Department of Fisheries

Matshya Bhaban
Ramna, Dhaka

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Glossary and Abbreviations

AIGA	Alternative Income-Generating Activity
BBS	The Bangladesh Bureau of Statistics
BFRI	The Bangladesh Fisheries Research Institute
BIDS	The Bangladesh Institute of Development Studies
BWDB	Bangladesh Water Development Board
CBD	International Convention on Conservation of Biodiversity
CBO	Community-Based Organisation
DoF	The Bangladesh Department of Fisheries
EU	The European Union
FAO	The Food and agriculture Organisation of the United Nations
FMES	Fisheries Monitoring and Evaluation Strategy
FRSO	Fisheries Resource Survey Officer (in FRSS)
FRSS	Fisheries Resource Survey Section
GDP	Gross Domestic Product
GoB	Government of Bangladesh
HACCP	Hazard Analysis and Critical Control Point
HRD	Human Resource Development
ICF	Inland Capture Fisheries
IMED	The Bangladesh Implementation Monitoring and Evaluation Department
iPRSP	Interim Poverty Reduction Strategy Plan
IT	Information Technology
IUCN	The International Union for the Conservation of Nature
LEAF	Local Extension Agent for Fisheries
LGED	The Bangladesh Local Government Engineering Department
M&E	Monitoring and Evaluation
MCF	Marine Capture Fisheries
MIS	Management Information System
MoC	The Bangladesh Ministry of Commerce
MoEF	Bangladesh Ministry of the Environment and Forestry
MoHFW	The Bangladesh Ministry of Health and Family Welfare
NBSAP	National Biodiversity Strategy and Action Plan
NFP	National Fisheries Policy
NGO	Non-Governmental Organisation
PHQC	Post-Harvest Quality Control (??)
PME	Planning, Monitoring and Evaluation
PP	Project Proforma (of Government of Bangladesh)
PS	Private Sector
PSO	Principal Scientific Officer (Head of FRSS)
QA	Quality Assurance
R&HD	The Bangladesh Roads and Highways Department
RDA	Recommended Daily Amount
SSO	Senior Scientific Officer (in FRSS)
SSoQ	Shrimp Seal of Quality

1 INTRODUCTION

1.1 The Policy Framework

The Fisheries Monitoring and Evaluation Strategy (FMES) is one of a number of sub-strategies currently being developed under the National Fisheries Policy. Others include the Aquaculture Extension Strategy (already completed), and the Shrimp, Marine, Inland Open Water and Human Resource Development Strategies (in progress).

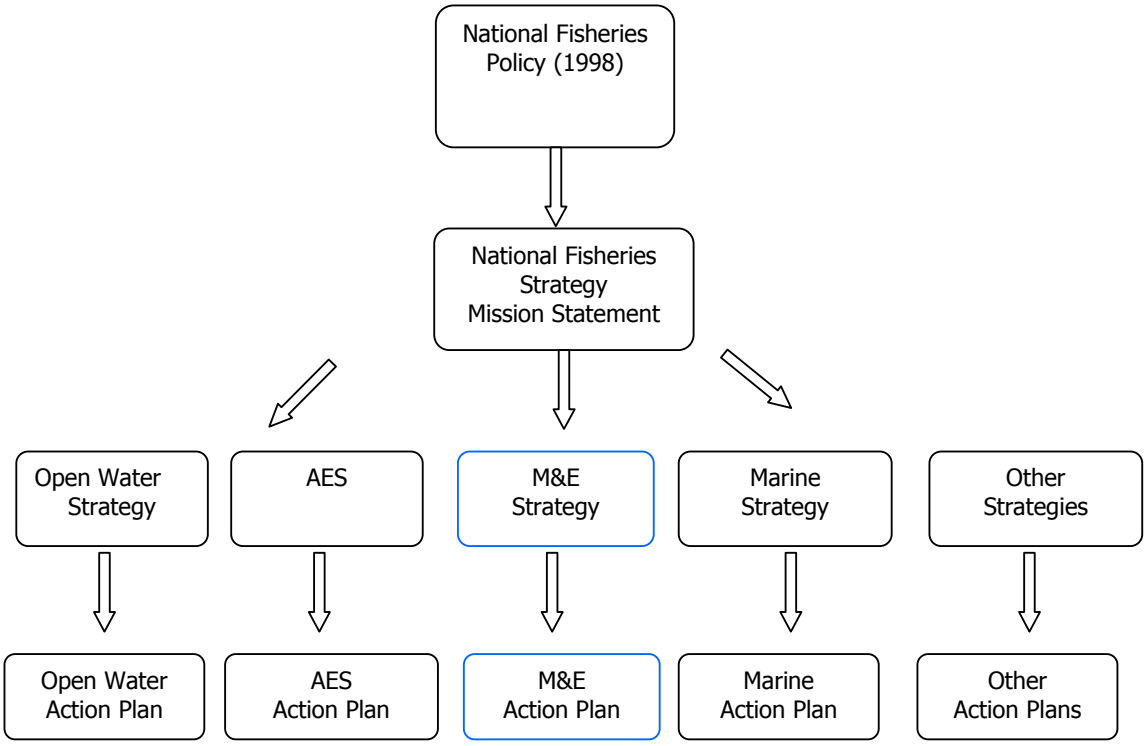


Figure 1: Policy Framework

The FMES, like the HRD Strategy, is designed to provide a framework for a specific area of technical support for the implementation of the main sub-sectoral strategies. It therefore cuts across sub-sectoral boundaries

1.2 Objectives of the National Fisheries Policy

a) Enhancement of the fisheries production and development;
b) Poverty alleviation through creating self-employment and improvement of socio-economic conditions of the fishers;
c) Meet the demand for animal protein,
d) Achieve economic growth and earn foreign currency by exporting fish and fisheries products;
e) Maintain ecological balance, conserve biodiversity and improve public health.

1.3 Documents Providing Guiding Principles

In addition to the NFP itself, the strategy formulation process must take account of the broader policy context, including policies for other sectors impinging on Fisheries. The Government of Bangladesh and its cooperating partners are planning and implementing their development activities according to the principles laid out in a number of key documents, as shown in Table 1:

Table 1: Guiding Policy Documents

National Level	
	The Constitution of the Government of Bangladesh
	The 6th 5-Year Plan (Draft)
	The National Strategy for Economic Growth, Poverty Reduction and Social Development (Draft)
	Various Acts of Parliament defining pyramidal structure of local Govt.
Sectoral Level	
	National Fisheries Policy (MoFL 1998)
	The Fisheries Sector and Future Developments Study (2003)
	National Agricultural Policy (MoA 1999)
	Livestock Development Policy (MoFL 1992)
	National Forestry Policy (MoEF 1994)
	National Biodiversity Strategy and Action Plan (Draft 2004)
Sub-Sectoral Level	
	The Draft Aquaculture Extension Strategy (2003)
	The New Agricultural Extension Policy (1996)
International Level	
	Millennium Development Goals
	FAO Code of Conduct for Responsible Fisheries (1995)
	The Rio Declaration and Agenda 21 (1992)
Cross-Sectoral Level	
	National Rural Development Policy (MoLGRD&C 2001)
	Environment Policy & Implementation Plan (MoEF 1992)
	The National Environmental Management Plan (1998)
	National Water Policy (MoWR 1999a)
	The Bangladesh Water and Flood Management Strategy (1995)
	The National Water Management Plan
	National Land Use Policy (MoL 2001)
	National Energy Policy (1996)
	National Women Development Policy (1997)

1.4 Role of M&E in Achieving Policy Objectives

To move effectively towards the NFP objectives, management decisions must be made at many different levels and on different time-scales. These decisions must be based on genuine and relevant information, which must be regularly and systematically updated and reviewed. The process of regularly obtaining the relevant information for guiding management decisions is Monitoring. The review of what that information means is Evaluation.

1.4.1 M&E in the Activity Cycle

The way in which M&E fits into the management of objective-oriented activities is shown in Figure 2.

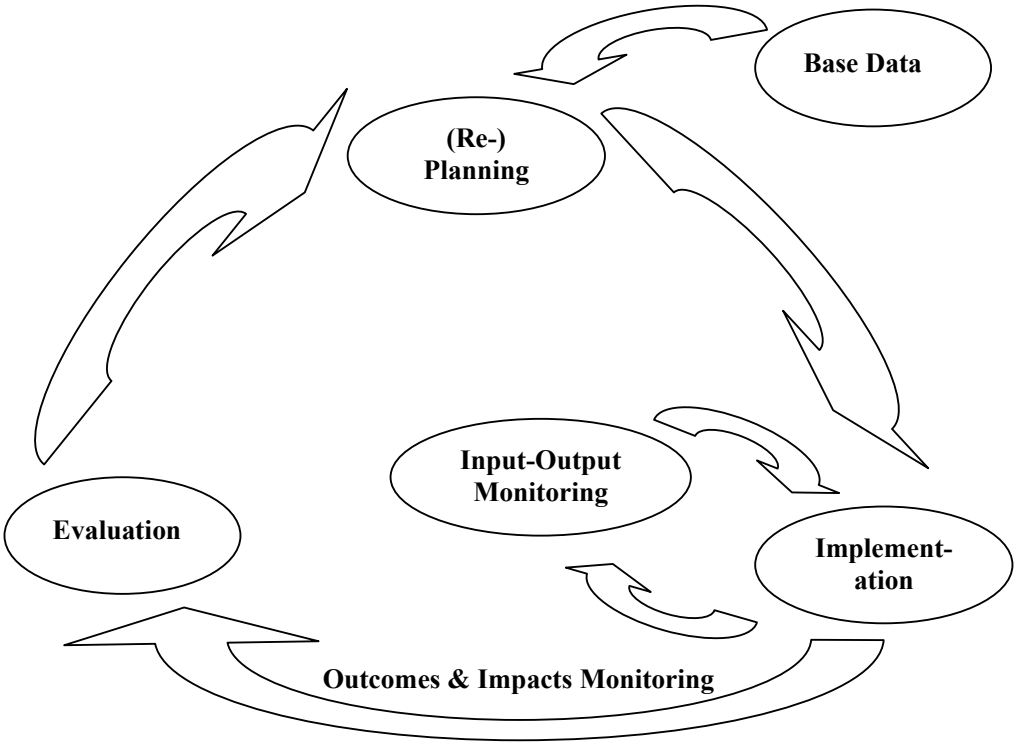


Figure 2: Planning, Monitoring and Evaluation for Objective-Oriented Activities

As stated above, the focus of the Fisheries M&E Strategy is on the NFP Objectives. Monitoring and evaluating progress towards those objectives requires a framework for M&E at the Outcomes/Impacts/ Goals levels, that is, the major cycle in Figure 2. Theoretically, the initial base data used to start the activity cycle is not part of Monitoring and Evaluation, but in practice much of the information required is the same as that needed later in the cycle for Outcomes/Impacts/Goals M&E. Therefore, acquisition of the required base data is included in the Strategy. The Input-Output Monitoring sub-cycle shown in Fig.1 provides the means of verifying whether implementation activities are on track. This type of monitoring is essential for successful achievement of objectives but it is not the focus of the M&E Strategy.

1.4.2 Levels of Attainment Towards Objectives

To provide useful management guidance, attainment towards objectives must be measured at different levels. It is of little practical help to be able to state that an objective has or has not been achieved, without measuring the factors that have contributed to the degree of success. The normal approach is to rank project activities, and the indicators that measure their success, in an ascending sequence, so that success or failure at each level can be related to what happened at the level below. This is the basis of logical framework analysis and allied techniques, which are central to the design of monitoring and evaluation systems.

A typical hierarchy of activities and indicators has the general form shown in Table 2 below (with example contents drawn from a typical aquaculture project):

Table 2: M&E for Different Levels of Project Achievement

Level of Achievement	Objectively Verifiable Indicators	Means of Verification	Assumptions
Goal	*Enhanced rural livelihoods.*	• *Baseline & post-implementation household surveys* • *Participatory livelihoods assessments*	
Impacts	*Increased fish product-ion & income.*	• *Baseline & post-implementation household surveys*	*Capacity of aquaculture to reach vulnerable groups*
Outcomes	*Technical knowledge increased & applied.*	• *Baseline & post-implementation household surveys* • *KAP studies*	*Training content technically appropriate* *Trainees willing & able to apply knowledge*
Outputs	*Training designed & delivered*	• *Training formulation workshop records* • *Training participation records* • *Course evaluations*	*Training effectively delivered (time/ place/teaching method)*
Inputs	*Funds & staff time used*	• *Management accounts* • *Staff records*	*Funds and staff available at required time/place*

1.4.3 Time-Frames for M&E

Time-scales for evaluation are related to the time required for activities to produce measurable results. Major strategic decisions such as changing investment priorities for the fisheries sector may require 5 to 10 years to take effect, whereas modifying activities within an ongoing project or programme will usually produce an effect within one or two years. However, there is no fixed time-scale for monitoring and evaluation, and the same set of activities may be evaluated in different depth at different intervals, using different indicators. For example, it may be possible to evaluate a technology-transfer intervention at the outcomes level (increase of technical knowledge) after a year (earlier in some cases) but evaluation at impacts level (the production increase resulting from improved knowledge) may have to wait several years.

Examples of different intervals for evaluations, and the types of decisions which are based on the evaluations, are shown in Table 3:

Table 3: Typical Time-Frames for Monitoring and Evaluation Activities

Frequency (Typical)	Type of Evaluation	Levels of Indicators	Type of Management Decisions
Annual	Work Plan & Expenditure Review	Inputs, Outputs	Adjustment of project/programme implementation schedule to maintain progress towards targets
2-3 years	Project Mid-Term Review or Programme Interim Review	Inputs, Outputs Outcomes (normally) Impacts (sometimes - many will be later)	Modification of technical scope of project/programme. Revision of ceiling resource allocations (e.g. revised PP).
4-6 years	Project Complet-ion Review or Programme End of Phase Review	Outcomes (always) Impacts (normally - some may follow later)	Changes to design of future projects/programmes of same type
10 years	Sector or Sub-Sector Strategy Review	Impacts (always) Goals	Changes to the mix of project/programme types

1.5 Goal of Fisheries Sector M&E Strategy

Based on the requirements defined in Section 1.1 and the potential contribution of M&E as defined in Section 1.4, the goal of an M&E Strategy for the Fisheries Sector should be:

To develop systems able to monitor progress towards the NFP Objectives and evaluate activities directed towards achieving those objectives.

1.6 Principles for M&E Strategy Development

In drafting this strategy, the following principles have been followed:

- The aim of strategy development is to provide a framework for developing M&E systems, not to define the details of the systems (which in any case will evolve over time)
- M&E systems must be geared to the needs of different levels of decision-makers in the Fisheries Sector
- M&E systems must, as far as possible, be vertically integrated (so that data needs of higher levels are met, as far as possible, by data collected for use by lower levels)
- Realism in the frequency and level of coverage of M&E systems, so as not to overload field staff to the detriment of development activities
- Realism regarding the time-frame for achieving the aims of the defined M&E strategy
- Defining where additional skills and capacity are required, while avoiding duplication of existing skills and capacity

2 STRATEGIES FOR MONITORING AND EVALUATION OF NFP OBJECTIVES

2.1 Fisheries Production and Development

2.1.1 NFP Objective:

Enhancement of the fisheries production and development

2.1.2 Overview

The production objective lies at the heart of the NFP. Without increased production, poverty alleviation is problematical, and it will be impossible to meet the rising demand for protein and foreign exchange, and to contribute to National economic growth. Biodiversity both sustains production and is potentially threatened by it if ecologically damaging technologies are used.

Measurement of production trends, both in aggregate and in relation to specific interventions, is therefore the central task of production M&E systems. However, systems focusing purely on increases in volume will not provide decision-makers with the guidance they require. The NFP has a specific poverty-reduction objective, and other key documents setting the National policy agenda (see section 1.3) clearly state the need for greater equity between gender groups. Production M&E systems must therefore have the ability to measure not only production in aggregate, but its distribution by poverty and gender status.

M&E of the production objective under the NFP presents particular problems due to the organisation of production in technically and geographically distinct sub-sectors: Freshwater Aquaculture; Brackish Water Aquaculture; Inland Capture Fisheries; and Marine Capture Fisheries. In terms of the applicable production monitoring techniques, Freshwater and Brackish Water Aquaculture have much in common because in both sub-sectors the production units are well-demarcated, physically enclosed and predominantly in private ownership. These two sub-sectors can therefore be grouped together for M&E strategy development. The other two sub-sectors, however, have little in common with aquaculture or with each other. It is therefore necessary to set out three separate sub-strategies for the NFP production development objective.

Within each sub-strategy, there are three common areas of need:

- production development planning data, to ensure that production development interventions in the concerned sub-sector are well-designed and to provide a framework for subsequent monitoring and evaluation;
- production trend monitoring, to track the aggregate movement of the concerned sub-sector towards the NFP production objective; and
- evaluation of specific production development interventions in the concerned sub-sector.

The means by which these needs can be met for each sub-sector are set out in the remainder of this section.

2.1.3 Freshwater and Brackish Water Aquaculture

i) Production and Development Planning Data

a) Requirement:

- Ability to inform decisions of DoF senior management and other concerned agencies regarding the potential of aquaculture for meeting sectoral production objectives;
- Ability to produce realistic detailed plans for aquaculture interventions at District level and below.

b) Proposed Approach:

- DoF should develop the capacity to carry out a 5-yearly Aquaculture Resources Census generating a National database of aquaculture resources comprising:

  - number and area of ponds and ghers, by administrative area (District/Upazila/ Union, Mouza);
  - yields and technical practices;
  - socio-economic profile of aquaculture operators;
  - a linked database at Upazila and Union level of input suppliers (hatcheries/ nurseries, feed, fertilizer etc.), extension agents, fish traders and markets.

  The approach for data collection and processing should be:

  - data collection by DoF field staff (District and Upazila levels);
  - 100% coverage of main items (pond/gher nos., areas, yields);
  - sample coverage of more complex items (technical practices, socio-economics);
  - unique identification codes for all aquaculture waterbodies based on administrative area geocodes;
  - database creation and maintenance by DoF HQ.

- As and when local extension agents - Local Extension Agent for Fisheries (LEAF) or comparable level - are put in place, DoF should develop systems for annual updating of the database at Union level.

c) Constraints:

- Insufficient institutional capability in DoF HQ to design and supervise the resources census and to create, manage and maintain the database
- Incomplete coverage by Union-level fisheries extension agents
- Insufficient data collection skills amongst DoF field staff

ii) Production Trend Monitoring

a) Requirement:

Ability to inform the thinking of policy makers (DoF senior management and above) regarding movement by the aquaculture sub-sector towards the NFP production objective.

b) Approach:

DoF should develop the capacity to carry out:

- Regular review, and when necessary redefinition, of the statistical basis of aquaculture production trend estimates;
- 5-yearly comprehensive aquaculture sub-sector production estimates (combined with Aquaculture Resources Census)
- Annual sample surveys of aquaculture production by DoF field staff, based on revised statistical designs and using the Aquaculture Resources database as a frame.

c) Constraints:

- Insufficient institutional capacity and staff skills in DoF HQ to carry out the statistical review, design the sample surveys and process the data
- Insufficient field staff numbers to carry out the data collection programme without detriment to development activities
- Insufficient data collection skills in DoF field staff

iii) Outcomes and Impacts of Aquaculture Production Interventions

a) Requirement

Ability to analyse project/programme performance at Outcomes and Impacts levels, on a comparable basis between different projects and programmes, in order to inform decisions on:

- revision of ongoing projects and programmes (e.g. at Mid-Term Review)
- design of new projects/programmes incorporating the lessons of completed interventions.
- setting priorities for inland and coastal aquaculture in sectoral and National development strategy

b) Approach

- Creation of a permanent in-house capability in DoF to design, execute and report monitoring and evaluation studies of the production impacts of aquaculture interventions. Such capability must be closely linked to DoF's planning structures and must be able to take account not only of aggregate production but also of its distribution between different categories of beneficiaries, including distinctions by gender and poverty status;
- Development of a DoF doctrine on aquaculture production M&E approaches and its application to all aquaculture projects and programmes, whether donor-funded or under GoB.

c) Constraints

- Inappropriate DoF institutional structures for the conduct of M&E studies and feedback into the planning process;
- Insufficient DoF staff with specialist skills required for M&E studies, especially in the fields of survey statistics, evaluation methodologies, and socio-economic investigations;
- Insufficient data collection skills in DoF field staff

2.1.4 Inland Capture Fisheries

i) Production and Development Planning Data

a) Requirement:

- Ability to inform decisions of DoF senior management and other concerned agencies regarding the potential of inland capture fisheries for meeting sectoral production objectives;
- Ability to produce realistic detailed plans for inland capture fishery interventions at waterbody and community level.

b) Proposed Approach:

DoF should develop the capacity to carry out 5-yearly Waterbody Census generating a National database of Inland Capture Fishery resources comprising:

- number and area of waterbodies, by administrative area (District/Upazila/Union)
- numbers and socio-economic profile of fishers
- technical practices

The approach for data collection and processing should be:

- data collection by DoF field staff and other service agencies;
- 100% coverage of main items (waterbody nos., areas);
- sample coverage of more complex items (fishing practices, socio-economics);
- database creation and maintenance by DoF HQ.

Because of the large year-on-year variation in production from inland capture fisheries this must be measured annually (see below), probably with individual observations on a monthly basis.

c) Constraints

- Insufficient institutional capability in DoF HQ to design and supervise the waterbody census and to create, manage and maintain the database
- Insufficient data collection skills amongst DoF field staff, especially for socio-economic aspects.

ii) Production Trend Monitoring

a) Requirement:

- Ability to inform the thinking of policy makers (DoF senior management and other concerned agencies) regarding movement by the ICF sub-sector towards the NFP production objective;
- Availability of production data complementary to the Waterbody Resource database;
- Ability to inform DoF decisions on changes in the regulatory regime for Inland Open Waters;
- Ability to inform debate on competing fisheries and non-fisheries uses of waterbodies and on the production impacts of non-fisheries activities.

b) Approach:

DoF should:

- Carry out a comprehensive methodological review of the statistical basis for Inland Open Water production estimates;
- Revise the existing system of sample surveys by DoF field staff, using the Waterbody Resources database as a frame;
- Develop a sampling scheme providing equal accuracy of results for sites with and without current development interventions;
- Ensure that production estimation for Inland Open Waters is closely integrated with biodiversity monitoring.

c) Constraints:

- Insufficient institutional capability in DoF HQ to carry out the statistical review, design the sample surveys and to process the data
- Insufficient field staff numbers to carry out the data collection programme at the required intensity without detriment to development activities
- Insufficient data collection skills in DoF field staff

iii) Outcomes and Impacts of ICF Production & Regulatory Interventions

a) Requirement

Ability to analyse project/programme performance at Outcomes and Impacts levels, on a comparable basis between different projects and programmes, in order to inform decisions on:

- redirection of ongoing projects and programmes (e.g. at Mid-Term Review)
- design of new projects/programmes incorporating the lessons of completed interventions.
- setting priorities for Inland Capture Fisheries in sectoral and National development strategy

b) Approach

- Creation of a permanent in-house capability in DoF to design, execute and report monitoring and evaluation studies of the production impacts of aquaculture interventions. Such capability must be:

  - closely linked to capacity for biodiversity monitoring;
  - integrated with DoF's planning structures; and
  - able to take account of the distribution of production between different categories of beneficiaries, including distinctions by gender and poverty status.

- Development of a DoF doctrine on ICF production M&E approaches and its application to all ICF projects and programmes, whether donor-funded or under GoB. This must recognise the severe statistical problems inherent in estimating ICF production due to the wide year-on-year variation and the differing characteristics of the waterbodies.

c) Constraints

- Inappropriate DoF institutional structures for the conduct of M&E studies and feedback into the planning process;
- Insufficient DoF staff with specialist skills required for M&E studies, especially in the fields of survey statistics, evaluation methodologies, and socio-economic investigations;
- Insufficient data collection skills amongst DoF field staff.

2.1.4 Marine Capture Fisheries

i) Production and Development Planning Data

a) Requirement:

- Ability to inform decisions of DoF senior management and other concerned agencies regarding the potential of marine capture fisheries for meeting sectoral production objectives;
- Ability to assess the need for changes in the regulatory regime for marine capture fishery interventions.

b) Approach

DoF should develop the capacity to:

- Create, and regularly update, a database of landing sites, boats, and fishers engaged in the marine sub-sector. This will provide an index of the catching effort in the sector and a frame for production monitoring. The database must to be stratified according to the subdivisions of the sub-sector: industrial fishing; mechanised artisanal fishing; and unmechanised artisanal fishing. To be feasible, the level of detail required must be tailored to each subdivision - at the lower end the numbers and geographical dispersion of boats and fishers is too great for comprehensive coverage.

- Strengthen the stock assessment system to provide estimates of the marine fisheries resource to match the estimates of catching effort from the boat/fisher database. Stock assessment for planning of marine fisheries regulation must be integral with biodiversity assessment.

c) Constraints

- Insufficient DoF field staff numbers and fieldwork resources for creating/updating the database.

ii) Production Trend Monitoring

DoF should develop an integrated catch monitoring system covering:

- all subdivisions of the marine sub-sector: industrial fishing; mechanised artisanal fishing; and unmechanised artisanal fishing;
- all geographical areas; and
- integrated with assessment of the marine fish stock.

This will require:

- substantial strengthening of the Fisheries Inspectorate, including extending their coverage to ports on the West coast of the Bay;
- similar strengthening of Fisheries Resource Survey staff in the Districts surrounding the Bay;
- development of a revised network of data collection points based on an updated database of landing sites (as defined above), especially for the artisanal sub-sector;
- rationalisation of responsibilities between DoF's Marine Survey Unit and BFRI, and strengthened resources for both.

iii) Evaluating Outcomes and Impacts of MCF Production & Regulatory Interventions

The scope for intervention in the Marine sub-sector is almost entirely limited to regulation of the fisheries, aimed at sustaining production through conservation of stocks and preservation of biodiversity. Evaluation of the production impact of regulatory interventions should be the ultimate aim of M&E in the Marine sub-sector, but earlier and less ambiguous indications can be obtained by monitoring the outcomes of regulation, in terms of compliance by fishers and the abundance and diversity of fish stocks.

a) Requirement

Capacity to:

- Monitor initial outcomes (conformity) of the Marine fisheries regulatory regime;
- Monitor higher-level outcomes (stock levels and biodiversity) of the Marine fisheries regulatory regime;
- Evaluate the impact on production of changes in the Marine fisheries regulatory regime.

b) Approach

DoF should develop systems for:

- Inspection of gears and policing reports on closed areas/seasons;
- Monitoring species composition of catch at sample landing points;
- Monitoring market volume for key species at selected markets;
- Integration of monitoring data with information from independent sources including BFRI and Chittagong University.

2.2 Poverty Alleviation

2.2.1 NFP Objective:

Poverty alleviation through creating self employment and improvement of socio economic conditions of the fishers

2.2.2 M&E Needs

The task given under the policy directives of the iPRSP, the 5 year development plans and the NFP is to ensure that activities undertaken have as one of the prime objectives, to alleviate poverty. The effectiveness of these must be monitored to enable planners to adjust their programmes accordingly so that this task is better met and for the implementers to know that they are meeting objectives set for them.

The principal needs for Planning and Evaluation of poverty alleviation is to establish a flow of information to the planners that will enable them to evaluate the impact of their planned interventions. This has to be set against a baseline for the sector which encompasses all of the social criteria that define how the poor can be benefited by interventions.

The strategy must therefore be to define the baseline, establish a system of monitoring and improve the capacity of planners and implementers to address the needs of the poor based on quality information.

The key areas where information is needed are:

Resource Allocation: The principal problem that is faced here is that the DoF does not have any resources to distribute. These are held either privately or on behalf of the Government by Ministry of Lands, Ministry of Youth, BWDB, R&HD. Local Government, etc. The DoF cannot therefore allocate land, but can ask for support from these agencies to ensure that resources are offered on a priority basis to the poor. How they are distributed should however be monitored.

Improved management of resources: For those with access to resources then their improved management can have an impact on their livelihood. Advice should be targeted to ensure that communities and the poor are provided with the relevant advice so that they are able to benefit. For improved management it has to be tested whether improvement management is being undertaken by the resource users and whether the poor are also able to respond to this advice.

Training and Knowledge Dissemination: Traditionally targeting of training has been at those with the most resources in the belief that this will have the biggest impact and because of peer compatibility. Recently however increased targeting of the poor has enabled some of the resource poor to be reached. To reach the poor though they generally have to be formed into groups to provide mutual support and extend the coverage. Monitoring is needed to check that the targets for reaching the poor are met.

Inputs: The supply of credit and inputs is also critical (in logical framework terms, generally a critical assumption for the conversion of intervention outcomes, e.g. better technical knowledge, into impacts, e.g. increased production and income). The poor are typically less able to benefits from these, but through targeting they could be access these more easily. These however have to be provided by institutions other than those providing the technical information otherwise there is likely to be a conflict of interest. Monitoring the access of the poor to credit and inputs is essential for understanding the success or failure of projects and programmes targeting the poor.

Employment generation: The growth of aquaculture, for both fish and shrimps, is proceeding at a rate of over 10%. The impact of this on employment generation must be monitored to establish if there are positive benefits to the poor.

Alternative Income-Generating Activities (AIGAs): Although these would not normally be administered by the DoF, they should form part of the strategy for the DoF to encourage people to move out of fishing to alleviate fishing pressure on inland waters. This can only be done in partnership with NGO or similar organisations who are able to promote AIGAs. Monitoring the reports of NGOs helping promote AIGAs is required to show how the poor in fisheries are benefiting

2.2.4 Systems to Meet User Needs

DoF at present has very limited capacity to assess the impact of poverty alleviation interventions, and improvement will depend on developing specialist skills outside the normal spectrum of fisheries staff; it is therefore likely to be a long process. In the short to medium term, therefore, the ability to monitor poverty impact must come through support from other institutions and specific studies conducted to provide information on key areas.

DoF has however the task to implement national priorities which include poverty alleviation, and it must therefore be able to target its interventions (and those of other agencies which it coordinates) according to poverty criteria. It is therefore necessary to collect information to inform the planners in which ways poverty can be addressed in the fisheries sector, monitor the impact of these and through evaluation improve the performance of the interventions.

i) Monitoring

Baseline of Field resources

The FMES requires a baseline which should cover the key indicators for all of the five principle objectives of the NFP. This would include indicators for poverty alleviation. This baseline would require to be updated every five years giving some assessment in changes in resource allocation and ownership, employment in fisheries and changes in the basic demography. The proposed system of periodic censuses of production resources (see Section 2.1 above) would provide a suitable framework for collecting the required information.

Field reports from DoF and partner institutions.

A revision of the information incorporated into regular monthly reporting by field based staff can provide an overview of activities. They however are unlikely to provide specific information on the impact of the intervention.

Information on membership of CBOs, credit groups and other grassroots organisations and associations would give information on the participation of various classes of beneficiaries.

Impact studies

Most impact studies would be contracted to other institutions that have the required capacity. These would provide sampled impacts of interventions against the objectives of the project / programme.

A range of institutions such as:

- Universities,
- Research bodies such as BIDS
- NGOs

are developing capacities to undertake impact studies, however it is important that this capacity is developed further and that funds are available for the studies to be undertaken.

National statistics

Other organisation are tasked with collecting information for national statistics i.e. Bangladesh Bureau of Statistics (BBS). These can provide cross referencing for other sources of information. The capacity and attitude within DoF should be developed so as to make best use of outside information to

ii) Evaluation

The collection of information is pointless without the capacity to evaluate it. At present the capacity to do so is limited and for specific evaluations such as impact on poverty there is even less capacity. A necessity is therefore to build up a cadre of staff capable of analysing this information and being able to link into the planners to improve their interventions.

iii) Planning

Principally the planning for interventions to tackle poverty alleviation are centrally undertaken. The information has therefore to be transmitted to the levels to understand how the poor have been impacted and how through revised planning could this be improved.

Lessons learnt from previous interventions need to be incorporated into new interventions and so an archive needs to be established to help reduce the possibilities of mistakes being repeated.

iv) Funding

A critical constraint to M&E is the resources to undertake the collection of data. For poverty alleviation where the collection of data can be expensive the temptation is often avoid the monitoring. However if the objectives are to be met and firm verifiable indicators are to be assessed then it is important that adequate funding be planned into the intervention to ensure that monitoring can take place.

2.3 Nutrition and Public Health

2.3.1 NFP Objectives

To develop a coherent M&E strategy it has been necessary to re-group some of the NFP Objectives. Improvement of public health is included along with biodiversity under NFP Objective, 5 but clearly is closely related to Objective 3 "Fulfil the demand for animal protein". The M&E needs considered in this section therefore relate to the NFP Objectives to:

Fulfil the demand for animal protein; and
Improve public health.

2.3.2 Overview

i) Protein intake

The fishery sector provides an important source of animal protein and essential elements for all consumers, and is particularly important for poor people in both rural and urban areas. Children's ability to learn and ultimately become productive in terms of employment and contribution to the country's GDP, depends on a good diet during the formative years (0-18, see Table 4 below). Adequate protein consumption has a bearing on the physical well-being of productive adults and their ability to resist disease – part of their human capital. An unhealthy population reduces GDP levels plus economic growth and reduces people's ability to resist shocks.

Table 4: Protein Needs by Age Group

Age	Protein Recommended Daily Amount (RDA) in grams per kilo body weight
0-6 months	2.2 e.g 3kg. baby needs 6.6g protein/day
6-12 months	2.0
1-3 years	1.8
4-6 years	1.5
7-10 years	1.2
11-14 years	1.0
15-18 years	0.9
19+ years	0.8 e.g. 60Kg adult needs 48g protein a day

The Bangladeshi population gets over 60% of its animal protein from fish. However the per capita fish consumption, currently 14kg./yr., is declining at 1% per annum. In the case of the poor this translates to a reduction in animal protein intake and probable absence of 2 essential amino acids: lysine and tryptophan.

ii) Improving Public Health

To the extent that public health is related to dietary quality, M&E of this NFP Objective is governed by the considerations outlined above. However, public health is also directly impacted by the quality of fish made available by the sector. Around 10% of the fish produced in Bangladesh is lost through spoilage. This is close to 200,000 mt of fish totally lost or consumed in putrid condition annually. The

consumption of rotten or contaminated fish obviously has a negative effect on human health with consequential losses in terms of productivity in the work force. In addition, there is evidence to suggest that fish traders are increasingly resorting to use of harmful chemicals such as formalin to slow down the spoilage of fish, with clear public health implications.

2.3.3 M&E Needs

i) Meeting Protein Requirements

Meeting dietary animal protein requirements is one of the principal justifications for Government intervention in the fisheries sector. Therefore, GoB needs to know how the contribution of fish to animal protein consumption is changing over time at National level, by age, social level and occupation. Additionally, since fish is a highly perishable commodity, the detailed planning of interventions should aim to develop production as close as possible to areas of demand. However, there is insufficient good data on the local balance of supply and demand for fish.

The aim of M&E regarding this NFP Objective should therefore be:

- *To inform policy decisions on National priorities for investment in the Fisheries sector; and*
- *To inform decisions regarding the geographical spread of production interventions, with the aim of meeting animal protein requirements as far as possible with local production.*

It should not be a DoF role to monitor animal protein intake as this is the mandate of the Ministry of Health and Family Welfare (MoHFW) in cooperation with the Bangladesh Bureau of Statistics (BBS). However, DoF should develop the capacity to provide both MoHFW and BBS with production data by sector (see Section 2.1 above) coupled with marketing trends by product including seasonal and annual price fluctuations per species. The latter is of particular importance when considering small indigenous fish species (SIS) as they are typically eaten by the poorest sector of the community and play a very important role in human nutrition in terms of providing essential amino and fatty acids plus essential micronutrients (minerals and vitamins).

DoF should develop the capacity to monitor key representative markets (tentatively, one village market and one at Upazila HQ in each Upazila) to measure the following indicators:

- Fish availability by species and origin (marine fish is a source of dietary iodine – if marine fish are not consumed than iodized salt has to be used in cooking);
- Presentation (fresh live, fresh killed, on ice, frozen, smoked/dried, etc.)
- Fish price by species and size;
- Trade volume by season and origin (national/imported):

Coupled with the market analysis DoF should develop the capacity to assess the local balance of supply and demand as a guide to planning production development interventions (see Section 2.1). A possible approach would be a simple survey of a representative sample of market goers to assess whether fish consumers found what they came for, whether they purchased the product and whether they considered the price to be fair.

ii) Improving Public Health

At present post harvest quality control mechanisms in effect only apply to the export market, as the GoB ability to monitor quality at the national market level is almost non-existent. The M&E needs are therefore:

- *to inform policy decisions at Ministerial and Departmental level on introduction or strengthening of public health legislation and regulation regarding fish marketing; and*

- *to guide local (District and Upazila) actions for enforcement of public health regulations regarding fish marketing.*

DoF Upazila level staff should be trained in a basic modified organoleptic quality monitoring system. This is based on rapid assessment of fish quality (modified organoleptic = sensory measurement of spoilage) as a measurement of consumer acceptance. The key indicators are:

- Appearance and colour (special reference to eyes, gills and skin)
- Odour (fresh fish has no odour)

This modified test could easily be used by the Upazila staff and used as a gauge as to the degree of spoilage and/or simple contamination (injection of formalin for example).

DoF alone will not be able to assess the level of contamination present in fish and shellfish products. This is a function of the MoHFW. However the DoF should inform GoB Ministries and agencies, charged with the task of monitoring food quality, what tests should be performed on aquatic organisms i.e. heavy metals, pesticides, biotoxins etc and the risks of bio-accumulation of certain toxic elements. DoF could then run spot checks in its laboratories but could not cope with the scale of routine monitoring.

2.3.4 Systems to Meet User Needs

i) Production data by sub-sector

As with other NFP objectives, the basic production data coupled with imports and exports are essential as a means of monitoring change in the availability of fish and shellfish products for human consumption. The systems proposed in Section 2.1 cover this requirement.

ii) Local Market Fish Availability and Quality Data

DoF should develop capability for Upazila level data collection by means of record sheets and questionnaires. Data should be entered on a database at DFO level and sent in electronic format monthly to DoF HQ M&E Wing for DoF data management and forwarding to MoHFW plus BBS. UFOs will require basic training in the use of questionnaires, modified organoleptic testing and data management. DFO support staff may need data entry training.

2.4 Economic Growth and Export Earnings

2.4.1 NFP Objective

Achieve economic growth and earn foreign currency by exporting fish and fisheries products

2.4.2 Overview

i) Contribution to Economic Growth and Export Earnings

In 2000, the Fisheries sector contributed Tk 130,097 M (US$ 2,243 M) to national GDP, around 6% of the total, involving a full-time equivalent of at least 5.2 million people, or 9% of the labour force. Exports were valued at Tk 17,813 M (US$ 307 M), some 6% of the total.

ii) Development of Export Earnings

The export earnings contribution derives almost entirely from the Brackish Water Aquaculture sub-sector, and within that sub-sector almost entirely from shrimp farming. International competition in the Ready Made Garments industry probably means that the shrimp industry will become Bangladesh's biggest export earner and the second foreign currency generator after remittances. However, if Bangladesh is to increase its 2% share of the world shrimp market it will have to improve the industry's image in terms of human rights issues and product quality.

2.4.3 M&E Needs and Systems

i) Economic Growth

The contribution of the Fisheries sector in terms of GDP is an important guide for policy decisions on National investment priorities. Since investment opportunities and returns vary by sub-sector (inland aqua, capture freshwater, brackish & marine) the data must be disaggregated correspondingly. Primary responsibility for compiling National economic growth statistics rests with BBS and should remain there, but DoF must be able to provide BBS with accurate production data. The systems required for doing this for the various sub-sectors are covered in Section 2.1.

In addition to production data, monitoring the Fisheries sector contribution to economic growth requires estimates of employment generated in the sector. These are not required annually, and data collection for this purpose could be included in the 5-yearly fisheries resource censuses specified under the production monitoring sub-strategy.

ii) Development of Export Earnings

Systems are required at two distinct levels:

- systems at National level able to:
  - monitor trends in the Fisheries sector's contribution to export earnings, as a guide to National investment priorities; and
  - monitor international fishery product supply & demand, and Bangladesh's market share.

- systems for monitoring quality control in the export fisheries at the level of the production unit and processing plant, as a means of facilitating access to world markets for Bangladeshi products.

a) Data at National Level

Monitoring the Fisheries sector contribution to export earnings should remain a Ministry of Commerce and BBS responsibility as at present. DoF should maintain close links with these organisations and should develop capacity for routinely cross-checking trends in the National data against estimates from its own production monitoring systems (see Section 2.1).

Monitoring international supply and demand, and Bangladesh's market share, should also be mainly a Ministry of Commerce (MoC) function. However, DoF should ensure it develops linkages so that this information can guide its feedback to producers regarding the type, size and seasonality of the international market demands.

b) Quality Assurance Monitoring

DoF should develop the capacity to check on sanitary standards in registered plants and to detect processing at unregistered plants. The DoF role in Quality Assurance monitoring is related to a number of on-going initiatives:

Registration and licensing of all finfish and shellfish hatcheries;
Registration of aquaculture production units above a 100mt/yr production capacity and ensuring that they comply with HACCP audit requirements.
Carrying out spot checks on quality of inputs especially therapeutic chemicals and feedstuffs
Putting into effect the Code of Conduct for Responsible Fisheries/Aquaculture
Monitoring live shrimp stock movements both within and outside Bangladesh's national boundaries
Ensuring that non-indigenous species movements are either banned or adequately controlled (see biodiversity objectives).
Following the SSoQ Certification Standards
Linking with the National Reference Laboratory for Food QA in terms of contaminant and spoilage detection.
Ensuring that foreign buyers can access the traceability data they require.

DoF currently has 3 equipped laboratories (Dhaka HQ, Chittagong and Khulna). However the staff are not fully trained. An EU project will assist the DoF to put the units into operation. They should not operate in competition with the private sector but should be used as a monitoring mechanism regarding PS analyses related in particular to the shrimp export business.

DoF should constantly monitor the emergence of new products such as packaged dried fish and smoked products marketed in cans or bottles, and develop its quality assurance monitoring systems accordingly. This will be particularly important in the case of production by artisanal fisher groups.

DoF should develop the capability to feed back findings from the Quality Assurance monitoring system in order to guide corrective action. Such action may be by DoF itself, for example, on the basis of rejection reports, following up and checking on production units failing to comply with international QA standards. It may also require feedback to producers and processors in order to achieve self-promotion of improved standards.

c) Systems Development

DoF should develop and continuously update a database of:

- registered export production units;
- product collection points; and
- processing plants

For all of these the database should include present capacities and required improvements of the facilities. To implement this approach, DoF will require to develop the data collection capacity of its field staff (at District and Upazila level) in export-production zones, and its capacity in database management at District and Headquarters levels.

DoF staff are not sufficiently well trained in the QA aspects related to exports. DoF has sufficient funds to train staff but needs assistance with the identification of courses. There is a recommendation that the DoF should send key PHQC staff for work experience at a National Reference Laboratory operating in a neighbouring country

2.5 Biodiversity

2.5.1 NFP Objective

Maintain ecological balance and conserve biodiversity

2.5.2 Overview

The Convention on the Conservation of Biological Diversity (CBD) defines biodiversity as **"the variability among living organisms from all sources including, *inter alia,* terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems".**

As this definition illustrates, biodiversity is not only about species. It also includes ecosystem diversity and genetic diversity within species. Cross-scale linkages between ecosystems, habitats, species and sub-species are emphasized (i.e. "ecological processes"). This means that activities operating at higher scale impact lower scales, and vice verse. For instance, human-induced changes to ecosystems and habitats (flood control, land-use changes etc.) impact lower-scale biodiversity components (species and sub-species). On the other hand, changes at species level (e.g. introduction of exotic species, over-exploitation of species) may impact biodiversity at both species and habitat/ecosystem level.

Bangladesh is a signatory party to the CBD. This commits to the country to the following overall objectives of the Convention:

the conservation of biological diversity;
the sustainable use of its components, and;
the fair and equitable sharing of the benefits arising out of the utilization of the use of genetic resources.

The CBD also commits signatory countries to develop a National Biodiversity Strategy and Action Plan (NBSAP). The Ministry of Environment and Forestry (MoEF), through the IUCN, has formulated the NBSAP for Bangladesh. The NBSAP has been completed in March 2004 and will have important implications for all sectors, including the fisheries sector of Bangladesh.

Bangladesh is rich in aquatic biodiversity in both the inland, coastal and marine areas. This biodiversity supports the livelihoods of the people of Bangladesh, in particular the poorer sections of society. Fish are just one of many components of biodiversity of fundamental importance to the food security of Bangladeshi people.

Sustaining biodiversity (including ecosystems) is thus a prerequisite for sustaining fisheries. However, this cannot be achieved by one sector alone. It is the responsibility of the society as a whole and coordination is needed across sectors.

The fisheries sector needs to focus on two areas in relation to sustaining fisheries and maintaining ecological integrity and biodiversity:

1. it must promote the maintenance of healthy ecosystems for fisheries to be sustained (targeting activities outside the fisheries sector).

2. it must promote sustainable exploitation of aquatic resources (targeting activities within the fisheries sector).

Traditionally, government fisheries agencies have focused on the second point, i.e. within-sector activities. In the future, it is important that they also engage with other sectors to ensure the maintenance of healthy ecosystems for fisheries (point 1 above). Thus, monitoring systems need to be in place, which target activities within the fisheries sector as well as activities across sectors.

2.5.3 M&E Needs for Biodiversity

Therefore, DoF needs information on:

- Impacts of other sectors on fisheries and biodiversity; and
- Impacts of the fisheries sector on biodiversity and ecological integrity.

All development activities implemented both within the fisheries sector and in other sectors (including by DOF, NGOs and the private sector) will have to be assessed for their impacts on biodiversity and ecological integrity of ecosystems. Monitoring and evaluation will be crucial for this process. Without appropriate monitoring data and information, the status of biodiversity and impacts of development activities cannot be assessed.

2.5.4 Systems to Meet User Needs

The terms 'biodiversity' and 'ecological integrity' represents the complexity of nature. Importantly, they entail complex inter-linkages between ecosystem components across scales. Correspondingly, monitoring of biodiversity and ecological integrity is an extremely complex undertaking. It will not be possibly by one sector alone to monitor biodiversity.

Monitoring biodiversity requires systems that are broad-based and which incorporate data from multiple sources and take cross-scale linkages into account. Coordination between all government agencies, relevant NGOs and research institutions will be of fundamental importance. Systems need to be established, which enable flow of data and information of different types and from different sources and which ensures that the knowledge base is maintained and continuously improved. In other words, a national aquatic biodiversity information system is needed.

The starting point for a monitoring system should be at the larger-scale landscape level, e.g. based on identified ecosystems and watersheds. This should include information on:

- catchment areas
- aquatic habitats
- elevation data
- land-use
- population distribution
- vegetation cover.

Seasonal changes should be taken into account, for instance seasonal flooding and saline intrusion.

Such information is important as it provides structure to monitoring activities at lower scales. Furthermore, many root causes of change at lower scales can often be identified at the ecosystem (landscape) level.

This broad-scale information will typically be the responsibility of central geographic/environmental monitoring agencies specializing in GIS-based systems. Each sector (including fisheries) will provide its own data at the lower scale to fit with these broad-based systems. DoF will focus on collecting fish production data (dis-aggregated by species, habitats, gears etc.) as well as social and economic data on fisheries and aquaculture.

DoF's biodiversity monitoring systems should conform to the following main points:

- DoF should focus its own monitoring programme on “typical” fisheries data (e.g. production by habitat/gear/species, data on key flagship species such as Hilsa, social data related to fisheries, economic data related to fisheries) – but at the same time ensure that such data are compatible with biodiversity/environmental data collected from other sources.

- DoF should ensure that data and information from other relevant sources are used to assess impacts of fisheries development and implementation activities on biodiversity and ecological integrity.

- Through data and information obtained from both its own monitoring programme and those of other relevant agencies, DoF should ensure that external development activities (e.g. water resources development, agriculture, industry) are assessed for their impacts on biodiversity and, in turn, fisheries.

- In coordination with other government agencies, DoF should establish a system to alert other agencies to potential impacts on ecology, biodiversity and fisheries of their proposed development activities.

- DoF should support, and actively participate in, the establishment of a national aquatic biodiversity information system.

- In collaboration with other relevant agencies, DoF should facilitate the development of key ecological and biodiversity indicators for future monitoring.

3 Networking and Linkages

3.1 Linkages between Elements of the M&E Strategy

Although the needs for M&E have been divided up into the needs according to the five core objectives of the National Fisheries Policy, in reality the information cannot be collected separately and will have to largely be collected through the same system.

Baseline data – required for all monitoring
Activity monitoring – reflects different interventions
Impact monitoring – evaluation of different interventions

In order for this to happen:

- A central M&E cell needs to be established
- Responsibility to coordinate, rationalise and harmonise collection of information must be given to this cell.
- Each wing should have clear monitoring responsibilities in support of the overall sector needs
- Field staff should be assigned responsibilities as determined by the fisheries resource and staff resources of the Upazila.
- Local markets should be a prime source of information, but should reflect the wider needs of the sector and not just production
- Information needs to be collated both by topic and geographic area.

3.2 Networking with Outside Institutions

The range and amount of information required to manage the sector effectively cannot be collected by one agency alone. Many will collect the information for a unified objective as they follow similar governmental directives.

Others however will have different objectives and these can provide useful checks to try and ensure that the information received is accurate and is not collected for gains such as to meet rewarded targets.

Local Fishermen & Communities: The principal person providing the information is the primary stakeholder. He is also hopefully one of the key beneficiaries. Information is traditionally collected from this source by interviews or surveys. However if suitably motivated they can also become a key collector of information through monitoring their own activities / catches

Private Sector Exporters & Traders: Records are kept for a number of reasons with the private sector. Some of these however can provide key insights into the industry. The also act as useful cross checks as their objectives for keeping the records are often different from other information collectors.

NGOs: Depending on their activities NGOs collect a range of information on community mobilisation, training, extension, credit disbursement. This information will be collected in a form to suit their requirements, but will also provide supporting material for activities within the sector.

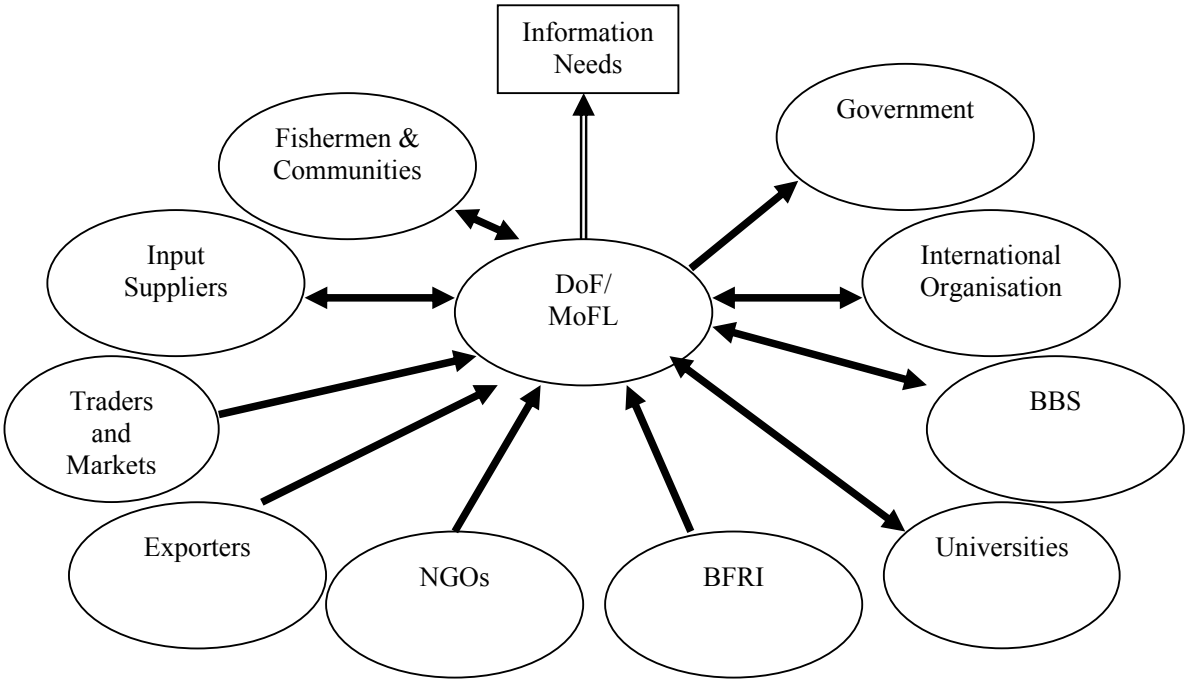


Figure 3: Institutional Linkages -implementation

DoF: For information on the fisheries sector DoF must play a critical role in monitoring the activities in the sector and collecting information from other key institutions. This information should also be widely disseminated so that others are able to benefit from it to improve their understanding of the sector and its management.

BBS: The Bangladesh Bureau of Statistics is tasked with collecting a range of information including undertaking household surveys. This can provide a useful alternative source of information on consumption of fish. It is also responsible for compiling information from all of the different sources for an annual resource book.

BFRI: Although BFRI does not have a monitoring brief, in order to improve its research focus it must assess the problems faced in the field and the current position. This will prove useful information on the changes within the sector.

Universities: Increasingly Universities are supporting their educational function with a research function. This can generate information on a wide range of topics and is increasingly covering areas beyond the traditional technical fisheries management field. Providing focus can be given to the research this can be used to cover areas previously missed from monitoring.

International Organisations: To judge the achievements in country it is often necessary to relate these to the achievements internationally. There is a need for outside information to be collected to support this.

There is often need to verify what is happening and this may require international monitoring / auditing.

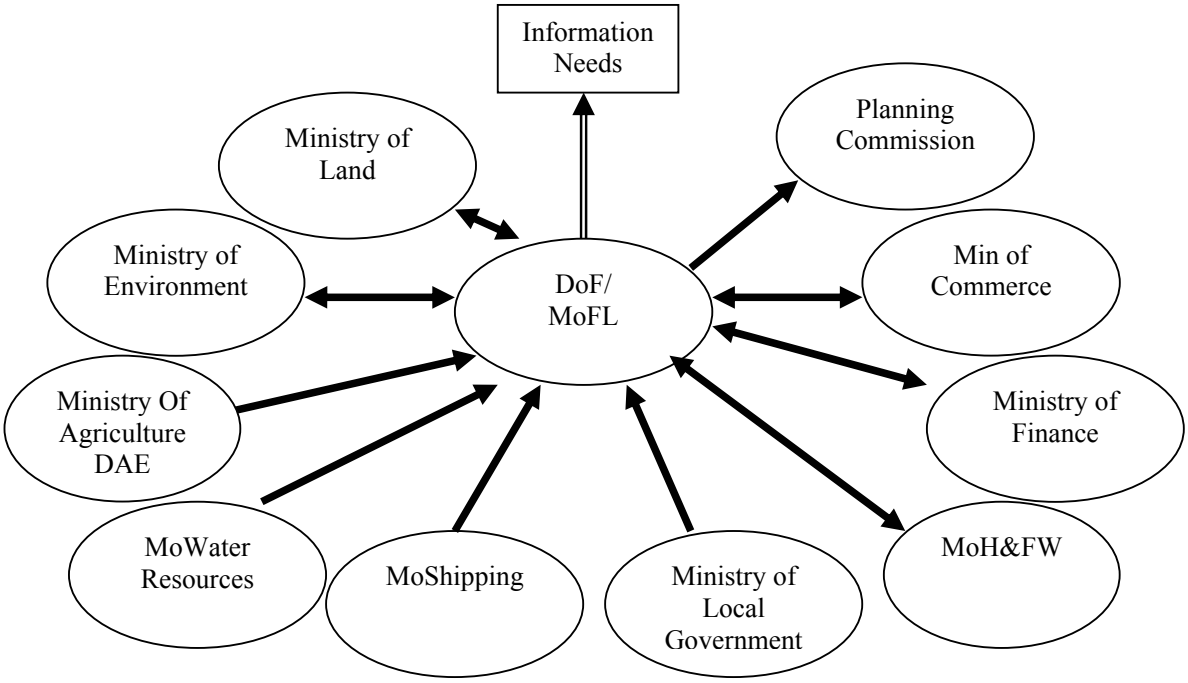


Figure 4: Institutional Linkages –policy and national

Planning Commission: The Planning Commission is one of the major recipients of collated data. This is required to evaluate activities and determine options for future interventions. It is also through IMED responsible for monitoring and evaluating activities under the Annual Development Budget. This information would also be used by the Ministry of Finance for budgetary allocation

Ministry of Water Affairs / BWDB: Since water is the key element for the sector, then information collected on this resource is vital for the fisheries sector. Issues such as water flows, dry and wet season water areas, siltation levels are vital for both the needs of the Ministry of Water Affairs and the fisheries sector.

Ministry of Commerce: Through the export of shrimp and some fish the sector is becoming one of the major export earners for the country. The responsibility for monitoring this falls on the Ministry of Commerce.

Ministry of the Environment: The MoEF like DoF is understaffed to collect information pertaining to its mandate. However they are tasked with monitoring the environment and the status of the forests including the Sundarbans.

Ministry of Local Government: If decentralisation is implemented then the role of local Govt in supplying information and utilising it for improved planning will become even more critical. This will link into the role of *Ministry of Land* in managing government land and its allocation.

In order for all of these disparate sources of information to be collated there is a need to:

- Establish links with partner institutions
- Establish information requirements that cannot be internally sourced
- Examine outside sources of information to fill in gaps
- Examine areas of mutual support and reduce overlap and repetition
- Examine policy objectives to ensure compatibility of information needs and activities

4 Structures, Staffing and Resources

4.1 Harmonisation

At present M&E is undertaken at a project level by parallel units. Evaluation criteria are not fixed and project interventions do not necessarily tie in with the NFP. The present Strategy must lead to a co-ordinated approach to M&E based on a single structure tasked with the job of monitoring all activities within the sector, though seeking support from other institutions who under their own remit are also tasked with monitoring activities. All M&E activities undertaken or sponsored by DoF (including activities under donor-funded projects and programmes) must conform to a common core of methodologies in order to achieve comparability in the findings which are fed into the planning process. Adherence to a consistent core of methodologies will also greatly ease the development of M&E skills in DoF staff.

4.2 Resourcing

Funding for all activities should include resources to undertake M&E. These funds, however, should be used for the purpose of allowing a centralised unit to function as required. The present approach of using funds to create parallel M&E units of limited duration contributes little to the development of DoF's capability or to the sustainability of the systems created. Potential models should be examined and implemented as suitable to build up the in-house capacity (e.g. LGED).

The other critical resource required is for staff to collect, collate and evaluate the information and help in the use of the information for planning interventions. It is recognised that GoB policy is in general opposed to expansion of staff numbers under the Revenue Budget, and in the short term much can be accomplished by rationalising the use of DoF's available staff resources. Nevertheless, even in the short term a limited additional staffing is essential in areas where DoF lacks capacity. This is particularly the case for specialisations like Management Information Systems and Information Technology which are new to DoF.

Therefore, a phased approach is proposed for development of staffing and structures. In the first phase, the required structures should be created, and filled to the maximum extent possible with existing staff. Revised job descriptions will be necessary for many posts. New staff should be recruited only where there is no immediate prospect of retraining DoF staff to the required standard. Such recruitment should be on contract terms so that DoF can immediately acquire the staff skills required, while leaving room for replacement of contract staff by permanent staff as and when DoF staff development and GoB recruitment policy permit. In the longer term, DoF will require additional staff resources, especially at the District and Upazila levels, if it is to effectively monitor and evaluate its own performance, as well as introduce new implementation approaches such as the Local Extension Agents for Fisheries (LEAF). These additional resources, however, will have to await a later stage in the implementation of the Strategy.

Staff given specific training in the technical requirements for M&E should be formed into a cadre that will remain within this area. A suitable career structure should be developed to allow them to progress at an equivalent rate as staff in the field services.

4.3 Proposed DoF Institutional Structures

4.3.1 Requirements for DoF M&E Structures

As fundamental guidelines for the institutional placement of a permanent M&E structure, it must meet the following two requirements:

- the closest possible integration with the Department's Planning structures, to ensure ownership of M&E findings by planners and their prompt feedback into the planning process (see Figure 1); and
- independence from the implementing Wings (Marine and Inland) of DoF, in order to minimise pressures to distort or suppress M&E findings that may reflect unfavourably on implementation performance.

To fulfil these requirements will require a structure at Wing level, headed by a Director who is directly responsible to the Director General, and incorporating all DoF's Planning, Monitoring and Evaluation (PME) functions.

To effectively discharge its functions, the PME Wing must:

- be supported by key individuals at the DoF Headquarters and field levels that collect and transmit data, and monitor, evaluate and plan using the information generated (M&E Cell, MIS Cell, IT Cell);
- support the roles of the other wings with information that will allow for their improved performance based on a flow of accurate information;
- support the utilisation of data from technical wings through its evaluation;
- have the capability to undertake impact monitoring (in terms of production, socio-economic and environmental impacts) on key areas as required;
- be able to design and supervision of fisheries resource censuses, both in the Inland and Marine sub-sectors, and create, maintain and analyse of the resulting fisheries resources databases;
- be able to design and supervise regular catch assessment surveys for the Inland and Marine Capture Fisheries sub-sectors and production assessment surveys for the Inland and Coastal aquaculture sub-sectors, and analyse and report production trend data;
- be able to design, supervise, analyse and report impact studies on Fisheries sector projects and programmes, using both formal survey and participatory methodologies;
- be able to specify and supervise special studies by external contractors and consultants;
- be able to develop standards for M&E methodologies applicable to the Fisheries sector, and coordinate their application to all DoF fisheries interventions, both donor and GoB funded;
- have the capacity to collate and cross-reference data from DoF and non-DoF sources; and
- be able to design and facilitate training for DoF field staff in:

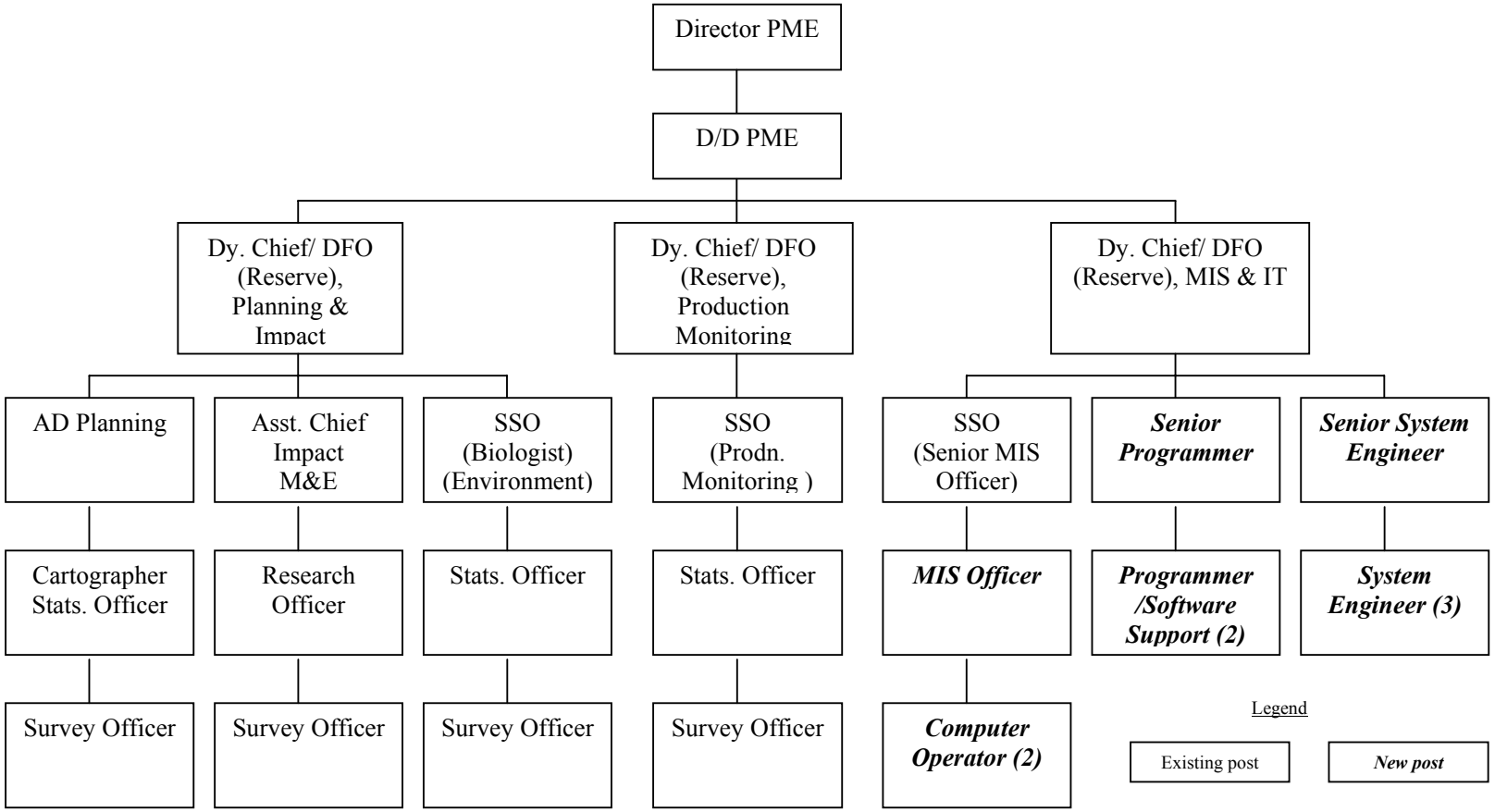
    - data collection for fisheries resources censuses and surveys;
    - data collection for impact studies (questionnaire surveys and participatory investigations);
    - catch assessment for Inland and Marine Capture Fisheries;

4.3.2 DoF Headquarters PME Structure

DoF at present has significant resources of staff whose responsibilities relate, at least in principle, to various aspects of Planning, Monitoring and Evaluation. However, they are organisationally dispersed, under-resourced, and many have been diverted to tasks not in their original job descriptions. The first priority for M&E development should be to integrate the available staff resources into a structure meeting the requirements stated above.

The recommended structure at Headquarters level is shown in Figure 5. As shown in Table 3, this makes maximum use of existing posts related to M&E functions. The structure is based on six individual cells or sections: Planning; Intervention Monitoring and Evaluation; Environmental Monitoring; Production Monitoring; MIS; Database Programming and Software Support; and Hardware Support. The cells are defined by the technical content of their activities, which in turn are based on the needs defined in Section 2 above.

Figure 5: Proposed DoF Headquarters Structure for Planning, Monitoring and Evaluation Wing


Director PME
D/D PME
Dy. Chief/ DFO (Reserve), Planning & Impact
Dy. Chief/ DFO (Reserve), Production Monitoring
Dy. Chief/ DFO (Reserve), MIS & IT
AD Planning
Asst. Chief Impact M&E
SSO (Biologist) (Environment)
SSO (Prodn. Monitoring)
SSO (Senior MIS Officer)
Senior Programmer
Senior System Engineer
Cartographer Stats. Officer
Research Officer
Stats. Officer
Stats. Officer
MIS Officer
Programmer /Software Support (2)
System Engineer (3)
Survey Officer
Survey Officer
Survey Officer
Survey Officer
Computer Operator (2)
Legend
Existing post
New post

The individual cells are formed into three major groups for coordination and direction: Planning and Intervention Monitoring; Production Monitoring; and MIS/IT. The groups are based on the main interactions between the cells, but in fact all cells must interact freely regardless of the group under which they are administered.

Table 5: Posts Required for Planning, Monitoring & Evaluation

Proposed Post	Existing Post	Status of Existing Post
Director, PME Wing	Principal Scientific Officer, FRSS	Filled
Deputy Director, PME	Deputy Director, Planning & Implementation	Filled
Deputy Chief, Planning & Impact M&E	Deputy Chief,	Filled; incumbent has the charge of planning
Asst. Chief, Impact M&E	Asst. Chief,	Filled
Research Officer, Impact M&E	Research Officer	Filled; incumbent holds a charge of Extension Officer
Survey Officer	FRSO	Filled
Asst. Director, Planning	Asst. Director, Planning & Implementation	Filled
Evaluation Officer	Statistics Officer	Filled
Cartographer	Cartographer	Filled FRSS
Assistant Cartographer	Assistant Cartographer	Filled FRSS
Survey Officer	Survey Officer	Filled FRSS
Sr. Scientific Officer (Environment)	SSO	Filled
Statistics Officer	Statistics Officer	Jalmohal Section
Survey Officer	Survey Officer	Filled
Deputy Chief, Production Monitoring	Deputy Chief,	Filled; incumbent has the charge of Jalmohal
Sr. Scientific Officer (Prodn. Monitoring)	SSO	Filled
Statistics Officer	Statistics Officer	Filled
Survey Officer	Survey Officer	Filled
Deputy Chief, MIS & IT	Deputy Chief,	Filled; incumbent has the charge of training
SSO (Senior MIS Officer)	SSO	Filled
MIS Officer	**NONE**	
Computer Operator (2)	**NONE**	
Senior Database Programmer	**NONE**	
Database Programmer (2)	**NONE**	
Senior System Engineer	**NONE**	
System Engineer (3)	**NONE**	

As shown in Table 5, the majority of the posts initially required for the Headquarters structure can be created by reassigning existing posts, though in some cases the job descriptions will have to be amended and training provided to match the new descriptions. The exception to this is the MIS/IT

group. DoF posts are available which could be made responsible for supervision of the group, but the technical skills required for MIS and IT operations are not available in DoF, nor will they be developed in sufficient numbers and capability under any project or programme now in progress. As an interim solution DoF will need to engage contract staff to fill these posts, while in-house capability is being developed. This must be done without delay, since MIS/IT development is already advancing rapidly due to activities under the Fourth Fisheries Project.

4.3.3 District and Upazila Level PME Structure

i) Short- and Medium-Term Strategy

a) Primary Data Collection

Any M&E system is only as good as the raw data which it uses for its analyses. In the short to medium term, DoF's data requirements will have to be collected primarily by existing staff at Upazila (and to a lesser extent, District) level, as an addition to their technical support and regulation functions. Experience in projects such as Fourth Fisheries Project shows that staff at Upazila level are capable of producing good data when working to a carefully designed plan and under good supervision. It will be essential to provide Upazila staff with data collection training specific to the Fisheries sub-sectors which are important in their respective areas. For example, staff in Upazilas around the Bay will require training in catch assessment for marine artisanal fisheries, while those in North Bengal will require training for production measurement in Aquaculture and Inland Capture Fisheries.

b) Coordination and Supervision at Field Level

Supervision and coordination of field data collection should be the responsibility of the Fisheries Resource Survey Officers (FRSO) who are already stationed at Divisional and District level. The FRSS within which they currently operate will be one of the main building blocks of the proposed PME Wing structure, and the FRSOs should be the key link between the Headquarters structure and the Upazila staff who will do most of the data collection. To fulfil this role the FRSOs will require to be freed from the general technical duties which many of them are currently performing, retrained and have new terms of reference to assigned to them.

c) Data Capture at Field Level

The installation of a DoF computer network down to District level by Fourth Fisheries Project means that M&E data of all types can and should be captured on electronic media at the Districts. This will however require permanently assigned computer staff who do not exist at present. Retraining of existing clerical staff will be only a partial solution, since there is a generational problem with many of these. Further, use of District computers for M&E data capture will be a new workload which will be only partially offset by computerisation of MIS data capture. As in the case of MIS/IT staff for the Headquarters structure, the additional staffing is required immediately.

ii) Long-term Strategy

Although a workable system can be developed using existing field staff as described above, this will impose additional workload on field staff who are already heavily burdened. There is therefore a danger either that their technical support and regulation functions will be compromised, or that they will fail to devote the required time and attention needed for collecting good quality data, or both. In this context, it must be noted that strengthening M&E is only one of a series of initiatives under the National Fisheries Strategy, many of which will also tend to increase the workload of Upazila staff.

Therefore, in the longer term, DoF will need to secure additional staff resources at field level. At District level, the importance of the M&E function will require the creation of a post of Additional District Fisheries Officer in charge of M&E activities. At Upazila level, the increasing technical

workload (including the introduction of initiatives such as LEAF) requires the posting of an Extension Officer in all Upazilas (as already done in Upazilas under Fourth Fisheries Project). Such staff should share in the M&E responsibilities of the Upazila, though not on a full-time basis. However, one full-time staff member for data collection will be required to ensure good quality data under the increased intensity and regularity of monitoring proposed under this Strategy. It is therefore proposed that the long-term objective should be to create the post of Survey Assistant in each Upazila.

The proposed field level M&E structure towards which DoF should work in the long term is shown in Figure 6.

Figure 6: Proposed DoF Field Level Structure for M&E