

# The Netherlands and WorldFish



## Partnership to safeguard environments and livelihoods

### *The challenge of sustainable fisheries*

*Fish are crucial to the welfare of poor people the world over. The last extractive food industry, fishing is often the mainstay or supplementary subsistence activity of landless rural families 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) in fulfilling a mandate that spans both natural resource management in capture fisheries and crop productivity enhancement through integrating aquaculture with agriculture. WorldFish research addresses how poverty and the environment interact, as resource depletion drives harvesters to intensify overexploitation in a vicious cycle of environmental decline.

Asians derive much of their dietary animal protein from fish, ranging from nearly a third or more in Bangladesh, Malaysia, Vietnam

and Thailand to half or more in the Philippines, Indonesia and Cambodia. 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.

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 there. In sub-Saharan Africa, declining capture fisheries and growing populations have pushed per capita fish supply 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.

Fisheries are central to 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 affected by HIV/AIDS 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 environmental issues helps advance a global partnership for development.

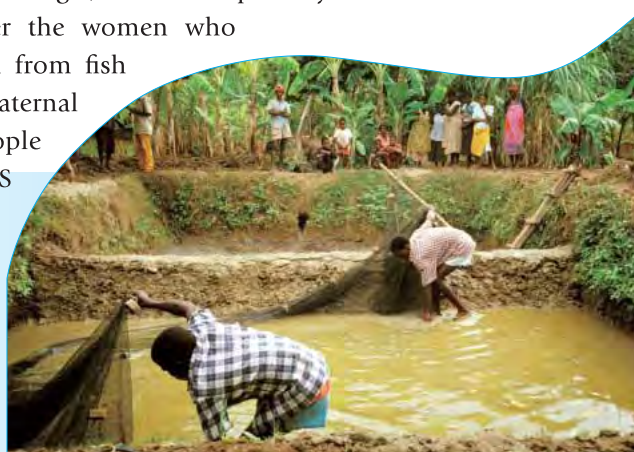
### The WorldFish mission

WorldFish is an international research center committed to improving the well-being of those in the developing world who use and depend on living aquatic resources. Established by the Rockefeller Foundation in 1977 and now based in Penang, Malaysia, WorldFish currently works in 22 developing countries and has staff stationed 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 and Zambia.

WorldFish research focuses on fisheries, aquaculture and aquatic environmental issues, aiming to boost

the productivity of aquatic systems, promote environmental conservation, preserve biodiversity, improve resource management policies, and strengthen national capacities in these areas. WorldFish has, with over 300 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 technologies to integrate aquaculture with existing agriculture systems,
- innovated culturing techniques for high-value coral reef species by village farmers,
- researched new practices for sustainably managing small-scale fisheries, and
- developed global databases to assemble and make accessible essential knowledge for managing aquatic resources.



### WorldFish-Netherlands collaboration

In 1993, the year after WorldFish joined the



CGIAR, the Netherlands began providing unrestricted core funding through its Directorate General for International Cooperation. This support has steadily grown from less than €250,000 equivalent annually to a high of €950,000 in both 2004 and 2005. This makes the Netherlands the largest donor of core funding to WorldFish. In addition, Dutch support for the CGIAR Challenge Program on Water and Food contributes to the work

of its Theme 3, which WorldFish coordinates, to foster research and capacity-building toward improving water productivity in sustainable aquatic ecosystems and fisheries.

WorldFish knows that providing good value for money helps donors achieve their development assistance objectives. A recent analysis of several key WorldFish projects showed an average international rate of return of 34% per year, meaning that every \$100 invested in WorldFish research generates \$134 per year in benefits for the poor people targeted.

The following are several highlights of this partnership from 2000 to 2005.

### **Global and regional analyses guiding fisheries' contribution to economic development.**

Demonstrating WorldFish core competencies in fisheries and related policy is its influential report *Fish to 2020: Supply and Demand in Global Markets*. The report tells how enlightened policy and technology, both new and traditional, can enhance livelihoods and



nutrition while avoiding environmental damage and waste. It has influenced and informed policy on fisheries development regionally and globally, as well as spurred interest in the AsiaFish model that WorldFish introduced in 2003. This model allows governments to make detailed projections of fish supply up to 2020 and develop strategies and options, including aquaculture, for sustaining and increasing supplies. It looks at how price movements, policy and technological developments,

and buyer preferences affect supply and demand for fish species, both cultured and wild.

### **Strengthening policy to increase the contribution of fisheries and aquaculture, to Africa's development.**

Dutch funding has supported WorldFish policy research 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 small-scale fisheries to contribute to program implementation.

### **Restoring the productivity of degraded fisheries through co-management and capacity-building.**

WorldFish works to improve fisheries governance at various scales, and so defuse conflicts and facilitate cooperation to restore the environmental health and productivity of degraded fisheries. WorldFish work on sustainably managing coastal fish stocks prompted government partners 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 coastal livelihoods and of disseminating techniques for participatory consensus-building — initially in coastal areas of South and Southeast Asia and later in floodplain fisheries in Bangladesh and Cambodia. 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 preserving biodiversity through community-based

fisheries management. The lessons learned and successes attained in the Bangladesh project are now being applied in Vietnamese communities, where fisheries co-management is now official government policy.

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 — to help establish and build the capacity of the 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 intensifying 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 environmental 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. BayFish integrates the various factors driving fish production, models their interactions, and predicts the impact of land and water management options on aquatic food production, allowing managers to balance options according to their priorities. Bayfish data and decision-support functions used initially in the Tonle Sap of Cambodia are now used in the Mekong River itself, both in Cambodia and Vietnam.

Citing the role of sustainable small-scale fisheries as a component of well-managed rivers, floodplains and coastal wetlands, WorldFish has identified fisheries as the key economic argument against building large dams and other infrastructure that impede water flows and imperil the biodiversity that depends on the Mekong and other rivers in Asia and Africa.

**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 easy to underestimate 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 Breeding tropical food fish began only in the last 3 decades with WorldFish work on Nile tilapia. Genetically improved farmed tilapia (GIFT) is a conventionally improved strain that grows quickly and has a high survival rate, lowering farmers' production costs and boosting profits. GIFT fish are now farmed in 13 Asian countries, including Bangladesh, China, Indonesia, Malaysia, Philippines and Vietnam,

improving the supply of low-cost, high-quality protein for the poor. The internal rate of return on developing and disseminating GIFT technology was found to be 70%. In part through the International Network on Genetics in Aquaculture — which WorldFish helps coordinate to foster cooperation and strengthen capacity in genetic improvement — the center transfers breeding technologies and, in accordance with quarantine protocols, materials to developing countries. This enables them to carry out their own breeding programs for GIFT

fish and, more recently, carp and catfish. WorldFish has developed an information base on carp genetic resources, including strain diversity for 20 carp species raised in Asia. GIFT techniques and lessons learned are being transferred to Africa for use in breeding tilapia, catfish and other species in Cote D'Ivoire, Egypt, Ghana and Malawi.



**Expanding integrated aquaculture-agriculture for improved livelihoods.** The principle behind integrated agriculture-aquaculture (IAA) is to use waste from one activity as a resource for another. Manure, crop residues and kitchen waste become food for fish. Farmers harvest the fish for food and income and recycle pond sediments as fertilizer for crops. IAA farms provide protein and expand the range of food choices in areas prone to famine. They also provide more durable and resilient livelihoods in areas prone to drought. In Malawi, IAA farms were found to be 18% more productive during drought than traditional ones. 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). 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 leveraging partnerships in Bangladesh to promote a gradual transition toward more commercial aquaculture, including exports, using person-to-person dissemination of new business, marketing and technological knowledge to initiate market-driven aquaculture for the poor.

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 childhood malnutrition has fallen by 15% in areas where it is practiced. 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.**

As earning income from various sources improves communities' well-being and security, WorldFish works to develop alternative livelihoods where appropriate. WorldFish and its national partners in Vietnam and the Solomon Islands 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 Solomon Islands is also the site of WorldFish research on 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 is studying 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. Research aims to help establish sustainable harvest and management principles for valuable but scarce ornamental fish and build capacity in forest communities for governance, marketing, advocacy, sustainable management, monitoring and reporting of aquatic resources. This work is expected to expand from Cameroon to the rich rivers of the Democratic Republic of the Congo.

Developing alternative livelihoods provides the basis for the WorldFish response to the Indian Ocean tsunami of December 2004. WorldFish, in consultation with country partners developed a post-tsunami framework and set of guides 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. Another post-tsunami partnership that combines WorldFish, three other CGIAR centers and half a dozen Indonesian entities aims to improve the capacity of Indonesian government offices, R&D agencies, urban civil society, and rural communities to integrate natural resource management with livelihood enhancement.

**Developing and maintaining global databases.** Core funding from the Netherlands has helped WorldFish develop and maintain its databases on aquatic resources, notably

the award-winning and highly collaborative FishBase, which attracts more than 14 million hits per month. Other databases include TrawlBase and ReefBase, the latter of which also enjoyed Dutch support from 1996 to 2002 in the form of technical experts who helped develop and manage work on coral reefs. These databases contribute to the conservation of important biodiversity and to maintaining aquatic ecosystems for food and livelihoods. The most recent Dutch expert, Marco Noordeloos, continues at WorldFish as the manager of ReefBase. 🐟



## Future Directions

Worldfish will expand upon its earlier achievements. While advancing its work in Asia, the center is investing more resources in sub-Saharan Africa, when August 2005 brought the promise of a new dawn 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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