

## **Problems in estimation of inland fish catch statistics**

### **Introduction**

Trend analysis by species or species groups of the inland catch data in the FAO database risks being biased for two main reasons: the very poor species breakdown reported by many countries and the recent large fluctuations within the data for major items in the inland catch statistics reported by China, which represents over one quarter of the global production. In 2003 and 2004, global inland catches classified as “freshwater fishes not elsewhere included” again exceeded 50 per cent of the total, and only about 19 consequences as catch information by species is required for management purposes. In countries where inland fisheries are significant for food security and economic development, particularly in Africa and Asia, mismanagement of inland fisheries would as a rule lead to economic losses far greater than the expenditures needed to improve quality and detail of inland catch statistics significantly.

### **Constraints in fisheries data collection**

The major constraints in data collection on fisheries and related aspects are as

- ✓ Lack of clearly stated management objectives for fishery data collection;
- ✓ Lack of sufficient funding;
- ✓ Extreme variability (small scale, part time and seasonal fishing operations);
- ✓ Inadequate system design and coordination (fragmented and incomplete data system);
- ✓ Inadequate information processing and analysis systems;
- ✓ Non-compliance with rules and regulations by the fishermen;
- ✓ Lack of skilled manpower;
- ✓ No involvement of local communities in management and data collection;
- ✓ Inadequacy of data collection systems
- ✓ No sampling design;
- ✓ Reported data by fishermen-leads to misreporting
- ✓ Capture fishery mainly traditional-no fix time and landing centres;
- ✓ Grouping of data reported- no species data are available
- ✓ Routine collection of biological data-only project based.
- ✓ Socio-economic data not collected on a routine basis;

- ✓ Frame survey-no information about fishing villages, fishers population and their gears and boats, landing centres, water bodies, etc.,
- ✓ Lack of coordination between different agencies, institutes, states;
- ✓ No validation of data collected and compiled;
- ✓ Lack of two-way linkage among enumerators, data managers and end users;
- ✓ Inappropriate data collection methods including insufficient use of sample survey
- ✓ Non-standard classification and definition of water bodies, gears, boats, species, etc.;
- ✓ Inaccurate reporting by administration;
- ✓ Discontinuity in funding disrupting time series data;
- ✓ Fishermen's unwillingness to give information;
- ✓ Lack of flexibility for reporting estimates at different levels;

**Cross- checking mechanism to validate survey estimate is not followed.**

- Deliberate misreporting
- Lack of attention to small-scale fishing activities;
- Lack of status, capacity or training of local fishery officers;
- Errors in catch reporting (often field data is collected based on 'recall');
- Difficulty in accessing sources of information (women, children and other fishers far from population centres);
- Highly dispersed and isolated nature of fishing and landing areas;
- The innumerable landing places
- The migration of fishermen from one area to the other for fishing
- The prevailing system of fish merchants buying off catches from the fishing boats at the fishing spots.
- The multispecies composition of catches and the landing of catches in unsorted condition
- Isolated nature of fishing areas lower estuaries direct observations are very limited.

## **Needs to collect information**

The types of information needed will depend on the intended uses of that information that is it will depend on the objectives of fishery management and the goals of water management policy. There are several possible objectives of inland fishery management that can be generally classified into social, economic, and conservation categories. Priority objectives for collecting information on inland fisheries include:

- To obtain status and trend information on the fisheries and the environment for the formulation and assessment of management interventions concerning the fishery;
- To ensure proper valuation of the fisheries;
- To assess management interventions concerning the fishery
- To justify the request for appropriate allocation of funding and other resources to the sector
- To fulfill international obligations

## **Approaches to improve information**

In general, information collection methods in many areas are based on the application of traditional methods of government fishery officers assessing catch and effort data. However, these methods are best suited for formal, large-scale fisheries and are inadequate or inappropriate for the many informal, small scale fisheries; many inland water bodies support both formal and informal fisheries, i.e. both large scale and small scale. Thus, alternative approaches are being developed and evaluated that attempt to include individual fishers, households, and communities. Additionally, indicators and proxy measures of fishery yield are being developed. Data alone are not always enough to manage a fishery or develop fishery policy. Data must be analyzed and transformed into meaningful information and this information delivered in an appropriate form to the people who are actually making decisions that affect fisheries.

## **Means to obtain information**

There are two general means to obtain information on inland fisheries:

- Direct measurement of the fishery through frame surveys, catch assessment surveys, census at landing sites, counting number of fishers, gears, boats, etc. and
- Indirect measurements such as yield per type of habitat, GIS and remote sensing, post-harvest surveys such as consumption, trade and household surveys.

### **Direct measurement**

Direct measurement has not been adequate to represent the entire diversity of many informal or small-scale inland fisheries and is best used for large-scale, managed fisheries. For many of the indirect strategies, participatory approaches that involve the stakeholders will be necessary to promote cooperation, information sharing and compliance with fishery management regulations. Information collection systems must be flexible enough to accommodate the diversity of inland fishery data. There are already rigid, inflexible data collection systems in some areas and it would do little good to replace one for another. Practical alternative approaches to information collecting are agricultural surveys, household surveys, consumption surveys, use of geo-referenced data coupled with habitat productivity estimates and fishery co-management. Each approach has strengths and weaknesses. Regardless of the approach used, training in survey techniques, participatory techniques and gender issues will be necessary to improve the quality of data collected.

### **Indirect measurements**

- Yield is a primary information need. There are direct methods to measure yield but these are difficult to apply to the entire inland water ecosystems that include lakes, temporary water bodies, rivers, swamps and other wetlands. Therefore, alternative approaches will be required to supplement direct measures of fishery yield.

- Inland fisheries are extremely diverse and composed of both formal and informal fishery sectors that must be treated differently. Methodologies that work in one area may be inappropriate for others. A certain amount of standardization of terminology, approaches and methods will be essential for basin wide planning and information exchange, however, it is recognized that the diversity of situations will require a diversity of approaches.

- Given limited human and financial resources to manage inland fisheries one cannot measure everything that is needed in all areas. Thus, focused studies can provide information on particular fisheries or habitats and these results can then be extrapolated to a wide area. An ongoing and sustainable data collection programme needs to be based on activities that can be done well with a limited amount of financial and human resources inland fisheries and fishing activity often have a strong seasonal component. Data collection and interpretation must take into account how habitats, production, and human activity change in response to the changing environmental conditions. The capacity of local fishery resource officers needs to be increased. Training in standard and new data collection, fish identification and community participation techniques will be required. The status of government fishery officers is often very low and leads to lack of motivation, which results in poor performance of duties. Once the importance of inland fisheries is fully appreciated, the status of the officers responsible for managing the resource should improve.

- There are data collection systems in place. Significant progress can be made by working with information that is already available in project reports, government offices, NGO and IGOs. Modification of existing mechanisms to make them more flexible, to ensure they do not bias results in regards to inland fisheries, such the agriculture census, or to ensure that they access all available information, such as information from women and children, can be expected to greatly improve the quality of information needed for fishery management. Inland fisheries do not exist in isolation of other sectors and there are many other users of inland water resources. Inland waters are most strongly impacted by events occurring outside the sector. Therefore, it will be crucial for policy makers and managers of the inland fisheries to form partnerships with stakeholders in other sectors. Often government departments can help form linkages to other sectors where fishers have difficulty in establishing relations. The private sector must also be involved in the partnership, for example access to middlemen and brokers could improve information on commercial (formal) fisheries. Many member countries have limited financial resources and have acknowledged that external assistance will be needed to improve their data collection and fishery management capacities. Training is needed on a variety of subjects and should include local communities and training-of-trainers. Given the productivity of the inland fisheries, the large number of people dependent on them and the wealth of biological and cultural diversity of many inland aquatic ecosystems, donor support in improving information for fishery management is well justified.