

**FISHERIES MANAGEMENT
SCIENCE PROGRAMME**



Department For
International
Development



Programme Development Visit to E. Africa

17 February – 5 March 2002

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SYNTHESIS REPORT

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1 Introduction

The Fisheries Management Science Programme

The Fisheries Management Science Programme (FMSP), is one of ten Renewable Natural Resources Research Programmes funded by the UK Department for International Development (DFID). The objective of DFID's research strategy is to generate new knowledge and to promote its uptake and application such that the livelihoods of poor people are improved through better management of renewable natural resources.

Within the FMSP, the programme purpose is to generate benefits for poor people by the application of new knowledge to fisheries management systems. There are two outputs, relating to capture and enhancement fisheries, within each of which both the marine and inland environments are covered. East Africa (Kenya and Tanzania) is the geographic focus for the marine fisheries component of the programme. Minor inputs are also relevant for Indian Ocean island states, plus promotion of FMSP outputs in Orissa and Andhra Pradesh (India).

The FMSP Programme Development Visit to East Africa

This report synthesises the findings of the FMSP Programme Development Team (Dr Chris Mees and Ms Catherine Barry) to East Africa (Tanzania, Kenya and Uganda) during the period 17 February to 5 March 2002. The purpose of this visit was to inform the development of the Programme strategy by consulting with a wide range of regional stakeholder institutions and other relevant specialists on potential areas for future research related to fisheries management. The specific aims were to:

- Assess demand for FMSP research as expressed by the institutes visited, set in the context of the FMSP strategy. This involved identifying the target beneficiaries of the research, in order to prioritise research needs that would have strong livelihood relevance;
- Assess the mandates, and existing and planned research of the institutes visited in Kenya and Tanzania. This will contribute towards defining the institutional and other pathways through which benefits of research will be delivered to poor groups; and
- Identify possible ways by which FMSP could link with existing research/development projects. New research would aim to be complementary to other similar initiatives currently at various stages of development and implementation in the region by other donors in order to improve co-ordination of research activities, and promote dissemination and uptake of outputs.

This report synthesises the information generated and recorded in individuals meetings reports throughout the visit, and details (for Tanzania and Kenya):

- Background issues relating to the fisheries sector, in each country and regionally;
- The national institutional arrangements for the fisheries sector in each country, and details of other institutions, nationally and regionally, involved in fisheries research and development activities;
- Appropriate institutions that the FMSP may engage in research activities with, mechanisms for doing so, and potential uptake pathways;

- Demand expressed by the institutions and individuals met, synthesised for each country; and
- Known existing research and development activities, in order to highlight research gaps and priorities, and opportunities for collaborating or adding value to existing activities.

It also reports on the visit of the FMSP PD Team to Uganda to discuss with the DFID Regional Co-ordinator based in Kampala means by which the DFID East Africa Natural Resources Research and Development Co-Ordination Office could support the activities of the FMSP in the region.

The itinerary for this visit is given in Appendix 1. Details of individuals met are given in Appendix 2.

2 Background issues relating to the fisheries sector

Country-specific issues relevant to the fisheries sector highlighted by interviewees are outlined below, with regionally applicable issues following.

2.1 Tanzania

Nature and status of resources

The continental shelf off Tanzania is narrow, and marine fishing activity is concentrated inshore. Thus coastal resources are believed to be overexploited, since the area available to artisanal fishers is narrow and fishing pressure is high. For example, the mackerel stocks were believed to have collapsed, although the catch of small pelagics is possibly now increasing due to a reduction in fishing effort on the fisheries in the last few years. However, sufficient data for full resource assessments are not available. Resource surveys and assessments were last undertaken during the 1970's and 80's, and whilst no resource assessments have been undertaken since, resources are believed to have been depleted through overfishing, the use of destructive methods and the impacts of land based activities. There is an urgent need to re-evaluate resource status.

Destructive fishing methods, along with land-based pollution, have contributed to the degradation of habitats and fisheries productivity. Whilst dynamite fishing has now been banned, it still occurs along with other harmful fishing practices, such as the use of poisons and encircling fine mesh nets, which also damage coralline habitats. Environmental damage also occurs due to the recent introduction of the use of chains in the prawn trawl fishery. It is also believed that substantial bycatch occurs in the trawl fishery.

Limited fishing of offshore resources currently occurs by national vessels, as artisanal fishers do not have the financial capacity or expertise to fish offshore. Thus it is believed that deep-sea fishing may provide an alternative resource, and allow effort to be transferred away from the coast. Some licensed and illegal foreign fishing offshore occurs. Whilst only six or so foreign tuna vessels are licensed, it is believed that many more fish illegally in Tanzanian waters, with some fishing close to shore. Surveillance capability is currently limited, although being addressed by the EU MCS project. There is therefore a lack of information on the status of alternative resources on which to base development and management decisions.

It was noted that the south coast of Tanzania is a region of high population density, but also rich in resources. Small pelagics are an important resource for the artisanal fishery due to the continental shelf being particularly narrow. However, poverty is high, and the region has poor infrastructure in terms of processing facilities and markets. Development of appropriate processing and market arrangements would allow for sale of these products inland, where there is a shortage of animal protein.

Socio-economics of fishers

There is a substantial lack of information on the extent of artisanal fishing. For example, official statistics for the Rufiji district give 400 fishers. However, the Rufiji Environmental Management Project has found that on average, 61% of households fish, giving approximately 3,000 people involved in fishing in the district.

Migration in artisanal fisheries was a particular issue highlighted. Fisher migration is an important characteristic of many fisheries in Tanzania, leading to conflicts with sedentary communities. It also poses particular problems for the management of fisheries, and for the adoption of community-based approaches to management.

Whilst the extent of dynamite fishing has decreased since being banned, there has been an increase in live coral mining, as fishers have needed an alternative livelihood. The livelihood options available to fishers, and incentives for conducting different options, need to be fully understood in order to devise appropriate management strategies. Implementation of policies, for example the banning of destructive gear types, needs consideration of the impacts on, and alternatives available to fishers, or the policy may not be adhered to.

The issue of developing alternative fishing activities for artisanal fishers was raised several times, including diversifying from coastal to marine resources, and engaging in enhancement activities (see below). However, others questioned whether this was feasible, as artisanal fishers would lack the finances to enable them to engage in alternative fishing activities. Previous efforts to diversify people out of fishing have not necessarily been successful. For example, on Zanzibar, seaweed farming and bee-keeping have been promoted. However, seaweed farming did not reduce pressure on the fisheries resources, as women previously not involved in fishing undertook this activity.

Fisheries information

Fisheries Division is responsible for collecting catch statistics, through a system established with assistance from FAO some 10-15 years ago. Data from the artisanal fisheries is collected through the district level officers and village-based enumerators. However, the data collected is considered to be unreliable and inadequate for management purposes. It is also not necessarily entered into a database or analysed. Demand was expressed for determining which are appropriate and necessary data to collect.

There is also a serious lack of baseline knowledge on important fish species in Tanzania. It was reported that biological studies have been conducted for only five species (Indian Mackerel, squid, octopus, a parrot fish and a snapper). This is a serious constraint to management of fisheries resources.

It was expressed by Fisheries Division that this lack of information on the biology and status of the resources hampers the Division's ability to provide appropriate advice on fisheries management measures.

Fisheries management and legislation

Current management measures in place in Tanzania principally relate to the prawn fishery. For this fishery, a three-month closed season (December to March) is currently in place, although analysis shows that juveniles are still caught in April, hence it has been proposed to extend the closure by one month. There are also restrictions on trawling activities, such as, fishing is only to be conducted during daylight, and not within a certain distance of the shore.

Outside of the prawn fishery, few regulations exist, other than a ban on dynamite fishing, and measures to conserve particular endangered species, for example turtles. However, a new Fisheries Act is currently in draft. Enforcement is a key issue, due to

lack of capacity, and the fact that management is not yet binding, due to the Act being still in draft.

The Tanzanian government is following a policy of decentralisation, whereby local government has greater responsibility for management. Co-management is being considered for the marine environment, although not currently implemented. Beach Management Units (BMUs) have been established in Lake Victoria, and a MoU signed between Government and the BMUs to allow local management of the lake resources. The national fisheries research institute, TAFIRI, is keen to widen this type of arrangement to the marine sector, and the transferability of the arrangement would be a researchable area (although the difficulties in sustaining management by BMUs beyond the life of projects was noted). It was considered that the potential for successful co-management in Tanzania was high, due to the current social system of chiefs and sub-chiefs.

Marine protected area management is currently being developed, with the Marine Parks and Reserves Unit having been created for the establishment and management of marine protected areas. To date two marine parks (restricted use of resources) at Mafia Island and Mnazi Bay, and a number of smaller reserves (no-take-zones) have been designated. However, it was commented that there is little evidence at present as to the effectiveness of marine protected areas, and whether other management strategies would be more appropriate has not been addressed.

Fishing communities have been involved in the establishment and subsequent management of marine protected areas. The designation, zoning and development of management plans for the first marine park, at Mafia Island, took 10 years to achieve through an iterative consultation process. Village councils now take part in the management of activities within the park. The second marine park, at Mnazi Bay, has currently only been designated, and not yet zoned. The perceived benefits of protected areas has in some cases, for example at Menai Bay, even led to local communities approaching government to request an area be protected, however, as noted above, some interviewees felt that the effectiveness of MPAs still need demonstrating. It was also questioned whether the zones finally agreed for the Mafia Island Marine Park are necessarily the most appropriate.

Some traditional management 'practices' do exist, such as the use of closed seasons in the octopus fishery. However, whether these are active fisheries management measures, or rather that access to resources is restricted at certain times, for example neap tides and Ramadan, was unclear.

It was noted that land-based activities, and other impacts such as oil-spill pollution and the introduction of alien species in ballast water all significantly affect the marine environment. The management of fisheries therefore needs to be placed within an ICZM context. Much research demand expressed related to this, and appropriate lessons learned from the LWI Programme would be relevant.

Marine enhancement

There is currently very little enhancement activity in Tanzania in relation to marine fisheries. Some small-scale habitat restoration, such as mangrove and coral replanting, has occurred, for example coral re-seeding in the Kinondoni Coastal Area Management Project (KiCAMP). Stock enhancement has not been conducted. Demand was expressed for investigating the potential of enhancement as a means of alleviating pressure on the capture fisheries resources, and allowing fishers to diversify their

activities. However, it was noted that fishers would lack access to credit in order to engage in these activities. For the use of FADs however, whilst these may not be directly accessible to artisanal fishers, they would be to vessel owners with sufficient capital, who could then employ fishers aboard their vessels. To encourage investment in FAD enhancement would require pilot studies to demonstrate the potential benefits.

2.2 Kenya

Nature and status of resources

As in Tanzania, the continental shelf is narrow and coastal resources are believed to be overexploited. Catches by artisanal fishers, who exploit the nearshore resources on the continental shelf, are believed to have declined in recent years and catch rates have fallen. Habitat destruction from prawn trawling and from smaller scale destructive beach seine activities are thought to have contributed to the decline in artisanal catches. Whilst little commercial fishing occurs in inshore waters other than for prawns, East African coastal waters are recognised as having low productivity, and so whilst effort is not that high, coastal resources are believed to be depleted. Overfishing is believed to be more significant in the south, as the Somali current, which alters direction during the year, is considered to maintain higher productivity in the north.

It is believed that the offshore marine resources are not yet fully exploited, due to the lack of ability of artisanal vessels to fish offshore, and the limited licensed offshore foreign fishing. Some consider that training and empowering fishers to move offshore in order to enhance catches is desirable. However, whilst in 2001 only six foreign vessels, fishing for tuna and other pelagics, were licensed, it is believed that many more fish illegally. In theory, Kenya should be able to request information on catches in their waters from IOTC, although how accurate this is, especially if taken illegally, is questionable.

Thus the true status of Kenya's marine resources is not known. Again, the last resource assessments were in the 1980s, and so there is a need for updated assessments. Recorded marine landings have remained stable at around 6-10 tonnes per annum in recent years, but the reliability of these figures has been questioned. Also, these figures do not include foreign vessel catches. Improved data collection and resource assessments are considered a priority. Recorded marine landings currently only comprise around 5% of total catches (although the data are questioned), so it is considered that there may be potential for development of marine fisheries, in particular offshore, but assessments are needed to verify this.

Socio-economics of fishers

The coastal region has high poverty, with an estimated 60% below the poverty line, and high illiteracy. The current economic situation, in particular high unemployment, is causing many school-leavers to return to their family villages and take up fishing, due to lack of alternatives.

Fisheries are mostly low technology and artisanal. Coastal fishers mostly use traps, as they cannot afford nets. Some use of destructive fishing methods, such as the use of drag nets, and breaking corals to drive fish into nets, does occur. The artisanal fishery is seasonal, and particularly from April to August rough weather limits activities to within 2-3 miles from shore.

Conflicts between the artisanal and prawn trawl fisheries occur. Issues identified in a study being undertaken by Department of Fisheries and the Kenya Marine Fisheries Research Institute relate to overlapping fishing grounds, gear damage by trawlers, habitat damage, depletion of resources due to the large by-catch, and socio-economic impacts. Whilst many trawlers are registered as local, they are effectively foreign, with only local frontmen.

An issue relating to fisher livelihoods is the demand for plate-sized fish for the tourist industry in Mombasa. Refrigerated collector vessels move along the coast to buy fish from local fishers. The high demand leads to the use of destructive beach seine methods, often operated from vessels owned by influential local individuals. The operation is run along typical share system lines with poor returns to employed fishers. Limited research has indicated that in fact the cost/benefit to individual small-scale fishers would favour hand-lining, and smaller catches. However, young persons are reluctant to engage full time in fishing and also lack access to credit to purchase small boats needed. The political dimension, given the influential position of the boat owners, further complicates management of this illegal activity.

Fisheries information

The Department of Fisheries is responsible for collecting fisheries statistics, but their capacity for data collection has declined in recent years (in particular with the recent retrenchment of staff), and the statistics are not considered to be reliable, probably substantially under-estimating the true marine catch from coastal and offshore fisheries. No resource surveys have been conducted since the 1980s.

There is a lack of baseline data on the ecology of commercially important fish species. It was considered that potential exists to use traditional knowledge as a mechanism for rapid assessment of baseline information on aspects of the life history of important species.

The demand was expressed for research to identify what data are required for stock assessment and management decision-making, and the development of appropriate data collection methodologies.

Fisheries management and legislation

Historically, some (documented) traditional ownership rights existed over coastal resources. However, since colonial rule, fisheries management in Kenya has been very top down within a centralised system. It has been recognised, however, that this top-down approach was failing to adequately manage coastal resources. Changes within the Department of Fisheries have occurred (the appointment of a new Director, and retrenchment of field staff), together with a move towards co-management (see below). Furthermore, the Fisheries Act has been reviewed, prompted initially by the inadequacy of the Act on freshwater fish export quality control, but additional issues for the review were the need for legal protection of breeding grounds, and the prohibition of destructive fishing methods. The review of the Act has been conducted through a participatory process with community consultation. A policy review of fisheries management is also expected to occur shortly.

The Kenyan model for co-management is being implemented through the establishment of Beach Management Units (BMUs), which started in 2001. At present the BMUs are involved in the collection of catch and effort data, by trained 'scouts' within communities. This is then provided to Department of Fisheries (DoF) for analysis, although no independent data verification is conducted at present. BMUs are also involved in

notifying DoF of infringements concerning the use of illegal fishing gears, negotiating access to landing sites, and raising funds for small-scale processing facilities. Fisheries cooperative groups have previously been established in Kenya, but have not been successful, as they did not provide any financial feedback for the uptake of beaches and facilities.

It is envisaged that in time, with sensitisation and training, BMUs will become more involved in the management of marine resources. The process is currently at an early stage, although already interactions between fishers and DoF have improved and there is more confidence in the actions of DoF. However, the legal basis for BMUs has not yet been provided for in the new Fisheries Act, and the institutional arrangements for effective co-management between DoF and BMUs have not yet been established. In particular, it was highlighted that appropriate levels for management decision-making need to be clearly defined. It was also noted that an overall framework for a co-ordinated approach to management between separate BMUs (and DoF) should be developed, since the scale of resources is greater than an individual BMU. Government policy and regulations thus need to be clear, for easy interpretation by BMUs. Recently community tenure has locally been revived. Alternative models for co-management that incorporate traditional systems, and which may be applied within the context of Kenya's BMUs, should be investigated.

Unlike in Tanzania, marine protected areas are long established in Kenya, having been implemented using a top down approach along the lines of terrestrial parks. Protected areas cover both marine parks and reserves, the former being no-take-zones, and the latter allowing fishing using traditional methods. A high proportion of coastal waters is now under MPAs, resulting in reduced access to resources by fishers. This, plus the non-involvement of communities in the designation process, has led to much resistance to MPAs. Parks and reserves were originally gazetted for conservation and tourism purposes with lack of any reference to existing resource users. The need for participation of communities has been recognised, and is being encouraged through the ICAM (Integrated Coastal Area Management) approach. In 1999/2000 management plans were established for each park/reserve which include an advisory committee of all relevant stakeholders. However, the transition to a more equitable approach is still at a very early stage.

The Kenya Wildlife Service is the organisation responsible for managing marine protected areas. However, there is some conflict of responsibility with DoF, who are actually responsible for the resources inside MPAs. Currently no MoU exists between the two organisations for working together on protected area management, and duplication of activities occurs. There is also considered to be insufficient information exchange between the two organisations. The institutional arrangements for coastal management are being addressed by the ICAM initiative, which aims to bring the relevant institutions together to share information and ideas, and discuss how best to manage coastal resources.

The appropriateness of different management measures was questioned. As with other artisanal fisheries, effort controls were not considered to be a realistic option. Whilst MPAs were considered appropriate, it was also considered that the number and extent of protected areas in Kenya has reached saturation point. There is resistance from fishers to the introduction of more protected areas, plus it was considered that the science supporting further expansion of MPAs was not yet proven. Information from within Parks and Reserves indicates that their ecological status is healthier than that in open access areas. However, the benefits from reserves are not as great as expected due to the incidence and level of fishing within them. Individual park or reserve managers also have a significant influence on their degree of success (measured in

ecological terms). Some existing socio-economic studies of protected areas have addressed the impacts on fishers through loss of access. However, greater understanding is required of the livelihood impact of MPAs at a community level, through considering whether benefits to fishers outside of closed areas compensate for lack of access within.

Alternative management mechanisms were considered appropriate and necessary, including further gear controls. In 2000, the use of beach seines and spear guns was prohibited. However, these are not widely enforced at present, and lack of capacity for enforcement of any management measures is a significant constraint.

A commonly stated view was the need to consider fisheries in the wider land-water interface context. Land-based impacts of human activities cannot be detached from fisheries management issues, which need to be addressed in an integrated manner. Whilst integrated management is outside the scope of the current FMSP strategy it is important to highlight this, in order to inform the development of the next NR research strategy.

Marine enhancement

Very little enhancement activity currently occurs within Kenya. Some habitat rehabilitation (for example, replanting mangroves, transplanting corals) or enhancement (deployment of rafts for oysters) has occurred. No stock enhancement has occurred, although mariculture (of shrimp, seaweed) has been tried. However, there is interest in the potential for enhancement.

2.3 Regional

Need for regional management

The need for regional approaches to the management of transboundary resources was highlighted, as was the need for an appropriate regional organisation to co-ordinate this¹. Whilst at present there is no regional management committee responsible for marine fisheries, it was suggested that the recently re-established East African Community would provide an appropriate mechanism for collaboration on regional approaches. Data on transboundary resources should also be held regionally, although the appropriate regional organisation to host a database does not exist at present. It was noted that a GEF/UNDP regional programme may be assisting in setting up a Western Indian Ocean regional fisheries institution that would be appropriate. Certain existing and projected data sets would provide useful data to be incorporated into a regional system, for example the database to be output from the *Development of a Partnership Programme for implementing the Jakarta Mandate in the Western Indian Ocean region*.

Marine fisheries legislation between adjacent countries could also be better co-ordinated. In the inland environment, a task force has been set up within the Lake Victoria Environmental Management Project to harmonise legislation between the three riparian countries, and it is considered there may be a move to look at this for the marine environment also.

¹ It is noted that the Secretariat for Eastern African Coastal Area Management (SEACAM) was established by ten Eastern African Coastal Countries, including Tanzania and Kenya, to assist them to implement and co-ordinate coastal management activities in the region. However, this organization was not met during this visit.

Need for communication and co-ordination of activities

Both nationally and regionally, there is a lack of institutional co-operation and communication. Whilst the limited number of organisations means that many are involved together in the same initiatives, the actual communication is poor. In Kenya, the Kenya Marine Forum is being established to address this issue, as would any future regional management committee, as above.

Donor activity in the region could also be better co-ordinated. There are a number of overlapping initiatives, for example the IUCN Jakarta Mandate programme and the GEF/UNDP regional programme for research and capacity building. Whilst the latter is focussing on offshore fisheries, it is believed there is overlap with the IUCN programme. Within DFID itself, there are a number of initiatives, including RFIS, FMSP, and a coral reef project, and there was some confusion in the region as to the co-ordination of these activities.

3 Institutional framework relating to the fisheries sector

The following sub-sections give details of the national fisheries institutions within each country, plus key non-governmental and other organisations. It is not necessarily a complete list, but covers the main institutions responsible for or involved in fisheries research, management and development. Details of actual projects or activities carried out by these institutions are given in Section 6.

3.1 Tanzania

Management bodies and policy-makers:

Fisheries Division, within the Ministry of Natural Resources and Tourism is responsible for developing fisheries policy and implementing relevant management and development of fisheries in mainland Tanzania (separate arrangements exist for Zanzibar, where the Department of Fisheries and Marine Resources is responsible for fisheries policy, management and development). For local-government level fisheries management and development, a process of decentralisation has occurred, whereby authority has been devolved from the regional to the district level, under the Local Government Reform Act (1998). Most fisheries research is conducted by the TAFIRI (see below), to the policy developed by Fisheries Division. However, Fisheries Division does have a Research, Training and Statistics Section, which co-ordinates research within Tanzania and with external agencies.

The **Ministry of Environment** also has responsibilities relating to fisheries, through being responsible for overall policy, planning and implementation on environmental matters, including developing Integrated Coastal Zone and Watershed Plans. Within the Ministry, the Division of Environment provides policy advice, develops cross-sectoral and integrated policies and programmes, and promotes interministerial cooperation in environmental management. With respect to fisheries, the Division does not work independently, but with the competent authorities for fisheries. The Division focuses its activities towards poverty alleviation, due to the interactions between poverty and environmental degradation.

The **Marine Parks and Reserves Unit** was established by Marine Parks and Reserves Act (1994) to establish, monitor, control, manage and administrate marine parks and reserves. The Unit undertakes participatory management with stakeholders, through the Marine Park Liaison Committees, comprised of Village Council members. There is currently no comprehensive monitoring of the two marine parks established, and the Unit would be keen demonstrate the effectiveness of marine protected areas, both biologically and in terms of their effects on livelihoods.

Research organisations:

The **Tanzania Fisheries Research Institute (TAFIRI)** is the parastatal organisation with the mandate to promote, conduct and coordinate fisheries research (in all water bodies) in Tanzania. Its headquarters in Dar es Salaam is the focus for marine activities, and three further centres located inland conduct work in freshwater environments, the focus of work to date. Research demand originates from Government priorities for immediate applied research results, plus a wider programme of research to ensure all areas of fisheries are covered. Once Government has identified a particular issue for research (quite often through public pressure), TAFIRI then consults with the relevant communities to understand the nature of the issue. From the results of the research,

TAFIRI provides advice and recommendations to the Fisheries Division, who translate this into management strategies, including regulation.

The **University of Dar Es Salaam, Department of Zoology and Marine Biology** also conducts fisheries research, by its staff members and post-graduate students. They also provide an MSc course in fisheries. The Department has 3 Sections: Marine Biology; Zoology; Wildlife ecology and management. Additionally there is a field station at Kunduchi. Whilst research capacity is limited in terms of number of staff available, it was noted that capacity exists to take on more activities as three staff members are shortly due to return from overseas.

The **Institute of Marine Sciences (UDSM)**, based in Zanzibar, has the mandate to undertake research in all aspects of marine sciences, and provides training at undergraduate and postgraduate levels. It has an advisory role to government for coastal and marine affairs, based on research, and also fulfils an advocacy role, disseminating information to policy makers and to resource users. The Institute works in close collaboration with relevant Government Departments (Fisheries and Environment Divisions). Donor funding is important, particularly from Sida through SAREC.

The **Institute of Resources Assessment (IRA)** is a social science research institution within the University of Dar Es Salaam. It conducts multi-disciplinary research in partnership with other relevant institutions in natural resources and the environment. Whilst the Institute has undertaken few activities directly related to fisheries, it has experience of using participatory approaches (such as PRAs) for forestry, wildlife and wetlands, where such techniques are better developed. For example, IRA have undertaken a project in collaboration with DANIDA related to the management of a RAMSAR wetland site which took a participatory approach to problem identification and the formulation of management solutions. Research outputs are disseminated through publications and the Institute has its own publications series. The Institute also houses TANRIC, the Tanzania Natural Resources Information Centre that holds natural resources and environmental data. IRA has a mandate to enter directly into contracts for research with international organisations.

Other relevant national organisations, programmes and projects:

- **Kunduchi Fisheries Institute**, one of three fisheries training institutes, providing post A-level training in fisheries science to Fisheries Department staff, the private sector (eg fishing or processing company staff), and regional or district level extension staff. Now that TAFIRI has been established, the training institutes no longer have the mandate to do research, however individual professors may conduct small-scale research activities, or collaborate with TAFIRI on research projects.
- **National Environment Management Council (NEMC)**, which co-ordinates all environment-related activities and initiatives, and provides technical advice to Government, private sector and the general public on the effects of management on the environment. Where fisheries research encompasses livelihoods issues and the environment, NEMC would have a role to ensure that fisheries management strategies developed would not have adverse environmental impacts.
- **Tanzania Coastal Management Partnership (TCMP)**, a partnership, operating through NEMC and funded through USAID, designed to facilitate linkages between stakeholders, and between projects. It was initiated to address policy issues, in particular how to bring different groups together to develop management. It has looked at the coherence of all policies in Tanzania relating to the coastal zone, with

the aim of integrating them. Through an inclusive stakeholder consultation process, the key issues relating to the coastal zone have been identified, and an integrated coastal zone management strategy developed. The project now focuses on implementation of integrated coastal zone management strategies for better use of the environment, through district-level council and community involvement. Its two main activities are awareness-raising, and promoting community participation in management.

- **Rufiji Environment Management Project (REMP)**, a partnership between the Tanzanian Government, the Dutch Government, and IUCN, the World Conservation Union. The overall goal of the project, which is implemented by the Rufiji District Council and covers most of the district, is to promote long-term conservation through wise use of the lower Rufiji forests, woodlands and wetlands. The project is involved in awareness-raising of the importance of sustainable use of resources, developing village environmental management plans with local communities, implementing sustainable pilot development activities to enhance local livelihoods, capacity building of local government staff, and influencing integrated natural resource policy development.
- **Wildlife Conservation Society of Tanzania (WCST)**, a conservation organisation primarily focussed on game, forestry and bird conservation. However, the Society considers marine conservation to be a priority issue, and is interested in participating. The key activity of the Society is awareness raising, both at the Ministry level and through information dissemination aimed at the general public. It also produces education materials for use in schools. It does not conduct research, but commissions research studies, to use the results in its awareness raising activities (funding for this has to be found). WCST works closely with Government in order to achieve appropriate action.
- **WWF Tanzania**, whose Dar es Salaam office covers work specific to Tanzania, including inputs into MPA management at Mafia Island and Menai Bay. It works closely with the WWF East Africa Regional Office (see Section 3.3).
- **Frontier-Tanzania**, a collaboration between the UK Society for Environmental Exploration and the University of Dar es Salaam, which conducts field research using volunteers. The Marine Programme has worked in a number of areas in Tanzania, and is now located at Misali Island, off Pemba. The project conducts baseline surveys and resource assessments, provides training for fisheries officers and resource users, and raises awareness amongst coastal communities. Frontier's current activities will feed into the Misali Island Conservation Association (MICA) community based natural resources management project, which is supported by CARE Tanzania.

Donors

- **SIDA (Swedish)**: SIDA does not directly undertake research activities (which occur through SAREC, based in Stockholm) but supports a number of relevant activities:
 - ▶ WIOMSA's MASMA Programme (which has links to CMREC, the Coastal Management Research Centre at the University of Stockholm);
 - ▶ Lake Victoria District Development, through support to district administrations, capacity building, advice on NR use, and district planning (this is a participatory planning exercise, but has not yet directly supported fisheries);
 - ▶ CORDIO (Coral Degradation in the Indian Ocean);

- ▶ Institute of Marine Sciences, through a SAREC programme with the UDSM, which provides approximately \$300,000 per annum for capital items and post graduate training.

3.2 Kenya

Management and development bodies and policy-makers:

The **Department of Fisheries, Nairobi** has the mandate to manage the use of fisheries resources throughout Kenya. Its principal activities are statistics collection, quality control, aquaculture, fisheries legislation and enforcement, and extension activities and awareness raising. The Department mostly passes identified research needs to the appropriate fisheries research institute. The Department's extension service is implemented through the district fisheries officers, who both manage the fisheries in their district (including carrying out enforcement activities) and offer advisory services to communities.

The **Department of Fisheries, Mombasa** is responsible for implementing government fisheries policy for marine and coastal waters. The theme of the most recent five-year national development plan is effective management for sustainable growth and poverty reduction. A complementary fisheries management plan exists which outlines activities related to resource management, enforcement, training needs, extension services, enhancement / aquaculture, post harvest, and any research.

The **Kenya Wildlife Service (KWS)** manages marine protected areas (parks and reserves) and enforces regulations within them. Most funds within KWS are employed for enforcement activities and little is allocated to research, so the organisation works collaboratively with other research organisations such as CRCP, KEMFRI and students. A Community Wildlife Service has been established within KWS to encourage community participation in MPA management, and is currently being tested in Kionga (with WWF) and Diani. There is some overlap and resulting conflict in responsibilities between KWS and DoF (as noted in Section 2.2). For example, DoF issues licences to fishers who may fish within reserves, or to prawn-trawlers that may take turtles (that are mandated under KWS for protection) but KWS presently has no seat on the Board that decides and issues licences.

The **Coastal Development Authority (CDA)** is a governmental organisation with the mandate to develop the coastal region, and reduce coastal poverty. It co-ordinates future development, and initiates new programmes. It also acts as 'secretariat' for coastal development throughout the East Africa region, facilitating information exchange. CDA is looking to promote development of the offshore fisheries, and freshwater aquaculture where possible.

Research organisations:

The **Kenya Marine Fisheries Research Institute (KMFRI)** is mandated to carry out research on aquatic resources. It has a number of research centres, mostly inland, with the Mombasa centre being the Headquarters and focus of marine research. Research projects are conducted mostly through collaborative arrangements with donors (especially the EU). Under its Fisheries Programme, the mandate is to conduct research into fish ecology, population dynamics, stock status and distribution; fish disease; and ways of adapting suitable environmentally-friendly fishing technologies.

The Environmental and Ecological Programme addresses the state of the aquatic environment, and the impacts of exploitation and degradation on fisheries and the environment. The Socio-Economics Programme addresses participatory approaches to sustainable resource use, fish marketing, and the impact of management on food security. The Information and Data Management Programme archives research data and products, and packages information into suitable modules which can be used to create awareness.

The **University of Nairobi, Department of Zoology** is a research and training institute which provides undergraduate and post graduate training in zoology, and develops human resources for national organisations. It also generates and disseminates new knowledge (research). At present, the Department has no externally funded projects, but does have fisheries-related activities through PhD and MSc studies (see Section 6.4).

The **Coral Reef Conservation Project (CRCP)**, originally a Kenyan NGO, is now linked to The Wildlife Conservation Society in New York that also has programmes in Belize, Indonesia and Papua New Guinea. It is a research-based institution that aims to promote the wise use and management of coral reefs through the generation and appropriate dissemination of knowledge. It conducts long-term ecological and catch monitoring programmes, plus shorter-term research and adaptive management experiments, for example on gear effects to inform appropriate management measures.

Other relevant organisations

- The **National Council for Science and Technology (NCST)** is a government organisation, established to determine priorities for and co-ordinate collaboration on scientific and technological research, advise on the application of the results of research, and technology transfer, and provide policy advice to Government. The Council Secretariat operates through various sections, the two of relevance to the FMSP being that on Natural and Physical Sciences, which has a schedule relating to fisheries and marine science, and Research, which provides research clearance (see Section 4.2). The Council advises on research needs, but does not conduct research itself. For marine science and fisheries, it acts as research and policy advisor to KEMFRI, DoF, and KWS, with research being conducted mostly by KEMFRI and KWS. The Council also works regionally on marine issues, with Tanzania and Eritrea, and co-ordinates a regional network for biotechnology research.
- **MKK Ltd** is a private consultancy that focuses on social science issues. The company is currently trying to promote a socio-economic monitoring network for the E. African region but without funding to date.

3.3 International / Regional

International and regional NGOs, programmes and initiatives:

- **WWF:** The WWF East Africa Regional Programme Office co-ordinates a global programme covering six theme areas within East Africa. These areas include oceans and coasts, and marine and freshwater ecosystems. It works closely with the Tanzania office, particularly in relation to marine work. WWF undertakes a range of activities (in partnership with other organisations) that encompass research, advocacy, and implementation of management and development actions. Regionally, WWF has its eco-region based conservation approach, inputs to the IUCN programme on small-scale fisheries (see Section 6.2), and other target programmes including MPAs and fisheries. WWF is engaged in working directly with communities, and some activities have also related to generation of alternative livelihood activities.
- **TRAFFIC:** TRAFFIC is a programme of WWF and the IUCN established to monitor trade in wildlife. In particular it relates to CITES, and performs a monitoring and advocacy role. It is a research-based organisation which aims to collect, analyse and disseminate information on trade. Within East Africa the organisation has undertaken two studies relevant to trade in marine organisms: sharks, as part of a global study; and sea cucumbers, lobsters and sea-shells.
- **Western Indian Ocean Marine Science Association (WIOMSA):** WIOMSA is a membership organisation based in Zanzibar. It comprises over 600 members, including institutions and individuals, both regionally and worldwide. The Secretariat in Zanzibar reports to a board of trustees, comprising individuals from four regional countries (2 from Kenya, 1 from Tanzania), and one associate (non-regional) representative. National co-ordinators exist at the country level.

The main objective of WIOMSA is to increase scientific capability to provide information for the creating effective management schemes. WIOMSA provides a forum for communication and exchange of information amongst its members, organises meetings and seminars on marine science findings and application, supports marine research through offering research grants, and promotes and fosters inter-institutional linkages within and beyond the region for coordination and support of marine science development. Research is considered a priority of the organisation, and it also has an advocacy role in interacting with policy makers currently via an MOU with IUCN related to the Nairobi Convention. WIOMSA is also involved in running training courses in ICZM. Programmes and activities include:

- ▶ **Marine Science for Management Programme (MASMA),** a regional programme which formally started in January 2001 with funding from SIDA. It seeks to develop and implement research projects that focus on the sustainable management of coastal and marine resources in the WIO. A multidisciplinary approach is adopted with the involvement of social and natural scientists. Sustainable fisheries and food security (with a focus on artisanal fisheries) is one of the priority research themes. The objectives of the programme will be met via a series of activities (projects). The programme operates in a way that is very similar to that of FMSP via a competitive research grant scheme. Like FMSP, projects should be regional, or if site-specific then of a generic nature with regional implications. Calls have been non-prescriptive to date and only two fisheries specific proposals have been received (one on ornamental fish, the

other a very broad submission to generate management advice from ecological and socio-economic studies). For current projects funded, see Section 6.2.

- ▶ *Marine Research Grant (MARG)*. The grant (max \$6000 pa) can support research on any theme, or can be utilised to enable regional scientists to undertake exchange visits or attend conferences.
 - ▶ *Group of Experts for MPAs in Eastern Africa (GEMPA-EA)*. The group comprises members of the Coastal Zone Management Centre of the Netherlands, the Institute of Marine Sciences in Zanzibar, and regional experts. It was established to co-ordinate and facilitate implementation of activities geared towards improving management of MPAs in the region. Particular areas include improving management effectiveness; understanding ecological and socio-economic roles of MPAs; and capacity building for effective management. WIOMSA also promotes these areas via the MASMA programme.
- The ***IUCN East Africa*** office is the regional office of the IUCN – World Conservation Union, an international organisation of members (Governments and NGOs) with the aim of achieving conservation of nature and sustainable utilisation of natural resources. The IUCN EA work programme is thematic, with marine and coastal conservation having been selected as one area of work. Projects range from national, site-specific to regional policy projects, with much of the marine and coastal work falling under the latter. As well as programme and project activities (see Section 6.2 for details), IUCN interacts and collaborates regionally, with inputs into the development of fisheries policy. It is also assisting with the Kenya Marine Forum, recently established to promote dialogue and experience-sharing amongst coastal management practitioners, institutions and community representatives, and aiming to give member groups a voice in policy-making. IUCN are also seeking to reinstate the Kenya Wetlands Working Group, which collapsed in the early 1990s, as the Kenya Wetlands Forum.
 - ***Coral Reef Degradation in the Indian Ocean (CORDIO)*** is an ocean-wide programme, funded principally by SIDA/SAREC, established originally to assess the extent and impacts of coral bleaching arising from the 1997/98 event. The East Africa component covers Kenya, Tanzania and Mozambique. Since its establishment, the programme has widened to cover artisanal fisheries. CORDIO has substantial overlap with the Global Coral Reef Monitoring Network (GCRMN) of the International Coral Reef Initiative (ICRI), and acts as the regional node of the GCRMN in East Africa. Its East Africa operations also overlap with a number of other regional institutions, with whom operational relationships are being developed. CORDIO operates by conducting projects with core staff, and also through funding work with other relevant organisations (such as IMS, KEMFRI). It is currently conducting a participatory monitoring project on artisanal fisheries in the Diani-Chale area (see Section 6.2). They are also conducting awareness-raising, by feeding back information to fishing communities through simple formats (documents, videos), and have also arranged fisher exchange visits between projects. They are also looking at how to target the information they already have to other relevant stakeholder groups, including the tourism sector, management agencies, and potentially also to policy-makers. CORDIO have developed a database for resource monitoring, which holds their current fish catch monitoring and Kiunga data. They would like to develop this further so that it can be used more widely, to hold data from a number of projects, and expressed interest in the transfer of results from the FMSP Information Systems for Co-management project (see Section 5.4).

4 Mechanisms for FMSP to work in the region

4.1 Tanzania

Partners for research

In future development and implementation of the FMSP strategy relating to Tanzania, the Programme should be in contact with Fisheries Division's Research, Training and Statistics Section, who co-ordinate research within Tanzania and with external agencies. This is to ensure that proposed projects are consistent with the research requirements identified in-country. Fisheries Division are unlikely to participate in the research itself, but should be engaged in the proposal from the outset, as the mechanism to ensure uptake of research products through the district-level fisheries officers (see below).

Potential research partners will depend on the nature of a particular project, but may include one or more of the following:

- TAFIRI – for biological and ecological research, plus also socio-economic studies. Through TAFIRI, members of the Kunduchi Fisheries Institute could also become involved;
- University of Dar es Salaam Department of Zoology and Marine Biology - for biological and ecological research;
- Institute of Marine Sciences* – for a range of areas, including biological / ecological, environmental, resource economics and management, and sociological issues;
- IRA* - in relation to understanding fisheries / livelihood interactions, socio-economic studies, and transaction of pro-poor management strategies ;
- WWF*
- TRAFFIC*
- TCMP's Science and Technology working group.

* these organisations explicitly requested to receive future calls for concept notes.

If FMSP were to conduct fisheries research with environmental implications, NEMC would be appropriate to coordinate this nationally, and ensure that the relevant institutions were involved.

Partners for uptake

It was stressed by many interviewees that in order to transact research into development actions, it is necessary to work through the relevant district-level organisations who are mandated to perform management and development functions, and are the interface with communities. For FMSP, this will mean working with District Fisheries Officers, who should be engaged at the stage of developing the Project Memorandum, in order that they fully endorse the objectives of the project.

Whilst it was considered essential to work with district-level authorities, it was noted that this did not always guarantee actual uptake of research, due to lack of capacity (both in terms of staff and finances) and infrastructure. Thus, whilst management advice may be formulated and accepted, it is not necessarily implemented.

Lessons on appropriate mechanisms to work with district administrations could be learned from the SIDA Lake Victoria District Development Programme, the outputs of which are due shortly, and which could inform FMSP.

Given the limited number of district-level fisheries extension staff, it may be appropriate for FMSP to consider additional extension mechanisms, including the community development and agricultural extension services, both of which are available at the village level. Whilst some extension activities will require specialised fisheries staff, it was considered that at the district level, it may not be necessary to have such specialised staff. It is important to determine which types of extension activities need to be conducted by which type of staff, and package the results accordingly. It was also noted that a large number of NGOs exist that conduct extension activities, for example Oxfam GB, which could provide additional mechanisms for FMSP.

Other institutions could also be relevant partners for uptake, through, for example, pilot testing of results. These include:

- WWF, who could apply relevant management tools through existing community based activities. They could also assist in wider dissemination of research outputs through their advocacy role;
- REMP, through testing of research outputs in their pilot villages. They would also facilitate any research working in the remote Rufiji delta (although not conduct research themselves);
- Marine Parks and Reserves, if research related to marine protected areas, through better designation and management of MPAs.

Other potential dissemination pathways

In addition to the potential uptake pathways identified in order to transact research into development action, there are a number of other existing networks or mechanisms for wider dissemination of FMSP outputs. These include through:

- TCMP - as a platform for communication exchange between different stakeholders, it is a potential uptake pathway for FMSP outputs and mechanism for transferring research findings to a wider area;
- IRA - through their publications network;
- WIOMSA - in particular for promoting outputs relevant to policy, but also for information exchange on research results, via their existing network;
- WCST – through their existing information dissemination network (funding would be required for activities such as printing information leaflets).

4.2 Kenya

Partners for research

In order to undertake research in Kenya, external organisations are likely to be affiliated with an appropriate Kenyan research institution or government department, who then submit the proposal for research clearance through the National Council for Science and Technology. This is standard procedure, and takes approximately one month. It would be possible to work in Kenya through NGOs, thus independent of government and research institutions, but NGOs would still need to obtain clearance through NCST, and would not be the best mechanism to ensure implementation of project outputs (see below). A project solely in collaboration with a national university department would not need to seek clearance, however, as universities have a standing mandate to collaborate on or commission research. Thus FMSP Programme Management should, at the project memorandum stage, ensure that clearance has been obtained by project teams, and follow this up subsequently if required. Project proposals submitted to NCST should clearly identify the extension outputs that are expected to result from the proposed research.

Potential partners for FMSP research include:

- KMFRI – the national fisheries research institute;
- KWS – for any research involving marine parks;
- WWF – which works closely with KWS;
- Department of Zoology, University of Nairobi –collaborative research with external organisations is welcomed (they would also like to receive CN calls)
- Department of Fisheries – for research on livelihoods issues, as DoF work with communities, as opposed to KEMFRI, which is a pure research institute.

It was noted that mangroves fall under the mandate of the Forestry Department, and thus any fisheries work that involved mangroves would require interaction with the Forestry Department.

Partners for uptake

Whilst other organisations, such as NGOs, may be collaborating on the research itself, it is essential that projects work closely with government, to ensure implementation of research results, particularly beyond the life of a project. Department of Fisheries is the key government organisation, as the policy-maker for fisheries, and as they work closely with communities, especially through the new Beach Management Units. The Department has the appropriate institutional structure with fish ‘scouts’, fisheries assistants and fisheries officers placed at the district level and within communities (‘front line workers’). Whilst NGOs may also work with communities, they will have shorter-term goals than government, and activities are likely to cease at the end of a particular project.

Working with Department of Fisheries at a national level was considered important in order that appropriate use is made of research findings, and that the results inform future policy. However, as with Tanzania, working also at the district level was seen as essential in order to promote the uptake of research outputs. District Fisheries Officers are key partners for uptake of research, as they work closely with communities, and fulfil extension roles (however, the need for capacity building in some districts was

highlighted, plus the Fisheries Department extension service is currently focussed on inland fisheries). Environmental Officers would also have an important role. Uptake within a particular district will also be reliant upon the support of district-level officials such as the District Commissioner, whose engagement in the project process from the start is necessary in order to ensure the success of management actions resulting from the project. In one example cited, the District Fisheries Officer found that writing to the District Commissioner informing him of scientific findings from research, and intended management action in advance, resulted in official support for any subsequent action and a higher success in implementing it. Valuation of resources and supporting scientific evidence for any proposed management action are both important.

Feeding back the results of research to communities and other important stakeholders was also considered to be necessary to ensure full support of resulting management actions. For example, the Coral Reef Conservation Project holds a six-monthly forum with fisheries leaders to feed back data analysis, discuss trends and identify problems. Information on the increase in catches and catch rates since a ban on beach seines led to increased acceptance and compliance by the community involved. The involvement of other District Fisheries Officers within a province at such meetings also encourages the scaling up of management actions to other districts. Informing communities also leads to public pressure being brought to bear on local officials and others in influential positions, such as vessel and gear owners, which has led to management actions such as banning of gear types, being successfully implemented.

Another potential partner for uptake would be the relevant development authority. For the coastal environment, there are two such authorities, the Coastal Development Authority (CDA), a regional development authority with the mandate for community participation in coastal development, and the Tana and Athi River Development Authority (TARDA), who are responsible for the coastal outlets of these two rivers. The CDA has a wide mandate for managing coastal resources, and are reliant on the outputs from external research projects (they conduct limited research themselves) in order to inform their development activities. They would thus be an appropriate target organisation for FMSP in translating the results of research into development action, and would be keen to receive the outputs of FMSP research. CDA already work with communities, and are now initiating Community Development Groups (driven by the ICAM initiative). The requirements of these groups will differ according to the local issues, but they will be taking a wider role than the Beach Management Units being established by Fisheries Department, and will encompass all other beach-related activities, for example tourism-related activities. CDA is already working closely with both Fisheries Department and KMFRI, and a partnership of these three organisations was considered to be one appropriate grouping for conducting and implementing marine fisheries research within Kenya.

In order to achieve impact, it was considered that demonstration/pilot projects were the most effective method. For example, the success of one of the ICAM project sites had prompted other communities to replant mangroves.

Other potential dissemination pathways

There are a number of existing or proposed additional mechanisms that FMSP could use for wider dissemination of its outputs, including:

- The National Council for Science and Technology's regional research forum, which is funded through the East African Community, primarily to develop priorities for research and capacity building, but also to facilitate the transfer of research between

countries. Research outputs should be sent to NCST in any case, as they act as repository for all research outputs, through their library;

- Samaki News, a new mechanism which aims to target policy makers and provide key scientific outputs in an appropriate non technical-format for policy makers. FMSP projects could contribute articles to this newsletter (via James Omondi, Department of Zoology, University of Nairobi, who is Assistant Editor). The Department of Zoology is also exploring further mechanisms for communicating with policy makers and the public, which may be of relevance to FMSP in future, thus continued contact with the Department is appropriate;
- The Kenya Marine Forum, which is in the process of being established by IUCN and others to promote dialogue and experience sharing amongst coastal management practitioners, institutions and community representatives, and which aims to give member groups a voice in policy-making.

4.3 Regional

Collaboration and linkages with other programmes

There is potential synergy between the FMSP and other national or regional programmes. For example, outputs from the WWF East African Marine Eco-region Programme will be relevant to the FMSP, and also the FMSP could contribute to the WWF programme in the development of appropriate management strategies.

There are also parallels between the FMSP and the IUCN/NORAD/WWF 'Jakarta Mandate' programme, in particular the component *Advancing the understanding and management of small scale fisheries in the Western Indian Ocean*, and information sharing on activities and results would be appropriate. IUCN would be particularly interested in developing linkages in relation to this programme, and would hope that the FMSP project arising from the current call for CNs (understanding resources and livelihoods) would contribute to their programme workplan. Inputs from FMSP may also encourage NORAD to provide further research funding.

In terms of IUCN actually participating in FMSP activities, it was noted that IUCN is prohibited from entering into any competitive bid process, due to potential competition with their members (although member organisations could apply). However, there is potential for IUCN to work with FMSP, if it became involved as a partner organisation at the project memorandum stage, once one concept note had been promoted. Also, since FMSP is able to commit funds in a non-competitive way if there is only one organisation with the relevant expertise, IUCN could become involved due to its regional coverage and role in facilitating dialogue between government and non-government organisations.

There is possibility for joint funding of research, as is encouraged by DFID, which was specifically raised by WIOMSA (through their MASMA programme), WWF and TRAFFIC.

It was also mentioned that FMSP could interact in the region via the Nairobi Convention, and contact should be made with the UNEP office in Nairobi to explore mechanisms for doing so.

5 Research demand expressed

The demand expressed by interviewees will be used to inform the future strategy for the FMSP, implemented through a revised logical framework for the Programme detailing future activities.

Some interviewees expressed demand for issues that were not research (eg public awareness raising, capacity building), or were outside the scope of the FMSP (eg fish health and post harvest issues, marketing, the development of alternative livelihoods). In the synthesis for FMSP, these non-research issues are not included directly, however some will be relevant to programme and project activities, eg capacity building and public awareness raising can be addressed within a research project to an extent. Others may be relevant to other programmes / donors.

Much interest was expressed in existing FMSP outputs, either directly for reports or tools such as stock assessment packages and databases, or for the transfer and testing of results in-country. This is noted separately from the synthesis presented in this section, as a Programme Development activity (see Section 5.4).

A synthesis of the research demand relevant to FMSP is given in Table 1, sorted by the three research activity areas (outputs) currently defined for the Programme. Brief descriptions of the main demand expressed are given below, by country.

5.1 Tanzania

The demand for baseline information expressed (Table 1) reflects the opinion that insufficient data exist, both on the status and the use of resources, in order to inform management. A better baseline understanding is required in order that appropriate management measures can be developed and implemented. It was also felt by one interviewee that better baseline understanding would inform what the priority areas for further research should be.

Whilst minimal marine enhancement is currently conducted, there was demand expressed for determining the potential and appropriateness of enhancement techniques. This arose through the demand for investigation of alternative livelihood options for coastal fishers, which also included assessing the potential for developing offshore resources, for example.

An assessment of the impacts and effectiveness of existing and alternative management measures was also considered important. At present, Tanzania is pursuing a policy of increased marine protected areas, however it was felt that the effectiveness of MPAs, in particular on improving livelihoods, required further demonstration.

The identification of key data requirements for management, and improved data collection systems, including the involvement of communities, were also considered important areas for research.

Much demand was expressed for management strategies, relating to specific instruments such as gear controls or closed seasons, or for critical habitats or particular species.

In terms of implementing pro-poor management, co-management was considered by most to be the appropriate institutional arrangement, and so much demand related to alternative models for co-management. The need for improved access by the poor to resources, through conflict mitigation measures and appropriate legislative arrangements, was also highlighted.

5.2 Kenya

Much of the demand expressed in Kenya was similar to that from Tanzania. Again, baseline information, both on the ecology and status of resources, and also on understanding livelihoods, was highlighted as an important area for further research. The potential for enhancement of resources, and development of alternative resources was also highlighted.

Many more MPAs have been designated in Kenya than in Tanzania, and there is community resistance to any further designation. Demand was therefore expressed for an assessment of the impacts of MPAs on livelihoods, and identification of appropriate alternative management measures.

Socio-economic valuation of resources was believed to be important for informing policy makers of the true contribution of marine resources to catches (current data are considered unreliable) and to livelihoods. However, it was also believed that appropriate methodologies for conducting socio-economic valuations had yet to be developed.

Demand was expressed for adaptive research to assess appropriate co-management models, including mechanisms for integrating traditional management systems into co-management, and related issues such as participatory information monitoring systems, and appropriate legislative arrangements.

Table 1: Synthesis of research demand expressed by country

(N = number of institutions that raised each issue)

OUTPUT 1: Improved understanding of capture and enhancement fisheries and their contribution to the livelihoods of the poor developed and promoted.					
Research Theme		Tanzania	N	Kenya	N
FMSP Activity	FMSP sub-Activity				
Baseline understanding of capture and enhancement fishery resources	Life history and ecology	Ecological studies of the key species of importance to artisanal fishers (including small pelagics, invertebrates) and commercial fishers	3	Baseline studies of the ecology and population dynamics of important commercial species, and rapid appraisal through use of traditional knowledge	2
		Genetic studies to determine extent of unit stocks (of prawn)	1		
	Critical habitats and their role in fish production	Identification of key habitats (eg spawning areas) and assessment of current status	2	Identification of key habitats	1
	Resource assessment	Stock assessment of key marine resources exploited by both artisanal fishers (including small pelagics, invertebrates) and commercial fishers (principally deep-sea resources, including prawn)	6	Stock assessment of offshore and inshore resources (to inform management of appropriate fishing levels) for key (including major fin-fish species and invertebrates) and non-traditional species in different habitat types	7
	Potential for enhancement	Investigate potential for stock enhancement of coastal resources	2	Evaluate potential for and feasibility of (small scale, extensive stock) enhancement fisheries as an alternative/supplement to capture fisheries, and demonstrate through small-scale pilot projects	3
		Investigate effectiveness of habitat enhancement through eg FADs, and demonstrate through pilot studies	4	Investigate effectiveness of FADs	2
				Habitat conservation and restoration of critical habitats (incl seagrass, mangroves and coral reefs), and further enhancement (eg artificial reefs)	3
Baseline understanding of the contribution of fisheries to livelihoods	Understanding livelihoods	Understanding the use of resources in the livelihoods of coastal fishers, including options available, seasonality, migration of fishers, interactions between different resource user groups, role of women, fish trade, and changes in livelihoods over time	9	Understanding the use of fisheries resources, their role in livelihoods, (contribution to marine fish industry) and influences on fisher decision-making	6
		Development of poverty-environment link indicators to evaluate livelihood-resource interactions	2	Development of key indicators for socio-economic monitoring	1

		Evaluation of the distribution of benefits from fishing (fishers vs. middlemen/traders)	1		
	Alternative / improved livelihood opportunities for artisanal fishers	Determine potential for developing fisheries for alternative resources (eg, developing offshore fisheries, mud crab), including enhancement	6	Determination of the feasibility, and identification of the constraints and development options for the adoption of alternative fishing technologies (eg improved gears) and exploitation of alternative (eg offshore, or currently underutilised) resources (via adaptive participatory research)	5
		Assess actual benefits to fishers, compared to potential benefits from current (with improved processing/trading) and alternative fishing strategies	1		
Impacts of fishing activities on resources and livelihoods dependant upon them	Capture	Effects of fishing gears (including destructive fishing practices) on habitats and recommendations for improvements	6	Assess the effects of (destructive) fishing gears, including relative impacts of different gear types on catches and habitats, and potential for improvements to current gears	2
Impacts of fisheries policies and management on fisheries resources and livelihoods dependant on them	Capture	Assess the impacts of existing and alternative fisheries management measures on livelihoods and resources	3		
		Assess effectiveness (biological, economic and social) of closed season management	3		
		Assess impacts of MPAs on resources and livelihoods	1	Assess the impacts of MPAs on livelihoods of coastal dwellers (considering both fisheries and alternative livelihoods arising as a result of the MPA, and bioeconomic modelling the effect of no MPA).	2
		Development of key information requirements and monitoring protocols for assessing effectiveness of MPAs (<i>cross cuts data collection below</i>)	1		
Impacts of non-fishing activities (and policies) on fisheries resources and livelihoods dependant on them		Assessment of impacts of land-based activities (eg pollution, sedimentation) and marine pollution on the marine environment and resource users, and identification of appropriate indicators species for monitoring	4	Assessment of human impacts on commercially important fisheries through agrochemical and other pollution	1
		Assessment of impacts of habitat destruction (eg mangrove deforestation) on marine resources and users	2		
		Impacts of trade regulations in marine organisms on livelihoods	1	Impacts of export controls and regulations on fish trade and livelihoods	1

Socio-economic valuation of aquatic resources				Socio-economic valuations of (exploited and non-exploited) fisheries resources in order to inform policy makers	2
				Development of appropriate methodologies for socio-economic valuation of (exploited and non-exploited) fisheries resources	1
Data collection methodologies	Improved data collection methods (and identification of appropriate data)	Identification of key data required to inform management, and improved data collection mechanisms	4	Design of improved data collection systems (within the existing capacity of DoF)	2
			3	Assessment of alternative data collection mechanisms, including community data collection, in order to develop appropriate mechanisms to provide adequate data for stock assessment and (co-)management decisions at different levels	2
	Participatory information monitoring systems.	Development of participatory information collection and monitoring methodologies	2	Mechanisms for improving community/participatory data collection, including production of simple species identification guides for community level monitoring at species level, independent data verification, and improved mechanisms for information flow between resource users and managers	3
		Development of community feedback mechanisms to inform fishers of management options and verify effects of management.	1	Key indicators for community management	1

OUTPUT 2: Management tools and strategies for capture and enhancement fisheries that are most likely to support improved livelihood outcomes of the poor developed and promoted.				
Research Theme	Tanzania	N	Kenya	N
FMSP Activity				
Developing and assessing the effectiveness of different capture fishery management tools to inform management	Predictive models for yield assessment	1	Mechanisms to integrate local knowledge, and use socio-economic data and analysis in management decision-making	1
	Trade-off analysis for the conversion of mangroves	1		
Developing and assessing the effectiveness of different capture fishery management instruments for implementing pro-poor management	Development of (improved) sustainable management strategies for species of importance to artisanal and industrial fisheries	2	Identification of appropriate management mechanisms (suitable for different stakeholders), (potentially including effort limitation, gear restrictions, closed seasons and minimum size regulations)	2
	Management strategies for MPAs (with reference to regional initiatives)	1	Guidelines for the establishment, monitoring and management of MPAs	1
	Management strategies for beche de mer fisheries	3	Management tools and strategies for invertebrate fisheries (incl BDM)	1
	Development of appropriate management strategies based on gear controls, including prohibition of destructive gear types	2	(Adaptive experimentation to determine) appropriate management interventions based on gear controls, through investigation of effects of alternative gear types and gear interactions	3
	Management strategies for critical or sensitive habitats (eg mangroves, breeding grounds)	2		
	Management strategies for improved livelihood security	1		
	Development of management strategies for open access resources exploited by migratory fishers	1	Mechanisms and strategies for co-ordinated management of straddling / migratory stocks	
Developing and assessing the effectiveness of different enhancement fishery management instruments for implementing pro-poor management	Investigate how to manage habitat enhancements (eg artificial reefs, octopus dens) so not purely aggregation mechanisms, through additional management for example closed seasons	1		

OUTPUT 3: Mechanisms for the implementation of pro-poor capture and enhancement fisheries management developed and promoted					
Research Theme		Tanzania	N	Kenya	N
FMSP Activity	FMSP sub-Activity				
Improving access of the poor to fisheries	Conflict resolution	Assessment of conflicts between artisanal and commercial fisheries, and development of appropriate management structures and access arrangements for mitigation	4	Conflict resolution methodologies	3
	Use rights and the legal framework	Examination of the principal legislation and its relation to district and community level management; mechanisms to inform the development of legislation at different institutional levels	2	Appropriate legislation to support community / co-management	1
				Appropriate legislation to ensure access of artisanal fishers to resources (including access to landing sites)	1
Improved institutional arrangements for pro-poor fisheries management	Investigation of alternative institutional arrangements for fisheries management that benefit the poor	Institutional arrangements for effective management of fisheries resources, including those exploited by migratory fishers	1	Document and research traditional (community tenure) management institutions in Kenya, evaluate their potential contribution to fisheries management and mechanisms for integrating them into co-management approaches	2
				Mechanisms and arrangements for co-ordinating the activities of individual community management units (Beach Management Units) to ensure a co-ordinated approach relevant to the spatial scale of the resource	1
				Improved mechanisms for revenue sharing	1
	Co-management models	Investigation of appropriate co-management models for coastal fisheries, including transferability of lessons from inland environments, and the integration of traditional management practices	4	Adaptive research to assess alternative institutional arrangements for successful pro-poor co-management, including reviewing the effectiveness of existing models, and potential for transferring models from outside the region	6

5.3 Research demand identified through existing regional initiatives

It was noted that a number of other initiatives and reports have recently identified research demand for the region, including:

- WWF Eco-regional approach, Bagamoyo and Mombasa meetings, and Draft Strategy for the Eco-regional approach;
- IUCN Conservation of Coastal and Marine Biodiversity in the Eastern Africa Region (April 2001);
- The Biennial Workplan for the Implementation of the Nairobi Convention, 2002-2003 (document supplied), details the five main themes for the programme: assessment (of coastal and marine environments, the effectiveness of management options, and social and economic factors); management (in particular, improving the management of MPAs, and mitigation measures for pollution); co-ordination and legal aspects (focusing on the review of the Nairobi Convention), and cross-cutting issues such as information dissemination and exchange. Some activities are already being addressed, for example the UNEP International Coral Reef Action Network project assessing the effectiveness of management of MPAs, and the priority activities being implemented by the IUCN East Africa Regional Office (See Section 6). However, there is potential for FMSP to address some of the remaining issues, for example the development of socio-economic management indicators.

In developing the strategy for the FMSP, the priority research areas identified by these initiatives, some of which are already being addressed, will be considered in determining FMSP future activities. It is preferable that smaller projects, such as those that will be undertaken through FMSP, link into regional initiatives where possible.

5.4 Additional Programme Development activities relevant to the region

A significant demand was expressed for the outputs of existing FMSP projects, including:

- Analysis of Fish Aggregating Devices (R4777);
- Information systems for co-management of artisanal fisheries (R7042);
- Computer Aids in fish stock assessment (R5050CB);
- Management of conflict in tropical fisheries (R7334);
- Analysis of Multispecies Tropical Fisheries (R5484);
- Enhancement of a lagoon prawn fishery at Rekawa, Sri Lanka (R6267).

An appropriate Programme Development activity would therefore be to develop activities to promote dissemination and uptake of existing results. Suitable activities might include training workshops for stock assessment packages, and pilot studies to examine the transferability of outputs from one region to another.

It would also be relevant to consider additional promotion of existing outputs, for example more project outputs to be available on the web. However, DFID must consider how to fund retention of such information beyond the life of the Programme.

6 Existing research and development activities

The following tables summarise, overall for the region and by country, the main known fisheries research and development activities, by institution. It is not a complete list of all activities.

6.1 International

Institution	Programme/Project
UNEP	<i>International Coral Reef Action Network</i> project, assessing the effectiveness of management of MPAs
	<i>Global International Waters Assessment (GIWA)</i> - CORDIO, KMFRI, and IMS representatives are on the Subregional Task Team

6.2 Regional

Institution	Programme/Project
WWF	<i>The East African Marine Eco-region programme</i> : a regional programme extending from Somalia to South Africa, which aims to develop an eco-region conservation approach to the maintenance of bio-diversity. It will collect and analyse baseline data on the biological, socio-economic, policy, legal and institutional characteristics of the eco-region. Using this, it will identify key sites of biodiversity that should be prioritised for their conservation value. In relation to fisheries, the programme will be addressing the sustainable use of important resources through management planning and the development of harmonised policies and legislation.
	<i>Advancing the Understanding and management of small scale fisheries in the Western Indian Ocean</i> (Jointly with IUCN/NORAD – see below). WWF involvement currently relates to understanding the biological and socio-economic aspects of fisheries.
IUCN	<i>Development of a Partnership Programme for implementing the Jakarta Mandate in the Western Indian Ocean region</i> , (funded by NORAD, with contributions from WWF). The focus is promoting ICZM, establishing a network of effectively managed MPAs, and improving the management of marine and coastal resources. Components, currently underway in Kenya, Tanzania, and other countries, include <i>Advancing the Understanding and management of small scale fisheries in the Western Indian Ocean</i> , which is assessing the status of small-scale coastal fisheries resources, primarily derived from compiling existing records. This will cover all species, not just the commercially important ones. This information will be held in a database, and once compiled, will allow the identification of major gaps in scientific assessment and management needs, and hence specific research areas. Further activities will relate to improved fisheries monitoring and management systems, and the development of appropriate sustainable livelihoods

DFID	<p><i>Regional Fisheries Information Systems (RFIS)</i>: This project, covering Angola, Moçambique, Namibia, South Africa and Tanzania, has a number of outputs, the most relevant to FMSP being the 'enhanced provision of appropriate information for management (and co-management) of the artisanal marine fisheries sector'. Within this output, project activities are focusing on the collection, use and dissemination of information in support of the selection and establishment of pilot sites within which to develop co-management. Current information use will be reviewed for community and government stakeholders. Supporting these developments will be project inputs into the customisation of database software to collate frame survey and monitoring data. Monitoring activities will be developed with communities to assess management performance. Investigations will also be undertaken into assessing alternative livelihood for the communities adopting restrictive management options.</p>
WIOMSA	<p><i>Marine Science for Management Programme (MASMA)</i>. Current projects are:</p> <ul style="list-style-type: none"> • Milkfish aquaculture in Zanzibar • Coral reef evaluation in Madagascar and Comores • Sea grass evaluation in Mauritius, Mozambique, Tanzania and Kenya • Mangrove management in Kenya and Mozambique <p><i>Marine Research Grant (MARG)</i></p> <p><i>Group of Experts for MPAs in Eastern Africa (GEMPA-EA)</i></p> <p>A pipeline initiative relates to a review of national fisheries policies (including their adherence with international conventions and ratified agreements). This proposed project would also address the need for a regional mechanism for fisheries management. It is proposed to be in collaboration with the Coastal Zone Management Centre of the Netherlands. The project was approved for USAID funding but has not been initiated and currently USAID funding is under review.</p>
CORDIO	<ul style="list-style-type: none"> • Fisheries catch, population and socio-economic analyses (KMFRI, 1999-2001); • Fisheries catch monitoring, northern Zanzibar (IMS, 2000-2001); • Artisanal fisheries in the Diani-Chale area (Internal project, current). This project works with communities on participatory fish catch monitoring, underwater fish surveys and reef mapping. It also conducts other biological monitoring and habitat assessments. • Assisting Fisheries Department on the revision of the Fisheries Act. • Inputs to IUCN's Diani project. • Short-term monitoring inputs to WWF's Kiunga project • developing a site-specific database for the IUCN Tanga project. <p>CORDIO also fund project through other institutions, including:</p> <ul style="list-style-type: none"> • an alternative livelihoods/crab aquaculture project (KEMFRI); • a coral resettlement study (IMS).
SEACAM, national institutions	<p>with Integrated Coastal Area Management (ICAM) initiative. This is a global process initiated by relevant national institutions. SEACAM (Secretariat for Eastern African Coastal Area Management) is the</p>

	co-ordinating body for the region.
ACOPS	A GEF-funded programme on the development and management of coastal marine resources. This is being conducted in 11 countries in the Western Indian Ocean and West Africa, in two stages. An integrated problem analysis is being conducted to identify national issues and areas for intervention (from consulting institutions with mandates for the management and exploitation of coastal and marine resources). Following this, project proposals will be developed that will be regional in approach.

6.3 Tanzania

Institution	Project
Fisheries Division	Prawn stock assessment in the shallow water shrimp fishery;
	Capacity building in planning and co-management;
	Partner in the SADC RFIS project;
	Strengthening fisheries statistics, FAO, 1989-1992
TAFIRI	<ul style="list-style-type: none"> • Fish biology (squid and other species) • Prawn fishery (resources assessment, by-catch composition, socio-economic and market surveys, culture) • Environmental pollution (eg heavy metal concentrations in oysters)
WWF	Partner in MPA management in Mafia Island and Menai Bay, Zanzibar, which includes a community management component.
UDS, Dept of Zoology	<p><i>Current activities</i></p> <ul style="list-style-type: none"> • Impact of the Mafia MPA on the blackspot snapper, <i>Lutjanus fulvivflamma</i>; • The importance of mangroves to the life-history of fish species (in conjunction with a Dutch University); • The impacts of a gas pipeline on coral reef habitats, the benthic environment and fisheries; • Octopus fisheries in Tanzania, including their population dynamics and enhancement with artificial dens (in collaboration with Aberdeen University); • Zanzibar octopus fisheries; • Chaetodontidae as indicators of the health of coral reefs (in Zanzibar); • Peneid shrimp fisheries at Bagamoyo – their biology, population dynamics and local fishery potential. • Milkfish culture, IMS in collaboration with University of Stockholm and a Philippine Institution. • Evaluation of the coastal resources of Bagamoyo District, and the formulation of management advice to the District authority <p><i>Planned activities</i></p> <ul style="list-style-type: none"> • Enhancement study (fingerling ponds) for floodplain fisheries in the Rufiji delta (with EU funds) • A multidisciplinary investigation of people and resources in the Mtoni Mangrove system, to include a modelling component (Netherlands funding).
IMS	<ul style="list-style-type: none"> • Marine affairs: public awareness, resource economics and management, and sociological issues; • Inputs (with others) into establishment of MPAs, including with WWF and DoF a community based management approach at Menai Bay

	<p>(though not believed fully effective yet), and with a UK university, assessment of spill-over effects from MPAs;</p> <ul style="list-style-type: none"> • Marine and coastal resource management – catch assessments of Zanzibar's reef fisheries; biological and ecological studies of specific marine organisms (holothurians, molluscs). Under these activities catch effort and biological data has been generated, most of which is in electronic format and to which there is potential to apply LFDA/CEDA; • Marine and coastal resource mapping - a coral reef resources map for Tanzania is available, and mapping of existing and potential tourist areas; • Mariculture (seaweed and milkfish); • Octopus ecology and biology in Zanzibar (Msc Study project under SAREC support); • Chaetodontidae as indicators of the health of coral reefs in the whole Tanzania coast (Msc Study project under SAREC support); • Milkfish and rabbit fish culture at Makoba and Mungoni villages in Zanzibar (in collaboration with EILAT Israel and under the support of the WIOMSA MASMA Programme); • Development of fish feed and experiment on production of live food (zooplanktons) for larvae in the aquaculture project mentioned above; • Monitoring of Fish, corals and benthic organisms at Misali Island in Pemba; • Mangroves and sea grass beds as nursery grounds of fish (In collaboration with SAREC); • Monitoring of artisanal fish landings at four fishing villages, Mkokotoni, Matemwe, Chwaka and Nungwi in Zanzibar; • Monitoring of the socio economic aspects of fisheries in the above villages under CORDIO support.
TCMP	<ul style="list-style-type: none"> • 'State of the Coastal Environment' report (copy obtained), a collation of all coastal scientific studies conducted in Tanzania supplemented by rapid rural appraisals; • Assessing the use of remote sensing with ground truthing in rapid assessment of the coastal environment. • Socio-economic research in coastal areas.
IUCN	<ul style="list-style-type: none"> • <i>Tanga Coastal Zone Conservation and Development Programme</i>, Tanzania: Running since 1994, this project has been establishing collaborative resource management, through community participation in the development of management plans, and the development of community-based fisheries management programmes; • <i>Rufiji Environmental Management Project</i>, Tanzania: This project has been developing an environmental management plan for implementation at the district and village level; • Development of the Mnazi Bay Marine Park, Tanzania: This will assist in the development of a management plan for this recently-gazetted marine park.

6.4 Kenya

Institution	Project
DoF, Nairobi	Investigating conflict between artisanal fishers and trawlers
DoF,	Small-scale extensive prawn mariculture in the Malindi District

Mombasa	(extension activities)
	ICAM programme (in collaboration with KWS, NGO's, and CDA)
CDA	Involved in: <ul style="list-style-type: none"> • <i>Integrated Coastal Area Management (ICAM)</i> initiative; • GEF funded, ACOPS-facilitated programme on the development and management of coastal marine resources (see above); • Developing management for the prawn trawler fishery, (together with KEMFRI, who have been collecting environmental and oceanographic, fisheries, and socio-economic data)
Dept of Zoology, University of Nairobi	<p>PhD projects:</p> <ul style="list-style-type: none"> • Species composition, distribution and abundance of spiny lobsters (Palinuridae) in Kenya • Biology of pearl oysters (<i>Pinctada margaritifera</i>) • Trends of marine fisheries in Kenya • Reproductive biology and culture potential of the blue swimming crab (<i>Portunus pelagicus</i>) • Ecological role of bacterioplankton in shallow coastal waters • Water exchange, sediment dynamics and heat fluxes in mangrove wetlands <p>MSc projects:</p> <ul style="list-style-type: none"> • Revision of taxonomy – species identification • Food and feeding habits of clupeids • Surveys of artisanal fisheries in the S. coast of Kenya • Biology of lemonfish • Effects of land use changes on hydrology, water quality and fisheries • Bioaccumulation of heavy metals in estuarine biota • Nutrient loading, eutrophication and plankton dynamics in tidal creeks
KMFRI	<p>(with DoF) Assessment of the Malindi-Ungwana Bay fishery (addressing conflict between prawn trawling and artisanal fisheries). The study is focussing on biological aspects (eg gear conflicts, trawler bycatch, and effectiveness of turtle excluder devices), and has not studied the socio-economics of conflict, hence there is potential for further research.</p> <p>Fish landing statistics (training Fisheries Officers on sampling protocols and other data collection issues, and developing a database)</p> <p>Biology of key commercial and non-conventional fisheries</p> <p>Projected projects include:</p> <ul style="list-style-type: none"> • Assessment of deep-sea and offshore fisheries (a GEF regional programme for this is being developed); • Resource evaluation and management options for southern Kenya coast: This would address resource use conflicts (including transboundary with Tanzania) in the artisanal fishery, and aim to develop co-management approaches (no external funding has been found, but the institute would hope to conduct the project with core funding within the next 5 years);. • FADs: This proposed project has not yet been funded, and there was interest in the FMSP addressing this (also for the results of the previous FAD project).
IUCN	<ul style="list-style-type: none"> • Kisite Marine Park, Kenya: This recently completed project was looking at how to improve management of marine protected areas through collaboration with stakeholders. • Stakeholder partnerships for the conservation of coastal resources, Diani, Kenya: This project will be assisting local stakeholders to

	<p>develop an alternative management model to the hugely opposed marine reserve.</p> <p>Potential further work might be supporting local communities in the Tana Delta area, Kenya, where sale of common land through an adjudication process is occurring (project not yet established).</p>
WWF	<p>Protected area management at Kiunga Marine National Reserve, working with DoF and KWS to assist in the implementation of the reserve. WWF's activities relate to fisheries, habitats, key species, and income generation. The fisheries activities include employment of local data collectors to monitor catch (focussing on lobster, beche de mer, shells, and fin-fish).</p>
CRCP	<p>Current long-term programmes:</p> <ul style="list-style-type: none"> • Ecological monitoring, which occurs at 14 sites half of which are each in parks and sites of heavy fishing pressure • Fish catch monitoring, which has occurred since 1990 with two field based data collectors who collect 12 days data per month. Catch and effort data is collected, and annual length frequency data. <p>Additional projects:</p> <ul style="list-style-type: none"> • Effects of different gear types. CRCP aim to investigate gear controls in more detail over the next two years, but it was also considered an area where FMSP could also usefully contribute. • Bio-economic modelling of open and closed (park) areas (with University of York). It was indicated that the study could usefully be extended to expand on the economic impacts, to include social data, and to look at gear changes and their predicted effects on catch and habitats.
MKK Ltd	<ul style="list-style-type: none"> • PhD studies on socio-economic aspects of fisheries in southern Kenya • Some coral reef monitoring • Training courses on socio-economic monitoring • Consultants to IUCN, compiling workshop proceedings on progress in implementing the Jakarta Mandate
NCST	<p>Current research/activities conducted or approved through the Council (but conducted by independent researchers) include:</p> <ul style="list-style-type: none"> • Impact assessment of alien species (through KWS); • Small scale oyster farming; • Fish diseases; • Seasonality of fishing (social and financial impacts of non-fishing periods); • Oil spill mitigation.

7 Support to the FMSP by the DFID East Africa NR Co-ordination Office

At the end of the Programme Development visit to East Africa, a visit was made to the DFID East Africa Natural Resources Research And Development Co-ordination Office in Kampala, Uganda. The purpose of this visit was to brief the DFID Regional Co-ordinator, Mr Dan Kisauzi, on the outcomes of the visit to Tanzania and Kenya, to explore how other DFID NR programmes work with the EA co-ordination office, and how this office might support the FMSP.

Briefly the office can provide the following:

- Dissemination of programme outputs in the region;
- Dissemination of Concept Note calls to relevant organisations in the region;
- Formation and maintenance of linkages of Programmes to relevant national policy making bodies, raising the profile of the programme in the region;
- Co-ordination of research and bilateral programmes;
- Investigate and document institutional outcomes of programmes/projects beyond or outside specific project activities, ie measuring uptake and impact of programme outputs;
- Raise the capacity of national institutions to respond to research calls (including Concept Notes calls);
- Assist in the identification of appropriate research partners and target organisations for projects. A database of institutions is maintained, which does not currently include fisheries, but the material generated during the current PD visit would be added to the database;
- Administrative support to Programmes via identification of appropriate people to work with;
- Sourcing and provision of relevant material of a policy / strategic nature, and placing much of this on the website;
- Monitoring and evaluation.

The office works at a Programme and strategic level and tries to minimise interactions at the project level, so for example would not source technical documents for projects, but could help establish institutional linkages.

FMSP is currently considering mechanisms for interacting with the DFID Regional Co-ordination Office, including what level of support to the Programme would be appropriate.

Appendix 1: Itinerary

Travel	16 February	<i>Depart UK to Dar es Salaam</i>
	17 February	<i>Travel / meeting with local collaborator</i>
Tanzania	18 February	Meetings with: <ul style="list-style-type: none"> • Division of Fisheries • Environment Division • WCST • WWF/Traffic
	19 February	Meetings with: <ul style="list-style-type: none"> • TAFIRI & Kunduchi Fisheries Institute • Dept of Zoology, University of DSM • IRA
	20 February	Meetings with: <ul style="list-style-type: none"> • NEMC (round table with TCMP, REMP, Marine Parks) • SIDA <i>Travel to Zanzibar</i>
	21 February	Meetings with: <ul style="list-style-type: none"> • WIOMSA • IMS • Directorate of Fisheries and Sea Products / Frontier Tanzania
	22 February	Report writing
	23 February	
	24 February	<i>Travel to Nairobi / report writing</i>
Kenya	25 February	Meetings with: <ul style="list-style-type: none"> • Department of Zoology, University of Nairobi • IUCN EA Regional Office • WWF/EARPO • MKK Ltd
	26 February	Meetings with: <ul style="list-style-type: none"> • Department of Fisheries • NCST
	27 February	Report writing / <i>Travel to Mombasa</i>
	28 February	Meetings with: <ul style="list-style-type: none"> • CRCP • CORDIO • CDA
	1 March	Meetings with <ul style="list-style-type: none"> • Department of Fisheries, Mombasa • KMFRI
	2 March	
	3 March	<i>Travel to Kampala, via Nairobi</i>
Uganda	4 March	Meeting with DFID Regional Co-ordinator & report writing
	5 March	Report writing & meeting with DFID Regional Co-ordinator <i>Depart for UK</i>
	6 March	<i>Travel to UK</i>

Appendix 2: Details of persons met

Tanzania

Institution	Individuals met
Department of Fisheries (Ministry of Natural Resources & Tourism, Fisheries Division)	V. Mushi, Senior Fisheries Officer, Fisheries Development and Planning; B. Mngulwi, Senior Fisheries Officer, Fisheries Development and Planning; F. Sobo, Ag Assistant Director, Research Training and Statistics Section; M. Mlolwa, Ag Assistant Director, Fisheries Quality Control and Standards Section; E. Mosha, Senior Fisheries Officer, Fisheries Quality Control and Standards Section; G. Kalikula, Senior Fisheries Officer, Surveillance Section.
Department of Fisheries and Marine Resources	Mr Saleh Sadiq Osman, Director Mr Anas Masoud Othman, Chief Planning Officer Mr Makame Salum Nassor, Chief Marine Resources Officer Mr Mussa Aboud Jumbe, Chief Fisheries Officer Mr Ali Hassan Kombo, Artisanal Fisheries Officer Mr Jihaba Haji Vuai, Fisheries Licensing Officer
Dept of Zoology & Marine Biology, University of Dar es Salaam	Dr Yunus Mgaya, Senior Lecturer / Aquaculture Specialist Malina Lugendo, PhD student in fisheries
Division of Environment, Vice Presidents office	Mr Rawson Yonazi, Assistant Director (Policy and Planning) Ms Ester Makwaia, Senior Fisheries Officer
Frontier - Tanzania	Ms Carol Daniels
Institute of Marine Sciences, University of Dar es Salaam	Dr Narriman Jiddawi, Associate Director
Institute of Resources Assessment, University of Dar es Salaam	Professor Pius Yanda Simon Masasu
Kunduchi Fisheries Institute	Mr Mongi, Principal
Marine Parks and Reserves	Sikaru Mishu, Marine Parks and Reserves Amin Abdallah, Planning Warden, Marine Parks and Reserves
National Environment Management Council	Dr Magnus Ngoile, Director General Arnold Mapendusa Godlave Mwamsojo Mr Muheto, Director, Natural Resources
Rufiji Environmental Management Project	Ezikil Chilwa Mohammed Chaude, National Research Office Dr Olivier Hamerlynck, (CTA, IUCN)
SIDA (Embassy of Sweden)	Mr Bertil Oden, Consellor – Economist Ms Marie Bergstrom, Natural Resources, District Development – Lake Victoria
Tanzania Coastal Management Partnership	Gratian Luhikula
Tanzania Fisheries Research Institute	Dr Aih Chande, Snr Researcher/Acting DG Mr Shigalia Mahonga, Snr Researcher Mr Hassan Mhitu, Researcher Ms Joyce Kulekana, Researcher Mr John Bayona, Centre Director, Marine Projects
TRAFFIC East/Southern Africa, Tanzania Office	Mr Simon Milledge, TRAFFIC Senior Programme Officer
Western Indian Ocean Marine Science Association	Julius Francis
Wildlife Conservation Society of Tanzania	Ms Alice Bhukoli, Co-ordinator Mr P Nyit
WWF Tanzania Programme Office	Ms Irene Kamau, WWF Ecoregional Co-ordinator

Kenya

Institution	Individuals met
Coast Development Authority	Dr Mwandotto, Deputy MD Mr Saeed Mwaguni, Head, Environment and Tourism Dept Agnes Mkazalla, Fisheries Officer
CORDIO – East Africa	Innocent Wanyonyi, Research Assistant Sangeeta Mangubhai William Nyaga
Department of Fisheries, Kilifi District	John Karungo Wanyoike, District Fisheries Officer, Kilifi
Department of Fisheries, Mombasa	Mr Charles Oduol, Assistant Director of Fisheries Elizabeth Mueni, Fisheries Officer George Okoth, Fisheries Officer
Department of Fisheries, Nairobi	Ms Eunice Kimani, Food technologist Ms Jane Kibwage, Training Officer
Department of Zoology, University of Nairobi	Dr James Omondi, Senior Lecturer & Co-ordinator of hydrobiology
IUCN Eastern Africa Regional Office	Sue Wells, Co-ordinator, Marine and Coastal Kelly West, Co-ordinator, EA Wetlands and Water Simon Heck, TA, Socio-economics of the Nile Perch Fishery on Lake Victoria
Kenya Marine and Fisheries Research Institute	Dr Kazungu, Director Dr Ruoa, Deputy Director, Kuria Kairo, Assistant Director Gerard Mwatha, Head, Marine Fisheries Research Programmes Shaaban Mwachireya, Aquaculture Programme Coordinator Jacob Ochiowo, Socio-economist Johnson Kitheka, Water Dynamics Harrison Onanda, Information and Data Management Mika Odido, UNESCO/IOC Marine Science Programme, coordinator
Kenya Wildlife Service	Dr Nyawira Muthiga, Head, Coastal and Wetlands Programme
MKK Ltd	Dr Anthony King Dr Delphine Malleret-King
National Council for Science & Technology	Mr H K Macharia, Principal Research Officer Ms C K Nzau, Senior Research Officer Mr Etuli
Wildlife Conservation Society, Coral Reef Conservation Programme	Dr Tim McClanahan, Director Joseph Maina, Research Assistant Stephen Mangi, Research Assistant Lynda Rodwell, Research Fellow (University of York) Moses Mwambogo, Office Manager
WWF East Africa Regional Programme Office	Julie Church

Uganda

Institution	Individuals met
DFID East Africa Natural Resources Research And Development Co-Ordination Office	Dr Dan Kisauzi, Regional Co-ordinator Ms Agnes Nayiga, Assistant Regional Co-ordinator