



Impact of DFID funded research on fisheries management
Key lessons for policy

The role and importance of fisheries

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Sustainable use of the world's oceans, coastal areas and inland water bodies is critical for global food security, employment and income generation. Fisheries are important because of the various roles as a provider of food, employment and income for poor people in both coastal and inland communities.

A measure of the importance of fisheries in terms of food alone is that fisheries represent the main source of animal protein for nearly one billion people, predominantly in developing countries. The majority of this is based on natural production harvested from the wild and the cost of substituting for this production if fisheries fail would be immense.

However this production, and access to it by the poor is threatened. These threats include overfishing and conflicting water use demands that can affect fish production, e.g. for agriculture and hydroelectric purposes, that can affect fisheries and access to fisheries. Access arrangements in marine fisheries and enhancement activities can also reduce access to resources by small scale fishers. The importance of fisheries and the threats facing them provide an urgent need for effective and well founded management.

Unfortunately this need can be hampered by the fact that fisheries tend to be under-valued in the decision making process. Often subsistence fishing and household consumption are not considered and the role of fisheries is not highlighted. For example households that describe themselves as farmers may actually on average spend more time on fishing rather than agricultural activities.

In order to support the goal of sustainable use, DFID has since 1991 commissioned over 50 innovative world-class research projects on marine and inland fisheries management through the Fisheries Management Science Programme.

Photo: Woman participating in community fishing day. Dong Noi village, Lao PDR.

This research has contributed to international efforts to achieve the Millennium Development Goals (see below) by supporting fisheries managers and policy makers in the sustainable management and development of fisheries in developing countries.

Contribution of fisheries towards the Millennium Development Goals

Fishing activities and fish can make some important contributions towards achieving the Millennium Development Goals (MDGs). In particular through MDG 7, ensuring environmental sustainability, as the failure to achieve this can jeopardise other goals dependent upon fishing activities. The goals to which the contribution is greatest are:

MDG 1: Eradicating extreme hunger. Increasing the productivity of, or production from, the fishery systems on which so many poor people depend and ensuring that fisheries policies are suitably pro-poor and ensure equitable distribution of the benefits from the system can contribute to eradicating extreme poverty and hunger.

MDG 2: Achieving universal primary education. Better management of fisheries resources can contribute to improving the incomes of households or communities, crucial in those cases where fisheries represent one of the few potential income generating options. Increased income can increase the likelihood of child education.

MDG 3: Promote gender equality and empower women. Women often play an important role in the processing and marketing of fisheries related products. This can provide them with an important role in administering and controlling money and some control over household spending.

MDG 4: Reducing child mortality. Given the important nutritional benefits of fish, fish can make an important direct contribution to achieving this goal. In large areas of South and Southeast Asia, the Pacific, Caribbean and West Africa, fish is a vital component of the diet complementing the carbohydrate-based (mainly rice) diets of the poor. Again, increased income from well managed fisheries can also lead to improved access to food.

MDG 5: Improving maternal health. As with MDG 4, fish as a foodstuff, a rich source of protein, and income from fisheries can both contribute to achieving this goal.

MDG 7: Ensuring environmental sustainability. Fishing activities can have substantial negative impacts on both stocks and habitats, particularly in marine environments. In addition, much of the subsistence catch worldwide comes from wild stocks. Together this highlights the pressing need for good, well founded, management measures to ensure that habitats are maintained and stocks sustained.

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The challenge of achieving developmental impact through fisheries research

As we have seen, there is no doubt that fisheries can provide an important component of the livelihoods of many poor people in developing countries, and that fisheries can also play an important role in the economic development of such countries. However fisheries also present a number of challenges for management and developmental impact. Among the challenges facing fisheries managers there are two that create particular conditions that are almost unique to fisheries.

Photo: Small scale fishers in the Indian Ocean land their catch from the reef fishery

Fisheries management: a question of scale.

In the first place fisheries need to be managed at a level appropriate to the scale and distribution of the stock. Because the boundaries of fish stocks are usually much greater than community boundaries, it is often not possible to manage at a household or community level. Instead management decision making occurs at the national or even international level.

How many fish are there?

Unlike trees, which can be counted, fish are effectively invisible. Our knowledge about the size and distribution of the stock is therefore based on sampling and the use of statistical methods—the stock assessments— that often require skilled assessment scientists to work this out. Skills that can be in short supply in developing countries.

Because of both of these aspects, much fisheries management research occurs at the more ***enabling*** level to strengthen and support the assessment and decision making institutions (see Figure 1). However, research at the enabling level is somewhat removed from the target beneficiaries and developmental impact requires a series of events to occur (unlike in more focussed interventions). This process is itself informed and supported in a number of other ways, and there will be both external effects upon the process and uncertainties about how well the process is implemented. Together this makes it difficult to attribute the outcomes, or any portion of the outcome to the research alone. This would be the case even if all the data were available, which it often isn't.

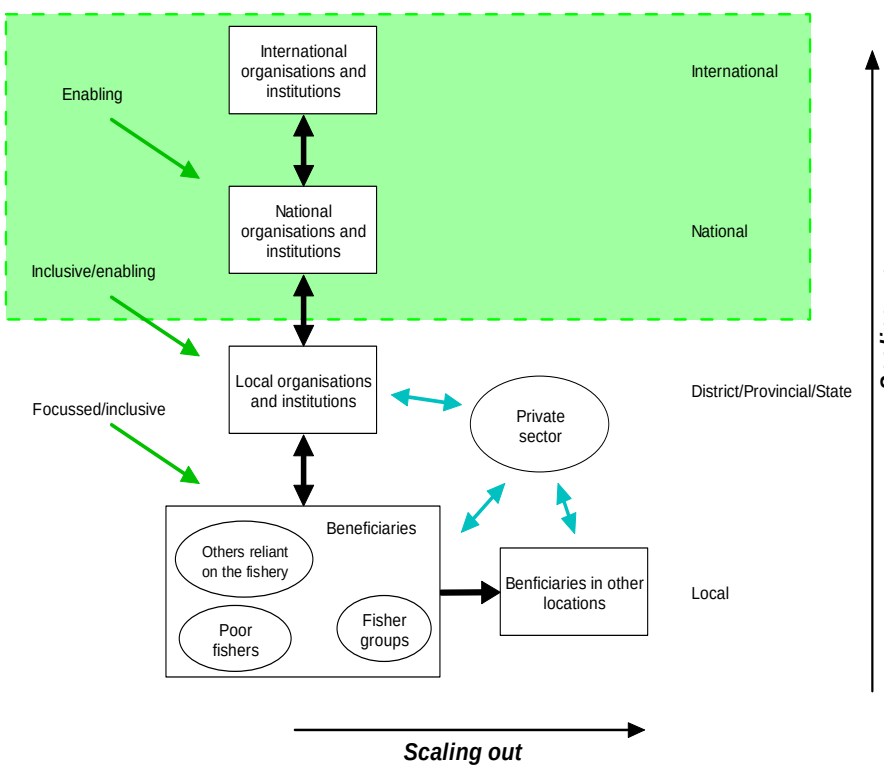

Figure 1. Types of project intervention illustrating the enabling, inclusive and focussed nature of research projects and the area of intervention of the majority of fisheries management research projects (green box).

Avoiding stock collapse

Fisheries can have diverse and yet vital roles in supporting livelihoods in developing countries. Because of this the results of good management may not necessarily be increased incomes or yields but the prevention of conditions that might lead to stock collapse. It is the failure to manage that can lead to overexploitation and changes that lead to less resilient and more fragile systems.

Ensuring production potential

Fisheries management in developing countries is often about balancing objectives to ensure the maintenance of production potential and development of a resilient social-ecological system. This is particularly true where fish are relied on for subsistence purposes and fishers value being able to harvest what they need in a short period so that they can concentrate on other activities.

Measuring impacts in terms of social-ecological resilience is still quite challenging, particularly given that the natural production of the fishery system is dynamic and subject to often quite large natural fluctuations.





Examples of specific impacts of DFID funded research

Despite the difficulties inherent in assessing and attributing impact, the eleven years of DFID funded research on fisheries management issues has provided a number of examples where there has been uptake of research outputs beyond the partner agencies and developmental impact as a result.

The research has been structured around five main themes, each comprising groups of projects addressing a common issue. These themes are shown in the table below.

Some examples of the impact that has been achieved and some of the key products that have been made available are shown in the table below. The results of a recent more in-depth study into the impact that has been achieved by the DFID funded fisheries management science research are available from the FMSP website:

www.fmsp.org.uk

FMSP research themes	Examples of research impacts	Examples of outputs and available research products
1) Research to inform management and influence policy	Knowledge on livelihoods has been incorporated into development and poverty reduction strategies in East Africa and South and Southeast Asia. Research has contributed towards FAO data sets and has significantly affected FAO fisheries advice. Incorporation of climate change messages into policy is expected over the next few years.	● Database of models for tropical lake fisheries. ● Database of models for tropical river fisheries. ● Assessments of the contribution of fisheries to livelihoods in East Africa and Asia. ● Information on the vulnerability of poor fishers to predicted climate change.
2) Promotion of the participation of poor fishers in the assessment and management of their fisheries	Application of participatory stock assessment methods has increased management capacity in Zanzibar, a location where some 23,000 fishers and 2,300 traders are directly dependent on the fisheries and where fishers are generally from the poorest and most disadvantaged sectors of society.	● A framework and guidelines for implementing adaptive co-management (see also www.adaptivelearning.info). ● Participatory fisheries stock assessment (ParFish) guidelines and software. ● Tools for developing information systems for fisheries management.
3) Development of fisheries assessment methods to inform management	FMSP software is regularly applied in the assessment of major fisheries worldwide. The methods and software developed have been incorporated into University and management agency training in both Asia and Africa. Research outputs have also informed the design of co-management institutions in Africa.	● Software packages to assist assessments including CEDA (Catch-effort), LFDA (Length-frequency), YIELD (yield per recruit) and ParFish (Participatory stock assessments). ● Guidelines for managing fisheries resources that fluctuate in abundance. ● Methods for assessing fisheries where there is little or no catch and effort data.
4) Development of pro-poor capture fisheries strategies	Research on control of foreign fishing has produced recommendations that have dramatically reduced illegal fishing around South Georgia to virtually nothing and enabled Seychelles to increase national revenue to £1-2.5 million per year. In Bangladesh information has been invaluable in planning fisheries and water control interventions.	● Methods for controlling foreign fishing and reducing IUU fishing. ● Selection criteria for harvest reserves in tropical river fisheries. ● Training in the application of stock assessment tools. ● Guidelines for floodplain fisheries management and sluice gate control.
5) Development of pro-poor enhancement fisheries strategies	Research in South and Southeast Asia has developed technologies that enable farmers to increase production without increasing inputs, crucial to poorer farmers. In Lao PDR the profitability of participating fisheries was doubled, increasing funds available for village development and providing additional benefits to poorer households. Strategies for enhancing self recruiting species important to the poor have been successfully promoted in India, with widespread interest demonstrated in both South and Southeast Asia.	● Culture-based fisheries assessment methodologies. ● Guidelines for managing small, self-recruiting species in aquaculture and culture-based fisheries. ● Policy brief on the benefits to fisher livelihoods from Fish Aggregating Device (FAD) technology. ● Manual on the deployment of inshore FADs. ● Guidelines for promoting village managed 'community fisheries'. ● Spreadsheet based model for optimising stocking of enhanced fisheries.





Key lessons from assessing DFID's fisheries research and its impact:

From an assessment of the fisheries management research funded by DFID it is possible to draw a number of important lessons for the future. In the first place it has become clear that fisheries have certain characteristics that mean that they can be very different to other renewable natural resource systems and that these characteristics have consequences for support to fisheries managers in developing countries.

Fisheries are about more than fish and fish yields

Fisheries are mainly based on natural production (although this production may be enhanced through stocking or habitat modification) rather than inputs. This means that it is vital to consider factors affecting this production such as climate change and destructive fishing methods and practices, including water management developments, that affect spawning runs and nursery areas such as mangroves. Furthermore a common management objective, especially for the poor, is maintaining the production potential and livelihood support functions of the fishery and for the majority of fisheries an important concern is preventing collapse.

Photo: Fishers at an irrigation sluice gate, Bangladesh.

Management requires effective decision making structures...

Management cannot always be conducted at the community level. Fish stocks are often widely dispersed and/or migratory. Where the boundary of the fish stock is greater than the community the fishery becomes a common pool resources and, as such, community management is not always appropriate. In turn this requires effective governance structures at a larger scale, often national. However, the role of fisheries in livelihoods is both complex and dynamic. There is therefore a need to develop and put in place structures that enable the voices of the fishers and others dependent on the fishery to be heard, and for management decisions to be implemented, monitored and evaluated effectively.

...and timely information about the fishery and likely effects of changes on it

As well as the human aspects of the fishery, effective decision making structures require knowledge about the biological nature of the fishery. Uncertainties around the state of the stock, the stock dynamics and interaction with other sectors and components of the ecosystem in turn require tools to understand the fishery and trained assessment scientists who can advise the decision makers on the state of fisheries resources and the likely consequences of alternative management actions. Given the dynamic nature of fisheries and fluctuations in the stock this advice needs to be both accurate and timely.

Photo: Small scale fisheries represent a vital resource for small island states.

This is where research and policy support can have a vital role

While much has been achieved through DFID support (see previous page), in many developing countries it remains the case that the capacity to manage is often low. Information about fisher objectives and constraints and the state of the stocks is either not available or not accessible to those making the decisions. Fisheries management research can make a difference and contribute to achieving the Millennium Development Goals through the creation of innovative tools and methods and development of knowledge and skills that can assist assessment scientists and support decision makers at the appropriate levels. This allows decisions to be made and implemented effectively that will avoid fisheries failures and support fisheries dependent livelihoods.

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