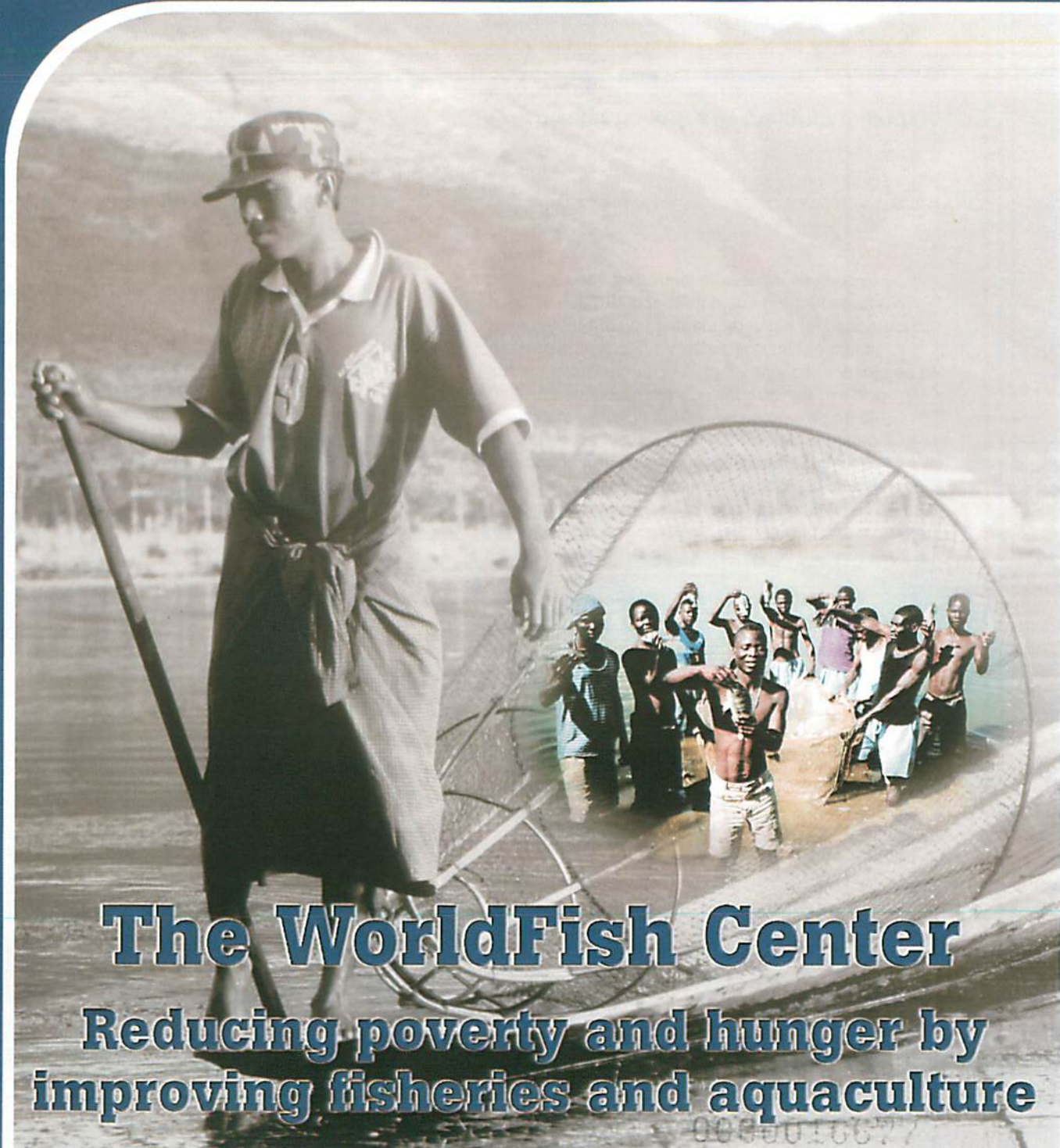


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# The WorldFish Center

Reducing poverty and hunger by  
improving fisheries and aquaculture

The supplies of fish in the world's vast oceans once seemed inexhaustible. Not any more. In the past three decades, production and consumption of fish have risen so dramatically that the world's wild fisheries may fall victim to their own success. Meanwhile, the growing aquaculture industry attempts to fill the gap between supply and demand. However, as the global appetite for fish continues to increase, current trends in the fish sector pose serious risks to the environment, to the well-being of poor people, and to the viability of the fish sector itself. WorldFish's mission is to respond to this challenge by contributing to food security and poverty reduction by increasing the productivity of global fisheries resources through conservation, sustainable use and development. WorldFish's research program addresses the following priorities – improving productivity, protecting the environment, saving biodiversity, improving policies and strengthening national programs.

The WorldFish Center is an autonomous, non-profit, international scientific research organization. It was originally established in Manila (1977) as the International Center for Living Aquatic Resources Management with support from the Rockefeller Foundation. The Center joined the Consultative Group on International Agricultural Research (CGIAR) in 1992, and moved headquarters to Penang, Malaysia in 2000, simultaneously changing its name to The WorldFish Center. WorldFish has offices and field sites in Egypt, Malawi and Cameroon (Africa), Bangladesh, Cambodia and The Philippines (Asia), New Caledonia and Solomon Islands (Pacific region). Research projects are carried out with over 300 governmental, inter-governmental and private partners in approximately 50 different countries. Funding support is received from a wide variety of sources including development banks, private foundations, bilateral and multilateral aid agencies.

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### Genetic enhancement and breeding

— increasing the productivity of aquaculture through development of improved fish strains using traditional selection and breeding approaches, and supporting development of national breeding programs.

Faster growth rates, improved product quality and disease resistance will increase the profitability of aquaculture. In the early 90s WorldFish developed the genetically improved farmed tilapia (GIFT) – the first time a tropical food fish species had been improved using traditional selection and breeding practices. The Center has now expanded its breeding program to include carp.

### Conservation of aquatic diversity

— assisting developing countries implement programs to conserve and sustainably manage aquatic resources by developing and improving use of scientific tools and methods.

### Managing the impacts of introduced species

— developing science-based policies for introduced fish in developing countries that will ensure sustainable aquaculture development and maintenance of natural biodiversity.

Aquaculture has enormous potential for improving livelihoods of poor fishers, farmers and consumers in developing countries. However, the continued development of aquaculture will increasingly rely on improved strains introduced from elsewhere. Countries need institutional arrangements and policies to manage introductions backed up by decision support tools and capacity for risk and impact assessment. WorldFish has been identified by the Secretariat of the Convention on Biological Diversity to provide leadership in the development of policies and management plans for mitigating the potential adverse impact of introduced species and strains.

### Freshwater fisheries — integrated land and water management

— providing an improved range of sustainable options for integrated land and water management; improving knowledge of efficient and effective policies and local governance strategies; and generating improved understanding of fish and fishery resources

### Strategies and options for realizing gains from sustainable freshwater aquaculture

— enabling small-scale farmers in Africa and Asia to practice aquaculture on a sustainable basis and building national capacity to promote and deliver technologies adapted to freshwater aquaculture systems.

Aquaculture is a \$60 billion a year industry, accounts for 30% of total fish production and is the fastest growing agricultural industry. To respond to the projected doubling of demand for fish in developing countries by 2020, much of the increased supply must be met by aquaculture. Aquaculture makes a key contribution to the economies of developing countries and is an important livelihood strategy for the poor - backyard fish ponds provide an important source of income, and fish is often the only source of protein. But if aquaculture is to grow as a livelihood strategy for the poor, significant increased capacity is needed to deliver and promote technologies adapted to specific agro-ecological and socio-economic situations.





Fishing is the largest extractive use of wildlife. In 2000, global production of fish, crustaceans and molluscs approached 130 million tonnes. But, over 70% of fish production came from stocks that are severely depleted, or fully exploited; some types of freshwater fish are among the most threatened on the planet. Much that we need to know about fish and other aquatic life is still a mystery. Research develops counter-measures against threats to aquatic diversity based on information collected on species biology, habitat requirements and genetics. The work is supported by the Center's FishBase – a database of over 25,000 species of fish and their habitats. FishBase will evolve from a global biodiversity database focused on taxonomy and biology, to resources management and biodiversity conservation thus supporting decision-making for country-specific management.

*(biological and ecological roles, economic and social values) to support the sustainability of fisheries.*

Inland fisheries are the main source of income and animal protein for millions of poor people in developing countries, mostly utilizing traditional artisanal techniques. Freshwater capture fisheries are increasingly threatened by external factors such as increased erosion and siltation, water abstraction and pollution, habitat and spawning ground loss, flow regime changes, inhibited migrations due to dams and flood control measures, intensified agriculture, and a considerable increase in the number of fishers. If freshwater fisheries in developing countries are to continue to be a major contributor to the livelihoods of the poor, integrated approaches for management of water and living aquatic resources are needed.

### **Legal and institutional analysis for aquatic resources management**

*— improving governance through the provision of support to national partners in order to develop and implement innovative strategies for conflict resolution, integrated resource management and related policies that will promote sustainable livelihoods, poverty reduction and resource protection.*

The global fisheries management crises that followed the declaration of exclusive economic zones (EEZ) and the signing of the UN Convention on the Law of the Seas have been exacerbated by weak institutions, lack of good governance and the prevalence of ill-defined property rights in developing countries. While a sevenfold increase in the supply of fish has been achieved over the last fifty years, over-fishing and excess capacity now threaten the sustainability of capture fisheries with significant consequences for coastal livelihoods and food security. To deal with access rights and user conflicts, improvement of governance that emphasizes participation, liability, accountability and decentralization of power is the key.

### **Economic, policy and social analysis, and valuation of aquatic resources in developing countries**

*— examining the range of economic, social and environmental policy issues and providing options by which the supply of fish for consumption and the economic benefits to the poor can be increased.*

The demand for fish in developing countries is set to double by 2020. These countries also account for 75% of global fish production and over 70% of fish traded. Given the growing importance of both production and consumption of fish, this sector should offer important opportunities for people to increase their incomes by producing fish, and to improve and diversify their diets. But the poor face barriers in both areas. The cost of low-value fish is rising as demand exceeds supply and there is a shift in production to higher-value fish for export markets. Developed countries are implementing new requirements for fish imports, including labeling and certification to overcome food safety concerns. Developing countries that can address these new hygiene and food safety requirements will have the opportunity to capture more of the lucrative export market. However, if the poor are to benefit from this potentially profitable activity, policy-makers need to find ways to include small-scale producers in these arrangements. Likewise, environmental concerns will only increase in future and policies based on preserving the environmental integrity of natural resources are needed.





### Reversing degradation of coastal habitats

— *maintaining and restoring the health of coastal habitats, especially coral reefs, so that they are able to support improved livelihoods in developing countries.*

A significant proportion of the population in developing countries in Southeast Asia, as well as small island developing states in the Caribbean and Pacific, depend on coral reefs for basic food and income. Coral reefs are important storehouses of biodiversity and natural products, and a frequently untapped source of foreign income from responsible tourism. Furthermore, up to 50% of chemicals for new drugs come from the sea, many from reef organisms. However, in Southeast Asia alone, which has over 30% of the world's reefs, nearly 90% of reefs are considered to be at risk. Policy advice and knowledge access is provided to communities and government agencies. This allows them to identify the threats to their coral reefs, assess their status and implement measures to reverse habitat degradation. The Center's highly successful global knowledgebase - ReefBase - is an invaluable tool assisting in this process.

### Restoration of capture fisheries

— *restoring small-scale coastal fisheries to more productive levels by developing recommendations to restore breeding fish populations, building national capacity to sustainably manage future harvests, and promoting policies that will ensure more equitable sharing of benefits.*

Small-scale fisheries play a crucial role in the livelihoods of an estimated 200 million people in developing countries. Globally, it is estimated that over 99% of all fishers are small-scale operators who produce around 60% of global fish catches. Small-scale fisheries provide both an economic 'safety net' for marginalized households, and a stimulus for commercial development in rural economies. Crucially, they offer vital nutritional products at affordable prices to the world's poor. The future of small-scale fisheries is critical for the long-term contribution of fisheries to human development. Alarming, like the whole sector, small-scale fisheries are suffering from over-exploitation, which has removed too many of the breeding fish needed to underpin production. Fishing communities, local and national governments urgently need information on how to redress this problem and restore small-scale fisheries to optimal levels of production. They also need guidance on how to improve the sustainability of restored fisheries, and to increase the value of their products.

### Environmentally-friendly coastal aquaculture

— *developing environmentally-friendly coastal aquaculture through identification and evaluation of suitable herbivorous marine fish, and through the culture of coral reef specimens to meet the rapidly growing call for "eco-labeled" products.*

Most aquaculture is focused on freshwater systems. Over 80% of the fish are herbivorous or omnivorous species grown in low-intensity systems for local consumption. Mariculture - aquaculture in marine environments - currently depends largely on carnivorous fish which are not as environmentally-friendly. This is due to their reliance on wild-caught fish or fishmeal as feed, and the nitrogen-rich effluents that can pollute surrounding waters. Identifying a suitable herbivorous marine fish will help alleviate these problems, reduce production costs and help meet the projected demand for fish from aquaculture. Resource poor coastal dwellers can also benefit from alternative livelihood options, which could include supplying the tropical marine aquarium trade. Our research will develop a greater range of cultured products that can be supplied to the market using simple village-based grow-out methods.

