

FISHERIES MANAGEMENT RESEARCH AND THE MDGS: PAST EXPERIENCE AND FUTURE VISION

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ABSTRACT

This paper examines the eleven year Department for International Development funded Fisheries Management Science Programme as a model to explore how fisheries management science can contribute to achieving the Millennium Development Goals. It describes how the Programme strategy was able to adapt to a changing policy environment and local needs and demands for research in order to achieve these goals. It describes a research portfolio that addresses a number of themes contributing to achieving ecologically and economically sustainable fisheries that can support and maintain fisheries associated livelihoods. These themes include policy information required to support fisheries; the information systems needed to involve fishers, particularly the poor, in the co-management of fishery resources; fisheries assessment methods and how these can be integrated within pro-poor capture fisheries management strategies; and, the role that enhancement fisheries can play in poverty alleviation. The paper concludes by highlighting what more needs to be done, building on the achievements of the FMSP, and outlining a vision for the future.

Keywords: Fisheries management research, sustainable livelihoods, MDGs, development, policy, poverty

BACKGROUND

In 1994, with the goals of alleviation of poverty, promotion of economic growth and reform, and mitigation of environmental problems, the Department for International Development (DFID, then Overseas Development Administration) published its Renewable Natural Resources Research Strategy (RNRRS) for 1995-2005. Through removing researchable constraints to economically and environmentally sustainable renewable natural resource (RNR) development and management, it aimed to achieve improved productivity within seven RNR production systems during the life of the strategy (semi-arid, high potential, hillside, tropical moist forest, forest agriculture interface, land water interface, and peri-urban interface). The strategy was implemented in DFID's core target countries through ten contracted out research programmes, one of which was the Fisheries Management Science Programme (FMSP). Following publication of the 1997 White Paper 'Eliminating world poverty: a challenge for the 21st century' the Strategy shifted from a production to a people centred livelihoods focus to achieve the Millennium Development Goals (MDGs). The strategy was extended until March 2006 in order to maximise uptake and impact from RNRRS research products during the final year.

This paper describes how the FMSP responded and adapted to DFID's changing policy environment and to the challenges of fisheries management. The achievements of the Programme are briefly presented in relation to the MDGs. Lessons from the experience relevant to future development research are presented alongside some priorities for the future.

THE IMPORTANCE OF FISHERIES AND CHALLENGES TO THEIR MANAGEMENT

Global fisheries importance

Fisheries make an important contribution to nutrition and they support diverse livelihoods. They are particularly important to the poor. In developing countries 60% of people depend on fish for at least 30% of their animal protein supply, and in most African and Asian countries fish provides between one and two thirds of animal protein [1]. The importance of small scale fisheries in particular for food security is emphasised by FAO [2]. Small fish are particularly important to nutrition of the poor as they tend to be eaten whole providing a valuable source of calcium, protein, micro-nutrients and essential fatty acids. They are also important as they can be bought in small quantities at low cost, and so are more accessible to the poor than other protein sources such as chicken [3].

Global capture fisheries production was 132 million tonnes up to 2003 and exports were worth US\$58.2 million making fish the most valuable agricultural commodity traded, worth more than the sum total of tea coffee and cotton combined [1]. Fisheries provide a range of livelihood benefits through the income and employment generated from fishing, and importantly, as they are often part of a diverse livelihood strategy, they reduce vulnerability providing a safety net when other economic opportunities or food sources are limited. In terms of employment 95% of the world's 38 million fishers (including 8 million in aquaculture) live in developing countries, and including associated industries and household dependants the sector directly supports 200 million people. Small scale fisheries are particularly important to the poor. Whilst fisheries are capable of generating great wealth it is still the case that 23 million fishers subsist on less than £1 per day, and in many developing countries fisheries and poverty are synonymous [2].

Fisheries can play a significant role in alleviating poverty, and in achieving the MDGs, a set of eight goals aimed at halving the number of people living in poverty by 2015 (see Table I). However, overexploitation resulting from too much fishing pressure threatens the contribution that fisheries can make. Over 70% of world fisheries are fully exploited, overexploited, depleted or recovering; under utilised resources are often not accessible to poorer fishers; and, fisheries management is inadequate [1]. There is therefore an urgent need for better management to contribute to achieving the Millennium Development Goals. This was recognised in the commitment made to achieve sustainable fisheries and to reverse the impacts of over-fishing at the World Summit on Sustainable Development in Johannesburg in 2002.

Table I: Some contributions of fisheries towards achieving the Millennium Development Goals

MDG	Some contributions of fisheries
Eradicate poverty and hunger	Food security and livelihood benefits for 200m people; food for 1bn people
Universal primary education	Income from fisheries is used for a number of socially important activities. Nutritional benefits of fish contribute to a child's development and learning ability
Gender equality	Processing and trading fish dominated by women, providing income and some control over household spending.
Reduce child mortality; improve maternal health	Fish provide significant nutritional benefits to large numbers of people in developing countries
Ensure environmental sustainability	Effective management of fisheries contributes to ensuring environmental sustainability.
Global partnership for development	Fish amongst most widely traded goods, globally. Fisheries boundaries often international. Policies /governance promote management partnerships.

The challenge to fisheries management

Fisheries are diverse, complex and difficult to manage for the benefits of society. They are frequently common pool (open access) resources, and being a natural production system rely on variable and vulnerable processes that cannot be, or are difficult to control. It is in the absence of management that fish stocks become over-exploited. To contribute to poverty alleviation, environmental sustainability and improved food security in small-scale fisheries, diverse approaches, methodologies and tools are needed appropriate for each specific context. Fisheries management research can make important contributions through improved and more appropriate approaches to pro-poor fisheries management, and the provision of information for policy and management decision-makers.

Figure 1 illustrates the challenges to managing capture fisheries. The range of benefits that fisheries provide can be categorised as biological (relating to the fish stock and the ecology / environment), social and economic (relating to livelihood benefits). However, not all benefits can be realised at the same time. There are competing benefits and costs which differ according to the level of exploitation, i.e. fishing effort.


Costs Benefits	FISHING EFFORT (# people, boats, nets etc)		
	LOW	MEDIUM	HIGH
Biological	High biodiversity; many large fish		Overfishing, loss of biodiversity, extinctions. More risk of stock collapse
Social		Maximum food provision	Large numbers of people employed Resource user conflicts
Economic	High return per unit of effort: efficient; (exports, profits)		High cost of fishing for less return, inefficient
Management	The costs of regulating access can be High		Unregulated = minimum management costs but also undesirable
Trend in open access systems 			

Figure 1: The competing benefits and costs of fisheries

In fisheries, the relationship between yield (and/or catch per unit effort), and fishing effort (or mortality) can be mathematically represented as a “surplus production model”. This model describes the way a stock of fish responds to the removal of its individuals (for example by fishing). Surplus production models are used to determine the level of effort that produces the maximum yield that can be sustained without affecting the long-term productivity of the stock, the maximum sustainable yield (MSY). Figure 2 is a typical surplus production model that explains the information in Figure 1 in fisheries terms. Catch increases with increasing fishing effort up to MSY (where there will be maximum food provision), but as fishing effort continues to increase, the catch decreases as there are no longer sufficient individuals to maintain the stock size. To be sustainable there must be sufficient stock each year to maintain levels of spawning and replace those fish that are caught. With continued increases in fishing effort, the stock can be eliminated. An advantage of fishing beyond MSY is that large numbers of people can subsist and be employed. However, economically this is inefficient, social conflicts also increase, and it will only be sustainable up to the biological limits of any particular stock beyond which the fishery may collapse. Unfortunately the costs of regulating access can be high and can require significant capacity, yet in open access systems the trend is towards high exploitation, especially if unregulated. As Figures 1 and 2 illustrate, fisheries can provide a range of benefits, but these cannot all be maximised simultaneously and it is essential that they are balanced against environmental costs. The challenge for fisheries management is to prioritise the outcomes desired from a fishery and develop management strategies that best achieve them whilst ensuring an acceptable level of biological and economic productivity that will be sustainable. This requires effective governance.

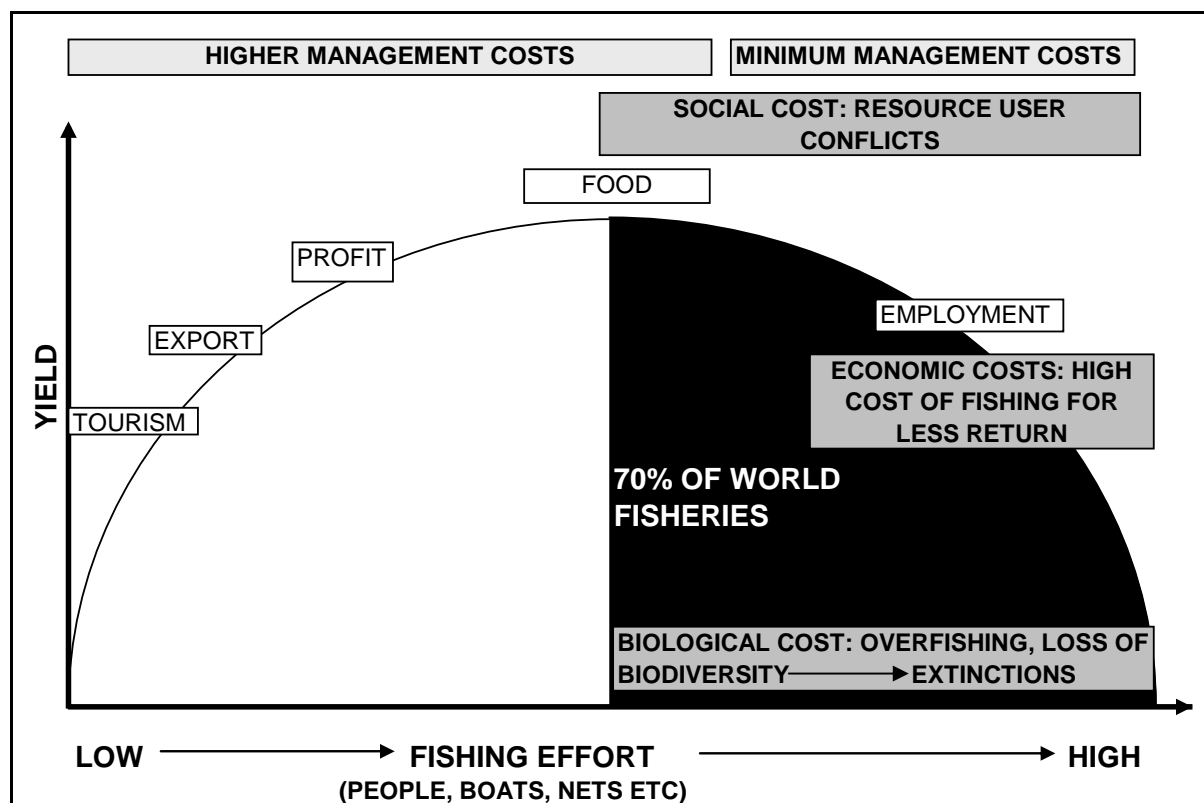


Figure 2: A simple surplus production model illustrates the impact of increased fishing effort on fish yield. Some benefits and costs of fishing are highlighted.

MEETING THE FISHERIES MANAGEMENT CHALLENGE FOR THE BENEFIT OF POOR PEOPLE – THE FMSP.

Within the context of developing countries, where resources and capacity are often limited and large numbers of people rely on fish for food, the challenge of fisheries management becomes even greater. The Fisheries Management Science Programme (FMSP) has sought to address some of these challenges through high quality research aimed at developing and delivering new knowledge on fishery management systems for the benefit of the poor in developing country contexts. At the same time the FMSP has, since 1995, adapted from a production oriented focus to a livelihoods centred approach, reflecting changes in UK government policy.

The logical framework (a 4x4 matrix indicating goal, purpose outputs and activities against a narrative summary, indicators, means of verification and assumptions) was the preferred management tool used by DFID to define, monitor and evaluate the implementation of its RNR strategy. The Goal and Purpose of the FMSP were defined by DFID whilst the Outputs and Activities, and the strategic approach to achieving them were defined by MRAG as the contracted managers of the Programme (Table II). RNR managers were contracted to deliver Outputs, but towards the end of the Programme DFID also began to assess them against the Purpose (i.e. achievement of developmental impact). The FMSP also commissioned work to examine this aspect [4; 5]. Thus in addition to the shift from a production focus to a livelihoods approach, greater responsibility for uptake promotion was shifted from DFID to the RNR Programmes. However, constraints existed within the conditions imposed by DFID for Programme management that affected the way the Programme was run, limiting the extent of uptake promotion activities and largely preventing projects from engaging in capacity development [6]. It was only in the final extension year to 2006 that an explicit focus on uptake and impact was reflected in the DFID strategy, and when substantial resources could be allocated to this by the Programme.

Table II: The changing FMSP Outputs to meet the different priorities of DFID over time.

Date	Goal (DFID/RNRRS)	Purposes (DFID/RNRRS)	Outputs (FMSP)
1995-1999	Productivity and productive potential of the land/water interface increased through improved management of aquatic resources.	Optimum sustainable yield from capture fisheries achieved by improved resource management. Yields from enhanced fisheries increased by optimising strategies for stocking and harvesting.	A number of Outputs were defined against specific fisheries issues (e.g. assessment models; floodplains; Harvesting strategies for enhanced fisheries). Within each a three phased strategy was adopted: Basic ecological research to assess the response of ecosystems to management; tools for management; socio-economic implications of management.
2000-2001	Livelihoods of poor people improved through sustainably enhanced	Benefits for poor people generated by application of new knowledge to fisheries management systems.	Four Outputs: Capture, enhancement, dissemination, promotion. Followed same three phased strategic approach but gave added focus to dissemination and promotion
2002-2004	production and productivity of land / water interface systems.		Four Outputs incorporate livelihoods approach and explicitly reflect strategic approach plus uptake promotion for both capture and enhancement fisheries: Fisheries and livelihoods; Management tools/strategies; Mechanisms for implementation; Uptake promotion
2004-2006			One Output focused on uptake promotion of existing FMSP products

From 1995 improved *capture* fishery management to optimise yield, and optimal stocking and harvesting strategies for *enhancement* fisheries were aimed at delivering greater productivity and productive potential. In December 1998, however, DFID revised the RNRRS logical framework in line with the 1997 White Paper requiring a corresponding change in the Programme logical framework and strategy. Whilst an initial change in the Programme Outputs in 1999 reflected DFID's requirements and gave more emphasis to dissemination and promotion of research findings, they were not considered by MRAG to adequately address the complexities of the sustainable livelihoods approach. To move towards a people-centered livelihoods approach whilst at the same time capitalising on the achievements of the Programme up to that time, the FMSP undertook a number of programme development activities starting with a strategic review of the Programme in 2001 (Figure 3). Towards the end of the RNRRS DFID placed increasing emphasis on achievement of developmental impact and the revised strategy from 2002 reflected this with a greater emphasis on uptake promotion. During the final year the entire focus of the Programme was aimed at adapting and promoting existing research products.

The starting point for the FMSP strategic review was the DFID sustainable livelihoods (SL) framework [7] that arose from extensive consultations following the 1997 White Paper. The framework is an analytical device for improved understanding of livelihoods and poverty. The SL approach based on this framework supports poverty eradication by making enhancement of poor people's livelihoods a central goal of development efforts. In this context, a livelihood '... comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base' [adapted from 8]. Examination of the programme geographic focus was also central to the review in order to ensure that work occurred in locations with large numbers of poor people, as required by DFID. The review considered fisheries dependence, population density as an indicator of the pressure on the environment, and a number of poverty indices (e.g. including GNP; UNDP Human Poverty Index). An average was taken of the different indices in order to derive a ranking of the poorest countries against different criteria (Table III). Those shown in bold text are where FMSP has undertaken projects. The blacked out cells indicate the final geographic focus agreed with DFID, plus Laos, Cambodia and minor inputs into Indian Ocean Small Island Developing states. For the FMSP the greatest changes resulting from this geographic realignment with DFID's aims was in the marine fishery sector where much of the work had been located where significant resources existed, largely small island states as indicated in columns 3a and 3b (Table III). Inland fishery work was already centred in Asia chiefly Bangladesh and south-east Asia. Very little work had been done in India in either the marine or inland sectors.

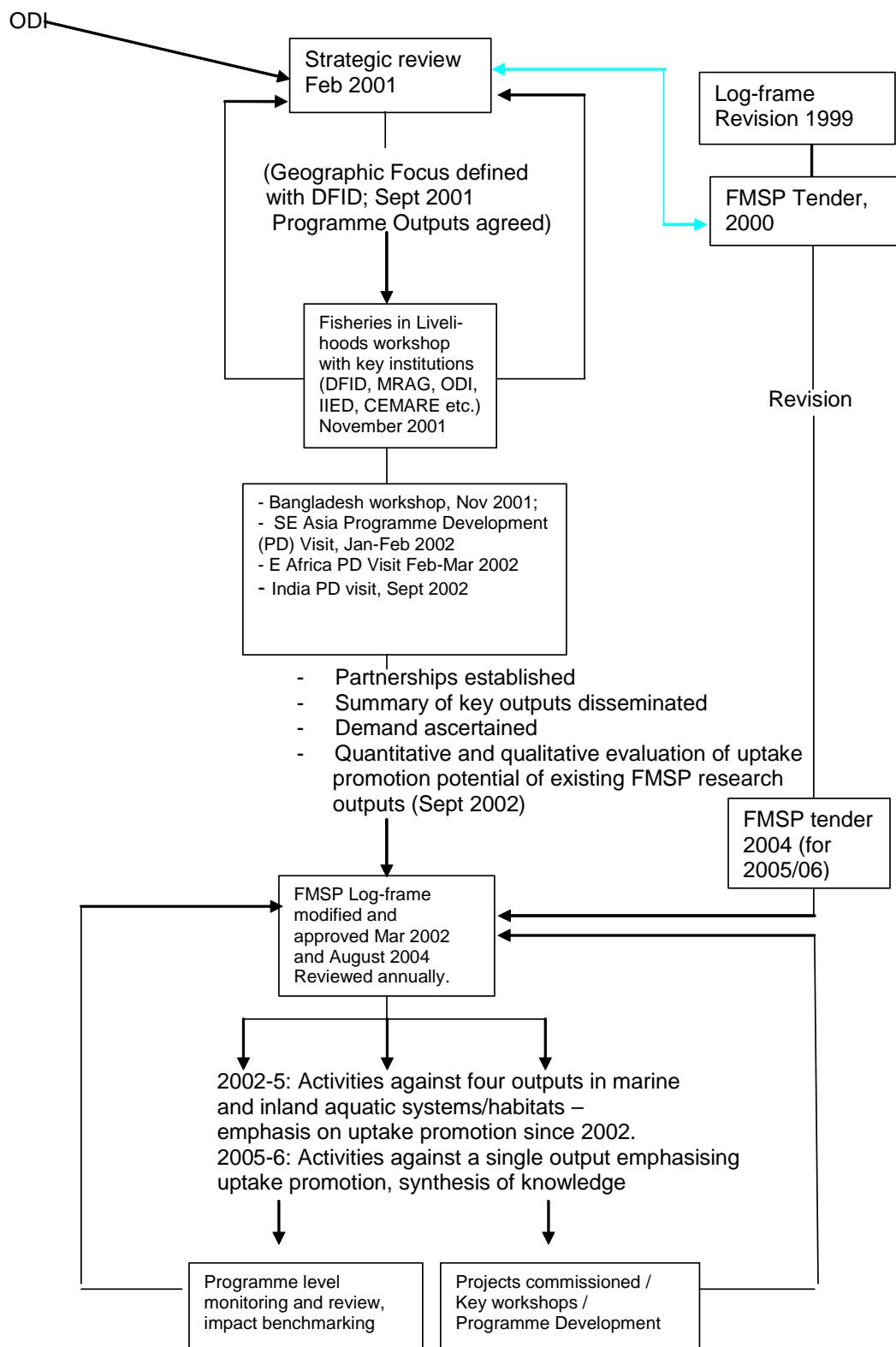


Figure 3: Key Programme Development activities contributing to strategic development of the FMSP and to address changes within DFID and the RNRRS

Table III: Country rankings against different criteria of poverty and fisheries dependence.

Ranking	1	2a	2b	3a	3b
Inclusion criterion	Fisheries dependence	Moderately poor or poorer	Moderately poor or poorer	All countries	All countries
Ranking criterion	Averaged poverty indicators	Direct fisheries dependence	Indirect fisheries dependence	Direct fisheries dependence	Indirect fisheries dependence
Population weighting	Yes	Yes	Yes	No	No
1	Bangladesh	Philippines	Korea, Rep	Kiribati	Maldives
2	India	Indonesia	Thailand	Maldives	Seychelles
3	Vietnam	China	Vietnam	Turks & Caicos	Namibia
4	Uganda	Vietnam	Indonesia	Anguilla	Solomon Islands
5	Nigeria	Thailand	Ecuador	Samoa	St Helena & Ascension
6	Pakistan	Myanmar	Senegal	Tonga	Kiribati
7	Sierra Leone	Bangladesh	Morocco	Fiji	Korea, Rep
8	Madagascar	Ghana	Philippines	Seychelles	Guyana
9	Kenya	Korea, Rep	Peru	Tuvalu	Senegal
10	Tanzania	Sri Lanka	China	Cayman Islands	Turks & Caicos

The strategic review indicated where the FMSP should work and the strategic approach, defined by the Programme Outputs, that would achieve DFID's revised aims.

An evaluation of what the Programme had already achieved, i.e. the research products that it had generated, and the uptake promotion potential of those products was undertaken before a series of demand assessment activities within the focus countries were embarked upon. The latter exercise identified demand both for new research within the context of the strategic approach (i.e. related to identified Outputs), and for existing research products as well as highlighting gaps in the existing knowledge.

All RNRRS programmes commissioned projects to achieve their strategic aims. With a budget of approximately £500,000 a year, the FMSP commissioned eight to ten projects annually, each of up to three years duration, designed to deliver the Outputs. Thus the next step in the realignment of the Programme was to prioritise the demand expressed and to allocate financial resources to specific activities. A revised Programme logical framework was then developed reflecting the FMSP strategic approach, DFID's policy aims, and user demand. The approach centred on developing fishery management systems and policy relevant products primarily targeted at a strategic and policy level and at intermediary organisations. These products were aimed at creating enabling environments, in order to achieve impact amongst ultimate target beneficiaries, the poor^a. Reflecting this, the Outputs were:

- Improved understanding of the contribution of fisheries to the livelihoods of the poor;
- Through high quality research, the development of capture and enhancement fisheries management tools and strategies that could benefit the poor;
- The means to realise improved management; and,
- Promoting the take-up of research products generated by the Programme against relevant demand-led research product themes and project clusters.

Evaluation of the uptake promotion potential of FMSP research identified product themes and project clusters. Themes identify broad areas of research and types of research product, while clusters are similar projects or sequences of projects related to that theme. Clusters cross cut the four Outputs. Thus, in relation to the logical framework, whilst a cluster is always focused on a particular topic, over time the type of research can move from understanding fisheries and livelihoods through to promotion of management tools and strategies (Figure 4). Reporting the achievements of the Programme to DFID was against the logical framework, but in a fisheries context, analysis against the 11 clusters^b is also meaningful and was the approach adopted within the Programme for impact

assessment [5]. During the final extension year when the DFID focus was impact generation, a final revised logical framework had a single output related to uptake promotion, with activities that related to each product theme.

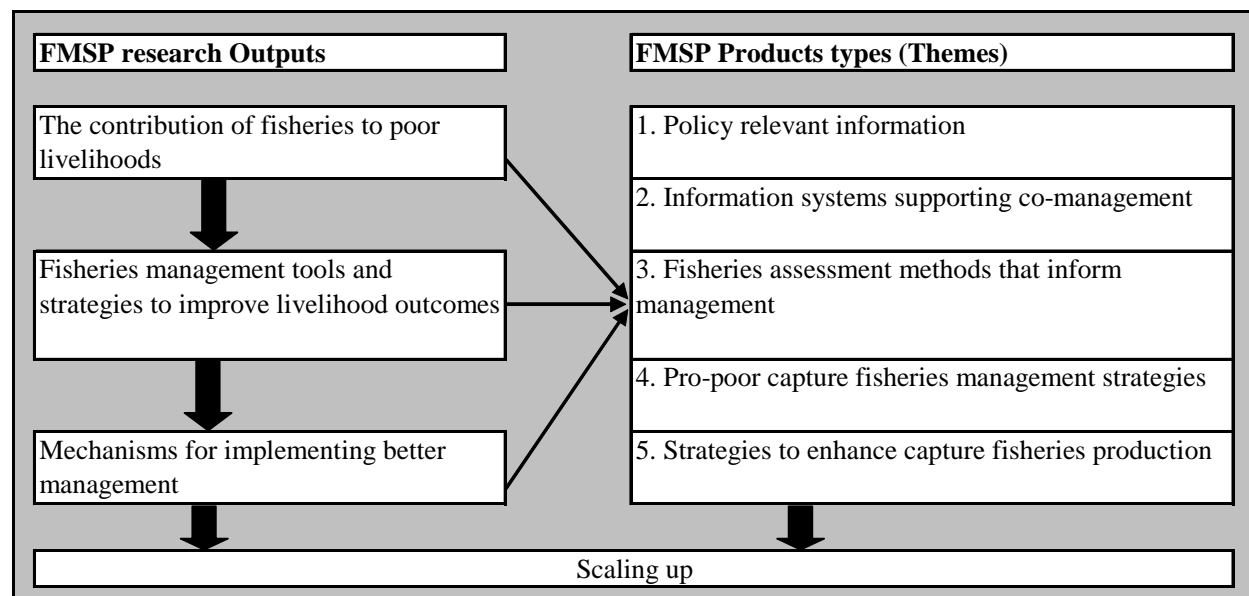


Figure 4: The relationship between the FMSP Outputs and product themes

LESSONS LEARNED

Over the 11 years of the FMSP a number of changes have occurred enabling lessons to be learned at a number of levels. Lessons on the DFID RNRRS have been provided elsewhere (e.g. [6]), but within that strategy and approach we are able to draw lessons on the ability of the FMSP to adapt to policy change. Looking at the FMSP itself, we can draw some conclusions related to the ability of fisheries research to address a poverty focused research agenda aimed at delivering the MDGs. Finally, returning to DFID's approach to implementing the RNRRS, we can also derive lessons on research into use and thereby delivering impact.

Adapting to policy change

The management structure of FMSP was flexible and able to respond to what was a significant shift from a focus on resources and productivity to that of a people-centred livelihoods approach. The mechanism by which this was achieved is described above. The change was positive and resulted in research that explicitly recognised the impacts of resource management on those people dependant upon the resources, and appreciated the importance of addressing their needs as well as environmental sustainability. Multidisciplinary approaches to resolving research questions that put people at the centre were encouraged. Of the FMSP products generated up to 2002 it was significant that the evaluation of their uptake promotion potential indicated that 70% had an appropriate poverty focus and could be taken forward as the strategy changed [9]. In fact, poverty reduction was always the first goal of the RNRRS from 1995, but the changes to the strategy in 1999 gave this greater prominence, and made poverty reduction an explicit goal at the Programme level.

One of the features of the Programme that provided it with the flexibility to respond and change rapidly was the relatively short project duration. Unfruitful lines of research could be dropped, especially at the time of the policy shift. The testing of innovative approaches that may not have developed in a more prescribed longer project format could also be undertaken. Novel ideas were developed and the outputs generated represented good value for money [5; 6]. The project cluster approach used by the FMSP allowed a progression of projects that built upon earlier findings of projects in that cluster to be commissioned. Such progressions followed the strategic approach (the Outputs) through stages from an understanding of fisheries and livelihoods, through developing and testing management tools and strategies and the means to implement them, to uptake promotion. This enabled changes in project team composition to reflect both the different skill sets needed at each stage and the introduction of the

livelihoods approach. Importantly, it enabled a shift of *product* ownership and project leadership from north to south over time. The cluster approach provided continuity, and also ensured that research networks and partnerships were maintained where the geographic focus did not change. This appears contrary to the LTS review of the RNRRS which has recommended larger and longer duration projects [6]. The FMSP experience strongly suggests this does not need to be the case, as long as long term lines of research (the clusters) can be pursued and that within these lines sufficient flexibility to adapt exists.

One of the particular challenges faced by FMSP related to the change in geographic focus. There are two aspects to this. The first, and most damaging, was in respect of locations that were no longer focus countries. For example, in a review of the Programme impact, the FMSP was criticised for failing to follow up promising lines of research in the Pacific [10]. In fact, RNRRS research was intended to be generic, but inevitably location specific partnerships developed and could not be maintained. The second aspect was that to initiate research in new locations, new networks and partnerships had to be developed and built within a short space of time. While this proved achievable, it did present a challenge, and the case of India highlights some particular issues.

The Indian Centre for Agricultural Research (ICAR) institutions represent a particular target for FMSP research products, and an opportunity to achieve widespread uptake and adoption in India. However, within the Indian context, the FMSP was a small scale player and unable to negotiate a partnership agreement with ICAR in the timeframe available, and in the absence of one negotiated by DFID for the RNRRS as a whole. Whilst individual ICAR institutions [such as the Centre for Marine Fisheries Research (CMFRI) or the Centre for Inland Fisheries Research (CIFRI)] expressed a willingness to work with FMSP, the lack of a formal agreement prevented this occurring directly. The lesson to be derived from this is that higher level DFID support is required for implementing its research strategy in focus countries, and again, that long term arrangements are needed to build on and maintain partnerships.

Fisheries research and poverty eradication

In this paper we have described some of the challenges related to meeting multiple objectives in dynamic resource systems that frequently exist at a different scale to human boundaries. These challenges often require us to work at an enabling strategic and policy level rather than necessarily directly focused on the poor. This presents particular challenges to demonstrating developmental impact of fisheries research on the poor, and for assessment of the FMSP [4; 5]. Some of the contributions of fisheries to achieving the MDGs have been described in this paper, but it is especially through MDG 7, ensuring environmental sustainability, that fisheries research can make the greatest contribution. The failure to achieve this can jeopardise other goals dependent upon fishing activities and achievement of sustainable livelihoods. Specific examples of the positive impacts of FMSP fisheries research are presented elsewhere [4; 5] and are not reiterated here. However, the scale of the fisheries problem, as outlined in this paper (e.g. fish provide food for 1 billion people yet 70% of fish stocks are overexploited), indicates that realising better fisheries management could have a significant global impact. To increase the contribution that fisheries make to poverty reduction, management is needed that ensures sustainability of fish stocks and equitable distribution of the benefits. To achieve this, policy-makers must recognise the important contributions that fisheries make at both national and local levels. Effective governance structures and the development of better management capacity are a fundamental requirement [11]. At the same time, given that the benefits from fisheries are dependent upon a sustainable resource base, it should also be recognized that there needs to be continued support for the development of appropriate assessment and decision support tools.

FMSP programme development activities indicated that a significant demand for fisheries research exists, but within the timeframe and budget of the FMSP it was not possible to cover everything. The FMSP generated management system and policy relevant products against each of the five theme areas. In the final years a number of synthesis studies were conducted to capture learning across projects and to make the products of those projects more accessible (see <http://www.fmsp.org.uk/KeyLessons.htm>). Whilst FMSP has made a start, a significant amount of additional work remains to be done. Some examples are provided from a review of CPR issues in FMSP fisheries projects [12; 13, see also 14]. Areas in which additional work is needed, include, *inter alia*: the relationship between fisheries and livelihoods, in particular issues that may threaten their contribution (vulnerability, e.g. climate change) and development pathways that will lead to livelihood improvements; information on the performance of alternative management strategies that can improve decision making; greater understanding of the relationships between fisheries policy and the wider political, economic and social context to ensure coherent management policies.

Getting fisheries research into use

FMSP experiences with promoting products capturing management system and policy information indicate that to achieve uptake and adoption a supportive policy environment is essential. Mechanisms to effectively communicate with policymakers, linking them to users, are the key to achieving RNR management success. Thus information needs, and the means of obtaining and sharing it, must be identified. In particular, the message to policy must include the need for integrated policies across sectors if the competing demands on fisheries are to be met, and the role of each sector in the wider political, social and economic context must be understood. Importantly, policy makers need to be involved in management research from the start.

The FMSP has shown that it is possible to develop and work effectively in partnerships across a range of levels with fishers, management intermediaries and policy makers. Through over 60 projects the Programme has developed a number of high quality products to meet the challenges of fisheries management aimed at the poor. The greater emphasis on uptake promotion towards the end of the RNRRS was a positive move by DFID. However, high quality products that have been well promoted are not enough as there must also be adequate capacity amongst the potential users to utilise these products. Therefore, it should be recognised that, as recommended by LTS [6], attention is given to capacity development at a range of levels from the start.

The FMSP also demonstrated the advantages of a flexible approach to project and Programme management that enables promising, and sometimes novel initiatives to develop whilst those that are not delivering or have been overtaken by initiatives from elsewhere can easily be dropped without having committed significant resources to them. In the case of FMSP this applied to the generation of new research findings, but the lesson applies equally to projects applying approaches for getting research into use.

WHAT NEXT?

Research leading to better fisheries management has a considerable contribution to make towards poverty reduction and achievement of the Millennium Development Goals. The DFID funded FMSP generated a number of relevant management science research products over an 11 year period, and has left an enduring legacy with all products remaining available from the Programme website (www.fmosp.org.uk). However further active promotion of these products and development of capacity of potential users is required. The FMSP began this task but it is now vital that momentum is not lost in order to get these products into use. The DFID RNRRS ended in March 2006 and a new DFID strategy for sustainable agriculture has a number of different components. The 'research into use' component may take forward an element of the fisheries programme. Regional programmes under this new strategy however, will have a largely agricultural focus and it is not planned to review the need for further fisheries inputs until some time in the future. There is no timetable for fisheries research to be included in the complementary research programme between DFID and the UK Research Councils (Howlett, pers. comm.). The danger of postponing further work is that momentum will be lost and that productive partnerships may not be maintained.

There is currently a pressing need to pick up where DFID has left off in two areas: capitalising on existing fisheries research products that address the problems of the poor; and, continuing new research to provide the basic information for the development of fisheries management strategies and governance structures that address the balancing act between optimising livelihood benefits and maintaining the biological sustainability of the resource.

Other significant contributors to fisheries research include the Food and Agriculture Organisation (FAO), the WorldFish Centre (WFC) and other development agencies such as the Canadian International Development Research Centre. There are a number of potential users of fisheries research products at a range of scales: Internationally these include organizations such as the World Bank, FAO and WFC; regionally there are the Asian and African Development Banks, the Mekong River Commission and other fisheries commissions, for example; and nationally the products are relevant to local development bodies. Some new initiatives already exist, such as the project concept currently being developed by WFC and FAO for small scale fisheries that will look at existing tools from around the world and where relevant develop new tools that will improve the capacity of developing countries to assess and manage their fisheries. The door is now open to build on past achievements such as those of the FMSP and to move forward with a new fisheries research agenda. It is important that the development community step through it now to continue to address the challenges of managing fisheries for the benefit of the poor.

REFERENCES

1. FAO (2004) The State of World Fisheries and Aquaculture. Report. Rome: FAO.
2. FAO & WFC, 2006, Interdisciplinary assessment and management of small scale fisheries and their role in food security and poverty alleviation, Concept note, WFC and FAO, Unpublished.
3. Gameiro M.F.S. & J.D.K. Wilson, undated, The importance of marine fisheries to coastal community livelihoods in SADC countries. Maputo: Kusi Consultores Ltda.
4. Arthur, R.I., E. Fisher, R. Mwaipopo, X. Irz, and C. Thirtle, 2005. Fisheries Management Science Programme: An overview of developmental impact to 2005, Final Technical Report. MRAG Ltd. (see www.fmsp.org.uk and Search Project Database, Project R4778C).
5. Arthur, R., A. Halls and C. Mees, 2006, Impact of fisheries management science: Experience from DFID's Fisheries Management Science Programme. *Paper 235 IIFET Conference Proceedings*, IIFET, Portsmouth, July 2006.
6. LTS (2005) Evaluation of DFID Renewable Natural Resources Research Strategy 1995-2005. *Evaluation Report EVD659*, Department for International Development, Central Research Department and Evaluation Department.
7. DFID, 1999, Sustainable livelihoods guidance sheets, 1.1 Overview, DFID London, 10pp; 2.1 Framework, DFID London, 26pp (http://www.livelihoods.org/info/info_guidancesheets.html).
8. Scoones, 1998 Scoones, I. (1998) Sustainable rural livelihoods. A framework for analysis. *IDS Working Paper No. 72*. IDS, Brighton.
9. MRAG, 2002, Evaluation of Uptake Promotion Potential of Existing FMSP Research Outputs, *FMSP Programme Development Report*, MRAG Ltd
10. Halls, A.S. and R.I. Arthur, 2006, Assessment of the Impact of the FMSP: A Summary of the Assessment of Impact from the Perspectives of Key Fisheries Institutions and Researchers. MRAG Ltd. (see www.fmsp.org.uk and Search Project Database, Project R4778C).
11. FMSP, 2006, Poverty Reduction and Fisheries. *FMSP Policy Brief 1*, MRAG Ltd. (see http://www.fmsp.org.uk/Documents/keylessons/FMSPBrief1_Poverty%20Reduction.pdf)
12. Neiland, A.E. (2006) Incorporating Common Pool Resource (CPR) Issues into Fisheries Management in Developing Countries: Key Lessons and Best Practise. *Final Technical Report*. IDDRA Ltd, Hants, UK. (see www.fmsp.org.uk and Search Project Database, Project R8467).
13. DFID, MRAG & IDDRA (2005) Common Pool Resources and Fisheries Management (4) Future Research Priorities For CPR (Fisheries) Management In Developing Countries *Key Sheet No. 4*. FMSP, UK (see <http://www.fmsp.org.uk/Documents/keylessons/keysheet4.pdf>).
14. MRAG, 2006, Fisheries Management Science Programme Annual Report, April 2005-March 2006

ENDNOTES

- a. The nature of capture fisheries where stock boundaries do not correspond with human administrative boundaries meant that to tackle fisheries management issues effectively a high level strategic approach was more appropriate than working directly with individual groups of the poor. A mix of both was ultimately achieved.
- b. Project clusters for each theme (see Fig 4) were: Theme 1- Databases of information; Livelihood appraisals; Impacts of climate change; Theme 2- Information requirements for fisheries management; Theme 3- Stock

assessment guidelines; Bayesian stock assessment and management with limited data; Theme 4- Generic management guidelines; Control of foreign fisheries; Floodplain fisheries management; Theme 5- Enhancement of inland fisheries; Enhancement of marine fisheries

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