FIGIS/2002/10a

FIGIS-FIRMS Fisheries inventory
Purpose, issues faced, and proposed solutions

version 1-0

last updated : 31 July, 2002

Management Summary

Author	Marc Taconet; Richard Grainger
Version	1-0
Project	FIGIS
Created	24 June 2002
Powerpoint presentation	FIGIS-2002-10a_Fisheries inventory.ppt

Purpose of an Inventory of Fisheries

The purpose of an inventory is to describe the complete picture. It is necessary to know the complete picture for fisheries in order to identify gaps in fisheries monitoring and management. It is never possible to closely monitor and manage all fisheries or to assess all fishery resources and so priorities are set when deciding which fisheries and resources will be monitored and to what extent. However, it is still important to know what fisheries are not being closely monitored for several reasons, including the following:

- Fisheries which are minor from the national perspective may nevertheless be important locally as a food source to subsistence fishers as a source of food or may be important for livelihoods in coastal communities.

- When numerous minor fisheries are taken together they can account for a considerable portion of total production, but in terms of contribution to national food supply or to the national economy such fisheries are often grossly under-represented or even ignored in official statistics, with the result that these fisheries and the communities dependent upon them are often not taken into account for policy-making. This is typically the case for many inland fisheries. It is important that at least an estimate can be made of the contributions of fisheries which are not closely monitored.

- Some minor fisheries may be new fisheries which have the potential to grow and may require closer monitoring at a later stage. It is important to at least be aware that such fisheries exist and that they may need closer scrutiny, particularly if they are destructive to the environment or illegal.

- The Code of Conduct for Responsible Fisheries requires flag states to monitor the activities of their fishing vessels, irrespective of where the vessels are operating. For states to do this they must have a knowledge of all the fisheries in which their vessels participate.

<u>at international level</u> : Article 36 of the UN Agreement on Straddling Fish Stocks and Highly Migratory Fish Stocks provides for review of the implementation of the Agreement four years after its entry into force. Also, FAO is obliged[1] to monitor and report on the implementation of the Code of Conduct for Responsible Fisheries and its effects on *fisheries*, including action taken under other instruments and resolutions by UN Organizations, in particular, the UN Fish Stocks Agreement. In order to undertake any comprehensive review of the implementation of these international initiatives, or indeed to classify fisheries for ecolabelling purposes, it would seem essential to first have an inventory of world fisheries in order to state clearly what is being considered. To put it another way, it is necessary to first identify units before classifying them.

<u>at regional and national levels</u> :

The subject scope of fisheries status and trends reporting needs to be broadened. Current reporting relies too much on catch and trade statistics, whereas the general underestimation of the economic and social role of fisheries in countries (and in particular of small scale fisheries) critically calls for data relevant to economic and social aspects, including fishing

[1] Resolution of the Twenty-eighth Session of the FAO Conference on 31 October 1995 adopting the Code of Conduct for Responsible Fisheries.

capacity and participation in fisheries, value of fisheries with economic performance and income distribution consideration, cost of overfishing, and ecosystem status. These type of information are tightly fisheries related.

Many fisheries have inadequate or no formal management or governance; it is fisheries that are managed, not resources (stocks), although the fisheries are usually managed to achieve some objective in terms of the resources. One has to raise awareness that there is a need to manage and monitor : an inventory should primarily identify responsibility for managing fisheries by distinguishing fisheries which fall under the direct responsibility of Coastal States (i.e. within EEZs) from those which do not (i.e. on the high seas) or which fall into both categories (i.e. straddling fisheries), and this will also identify which fisheries fall within the remit of regional fishery commissions, some of which only have regulatory responsibilities in high seas areas (e.g. NAFO). It should then serve the purpose of identifying management gaps.

For monitored fisheries, fisheries management and its effectiveness need to be characterised, including characteristics of governance systems, management measures, scientific advice given and related management actions, response of fisheries resources and of fishery performance to fishery management. Fisheries management can sometimes fail to meet its objectives because not all the fisheries are controllable (e.g. some high seas fisheries).

Other usage could be made from such inventories : from the aspect of fisheries data, this could be useful in identifying where major weaknesses exist due to the absence of formal responsibilities, with the aim of directing international efforts for the improvement of data most effectively.

There would also be numerous other potential uses for such an inventory, such as for describing the main target and by-catch species and so illustrating the technical interactions between the species resulting from the fisheries, or for the estimation of discarded catch by gear type or region.

THE FISHERIES , and METIER CONCEPTS : issues faced, and discussion

Issues :

A recent FAO internal Email discussion on the fisheries concept established the existence of a number of issues attached to the fisheries concept :

- ✓ the term "fishery" is used in many different senses [2];
- ✓ the term "fishery" as generally used is not specific enough and often do not include a specification of the intended catch (target species) ;
- ✓ fisheries can be defined at various levels of aggregation, and from different perspectives : the question is are dis-aggregated levels different fisheries or different "segments" of a single fishery ?

[2] see some definitions in Annex

Examples for a fishery would be :

"*Mediterranean hake fishery*";	area - species
"*Cape Blanc Spanish Trawlers fishery*";	area - flag state – vessel type
"*Winter Moroccan EEZ cephalopod* trawl *fishery*";	season – area – species - gear

These different examples reflect units commonly perceived by people according to their disciplinary approach of a Fishery. For specific purpose, it is often necessary to define more focussed sub-components. Even if apparently more specific, the later example above had to be further sub-divided into two components by biologists doing stock assessment: a industrial large freezer trawlers foreign fleet and a national traditional fresh fish trawlers one.

From a biological stock assessment view point, this lack of precision associated with the need to improve the relation between F and f resulted in the creation of a more specific and clear concept, that of Métier[3], defining levels with sufficiently distinct properties and characteristics to generate different F/age vectors. This definition was given by the IFREMER Workshop on Assessment of Technical Interactions in Mixed Fisheries (Nantes, 1987) as *"a combination of gear, target species, location and seasonality"*.

Proposed solutions for FIGIS-FIRMS :

A management related definition : In FIGIS-FIRMS, because the final objective is to promote a responsible management of fisheries, it is proposed to use a pragmatic and management related definition of a "fishery". A management scheme should be related to one fishery, including possibly different segments, or Métiers. Thus, for management purpose, capture fisheries should be identified by the target species, the area of operation, and the production system, reflected through the combination of terms such as gear type, vessel type, flag state, exploitation form (artisanal, industrial, subsistence, ...) and occasionally by fishing season.

Strategy : Considering the ultimate objectives for such an inventory (a monitoring system serving the promotion of resource conservation through improvement of management policies), the inventory should[4] be management-driven : the units identified within the system have to be seizable, manageable entities, and not units defined from a purely academic point of view. Thus the highest priority should be given to ensuring that fishery entities identified will fully or partially fit under at least one existing management unit. This means that the inventory should start identifying management units perceived by the institutions having management responsibilities, be it at global, regional, national (or local) level.

Scenarios for the development of the fisheries inventory :

Now from a data management view point, the scenario of striving to enforce the above definition, may prove difficult to implement, because the complex nature of the concept (a

[3] see definition in Annex

[4] Stocks and fisheries can be listed from a variety of viewpoints :
- from a geographical viewpoint : from low to high scale ;
- from a biologist's or ecologist's or manager's viewpoint ;
- from a country or regional commission viewpoint ;

minimum of 3 keys, each possibly showing different levels of aggregations), combined with its highly dynamic characteristics, may result in discouraging information managers to simply develop and maintain this type of information.

An alternative scenario would be to exploit the fact that the different definitions of fisheries reveal different approaches. Fisheries may be defined by biologists working on stock assessment, hence they are often presented as the different production systems exploiting the stock. They may be shaped by economists comparing the socio-economic performance of production systems based in different localities. They may be introduced by fishing technologist listing local applications of generic fishing techniques. They may be what managers having authority in a given territory perceive as the units to manage. In these different examples, and referring to the ideal definition described above, fishery entities take shape combining a prevailing view (the context), complemented by typical attributes of this view. Typical examples are provided hereafter :

PREVAILING VIEW		**EXTENSION**	
	keys	keys	
Stock	species water area	gear type vessel type exploitation form flag state	**production system**
Localised production system	vessel type flag state land areas	species	**species landed**
Fishing technique	species gear type vessel type	water area flag state	Localities where technique is practiced
national or regional management	land area management unit (most of the time "water area" and/or "production system" and/or "Resource")	stocks species	resources exploited
national or regional management	land area fisheries (when there are fisheries management plans)		

This scenario for developing a fisheries inventory would be less demanding as it is more natural, sticking more to usual approaches and perceptions from institutions having a monitoring or management role, and would not result in less accurate or usable results. One may argue that from such different approaches, it may be difficult if not impossible to construct one consistent and useful "fishery" view. However, imposing the first scenario

would not result in any better ability to identify single consistent fishery units, as the following example makes it obvious : would one consider the Spanish west African cephalopod trawler fishery (defined by Spanish people) the same fishery unit as the foreign industrial demersal fleet exploiting Senegalese coastal waters (from a Senegalese view point) ? The fact is that the “Spanish cephalopod trawler exploiting Senegalese coastal waters” is the common segment, which a fishery management plan may need to identify.

Thus, as the second scenario is likely to meet a greater acceptance, and is not expected to produce less usable information, it seems to offer the most realistic and pragmatic strategy for the implementation of the fisheries inventory. The management oriented Fishery concept should then provide the architectural skeleton of virtual views that an intelligent software using fuzzy logic could construct from the different approaches mentioned above. The virtual Fishery view would thus bring together proxi pseudo-fisheries resulting from different approaches, and allow users to appreciate all the facets that should be taken into account in an attempt to define fisheries for management purposes, and accordingly consolidate Fisheries units.

Annex 1 :
Fisheries and Métier definitions

Fishery definitions :

A Dictionary definition is: *the occupation, industry, or season of taking fish or other sea animals (as sponges, shrimp, or seals). A place for catching fish or taking other sea animals; the legal right to take fish at a particular place or in particular waters; the technology of fishery*.

the fishing operations effectively carried out by a number of vessels within a certain area/fishing ground.

The FAO Glossary indicates that *"**a fishery** is an activity leading to harvesting of fish (sensu lato) from the wild using some fishing technology (**capture fishery**) as well as activities producing fish through **aquaculture**."*

The IFREMER definition for Pêcherie : *terme sans définition stricte, pouvant désigner une zone de pêche et/ou l'ensemble des navires qui y sont actifs*

The old definition by Cadima (in a study done for FIDI with the view to replace Statlant B Forms and have a better relation between fishing effort and mortality) defined a *"Fishery" as an intersection between a fleet of vessels of a particular type (or types?), using one or more specific gears, in some area, to catch one or many species*. A fishery can also be seasonal.

Métier :

Definition by IFREMER, attempting to Improve the relation between F and f : Métier (Craft): *describe a certain (planned) fishing activity, specific in term of target species, fishing gear in use and fishing area/ground*.

The Dictionary definition for Métier is indeed: "*Occupation manuelle ou mécanique qui permet de gagner sa vie. Le métier de menuisier. Corps de métier. 2. Profession quelconque, considérée relativement au genre de travail qu'elle exige. Écrivain qui connaît bien son métier. -- Un homme du métier: un professionnel, un spécialiste. || Prov. Il n'y a pas de sot métier: toutes les professions sont honorables et utiles, même les plus humbles. 3. Savoir-faire, habileté acquise dans l'exercice d'un métier, d'une profession. Cet acteur a du métier*".

The English equivalent of Métier, in its general acceptation, is "craft". A dictionary definition of the latter is: *skill in planning, making, or executing. An occupation or trade requiring manual dexterity or artistic skill* (indeed "Trade" would do!).

An ICES workshop defined Métier *"as a combination of gear, target species, location and seasonality (unless accounted for in the temporal resolution) for which the catchability matrix (F-at-age) can be determined. Here target implies a combination of gear type and preferably also the intention of fishing some subset of the resources. Vessels of different size and origin operating in the same place at the same time with the same target are assumed to generate the same catchability matrix*, (i.e. the same mortality by unit of effort (added by me)) *but may have different fishing powers*."

Annex 2 : Discussion

In Cadima's sense, ensuring that F is proportional to f, a complete theoretical example for a fishery would be the Winter (season) Moroccan EEZ (area) Cephalopod (species) trawl (gear) fishery. However, this fishery had two components: a industrial large freezer trawlers foreign fleet and a national traditional fresh fish trawlers one.Are these different fisheries or different "segments" of a fishery (one of which could be operating in less coastal waters than the other). If the notion of "segment" is accepted, following the métier definition, one could easily have a clear F/age for each, from which one could extract a F for both segments. In a context where the definition of "fishery" is pragmatic and related to management, if you have one management scheme, you have one fishery, with two segments.

The attempt by IFREMER, in a way was similar to that of Cadima: Improve the relation between F and f. So, somehow, what Cadima called a fishery is called a métier by Ifremer. The only difference seems to be in the intention as opposed to the action : a Métier is a "planned" fishery. Seems odd to me. If we go back to the general definition, métier, in general, does not refer to a physical object. It is a human skill or specialization. It does not refer to a productive activity with its technology and targets but to a human occupation, tradition, culture, skill.

From the following statement QUOTE "considered the appropriate form of the definition of **components for the fishery**, and concluded that the concept of "métier" adopted by workers at IFREMER was most appropriate and recommends that this terminology and definition be used more generally". That workshop believed that the term "fishery" as generally used was not specific enough and often did not include a specification of the intended catch (target species) whereas IFREMER scientists had included this in the definition of a métier. Nobody at the workshop could think of a corresponding term in English. The term subsequently became quite widely used in ICES and the EC.UNQUOTE. I conclude that a métier is a "segment" of a fishery, a component, with sufficiently distinct properties and characteristics to generate different F/age vectors.

I think the main point is that the term "fishery" is used in many different senses (whether it is a flexible term or just mis-used is debatable) whereas the term métier as defined by IFREMER people and generally used by fishery scientists is specific and clear. As you say, the definition of a "fishery" can be pragmatic and related to management. It has also been defined by Cadima to be the same as a métier (he saw the need for the métier concept, even if he did not call it that). But it is often used in different senses such as the "Mediterranean hake fishery" which in that sense includes many métiers. You simply could not use the term "Mediterranean hake métier" in the singular; it does not make sense. So I think the term "métier" is useful as it is more specific and the concept is essential, whatever it is called. The fact that the term "fishery" can be defined to be the same does not invalidate this, it is just a bit confusing.

FISHERY Object

- Fishery Source Reference
  - Collection - series
    - Institutional Programme
      - Institution ref.
    - Institution ref.
  - Cover page
    - Title
    - Author
    - Year
    - other bibliographical references
- **Fishery identity**
  - **Title**
    - sequential Id
    - Resource Stock type
    - Resource Stock parent
  - **Species ref.**
  - **Species group ref**
    - group name
    - species group external reference
    - species ref.
      - common name
      - id species (alpha code)
      - scientific name
        - genus
        - species
  - **Area reference**
    - area name
    - Statistical water area ref.
      - area name
      - coding system
      - area code
    - Area of competence ref.
      - area name
      - coding system
      - area code
    - Environment area ref.
      - area name
      - coding system
      - area code
  - **Exploitation unit reference**
    - Fishing gear ref.
      - Gear Name
      - Coding system
      - GearType code
    - Fishing Vessel ref.
      - Vessel type Name
      - Coding system
      - VesselType code
    - Handling mode ref.
      - handling mode Name*
      - Coding system
      - Handling mode code
    - FlagState ref.
      - flag state Name*
      - coding system
      - FlagState code
    - Exploitation form (artisanal, industrial, recreational, subsistence, ...)
      - Exploit form Name*
- **Fishery profile**

FIGIS-FIRMS - Fisheries topic tree

- **Fishery profile**
  - Area description
    - general description
    - sub-areas
    - environment
  - Target species
    - description
  - Accessory species
    - description
  - Exploitation unit
    - general description
    - Fishing gear description
    - Fishing Vessel description
    - Handling mode description
    - FlagState descrtiption
    - Exploitation form (artisanal, industrial, recreational, subsistence, ...)
  - Fishing practice
    - Zone of activity
      - Landing base (region; country; Province; port)
      - Range of action
      - Fishing grounds* (description, nature of the bottom, etc.)
    - Description of exploitation patterns
      - Duration of trip
      - Number of trips* (per time unit)
      - Recent development*
    - Fishing practice parameters* (socio-economic)
      - Crew*
      - Accountings*
      - Performance* (socio-economic)
  - Seasonality
- **Fishery features**
  - Fishery history
  - Exploited resources/stocks (list of resources or stocks)
    - Description
    - Resource/Stock overview (1)
      - Resource/Stock short reference
        - name
        - _species
        - _spgroup
        - _statistical water area
        - _competence area
        - _environment
      - description
      - Exploitation indicators
    - Resource/Stock overview (2)
    - Resource/Stock overview (...)
  - Fishery exploitation
    - Description
    - Exploitation indicators
      - Type (effort, Catch, landing, CPUE, size, bycatch, incidental catch, production)
      - indicator name
      - description
      - value
      - date
      - source
      - status and trend of indicator
      - Reporting unit
  - Fishery management

FIGIS-FIRMS - Fisheries topic tree