

## Key messages

- Fisheries provide the main source of animal protein for about one billion people worldwide.
- They provide food for consumption, employment and financial income, and a food source when other sources are at seasonal lows.
- Fish are especially important for the poor as they are often one of the cheapest and most accessible sources of protein available.
- Competing demands for resources and access can lead to conflicts and overexploitation of fisheries, with negative impacts on food security.
- Management of fisheries that ensures their sustainability is essential to maintain their contributions to food security.

This brief examines the ways that fisheries contribute to food security, particularly in developing countries, with examples from the Fisheries Management Science Programme (FMSP). It considers the factors that threaten this contribution, and makes recommendations for future work in this area. This brief is one of a series of five concerning fisheries and development issues produced by the FMSP.

## How fisheries contribute to food security

Food security does not just concern food production. It can be defined as the physical and economic access to sufficient safe and nutritious food to meet dietary needs [1].

Fish provide the main source of animal protein to about one billion people globally. Fisheries are an important part of food security, particularly for many poor people in developing countries. In low income food deficient countries (LIFDCs), they make up 22% of animal protein consumption overall (see Figure 1). In coastal areas and around major river systems the dependence on fish is usually higher [3]. The importance of small-scale fisheries in particular for food security is emphasised by FAO [4].

Fish and fisheries contribute to food security in a variety of ways:

### Subsistence and local consumption

Fisheries provide a direct supply of fish, either for consumption by fishers and their families, or through their sale at local markets.

Small-scale fishers usually satisfy their subsistence needs first, before selling the rest of their catch. A study in the countries of the Southern African Development Community (SADC), found that coastal small-scale fishers usually first remove a portion of their catch for consumption, and then sell the excess. The amount that

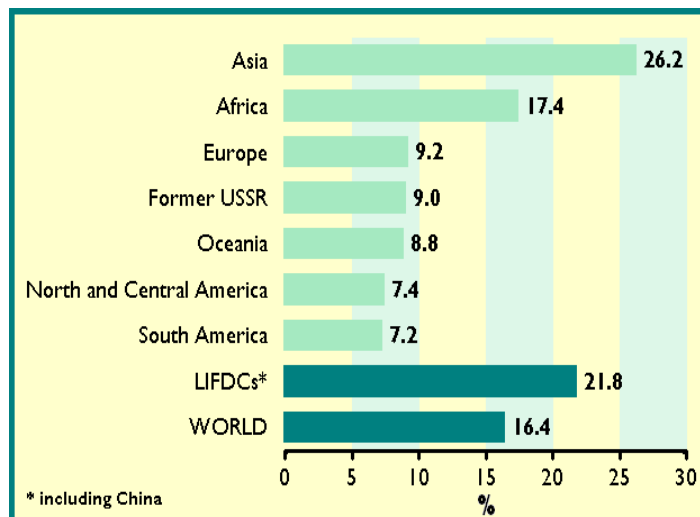


Figure 1: Contribution of fish to human diet: fish as a percentage of total animal protein intake (1995) [2].

is retained is fairly constant, independent of the size or value of the catch. This demonstrates that subsistence needs are their first priority, but that increasing catches enables them to gain benefits beyond this.

Inland fisheries are especially important for food security as almost all production goes for human consumption rather than, say, animal feed [5]. In southeast Asia, small waterbodies and reservoirs are important to the poor by providing a subsistence source of food, helping to reduce household expenditure [6].

### Nutritional quality

Fish are a source of protein, micro-nutrients and essential fatty acids, providing an important complement to the predominantly carbohydrate-based diet of many poor people in developing countries. Evidence from a project commissioned jointly by the FMSP and Aquaculture and Fish Genetics Research Programme (AFGRP) suggests that small, indigenous fish are particularly important for nutrition because they are

eaten whole, 'bones and all', thereby providing a source of calcium and other micronutrients.

### **Income**

38 million people worldwide are employed in fisheries, 95% of whom are in developing countries. The income from employment, and/or the financial revenues from the sale of fish, provide cash which can then be used for the purchase of other foodstuffs.

### **Accessible protein for the poor**

Fish are often one of the cheapest protein sources available in developing countries. Small fish are especially important for poor consumers, as they can be purchased in small quantities at low cost. The same consumers often cannot afford to buy other protein sources which have to be bought in much larger quantities, such as chicken [7].

Furthermore, fish are often processed locally and transported large distances, providing a cheap protein source for people who do not have access to fishing areas or fresh fish. Preserving is often carried out by smoking, drying or salting, which do not require complex or expensive technology.

Some industrial fisheries provide cheap fish for urban dwellers; for example, horse mackerel caught off Namibia are widely available throughout southern Africa.

### **Reducing vulnerability**

Fisheries reduce vulnerability to hunger by providing a complementary food source as part of diversified livelihood strategies (see Brief 4). Although fisheries resources may fluctuate in abundance, very few marine fisheries have periods when the catch is consistently zero. Fisheries thus provide food when other food



A woman packs dried fish to transport to inland markets in Mozambique. Photo by: S.F.Walmsley

sources such as agriculture are at a seasonal low. When there is little or no cost to the household, as with intertidal resources or species that do not require regular re-stocking in inland fisheries, their importance to the poor may be even greater (see Box 1).



A vendor selling dried shrimp at a market in Tanzania. Small crustaceans and fish are especially important for the poor as they can be bought in small quantities. Photo by: R.Wakeford

### **Box 1: Increasing food security for poor people**

FMSP has conducted several projects that have increased the food security benefits to poor people from small-scale fisheries:

- Self-recruiting species do not, by definition, require regular and repeated re-stocking. However, FMSP identified management strategies to enhance their production in inland fisheries, as well as improve access to them for the poor. Self-recruiting species are particularly important to the poor as they provide a complementary protein source at low cost. Strategies identified included keeping broodstock, re-stocking collected juveniles and screening pond entrances (Project R7917).
- Better management of fisheries resources can increase their food security benefits and ensures that these are sustained. A participatory methodology for stock assessment (ParFish) allows stock assessments to be carried out for fisheries where data are limited, which is the case for many small-scale fisheries. This enables recommendations to be made and decisions taken in order to manage the fishery within sustainable limits, reducing the chance of overexploitation of the stock. The approach allows fishers' priorities for different relative levels of catch and effort to be taken into account and promotes a participatory process for management decision-making and implementation (Project R8464).

## Issues threatening the contribution of fisheries to food security

### **Overexploitation**

With growing populations, there is a need to feed more and more people. Coupled with effective open-access systems, this often translates into increasing pressure on resources, and many fish stocks are now overfished. This reduces productivity, resulting in fewer fish being available and at higher prices.

### **Competing demands and access to resources**

There are often many competing demands on limited fishery resources in both marine and inland fisheries. Conflicts arise as a result of competition for access, as well as cultural and political differences (see Box 2). Fisheries managers are therefore faced with issues of property and access rights.

Where industrial fishing boats compete with local fishers for fishing areas or for the same fish stocks, the small-scale fishers usually lose out. This has serious implications for their food security. Protecting small-scale fishers' access rights through exclusion zones where the industrial fleet is banned from fishing, with appropriate enforcement, can help avoid such problems.

For example, in northern Mozambique small-scale fishers and industrial boats had been in conflict over gear entanglement. A three mile exclusion zone was established to prioritise the small-scale fishers in this area.

In inland fisheries, competing demands for access and/or water use can lead to conflict, particularly where fish production may be a secondary use for water resources. In either case, the poor are often the most disadvantaged.

### **Habitat destruction and pollution**

Habitat destruction and pollution threatens fisheries' productivity and is a particular problem for inland fisheries. Damage to or alteration of the habitat can reduce the production potential of a fish stock. For example, destruction of mangroves removes the nursery grounds of many fish species, and can result in reduced productivity of the fish stock.

### **Box 2: Dealing with conflicts of interest**

FMSP has carried out several projects that address conflicts over the use of resources and access to them:

- In Bangladesh, the use of sluice gates for irrigation schemes successfully increased agricultural production, but affected fish migration, with a resulting detrimental effect on fish stocks and fish catches. FMSP developed guidelines for rational water management that takes into account the need for irrigation water as well as the requirements for the fisheries. This has successfully helped integrate both uses and increase fish production (Projects R8210 and R8486).
- In Ghana, many fisheries conflicts were found to be a result of cultural differences and political power struggles rather than issues of access. FMSP developed conflict assessment and resolution methodologies to better understand and address the issues (Projects R7334 and R8294).
- By involving stakeholders, the Adaptive Learning approach seeks to maximise consensus and deal with conflicts through sharing decisions on setting objectives and management measures (Project R8292).

## What can be done to maintain fisheries' contribution to food security?

There are several ways through which the contribution of fisheries to food security can be maintained or increased.

### **Sustainable fisheries through managed exploitation**

Fish stocks have to be maintained at levels that ensure sustained productivity, if the food security benefits derived from them are to continue to be available. This is not straightforward, but FMSP has developed many tools to support fisheries managers for inland, marine, capture and enhancement fisheries, which have been summarised by Project R8468 [8] [9].

### **Enhancement to increase production**

Stocking water bodies with juveniles can increase production and availability of mature fish, generating benefits for the poor and increasing food security. For example, in Lao PDR, stocking increased the production

potential of small reservoirs and provided a source of food for villagers in times of need [10].



A fisher stocks his pond with juvenile tilapia in Lao PDR. Photo by: R.Arthur & C.Garaway.



Fishers repairing their nets in Andhra Pradesh, India. Fishing is important to the food security of many coastal communities. Photo by: S.F.Walmsley

## Management of conflicts over access to resources

National development and fisheries policies should recognise the important contribution of all fisheries, but particularly the small-scale, to food security. Access to resources for the poor must be maintained. Policy makers need to be more aware of the different contributions that fisheries make to food security and ensure management, access rights and governance structures help maintain these benefits (see also Brief 5).

## Priorities for future work

Fisheries provide an essential contribution to food security which can be maximised through effective and equitable management of fisheries. Further support is required in the following areas:

- Improving access by the poor to fish of high nutritional value.
- Maintaining and increasing the productivity of marine capture fisheries through effective management arrangements.
- Research into how the production of culture fisheries can be increased through enhancement, and dissemination of effective practices.

## References

- [1] 1996 World Food Summit
- [2] FAO 2003. Assessment of the World Food Security Situation. 29<sup>th</sup> Session of the Committee on World Food Security, 12<sup>th</sup>-16<sup>th</sup> May 2003. Rome: FAO.
- [3] FAO 2005. FAO/Worldfish Center Workshop on Interdisciplinary Approaches to the Assessment of Small-Scale Fisheries. 20-22 September 2005. FAO Fisheries Report No.787. Rome: FAO.
- [4] FAO 2003. Report of the twenty-fifth session of the Committee on Fisheries. Rome, 24-28 February 2003. FAO Fisheries Report. No. 702. Rome, FAO. 88pp.
- [5] FAO 1999. *Future challenges in world fisheries and aquaculture*. 23rd Session of the Committee on Fisheries. 15-19 February 1999. Rome.
- [6] Sultana, P., Thompson, P. & Ahmed, M. 2003. Understanding Livelihoods dependent on Inland Fisheries in Bangladesh and Southeast Asia. Final Technical Report (DFID/FMSP Project R8118). London: MRAG.
- [7] Gameiro M.F.S. & Wilson, J.D.K. The importance of marine fisheries to coastal community livelihoods in SADC countries. Maputo: Kusi Consultores Ltda.
- [8] Hindson, J., Hoggarth, D.D., Krishna, M., Mees, C.C. & O'Neill, C. 2005. How to Manage a Fishery — A Simple Guide to Writing a Fishery Management Plan. Ahmedabad: CEE.
- [9] Hoggarth, D., Abeyasekera, S., Arthur, R., Beddington, J., Burn, R., Halls, A., Kirkwood, G., McAllister, M., Medley, P., Mees, C., Parkes, G., Pilling, G., Wakeford, R., Welcomme, R. 2005 (in press) Stock Assessment for Fishery Management – A Framework Guide to the use of the FMSP Fish Stock Assessment Tools, FAO Fisheries Technical Paper 487, Rome.
- [10] Garaway, C., Lorenzen, K. & Chamsingh, B. 1997. Reservoir Fisheries Management in Savannakhet Province, Lao PDR. London: MRAG.

## For more information:

Further information about fisheries and development issues can be obtained from the Fisheries Management Science Programme (FMSP) and Marine Resources Assessment Group (MRAG) Ltd.

### Fisheries Management Science Programme:

The FMSP website has a searchable database where full-text project documents and reports can be downloaded:

[www.fmsp.org.uk](http://www.fmsp.org.uk)

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This FMSP Policy Brief is one of a series of five. Other briefs in this series are:

1. Fisheries and Poverty Reduction
2. Fisheries and Economic Growth
4. Fisheries and Livelihoods
5. Fisheries and Governance

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