



— impacts from collaborative research in southern Africa

WorldFish established an African aquaculture project

office at the National Aquaculture Center in Domasi, Malawi, in 1987 with funding from Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). The office now services the full Southern Africa Development Community (SADC). The Center is creating new partnerships across civil society, engaging with governments through the Departments of Fisheries in Malawi, Mozambique and Zambia, with the academic community through the University of Malawi and the

Memorial University of Newfoundland, Canada, and with numerous non governmental organizations.

The research and development agenda has focused on:

- development and transfer of integrated aquaculture-agriculture (IAA) technologies
- research on extension methods (farmer-scientist research partnership approach)
- fisheries and watersheds studies
- enhancement of farmed tilapia by selective breeding
- the role of fisheries in mitigating the effects of HIV/AIDS
- institutional strengthening and capacity building



fighting poverty

Research and Technologies

Bigger fish for smallholders in southern Africa

New low input technologies for integrated aquaculture-agriculture (IAA) have been developed with the Malawi Department of Fisheries and delivered to thousands of farmers through government, NGO and community-based organizations. The technology has resulted in fish production rising from 800 kg.ha⁻¹ in ponds not integrated with agriculture to over 2500 kg.ha⁻¹ from fully integrated ponds. About 30 per cent of fish farmers are women and income from their ponds is helping empower them within their rural communities.

The implementation of the farmer-scientist research partnership approach to aquaculture technology and transfer has increased both farmer-to-farmer interactions and the involvement of NGOs in aquaculture development. A 300 per cent rise in the number of fish farmers took place over the period 1999-2004.

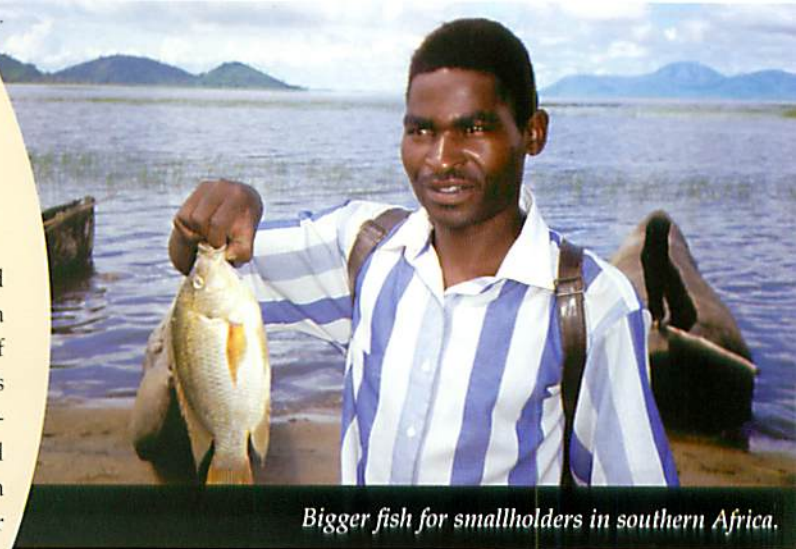
Household level impacts of adding aquaculture to normal agricultural operations

- Fish farmers have significantly (USD 310) more income than non-IAA farmers (USD 160)
- Higher monthly per capita consumption of fresh fish (IAA=0.96 kg; non-IAA=0.36 kg)
- A 23 per cent per capita rise in protein consumption by IAA farmers compared with non-IAA households

A study to examine the impact over the last 15 years of the development and distribution of these small-scale IAA technologies in Malawi has shown that the donor investments have yielded an internal rate of return of 15 per cent. This implies that the social benefit of the investment is equivalent to an asset with a 15 per cent annual return.

IAA helps mitigate persistent droughts

With an estimated 3.7 farmers per hectare of arable land, even mild droughts or irregular rainfall patterns produce food shortages in sub-Saharan Africa. This, coupled with unsustainable farming practices, has resulted in declining productivity and increased social stress. WorldFish Center's work in southern Malawi has shown that farmers practicing



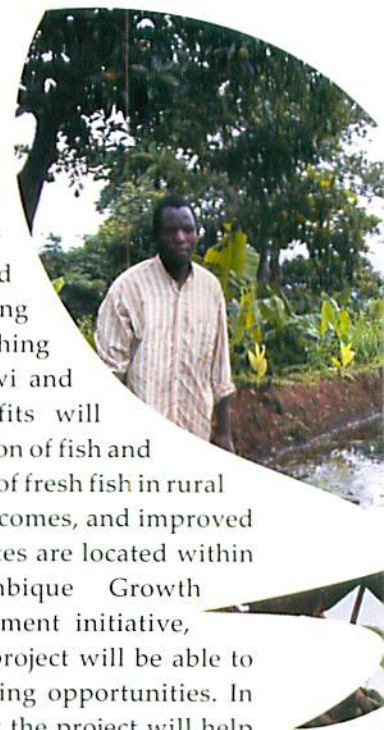
Bigger fish for smallholders in southern Africa.

integrated aquaculture-agriculture can survive droughts and suffer less from poverty, hunger and malnutrition. IAA has produced environmental benefits that enhance farm productivity through efficient resource recycling, increasing ground cover that reduces erosion and improves water holding capacity of soils. Yes, the ponds are good water harvesting structures too.

The WorldFish Center has taken up the challenge to expand dissemination of the IAA technology on a wider scale within the region. This initiative, funded by the OPEC Fund, is projected to impact 8,000 farming households, directly reaching 40,000 beneficiaries in Malawi and Mozambique. Specific benefits will include greater farm production of fish and other crops, increased supply of fresh fish in rural areas, increased household incomes, and improved nutrition. Since the project sites are located within the Zambia-Malawi-Mozambique Growth Triangle (ZMM-GT) development initiative, the farmers involved in the project will be able to exploit the improved marketing opportunities. In this way, it is anticipated that the project will help establish the foundation for the development of market-oriented integrated irrigation-aquaculture in the Growth Triangle.

A watershed for inland fisheries

Research undertaken by the Malawi Department of Fisheries, the Memorial University of Newfoundland (Canada), the Ministry of Agriculture (Mozambique), and the WorldFish Center shows that sediment yield, river flow rate, electrical conductivity and total suspended solids





The farmers practicing integrated aquaculture-agriculture (IAA).



Work is currently focused on the improvement of three important tilapia species.

are the major predictors of the migratory pattern and reproductive status of *Barbus* sp. in rivers flowing into Lake Chilwa—a clear demonstration of the linkage between land use, erosion, siltation and fish productivity. The results indicate that elimination of the 6-month closed season coupled with a program to protect the marshes that serve as breeding grounds for *Barbus* could increase fishers' incomes and reduce their vulnerability, without affecting the productivity of the Lake. The results also indicate that the *Barbus* fishery in the Lake could be maintained if fishing pressure on breeding females and soil loss in the catchment area are both reduced.

A management plan designed to improve watershed health and fish productivity in the Lake Chilwa Wetland will be developed based on the results of the research efforts, and fisheries and agriculture policy stakeholders will be informed about the impact of catchment land use on fish production. This will help to influence and guide policy decisions towards integrated catchment management.



High performance fish

Traditional selective breeding is the best approach for improving the performance of tilapia in Malawi, research by the Malawi National Aquaculture Center and WorldFish indicates. Work is currently focused on the improvement of three important tilapia species (*Oreochromis shiranus*, *Tilapia rendalli* and *Oreochromis karongae*).

Fish in the City

The urban fish? This regional project in sub-Saharan Africa, involving Malawi as one of six case-study countries, will develop new knowledge on the roles of aquaculture in the context of urbanization.

Based on this knowledge, strategic opportunities for support will be identified to ensure that benefits from aquaculture will accrue to urban and peri-urban poor communities.



Not only a health issue but also a developmental and social one

The income and nutritional status of HIV/AIDS affected households can be increased through improved fish farming practices. This is the goal of a new project that won a World Bank African Development Marketplace competition in 2005. The purpose of the project is to develop technologies and practices in fish production that are specifically suited to orphan and widow headed households. The research will take place in Chingale, Zomba West, an area that has a comparative disadvantage in terms of household incomes and food security.





Skills and Experience

The WorldFish Center is committed to developing the scientific capacities of its partner institutions in Malawi, Mozambique and Zambia. To this end it has conducted training programs for scientists, extension workers and farmers; produced scientific publications, training manuals, technology brochures, and fact sheets; and supported a number of Malawian and Zambian postgraduate students by supervising MSc and PhD theses. ☺

Once a clear understanding of the constraints faced by these households is achieved, technologies and practices will be identified that can result in household production, income and fish consumption increases of at least 25% each. Extension modules will then be developed and disseminated to NGOs to promote uptake and outreach. The long term impact of this work will be to ensure that 1,000 orphan or widow headed households have at their disposal suitable fish farming technologies and skills that will enable them improve their nutritional status and generate increased income.



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Partners

Malawi Department of Fisheries
Zambia Department of Fisheries
University of Malawi
Mozambique Ministry of Fisheries
Memorial University of Newfoundland, Canada
Non governmental organizations

Investors

The following investors have supported research projects:
Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) (1986-1994)
United States Agency for International Development (USAID) (2001-2003)
Danish International Development Assistance (Danida) (1999-2001)
Canadian International Development Agency (CIDA) (2003-2005)
United Nations Development Programme (UNDP)

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