Managing fisheries and aquaculture in the coming decades to sustain and increase fish supplies for both domestic consumption and trade.



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Essential to durable fisheries co-management is capacity building in national organizations. A notable success has been the WorldFish effort in Cambodia, where freshwater fish production per capita is at least four times greater than in any other country in the world, and where fish supply up to 75% of animal protein in the typical diet WorldFish helped establish and build the capacity of Cambodia's Inland Fisheries Research and Development Institute to provide scientific bases for improving management and policy decisions regarding inland fisheries.

Improving management of small-scale fisheries to sustain aquatic ecosystems. Like many river systems, the Mekong is experiencing intensified competition over water flows, in particular from hydropower and irrigation schemes, either planned or underway, that threaten sensitive aquatic ecosystems. With national and local partners, WorldFish has assessed the river flows required to sustain aquatic ecosystems and anticipate how these would be affected by proposed infrastructure projects. The center helps fishers and regulators assess the geographic distribution, critical habitat, and other basic characteristics of important fish stocks, as well as the current distribution of benefits. To help stakeholders use this information to design effective rules on fisheries, and so improve their productivity while protecting the environment and preserving diversity, WorldFish has pioneered the application of Bayesian modeling to create a set of decision-support tools for policymakers in the Mekong basin. This technology is now being generalized to support the management of small-scale fisheries in the coastal zone.

Evaluating small-scale fisheries in Africa and their contribution to economic growth. WorldFish has intensified its research on small-scale fisheries in sub-Saharan Africa and their contribution to economic growth. This

work includes research on fisheries valuation, governance, co-management and community health issues, notably HIV/AIDS. The benefits of artisan fisheries, like those that predominate in Africa, are easily underestimated because they are dispersed among many small-scale producers. These include part-time subsistence fishers, often women and children, with no other source of animal protein or essential micronutrients.

Genetic improvement of tropical food fish. Breeding tropical food fish began only in the last 3 decades with WorldFish work on Nile tilapia undertaken with technical and financial support from Japan. Genetically improved farmed tilapia (GIFT) is a conventionally improved strain that grows nearly twice as fast as ordinary tilapia, enables 3 harvests a year (rather than 2) lowering farmers' production costs by up to 30% and boosting profits. GIFT fish are now farmed in 13 Asian countries, improving the supply of low-cost, high-quality protein for the poor. In part through the International Network on Genetics in Aquaculture — which WorldFish helps coordinate to foster cooperation and strengthen capacity in genetic improvement. With Japanese funding, WorldFish has started GIFT breeding for Africa, enabling national breeding programs in Cote D'Ivoire, Egypt, Ghana and Malawi. WorldFish is also adapting the selection and breeding technique used to develop tilapia to other species including carp and African catfish.

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Expanding integrated aquaculture-agriculture for improved livelihoods. Integrated agriculture-aquaculture (IAA) efficiently leverages smallholders' resources to provide protein to farm families and expand the range of food choices in areas prone to famine. In Bangladesh, IAA demonstration farmers nearly tripled fish production from earlier levels, and each dollar they invested in fish culture resulted in a gross benefit of \$2.29 in ponds and \$2.03 in rice paddies (rice-and-fish being an integrated technique pioneered by WorldFish, the fish often benefiting landless neighbors of rice farmers). Some 6,000 Bangladeshi farmers have used IAA to boost their income by 60%. These benefits were central to the decision of the World Food Prize Foundation to name Modadugu V. Gupta, a WorldFish senior research fellow, its 2005 laureate. WorldFish is now drawing on partnerships in Bangladesh to promote a gradual transition toward more commercial aquaculture, including exports.

Adopting small-scale aquaculture and so capitalizing on the nutritional benefits of fish in the diets of people living with HIV/AIDS and of aquaculture's income-generating potential for those unable to shoulder heavy labor.



IAA provides Malawian farmers more durable and resilient livelihoods in areas prone to drought.

than traditional ones. Meanwhile, AIDS-orphan groups in neighboring Zambia are increasingly adopting small-scale aquaculture and so capitalizing on the nutritional benefits of fish in the diets of people living with HIV/AIDS and of aquaculture's income-generating potential for those unable to shoulder heavy labor.

Innovations in sustainable alternative livelihoods. Where depleted fisheries can no longer support communities, WorldFish finds innovations to provide livelihoods while easing pressure on fish stocks. With its national partners in Vietnam and the Solomon Islands, WorldFish pioneered techniques to hatch sea cucumbers for release to restock coastal areas depleted of this delicacy, whose ease of capture makes it especially valuable to the poorest fishers. The Solomons are also where WorldFish demonstrated how to sustainably capture and rear wild spat of the blacklip pearl oyster, as well as coral reef fish and invertebrates for the tropical marine aquarium trade. In West Africa, WorldFish studies the sustainable harvest of ornamental fish in the Lower Guinean rainforest, where 8 million people depend on river ecosystems and harvesting fish is a particularly attractive livelihood option for women. Alternative livelihoods provide the basis for the WorldFish response to the Indian Ocean tsunami of December 2004. WorldFish developed a framework and set of guidelines that go beyond fisheries to examine coastal livelihoods at their broadest, both agricultural and not, with the aim of guiding rehabilitation efforts and investments towards a more robust and resilient future. An initial focus on tsunami-affected areas promises to provide lessons applicable to fragile coastal areas throughout the tropics.

Since WorldFish began promoting IAA in Malawi in the 1980s, the number of farmers using the system has grown by more than 10 fold and their incomes have risen by 6 fold, while childhood malnutrition has fallen by 15% in areas where it is practiced. IAA provides Malawian farmers more durable and resilient livelihoods in areas prone to drought, as IAA farms have been found to be 18% more productive during drought

Developing and maintaining global knowledge and information management systems. FishBase, the award-winning and highly collaborative flagship WorldFish database on aquatic resources, includes nearly 30,000 fish species (almost all known species) over 3,800 are native species to Japan. Fishbase attracts more than 20 million hits per month and Japanese organizations and individuals rank within the top 10 user groups.

Another system developed and managed by WorldFish is ReefBase (covering 10,000 reefs) is the world's pre-

mier online system on coral reefs, and provides information services to coral reef professionals involved in management, research, monitoring, conservation and education. One hundred and twenty registered users are from Japan who use this system to support management, monitoring and evaluation of the nearly 3000 sq km of Japans coral reefs; 91% of which are at risk. Nearly 75% of the 115 countries with coral reefs are developing countries who depend on reefs and the maintenance of these aquatic ecosystems for food and livelihoods. 🐟

A Future with *Fish for All*

Worldfish will expand upon its earlier achievements. While advancing its work in Asia, the center is investing more resources in sub-Saharan Africa, where August 2005 brought a new beginning for regional fisheries. The Fish for All Summit held in Abuja, Nigeria, was the fourth such summit organized with WorldFish assistance. The Abuja summit — co-hosted by the Fish for All initiative, FAO and NEPAD, and convened by Nigerian President Olusegun Obasanjo — provided senior policymakers, opinion leaders and researchers with a forum for dialogue, debate, sharing information, building public awareness, and creating consensus on scientific and policy aspects of fisheries and aquaculture. Expanding WorldFish activities in Africa will build on strong policy research, extend to Africa the livelihood and health benefits of IAA, and spur growing recognition of how small-scale fisheries help drive economic development.



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